



# CITY OF RADCLIFF COMPREHENSIVE PLAN

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**INTRODUCTION**

If the City of Radcliff was personified, it would be described as young, ambitious, energetic, progressive and cohesive! Radcliff is a wonderful city in which to live, offering the diversity and conveniences of larger cities, while at the same time it provides residents and visitors with a sense of belonging.

Radcliff is the second largest city in Hardin County, Kentucky. The population of the City is composed of a multiplicity of ethnicity. Our close proximity to the Fort Knox military installation brings people from all over the world to Radcliff.

Radcliff is the commercial and industrial hub of the northern part of Hardin County, yet it retains picturesque tree-lined streets and rolling hills throughout its neighborhoods. Radcliff's economy is strong and competitive, providing a variety of employment opportunities to residents. Our vibrant neighborhoods contain an assortment of housing choices to meet the needs of the entire community.

The city has an abundance of open spaces and parks that bring people together. Not only are green spaces prevalent within Radcliff, but recreational opportunities flourish, promoting health and wellness.

**THE COMPREHENSIVE PLAN**

In order for growth to continue in an orderly and attractive fashion, a firm plan must be in place to guide future development of both public and private property. To project the future needs and priorities of citizens, this plan must account for existing conditions and characteristics of the community. The basis of the Comprehensive Plan involves making the best decisions for the good of the community, which will shape Radcliff's collective future. Fundamentals must be in place, so that a clear vision for the city, grounded in durable principles, will assure continued success.

Before land use planning can occur, the State of Kentucky mandates that all cities have an adopted Comprehensive Plan in place. This Comprehensive Plan must consist of a set of goals and objectives, which are intended to guide future development in the best interest of the community. A Comprehensive Plan is remedial in nature, but it is also forward-looking. Comprehensive Plans are intended to be pro-active rather than reactive.

Public input is a key element of developing a Comprehensive Plan. A plan is ineffective if it is not representative of the entire community's needs; therefore, public hearings and meetings are essential in order to create a functional document. There is no such thing



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as an isolated or purely local decision. Each of us makes choices every day about where to live, work, play, shop and how to travel. They may seem like insignificant choices, but together and over time the consequences of these choices can affect everyone's quality of life. This is why planning matters.

Decisions made today will affect future actions for years to come. Comprehensive Plans consist of long-term policies for growth, based on existing conditions within a community. Comprehensive Plans are a general vision for growth within a community over a period of approximately twenty-five years. It is critical that important issues in the community are identified within the Comprehensive Plan, since it is a long-term vision.

### PRINCIPLES FOR A SUCCESSFUL RADCLIFF

A successful city is one with a competitive advantage over others on a local, national and international level. The prosperity of a community can be measured in terms of the quality of life that it offers residents and visitors alike. Quality of life attracts and retains people with capital, skills, knowledge and creativity. Quality of life is composed of factors such as substantial job growth, a low unemployment rate, a reasonable cost of living, abundant educational opportunities, the presence of technological advances, provision of quality health care and the opportunity to partake in a variety of recreational and cultural activities. Radcliff provides citizens a home of opportunity, diversity, beauty and cohesion. The City of Radcliff has all of the aforementioned attributes. Our challenge is to build on these strengths as we grow.

### A CITY OF DIVERSITY AND OPPORTUNITY

Radcliff is an eclectic city that is full of opportunity. Radcliff's population is composed of a mix of Kentucky-born residents, residents born out of state and residents born abroad. Many of Radcliff's residents that were not born in Kentucky come to the city, during or after serving for the United States Army at Fort Knox. Since Fort Knox and Radcliff are only five miles apart, the military community has strong ties to Radcliff. Fort Knox has made Radcliff one of the most diverse communities in the State of Kentucky.

Even though the population composition of Radcliff is by far the most obvious indicator of diversity in the community, there are also several other unique characteristics in the city that make it a great place to live. These characteristics include the following:

- ❑ a variety of need-specific housing choices are available for all income levels and all ages;
- ❑ environmental opportunities are being preserved and nurtured for future generations;

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- multiculturalism is embraced and cultural diversity is the backbone of this community;
- an assortment of jobs are available to people with a wide range of education and skills;
- a number of recreational opportunities exist, which are accessible to all citizens;
- people with special needs are accommodated in order to allow them to have equal opportunities;
- an efficient transportation network allows for the brisk movement of people, goods and services;
- excellent educational opportunities are available to people of all means and abilities;
- neighborhoods provide safe, stimulating and appealing areas for children to play;
- neighborhoods are in close proximity to other amenities in the community, which is important to the elderly.

### A CITY OF BEAUTY

All successful cities have aesthetic qualities that set them apart from other cities. These qualities may be in the form of either man-made beauty or natural beauty. Beautification of the city gives residents a sense of pride. In order to capitalize on our image and improve public perception of the city, areas of beauty within the city must be enhanced and integrated. Areas of beauty within the city may be preserved by instituting the following principles:

- make natural areas and open space accessible throughout the entire city;
- actively promote arts and culture;
- embrace public art along streets and in open spaces;
- historically significant buildings and structures should be preserved;
- natural areas should be enhanced, preserved and restored;
- the design of public spaces should warrant attention to detail;
- sidewalks must be inviting and full of life, in order to attract pedestrians;
- public views and vistas should be preserved;
- general maintenance and cleanliness of public grounds is necessary to influence public perception.

### A CITY OF COHESION

Perhaps one of Radcliff's best qualities is the lack of anonymity within the community. If you have lived in Radcliff for any period of time, you will find that bumping into a familiar face is common. People greet you with a smile, rather than a frown. Not only is cohesion amongst people common, but also connectivity

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between resources and infrastructure in the city is an essential element of growth. Every single action has a reaction; therefore, it is critical that decision-makers within the city embrace a sense of accountability. Cohesion is necessary to build and maintain a solid base for future growth. Radcliff's future is one where connections are understood and where:

- ❑ we meet the needs of the existing population without sacrificing the quality of life for future residents;
- ❑ people understand the social, economic and environmental consequences of their individual choices;
- ❑ a network of green space links our parks and other recreational amenities;
- ❑ an effective transportation network must be in place to connect residential areas to areas of commerce, areas of industry and recreational areas;
- ❑ mixed uses are welcomed, so that efficiency and convenience can be maximized;
- ❑ city services are delivered in conjunction with other private services, so as to create a cohesive infrastructure.

## IMPLEMENTATION OF THE PLAN

A plan is simply a guide for future actions. If proper tools are not in place to execute the elements of the plan, it will be useless. The City of Radcliff uses several documents to implement the Comprehensive Plan. These implementation documents include the Zoning Ordinance and Development Regulations, the Subdivision Regulations and the Code of Ordinances. The Comprehensive Plan sets the framework for positive change and these supporting documents provide a means for attaining these goals and objectives.

Intergovernmental coordination and coordination of government with private stakeholders is another important implementation procedure. Coordination between departments within the City of Radcliff is an important element of implementing the Comprehensive Plan. For example, building a new highway would involve coordination between the Planning Department, the Public Works Department, the Waste Water Department and the Finance Department. Coordination is also necessary between governmental agencies and private entities. Private utility companies must be notified of any land use decisions. In addition, private developers and the engineers that they hire can dramatically affect land use decisions and development patterns. All land use decisions must be coordinated in order to effectively implement a Comprehensive Plan.

**ORGANIZATION OF THE PLAN**

The Radcliff Comprehensive Plan is organized into seven elements:

- Element One: Goals and Objectives
- Element Two: Land Use
- Element Three: Environment
- Element Four: Transportation
- Element Five: Commerce and Industry
- Element Six: Housing
- Element Seven: Community Facilities

**GOALS AND OBJECTIVES**

**GOAL ONE: TO IMPROVE AND PROMOTE THE CITY OF RADCLIFF AS A PLACE OF RESIDENCE.**

**OBJECTIVES:**

1. To preserve neighborhoods and housing.
2. To promote attractive, safe and convenient neighborhoods.
3. To promote housing alternatives through the creative design of residential developments.
4. To promote the development of neighborhood parks and conservation of open space for passive and active recreation.
5. To promote residential development in close proximity to areas of commerce.

## ELEMENT I-GOALS AND OBJECTIVES

GOAL TWO: TO IMPROVE AND PROMOTE THE CITY OF RADCLIFF AS A PLACE OF DIVERSE AND INDEPENDENT COMMERCE AND INDUSTRY.

### OBJECTIVES:

1. To promote the expansion and/or revitalization of existing business and industry.
2. To encourage new business on land suited to meet the commercial and industrial needs of the community.
3. To promote creative and attractive design in commercial and industrial development.

GOAL THREE: TO ENCOURAGE DEVELOPMENTS TO BE SENSITIVE TO THE ENVIRONMENTAL CONSTRAINTS AND NATURAL CONDITIONS OF THE SITE.

### OBJECTIVES:

1. To encourage the preservation of streams, trees, sinkholes or other natural characteristics through reasonable review.
2. To promote the use of open space for the protection of the natural landscape.
3. To ensure that no development occurs in floodplains of 100 years of frequency or greater, without reasonable review.
4. To discourage noise sensitive land uses near major noise generators such as railroads or highways.
5. To discourage the development of noise generating industry near residential areas.
6. To require measures which reduce water and air pollution.
7. To establish minimum standards which promote the protection of the public from increased storm water runoff.

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GOAL FOUR: TO PROMOTE RECREATIONAL FACILITIES FOR THE CITIZENS OF RADCLIFF.

### OBJECTIVES:

1. To promote the improvement and expansion of existing recreational facilities to the extent reasonably feasible to meet the needs of the community.
2. To promote new recreational facilities to support the current and future needs of the community.
3. To encourage the development of recreational facilities that are compatible with surrounding land uses.
4. To promote attractive, safe, convenient and accessible recreational facilities.

GOAL FIVE: TO PROVIDE THE CITIZENS OF RADCLIFF WITH SOUND PUBLIC INFRASTRUCTURE, COMMUNITY FACILITIES AND PUBLIC SERVICES.

### OBJECTIVES:

1. To require that all new non-residential developments be connected to the public sanitary waste water system.
2. To require that all new developments have fire protection.
3. To require that all new developments have police protection.
4. To require that all new developments have an adequate water supply.
5. To promote the organization and location of community facilities to meet the public need.

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GOAL SIX: TO ENCOURAGE THE LOCATION AND DEVELOPMENT OF DIFFERENT LAND USES IN THE MOST APPROPRIATE MANNER.

### OBJECTIVES:

1. To encourage growth in areas where capital facilities and services are currently available and not being utilized to full capacity.
2. To promote planned development to ensure the best possible utilization of land within the city.
3. To require that all land uses be developed in a manner that is compatible with adjoining or surrounding land uses.

GOAL SEVEN: TO ENCOURAGE THE RECOGNITION AND RESTORATION OF HISTORICALLY SIGNIFICANT SITES.

### OBJECTIVES:

1. To recognize historically significant sites and encourage preservation and/or documentation.
2. To promote the utilization of historically significant sites in ways that are compatible with their historic character.
3. To promote the development of areas surrounding historically significant sites in a manner that is compatible with the historic site.

GOAL EIGHT: TO PROMOTE ENERGY EFFICIENCY AND CONSERVATION ON A COMMUNITY-WIDE BASIS.

### OBJECTIVES:

1. To discourage urban sprawl.
2. To encourage in-fill development.
3. To encourage alternative transportation modes.
4. To encourage the adaptive re-use of buildings and sites.

## ELEMENT I-GOALS AND OBJECTIVES

GOAL NINE: TO PROMOTE QUALITY TRANSPORTATION FACILITIES FOR THE MOVEMENT OF PEOPLE AND GOODS.

### OBJECTIVES:

1. To ensure that proposed developments do not adversely affect the level of service on existing streets.
2. To ensure that the streets proposed in new developments meet minimum design standards and are designed in a manner that promotes continuity with the existing street system.
3. To ensure that proposed streets allow for the extension into surrounding vacant properties where appropriate. New developments should not land-lock adjacent properties.
4. To promote the installation of sidewalks throughout the city, in order to facilitate pedestrian movement.
5. To encourage the use of traffic calming techniques in residential areas.
6. To require that all new developments provide adequate parking and insure the safe and efficient flow of vehicles and pedestrians.



## INTRODUCTION

A land use plan can be defined as a set of policies based on the physical composition of the land in an area delineated by specific boundaries. These policies, based on existing land use patterns, are used to project and plan future development. In summary, a land use plan draws conclusions about future development patterns from existing development patterns. Land use patterns are a direct reflection of the character and physical make-up of that place.

Zoning is the process of separating incompatible land uses. Land use and zoning are closely interrelated. Land use refers to the actual use of the land, whereas zoning refers to the intended use of the land. Land use does not always correspond to the zone within which it is located. For example, a single-family house may have existed prior to zoning being enacted and the zone for that area may be Commercial. When a land use does not match the zone it is located in, this is referred to as a non-conforming land use. Due to the zoning classification for that parcel of property, the future intended use of that land would be for business or office type land uses as opposed to the actual use of the land for a dwelling unit. In most cases, the majority of land uses do conform to the zone within which they are located. If that was not the case, zoning would be an ineffective tool for regulating land use.

## EXISTING LAND USE ANALYSIS

For purposes of this analysis, land use is evaluated under the premise that there are no non-conforming land uses. This control on the data was necessary, due to the fact that the City of Radcliff does not keep land use data in the form of a land use map. Therefore, it is very difficult to gauge the proportionality of land uses throughout the city. Zoning data was used in place of land use data, in order to derive the statistics for completing this element. Since the majority of land uses within the city conform to their respective zone, basing this analysis on zoning data is quite accurate. In addition, over time the non-conforming uses will eventually comply with the zone within which they are located.

Zoning data used to perform the land use analysis was obtained from the Official Zoning Map of Radcliff, Kentucky (See Appendix), dated January 13, 2003. Zones were measured throughout the entire city by using a drawing file in AutoCAD Map 2000i.

## ZONING CLASSIFICATIONS

The City of Radcliff is divided into a total of seventeen different zones. These seventeen zones are listed below as follows:

1. Residential-Holding
2. Rural-Estates
3. Residential-Estate
4. Residential-1
5. Residential-2
6. Residential-3
7. Residential-4
8. Residential-5
9. Residential-6
10. Residential-7
11. Planned Unit Development
12. Commercial-Holding
13. Commercial
14. Industrial-Holding
15. Industrial
16. Conservation
17. Urban Agriculture



*The Wal-Mart and Houchens Plaza are prime examples of thriving retail land uses in Commercial Zones.*

*Magnolia Point Subdivision is only the second Planned Unit Development in the City of Radcliff.*

The Residential-Holding Zone is used for the purpose of limiting development within this zone, so that the land can be used for future residential use.

The Rural-Estates, Residential-Estate, Residential-1 and Residential-2 Zones restrict development to low-density residential housing.

The Residential-3 and Residential-4 Zones both permit most types of medium-density residential dwellings.

The Residential-5 and Residential-6 Zones allow areas to be developed with high-density residential dwellings such as apartment complexes.

## ELEMENT II-LAND USE

The Residential-7 Zone is designed for land that will accommodate mobile home parks and areas of manufactured housing.

The Planned Unit Development Zone or the PUD Zone permits mixed use developments through creative design. For example, an elementary school may be located in the center of a residential subdivision. This would essentially mix residential and public land uses, but since the two uses are compatible they would be permitted in a Planned Unit Development.

The Commercial-Holding Zone is used for the purpose of restricting development on land intended for future commercial use.

The Commercial Zone permits such land uses as retail business, service industry businesses and office uses.

The Industrial-Holding Zone is used in a similar fashion as the Commercial-Holding and Residential-Holding Zones, except in this zone future development is intended to be industrial in nature.

The Industrial Zone allows for manufacturing and warehousing uses from heavy industry to light industry.

Conservation Zones are intended to limit development in natural areas that have development constraints. Conservation Zones generally contain such features as sinkholes, wetlands, swamps and ravines.

The Urban Agriculture Zone is primarily designated as property that can be used for agricultural uses within the city limits. This type of zone is predominantly found near the urban fringe of Radcliff.

### RESIDENTIAL-HOLDING ZONE ANALYSIS (1990-2003)

In 1990, 13.3% of the entire city was zoned as Residential-Holding (See Table 1). However, by 2003 only 10.6% of the city was zoned as Residential-Holding (See Table 1). These figures reflect a 20% decrease in the amount of land zoned Residential-Holding over a thirteen year period. This trend is likely attributed to Residential-Holding land being re-zoned to other residential zones for development purposes.

### RURAL-ESTATES HOLDING ZONE ANALYSIS (1990-2003)

In 1990, the Rural Estates Zone was non-existent; therefore, there was no land zoned as such (See Table 1). In 2003, 4.2% of land within Radcliff was zoned as Rural-Estates (See Table 1). This dramatic increase was the result of a substantial land annexation by the

**ELEMENT II-LAND USE**

city in 2002. This land is located east of Dixie Highway (U.S. 31-W), between Joe Prather Highway (KY 313) and Battle Training Road (KY 434).

**RESIDENTIAL-ESTATE ZONE ANALYSIS (1990-2003)**

The Residential-Estate Zone only comprised 1.0% of zoned land in Radcliff in 1990 (See Table 1). This number did not change substantially by 2003 (See Table 1). This lack of change is likely due to the fact that there is only one parcel of land zoned as Residential-Estate in Radcliff. There have been no new Residential-Estate Zones designated, since the inception of the original Residential-Estate Zone.

**RESIDENTIAL-1 ZONE ANALYSIS (1990-2003)**

The Residential-1 Zone comprised 2.2% of zoned land within the city in 1990 (See Table 1). By 2003, the amount of Residential-1 zoned land had increased to 2.4% (See Table 1).

TABLE 1: CHANGE IN ACREAGE OF ZONED LAND IN RADCLIFF 1990-2003

ZONE	1990		2003		% OF ACREAGE	% OF TOTAL
	ACRES	% OF TOTAL	ACRES	% OF TOTAL	INCREASE/DECREASE	INCREASE/DECREASE
R-H	780.2	13.3	759.2	10.6	-20.3	-2.7
RU-E	0	0	300.5	4.2	100	4.2
R-E	58.4	1	58.4	0.8	0	-0.2
R-1	127.5	2.2	175.7	2.4	27.4	0.2
R-2	2231.9	37.9	2373.8	33	6	-4.9
R-3	402.2	6.8	478	6.6	15.9	-0.2
R-4	336.8	5.7	398.9	5.5	15.6	-0.2
R-5	7.3	0.1	0	0	-100	-0.1
R-6	239.5	4.1	246	3.4	2.6	-0.7
R-7	267.8	4.6	257	3.6	-4	-1
PUD	6.6	0.1	14.4	0.2	54.2	0.1
C-H	106.2	1.8	73.5	1	-30.8	-0.8
COMM	840	14.2	1140	15.9	26.3	1.7
I-H	3.3	0.1	3.9	0.1	15.4	0
IND	239.3	4.1	420	5.8	43	1.7
CONS	235.1	4	299.1	4.2	21.4	0.2
<u>AG</u>	<u>0</u>	<u>0</u>	<u>197</u>	<u>2.7</u>	<u>100</u>	<u>2.7</u>
<b>TOTAL</b>	<b>5882.1</b>	<b>100</b>	<b>7195.4</b>	<b>100</b>	<b>18.3</b>	<b>0</b>

## RESIDENTIAL-2 ZONE ANALYSIS (1990-2003)

Over one-third (37.9%) of the city was zoned as Residential-2 in 1990 (See Table 1). By 2003, this figure had decreased to 33.0% (See Table 1). This was the largest decrease of any zone in the city. The decrease in land zoned Residential-2 can be attributed to the excessive amount of land zoned for low-density housing. Since the supply was higher than the demand, the excess resulted in a decrease in Residential-2 land, which may have been re-zoned for other uses.



*The above home typifies that which is found in low-density residential neighborhoods. This four-plex is located in a section of Hilltop Terrace, which permits medium-density housing.*

## RESIDENTIAL-3 AND RESIDENTIAL-4 ZONE ANALYSIS (1990-2003)

In 1990, the Residential-3 Zone (medium density housing) comprised 6.8% of all zoned land in Radcliff (See Table 1). By 2003, this percentage had dropped to 6.6% (See Table 1). The other medium density zone in Radcliff is the Residential-4 Zone. The Residential-4 Zone encompassed 5.7% of zoned land in the city in 1990 (See Table 1). By 2003, the Residential-4 Zone had decreased to 5.5% of the total zoned land. Between 1990 and 2003, both the Residential-3 and Residential-4 Zones grew by approximately 16%, but their acreage relative to other zones decreased by 0.2%.

## RESIDENTIAL-5 AND RESIDENTIAL-6 ZONE ANALYSIS (1990-2003)

In addition to the decrease in the amount of land zoned for medium-density housing, there was also a decrease in the amount of land zoned for high-density housing. Between 1990 and 2003, the amount of land zoned Residential-5 decreased from 0.1% to 0% of total land in the city (See Table 1). This change most likely resulted from re-zoning. Between 1990 and 2003, the amount of land zoned Residential-6 decreased from 4.1% to 3.4% of total land in the city (See Table 1). These figures seem to be

reflective of the overall decline in the housing market.

#### RESIDENTIAL-7 ZONE ANALYSIS (1990-2003)

The amount of land zoned Residential-7, for mobile home parks, decreased by 1.0% of total land in the city between 1990 and 2003. In 1990, 4.6% of the total land was zoned Residential-7 (See Table 1). By 2003, only 3.6% of zoned land was Residential-7 (See Table 1).

#### PLANNED UNIT DEVELOPMENT ZONE ANALYSIS (1990-2003)

Between 1990 and 2003, land zoned for Planned Unit Developments increased from 0.1% to 0.2% of the total land zoned in Radcliff (See Table 1). Since Planned Unit Development is still relatively new throughout Radcliff, these developments have grown, but at a slower rate than some other types of development.

#### COMMERICAL-HOLDING ZONE ANALYSIS (1990-2003)

From 1990 to 2003, the amount of land zoned as Commercial-Holding in Radcliff decreased from 1.8% to 1.0% of the total zoned land in the city (See Table 1). This decrease in the amount of Commercial-Holding land is a direct reflection of the re-zoning of Holding Zones to zones that can be developed.

#### COMMERCIAL ZONE ANALYSIS (1990-2003)

Commercially zoned land increased significantly between 1990 and 2003. In 1990, 14.2% of the city was zoned as Commercial (See Table 1). In 2003, 15.9% of the city was zoned as Commercial (See Table 1). Thus, over a thirteen year period the amount of Commercially zoned land in the city increased 1.7% relative to the total land zoned. This increase is reflective of the thriving business sector in Radcliff.

#### INDUSTRIAL-HOLDING ZONE ANALYSIS (1990-2003)

The portion of land in Radcliff zoned for Industrial-Holding purposes remained the same between 1990 and 2003. Only 0.1% of zoned land in the city is zoned as Industrial-Holding (See Table 1).

#### INDUSTRIAL ZONE ANALYSIS (1990-2003)

Over a thirteen year span, land zoned for industrial use grew at the same rate as commercially zoned land. In 1990, 4.1% of zoned land in Radcliff was zoned as Industrial (See Table 1). By 2003, 5.8% of land in Radcliff was zoned for Industrial use (See Table 1). Therefore, industrial zoned land increased by 1.7% relative to the total



zoned land, between 1990 and 2003.

CONSERVATION ZONE ANALYSIS (1990-2003)

The amount of land zoned for Conservation purposes grew by only 0.2% between 1990 and 2003 relative to total zoned land (See Table 1). This is likely due to the fact that relative to all the land in the city only a small portion is composed of a natural feature That cannot be developed. In 1990, 4.0%of the city was zoned as Conservation, whereas in 2003, 4.2% of the zoned land in the city was Conservation land (See Table 1).



*Conservation zones, which are heavily wooded, grew by 0.2%This wooded lot is zoned as Urban Agriculture. These zones relative to all zoned land. are primarily located along Joe Prather Highway.*

URBAN AGRICULTURE ZONE ANALYSIS (1990-2003)

In 1990, there was no land zoned as Urban Agriculture in Radcliff (See Table1). By 2003, 2.7% of the city was zoned as Urban Agriculture (See Table 1). This large increase in land zoned as Urban Agriculture is likely due to the fact that the Urban Agriculture zoned was established in 1990.

SUMMARY OF EXISTING LAND USE ANALYSIS

In 1990, 76% of the city was zoned for residential land use, 16% was zoned for commercial land use and 4% was zoned for industrial land use. In 2003, 70% of the city was zoned for residential land use, 17% of the city was zoned for commercial land use and 6% was zoned for industrial land use. Between 1990 and 2003, the amount of residentially zoned land in the city has decreased by 6%. Conversely, the amount of commercially zoned land has increased 1% and the amount of industrially zoned land has increased 2%. The change in these numbers is simply a reflection of the history of

Radcliff. Radcliff originated as a bedroom community for Fort Knox, before its incorporation in 1956. When zoning was enacted in Radcliff, the majority of the city was residentially zoned due to the fact that most of the city was already being used for residential land use. Over the past twenty-five years, Radcliff has become more independent from Fort Knox and this change is reflected in the increase of residential land use and the increase in commercial and industrial land use.

In summary, between 1990 and 2003 the largest increase of land in a particular zone was the 4.2% relative increase in land zoned Rural-Estates (See Table 1). This increase is attributed to an annexation of land in 2002. Other zones that grew substantially relative to overall growth in zoned land were the Urban Agriculture Zone (+2.7%), the Commercial Zone (+1.7%) and the Industrial Zone (+1.7%) (See Table 1).

The zone that experienced the largest decrease was the Residential-2 Zone, which decreased by 4.9% relative to the total land zoned in Radcliff (See Table 1). This large decrease was likely due to other zones growing at a rate faster than the Residential-2 Zone and the abundance of land already zoned as Residential-2. Other zones that experienced substantial decreases in size were the Residential- Holding Zone (-2.7%) and Residential-7 (-1.0%) (See Table 1).

## **FUTURE LAND USE PROJECTIONS**

Barring major social and economic changes, projections of future land use can be made, based on existing land use data. Future land use projections are more accurate if they can be drawn upon land use data over the past twenty-five years. For purposes of this future land use analysis, land use data is available for both 1990 and 2003. Therefore, the data can be analyzed in approximately ten years increments that are in line with the Census. By analyzing data over the past thirteen years, it is possible to accurately make projections about future land use within the city over the next ten years.

### **RESIDENTIAL-HOLDING ZONE PROJECTION (2003-2013)**

The overall percentage of Residential-Holding Zones in Radcliff decreased by relatively 2.7%, over the past ten years. It is unlikely that the percentage of Residential-Holding Zones will increase over the next ten years. Due to the fact that there is very little vacant land left in the city, there is virtually no need for holding zones. It is probable that several tracts of Residential-Holding zoned land will be re-zoned for future residential development in the next ten years.

### **RURAL-ESTATES ZONE PROJECTION (2003-2013)**

Due to the annexation of a large piece of property between Joe Prather Highway and Battle Training Road, the Rural-Estate Zone grew more than any other zone between



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1990 and 2003. Unless more land is annexed over the next ten years, it is unlikely that this zone will grow at the same rate. The average density for lots within a Rural-Estates Zone is five acres or greater. This requirement means that large parcels of land are needed to create a subdivision with several lots. The city does not have many large tracts of vacant land left.



*This home is being constructed in an RU-E Zone, which experienced significant growth due to annexation.*



*The Residential-7 Zone permits Mobile Home Park land uses. The amount of R-7 land has decreased over the past ten years.*

### RESIDENTIAL-ESTATE ZONE PROJECTION (2003-2013)

Since there is only one tract of land that is zoned as Residential-Estate within Radcliff, it does not appear that there will be a large increase in this type of land over the next ten years. This projection is further solidified due to the fact that the zone did not grow over the last ten years.

### RESIDENTIAL-1 ZONE PROJECTION (2003-2013)

Between 1990 and 2003, the amount of land zoned as Residential-1 increased 0.2% relative to the total amount of land zoned in Radcliff. It seems that this zone will grow at a slower rate between 2003 and 2013. Because of the large amount of land zoned for low-density residential use, it does not appear that there will be substantial growth in Residential-1 zoned property.

### RESIDENTIAL-2 ZONE PROJECTION (2003-2013)

Of all zones in the city, the amount of Residential-2 zoned land in Radcliff decreased the most relative to other zones. This trend is likely to continue in the future, due to the over-saturation of the city with low-density housing and the lack of available land for such type

developments.

#### RESIDENTIAL-3 AND RESIDENTIAL-4 ZONE PROJECTION (2003-2013)

Both the Residential-3 and Residential-4 zones experienced a relative decrease of 0.2% between 1990 and 2003. One would expect these zones to decrease proportionally by the same amount over the next ten years, but the reverse is likely true. Due to the lack of available land in the city, medium-density housing is becoming more attractive to potential developers. Townhouses and duplexes are becoming a popular option, so it seems that zones suited to medium-density housing will increase over the next ten years.

#### RESIDENTIAL-5 AND RESIDENTIAL-6 ZONE PROJECTION (2003-2013)

Since there is no land zoned as Residential-5, it seems that any high-density development to occur will be zoned as Residential-6. Because of the lack of vacant land available for development in the city, it is likely that high-density housing will be a more popular alternative in the future.

#### RESIDENTIAL-7 ZONE PROJECTION (2003-2013)

From 1990 to 2003, the amount of land zoned as Residential-7 decreased by 1% relative to the total land zoned in the city. It appears that this trend may continue over the next ten years. Since most residential zones permit owner occupied mobile homes, this appears to be a more attractive option than living in a mobile home park. Instead of renting a mobile home in a mobile home park, many people now choose to live in apartments and townhouses.

#### PLANNED UNIT DEVELOPMENT ZONE PROJECTION (2003-2013)

The percentage of land zoned for Planned Unit Developments will likely increase in the next ten years. This type of development is still relatively unknown, but it allows mixed-uses which are becoming very popular in larger cities.

#### COMMERCIAL-HOLDING ZONE PROJECTION (2003-2013)

The amount of land zoned as Commercial-Holding decreased from 1.8% of the total zoned land to 1.0% of the total over the last ten years. The amount of land zoned as Commercial-Holding will most likely decrease relative to the total land zoned in Radcliff, because most of these zones are being re-zoned as Commercial Zones due to the lack of ready-to-develop land in the city.

COMMERCIAL ZONE PROJECTION (2003-2013)

Since the Commercial Zone was one of the fastest growing zones in Radcliff, between 1990 and 2003, one would assume that this trend would continue. It appears that the relative proportion of Commercially zoned land within the city will continue to increase over the next ten years.



*The new Wal-Mart on North Wilson Road is an excellent example of commercial growth in Radcliff. Projects such as the Millpond Business Center support the projection of increased industrial growth over the next ten years.*

INDUSTRIAL-HOLDING ZONE PROJECTION (2003-2013)

Over the past ten years, the amount of land zoned as Industrial-Holding remained the same. It seems that the amount of Industrial-Holding land will either remain the same or decrease over the next ten years. There are very few Industrial-Holding Zones in Radcliff and the majority of these zones are being used for industrial use. Therefore, in the future it would be logical that new land intended for industrial use would be zoned as Industrial rather than Industrial-Holding due to the lack of land available for development in Radcliff.

INDUSTRIAL ZONE PROJECTION (2003-2013)

Between 1990 and 2003, land zoned for industrial use increased substantially relative to growth of other zones. It should be expected that in the next ten years, land zoned for industrial use will continue to grow at a fast rate relative to the rest of the zones in the city. This projected increase can be attributed to the low proportion of industrially zoned land in the city and the recent growth in that area.

**CONSERVATION ZONE PROJECTION (2003-2013)**

The acreage of land zoned as Conservation in Radcliff will likely continue to grow in the future, due to the rugged terrain of the area and the large number of areas with natural features that cannot be developed. The relative growth rate of this zone over the next ten years will probably be fairly similar to the existing rate of growth.

**URBAN AGRICULTURE ZONE PROJECTION (2003-2013)**

Even though the amount of land zoned as Urban Agriculture increased by 2.7% relative to the total land zoned in Radcliff, it is likely that this trend will not continue. The large growth of this zone between 1990 and 2003 can be attributed to the creation of the zone in 1990. Since there is very little land available for future development in the city limits, it would make sense that this Urban Agriculture land will be re-zoned for other use in the next ten years. This will become even more apparent as the rest of the city begins to develop in the immediate vicinity of this agricultural land.

**SUMMARY OF FUTURE LAND USE PROJECTIONS**

Based on trends from existing land use data between 1990 and 2003, a number of projections can be made regarding future land use over the next ten years. It appears that the amount of land zoned for the following uses will increase relative to the other zones in Radcliff; Residential-3, Residential-4, Residential-6, Planned Unit Development, Commercial, Industrial and Conservation Zones. Both medium and high density residential areas are projected to increase in the future. Commercial and Industrial Zones are currently growing at a faster rate than most other zones.

Areas that are likely to experience a decrease in relative growth are Residential-Holding, Rural-Estates, Residential-Estate, Residential-1, Residential-2, Residential-7, Commercial-Holding, Industrial-Holding and Urban Agriculture Zones. The amount of land zoned for low-density residential use should decrease proportionally over the next ten years. In addition, much of the land located in holding zones will likely be re-zoned in the future. It is very unlikely that land will be zoned or re-zoned as holding zones, due to the sparse amount of vacant land that is development-ready. Urban Agriculture zones will also likely be re-zoned to make land available for future development.

**EXISTING LAND USE ANALYSIS BY DISTRICT**

Land use can also be analyzed according to location. Analyzing land use according to location can be useful, since some land uses are more predominant than others within specific areas of Radcliff. The city has been divided into five districts with distinct boundaries, in order to analyze land use according to location. These five districts are shown on the Land Use By District Map (See Appendix).

District One is the area located north of West Lincoln Trail Boulevard and west of North Dixie Boulevard. District Two is the area north of East Lincoln Trail Boulevard and east of North Dixie Boulevard. District Three is the part of Radcliff located south of West Lincoln Trail Boulevard, west of South Dixie Boulevard and north of Joe Prather Highway. District Four is located south of East Lincoln Trail Boulevard, east of South Dixie Boulevard and north of Joe Prather Highway. District Five is the part of the city located south of Joe Prather Highway.

DISTRICT ONE ANALYSIS (2003)

District One is located on the north side of town; therefore, it is one of the oldest areas of Radcliff. The most predominant zone in District One is Residential-2, which composes 36.6% of the district (See Table 2). Other prevalent zones in District One include the Residential-Holding Zone (12.3%), the Commercial Zone (10.2%), the Conservation Zone (8.0%) and the Industrial Zone (7.5%) (See Table 2). By analyzing these statistics, it is evident that this district is dominated by low-density housing.

Table 2: District One Zoning (2003)

<u>ZONE</u>	<u>ACRES</u>	<u>% OF TOTAL</u>
R-H	221.3	12.3
RU-E	0	0.0
R-E	0	0.0
R-1	98.8	5.5
R-2	659.8	36.6
R-3	114	6.3
R-4	80.6	4.5
R-5	0	0.0
R-6	90.3	5.0
R-7	66.1	3.7
PUD	0	0.0
C-H	5.3	0.3
COMM	183.7	10.2
I-H	3.9	0.2
IND	134.9	7.5
CONS	144.5	8.0
<u>AG</u>	<u>0</u>	<u>0.0</u>
<b>TOTAL</b>	<b>1803.2</b>	<b>100</b>

DISTRICT TWO ANALYSIS (2003)

The Commercial Zone comprises the majority of zoned land in District Two. The Commercial Zone constitutes 43.0% of District Two (See Table 3). The majority of these commercial land uses are located on Knox Boulevard, North Dixie Boulevard and East Lincoln Trail Boulevard. These roads are corridors for retail business, service industries and offices. The other zones that make up the majority of District Two are the Residential Holding Zone (18.5%), the Residential-2 Zone (16.6%), the Residential-4 Zone (7.4%) and the Residential-1 Zone (6.0%) (See Table 3).





54% of District One is zoned for low-density residential uses such as this house.

43% of District Two is commercially zoned. This District includes the Radcliff Plaza pictured above.

Table 3: District Two Zoning (2003)

<u>ZONE</u>	<u>ACRES</u>	<u>% OF TOTAL</u>
R-H	99.5	18.5
RU-E	0	0.0
R-E	0	0.0
R-1	32.2	6.0
R-2	89.4	16.6
R-3	13	2.4
R-4	39.5	7.4
R-5	0	0.0
R-6	9.3	1.7
R-7	5.4	1.0
PUD	0	0.0
C-H	9.3	1.7
COMM	231.2	43.0
I-H	0	0.0
IND	0	0.0
CONS	8.6	1.6
<u>AG</u>	<u>0</u>	<u>0.0</u>
<b>TOTAL</b>	<b>537.4</b>	<b>100</b>

### DISTRICT THREE ANALYSIS (2003)

The largest zone in District Three is the Residential-2 Zone. The Residential-2 Zone makes up 42.8% of District Three (See Table 4). The remainder of District Three is composed of other zones such as the Commercial Zone (12.5%), the Residential-Holding Zone (10.3%), the Residential-4 Zone (8.8%) and the Residential-3 Zone (7.1%) (See Table 4). District Three is primarily used for medium and low-density residential land uses.

Table 4: District Three Zoning (2003)

<u>ZONE</u>	<u>ACRES</u>	<u>% OF TOTAL</u>
R-H	243.4	10.3
RU-E	0	0.0
R-E	58.4	2.5
R-1	13.3	0.6
R-2	1008.3	42.8
R-3	168.5	7.1
R-4	206.9	8.8
R-5	0	0.0
R-6	90.7	3.8
R-7	95.1	4.0
PUD	7.7	0.3
C-H	3.6	0.2
COMM	294.3	12.5
I-H	0	0.0
IND	8.2	0.3
CONS	97.8	4.1
<u>AG</u>	<u>62</u>	<u>2.6</u>
<b>TOTAL</b>	<b>2358.2</b>	<b>100</b>

DISTRICT FOUR ANALYSIS (2003)

Of the five districts, District Four is the most balanced. The zone that makes up the largest portion of District Four is the Commercial Zone. The Commercial Zone accounts for 22.9% of this district (See Table 5). Other zones that shape the remainder of District Four are the Residential-Holding Zone (19.3%), the Residential-2 Zone (15.8%), the Residential-3 Zone (10.6%) and the Residential-7 Zone (8.3%) (See Table 5). Not only is there a substantial mix of business and residential land uses in this district, but there is also a wide variety of housing types in District Four. Mobile home parks and medium density housing comprise a large portion of this district.

Table 5: District Four Zoning (2003)

<u>ZONE</u>	<u>ACRES</u>	<u>% OF TOTAL</u>
R-H	199.6	19.3
RU-E	0	0.0
R-E	0	0.0
R-1	31.4	3.0
R-2	163.2	15.8
R-3	109.4	10.6
R-4	63.8	6.2
R-5	0	0.0
R-6	55.8	5.4
R-7	85.9	8.3
PUD	6.7	0.6
C-H	19.8	1.9
COMM	236.1	22.9
I-H	0	0.0
IND	13.3	1.3
CONS	48.2	4.7
<u>AG</u>	<u>0</u>	<u>0.0</u>
<b>TOTAL</b>	<b>1033.2</b>	<b>100</b>

DISTRICT FIVE ANALYSIS (2003)

District Five is also much more balanced than the Districts located on the north side of the city. The largest zone in District Five is the Residential-2 Zone (30.9%) (See Table 6). The other predominant zones in District Five include the Rural Estate Zone (20.5%), the Industrial Zone (18.0%), the Commercial Zone (13.2%) and the Urban Agriculture Zone (9.2%) (See Table 6). The Rural-Estate Zone accounts for so much land in District Five, due to the annexation in 2002. The Industrial Zone comprises such a large portion of District Five, because the Millpond Business Center is located in this area of Radcliff. Also, this part of the city is the only place in Radcliff that land is zoned as Urban Agriculture.

Table 6: District Five Zoning (2003)

<u>ZONE</u>	<u>ACRES</u>	<u>% OF TOTAL</u>
R-H	0	0.0
RU-E	300.5	20.5
R-E	0	0.0
R-1	0	0.0
R-2	453.2	30.9
R-3	73.1	5.0
R-4	8.1	0.6
R-5	0	0.0
R-6	0	0.0
R-7	4.5	0.3
PUD	0	0.0
C-H	34.5	2.4
COMM	193.4	13.2
I-H	0	0.0
IND	263.7	18.0
CONS	0	0.0
<u>AG</u>	<u>135.1</u>	<u>9.2</u>
<b>TOTAL</b>	<b>1466.1</b>	<b>100</b>

SUMMARY OF EXISTING LAND USE ANALYSIS BY DISTRICT

Approximately 40% of District One and District Three are composed of Residential-2 Zones. This means that close to half of the city west of Dixie Boulevard is zoned as Residential-2. These figures show the prevalence of low-density housing on the west side of the city.

Districts Two and Four are primarily zoned as Commercial areas. Approximately 30% of the city east of Dixie Boulevard is zoned for commercial use. These figures reflect the strong business presence on the east side of Radcliff.

Another interesting land use issue relates to the large number of Residential-Holding Zones on the north side of the city. Approximately 15% of the land zoned north of Lincoln Trail Boulevard is zoned as Residential-Holding. This figure may not seem very



high, but when one considers that most of the city north of Lincoln Trail Boulevard is built-up, these Residential-Holding Zones do not appear to be serving their purpose.



*Large shopping plazas are common east of Dixie Highway.*

*For years, this property was used as a Drive-In Theatre to show movies, despite being zoned as Residential-Holding.*

## FUTURE LAND USE PROJECTIONS BY DISTRICT

Projecting future land uses according to the district within which they are located is an effective planning tool. These types of projections allow for the accurate planning of land use decisions in specific areas of the city.

### DISTRICT ONE PROJECTION (2003-2013)

Based on the existing land use analysis by district, it appears that this section of the city is composed of primarily low-density housing with some commercial uses along major thoroughfares, such as North Dixie Boulevard. These trends will likely continue in the future. Since this area is mostly built-up, there is very little land available for new development. New residential development in this part of the city would likely be medium-density to high-density residential development, due to the lack of vacant land. Duplexes, townhouses and apartments may be constructed. In addition, some of the Residential-Holding Zones that are not developed may become prime sites for new residential developments.

### DISTRICT TWO PROJECTION (2003-2013)

Similar to District One, District Two is also highly developed. It appears that any new development in the area will come in the form of medium to high density housing or new commercial development. Some of the Residential Holding Zones may become popular sites for new housing developments.

**DISTRICT THREE PROJECTION (2003-2013)**

New development in District Three will likely come in the form of new commercial development in the southern half of the district. This development could occur on either South Dixie Boulevard or Joe Prather Highway. New residential development in the area will likely come in the form of medium to high-density housing, since the area is widely developed. Some low-density residential development is also likely in this district, as it is not as built-up as Districts One and Two.

**DISTRICT FOUR PROJECTION (2003-2013)**

The most predominant zone in District Four is the Commercial Zone. In the southern half of this zone, there are several undeveloped tracts of prime commercial property. It seems that new commercial development will take place in this district in the future. Redevelopment of several older mobile home parks has already begun in this district. Since there are several large tracts of vacant land in this district, possible future housing options may include both medium and low-density housing.

**DISTRICT FIVE PROJECTION (2003-2013)**

District Five is the southernmost district in Radcliff. This area is developing at a fast rate and there are considerable amounts of vacant land in this district. The Millpond Business Center is located in this district, along with some new commercial developments. It appears that future development along Joe Prather Highway will be industrial and commercial in nature, due to the strong presence of these land uses at this time. Since most of the land in this district is adjacent to major thoroughfares (Dixie Highway and Joe Prather Highway), it is logical to assume that much of the area will be developed for commercial purposes. In addition, there may also be some medium and high-density residential developments in this district, since these developments are more compatible with commercial development than low density residential developments.

**SUMMARY OF FUTURE LAND USE PROJECTIONS BY DISTRICT**

Based on existing land use data and current development trends in Radcliff, it appears that much of the city north of Lincoln Trail Boulevard is already developed. Available land for new developments is very limited in this area. A lot of redevelopment will likely occur in this part of the city. Due to the lack of available land, there may be a slight shift from low-density residential housing to medium and high-density residential land uses.

The part of Radcliff located south of Lincoln Trail Boulevard contains several large tracts of land that are not developed. These areas seem suited to new commercial and industrial development. Housing types could vary from low-density to high-density residential, but it seems that medium and high-density residential areas will be

compatible with existing and future land uses.



*Medium-density housing such as this duplex, will become a much more popular housing alternative in the future.*

*These recently constructed apartments are a high-density residential use that will supplement the medium-density housing stock.*

## CURRENT LAND USE ISSUES FACING RADCLIFF

Radcliff has a number of important land use issues that need to be examined. Some of these issues have already been discussed earlier in this element, but they have not been discussed in detail. In addition, these issues have not yet been addressed through the formation of policy statements. Some of the most pressing land use issues facing Radcliff include holding zones, non-conforming uses, annexation and infill development. Each of these issues present unique circumstances that will be discussed and addressed in policy statements below.

### HOLDING ZONES

Currently, Radcliff has a total of three different holding zones. These holding zones include the Residential-Holding Zone, the Commercial-Holding Zone and the Industrial-Holding Zone. The purpose of a holding zone is to put a so-called “freeze” on new development in a specific location and to hold that land for a future designated use. Eventually, that land can then be developed in a manner that is compatible with adjacent development.

The Radcliff Zoning Ordinance and Development Regulations allows limited development within all holding zones. In effect, by allowing development within these holding zones, the purpose of holding the land for a specific future use is defeated. Once the holding zone is had been developed, it is no longer serving its intended purpose. Thus, the city is faced with the fact that most holding zones in Radcliff are fully developed in some form or another. These holding zones were never re-zoned, despite being developed. Since

the city permits development in these zones without requiring re-zoning there is no need to amend the holding zone status of the property.

All holding zones in Radcliff should eventually be re-zoned based on their existing land use. This would reduce the number of different zones in the city and it would offer a true indication of what actually exists on a piece of property.

In addition, removing holding zones entirely from the Zoning Ordinance would be beneficial for the city. Due to the lack of land available for development, holding zones are not needed. If the city annexes land, it is generally done with the intention of using that land for a certain purpose. Therefore, the land should be zoned according to the use for which it is intended rather than applying a holding zone designation to the land.

### NON-CONFORMING USES

Non-conforming uses present another unique problem for the city. The majority of land uses in the city conform to their assigned zoning designation, but there are some exceptions to the rule. Land uses that do not conform to the zone within which they are located are referred to as non-conforming land uses.

Non-conforming land uses usually arise when the city enacts zoning. The existing land use may not correspond to the intended future land use for that property. This use is allowed to continue operation under certain circumstances set out in the Zoning Ordinance.

The eventual goal is to phase-out all non-conforming land uses to increase compatibility between adjacent land uses. Currently, Radcliff has regulations that attempt to phase-out non-conforming uses over time. These regulations may need to be tweaked in order to speed the process. Phasing-out non-conforming land uses can be a lengthy process, since operation of the use is permitted to continue as long as the use is not expanded past a certain size.

### ANNEXATION

Another major land use issue facing the City of Radcliff is the lack of vacant land within the city limits. There are very few large vacant tracts of land north of Lincoln Trail Boulevard. There are still a few large vacant tracts of land south of Lincoln Trail Boulevard, but there is not an abundance of properties with these characteristics.

Generally, large commercial and industrial developments require large tracts of land on which to build. As well, most low-density housing subdivisions require a large area of vacant land, because they are more spread out than medium and high-density housing developments. Currently, many vacant lots within Radcliff have existing development on

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either side of the site. When lots with adjacent, existing development are built upon this is referred to as infill development. There are a number of infill development opportunities in Radcliff, but many of these lots do not meet the land requirements of larger developments.

Ultimately, the City of Radcliff needs to annex more land for future development on the south side of the city. Since Fort Knox abuts the city on the north and east side, annexation adjacent to those sides of the city is not feasible. Vine Grove abuts the Radcliff city limits on the west side of the city. Annexation would also not be feasible in this direction. Virtually, the only direction for future growth by annexation would be in a southerly direction.

If a proposed highway is ever constructed adjacent to Dixie Highway, between Radcliff and Elizabethtown, annexation along the roadway is recommended. Annexation of land in this area of Hardin County would create future commercial and industrial development opportunities along a major highway. This type of highway could become a future business corridor, much like Dixie Highway.



*This land adjacent to Mayer Lane was recently annexed by the City.*

*These commercial offices are a great example of infill development done the right way.*

### INFILL DEVELOPMENT

Infill development and annexation are closely interrelated. Infill development must be advocated prior to annexation occurring. If land adjacent to existing development meets site requirements for new development this land should always be developed prior to annexing land near the city limits and developing it.

When infill development occurs, it creates continuous areas of development with no gaps in the development pattern. It is more economically feasible and sensible to encourage infill development if adequate development conditions exist to meet the developer's

requirements. By promoting infill development the city's resources are used in a financially responsible manner. Often, utilities do not need to be extended when infill development occurs, opposed to the scenario that usually occurs when land is annexed and then developed. By encouraging infill development, urban sprawl is being discouraged and fiscal responsibility on the part of public officials is displayed. By advocating infill development, the public infrastructure does not need to be extended, which also results in substantial cost saving.

## **LAND USE SITING REQUIREMENTS**

Different types of land uses must be located in areas that will benefit the new development and nearby, existing developments. Planners strive to develop cities in which developments share symbiotic relationships. Abutting developments need not only be compatible, but they should also operate in conjunction with nearby facilities. Listed below are some land use siting requirements for new residential, commercial and industrial developments.

### **RESIDENTIAL LAND USE SITING REQUIREMENTS**

New residential developments should be sited in a manner that corresponds with the following guidelines:

#### **Low-Density Residential Developments**

1. Low-density residential developments should be located in close proximity to areas of employment and recreation by means of the existing road network.
2. Low-density residential developments should be located in close proximity to community facilities and local open space by means of walking.
3. Low-density residential developments should be protected from traffic and incompatible uses.
4. Low-density residential developments should be protected from noise and other nuisances.
5. Low-density residential developments should be located away from fragile ecosystems and natural hazards such as floodplains.
6. Low-density residential developments should be located in close proximity to existing public services, infrastructure and utilities.



### Medium-Density Residential Developments

1. Medium-density residential developments should be located in close proximity to areas of employment and recreation by means of the existing road network.
2. Medium-density residential developments should be located in close proximity to community facilities and local open space by means of walking.
3. Medium-density residential developments should be protected from traffic and incompatible uses.
4. Medium-density residential developments should be protected from noise and other nuisances.
5. Medium-density residential developments should be located away from fragile ecosystems and natural hazards such as floodplains.
6. Medium-density residential developments should be located in close proximity to existing public services, infrastructure and utilities.
7. Medium-density residential developments should be located in areas where infill development is needed. Medium-density can be used as a transition zone between commercial, industrial, high-density housing areas and low-density housing areas.
8. Medium-density residential developments should be located in areas with a larger number of nearby public amenities and services.

### High-Density Residential Developments

1. High-density residential developments should be located in close proximity to areas of employment and recreation by means of the existing road network.
2. High-density residential developments should be located in close proximity to community facilities and local open space by means of walking.
3. High-density residential developments should be protected from traffic and incompatible uses.
4. High-density residential developments should be protected from noise and other nuisances.

5. High-density residential developments should be located away from fragile ecosystems and natural hazards such as floodplains.
6. High-density residential developments should be located in close proximity to existing public services, infrastructure and utilities.
7. High-density residential developments should be located along major thoroughfares such as collectors and arterials. These streets must be able to handle the levels of traffic created by the development.
8. High-density residential developments should be located in areas where adjacent buildings share similar height characteristics so as to increase compatibility.

#### Residential Developments Adjacent to Military Installation

Residential land uses adjacent to the Fort Knox Military Installation shall be situated in such a manner as to minimize conflicts between the residential land use and the military installation. Provisions shall be made after consultation with the installation's command authorities to determine the needs of the military installation. These consultations shall include but not be limited to the following questions:

1. Installation expansion;
2. Environmental impact;
3. Installation safety;
4. Air space usage;
5. Noise pollution;
6. Air pollution;
7. Air safety.

#### COMMERCIAL LAND USE SITING REQUIREMENTS

New commercial developments should be sited in a manner that corresponds with the following guidelines:

1. Commercial developments should be located in close proximity to areas of housing and local open space.



## ELEMENT II-LAND USE

2. Commercial developments should be located away from fragile ecosystems and natural hazards such as floodplains.
3. Commercial developments should be located in close proximity to existing public services, infrastructure and utilities.
4. Regional malls or shopping centers should be located at interchanges or at the intersection of two arterial roadways.
5. Neighborhood commercial uses should be located along collector streets.
6. Office uses should be highly accessible to both pedestrians and automobile traffic.
7. Highway-oriented commercial uses should be located in outlying areas of the city on major highway approaches to the city center.

### INDUSTRIAL LAND USE SITING REQUIREMENTS

New industrial developments should be sited in a manner that corresponds with the following guidelines:

1. Industrial developments should be located on level sites, which have less than a five percent slope.
2. Industrial developments that involve extensive manufacturing should be located on large, open sites in excess of five acres in size.
3. Industrial developments should be located in close proximity to commercial transportation facilities such as highways, railroads and airports.
4. Industrial developments should be located within a short commuting distance of the labor force and the residential areas within which they reside.
5. Industrial developments should be located in close proximity to existing public services, infrastructure and utilities.
6. Industrial developments should be located next to compatible land uses.
7. The most highly recommended area for siting new industrial developments is adjacent to a major highway.

**INTRODUCTION**

Conservation of the environment is an integral component of land use planning. It is necessary to plan future development in a manner that is compatible with areas that we wish to preserve. Areas of preservation should be viewed as resources to the community rather than development constraints.

When referring to the environment, we are alluding to both the natural environment and the built environment. Generally, the natural environment consists of the topography, geology, hydrology, climate, vegetation and wildlife that is found within a specified geographic area. The built environment refers to the man-made resources within a community. The built environment is composed of structures and buildings constructed by man. Most communities aim to preserve those structures and landmarks, which have intrinsic value. By preserving both the built and natural environment, we are protecting the heritage of the community. Heritage is a building block for growth, around which future growth and development may occur.

In order to preserve the unique environmental features of the community, it is necessary to identify those elements that shape the character of Radcliff. Environmental features that are unique to Radcliff range from distinctive Karst topography to historical buildings such as the Haycraft Inn. It is the combination of these natural and man-made features that gives Radcliff its identity. Once important features in the community are identified, policies can be developed that promote the preservation of these features.

**CONSERVATION OF THE BUILT ENVIRONMENT**

The process of conserving the built environment has been referred to as historic preservation. The most pressing dilemma regarding historic preservation involves deciding which structures should be preserved and which structures should not be preserved. Properties can be recognized as being historically significant on three levels; National, State and Local. Properties may be significant on all three levels or they may only be significant on one level. For example, a local building such as Lex-A-Villa is significant at the local level since it is the only speakeasy remaining in Radcliff. On the other hand, Lex-A-Villa has not been recognized by the Kentucky Heritage Council as having historical significance at the State level. In addition, the building was moved from its original site; therefore, it will never qualify for nomination to the National Register of Historic Places. This example clearly shows how a building may not be recognized as being historically significant on all three levels, even though it is recognized as being historically significant.

**NATIONAL REGISTER OF HISTORIC PLACES**

## ELEMENT III-ENVIRONMENT

In order for a building to gain national recognition as a historic structure, the property

## ELEMENT III-ENVIRONMENT

must be listed on the National Register of Historic Places. The National Register is maintained by the National Park Service. For a property to be listed on the National Register it must first be nominated by the State Historic Preservation Officer (SHPO) of the State in which the property is located. State nomination forms are usually prepared by private individuals or by the staff of the State Historic Preservation Office. Once nomination forms have been completed, they are submitted to a State review board. The State review board is composed of professionals from the fields of American history, architectural history architecture, prehistoric and historic archaeology and other related disciplines. The review board makes a recommendation to the State Historic Preservation Officer to either approve or disapprove the nomination based on whether it meets National Register criteria.

If adjacent property owners object to the nomination, or the property owner himself objects to the nomination, then the State Historic Preservation Officer may forward the nomination to the National Park Service for review. If both the State review board and the State Historic Preservation Officer agree on the eligibility of the property ( and the owner has not objected to the nomination) then the nomination is forwarded to the National Park Service to be considered for listing.

### CRITERIA FOR LISTING A PROPERTY ON THE NATIONAL REGISTER OF HISTORIC PLACES

Properties eligible for the National Register are evaluated, based on their importance in relation to the accomplishments of people that have made a significant contribution to our country's history and heritage. Criteria for evaluating historically significant properties have been designed to guide State and Local governments, Federal agencies and other organizations in judging potential nominations to the National Register. Properties are evaluated, based on their significance in American history, architecture, archaeology, engineering, sites, buildings, structures and cultural districts. In order for properties to be eligible for listing they must possess integrity of location, design, setting, materials, workmanship, feeling and association. These properties must also possess the following characteristics:

1. Associated with events that have made a significant contribution to the broad patterns of our history; or
2. Associated with the lives of persons significant in our past; or
3. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

4. Have yielded, or may be likely to yield, information important in prehistory or history.

#### ADDITIONAL CRITERIA

Generally cemeteries, birthplaces, graves of historical figures, properties owned by religious institutions, properties used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, commemorative properties and properties less than fifty years old shall not be considered eligible for the National Register of Historic Places. However, properties with the aforementioned characteristics may be eligible if they are integral parts of districts that meet the criteria, or if they have any of the following characteristics:

1. A religious property that derives primary significance from architectural distinction, artistic distinction or historical importance.
2. A building or structure that is removed from its original location, but it is primarily significant for its architectural value or its association with a historic figure.
3. A birthplace or grave of a historical figure of outstanding importance may be eligible, if there is no appropriate site or building directly associated with his or her productive life.
4. A cemetery that derives its primary significance from graves of persons of transcendent importance, age, distinctive design features or association with historic events.
5. A reconstructed building that is located in a suitable environment and presented in a dignified manner as part of a restoration master plan. No similar structure with the same association has survived.
6. A commemorative property whose design, age, tradition or symbolic value gives it exceptional significance.
7. A property achieving significance within the past fifty years may be eligible, if it is of exceptional importance.

#### LENGTH OF NOMINATION PROCESS

The process of nominating a structure to the National Register of Historic Places takes ninety days to fulfill the review and notification requirements. Once the nomination has been submitted to the National Park Service, a decision on whether to list the property on the National Register must be made within forty-five days.

**NATIONAL REGISTER OF HISTORIC PLACES BENEFITS**

When a property is listed on the National Register, several benefits may accrue as a result of the listing. These benefits include the following:

1. The property will be considered in planning for federally licensed and federally assisted projects.
2. The property may be eligible for certain tax provisions.
3. The historic value of the property will be taken into account when considering the issuance of a surface mining permit.
4. The property may qualify for Federal preservation grant funds.

**IDENTIFICATION OF HISTORIC BUILDINGS AND STRUCTURES**

On June 21, 1983, Catherine C. Harned of the Kentucky Heritage Council appeared before Radcliff City Council and explained how she was in the process of documenting historical buildings and structures in Hardin County. This comprehensive historical structure inventory includes early homes of historical significance, commercial buildings of historical significance, old mills and iron bridges.

Harned completed her inventory of historical structures in Radcliff on October 17, 1983. The completed historical structure inventory consisted of sixteen total structures. By 2003, only ten of these sixteen historical structures and buildings remained intact. The six structures and buildings that were removed from the inventory in 2003 were either torn down, destroyed, burned or moved to another location within a period of twenty years.

In 2003, the Environmental Element Comprehensive Plan Committee identified another historical structure that had not been included in Harned's initial inventory. This unidentified historical building is the Crutcher School, which is located at 949 Rogersville Road. In addition, the Committee also identified Lex-A-Villa as being a building with local historical significance despite the fact that it is not eligible for the National Register .

**RADCLIFF PROPERTIES ELIGIBLE FOR THE NATIONAL REGISTER OF HISTORIC PLACES**

Currently, Radcliff has ten buildings and structures that are eligible for nomination to the National Register of Historic Places. Each building or structure is historically significant to Radcliff's past. These properties have been researched and documented by both the Kentucky Heritage Council and the Environmental Element Comprehensive Plan Committee. These properties have been deemed as eligible for the National Register

based on their age, condition, architectural qualities and relevance in Radcliff history.

### M-103 TANK

The M-103 Tank is located adjacent to the Radcliff Chamber of Commerce parking lot at 306 North Wilson Road. This M-103 Tank was given to Radcliff by the U.S. Army. When the M-103 was introduced in 1964, it was the largest production model tank made in the United States. Only three-hundred six M 103's were built. The M-103 saw limited use prior to the increase in production in the mid-1960's. These tanks were used by the Marine Corps, until 1973.

The tank is twenty-two feet , eight inches long and eleven feet, nine inches tall. The tank has a weight of sixty-two and one-half tons, a maximum speed of twenty-one miles per hour, and an operating range of eighty miles. It also has a one-hundred twenty millimeter cannon with fifty and thirty caliber machine guns. The tank serves as a civic symbol of the "Armor City", and it links Fort Knox's development and Radcliff's creation.



*This M-103 Tank in Radcliff is one of only 306 ever made.*



## REESOR HOUSE (RAINE-ENLOW CABIN)

The Reesor House is located at 483 West Vine Street, across from the former Fort Knox Drive-In. The Cabin was built by John V. Reesor (1810-1879), who migrated to Radcliff from Meade County after marrying fellow Meade Countian, Parmelia Sipes (1821-1898).

The circa 1836 one and one-half story log dwelling has a single cell, rectangular floor plan, V-notching decorative fabric and a gable roof. The cabin's dimensions are nineteen feet by twenty-one feet. The limestone chimney is not an original feature of the cabin. This chimney was added during the restoration of the structure. For years, the cabin was enclosed by a frame Residence, which was dismantled in 1982. The cabin is significant, since it is an old dwelling that pre-dates present-day Radcliff.



*The circa 1836 Reesor House is the oldest building of its type in the City of Radcliff.*

## EDWIN STOVALL HOUSE

The Edwin Stovall House is located at the intersection of Rogersville Road and South Logsdon Parkway. Hezekiah Owen Stovall (1805-1883) farmed one thousand acres in the area of which he gave one-hundred acres to his son Edwin, who built this house in this relatively late single pile, double cell, one and one half story log home contains decorative fabrics of half dovetailed notching and sawn weatherboard. The house has four bays, with first floor six over six lights and second floor four over four lights. The exterior brick chimney has a limestone foundation. In 1914 a tornado damaged the second floor. Weatherboard was applied during the repair as was a fan bracketed porch.



*The Edwin Stovall House survived tornado damage in 1914.*

## JOHN RAY CABIN

The John Ray Cabin was constructed in 1885. It is located at the terminus of Cedar Oaks Drive in Radcliff. The cabin is sixteen feet in length, with a width of sixteen feet. It is a single cell, single pile, one and one-half story log residence with square notching and a gable end tin roof.

The cabin is significant because not many log cabins were still being built at the time that the John Ray Cabin was constructed. Its construction may be attributed to the rugged terrain in this portion of the county.

At the time of Harned's historical inventory, the cabin was endangered. The owner wanted to either sell or donate the cabin to a private or public interest.



*The John Ray Cabin, pictured above, dates back to 1885.*

## THOMAS OWEN ATCHER BARN

The Thomas Owen Atcher Barn is located at 2889 South Wilson Road. Thomas Owen Atcher constructed the barn in 1880. It is a general purpose barn that is still in excellent condition. The barn is constructed with logs with a frame addition on either end. The barn has square notching and a piled limestone foundation.



*The oldest agricultural building still standing in Radcliff is the above pictured Thomas Owen Atcher Barn on South Wilson Road.*

## G.C. "JUDGE" LEONARD CABIN

The Leonard Cabin is located at 1915 Preston Street, which is at the corner of Northern Road and Preston Street. A title search in 1983 suggests that the cabin was constructed in 1873.

The cabin is a five bay, double cell, one and one-half story log home. The Leonard Cabin has a rear frame addition and vinyl siding.

G.C. Leonard lived in the cabin between 1863 and 1946. Despite the cabin being enclosed and extensively remodeled, it still shows early settlement patterns in Radcliff.



*The Leonard Cabin is an enclosed log cabin that dates back to approximately 1873.*



## DYER CABIN

The Dyer Cabin, like the G.C. "Judge" Leonard Cabin, is now enclosed and extensively renovated. The Dyer Cabin is located at 1607 South Wilson Road, near the intersection of South Wilson Road and Rogersville Road. Originally, this area was known as Dyer's Crossing, hence the name of the cabin. This part of Radcliff later became known as Rogersville.

The Dyer Cabin is a one story log dwelling. The condition of the cabin is unknown and the age of the cabin is also unknown. The owner of the cabin Bobby Lynch believes that the cabin dates back to around 1900.



*The Dyer Cabin is now enclosed and remodeled. It is located in the part of Radcliff that used to be known as Dyer's Crossing and later as Rogersville.*

## STONE'S GROCERY

Stoney's Grocery is located at 1543 South Wilson Road, near the intersection of Rogersville Road and Wilson Road. The store dates back to 1922 and it is the only remaining example of an early country general store in Radcliff. The store is currently being used as a hair salon. The store was one of two country stores in this area that served the surrounding Rogersville community.

The building is a one and one-half story, three bay frame store with an application of sawn weatherboard. The roof of the building is a gable end roof with cat-slide roofs on the additions.



*The Stoney's Grocery building is the only example of old-style country general stores that still remains in Radcliff.*



## EDWARD ATCHER HOUSE

The Edward Atcher House is located at 827 Elm Road. The age of the house is unknown. The original house was a one and one-half story, single pile log structure with a single cell, rectangular floor plan and a gable end roofline. Frame additions with decorative fabric of sawn weatherboard have since been added. Windows of the three bay house are four over four light.

Edward Atcher (1846-1927) was the original owner. Mr. Atcher served in the Union Army during the Civil War. This house is another example of early settlement patterns in the area.



*This house was originally owned by Edward Atcher, who was a Union soldier in the Civil War.*

## RADCLIFF PROPERTIES ON THE NATIONAL REGISTER OF HISTORIC PLACES

## HAYCRAFT INN

The Haycraft Inn is the only property in Radcliff that is officially recognized on the National Register of Historic Places. The Haycraft Inn is located at 2315 South Wilson Road. The inn is an eight bay, two story, single pile center passage brick residence of Flemish bond construction. The inn was built in two stages.

The 1814, three bay section had a single cell, rectangular floor plan. Tibbits added a beaded ionic order fireplace mantel from the demolished Hardin County Milling Company. Tibbits also added two façade porticoes that have dentil molding of the corinthian order.

The inn was apparently built by Coleman Lewis, who migrated to Radcliff from Culpepper County, Virginia. Lewis returned to Virginia to serve in the war. He then came back to Kentucky and built the Haycraft Inn..

The Haycraft Inn is historically significant, since it is an excellent example of an early stage coach stop that served the Louisville and Nashville Turnpike. It is also the last of three such stage coach stops that existed in this area.



*The Haycraft Inn served as a stage coach stop on the Louisville/Nashville Turnpike.*

## RADCLIFF PROPERTIES OF HISTORIC SIGNIFICANCE

## LEX-A-VILLA

Lex-A-Villa is located at 1875 North Dixie Highway, near the intersection of Knox Boulevard and North Dixie Highway. The building dates all the way back to 1939, when it was first used as a speakeasy. According to community lore, the building was also known for housing illegal gambling operations. Apparently, it was somewhat of a hot spot for police raids at one time. The historic house was used for family housing as a Fort Knox Officer's Club.

Unfortunately, Lex-A-Villa was moved from its original location in 1997. Since Lex-A-Villa was moved from its original site, it is not eligible for nomination to the National Register of Historic Places. Even though Lex-A-Villa is not eligible for listing on the National Register, it still has significant local historical value. The current owner has replaced the old brick that was painted white with new brick. In addition, new windows have been installed and landscaping is in the process of being developed.

The use of the newly refurbished home is uncertain, but there have been rumors that it may be used as a bed and breakfast.



*Lex-A-Villa served as a speakeasy and it housed illegal gambling at one time.*

**PRESERVATION POLICIES**

The City of Radcliff has actively encouraged the preservation of historic properties in the past. Although the City has encouraged preservation of historic properties, this action has often not always achieved the desired results. The City's role regarding historic preservation has never been clearly defined; therefore, each new administration has a differing view.

The following policies are intended to guide the City of Radcliff in terms of its endeavors regarding historic preservation:

1. The establishment of a City-operated Historical Board may be beneficial, if the City acquires any historic properties. This board would be responsible for overseeing any preservation projects.
2. The issuance of Radcliff Historic Property Certificates would help inform private property owners that they own a historically significant building or structure that is important to the community. This would increase awareness of historic preservation in the community.
3. If the City of Radcliff considers the acquisition of an endangered historical property, it should consider this acquisition based on the following criteria:
  - A. Age of the property
  - B. Condition of the property
  - C. Cost of acquisition
  - D. Improvement and Maintenance funding availability
  - E. Historic Significance
4. If the City of Radcliff acquires a historic structure, it should attempt to keep that structure at its original location if it is compatible with adjacent properties. This procedure preserves the opportunity to have the property listed on the National Register of Historic Places.
5. If the historic structure acquired by the City of Radcliff must be moved, the structure should be moved to another City-owned property.

**CONSERVATION OF THE NATURAL ENVIRONMENT**

As discussed earlier, the natural environment consists of climate, topography, geology, hydrology, vegetation and wildlife. The climate of Radcliff will be analyzed according to temperature and precipitation levels. Soils and topography of the area will be analyzed

## ELEMENT III-ENVIRONMENT

topography of the area will be analyzed with site development in mind. Since the geological features of Radcliff are very distinct, because of karst topography, a detailed analysis of karst formation and how it affects development is necessary. Finally, unique aspects of Radcliff's vegetation and wildlife will be examined. All of these aspects of the natural environment must be conserved, in order to maintain the integrity of the ecosystem.

### CLIMATE

When people think of climate they automatically think of weather. When people think of weather, the first thing they generally think of is temperature. The climate of a place is predominantly influenced by two factors: temperature and precipitation.

### TEMPERATURE

For the most part, Radcliff experiences fairly moderate temperatures year round. The annual mean temperature between 1971 and 2000 is 54.5 degrees Fahrenheit, according to the Kentucky Climate Center in Bowling Green, Kentucky (See Table 1). In addition, the annual average maximum temperature is 65.4 degrees Fahrenheit. On the other hand, the annual average minimum temperature is 43.6 degrees Fahrenheit.

TABLE 1: 1971-2000 MONTHLY MAXIMUM AND MINIMUM MEAN TEMPERATURES FOR RADCLIFF, KY

ELEMENT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
MAX F	40.1	46	55.3	64.8	73.6	81.6	86.2	85.7	80.6	69.1	56.3	45.4	65.4
MIN F	21.3	24.7	32.6	42.3	50.8	61.4	65.2	63.7	57	43.3	34.2	26.4	43.6
MEAN F	30.7	35.4	44	53.6	62.2	71.5	75.7	74.7	68.8	56.2	45.3	35.9	54.5

Based on the data from the Kentucky Climate Center, the month with the lowest mean temperature is January. The mean temperature in January between 1971 and 2000 is 30.7 degrees Fahrenheit. The month with the highest mean temperature is July, with a mean temperature of 75.7 degrees Fahrenheit.

### PRECIPITATION

For the most part, precipitation in the Radcliff area results from the passage of migratory low pressure systems over the city in the winter months. Rain showers occur in the spring and summer months as a result of warm, humid air passing over the area. August and September are dry months, because high pressure systems often extend over the southern

## ELEMENT III-ENVIRONMENT

United States and block the flow of warm, humid air from the Gulf of Mexico. The Gulf of Mexico is the major source of precipitation for both Radcliff and Kentucky.

Table 2 shows that the mean annual precipitation for Radcliff between 1971 and 2000 is 49.25 inches. This is a considerable increase from the mean annual precipitation recorded between 1956 and 1985, which was 43.03 inches.

TABLE 2: 1971-2000 MONTHLY PRECIPITATION LEVELS FOR RADCLIFF, KY

ELEMENT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
PRECIP (IN)	4.18	3.46	5.11	3.59	5.15	4.43	4.05	3.39	2.86	4.22	4.04	4.77	49.25

Table 2 also shows that the month with the highest recorded precipitation level between 1971 and 2000 was May with 5.15 inches. The month with the lowest precipitation level was September with only 2.86 inches of precipitation. Essentially, higher precipitation levels are recorded in the spring, with lower precipitation levels recorded in the fall months.

### TERRAIN

The terrain of the Radcliff planning area varies from north to south. The portion of the area north of Lincoln Trail Boulevard (KY 1815) can be characterized as rough and hilly terrain, which is spotted with numerous sinkholes of various sizes. The area south of Lincoln Trail Boulevard contains terrain which consists of wide ridges and moderately wide valleys. This gently rolling area contains fewer sinkholes than the northern part of the city. In addition, the southern part of the city contains Brushy Fork Creek and its tributaries. The area parallel to the banks of the Brushy Fork Creek is the only recognized floodplain in the city.

Elevations of the planning area range from 700 feet above sea level in the extreme northeastern part of the city to 840 feet above sea level in the south. The majority of elevations range between 700 and 800 feet above sea level. The variation in terrain found in Radcliff can increase development costs in some areas; however, the unique terrain allows for creative site design and it can create a natural buffer in some instances.





*Most of the terrain located north of Lincoln Trail Boulevard is heavily wooded, hilly and rugged.*

## SOILS

Soils in the planning area are of the Crider-Vertress-Nicholson association. There are nineteen sub-soils within the planning area. These soils have the following characteristics and limitations:

### Ashton Silt Loam (As):

Nearly level soil (0-1% slope) found on low positions of stream terraces. This soil is limited for urban use, since it is prone to flooding. The high water table and low strength of the soil can cause basements and pavements to be damaged.

### Crider Silt Loam (CrB):

A gently sloping (2-6%), deep, well-drained soil. CrB is found on ridges and in karst areas where its steepness varies within short distances. In karst areas the CrB drainage ways are dismembered and lead through openings in depressions into underground streams. As a result of the dismembered drainage ways, some of these depressions are ponded for years. This soil is limited for some urban uses, because of low strength and the tendency of the lower part of the subsoil to shrink and swell.

### Crider Silt Loam (CrC):

Same general characteristics as CrB, except that slope ranges from 6 to 12%. CrC is limited for urban uses due to high slopes, low strength and the tendency of the subsoil to shrink and swell. CrC will also easily erode, if the plant cover is removed. Due to its characteristics, any development that is sited on CrC should minimize the removal of vegetation and quickly re-establish disturbed areas of vegetation. Stockpiling the topsoil



and using it to form the surface layer of developed sites can help establish and maintain vegetative cover.

Elk Silt Loam (EIB):

A gently sloping (2-6%) deep, well-drained soil that is found on stream terraces. This soil is subject to frequent flooding from November to May. This soil is limited for nearly all urban uses, due to its high flood potential. Elk Silt Loam (EIC)-same as EIB, except has slopes of 5-12% and is suited for development, if it is protected from flooding.

Elk Silt Loam (EIC):

Same characteristics as EIB except that the slope ranges from 5-12%. EIC is suitable for development if it is protected from flooding.

Hagerstown Silt Loam (HnC):

A soil having slopes of 6 to 12% that is deep, well-drained and located on narrow ridge tops in karst areas. Has some general characteristics and limitations for urban uses as CrC, except that it has additional limitations for excavation, since the limestone bedrock is located 40 to 60 inches below the surface.

Lawrence Silt Loam (Lc):

This nearly level (0-2% slope) soil is poorly drained and located on stream terraces, in depressions and in the fan-shaped areas at the head of drainage ways. This soil is subject to occasional flooding from November to May. This soil is poorly suited for most urban developments, due to the hazard of flooding and wetness.

Lindside Silt Loam (Ln):

A nearly level soil (0-2% slope) found on flat plains and in karst valleys and depressions. This soil is poorly suited for most urban uses due to its frequent flooding and seasonally high water table.

Melvin Silt Loam (Mv):

A poorly drained, nearly level (0-2% slope) soil found in the plains, karst valleys and karst depressions. Mv is limited for nearly all urban areas, due to the hazard of flooding.

Neward Silt Loam (Nb):

A low sloping soil (0-2%) that is poorly drained and found in low areas on flood plains, karst valleys and depressions. This soil is subject to frequent flooding from about November to May. Nb is limited for nearly all urban uses, because of its flooding and wetness.

Nicholson Silt Loam (NcA):

A nearly level (0-2% slope), with moderately, well-drained soil that is found on broad ridge tops and in low areas around the head of drainage ways. This soil is limited for

limited for urban uses, because of wetness, slow permeability of the fragipan, a seasonally high water table within 18 to 24 inches of the surface, a moderate shrink-swell potential and low strength in the lower part of the subsoil. This soil type can damage basements and cause severe water problems during wet periods.

Nicholson Silt Loam (NcB):

A gently sloping (2-6% slope) moderately, well-drained soil found on ridge tops, rolling uplands and around the head of drainage ways. This soil is limited for urban uses, because of wetness, slow permeability in the fragipan, a seasonally high water table within 18 to 24 inches of the surface, moderate shrink-swell potential and low strength in the lower part of the subsoil. Since NcB erodes easily, construction should be kept on the contour, removal of vegetation should be kept to a minimum and plant cover should be quickly re-established.

Nolin Silt Loam (No):

A nearly level soil (0-2% slopes) that is well-drained and found primarily in floodplains and in the bottom of depressions. In sinkholes, surface water drains through openings in the soil and into underground streams. This soil is subject to frequent flooding from November to May. This soil is limited for nearly all urban development, because it is subject to flooding and has a high seasonal water table.

Otwell Silt Loam (OtA):

This is a nearly level (0-2% slope) and moderately, well-drained soil, which is located on stream terraces and in low depressions. Most areas of this soil are subject to occasional flooding. This soil is limited for nearly all urban uses, because it floods occasionally. Even if the development is protected from flooding, the slow permeability of the fragipan and seasonal wetness limit its use for many developments. The seasonally high water tables can damage basements and cause water problems during wet periods.

Otwell Silt Loam (OtB):

Same as OtA except has slopes of 2-6% and is very susceptible to erosion.

Vertress Silt Loam (VrC):

This soil has slopes ranging from 6 to 12% and it is well-drained. This soil is found on narrow ridge tops, the upper parts of hill-sides and in karst areas. This soil is often found on slopes, which lead into karst depressions.

Vertress Silt Loam (VrD):

A vertress soil having steep slopes (12 to 20%) that is located on hillsides in karst areas. In the karst areas, depressions are common and slopes are irregular. The potential for urban uses is limited, due to its slope, tendency to shrink and swell and low strength. This soil has a high erosion potential, so erosion and sedimentation control practices should be used.

Vertress Silt Loam (VrE):

A vertress soil that has very steep slopes (20-30%), which is located on hillsides in karst areas. The slopes tend to be irregular and steepness may vary within short distances. Urban uses are severely limited, due to the steepness of the slopes, tendency of clay subsoil to shrink and swell, low strength and high erosion potential.

Vertress Silty Clay Loam (VtD):

This is a sloping (6-20%), deep, well-drained soil that is found on ridge tops, hillsides and in karst areas. The karst areas have common depressions into which run-off flows as it makes its way into underground streams. This soil is limited for most urban uses, due to the steepness of its slope, the tendency of the subsoil to shrink and swell, its low strength and its high erosion potential. This soil is a poor source for topsoil, because of the high content of clay and the low content of organic matter.

Table 3 illustrates the limitations of soils for site development in the Radcliff planning area. These limitations have been classified as slight, moderate and severe. A slight limitation indicates that soil properties generally are favorable for the specified use. Any limitation can be overcome by minor site work. A moderate limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by good design and some site work. A severe limitation indicates that one or more soil properties or site features are so unfavorable and difficult to overcome that a major increase in the construction effort, special design or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

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*TABLE 3: SITE DEVELOPMENT LIMITATIONS ACCORDING TO SOIL TYPE*

		DWELLINGS WITHOUT BASEMENTS	DWELLINGS WITH BASEMENTS	SMALL COMMERCIAL BUILDINGS	LOCAL STREETS
SOIL TYPE	SHALLOW EXCAVATIONS				
ASHTON(As)	Severe: Floods	Severe: Floods	Severe: Floods	Severe: Floods	Severe: Floods
CRIDER(CrB)	Slight	Moderate: Low Strength	Moderate: Shrink-Swell	Moderate: Low Strength	Moderate: Low Strength
CRIDER(CrC)	Moderate: Slope	Moderate: Low Strength, Slope	Moderate: Shrink-Swell, Slope	Severe: Slope	Moderate: Low Strength, Slope
ELK(EIB)	Severe	Severe	Severe	Severe	Severe
ELK(EIC)	Severe: Floods	Severe: Floods	Severe: Floods	Severe: Slope, Floods	Severe: Floods
HAGERSTOWN (HnC)	Moderate: Slope, Depth to Rock, Too Clayey	Moderate: Slope, Low Strength	Moderate: Slope, Depth to Rock, Low Strength	Severe: Slope	Moderate: Low Strength, Slope
LAWRENCE(Lc)	Severe: Floods, Wetness	Severe: Floods, Wetness	Severe: Floods, Wetness	Severe: Floods, Wetness	Severe
LINDSIDE(Ln)	Severe: Floods	Severe: Floods	Severe: Floods, Wetness	Severe: Floods	Severe: Floods

The soil analysis points out that there are three (3) dominant soils in the Radcliff area: Crider Silt Loam, Vertress Silt Loam and Nicholson Silt Loam. The remaining soils are found mainly along the terraces of the Brushy Fork Creek and in the bottom of sinkhole basins and valleys. These secondary soils tend to have severe limitations to development, due to flooding or wetness. Many of the soils have high slopes, which hinder their development. As well, the majority of soil in Radcliff has a very high erosion potential. Much of the soil also has low strength and shrink-swell characteristics.

Developments should be sensitive to the slope of the site (Note: Slope is defined as the

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rise in vertical feet for every one-hundred feet of horizontal distance). A developer should consider the slope of the land in determining the compatibility of the site to a particular development proposal. Some designs are more compatible with the slope of land than other development proposals. Ideal slopes to be developed range from 2 to 6%; slopes above and below this range may be developed as well, but considerable cutting and filling must be done. Generally, urban land uses are limited to slopes of less than 15%. Residential structures can be suited to steeper slopes, if adequate measures are taken to stabilize the earth to prevent slippage and erosion. Many housing types, such as underground, partially underground, solar or walk-out basement units work well on sloped lots. Low-density residential and recreational land uses can be developed upon steeper slopes. Conversely, in most cases, high-density residential developments, commercial development and industrial developments should not be built on land with steep slopes. Developers should be concerned about the erosion potential of soils on all development sites. Sedimentation from erosion clogs up culverts and sinkhole outlets, which causes flooding. In addition, sedimentation is estimated to be the greatest single pollutant of lakes, streams, reservoirs and ponds in Kentucky. Sedimentation lowers the quality of water for municipal, industrial and recreational uses. Sediment is not only a pollutant itself, but it carries pesticides, phosphates and other polluting chemicals. By alleviating sedimentation; one can retain valuable topsoil, prevent contamination of the water system and reduce flooding. When cutting and grading occur during development, the striping of the topsoil and changes to natural contours should be held to a minimum. Sedimentation traps and basins should be installed to minimize erosion and the flow of sediment from the building site.



*Steep slopes such as the one pictured above are not ideal for development, due to their grade and soil properties.*

## GEOLOGY

The Radcliff planning area is located in the Pennyroyal Plain of the Mississippian Plateau Region. The meramec rock formation that is under Radcliff is one of the Mississippian Geologic Age, which is 340 million years old. The meramec rock formation is composed of St. Louis and St. Genevieve limestone. These types of limestone are soluble in ground water. The action of water reduces St. Louis and St. Genevieve limestone into the clayey soil found in numerous sinkholes and caverns. These rock formations are honeycombed with cracks, cavities and interconnecting caverns. These caverns become filled with water during the spring, fall and other periods of high precipitation. Large, interconnected, subsurface streams are formed as a result. The Radcliff planning area also contains two other minor rock formations: Alluvium (a mixture of sand, silt, clay and limestone gravel) is found mainly along the banks of the Brushy Fork Creek and in Karst valleys containing intermittent streams. Salem Limestone is found near the eastern boundary of the city.

The underlying limestone formations of central Kentucky, including the Radcliff area, are rare throughout the world. Karst are unique, because they are in a continual state of change. Underground stream channels, caverns and cavities repeatedly collapse, which ultimately results in the subsidence of above-ground landforms. This process of change, known as subsidence and collapse, occurs when water mixes with the other below ground elements to create a solution consisting of carbonic, lactic, organic and sulfuric acids. This acidic solution flows through the cracks, channels and caverns found in the limestone formations and it dissolves the limestone, weakening its support capacity.

This process continues until the underground channels can no longer support their weight, at which time they collapse and the above ground landform subsides. Evidence of this process can be seen throughout the city by the presence of sinkholes and karst valleys.

This karst process is strongest on compacted, well-defined points of limestone, in areas that receive a good amount of rainfall. A thick bed of limestone must exist for the karst process to continue to a depth which will cause alteration of landforms. Since the limestone formation under Radcliff averages about two-hundred feet in thickness and the climate is wet and humid, it can be expected that the karst process will continue to be fairly active in this area. The karst process is most likely increased by the practice of channeling the majority of the city's storm water into the sinkholes and underground caverns.

Due to the fact that Radcliff is located in a karst area that is probably fairly active, the city must be aware of the ramifications and potential problems that may arise from development in a karst area. The three basic problems that may be encountered when developing in a karst area are:

1. Collapse of land and associated structures;
2. Contamination of the underground water system;
3. Flooding.

Any time one builds in a karst area there is a chance that the lot and the associated structures may collapse. This possibility is probably higher in and around existing sinkholes, although new sinkholes can be formed in almost any area of Radcliff. It appears that the most active karst area of Radcliff is the area north of Lincoln Trail Boulevard and west of Dixie Boulevard. This area has the highest concentration of sinkholes, although numerous other sinkholes are scattered throughout the city. The possibility of having a structure collapse can be reduced by prohibiting development in sinkholes and their immediate environs, unless adequate measures are taken to stabilize the area. The city should identify all sinkholes and prohibit development in the area, unless measures are taken that stabilize the potential hazard. If the city thinks that an area may be unstable, it should require that the developer provide core samples and geotechnical engineering studies, which verify that the area is sound enough to house the proposed development.

The majority of drainage in Radcliff is subsurface drainage. Most of the storm water flows into sinkholes, where it seeps or flows into underground caverns and the underground water system. Sinkholes lead directly into the underground water table. This can lead to contamination of springs and wells in other parts of Radcliff and the county. Since run-off flows directly into the underground water system, extreme care should be taken to ensure that toxins from outfalls do not enter the water system. Sewer lines and lift stations should be located away from sinkholes, because sewer leaks could result in coliform bacteria entering the water table.

Flooding is yet another problem that is caused by sinkholes. Sinkholes can cause flooding in several ways. The sinkhole opening into the underground cave system can become clogged, so that the sinkhole drains much slower or not at all. If storm water is channeled into the sinkhole faster than it can drain, then pooling of storm water may cause flooding of nearby structures. The sinkhole's outlet may become clogged, due to sedimentation or debris blocking the channel. In addition, the channel itself may collapse as a result of the karst process. Many parts of the city have a naturally high water table, which means that many of the underground channels are filled with or contain water for much of the year. As new development causes additional storm water to be channeled into the under-ground system, these channels may become filled with so much water that it will flow out of the sinkholes and flood the adjacent area.

Evidence of the karst process and the resulting subsidence activity can be clearly seen in Radcliff. Many sinkhole basins in the northwestern portion of the city are very large and contain evidence of two and three stages of collapse. The vast majority of the sinkholes in this area have been filled or developed to some degree. Most of the development of



these subsided areas has been located on the first and second tier of the basin. The throats of the majority of these sinkholes have been left open, so it can function as a drainage outlet. In the past, the primary concern in developing areas near sinkholes is flooding, whereas little attention has been paid to the potential further subsidence of sinkhole's outer edge. Such subsidence activity could cause nearby structures to be unstable.

There are approximately fifty-two sinkholes located in the northwestern part of Radcliff. About eight sinkholes are located on the east side of Dixie Boulevard, north of the Vine Street intersection. On the east side of Dixie Boulevard and the south side of Vine Street, there are approximately twelve sinkhole basins, including a chain of oblong karst valleys. This chain of karst valleys extends from the Fort Knox Military Reservation, north of Falling Springs Road, southward, behind Uarco to Wilson Road. These subsided valleys likely originate from a major underground stream channel that has collapsed. The land located south of Vine Street and west of Dixie Boulevard remains relatively clear of subsidence activity, with only seven sinkhole basins that are spread out considerably. This southwestern portion of the city seems to have the greatest degree of stability of any portion of the planning area. It also appears to be an area that will spawn a lot of the future development in the city. For this reason, consideration should be given to annexing land in this area and encouraging future development in the vicinity.

## HYDROLOGY AND STORM WATER MANAGEMENT

Storm water management has become a major concern in the City of Radcliff, within the past year. The Environmental Protection Agency (EPA) has mandated that the City of Radcliff comply with the National Pollutant Discharge Elimination System Small Municipal Separate Storm Sewer System (MS4 Phase II) Program by 2008. The Phase II Program requires that municipalities track storm water outfalls, eliminate pollutants from waters of the state, more effectively manage water quantity relating to drainage in the city and educate the public on the importance of managing the quality and quantity of storm water in the community.

Hydrological features in Radcliff are very unique, due to the fact that the majority of hydrological features are subsurface. There are several small wet-weather water channels and only one continuous flow stream, Brushy Fork Creek, in the city. The Brushy Fork is fed by several tributaries, which drain a portion of the southwestern sector of the city. The Brushy Fork Creek feeds into Otter Creek in Vine Grove, which flows into the Ohio River. One other stream located just outside the city limits is Mill Creek. Mill Creek lies to the east of the planning area boundary inside the Fort Knox Military Reservation. The majority of surface drainage east of Dixie Boulevard flows towards Mill Creek, while the portion of the city west of Dixie Boulevard drains towards Brushy Fork Creek. Only a small percentage of this storm water reaches either Mill Creek or Brushy Fork Creek, due to the numerous sinkholes that intercept the flow and channel it into the

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underground water system. This water flows through underground stream channels, until it is discharged into the Brushy Fork Creek, Otter Creek, Mill Creek, the Ohio River or the Salt River. When precipitation levels are high, water tables are also high. Some water may be discharged out of springs into another sinkhole or tributary.



*The Brushy Fork Creek, which flows through Mill Pond Business Center, is the only above ground water channel within the Radcliff City limits.*

Due to the limestone rock substructure, which is very soluble in water, Radcliff is built upon several subsurface streams. These subsurface streams are fed water via sinkhole outlets. However, once the storm water flows into the sinkholes and enters the underground streams, the pattern of subsurface drainage is very difficult to determine. In general, it is composed of many small independent watershed units. The divides of these watersheds gather water and channel it into larger solution channels, which are generally found along enlarged joint systems. Generally, sinkholes are concentrated above the major solution channels; therefore, alignment of sinkholes can indicate the existence of subsurface solution channels. In Radcliff, it appears that these solution channels flow in a northwestern direction toward Otter Creek and the Ohio River. These solution channels normally contain a large amount of water and are excellent aquifers. Solution channels often yield wells with outputs of more than fifty gallons per mile. However, smaller solution channels at higher elevations are susceptible to going dry during the late summer and fall. Many of the streams discharging from upper solution channels go dry during this time of year. One of the drawbacks to the water within these channels, as mentioned earlier, is the vulnerability to surface contamination.

In terms of surface drainage, most surface storm water flows into sinkhole basins where it pools until it can flow through the outlet and into subsurface channels. This water will remain pooled for a wide range of time, varying from a few hours to a couple days. This time span depends on the capacity of the sinkhole's outlet. Storm water flowing into the

sinkhole basin almost always pools, because the water flows at a much faster rate at the surface than it does through the subsurface system. The amount of water that a sinkhole outlet and subsurface water system can handle will vary depending upon several factors including but not limited to:

1. The level of the underground water table (the higher the water table, the slower the absorption rate);
2. The condition and size of the underground channels (if a channel collapses, the sinkhole's carrying capacity will be greatly reduced);
3. The degree to which the outlet is clogged by debris or sediment.

Since all three of these factors are in a constant state of change, a sinkhole's outlet capacity is likely to change over time. The area adjacent to the sinkhole may experience flooding; therefore, it is difficult to determine how close a development can be sited in proximity to a sinkhole.

Radcliff is spotted with sinkhole basins that contain water on either a temporary or a permanent basis. It is probable that all of the basins within the planning area will flood to some degree with the advent of a one-hundred year storm. To date, these basins have been generally left untouched as unimproved drainage areas, although lately there have been developments around sinkholes which have been improved as retention areas. The vast majority of Radcliff's sinkholes are not maintained. Due to this lack of maintenance and the high degree of erosion in the city, many of these sinkhole outlets are clogged by sedimentation and debris. These clogged basins flood surrounding properties, act as mosquito breeding grounds and pose other health hazards to the community. As the city grows and develops, the amount of impervious surface will increase, thereby increasing the volume and velocity of storm water run-off. As sinkhole basins receive greater volumes of storm water at higher velocities, two things will occur:

1. The amount of water in the subsurface system will increase, which will lead to increased limestone deterioration and greater frequency of subsidence and collapse;
2. A majority of the sinkhole basins will receive an inflow of water greater than their outlets can handle, thereby increasing the area around the basin that will flood.

The bottom line is that sinkholes are a very undesirable form of storing and releasing drainage. However, with the exception of the area around the Brushy Fork and its tributaries, it is the only economical method of storm water disposal available to Radcliff. Since it is apparent that Radcliff must utilize sinkholes as a primary component of their storm water management system, the city should take steps to minimize the problems that are associated with this practice. The first step that needs to be taken is for the city to

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map all sinkholes within the city. Mapping of these storm water outfalls enables the city to determine sinkhole location in relation to development. These sinkholes should be shown on the city's digital mapping system. Eventually, a geographic information system database could be attached to each sinkhole with associated feature characteristics listed.

The second step should be to identify the outlets for the various sinkholes, and to determine if they are clogged. A procedure for unclogging those that are blocked should be developed. An easement release should be secured from all property owners of major sinkhole basins. This would allow for the routine inspection by city employees to locate any heavy sedimentation deposits. This would allow a clean out of a sinkhole before a major clean-up effort would be needed. If new developments propose to channel their storm water into sinkhole basins, then the outlet capacity of the sinkhole should be very conservatively estimated so that no structures within, or adjacent to, the development will become flooded in case of underground collapse or some other malfunction which reduces the outlet capacity.



Sinkhole basins, such as the one pictured above, should be mapped, regularly maintained and monitored.

Retention of the storm water created by new developments will help to minimize the problems associated with sinkholes. Retention of storm water allows for greater evaporation and percolation to occur, thereby reducing the amount of water the sink ultimately receives. Retention also reduces the velocity of the flow so that the sink's outlet capacity is not so likely to be exceeded.

Many of the city's future drainage, erosion, and sedimentary problems can be addressed through a policy that requires all developments to retain as much water as they create. This can be achieved through the construction of retention areas in all developments.

The retention areas can be either on or off site and can be designed to be wet or semi-dry basins. Following is a list of various retention basin designs that might be used:

1. **NATURAL OPEN AREA DRY BASIN**  
This type utilizes natural terrain for economic or aesthetic reasons, and consists of a designated storage area with a throttled outlet for effective retention. The hydraulic throttle may be a restricted culvert under an elevated roadway, a man-made dam warped and bended with the terrain for a pleasing appearance or some other restriction which, when surcharged, will not back flood any on site feature subject to damage.
2. **MODIFIED OPEN AREA DRY BASIN**  
This consists of an excavated area which is readily recognized as a retention facility to the casual observer, but otherwise is similar to the foregoing type.
3. **NATURAL OPEN AREA WET BASIN**  
The wet basin designation implies the use of a formal permanent pool. This type of basin is usually employed for aesthetic reasons acting as a site amenity which makes developments more attractive and desirable. This type of basin generally drains a sufficient sized watershed to preclude substantial evaporation effects during the summer months.
4. **MODIFIED OPEN AREA WET BASIN**  
This type consists of a man-made excavation with a permanent pool and is usually employed in developments where fountains or other permanent pools are desirable. This type of basin also often acts as a site amenity which improves the design and desirability of a development.
5. **LATERAL BASIN**  
This type of retention facility is basically an over-sized ditch or channel with checks or dams which cause temporary pooling of storm water.
6. **RECREATIONAL BASIN**  
This is usually similar to the general category of either natural open area or modified open area, but chiefly alludes to the dual usage of retention areas as some recreational facility which is not likely to be used and/or damaged during intensive rainfall periods. There should always be at least 1% slopes in these areas to promote rapid drying.
7. **SUBGRADE BASINS**  
Either a sub-grade vault or an over-sized storm piping with throttled outlets would be examples of this category. Where open areas are at a financial premium, the developer may elect to use fairly costly sub-grade facilities. This usually applies to



commercial areas.

No matter what design is chosen, storm water retention basins can go a long way in controlling current and future storm water problems. They can successfully reduce the need and cost of replacing and enlarging current storm water infrastructure, reduce the burden on sinkholes and generally protect structures and land adjacent to drainage ways from flooding and erosion damage.

## SINKHOLE INVENTORY

In order to plan future development in Radcliff around natural features, all sinkholes in the city have been identified on the City of Radcliff Sinkhole Map (See Appendix). This map shows the approximate locations of all sinkholes in the city. Each basin was assigned an identification number and briefly described in terms of how deep it is, how much it has been altered, how it related to other basins in the area and how flood prone it is. The basins are described in terms of what level of collapse they contained. Each level of collapse equals a 10 foot depression, unless otherwise noted

The following is a description of sinkhole basins, karst valleys, and flood prone areas illustrated on the City of Radcliff Sinkhole Map. The numbers located at the left of each description paragraph represents the sinkhole basin's number depicted on the Sinkhole Map:

1. SINKHOLES 1 AND 1A: The basin that exists at this location today is the remainder of a much larger basin. This basin used to run across the road to the east of the existing sinkhole and continue parallel to Northern Road, for approximately 700 feet. The remaining portion of the sinkhole is in the second and third stages of the depression. This area is also subject to flooding. A junk yard is located in the portion of the basin north of Northern Road; there appears to be another throat in this area near the intersection of Northern Road and Illinois Road. Basin #1 needs to be cleaned up and tires and rubbish removed from the sink.
2. SINKHOLE 2: This basin is very large and basically still in its natural state. The basin is approximately 30 feet to 40 feet deep and has several depressions within its boundaries. This basin was not field checked to determine if it is flood prone but is highly probable that at least the very bottom tier floods since its elevation is only 710 feet above sea level. Large amounts of water tend to stand for long periods of time in this basin.
3. SINKHOLE 3: This basin is approximately 25 feet deep and is still basically undeveloped except for a portion of it which lies within Paradise Mobile Home

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Park; here several trailers have been sited on the outer rim. Some filling may have occurred in this area. The lower levels of the basin are flood prone.

4. SINKHOLES 4 AND 5: These are the remaining bottom areas of a much larger basin which used to occupy much of the land area upon which the portion of Paradise Mobile Home Park closest to Hill Street now sits. Apparently, the basin was altered to accommodate the building of the trailer sites, and apartment building, and a single-family home. Much of this basin has been developed; the remaining bottom tier and throat areas are subject to flooding.
5. SINKHOLE 6 AND 6A: These sinkholes are located within the city park, their forms were altered when the park, tennis courts, and adjacent commercial property was developed. Sink #6 drains 6A water well, due to a large opening in the rock leading to an underground cavern; #6A receives water but does not drain well; therefore, the water tends to stand for long periods.
6. SINKHOLES 7, 8 AND 9: These three sinks all represent the lowest level of collapse of a larger basin which encompasses this area of the city park and a portion of the trailer park property. These sinks are basically in their normal state. The sinks within the park boundaries are a good example of how sinkhole basin areas can be utilized for recreational and open space purposes. Basin #9 is the largest of the three basins and may be subject to flooding although no field data is available.
7. SINKHOLE 10: This is a minor isolated basin which has experienced only one stage of collapse. No flood data is available on this basin. The depth of the depression should be less than 15 feet.
8. SINKHOLE 11: This is a fairly large basin still in its natural state which has two areas within it where further collapse has occurred; these second stage depressions are approximately 20 feet deep from the top of the basin. There is another smaller basin just south of #11 near the radio tower. These basins are located in the bottom of a large karst valley and receive a large amount of storm water runoff from the surrounding area. These basins are apparently taking the water adequately at this time; no flood data is available on this area.
9. SINKHOLE 12: This is a very large sprawling basin which runs for approximately 2,000 feet; a portion of the basin is within the planning area boundary with the remainder being within the military reservation boundary. This basin contains two second stage depressions, one of which contains a pond and the other acts as the terminus point for an intermittent stream. Although no flood data is available on this basin, it is highly probable that it would experience some degree of flooding during periods of intense rainfall. There would likely also be some minor flooding



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along the banks of the intermittent streams, which begins just east of 31W and terminates in the middle of basin #12. Only the northern end of this basin appears to have been altered.

10. SINKHOLE 13: This basin is the third stage of collapse within a much larger basin, which extended south along Logsdon and extended almost over to Hill Street. Much of this larger basin has been filled, altered, and developed in some manner, as residential building has occurred in this area. This basin does receive some storm water runoff but does not flood due to a cavern opening which takes the water adequately. The area around this basin has been extensively altered.
11. SINKHOLE 14: This basin has similar characteristics to #13, with the exception that the storm water which flows into may pool for a few days before it finally makes its way into the underground passages. Therefore, this basin is flood prone during periods of heavy rainfall. This basin has also been altered.
12. SINKHOLE 15: This basin has been extensively altered to act as retention basin for a portion of the Rolling Oaks Subdivision. The southern portion of the basin has been filled and the northern portion widened and deepened. Like #13 it also is the lowest level of collapse of the very large basin which used to encompass much of this area of the city. This basin receives a good amount of storm water runoff which currently pools for a considerable amount of time before it finds its way into the underground system.
13. SINKHOLE 16: This basin is another of the lowest level of collapse within the larger basin referred to in #13 and #15. This basin has also been altered with the construction of the Rolling Oaks Subdivision to act as a retention basin; the northern area seems to have been lengthened and deepened and the southern area filled. This basin also receives a substantial amount of storm water runoff which pools for considerable lengths of time.
14. SINKHOLES 17, 22, 23, 25, 30, 31, 32 AND 33: These basins are the remaining lower levels of a very large basin which used to run from Hill Street (near Globe intersection) to Elm Road. The majority of the larger basin has been either filled, altered, and/or developed as residential building has occurred within it. The land in basin #17 tends to be marshy and is flood prone; this area is contained within the second tier of collapse of the larger basin which is not the lowest elevation in the area. Number 22 is a basin contained within the third level of collapse and is one of the lowest elevations of the original basin; this basin & receives storm water which quickly finds its way into the underground system. This basin is also the terminus of an intermittent stream which finds its way into the underground system at this point. The form of this basin has been altered in preparation for residential development. Basin #23 follows an offshoot or dogleg of the original basin; the

intermittent stream flows through #23 on its way to #22; #23 is located on the first and second tier of the depression. No flood data is available on #23, but the probability of flooding is light except along the banks of the intermittent stream. The #25 basin has been extensively altered as residential units have been built up around it; today it functions as a large retention basin receiving a substantial amount of storm water which pools in it until it can be absorbed into the underground system. Basin #30, a second tier basin has been developed into an effective temporary holding area; it collects some of the storm water from the surrounding area and holds it temporarily until it can be channeled into basin #25 via connecting underground pipes. Basin #30 is a fine example of a well-shaped, piped and vegetated retention area. Basin #30 originally extended across Hillcrest; that area has now been residentially developed yet it retains water briefly during periods of high rains, this water is eventually piped across Hillcrest into #30. Basin #31, also a second tier basin which is located very near the outer western boundary of the original basin. The western slope of basin #31 is rather steep which is probably the reason why it remains undeveloped while everything around it is built upon. Storm water flows into #31 but no flooding has been evidenced. Basin #32 contains both second and third tier collapses; although much of it has been altered, it is one of the lowest remaining areas of this portion of the larger basin area and as such receives a large amount of storm water runoff. The runoff pools into a large area and remains for quite some time before it finally finds its way into the ground. Basin #33 is located within the second and third levels of collapse and remains in a natural state. This basin should receive a good deal of runoff but no flood data is available.

15. SINKHOLE 18: Basin #18 is a rather minor isolated basin indicating only one level of collapse, therefore should be less than 15 feet deep. No flood data is available on this basin.
16. SINKHOLES 19, 20 AND 21: These three basins are a portion of the remaining lower areas of the much larger basin which contains basins #13, 14, 15, 16, and 17. Basins #19, 20, and 21 are all located on the third level of the collapse, and there is a strong possibility that all three are flood prone to some degree. Two intermittent streams terminate with basin #20. All three basins appear to still be in basically their natural forms.
17. SINKHOLE 24: The majority of this basin consists of a first state of collapse except for the very most northern portion of the basin near Hill Street has another smaller further collapsed area. This smaller area may represent the throat of the basin leading into the underground system. No flood data is available on this basin. This sink has large amounts of trash that have been dumped around the throat.

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18. SINKHOLE 26: Basin #26 is a large sprawling basin that has been altered due to residential development. The basin is between 15 - 20 feet deep; no flood data is available on the basin.
19. SINKHOLE 27 AND 83: This basin is a large crescent shaped basin which contains four smaller stage depressions and one larger depression evidencing second and third stage collapses within its borders. Basin #27 is still in its natural state; there is no flood data available on the basin except that several of the smaller depressions do contain ponds. Basin #83 is a natural basin which exhibits two stages of collapse; no flood data is available on this basin.
20. SINKHOLE 28: This is a natural basin located just outside of basin #27. Basin #28 exhibits several stages of collapse; no flood data is available on this basin.
21. SINKHOLE 29: This basin indicates two stages of collapse; portions of it have been altered as the area around it has developed residentially. There is no flood data available for this basin.
22. SINKHOLE 34: This basin exhibits two stages of collapse with the steepest area of the basin being that portion adjacent to Woodland Drive. Portions of the basin have been altered as residential development has occurred along its outer boundary. There is soil slippage occurring along the east side of Woodland Drive into the basin due to improper fill in this area. This slippage may, in time, endanger the sub-grade and base of Woodland Drive. There is no flood data available on this basin although it is likely that some flooding would occur in the very bottom during periods of heavy rains.
23. SINKHOLE 35: This basin originally exhibited three levels of collapse; however, today only the third level and portions of the second and first remain. The majority of this basin has been extensively altered to accommodate the development of two multi-family subdivisions in this area. The lower areas of the portions are flood-prone with water lapping up against some of the multi-family structures for short periods of time during heavy rains.
24. SINKHOLE 36: This basin is the remaining second and third level depression of a larger basin that ran from just south of Spring Street to Robbie Valentine Drive. The remaining portions of this basin are sinkholes 36, 37, and 42. The south and west sides of second level of #36 have been altered when the land adjacent to them was filled. The remaining portions are basically in their natural state. Storm water flows into this basin but no flood data is available.
25. SINKHOLES 37 AND 42: Basin #37 is another of the remaining sub-depressions contained within the larger basin described in #36. Basin #37 exhibits second

and third degree levels of collapse. Much of the outer perimeter and area around #37 has been extensively altered through cut and fill operations, although it still remains vacant. Basin #27 receives storm water runoff which tends to pool for several days, before it is absorbed into the underground system. Basin #42 has been cut off from the larger basin with the construction of Lincoln Trail Boulevard. Basin #42 exhibits first, second and third degree levels of collapse. Most of the first level, and some of the second level on the west side has been filled, altered or developed. The area of #42 with the third degree level of collapse is a small area just south of Lincoln Trail Boulevard. A small intermittent stream flows through #42 from the south and north, entering and terminating into the ground. This area contains the third and lowest level of collapse. Basin #42 receives storm water runoff which tends to pool and flood the area around the lowest depression for short periods of time. The area adjacent to the intermittent stream is also flood-prone.

26. SINKHOLE 38: The majority of this basin is contained within a first level of collapse although there is a small area in the center of it which exhibits a further level of collapse. No flood data is available on this natural basin.
27. SINKHOLE 39: This large basin consist of a deep depression of the third degree level with the northern side of the basin having by far the steepest incline. The outer perimeters of this basin have been slightly altered; there is no flood data available on the basin.
28. SINKHOLE 40: This basin used to extend to the eastern edge of Dixie Boulevard and across East Lincoln Trail; the original oblong basin ran in an east-west direction for approximately 1,700 feet beginning at the present eastern edge of 31W. The original basin consisted of a large first degree level of collapse with two areas within it exhibiting second degree levels of collapse with two areas with two areas within it exhibiting second degree levels of collapse. Presently, the first degree level nearest to 31W has been filled, altered and developed to contain commercial structures. Most of the remaining first degree area and some of the second degree area which runs parallel to East Lincoln Trail has been filled and altered but still remains vacant. A portion of both of the second degree levels have been left open and both of these are flood prone.
29. SINKHOLE 41: This large basin consist of a first level of collapse. Portions of the northern area have been altered and contain an auto storage area, the remaining southern area is in its natural state. Portions of the basin are flood prone. Large amounts of garbage and fill have reduced the sinkholes retention capacity.
30. SINKHOLE 43: Basin #43 is the remaining portion of a much larger basin, which used to extend from Logsdon Parkway past Crescent Way to just south of Elm

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- Road. Most of the original basin has been filled and developed in a residential manner. The lower levels of the remaining portion are flood prone.
31. SINKHOLE 44: This basin is rather shallow exhibiting only one stage of collapse. The original shape of the basin has been altered slightly with the construction of Lincoln Trail and North Lorraine Street. This basin receives a considerable amount of storm water runoff from the before finding its way into the underground water system. Due to the limited capacity of the basin's outlet, the majority of this basin is very flood prone. These flood waters come very close to flooding adjacent single-family and multi-family residential properties, as well as commercial properties on the other side of Lincoln Trail. Boulevard.
  32. SINKHOLE 45: This basin contains three levels of collapse. The third degree level is a very small area in the northwest corner of the basin. This corner is also the steepest area of the basin. An intermittent stream flows from the northeast and terminates at this basin, flowing into the ground at the area containing the third degree level of collapse. This basin is still in its natural state. No flood data is available but it is likely that the areas adjacent to the lowest level and along the stream are somewhat flood- prone.
  33. SINKHOLE 46: This basin is small and exhibits one level of collapse. The basin contains a dry lake bed, but no current flood data is available.
  34. SINKHOLE 47: This is a small basin with a first degree level of collapse; a portion of the basin contains a pond.
  35. SINKHOLE 48: This basin is one of the lowest levels of a much larger basin which used to extend across Hill Street but was altered with the construction of the street. Basin #48 remains undeveloped; no flood data is available although the likelihood of some flooding is high.
  36. SINKHOLE 49: This basin consist of two levels of collapse; some of the development along Lincoln Trail Boulevard. This basin receives a considerable amount of storm water runoff which floods the lower level of the basin deeply.
  37. SINKHOLE 50: This large basin consists primarily of first and second level of collapse; however, there is a small depression in the southwest corner which is a third level depression. An intermittent stream flows from the south and terminates in the northern portion of this basin. Portions of the first and second levels on the east side have been altered and filled as residential subdivisions have been built there. Areas of the first level adjacent to Elm Road have also been altered and developed as mobile home parks were placed in this area. Much of the remaining northern portion of the basin and the area adjacent to the stream is extremely flood prone. Storm water tends to pool in portions of this basin to

depths in excess of four feet.

38. SINKHOLES 51 AND 52: These two basins are the remaining second level areas of a larger basin which has been dissected by Logsdon Parkway. Most of the larger basin has been filled and altered as residential development has occurred here, with #51 and #52 being the only areas that are still in basically their natural form. There is no flood data available on either of these basins.
39. SINKHOLE 53: This basin exhibits three levels of collapse, with the western side having a very steep incline. The northern and eastern first level areas have been filled and altered to house development. The second and third levels of collapse have been left in their natural form. There is no flood data available on this basin.
40. SINKHOLE 54: This basin exhibits three levels of collapse. The majority of the original basin was contained within the first level, and the second and third levels of collapse occurred in an area along the western border. Basin #54 originally extended north across College Street, east across University Drive and south to the edge of Crocus Drive. Most of the first level has been filled and altered to accommodate the single-family and multi-family development that has occurred in the area. The portion illustrated as #54 represents all of the second and third level areas. This portion of the basin is in its natural state. No flood data is available for this basin.
41. SINKHOLE 55: This basin has one level of collapse, which used to contain a pond. Apparently, the pond was drained as residential development occurred around the perimeter of the basin. The basin itself has not been extensively altered, with the exception of an area which was filled when Crocus Drive was built across it. Basin #55 receives a considerable amount of storm water runoff, which pools in excess of four feet during periods of heavy rains. The total basin area is very flood-prone.
42. SINKHOLE 56: This basin has two levels of collapse. The basin appears to be basically in its natural form and no flood data is available.
43. SINKHOLE 57: This basin exhibits a first degree collapse, which contains three separate second degree depressions within it. A large portion of the first degree level has been altered and filled when Hill as well. One of the second degree depression used to contain a pond, which is no longer present; however, the lower portions of this basin contains large amounts of water for extended periods of time.

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44. SINKHOLE 58: This basin contained first and second degree levels of collapse; today some of the first level has been altered and the second level contains a pond.
45. SINKHOLE 59: This basin contains a first degree collapse. The basin is undeveloped; no flood data is available.
46. SINKHOLE 60: This was a large sprawling basin which contained both first and second degree collapse areas. Much of the northern and eastern first level areas have been altered and filled to accommodate single-family and mobile home park development. Most of the second degree level remains vacant with the majority of it being flooded by a lake.
47. SINKHOLE 61: This is a large basin containing both first and second degree levels of collapse; a portion of both levels has been filled and altered by the development of a cement plant on the edge and within the original boundaries of the basin. Much of the remaining basin is flood prone with deep water pooling within it during periods of heavy rains. This water will often pool for considerable lengths of time.
48. SINKHOLES 62, 63, 64, 65, 66 AND 67: All of these basins are contained within one huge karst valley. The valley starts at the northern tip of #62. and runs in a southeastern direction to the bottom of #63. It splits into two separate off-shoot valleys, which run parallel in a southwesterly direction. One of the valleys contains basin #64, and the other valley contains #66 and #67. Often, when you have a valley of this nature it indicates that there is a major underground water channel in this area, along which the valley has collapsed. This more than likely is the case here. Basins 76, 68, 69, 70, 71, 72, 73, 74, 74A and 75 also most likely are aligned over top of this major underground channel. Although these basins are not contained within the actual karst valley they do have surface alignment which indicates that they probably are also sited over this underground channel. Water which enters into the underground channel system via the outlets of any of these basins (62 - 75) most likely feeds into Falling Springs, which then feeds into Mill Creek. There is the possibility that some of the water collected by these basins also finds its way into the Brushy Fork. The water may even flow in both directions at the same time, depending on the underground water level. Basin #65 exhibits three levels of collapse. It is an oblong basin, which is still in its natural state. No flood data is available for this basin. Basin #63 exhibits two stages of collapse, although the second stage depression consists of only a small part of the basin. This basin is in its natural state and no flood data is available. Basin #64 makes up the northern off-shoot of the karst valley described earlier. The majority of this natural basin is contained within a first and second stage of collapse although there are two independent third level depressions in the



center. An intermittent stream flows from the west and terminates in this basin at one of these third level depressions. No flood data is available on this basin, but flooding along the stream and within the lower levels is likely. Basin #65 is located at the northern tip of the other off-shoot karst valley. It consists of first, second, and third degree levels of collapse. There is no flood data available on this basin. Basin #66 consists of a first level of collapse. The lower levels of the basin contains three ponds. Basin #67 contains first, second and third degree levels of collapse, although the majority of the basin is contained within the second level. The third level depression is located at the northern tip of the basin. The basin is in its natural state and no flood data is available, although flooding of the lower level is likely.

49. SINKHOLE 68: This basin consists of a first degree level of collapse. The original basin is now dissected by Pinewood Drive. The south side of the original basin has been filled and altered with only the north side being left in its natural state. No flood data is available on the basin.
50. SINKHOLE 69: This basin consists of a first level collapse. The basin is still in its natural form. There is no flood data available on this basin.
51. SINKHOLE 70: This basin consists of first and second degree collapses, with the second level containing two ponds.
52. SINKHOLE 71: The majority of this basin is contained within a first level of collapse. There is a small second level depression located at the southern end of the basin. This basin is still in its natural state, and there is no flood data available on the basin.
53. SINKHOLES 72 AND 73: These two basins are contained within a larger karst valley, which originally ran from the northern end of #72 and terminated in the south on the western side of Lavon Court, in Happy Valley Subdivision. The southern portion of this valley has been altered as residential and commercial development has occurred in the area. The valley was also dissected by the construction of 31W so that now only basins #72 and #73 remain. Basin #72 contains three levels of collapse, with an intermittent stream flowing through the lowest level. This stream, which terminates in the northeastern end of the basin from the south, carries a considerable amount of storm water into this basin. Basin #72 is extremely flood-prone with water pooling to very deep depths during periods of heavy rain. The outer perimeters of #72 have been altered as development has occurred in the area. Basin #73 contains first and second degree levels of collapse. The remaining portions of the basin are basically in their natural state, although the original boundaries have been altered. Two intermittent streams flow through basin #73. These two streams converge into

one just prior to flowing under 31W and into basin #72. As basin #72 fills up, it backs water up these intermittent streams and floods basin #73 to deep depths. The flooding of basin #73 sometimes also results in the flooding of Wilson Road near the Shelton Road intersection. This area is part of the original boundaries of the karst valley. Basin #72 has been altered to better handle the large amounts of runoff.

54. SINKHOLE 74: This basin exhibits two levels of collapse. Due to the small size and depth of the basin (approximately 20 feet) the sides are rather steep. The basin is in its natural state and no flood data is available for this basin.
55. SINKHOLE 74A: This basin actually consist of two levels of collapse although only the first level has been illustrated due to the gentleness of the slope between the first and second depression areas. The second level area of collapse makes up about one-quarter of the total basin. area. The basin is in its natural state; no flood data is available.
56. SINKHOLE 75: This basin consists of three levels of collapse. However, the first and third levels are five foot levels and the second level is a ten foot level. The third level is contained within a small depression located in the southern end of the basin. The basin has been substantially altered by residential development. No flood data is available for this sinkhole.
57. SINKHOLE 76: This small basin exhibits two levels of collapse. The basin is in its natural form and no flood data is available.
58. SINKHOLE 77: This is an isolated basin which is in its natural state. The basin exhibits a first level of collapse and no flood data is available for it. Large amounts of concrete have sealed this sinkhole.
59. SINKHOLE 78: This is a second degree basin which is one of the lower level depressions contained within the same original basin that contains basins #13, 14, 15, 16, 19, 20 and 21. The outer perimeter of #78 has been altered slightly as residential development has occurred. This basin receives a good deal of storm water, which pools in the basin during periods of heavy rain. There may be an opening into a cavern within, or adjacent to this basin.
60. SINKHOLE 79: This basin contains both first and second level collapses, although much of the southern portion of the first level has been filled or altered with the construction of Globe Street and the development of Stoess Mobile Home Park and the businesses across from the park. Some filling has also been done on the western side of the first level border; including the construction of some type of earthen berm or dam between the first and second level of collapse. The

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remaining portions of #79 receive a considerable amount of storm water which floods the total basin. The storm water pools to considerable depths on both sides of the aforementioned berm during periods of heavy rains.

61. SINKHOLE 80: This basin consists of a first degree level of collapse. The basin has been filled and altered with the construction of the new motel on the south side. This basin becomes flooded during periods of heavy rain.
62. SINKHOLE 81: This basin exhibits a first degree level of collapse. The outer level has been slightly altered, as development has occurred around it. There is no flood data available on this basin.
63. SINKHOLE 82: Basin #82 is the remaining portion of a much larger basin which originally extended to the north as far as the present location of Hunters Lane and to the west as far as Congress Drive. Much of the original basin has been filled, altered and developed to house portions of the Kendale and Foxboro Subdivisions. The original basin consisted primarily of a first level of collapse, which contained two smaller second level depressions. One of the second level depressions was located on the north side of Hillcrest Drive. This area has been developed into residential yards and contains a paved drainage ditch which moves the storm water through it so it can empty into #82. Basin #82 contains all of the other second level depression and portions of the original first level. Basin #82 is completely surrounded by residential development, with the exception of the vacant area adjacent to Hillcrest Drive and Logsdon Parkway. This basin receives a considerable amount of storm water runoff from the surrounding area. This storm water floods the entire basin area and some of the adjacent residential yards during periods of heavy rain. This flood water tends to pool at fairly deep levels for long lengths of time. Eventually, it is absorbed into the underground system at a slow rate.
83. SINKHOLE 83: This is a small basin containing a first level depression. A church has been built over a good portion of the original basin, with only a third of the basin remaining. The remaining portion floods and pools with heavy rains.
84. SINKHOLE 84: This basin represents the second level depression of a larger first level basin which used to extend across both sides of Fairview Avenue. The majority of the first level has been filled and altered as development has occurred along Fairview Avenue, Logsdon Parkway and Crocus Drive. The remaining second level depression is basically in its natural state. No flood data is available.
85. SINKHOLE 85: This is a small basin surrounded by intense development. This basin receives storm water runoff from the commercial and multi-family developments built on both sides of Knox Boulevard, near the 31W intersection.

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Some of this water is piped across Knox Boulevard and flows into the basin via an eroding drainage ditch. No flood data is available, although it is likely that the bottom of this basin pools for at least short periods of time.

### WILDLIFE

Sightings of wildlife are common within the City of Radcliff. The majority of species are secure, but some are also endangered. The Kentucky Department of Fish and Wildlife has listed five endangered species that are located within Hardin County. These endangered species are as follows:

1. Alabama Shad (*Alosa alabamae*)
2. Gray Bat (*Myotis grisescens*)
3. Indiana Bat (*Myotis sodalis*)
4. Kentucky Creekshell (*Villosa ortmanni*)
5. Northern Harrier (*Circus cyaneus*)

New developments should be conscious of these endangered species prior to developing an environmentally sensitive habitat for wildlife.



*The gray bat is one of five endangered species in Hardin County.*

## INTRODUCTION

Land use planning and transportation are very closely related. In order to service a variety of land uses, an efficient transportation system is necessary. This transportation system must be able to adapt to changing land uses and density, so that it will move traffic without congestion and delays. The level of service on a road is directly related to the land uses and the density of these uses in the vicinity of the road. Generally, when the density of a land use increases, traffic increases, thereby decreasing the level of service on the road. The level of service on a single road can dramatically affect the performance of other roads, since the transportation network is intertwined.

The purpose of this Transportation Element is to assess Radcliff's existing transportation network and to determine Radcliff's future transportation needs. Once the future transportation needs are determined, policies can be developed to enhance the performance of the existing transportation network.

## STREET CLASSIFICATION

In order to establish transportation policies, an inventory of existing transportation facilities must be conducted. Radcliff's primary means of transportation consists of streets and sidewalks. Every street in the City of Radcliff can be classified, based on the operation of the roadway. Listed below are descriptions of the various street classifications found in Radcliff:

A. MAJOR ARTERIAL STREET

Major arterial streets generally have access control, channelized intersections and restricted parking. The primary function of major arterials is to collect and distribute traffic to and from minor arterials. Major arterials move both local and through traffic.

B. MINOR ARTERIAL STREET

Minor arterial streets are streets with traffic signals at major intersections and stop signs on minor intersections. The primary function of minor arterials is to collect and distribute traffic to and from collector streets. Minor arterials tend to move large traffic volumes across the city, but not outside the city.

C. COLLECTOR STREET

A collector street collects traffic from local streets and connects with major and minor arterials.

D. LOCAL STREET

A local street provides vehicular access to abutting property and it discourages through traffic by design. Examples of local streets are crescents, cul-de-sacs and

loops.

The following street classifications can be assigned to Radcliff's more heavily traveled streets:

A. MAJOR ARTERIALS

1. Joe Prather Highway
2. Dixie Boulevard
3. Battle Training Road
4. Vine Street

B. MINOR ARTERIALS

1. Lincoln Trail Boulevard
2. Logsdon Parkway
3. Wilson Road
4. Knox Boulevard
5. Rogersville Road

C. COLLECTORS

1. Hill Street
2. Elm Road
3. South Boundary Road
4. Woodland Drive
5. Hillcrest Drive
6. Centennial Avenue
7. Blackjack Road
8. Lorraine Street
9. Shelton Road
10. Miller Avenue
11. Skyline Drive
12. Shelby Avenue
13. Millcreek Road
14. Southland Drive
15. Wilma Avenue
16. Pearman Parkway
17. Atcher Street
18. Congress Drive
19. Park Avenue
20. Redmar Boulevard
21. Sunset Drive

- 22. Crocus Drive
- 23. Spring Street



*Dixie Boulevard is Radcliff's most heavily traveled major arterial roadway.*



*Darlene Circle, which is a cul-de-sac, is one of several local streets in Radcliff.*



*Lincoln Trail Boulevard is classified as a minor arterial, due to the fact that it is not a limited access roadway.*



*Skyline Drive is classified as a collector road, because it collects traffic from local roads in the Hilltop Terrace Subdivision and it channels this traffic onto arterial roads such as Joe Prather Highway, pictured above.*

## TRAFFIC VOLUMES

The Kentucky Transportation Cabinet conducts traffic counts on certain road segments throughout the City of Radcliff, approximately every three years. These traffic counts are performed by laying a traffic hose across a specific point on the roadway for a twenty-four hour period. The traffic hose counts the number of vehicles that travel over this specific point each hour. The traffic volume measured over a twenty-four hour time frame, is referred to as the Average Daily Traffic (A.D.T.). (See Traffic Volume Map).



## ELEMENT IV-TRANSPORTATION

The most current traffic volume data for Radcliff was last updated by the Kentucky Transportation Cabinet on June 27, 2003. The results of this traffic count data are shown below (See Table 1) for specific arterial and collector roads in Radcliff:

TABLE 1: RADCLIFF TRAFFIC COUNT SUMMARY

### U.S. 31W

	<u>A.D.T.</u>	<u>YEAR</u>
KY 434 TO JOHNSON RD/NALLS LN	32 984	2002
JOHNSON RD/NALLS LN TO SHELBY AVE	23 058	2000
SHELBY AVE TO MILLCREEK RD	29 991	2002
MILLCREEK RD TO VINE ST	31 049	2002
VINE ST TO LINCOLN TRAIL BLVD	31 025	2002
LINCOLN TRAIL BLVD TO WILSON RD	29 285	2001
WILSON RD TO HILL ST	27 128	2001
HILL ST TO GLOBE ST	26 344	2001
GLOBE ST TO KNOX BLVD	23 781	2001
KNOX BLVD TO BULLION BLVD	18 583	2001
BULLION BLVD TO CHAFFEE AVE BRIDGE	22 015	2000
CHAFFEE AVE BRIDGE TO MEADE COUNTY LINE	16 508	2000

### VINE STREET(KY 144)

HILL ST TO DEEPWOOD DR	5 550	2000
DEEPWOOD DR TO WILSON RD	5 687	2002
WILSON RD TO U.S. 31W	7 418	2000

### JOE PRATHER HIGHWAY(KY 313)

I-65 OVERPASS TO KY 251	5 079	2002
KY 251 TO SOUTH BOUNDARY RD	5 120	2002
SOUTH BOUNDARY RD TO U.S. 31W	5 185	2002
U.S. 31W TO ROGERSVILLE RD	7 662	2002
ROGERSVILLE RD TO VINE ST	5 675	2002

### BATTLE TRAINING ROAD(KY 434)

U.S. 31W TO SOUTH BOUNDARY RD	3 878	2002
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### ROGERSVILLE ROAD(KY 1500)

LOGSDON PKWY TO WILSON RD	3 481	1999
WILSON RD TO U.S. 31W	2 013	2001

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LOGSDON PARKWAY(KY 1646)

	<u>A.D.T.</u>	<u>YEAR</u>
KY 313 TO PEARMAN PKWY	5 808	2000
PEARMAN PKWY TO VINE ST	7 022	2000
VINE ST TO FAIRVIEW AVE	6 470	2000
FAIRVIEW AVE TO LINCOLN TRAIL BLVD	6 239	2001
LINCOLN TRAIL BLVD TO RED HILL RD	6 473	2001

LINCOLN TRAIL BOULEVARD(KY 1815)

HICKORY ST TO LOGSDON PKWY	9 168	2001
LOGSDON PKWY TO WOODLAND DR	10 412	2001
WOODLAND DR TO U.S. 31W	17 603	2001

WILSON ROAD(KY 447)

BATTLE TRAINING RD TO NALLS LN	2 723	2002
NALLS LN TO SHELTON RD	4 450	2001
SHELTON RD TO ROGERSVILLE RD	6 815	2001
ROGERSVILLE RD TO VINE ST	6 963	2001
VINE ST TO LINCOLN TRAIL BLVD	5 679	2001
LINCOLN TRAIL BLVD TO W SPRING ST	5 454	2001
W SPRING ST TO RAMP FROM U.S. 31W	8 017	2001
RAMP FROM U.S. 31W TO STINSON PL	9 784	2001
STINSON PL TO KNOX BLVD	8 909	2001

BLACKJACK ROAD

WILSON RD TO U.S. 31W	2 656	2001
U.S. 31W TO PINWOOD DR	1 237	2001

N LORRAINE STREET

LINCOLN TRAIL BLVD TO HILL ST	1 242	2001
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HILL STREET

CONGRESS DR TO RED HILL RD	1 050	2001
RED HILL RD TO LOGSDON PKWY	1 616	2001
LOGSDON PKWY TO U.S. 31W	1 814	2001

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WOODLAND DRIVE

	<u>A.D.T.</u>	<u>YEAR</u>
VINE ST TO LINCOLN TRAIL BLVD	4 195	2001
LINCOLN TRAIL BLVD TO WAGGONER WAY	5 619	2001
WAGGONER WAY TO HILL ST	1 423	2001

Based on the traffic volumes listed above, Dixie Boulevard is the most heavily traveled road in the City of Radcliff. Within the Radcliff City limits, an average of approximately thirty thousand vehicles per day travel on Dixie Boulevard. Based on the data, it appears that traffic volumes along Dixie Boulevard are slightly higher on the south end of the city as opposed to slightly lower traffic volumes on the north end of the city. Higher volumes on the south end of the city are an indication of the large number of vehicles traveling between Radcliff and Elizabethtown. High traffic volumes along Dixie Boulevard also indicate the immediate need for additional north/south arterials connecting Radcliff and Elizabethtown.

From examining the data, it is also evident that the second most heavily traveled road in Radcliff is Lincoln Trail Boulevard. The road segment with the highest traffic volume on Lincoln Trail Boulevard extends from Woodland Drive to Dixie Boulevard. The average daily traffic recorded on this segment in 2001 was 17,603 vehicles per day. Many of these vehicles are traveling to and from Dixie Boulevard.

The third most heavily traveled road in Radcliff is Wilson Road. Due to the fact that Wilson Road and Dixie Boulevard run parallel and are very close to each other, this can create some traffic problems. The highest traffic volumes recorded on Wilson Road are between West Spring Street and Knox Boulevard. Between the ramp from Dixie Boulevard and Stinson Place, the average daily traffic measured in 2001 was 9,784 vehicles per day. These volumes will likely increase in the immediate future, due to the opening of the new Wal-Mart on Wilson Road this month. New development in this area may substantiate road improvements in the future.

The other most heavily traveled roads in Radcliff are Joe Prather Highway, Vine Street and Logsdon Parkway. The road segment on Joe Prather Highway with the highest average daily traffic volume is between Dixie Boulevard and Rogersville Road. The traffic volume recorded on this road segment in 2002 was 7,662 vehicles per day. The road segment on Vine Street with the highest average daily traffic volume is between Dixie Boulevard and Wilson Road. The traffic volume recorded on this road segment in 2000 was 7,418 vehicles per day. The road segment on Logsdon Parkway with the highest average daily traffic volume is between Pearman Parkway and Vine Street. The traffic volume recorded on this road segment in 2000 was 7,022 vehicles per day.

## TRAFFIC ACCIDENT DATA

In order to correct traffic problems, it is necessary to have knowledge of both traffic volumes and traffic accident prone locations within the city. Generally, traffic volume and traffic accidents are directly related. High traffic volume on a particular road segment tends to indicate a high rate of accidents. Roads with higher speed limits also tend to have higher accident rates, due to the fact that the higher speed gives drivers less time to react to a potential road hazard.

Listed below (See Table 2) are the most accident-prone intersections in the City of Radcliff. Beside each intersection are the number of accidents that occurred at that location between January 1, 2002, and December 31, 2002. This data was accessed through the Collision Reports Analysis for Safer Highways (CRASH) website, which is designed by the Kentucky State Police.

TABLE 2: TRAFFIC ACCIDENTS IN RADCLIFF (2002)

	INTERSECTION	NUMBER OF ACCIDENTS
1.	Lincoln Trail Boulevard/Wilson Road	24
2.	Dixie Boulevard/KY 313	22
3.	Dixie Highway/KY 434	20
4.	Dixie Boulevard/Lincoln Trail Boulevard	16
5.	Dixie Boulevard/Elm Road	10
6.	Dixie Boulevard/Centennial Avenue	10
7.	Logsdon Parkway/Elm Road	9
8.	Dixie Boulevard/Blackjack Road	9
9.	Dixie Boulevard/West Spring Street	9
10.	Dixie Boulevard/Vine Street	8
11.	Dixie Boulevard/Fairmont Avenue	7
12.	Logsdon Parkway/Vine Street	7
13.	Dixie Boulevard/Knox Boulevard	6
14.	Vine Street/Wilson Road	6
15.	Lincoln Trail Boulevard/Woodland Drive	5
16.	Dixie Boulevard/Northern Road	5
17.	Wilson Road/Knox Boulevard	5
18.	Wilson Road/Medical Center Drive	5
19.	Dixie Boulevard/Millcreek Road	4

The highest rate of accidents in Radcliff occurs at the intersection of Lincoln Trail and Dixie Boulevard (See Traffic Accident Map) and the intersection of Lincoln Trail Boulevard and Wilson Road. In 2002, twenty-four (24) accidents occurred at the intersection of Lincoln Trail Boulevard and Wilson Road. In addition, another sixteen (16) accidents

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took place at the intersection of Lincoln Trail Boulevard and Dixie Boulevard. These intersections are located less than ninety feet apart. Therefore, a combined total of forty (40) accidents occurred at these two intersections in 2002. This amounted to the highest total number of accidents at any location in the City of Radcliff.

The second highest number of accidents occurred at the intersection of Joe Prather Highway (KY 313) and Dixie Boulevard. A total of twenty-two (22) accidents were recorded at this intersection in 2002. The high number of accidents at this location is likely attributed to the high traffic volumes on this segment of Dixie Boulevard and the fifty-five mile per hour speed limit on both roadways.

The third most accident prone intersection in the City of Radcliff is the intersection of Battle Training Road (KY 434) and Dixie Highway. A total of twenty (20) accidents took place at this intersection in 2002. Just like the intersection of Joe Prather Highway and Dixie Boulevard, the high number of accidents at this location is likely attributed to high traffic volumes and high speeds. In addition, one unique characteristic of the KY 434 and Dixie Highway intersection is the slope of the intersection. The intersection has a higher elevation on the south side, which can make stopping more difficult, especially in winter months. Also, the south bound left-turn lane on Dixie Highway does not have adequate storage capacity during peak traffic hours. Vehicles often queue into south bound through traffic, causing a hazardous situation for all motorists traveling south bound on Dixie Highway.

Excluding the intersections mentioned above, no other intersections in Radcliff had more than ten accidents in 2002. Overall, the majority intersections with a high number of accidents tended to be along Dixie Boulevard. This is likely due to the fact that it is the most heavily traveled road in the city and it is the primary north/south connector road between Radcliff and Elizabethtown.

### GENERAL TRANSPORTATION IMPROVEMENTS

#### NAMING ROADS

There are two reasons to name a road. When a new road is created, it must be named. When a road name sounds too much like another road name or if the name duplicates another road name, it must be renamed. A road that has the same name as another road, but a different suffix or prefix is still considered to be a duplicate name. Listed below are a number of road naming rules devised by the National Emergency Number Association (NENA) for 9-1-1 purposes. These are excellent guidelines that should be used in naming new streets or renaming existing streets.

## ROAD NAMING RULES

The following rules should be followed when naming or renaming a road:

1. Avoid family names or individuals names, especially living persons and politicians.
2. If the road is continuous, do not change names at an intersection or a curve or some other point.
3. Avoid sound-alike names (e.g. Bay View Dr., Bayview Dr. or Brainard Ln., Barnard Ln.).
4. Do not use the same name with a different suffix (e.g. Smith Rd., Smith St.)
5. Use the NENA recommended format for road names (e.g. Prefix Directional - 2 characters, Street Suffix – 4 characters and Post Directional – 2 characters).
6. Do not use special characters in road names, such as hyphens, apostrophes or dashes.
7. Avoid the use of standard suffixes or directional suffixes or prefixes as road names (e.g. North Blvd., Court St., Avenue of Pines).
8. Avoid the use of non-standard street name suffixes, which may be confused with subdivisions or commercial developments (e.g. Golden Armor Plaza).

## CONNECTING ROADS

Several roads in Radcliff share the same name, but are separated by vacant land. One such example of this type of road is South Woodland Drive. All sections of South Woodland Drive that are not joined together should be connected, other-wise the road name becomes a duplicate name. Roads that should be connected include South Woodland Drive, South Atcher Street, Crocus Drive, College Street and South Lorraine Street.. Either these roads should be connected or the road names should be changed in order to avoid duplicate road names.

## CONTINUOUS SIDEWALK SYSTEM

Currently, Radcliff is lacking continuity within its sidewalk system. There are a number of gaps within the existing sidewalk system that render it useless to the point that developers question the purpose of installing new sidewalks in the city. In order to effectively move pedestrian traffic, it is necessary to create a continuous sidewalk system with no gaps. A continuous sidewalk system not only assists in the movement of pedestrian traffic, but it

## ELEMENT IV-TRANSPORTATION

also reduces conflict between vehicular traffic and pedestrian traffic. This allows vehicular traffic to move more efficiently.

All new developments should be required to install sidewalks along adjacent road frontage. In addition, there should be no exemption from the installation of sidewalks. When new developments are proposed, the sidewalk should be considered as an essential means of transportation, just as roads are considered essential.

The City of Radcliff needs to also make sure that vacant lots, between developed sites, have sidewalks as well. The City should set aside a percentage of infrastructure funding every year to target the installation of sidewalks on undeveloped lots. These areas most in need of sidewalks can be identified through a Sidewalk Priority List assembled by the Public Works Department.

Crosswalks should be striped at intersections of arterial and collector roads. This will help facilitate the movement of pedestrian traffic across major intersections. The point at which the sidewalk meets the road should be handicap accessible, as should the crosswalk. This will assist all pedestrians traveling throughout the city.

### TIMING OF TRAFFIC SIGNALS

Traffic signals on major roads should be timed in conjunction with each other. This will improve the flow of traffic on major roads, by reducing delays and congestion. The timing of traffic signals should be adjusted in the vicinity of newly constructed traffic generators such as large retail outlets, entertainment centers, restaurants, hotels and business centers. Such uses tend to have a large effect on trip generation and existing traffic patterns.

### STRUCTURAL TRANSPORTATION IMPROVEMENTS

Radcliff's most glaring transportation problems are associated with intersection structure. Lane configurations on approaches, turn-lane storage capacity, approach speeds and the proximity of one intersection to another are all critical factors in determining the most effective solution to local transportation issues. The following specific improvements are recommended to improve Radcliff's most pressing transportation dilemmas.

#### DIXIE BLVD/LINCOLN TRAIL BLVD/WILSON RD INTERSECTIONS

In 2002, a total of sixteen (16) accidents were recorded at the intersection of Dixie Boulevard and Lincoln Trail Boulevard. Another twenty-four (24) more accidents were recorded at the intersection of Wilson Road and Lincoln Trail Boulevard. The combined total of accidents in 2002 at these two intersections is forty (40). This is the highest total of collisions at any intersection in the city.



## ELEMENT IV-TRANSPORTATION

Over the years, this intersection has always had the most accidents of any location in Radcliff. These accidents not only present a threat to public safety, but they also contribute to inefficient traffic flow on the City's most heavily traveled road segments.

The high rate of accidents and congestion associated with this intersection can be primarily attributed to the proximity of the intersection of Dixie Boulevard and Lincoln Trail Boulevard to the intersection of Wilson Road and Lincoln Trail Boulevard.

The intersection of Dixie Boulevard and Lincoln Trail Boulevard is controlled by traffic signals in all directions. The intersection of Wilson Road and Lincoln Trail Boulevard is controlled by stop signs in three directions. Both northbound and southbound traffic entering the intersection from Wilson Road is controlled by stop signs. Eastbound traffic on Lincoln Trail Boulevard is also controlled by a stop sign. Westbound traffic on Lincoln Trail Boulevard is uncontrolled, due to the fact that the two intersections are a mere ninety feet apart. If westbound traffic on Lincoln Trail Boulevard was controlled, traffic would queue into the intersection of Dixie Boulevard and Lincoln Trail Boulevard. This would congest the intersection even more.

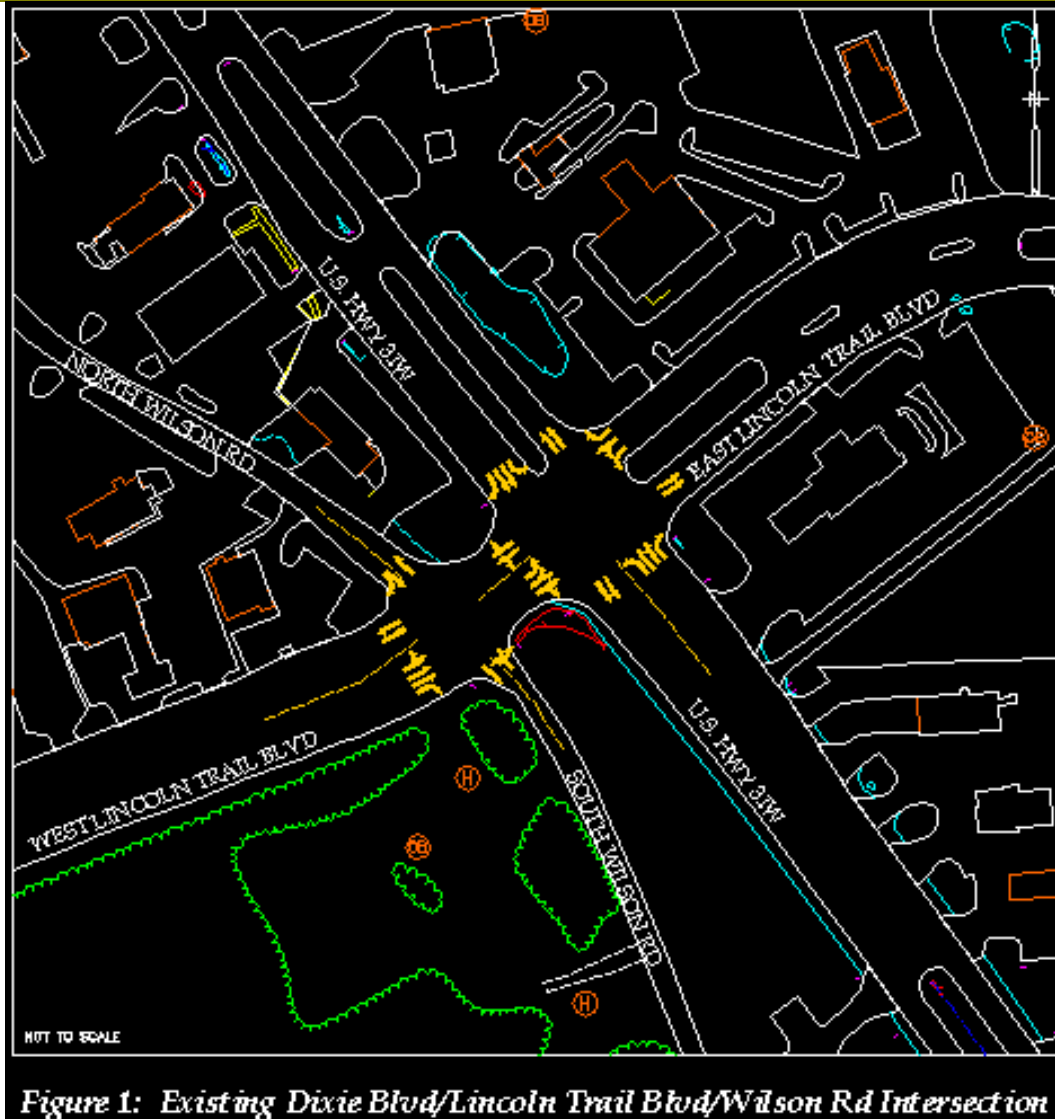
Since the intersections are located so close together, there are a multitude of permitted turning movements allowed within a very small geographical area (See Figure 1). A total of seventeen turning movements are currently permitted at the Dixie Boulevard and Lincoln Trail Boulevard intersection. At the Wilson Road and Lincoln Trail Boulevard intersection, a total of fourteen turning movements are permitted. The total permitted movements at both intersections is a combined thirty-one movements. This is simply too many movements to account for within such a small area. Several solutions have been proposed to rectify this dilemma.

The first proposed solution to decrease the number of accidents and reduce the level of congestion was to install a traffic signal at the Wilson Road and Lincoln Trail Boulevard intersection. The Kentucky Highway Department informed the

City that this solution was not feasible, due to the fact that two traffic signals can not be placed so close together.

The second proposed solution to the problem was to increase signage at the Wilson Road and Lincoln Trail Boulevard intersection, in order to reduce the number of permitted turning movements at this intersection. This attempted solution failed, because most motorists simply ignored the new signage and continued to make turning movements that they had made in the past.

Since neither of these proposed solutions has been effective, the only feasible solution is to physically reduce the number of permitted turning movements by installing a median across the length of the Wilson Road and Lincoln Trail

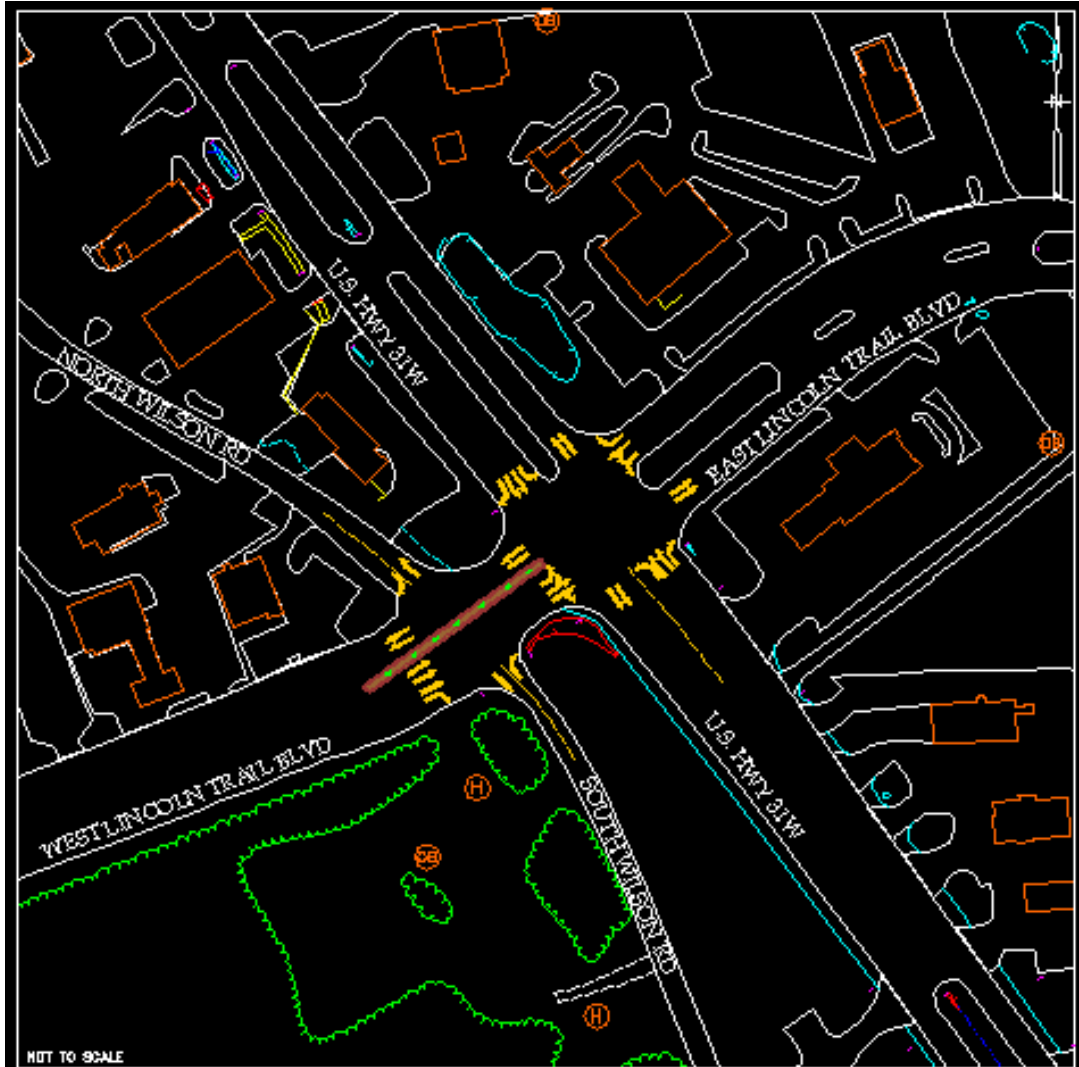


**Figure 1: Existing Dixie Blvd/Lincoln Trail Blvd/Wilson Rd Intersection**

Boulevard intersection (See Figure 2). The installation of a median across the intersection of Lincoln Trail Boulevard and Wilson Road, would effectively reduce the number of possible turning movements from fourteen to nine. This means that five turning movements, which are currently permitted, would be eliminated. In addition, blocking the intersection would reduce the number of combined turning movements at both intersections from thirty-one to twenty-six. From a numbers standpoint, this reduction of turning movements may not appear to be substantial, but the five turning movements that would be eliminated critically impair the current operation of this intersection.

Blocking the Wilson Road and Lincoln Trail Boulevard intersection will also have another positive effect on traffic flow. With the median, motorists traveling eastbound on Lincoln Trail Boulevard will be able to use the space of the current intersection for added lane

storage. Approximately five cars could occupy this wasted space.



**Figure 2: Proposed Dixie Blvd/Lincoln Trail Blvd/Wilson Rd Intersection**

Motorists that currently wait for the changing of the light at the intersection of Lincoln Trail Boulevard and Wilson Road could now wait for the light to change in the existing intersection. This would allow several more cars the ability to pass through the intersection of Dixie Boulevard and Lincoln Trail Boulevard, before the traffic signal changes. Therefore, the installation of this median will allow traffic to flow more efficiently in both an east-west and a north-south direction.

#### DIXIE BLVD/ELM RD/WILSON RD INTERSECTIONS

The intersections of Elm Road and Dixie Boulevard and Elm Road and Wilson Road are

## ELEMENT IV-TRANSPORTATION

only one-hundred and sixty-five feet apart. Since these intersections are so close together, the problems that they share are similar to those experienced at the intersections of Dixie Boulevard and Lincoln Trail Boulevard and Wilson Road and Lincoln Trail Boulevard. Due to the greater distance between the intersections of Elm Road and Dixie Boulevard and Elm Road and Wilson Road, the traffic problems are less severe than those experienced at the Intersections of Dixie Boulevard and Lincoln Trail Boulevard and Wilson Road and Lincoln Trail Boulevard. In addition, the intersection of Elm Road and Wilson Road is controlled with traffic signals at all approaches, as opposed to the Intersection of Lincoln Trail Boulevard and Wilson Road.

Traffic volumes are quite high in the vicinity of these intersections. The average daily traffic volume for the segment of Wilson Road, north of Elm Road, is near 10,000 vehicles per day. The average daily traffic volume on Dixie Boulevard, near the intersection with Elm Road, is approximately 30,000 vehicles per day. These traffic counts were conducted before the opening of the Wal-Mart Supercenter at the intersection of Dixie Boulevard and Wal-Mart Way; therefore, it is anticipated that traffic volumes may increase in this area of the city.

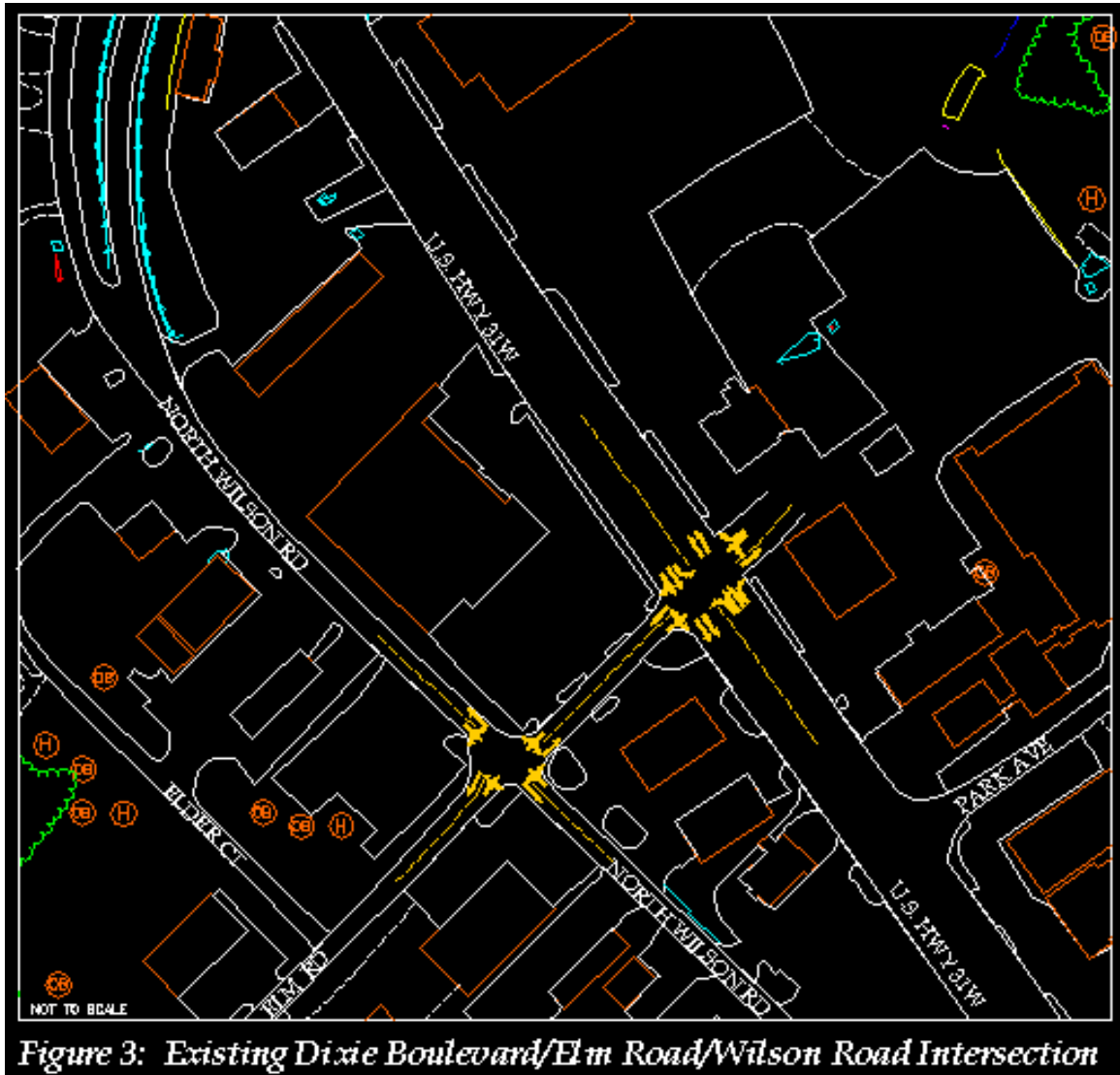
A total of twenty-six possible turning movements are currently permitted at the intersections of Elm Road and Dixie Boulevard and Elm Road and Wilson Road (See Figure 3). The intersection of Elm Road and Dixie Boulevard, currently permits a total of fourteen turning movements. One-hundred and sixty-five feet away, the intersection of Elm Road and Wilson Road permits twelve turning movements. This is a large number of turning movements at one specific location, but both intersections are controlled by traffic signals therefore this assists the operation of these intersections.

Traffic congestion is a larger problem at this intersection as opposed to accidents being the primary concern at the intersections of Dixie Boulevard and Lincoln Trail Boulevard and Wilson Road and Lincoln Trail Boulevard. Only ten traffic accidents occurred at the intersection of Dixie Boulevard and Elm Road in 2002. Considerable traffic congestion is prevalent on the road segment of Elm Road, between Dixie Boulevard and Wilson Road. Eastbound traffic on Elm Road almost queues into the intersection of Wilson Road and Elm Road, during peak hours of traffic flow. In addition, heavy traffic volumes on Wilson Road only contribute to the congestion. It appears that creating separate turn lanes would help traffic flow more efficiently.

Adding a separate right turn lane on the eastbound approach of Elm Road, at the Elm Road and Dixie Boulevard intersection, would filter right-turns from left-turns and through movements. Jordan, Jones and Goulding conducted traffic counts for the Traffic Impact Study of the Proposed Radcliff Wal-Mart Super-center on May 21, 2002. In the eastbound lane of Elm Road, at the intersection of Elm Road and Dixie Boulevard, they recorded an average of ninety-four left-turns, thirteen through movements, and ninety-nine right turns per hour. By studying these traffic counts, it is evident that adding a

## ELEMENT IV-TRANSPORTATION

separate right-turn lane would greatly reduce congestion in this direction on Elm Road (See Figure 4).

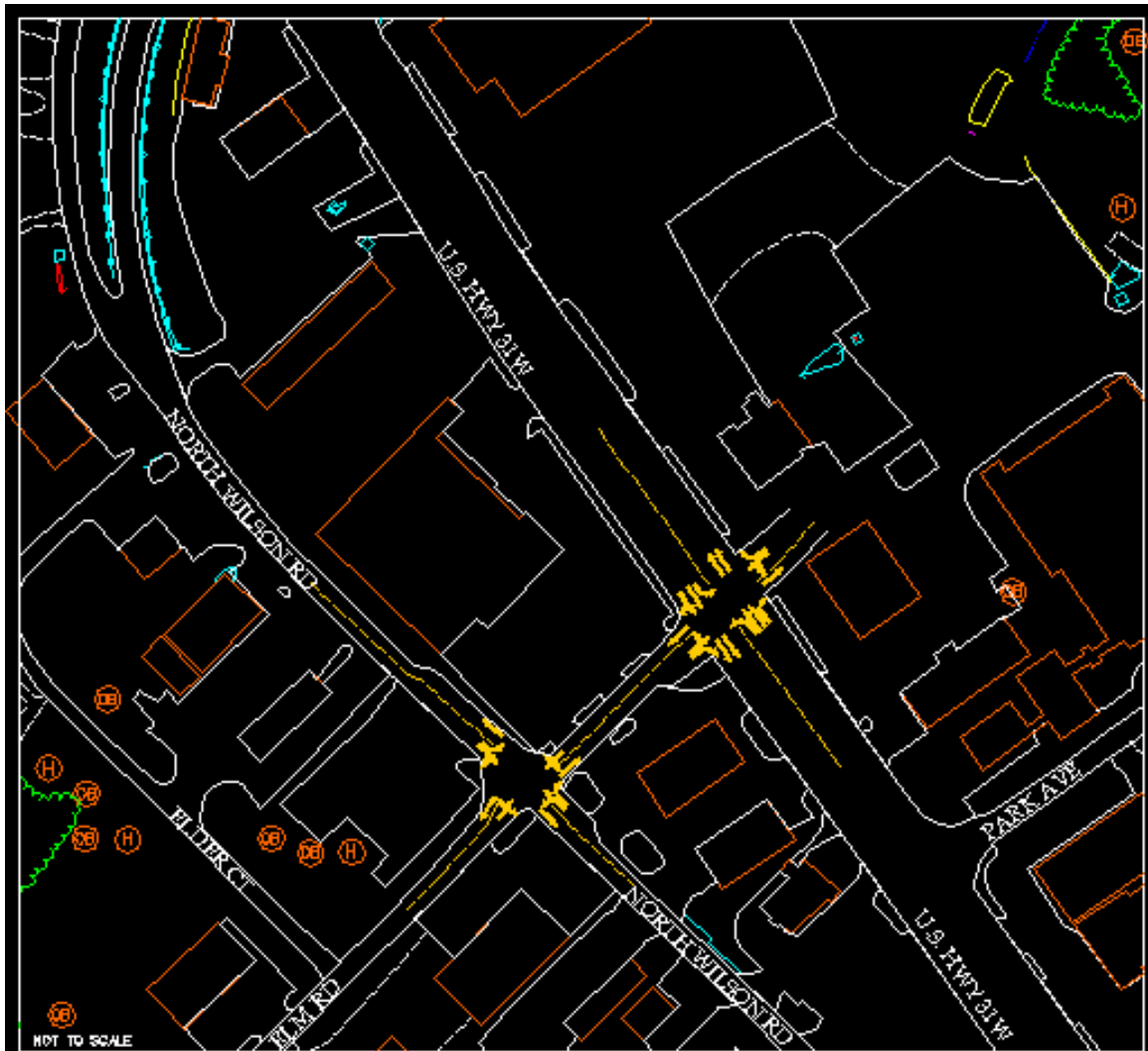


Jordan, Jones and Goulding recorded an average of fifty-five vehicles per hour traveling westbound on Elm Road, towards the intersection of Wilson Road and Elm Road. This amounts to approximately one-quarter of the average traffic traveling eastbound on the same road. Due to the low volume of vehicles traveling westbound on Elm Road, towards the intersection of Elm Road and Wilson Road, it appears that the current lane configuration at this approach adequately handles the existing traffic.

Based on a windshield survey of the existing conditions at the intersection of Elm Road and Wilson Road, it appears that eastbound traffic volume on Elm Road is not sufficient

## ELEMENT IV-TRANSPORTATION

enough to warrant any separate turn lanes. On the other hand, traffic continually queues in both directions traveling on Wilson Road. This congestion could be relieved by adding a separate right-turn lane to the northbound approach on Wilson Road and by adding a separate left-turn lane to the southbound approach on Wilson Road. This would separate the through traffic on Wilson Road from the traffic turning onto Dixie Boulevard (See Figure 4).



*Figure 4: Proposed Dixie Boulevard/Elm Road/Wilson Road Intersection*

### OPERATIONAL TRANSPORTATION IMPROVEMENTS

Operational transportation improvements can be defined as low-cost transportation solutions that can be expedited quickly, offering a more efficient alternative to current transportation deficiencies. These minor improvements are intended to facilitate traffic



## ELEMENT IV-TRANSPORTATION

flow and maximize the efficiency of the existing street system, without making structural changes to the existing right-of-way. Below, are a number of potential operational improvements designed to solve a particular problem at a specific location.

### DIXIE HWY/BATTLE TRAINING RD INTERSECTION

The intersection of Dixie Highway and Battle Training Road currently poses a traffic hazard for both northbound and southbound motorists on Dixie Highway. A total of twenty accidents were recorded at this intersection in 2002. This was the third highest total number of accidents at any one location in the City during 2002. Traffic traveling northbound on Dixie Highway generally has difficulty stopping, due to the slope of the road. Altering the slope of the road would be a massive undertaking, which would result in substantial costs incurred.

Remediation of the problem on the north side of Dixie Highway is much simpler. At this time, southbound traffic on Dixie Highway, approaching Battle Training Road, has the option of entering a left-turn lane. The left-turn lane storage capacity does not adequately hold enough vehicles at peak hours. When the left turn lane is full, vehicles in the left through lane will partially enter the left-turn lane. This results in a partial blockage of the left through lane. The speed limit on this segment of Dixie Highway is fifty-five miles per hour; therefore the partial blockage of the left through lane creates a very hazardous situation that can be amended through a simple solution. Since Dixie Highway is a State maintained road the city should make the State Highway Department aware of this problem.

### DIXIE BLVD/JOE PRATHER HWY INTERSECTION

In 2002, a total of twenty-two accidents occurred at the intersection of Dixie Boulevard and Joe Prather Highway. This was the second highest number of traffic accidents recorded at any location in Radcliff in 2002. The primary problem at this intersection appears to be the speed of the approaches from each direction. Traffic in all four directions is traveling at fifty-five miles per hour. By reducing the approach speed of the road that is less traveled it appears that the number of accidents could be reduced at this location. If the approach speed on Joe Prather Highway is reduced to thirty-five or forty miles per hour, it seems that fewer people would attempt to run the traffic light at this intersection.

### RINEYVILLE RD/WILSON RD INTERSECTION

This intersection is currently controlled by a set of stop signs for eastbound and westbound traffic. A flashing caution light warns motorists of the intersection that are traveling on Wilson Road. The existing slope of the road creates blind spots for drivers traveling northbound, eastbound and westbound. The City should attempt to notify the



State Highway Department that a fully-operational traffic signal may be warranted at this location.

#### DIXIE BLVD/COLLEGE ST INTERSECTION

If the aforementioned median is installed across the intersection of Wilson Road and Lincoln Trail Boulevard, this may require emergency vehicles to travel on Dixie Boulevard rather than Wilson Road. This is not a problem for police, but due to the location of the fire station it would likely result in fire trucks using College Street to access Dixie Highway. A traffic signal could be installed at the intersection of Dixie Boulevard and College Street that would allow emergency vehicles to access Dixie Boulevard without difficulty.

#### WOODLAND DR/VINE ST INTERSECTION

The problem at this intersection relates to the slope of Vine Street, south of the intersection. Currently, there is a large hump in the road that requires motorists traveling on Woodland Drive to slow down considerably when driving through the intersection. This reduces both the efficiency and safety of Woodland Drive and the intersection of Woodland Drive and Vine Street. The reason for the dramatic hump in the road is related to the underground utilities in the vicinity of the intersection. These utilities should be relocated, in order to improve the function of the intersection.

#### NEW STREET CONSTRUCTION

The proposed extension of existing streets and construction of new streets have been recommended so that the following objectives can be achieved:

1. To improve the current flow of traffic.
2. To provide access to vacant tracts of land, which are landlocked or in danger of being landlocked.

The following list of street extensions and new street construction should be undertaken in order to achieve these objectives. These improvements have not been listed according to priority.

1. CONNECTION OF NORTH AND SOUTH LORRAINE ST  
This connection will eliminate road naming duplication of South Lorraine Street. In addition, it will enhance the ability of South Lorraine Street to function as a collector road.
2. EXTENSION OF GREENVIEW LN TO SOUTH LORRAINE ST  
The extension of Greenview Lane, approximately 2, 150 feet to South Lorraine

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- Street would connect Pin Oak Subdivision to Bob-O-Link Subdivision. Vacant land would also be opened up in the process.
3. **EXTENSION OF HIGHLAND DR TO VINE ST**  
The extension of Highland Drive 950 feet to Vine Street would provide access from West Lincoln Trail Boulevard to West Vine Street.
  4. **EXTENSION OF ROBIN RD TO HIGHLAND DR**  
The extension of Robin Road to Highland Drive would allow residents on Robin Road another access to Lincoln Trail Boulevard and Vine Street.
  5. **CONNECT ALL SEGMENTS OF SOUTH WOODLAND DR**  
By connecting all segments of South Woodland Drive from Rogersville Road to Skyline Drive, it would create a continuous collector road from Navaho Court to Skyline Drive. This would provide another north/south alternative to Dixie Highway and Logsdon Parkway.
  6. **EXTENSION OF EAST LINCOLN TRAIL BLVD TO SOUTH BOUNDARY RD**  
By extending East Lincoln Trail Boulevard to South Boundary Road, it will open up vacant land south of Lincoln Trail Boulevard. In addition it will help move traffic around the southern portion of the city by providing a "ring road" that would include Lincoln Trail Boulevard, South Boundary Road and Joe Prather Highway.
  7. **EXTENSION OF VINE ST TO PROPOSED EXTENSION OF EAST LINCOLN TRAIL BLVD**  
Extending Vine Street to the proposed extension of East Lincoln Trail Boulevard will provide additional access to the vacant land located south of East Lincoln Trail Boulevard. Since Vine Street already intersects with South Dixie Boulevard, the proposed extension of Vine Street would not create an additional intersection on South Dixie Boulevard.
  8. **EXTENSION OF JONES AVE TO PROPOSED EXTENSION OF EAST LINCOLN TRAIL BLVD**  
The completion of this extension would help open up vacant land north of Hillcrest Estates.
  9. **EXTENSION OF WOODSIDE DR TO SHELBY AVE**  
The extension of Woodside Drive to Shelby Avenue (at the intersection of Jeffrey Court) will help to provide access to the large area of vacant land between Blackjack Road and Shelby Avenue.
  10. **EXTENSION OF WAGON WHEEL TRAIL TO JOHNSON RD**  
The extension of Wagon Wheel Trail to Johnson Road would create the potential

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for development of vacant land north of Woburn Place. It would also provide residents of Whispering Hills another access route to both South Dixie Boulevard and South Boundary Road.

### 11. CONNECTION OF ATCHER ST TO SOUTH ATCHER ST

The connection of Atcher Street and South Atcher Street would result in the conversion two local roads into one collector road. This would allow residents of University Acres and Pearman Manor direct access to both Lincoln Trail Boulevard and Vine Street.

### 12. EXTENSION OF LOGAN ST TO PROPOSED ATCHER ST CONNECTION

This extension of Logan Street would provide direct access from Atcher Street to South Dixie Boulevard.

### 13. CONNECTION OF COLLEGE ST

The connection of college street would provide direct access to South Dixie Boulevard for residents of University Acres.

### 14. EXTENSION OF SHELTON RD TO CENTENNIAL AVE

This extension would allow Shelton Road traffic direct access to South Dixie Boulevard. In addition, it provide a direct connection from Whispering Hills to both the Heatherfield and Meadowlake neighborhoods.

### 15. EXTENSION OF MEDICAL CENTER DR TO FUTURE ELIZABETHTOWN TO RADCLIFF CONNECTOR RD

Once the Elizabethtown to Radcliff Connector Road is constructed, south of Joe Prather Highway, Medical Center Drive should be extended westward to tie into this proposed road. This would allow Battle Training Road traffic access to the proposed connector. This extension would not only connect two highways, but it would also create potential development of vacant land west of South Wilson Road.

**TRAFFIC CALMING**

Traffic calming refers to a variety of procedures that make streets more inviting to pedestrians and bicyclists, most often on side streets where motorists have the tendency to speed through residential areas. In these situations, undesirable through traffic is calmed with physical techniques such as speed bumps, narrowed lanes, landscaping, traffic diverters, jogs or traffic circles at intersections. These traffic calming measures can be considered to be “active”, since they are intended to reduce speeding by reducing the capacity of the road. Active traffic calming is not suitable for major arterial roads such as Dixie Boulevard, which carry pass through traffic. Active traffic calming measures are only intended for local roads, that are designed to carry local traffic.

Passive traffic calming measures may also be used to promote a more pedestrian friendly transportation system. These measures play a major role in controlling speed without diminishing the number of vehicles that can use the road. Passive traffic calming measures do not interfere with the number or continuity of travel lanes in a road (although they sometimes reduce lane widths slightly). Typical techniques include providing curbs and street trees; allowing buildings nearer the road; and creating interesting vistas for drivers. These measures make the road more attractive and usable for pedestrians. They also discourage speeding by reducing the resemblance of the road to a rural highway, which encourages higher speeds and the movement of high traffic volumes.

Passive traffic calming along Dixie Boulevard would help reduce speeding and promote a “main street” feel along the roadway. Making Dixie Boulevard more aesthetically pleasing would increase pedestrian activity and help businesses to flourish.

The precise design of intersections has great impacts on travel behavior and pedestrian safety. Sharp corners (with a short radius) require drivers to slow down before turning. When the corner has a larger radius, vehicles can turn at dangerous. Some corners are designed with a channelized turn lane and a very large radius; these are extremely dangerous to pedestrians, although a raised island can be provided as a refuge for pedestrians. Figure 5 illustrates these types of intersections.

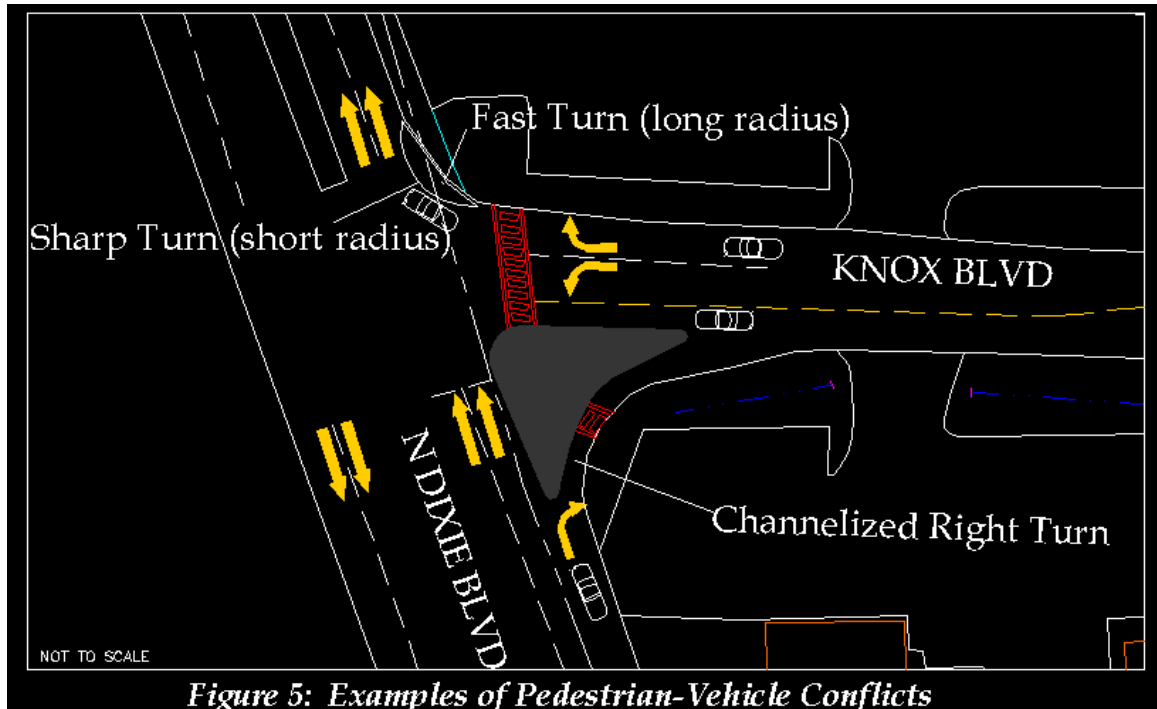
Landscaping and street trees provide a hospitable environment for pedestrians and thus pedestrian-orientated commercial activities. The presence of pedestrians passively calms traffic. Motorists understand the nature of a more urban street and tend to slow down, because of the inherent certainty of what lies ahead. These roads are usually more interesting to drive along even when congestion slows traffic to a crawl.

Pedestrians are generally shielded from traffic by curbing, but ornamental planters or trees can also be aligned in a row along the edge of the sidewalk that is closest to the road. Simple streetscaping procedures can protect pedestrians and enhance the visual

#### ELEMENT IV-TRANSPORTATION

appeal of a roadway. In addition, installing landscaped medians in the center of multiple-lane roads can also provide refuge to pedestrians attempting to navigate their way across busy streets.

The aforementioned traffic calming techniques should be applied in order to reduce conflicts between pedestrians and motorists.



*Figure 5: Examples of Pedestrian-Vehicle Conflicts*

**INTRODUCTION**

The founding economy of Radcliff was primarily based on both the service and retail industries. These two industries were a driving force in the early Radcliff economy, due to the fact that Radcliff provided services and retail uses that were not available on Fort Knox. Soldiers and their families frequented Radcliff businesses, and as a result both Fort Knox and Radcliff benefited from this symbiotic relationship.

Finance, insurance and real estate companies were also prevalent in the early Radcliff economy. These types of companies were required as a result of the large growth spurts that the city experienced as it began to develop. Periods of heavy construction and building led to a need for these types of firms.

Radcliff’s early economy contained very few manufacturing industries. The absence of manufacturers in Radcliff is likely due to the rapid growth of both the service and retail industries. In addition, most Radcliff residents that were not working in the service and retail industries were employed by the military at Fort Knox.

**LABOR FORCE (1990-2000)**

In 1990, the Radcliff labor force consisted of 10242 people, which was 71.0% of the population over the age of sixteen. In 2000, the labor force had increased to 11104, but this only composed 68.0% of the population over the age of sixteen (See Table 1). Between 1990 and 2000, the potential labor force grew by 862 (8.4%).

Between 1990 and 2000, another interesting trend that occurred in the labor force

*TABLE 1: 1990-2000 CHANGE IN RADCLIFF LABOR FORCE STATUS*

	<u>1990</u>		<u>2000</u>		<u>1990-2000</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number +/-</u>	<u>Percent +/-</u>
<b>Persons 16 years and over</b>	<b>14424</b>	<b>100</b>	<b>16324</b>	<b>100</b>	<b>+1900</b>	<b>+13.2</b>
In Labor Force	10242	71	11104	68	+862	+8.4
Civilian Labor Force	7625	52.9	9949	61	+2324	+30.5
Employed	6623	45.9	9190	56	+2567	+38.8
Unemployed	1002	6.9	759	4.6	-243	-24.3
Armed Forces	2617	18.1	1155	7.1	-1462	-55.9
Not in Labor Force	4182	29	5220	32	+1038	+24.8
<b>Females 16 years and over</b>	<b>7557</b>	<b>100</b>	<b>8460</b>	<b>100</b>	<b>+903</b>	<b>+11.9</b>
In Labor Force	4582	60.6	5205	61.5	+623	+13.6
Civilian Labor Force	4325	57.2	5033	59.5	+708	+16.4
Employed	3661	48.4	4611	54.5	+950	+26.0
<b>Own Children under 6 years</b>	<b>2238</b>	<b>100</b>	<b>1877</b>	<b>100</b>	<b>-361</b>	<b>-16.1</b>
All parents in family in labor force	1196	53.4	1110	59.1	-86	-7.2

## ELEMENT V-COMMERCE AND INDUSTRY

was the dramatic increase in the civilian labor force. In 1990, 52.9% of the labor force was classified as "Civilian". In 2000, 61.0% of the labor force in Radcliff was classified as "Civilian". Overall, the civilian labor force increased by 2324 workers from 1990 to 2000. This amounted to an increase of 30.5% over ten years.

Corresponding to the increase of the civilian labor force was a noticeable decrease in the percentage of the labor force in the Armed Forces. In 1990, 18.1% of the Radcliff labor force was classified as being in the Armed Forces. By 2000, the percentage of the labor force that was in the Armed Forces had dropped to 7.1% of the labor force. The 55.9% decrease in the number of Armed Forces workers living in Radcliff can actually be viewed as a positive economic sign.

Seemingly, this decrease signals that Radcliff's economy is not so reliant on Fort Knox as some may believe. This indicates a much more stable economy that is not prone to economic shifts occurring at the military installation.

Another important value in the aforementioned table is the unemployment rate for the City of Radcliff. In 1990, the unemployment rate was 6.9%. By 2000, the unemployment rate had decreased to 4.6%, signaling an economic improvement.

### WORKER STATUS (1990-2000)

Between 1990 and 2000, the civilian labor force increased by 30.5%, whereas the employed civilian labor force increased by 38.8% (See Table 2). The number of private wage and salary workers increased significantly between 1990 and 2000.

In 1990, 57.3% of the employed civilian labor force were private wage and salary workers. In 2000, 71.6% of the employed civilian labor force were classified as private wage and salary workers. Between 1990 and 2000, the number of private wage and salary workers increased from 3796 to 6576, which is a 73.2% increase. This increase shows the strengthening presence of private sector employment in the Radcliff labor force.

In 1990, government workers accounted for 38.0% of the employed civilian labor force. By 2000, government workers only composed 23.2% of the employed civilian labor force. In the ten year span, the number of government workers decreased by 382 workers or by 15.2% (See Table 2). This trend indicates that over the past ten years, public sector employment weakened. This trend is concurrent with recent national economic trends. Government has been down-sizing at the expense of the private sector.

Another interesting statistic regarding the class of worker status was the increase in the number of self-employed workers in unincorporated businesses. The number of self-employed workers increased by 57.1% between 1990 and 2000. Even though this



## ELEMENT V-COMMERCE AND INDUSTRY

increase seems substantial, there are still very few self-employed workers relative to other types of workers (See Table 2).

**TABLE 2: 1990-2000 CHANGE IN RADCLIFF CLASS OF WORKER STATUS**

	<u>1990</u>		<u>2000</u>		<u>1990-2000</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number +/-</u>	<u>Percent +/-</u>
<b>Employed civilian population 16 years and over</b>	<b>6623</b>	<b>100</b>	<b>9190</b>	<b>100</b>	<b>+2567</b>	<b>+38.8</b>
Private wage and salary workers	3796	57.3	6576	71.6	+2780	+73.2
Government workers	2518	38.0	2136	23.2	-382	-15.2
Self-employed workers in own not incorporated business	289	4.4	454	4.9	+165	+57.1
Unpaid family workers	20	0.3	24	0.3	+4	+20.0

### INDUSTRY CHANGES (1990-2000)

Between 1990 and 2000, the Radcliff economy underwent several changes. Some sectors of the economy flourished, while other areas of the economy did not experience significant growth. Listed below, is a description of economic impacts that were prevalent throughout the Radcliff economy between 1990 and 2000. Growth trends are examined in every sector of the local economy.

#### AGRICULTURE, FORESTRY, FISHING, HUNTING AND MINING

Agriculture, forestry, fishing, hunting and mining occupations do not compose a large portion of the employed civilian population in Radcliff. In 1990, only 0.5% of the employed civilian population was employed in this sector of the economy. In 2000, agriculture, forestry, fishing, hunting and mining occupations composed 0.4% of the employed civilian population. Overall, the number of people working in this sector of the economy increased by 20.6%, but relative to the employed civilian population this industry did not grow (See Table 3).

#### CONSTRUCTION

Between 1990 and 2000, the construction industry grew by 48.6%. In 1990, 4.7% of the employed civilian population was employed in the construction industry. In 2000, 5.0% of the employed civilian population consisted of construction industry employees (See Table 3). This growth in the construction industry can be attributed to increased building and construction in Radcliff between 1990 and 2000.

## ELEMENT V-COMMERCE AND INDUSTRY

### MANUFACTURING

The manufacturing sector was one of the fastest growing areas of the Radcliff economy over the past ten years. In 1990, 6.2% of the employed civilian population worked in the manufacturing sector of the economy. In 2000, 12.0% of the employed civilian population had jobs in the manufacturing industry (See Table 3). This dramatic increase in manufacturing positions can be attributed to the City of Radcliff's proactive stance in regards to industrial development. This proactive manufacturing stance taken by the City is evident in the development of both the Radcliff Industrial Park and the Millpond Business Center.

TABLE 3: 1990-2000 CHANGE IN RADCLIFF INDUSTRY

	1990		2000		1990-2000	
	Number	Percent	Number	Percent	Number +/-	Percent +/-
Employed civilian population 16 years and over	6623	100	9190	100	+2567	+38.8
Agriculture, forestry, fishing, hunting and mining	34	0.5	41	0.4	+7	+20.6
Construction	311	4.7	462	5.0	+151	+48.6
Manufacturing	410	6.2	1101	12.0	+691	+168.5
Wholesale Trade	81	1.2	234	2.5	+153	+188.9
Retail Trade	1806	27.3	1364	14.8	-442	-24.5
Transportation and warehousing, and utilities	316	4.8	845	9.2	+529	+167.4
Information	0	0	137	1.5	+137	+100.0
Finance, insurance, real estate, and rental and leasing	337	5.1	419	4.6	+82	+25.9
Professional, scientific, management, administrative	535	8.1	560	6.1	+25	+4.7
Educational, health and social services	1158	17.5	1697	18.5	+539	+46.6
Arts, entertainment, recreation, accommodation and food services	144	2.2	905	9.8	+761	+528.5
Other Services(except public administration)	301	4.5	572	6.2	+271	+90.0
Public administration	1190	18.0	853	9.3	-337	-28.3

## ELEMENT V-COMMERCE AND INDUSTRY

### RETAIL TRADE

In 1990, 27.3% of the employed civilian population worked in retail trade. By 2000, only 14.8% of the employed civilian population worked in retail trade. Between 1990 and 2000, the number of people employed in retail decreased 24.5% relative to the overall economy (See Table 3). This large decrease in retail trade, signals a stabilization of the local economy. Radcliff's early economy was overly reliant on retail trade. Now the city is forty-seven years old and the economy is more balanced. The retail industry is still very strong, but it is not dominant like it used to be. As other industries flourish, the local economy is not dependent on the success of retail trade.



*Pictured above, the Option Care Building is an example of the growing manufacturing industry in Radcliff. This recently constructed 184,000 square foot Wal-Mart Supercenter is a sign of strong retail trade in Radcliff.*

### WHOLESALE TRADE

Relative to the employed civilian population, the percentage of wholesale trade businesses has increased by 188.9% in the past ten years. In 1990, 1.2% of the employed civilian population worked in the wholesale trade industry. In 2000, 2.5% of the employed civilian population worked in wholesale trade (See Table 3). This large increase is most likely attributed to the large number of Army surplus stores found in Radcliff.

### TRANSPORTATION, WAREHOUSING, UTILITY

Another fast growing sector of the Radcliff economy is the transportation, warehousing and utilities industry. Between 1990 and 2000, this industry grew by 167.4% relative to the overall economy. In 1990, 4.8% of the employed civilian population worked in transportation, warehousing and utilities industries. In 2000, 9.2% of the employed civilian population worked in transportation, warehousing, and utilities industries.

## ELEMENT V-COMMERCE AND INDUSTRY



*The abundance of Army surplus stores is a primary reason for the growth of wholesale trade in Radcliff. Hardin Delivery, pictured above, is one of many new transportation and distribution centers in Radcliff.*

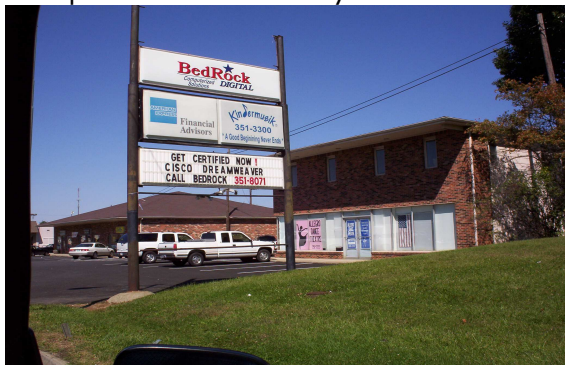
Growth in the transportation, warehousing and utilities industry may be attributed to the growth in the manufacturing industry, since these two industries are closely related.

### INFORMATION

Until the 2000 Census, information industry occupations were not recorded by the United States Census. In 2000, 1.5% of the Radcliff economy was based on information technology employment (See Table 3). The one hundred and thirty-seven jobs in the information industry are substantial, due to the fact that this industry was not even accounted for in the last Census.

### FINANCE, INSURANCE, REAL ESTATE, RENTAL AND LEASING

In 1990, 5.1% of the employed civilian population of Radcliff worked in finance, insurance, real estate, rental and leasing positions. By 2000, only 4.6% of the population was employed in this industry. Despite the decrease of this industry relative to the rest of the economy, finance, insurance, real estate, leasing and rental industry occupations increased by 25.9% between 1990 and 2000 (See Table 3).



*Information industries, such as Bedrock Digital, are relatively new to the expanding Radcliff economy.*

*Finance, insurance, real estate, rental and leasing businesses still remain a key component to the local economy.*



ELEMENT V-COMMERCE AND INDUSTRY

PROFESSIONAL, SCIENTIFIC, MANAGEMENT & ADMINISTRATIVE SERVICES

Professional, scientific, management, administrative and waste management employment grew by only 4.7% between 1990 and 2000. These types of occupations composed 8.1% of the employed civilian population in 1990. In 2000, 6.1% of the employed civilian population worked in professional positions (See Table 3).

ARTS, ENTERTAINMENT, RECREATION, ACCOMODATION & FOOD SERVICES

Surprisingly, the strongest growing sector of the Radcliff economy are the arts, entertainment, recreation, accommodation and food service industries. Between 1990 and 2000, these industries grew by an incredible 528.5%. In 1990, only 2.2% of the employed civilian population worked in the arts, entertainment, recreation, accommodation and food service industries. By 2000, 9.8% of the employed civilian population worked in arts, entertainment, recreation, accommodation and food services (See Table 3).



*Educational, health and social service industries are the largest employers in Radcliff. 18.5% of the employed civilian population worked within these industries in 2000.*

*Public administration positions have decreased by 28.3% over the past ten years. This is indicative of a nationwide shift to increased privatization.*

EDUCATIONAL, HEALTH AND SOCIAL SERVICES

The majority of Radcliff residents are employed in educational, health and social services occupations. In 1990, 17.5% of all employed civilians worked in these types of industries. By 2000, 18.5% of the employed civilian population worked in educational, health and social service positions. Overall, the number of jobs increased by 46.6% in these industries (See Table 3).

PUBLIC ADMINISTRATION

Public administration positions have decreased dramatically in the past ten years. In 1990, 18.0% of the employed civilian population worked in public administration positions. By 2000, only 9.3% of all civilian workers are employed in public administration positions. This amounts to a 28.3% decrease in the number of public administration officials over the past ten years (See Table 3). This sizeable decrease be attributed to downsizing of government at all levels. In addition, it is evident that the local workforce was over-saturated with public administration employees in 1990.

OTHER SERVICES (EXCEPT PUBLIC ADMINISTRATION)

In 1990, 4.5% of the employed civilian population worked in services other than public administration. In 2000, 6.2% of the employed civilian population worked in these types of service occupations. This increase amounts to 90.0% over the past ten years.

COMMUTING METHODS (1990-2000)

Between 1990 and 2000, workers began using alternative transportation modes to driving alone. Although the overwhelming majority of workers still drove to work alone, it appears that other modes of transportation are being explored.

DRIVING ALONE

In 1990, the percentage of workers in Radcliff that drove to work alone was 84.4%. By 2000, the percentage of workers driving to work alone had decreased to 80.7%. Despite the relative decrease in the percentage of workers driving to work alone, the number of workers driving to work alone between 1990 and 2000 increased by 523 or 1.1% (See Table 4).

TABLE 4: 1990-2000 CHANGE IN RADCLIFF COMMUTING METHODS

	<u>1990</u>		<u>2000</u>		<u>1990-2000</u>	
	Number	Percent	Number	Percent	Number +/-	Percent +/-
<b>Workers 16 years and over</b>	<b>9074</b>	<b>100</b>	<b>10144</b>	<b>100</b>	<b>+1070</b>	<b>+11.8</b>
Car, truck or van-drove alone	7661	84.4	8184	80.7	+523	+1.1
Car, truck or van-car pooled	988	10.9	1348	13.3	+360	+36.4
Public Transportation (including Taxicab)	15	0.2	81	0.8	+66	+440.0
Walked or worked at home	264	2.9	373	3.7	+109	+41.3
Other means	146	1.6	158	1.6	+12	+8.2
Mean Travel time to work (minutes)	N/A	N/A	25.2	N/A	N/A	N/A

## CAR POOLING

Between 1990 and 2000, car pooling became a more popular alternative for Radcliff commuters. In 1990, 10.9% of all workers traveled to work in car pools. In 2000, 13.3% of Radcliff workers traveled to and from work through car pooling. This increase amounts to a 36.4% jump in the number of workers car pooling between 1990 and 2000 (See Table 4) . This is a positive sign, due to the fact that car pooling is better for the environment and it also reduces the number of vehicles using busy city streets at peak travel times.

## PUBLIC TRANSPORTATION

Currently, the City of Radcliff does not have an extensive public transportation system. The City of Radcliff, in conjunction with the City of Elizabethtown, has considered funding bus routes between Radcliff and Elizabethtown, but it did not receive political support. The lack of political support can be attributed to the cost of the service and the limited service area of the buses. This led to the questioning of the effectiveness of such a public transportation system at this time.

Current public transportation is limited to taxicabs. In 1990, 0.2% of workers in Radcliff used public transportation to travel to work. In 2000, 0.8% of workers were using some form of public transportation to get to work (See Table 4). Obviously, there is a need for public transportation in the city, the question is whether public transportation can be offered in a cost-effective manner.

## WALKED OR WORKED AT HOME

In 1990, 2.9% of all workers either walked to work or worked at home. By 2000, 3.7% of Radcliff workers walked to work or worked at home (See Table 4). This increase is most likely attributable to the number of increasing home occupations in the city. Due to advances in information technology, it has become more convenient and cost-effective for many workers to work at home.

## MEAN TRAVEL TIME TO WORK

According to the 2000 Census, the mean travel time to work for Radcliff residents is twenty-five minutes. Since you can travel anywhere in Radcliff within approximately ten minutes, a mean travel time of twenty-five minutes to work indicates that many Radcliff residents are traveling outside the city to their place of employment. Several conclusions can be drawn from these facts. First, if Radcliff residents are drawn to jobs outside the community it is very likely that a similar position offered in Radcliff would entice them to work in the city.



## ELEMENT V-COMMERCE AND INDUSTRY

Secondly, if several Radcliff residents are working outside the community, then many positions in Radcliff are being filled by people living in surrounding areas. By offering a wide array of employment opportunities, both Radcliff residents and residents from surrounding communities are more likely to work in the city. It appears that the labor pool in the vicinity of Radcliff is much larger than the population of the city.

### HOUSEHOLD INCOME (1990-2000)

Between 1990 and 2000, the household income in Radcliff increased from \$25,197 per year to \$35,763 per year. Over a ten year span, the average household income increased 41.9% over ten years (See Table 5). This amounts to a 4.2% increase per year. This increase basically amounts to a cost of living increase; therefore, it does not appear that wages have increased dramatically over the past ten years.

### HOUSEHOLD INCOME OF LESS THAN \$10,000 PER YEAR

The number of Radcliff residents in lower income brackets decreased significantly between 1990 and 2000. In 1990, 13.0% of Radcliff households had incomes of less than \$10,000 per year. In 2000, only 8.6% of local households had incomes of less than \$10,000 per year. This amounts to a 21.6% decrease in the number of households earning less than \$10,000 per year (See Table 5). Even though incomes are rising with the cost of living, such as substantial decrease of the number of people in the lowest income bracket is encouraging.

### HOUSEHOLD INCOME BETWEEN \$10,000 AND \$14,999 PER YEAR

In 1990, 9.6% of Radcliff households reported an annual income between \$10,000 and \$14,999. In 2000, 8.2% of households reported an income in the aforementioned range. Despite the relative decrease of households in this income range, the overall percentage of households with incomes between \$10,000 and \$14,999 increased by 0.3% (See Table 5). The number of households in this income bracket probably increased, due to the large decrease in the number of households earning less than \$10,000 per year.

### HOUSEHOLD INCOME BETWEEN \$15,000 AND \$24,999 PER YEAR

In 1990, 26.9 percent of all Radcliff households reported an income between \$15,000 and \$24,999 per year. In 2000, only 16.6% of Radcliff households reported an annual income between \$15,000 and \$24,999. In addition, the overall percentage of households in this income bracket decreased by 27.1%. (See Table 5).

**ELEMENT V-COMMERCE AND INDUSTRY**

**TABLE 5: 1990-2000 CHANGE IN RADCLIFF HOUSEHOLD INCOME**

	<u>1990</u>		<u>2000</u>		<u>1990-2000</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number +/-</u>	<u>Percent +/-</u>
<b>Households</b>	<b>7204</b>	<b>100</b>	<b>8511</b>	<b>100</b>	<b>+1307</b>	<b>+18.1</b>
Less than \$10,000	935	13.0	733	8.6	-202	-21.6
\$10,000 to \$14,999	694	9.6	696	8.2	+2	+0.3
\$15,000 to \$24,999	1936	26.9	1412	16.6	-524	-27.1
\$25,000 to \$34,999	1443	20.0	1307	15.4	-136	-9.4
\$35,000 to \$49,999	1293	17.9	1616	19.0	+323	+25.0
\$50,000 to \$74,999	738	10.2	1754	20.6	+1016	+137.7
\$75,000 to \$99,999	100	1.4	586	6.9	+486	+486.0
\$100,000 to \$149,000	41	0.6	350	4.1	+309	+753.7
\$150,000 or more	24	0.3	57	0.7	+33	+137.5
<b>Median household income (dollars)</b>	<b>25197</b>	<b>100</b>	<b>35763</b>	<b>100</b>	<b>+10566</b>	<b>+41.9</b>

**HOUSEHOLD INCOME BETWEEN \$25,000 AND \$34,999 PER YEAR**

In 1990, 20.0% of Radcliff households earned between \$25,000 and \$34,999 per year. By 2000, only 15.4% of households in Radcliff earned the aforementioned income. The number of households earning between \$25,000 and \$34,999 decreased by 9.4% over the past ten years (See Table 5). This decrease can likely be attributed to higher incomes becoming more prevalent in Radcliff.

**HOUSEHOLD INCOME BETWEEN \$35,000 AND \$49,999 PER YEAR**

From 1990 to 2000, the percentage of Radcliff households earning between \$35,000 and \$49,999 per year increased from 17.9% to 19.0%. Also, the number of households earning between \$35,000 and \$49,999 per year increased by 25.0% (See Table 5). This is the first higher income bracket to display a noticeable increase in household earnings.

**HOUSEHOLD INCOME BETWEEN \$50,000 AND \$74,999 PER YEAR**

In 1990, 10.2% of households in Radcliff earned between \$50,000 and \$74,999 per year. In 2000, 20.6% of households in Radcliff reported income in this range. Overall, the percentage of households earning between \$50,000 and \$74,999 per year increased by 137.7% over the last ten years (See Table 5). The majority of Radcliff households earned this income in 2000.

**HOUSEHOLD INCOME BETWEEN \$75,000 AND \$99,999 PER YEAR**

The 1990 Census reported that only 1.4% of Radcliff households had an income. Between \$75,000 and \$99,999 per year. In 2000, the Census reported that 6.9% of

## ELEMENT V-COMMERCE AND INDUSTRY

Radcliff households were earning \$75,000 and \$99,999 per year. This amounts to a 486.0% increase in the number of households earning this income. (See Table 5) Needless to say, this is a very large increase.

### HOUSEHOLD INCOME BETWEEN \$100,000 AND \$149,999 PER YEAR

Households earning between \$100,000 and \$149,999 per year increased by 753.7% between 1990 and 2000. This was the largest percentage increase in any income bracket over the past ten years. In 1990, only 0.6% of households in Radcliff earned between \$100,000 and \$149,999 per year. By 2000, 4.1% of all households earned between \$100,000 and \$149,999 (See Table 5).

### HOUSEHOLD INCOME OF \$150,000 OR MORE PER YEAR

In 1990, 0.3% of households in Radcliff earned \$150,000 or more per year. Over the next ten years this percentage doubled relative to the total. By 2000, 0.7% of households earned \$150,000 or more per year. The number of households in the top income bracket increased by 137.5% from 1990 to 2000 (See Table 5).

### MEDIAN HOUSEHOLD INCOME

The median household income in Radcliff in 1990 was \$25,197. Over a ten year period, the median household income rose by 41.9% to \$35,763 in 2000 (See Table 5). Essentially, the average household income increased by approximately \$10,000 between 1990 and 2000. This is an average increase of \$1,000 per year, per household. This increase amounts to a 4.2% increase in average household income each year. Initially, the 41.9% income increase over ten years appears quite large, but when it is analyzed on a yearly basis it amounts to a cost of living increase.

### ECONOMIC ANALYSIS SUMMARY (1990-2000)

Based on the aforementioned statistical analysis, it appears that the economic outlook will be positive for Radcliff. Over the past ten years, Radcliff's economy has become more diversified. As a result of this diversification, our economy has become much more stabilized and less prone to economic downturns in certain industries.

From 1990 to 2000, the percentage of workers in the armed forces decreased dramatically. In addition, the number of people in the civilian labor force increased as a result of the declining number of workers in the armed forces. These trends indicate more economic stability for the City of Radcliff, by highlighting a decreased reliance on Fort Knox for economic prosperity.

Another significant economic trend is the decrease in public sector workers and the

## ELEMENT V-COMMERCE AND INDUSTRY

corresponding increase in private sector workers. This is a national economic trend towards downsizing and cost-cutting. Many believe that the private sector is more cost effective than the public sector, and these economic changes reflect this belief.

Industries that experienced growth between 1990 and 2000 include construction, manufacturing, wholesale trade, transportation and warehousing. In addition, numerous service industries experienced growth such as arts, entertainment, recreation, education, information, health, social, accommodation and food services.

Industries in decline between 1990 and 2000 include retail trade, public administration, finance, insurance, professional, scientific and management services.

Commuting methods of Radcliff workers changed very little from 1990 to 2000. Since Radcliff does not have a public transportation system, the majority of commuters drive to work alone. Over the past ten years, there has been a slight increase in the number of people car-pooling to work.

The mean travel time to work for Radcliff workers is twenty five minutes. This value indicates that many people are traveling outside the city to work. This also means that people from outside of Radcliff are coming into the city to work. These observations indicate that the area has an abundant labor pool.

The average household income increased by over forty percent over the past ten years. Although this increase appears substantial, it only amounts to a cost of living increase. Surprisingly, there were huge increases in the number of Radcliff residents earning high incomes from 1990 to 2000. Correspondingly, there were significant decreases in the number of Radcliff residents earning low incomes during the same time period. An abundance of higher paying positions generally indicate a prospering economy.

**INTRODUCTION**

Housing-related industries have always been key components in the local economy. Both the construction industry and the real estate industry have been strong players in the Radcliff economy, due in part to the presence of Fort Knox.

Throughout much of Radcliff’s young history, it has been perceived as a bedroom community for Fort Knox. A large number of military families have purchased homes in Radcliff over the past fifty years. This trend continues today, as evidenced by the large portion of the city zoned for single-family detached housing.

In addition to the abundance of single-family detached housing in Radcliff, there are also a number of other housing types available. The transient nature of Radcliff’s population base supports numerous medium and high-density housing developments in the city. Townhouses are being provided as both rental and ownership units, whereas apartments solely serve the rental market.

**AGE OF EXISTING HOUSING STOCK**

The majority of Radcliff’s housing stock was built between 1980 and 1989. A total of 33.5% of the entire housing stock in the city dates back to this time frame (See Table 1). Another 26.2% of all housing units were built between 1970 and 1979 (See Table 1). Within the twenty year period between 1970 and 1989, 59.7% of all current housing in Radcliff was constructed. These figures reflect that Radcliff’s existing housing stock is relatively young compared to most communities. Even though most of Radcliff’s housing stock was built between 1970 and 1989, there has also been a significant amount of construction between 1990 and 2000. A total of 19.1% of the existing housing stock in Radcliff was built within the last ten years; therefore, a large percentage of the housing stock has been constructed in accordance with the current Kentucky Building Code.

*TABLE 1: 1990-2000 AGE OF RADCLIFF STRUCTURES*

	<u>1990</u>		<u>2000</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
1999 to March 2000	0	0	237	2.5
1995 to 1998	0	0	738	7.8
1990 to 1994	288	3.5	837	8.8
1980 to 1989	3452	41.8	3168	33.5
1970 to 1979	2621	31.8	2483	26.2
1960 to 1969	1178	14.3	1266	13.4
1940 to 1959	637	7.7	630	6.7
1939 or earlier	75	0.9	110	1.2

**YEAR HOUSEHOLDER MOVED INTO DWELLING UNIT**

Due to the transient nature of the Radcliff population, 61.4% of householders moved into their current dwelling unit between 1995 and 2000 (See Table 2). An even higher percentage of householders moved into their current dwelling unit between 1990 and 2000. Surprisingly, 75.7% of Radcliff householders moved into their current home between 1990 and 2000 (See Table 2). On the other hand, only 24.3% of Radcliff householders moved into their dwelling unit before 1990 (See Table 2) . This indicates that people are migrating in and out of the community and they are also moving within the community as well.

*TABLE 2: 1990-2000 YEAR RADCLIFF HOUSEHOLDER MOVED INTO UNIT*

	<u>1990</u>		<u>2000</u>		<u>1990-2000</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
1999 to March 2000	0	0	2606	30.8	+2606	+100.0
1995 to 1998	0	0	2591	30.6	+2591	+100.0
1990 to 1994	2839	39.6	1211	14.3	-1628	-57.3
1980 to 1989	2806	39.2	998	11.8	-1808	-64.4
1970 to 1979	921	12.9	642	7.6	-279	-30.3
1969 or earlier	595	8.3	413	4.9	-182	-30.6

**RADCLIFF HOUSING VALUES**

Relative to other communities nationwide, Radcliff has some of the lowest housing costs in the United States. The average value of a Radcliff house was \$83,500 in 2000 (See Table 3). The average value of a Radcliff house was \$65,000 in 1990 (See Table 3); therefore, the average value of a home in Radcliff increased by 28.5% over the past ten years. Despite the substantial increase in housing values over the past ten years, Radcliff housing values continue to be well below the national average of \$119,600.

In 1990, 18.5% of all housing in Radcliff was valued at less than \$50,000. By 2000, only 5.6% of housing in Radcliff was valued at less than \$50,000 (See Table 3). It's evident that only a small portion of the Radcliff housing stock is valued at less than \$50,000 now.

In 1990, 76.7% of all houses in the city were valued between \$50,000 and \$99,999(See Table 3). Ten years later, 73.8% of the housing stock is still valued between \$50,000 and \$99,999. It can be concluded that the vast majority of housing has been valued between \$50,000 and \$99,999 over the past twenty years.

From 1990 to 2000, the number of houses valued between \$100,000 and \$149,999 increased by 466% (See Table 3). In 1990, only 4.1% of all houses were valued between

## ELEMENT VI-HOUSING

\$100,000 and \$149,999. By 2000, 18.2% of the housing stock was valued between \$100,000 and \$149,999 (See Table 3). This large increase is likely a result of both higher incomes and a higher cost of living.

Only 2.2% of all houses in Radcliff are valued at \$200,000 or more (See Table 3). Even though the number of houses valued at \$200,000 or more is relatively small, the number of homes with such values increased by 333.3% from 1990 to 2000. This indicates that the market for high-value homes is beginning to increase within the city.

**TABLE 3: 1990-2000 CHANGE IN RADCLIFF HOUSING VALUES**

	<u>1990</u>		<u>2000</u>		<u>1990-2000</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Less than \$50,000	555	18.5	216	5.6	-339	-61.1
\$50,000 to \$99,999	2308	76.7	2841	73.8	+533	+23.1
\$100,000 to \$149,999	124	4.1	702	18.2	+578	+466.1
\$150,000 to \$199,999	12	0.4	56	1.5	+44	+366.7
\$200,000 to \$299,999	6	0.2	18	0.5	+12	+200.0
\$300,000 or more	3	0.1	16	0.2	+13	+433.3
Median (dollars)	65000	N/A	83500	N/A	18500	+28.5

### NUMBER OF HOUSING UNITS PER STRUCTURE

Between 1990 and 2000, the number of housing units in Radcliff increased from 8251 in 1990 to 9469 in 2000. This amounts to a percentage increase of 14.8 over the past ten years (See Table 4).

According to the 2000 Census, 51.8% of housing units in Radcliff were 1-unit, detached. In 1990, only 49.3% of the city's housing stock was composed of 1-unit, detached structures; therefore, the number of 1-unit, detached structures increased by 20.7% over the past ten years (See Table 4). The large number of single-family detached structures indicates that there has been an abundance of developable land in the City in the last ten years. In addition, it also indicates a preference of ownership over rental in the area.

In 1990, only 3.4% of all housing units in Radcliff were 1-unit, attached structures. In 2000, only 3.6% of all housing units in the city were classified as 1-unit, attached. Overall this type of housing increased by 19.4% over the past ten years, despite the low number of these structures in Radcliff (See Table 4).



TABLE 4: 1990-2000 NUMBER OF HOUSING UNITS PER STRUCTURE

	1990		2000		1990-2000	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Total housing units	8251	100.0	9469	100	+1218	+14.8
1-unit, detached	4064	49.3	4907	51.8	+843	+20.7
1-unit, attached	283	3.4	338	3.6	+55	+19.4
2 to 4 units	774	9.4	1065	11.2	+291	+37.6
5 to 9 units	797	9.7	894	9.4	+97	-12.2
10 or more units	663	8.0	623	6.6	-40	-6.0
Mobile home, trailer or other	1670	20.2	1642	17.3	-28	-1.7

The fastest growing types of housing units in Radcliff are structures with 2 to 4 units. In 1990, 9.4% of the housing stock in Radcliff was composed of 2 to 4 unit structures. In 2000, 11.2% of all housing units in the city were structures with 2 to 4 units (See Table 4). Over this ten year period, the number of structures with 2 to 4 units increased by 37.6%. This was the largest increase of any housing type in the city. This type of medium-density housing is becoming more popular in Radcliff, due to the relatively large number of housing units that can be created on a small parcel of land. In addition, many of the amenities associated with low-density housing are also prevalent in medium-density housing.

Housing structures with 5 to 9 units increased by 12.2% between 1990 and 2000. In 1990, 9.7% of all housing structures contained 5 to 9 units. By 2000, 9.4% of structures in Radcliff contained 5 to 9 units (See Table 4). Interestingly, this type of housing decreased relative all other housing units in the city, but there was a slight increase in the number of these units.

In 1990, 8.0% of housing structures in Radcliff had 10 or more units (See Table 4). By 2000, only 6.6% of structures in the city had 10 or more dwelling units. Overall, the percentage of structure with 10 or more units dropped by 6.0% between 1990 and 2000 (See Table 4). This decrease may be attributed to the local preference of low and medium density housing as opposed to high-density housing. In addition, structures with 10 or more units generally indicate rental units. There appears to be an apparent shift from high-density housing to medium-density housing.

Behind 1-unit, attached housing, the second most common type of housing units in Radcliff are mobile homes. In 1990, 20.2% of all housing units in Radcliff were located in mobile homes (See Table 4). By 2000, the percentage of mobile homes relative to other types of housing in the city decreased to 17.3% (See Table 4). This amounts to a 1.7% decrease in the number of mobile homes in Radcliff between 1990 and 2000 (See Table 4). This decrease may be a result of the increased preference for both 1-unit, detached structures and 2 to 4 unit structures.



Single-family detached housing units, such as the one pictured Structures with two to four housing units are the fastest growing above, are the most common type of housing in Radcliff. type of dwelling units in Radcliff.

### NUMBER OF ROOMS IN RADCLIFF STRUCTURES

In 2000, the majority of housing units in Radcliff had five rooms. A total of 23.3% of housing units had five rooms in 2000 (See Table 5). In addition, 20.9% of housing units had four rooms, 17.0% had six rooms, 10.2% had seven rooms, 10.0% had three rooms, 7.5% had eight rooms, 5.4% had nine or more rooms, 4.9% had two rooms and only 0.8% had one room in 2000 (See Table 5).

The median number of rooms in a Radcliff housing unit was 5.1 in 2000 (See Table 5). A five room house may include a kitchen, living room and three bedrooms. Conversely, a five room house may include a kitchen, living room, dining room and two bedrooms. Both of these alternative housing types are relatively modest sized houses compared to today’s standards. Due to rising incomes, it is likely that the average number of rooms per housing unit will increase over the next ten years.

TABLE 5: NUMBER OF ROOMS IN RADCLIFF STRUCTURES

	<u>2000</u>	
	<u>Number</u>	<u>Percent</u>
<b>Total housing units</b>	<b>9469</b>	<b>100</b>
1 room	77	0.8
2 rooms	465	4.9
3 rooms	947	10.0
4 rooms	1978	20.9
5 rooms	2209	23.3
6 rooms	1614	17.0
7 rooms	963	10.2
8 rooms	707	7.5
9 or more rooms	509	5.4
Median (rooms)	5.1	---

**RADCLIFF MONTHLY OWNER COSTS**

In 1990, 79.5% of owner-occupied housing units were being mortgaged (See Table 6). By 2000, 80.2% of owner-occupied housing units were being mortgaged (See Table 6). Over that ten year period, the number of mortgages in Radcliff increased by 28.9% (See Table 6).

The average monthly owner cost in 1990 was six-hundred and forty-nine dollars (See Table 6). The 2000 Census reported that the average mortgage cost had increased by 23.0% to seven-hundred and ninety-eight dollars (See Table 6). Despite this increase in costs, monthly owner costs remain relatively low compared to other cities throughout the nation.

Most monthly owner costs in Radcliff range between seven-hundred and one thousand dollars. A total of 34.7% of costs fall between seven-hundred and one-thousand dollars per year (See Table 6). The number of housing units in this cost range increased by 53.5% from 1990 to 2000 (See Table 6).

*TABLE 6: 1990-2000 RADCLIFF MORTGAGE STATUS AND SELECTED MONTHLY OWNER COSTS*

	<u>1990</u>		<u>2000</u>		<u>1990-2000</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
<b>Owner-occupied housing units with a mortgage</b>	<b>2395</b>	<b>79.5</b>	<b>3088</b>	<b>80.2</b>	<b>+693</b>	<b>+28.9</b>
Less than \$300	43	1.8	10	0.3	-33	-76.7
\$300 to \$499	521	21.8	247	6.4	-274	-52.6
\$500 to \$699	844	35.2	723	18.8	-121	-14.3
\$700 to \$999	869	36.3	1334	34.7	+465	+53.5
\$1000 to \$1499	114	4.8	735	19.1	+621	+544.7
\$1500 to \$1999	4	0.2	39	1	+35	+875
\$2000 or more	0	0	0	0	0	0
Median (dollars)	649	N/A	798	N/A	+149	+23.0
<b>Owner-occupied housing units without a mortgage</b>	<b>619</b>	<b>20.5</b>	<b>761</b>	<b>19.8</b>	<b>+142</b>	<b>+22.9</b>
Median (dollars)	156	N/A	205	N/A	+49	+31.4

In 1990, only 4.8% of monthly owner costs were between one-thousand and one-thousand and five-hundred dollars per month (See Table 6). By 2000, the number of housing units with monthly owner costs between one-thousand and one-thousand and five-hundred dollars per month increased to 19.1% (See Table 6). This increase is reflective of the growing monthly owner costs in Radcliff.

Another statistic that reflects growing monthly owner costs in Radcliff, is the percentage of housing units with owner costs ranging between five-hundred and seven-hundred dollars per month. In 1990, 35.2% of housing units had monthly owner costs between five-hundred and seven-hundred dollars per month (See Table 6). In contrast, only 18.8% of

## ELEMENT VI-HOUSING

housing units had monthly owner costs between five-hundred and seven-hundred dollars per month in 2000 (See Table 6). In 1990, the majority of monthly owner costs were between five-hundred and seven-hundred dollars per month. By 2000, this range of costs was half as common compared to monthly owner costs in 1990.

Between 1990 and 2000, monthly owner costs also increased for housing units without a mortgage. This increase is likely due to the rising cost of utilities. In 1990, the median monthly cost of an owner-occupied housing unit without a mortgage was one-hundred and fifty-six dollars (See Table 6). By 2000, the median monthly cost of an owner-occupied housing unit without a mortgage was two-hundred and five dollars (See Table 6). This increase amounts to a 31.4% cost increase over the past ten years. Surprisingly, monthly owner costs increased at a faster rate for those without a mortgage than for those with a mortgage.

### MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME

According to the United States Census, 60.8% of homeowners spent less than twenty percent of their household income on monthly homeowner costs in 2000 (See Table 7). This percentage reflects the majority of homeowners do not spend much of their household income on monthly owner costs.

Another 14.1% of homeowners spend between twenty and twenty-five percent of their household income on monthly owner costs (See Table 7). Based on the aforementioned statistics, it can be concurred that approximately seventy-five percent of homeowners in Radcliff spend less than twenty-five percent of their household income on monthly homeownership costs. Only twenty-five percent of Radcliff homeowners spend more than twenty-five percent of their household income on homeownership costs.

*TABLE 7: 1990-2000 RADCLIFF MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME*

	<u>1990</u>		<u>2000</u>		<u>1990-2000</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Less than 20.0 percent	1575	52.3	2340	60.8	+765	+48.6
20.0 to 24.9 percent	428	14.2	543	14.1	+115	+26.9
25.0 to 29.9 percent	356	11.8	249	6.5	-107	-30.1
30.0 to 34.9 percent	243	8.1	256	6.7	+13	+5.3
35.0 percent or more	398	13.2	451	11.7	+53	+13.3
Not computed	14	0.5	10	0.3	-4	-28.6



**RADCLIFF GROSS RENT**

The median gross rent in Radcliff was four-hundred and thirty-three dollars per month in 2000 (See Table 8). In 1990, the median gross rent in Radcliff was only three-hundred and seventy-two dollars per month (See Table 8). Over the aforementioned ten year period, the median rent increased by 16.4% (See Table 8). In 2000, the United States median gross rent was six-hundred and two dollars, which is approximately 40% higher than average rent in Radcliff. It is evident that rent rates are quite reasonable in Radcliff compared to the rest of the country.

In 2000, 51.9% of renters paid between three-hundred and five-hundred dollars per month in rent (See Table 8). The majority of renters in Radcliff paid rent within this price range.

The second most common cost range for rent in Radcliff is between five-hundred and seven-hundred and fifty dollars. In 2000, 23.6% of all renters paid between five-hundred and seven-hundred and fifty dollars per month in rent (See Table 8). In 1990, only 15.7% of renters paid rents between five-hundred and seven-hundred and fifty dollars per month (See Table 8). This increase is indicative of rising rent costs.

Another significant indication of the rising cost of rent in Radcliff is evident by examining the increase of people paying rents between seven-hundred and fifty dollars and one-thousand dollars. In 1990, only 2.2% of renters were paying rents between seven-hundred and fifty and one-thousand dollars per month (See Table 8). By 2000, 7.9% of renters were paying rents between seven-hundred and fifty and one-thousand dollars per month (See Table 8). This amounts to a 278.7% increase over the past ten years. This is a huge increase in the number of people paying rent well above the average rent cost for the city. The large increase in the number of people paying high rents may be directly attributed to several causes. Renters may be paying more for rent due to increases in the cost of living or increasing incomes. In addition, rent rates at newly constructed buildings are generally higher than at older buildings. Newer buildings have more amenities and modern conveniences; therefore, they must charge higher rents to offset the increased cost of construction.

TABLE 8: 1990-2000 CHANGE IN RADCLIFF GROSS RENT

	<u>1990</u>		<u>2000</u>		<u>1990-2000</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Less than \$200	129	3.9	125	3.5	-4	-3.1
\$200 to \$299	627	18.8	347	9.7	-280	-44.7
\$300 to \$499	1912	57.3	1857	51.9	-55	-2.9
\$500 to \$749	523	15.7	845	23.6	+322	+61.6
\$750 to \$999	75	2.2	284	7.9	+209	+278.7
\$1000 or more	10	0.3	29	0.8	+19	+190.0
No cash rent	59	1.8	89	2.5	+30	+50.8
Median (dollars)	372	N/A	433	N/A	+61	+16.4

**GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME**

The majority of Radcliff renters contribute less than twenty percent of their household income towards rent. In 2000, 45.7% of Radcliff renters used less than twenty percent of their household income to pay for rent (See Table 9). In contrast, 22.7% of renters in Radcliff used thirty-five percent or more of their household income to pay rent in 2000 (See Table 9). These numbers tell us that the majority of renters are renting within their income, but that there are also a large number of people using a very substantial portion of their household income to pay for rent.

TABLE 9: 1990-2000 GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME

	<u>1990</u>		<u>2000</u>		<u>1990-2000</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Less than 20.0 percent	1120	33.6	1634	45.7	+514	+45.9
20.0 to 24.9 percent	576	17.3	510	14.3	-66	-11.5
25.0 to 29.9 percent	434	13.0	318	8.9	-116	-26.7
30.0 to 34.9 percent	327	9.8	146	4.1	-181	-55.4
35.0 percent or more	803	24.1	811	22.7	+8	+1.0
Not computed	75	2.2	157	4.4	+82	+109.3

**SELECTED HOUSING CHARACTERISTICS**

For the most part, nearly all housing units in Radcliff had complete plumbing facilities, complete kitchen facilities and telephone service in 2000. Only a handful of housing units did not have such facilities. Surprisingly, the number of housing units that do not have complete plumbing facilities and complete kitchen facilities increased from 1990 to 2000. Although the number of housing units without these facilities increased over the past ten years, less than 0.5% of housing units did not have these types of facilities by



2000 (See Table 10).

In 1990, 7.3% of all housing units did not have telephone service (See Table 10). By 2000, only 3.2% of housing units in Radcliff did not have telephone service (See Table 10). Even though the number of housing units without telephone service is decreasing, the number of housing units without telephone service may actually increase over the next ten years, due to the low cost of cellular phone service.

TABLE 10: 1990-2000 CHANGE IN SELECTED HOUSING CHARACTERISTICS

	<u>1990</u>		<u>2000</u>		<u>1990-2000</u>	
	Number	Percent	Number	Percent	Number	Percent
Lacking complete plumbing facilities	21	0.3	45	0.5	+24	+114.3
Lacking complete kitchen facilities	17	0.2	26	0.3	+9	+52.9
No Telephone Service	600	7.3	274	3.2	-326	-54.3

**RADCLIFF HOUSING HEATING FUEL**

In 1990, 58.6% of housing units in Radcliff were using electricity to heat their home (See Table 11). By 2000, 64.2% of housing units in the city were using electricity as heating fuel (See Table 11). Between 1990 and 2000, the number of people using electricity to heat their homes increased by 29.5% (See Table 11). Due to the low cost of electricity in Kentucky, it is likely that the use of electricity for heating homes will continue to increase in the future.

The second most common fuel used to heat homes in Radcliff is natural gas. In 1990, 36.5% of housing units in Radcliff used natural gas as a heating source (See Table 11). Ten years later, only 31.9% of housing units used natural gas as a heating fuel (See Table 11). This relative decrease is likely due to the dominance of electricity in the market. Gas prices fluctuate dramatically, whereas electricity costs are quite stable.

TABLE 11: 1990-2000 HOUSE HEATING FUEL

	<u>1990</u>		<u>2000</u>		<u>1990-2000</u>	
	Number	Percent	Number	Percent	Number	Percent
Utility gas	2612	36.5	2695	31.9	+83	+3.2
Bottled, tank or LP gas	87	1.2	203	2.4	+116	+133.3
Electricity	4198	58.6	5436	64.2	+1238	+29.5
Fuel oil, kerosene, etc.	191	2.7	65	0.8	-126	-66.0
Coal or coke	0	0	0	0	0	0
Wood	67	0.9	35	0.4	-32	-47.8
Solar energy	0	0	0	0	0	0
Other fuel	0	0	7	0.1	+7	+100.0
No fuel used	6	0.1	20	0.2	+14	+233.3

**HOUSING ANALYSIS SUMMARY**

Based on the housing analysis conducted, the existing housing stock in Radcliff is relatively young and it is in fairly good condition. Approximately sixty percent of the existing housing stock was built between 1970 and 1989.

Homeowners in Radcliff seem to be quite transient. The majority of Radcliff householders moved into their housing unit from 1990 to 2000. Over seventy-five percent of householders moved into their current housing unit within the last ten years.

Radcliff housing values are relatively low compared to the national average. In 2000, the average value of a house in Radcliff was \$83,500. In addition, approximately seventy-five percent of the existing housing stock is valued between \$50,000 and \$100,000. Despite the low cost of housing in the area, it appears that housing costs are on the rise within the city. The number of houses valued between \$100,000 and \$150,000 are increasing more than any other type of home.

The most common type of housing unit in Radcliff is the single-family detached house. Despite the abundance of single-family detached housing in Radcliff, the fastest growing type of housing are two to four unit dwellings such as townhouses. This type of housing should continue to grow, due to the lack of vacant land within the city limits.

The average number of rooms in a Radcliff house is five rooms. It is likely that the average number of rooms per housing unit will continue to grow, due to increasing incomes. With increasing incomes, the value of housing tends to increase as well.

Monthly ownership and rental costs in Radcliff are very low, relative to national averages. Average monthly owner costs are seven-hundred and ninety-eight dollars per month. Also, the average cost of rent is four-hundred and thirty-three dollars per month. These low cost housing alternatives are very attractive to people looking to relocate to the area.

**INTRODUCTION**

Community facilities are an important aspect of every city. Community facilities generally refer to both public and semipublic buildings, land and facilities. These types of facilities generally include parks, schools, libraries, churches, hospitals, fire stations, police stations, cultural facilities and public administration buildings. It is important for a community to have an inventory of such facilities and a long-range vision for future community facilities.

**PUBLIC ADMINISTRATION FACILITIES**

In most cases, there are two types of community facilities that house public administration activities. There are community facilities that provide space for the administration of government and there are also community facilities that provide space for the administering of services. Often, an office and its personnel will serve both of these functions.

The City of Radcliff public administration buildings are located along Freedom's Way, north of West Lincoln Trail Boulevard. Radcliff City Hall was built in 1975. It is a two-story structure with a basement. The ground floor of City Hall contains the offices of the Mayor, the Executive Assistant to the Mayor, the City Clerk, the Finance Department Manager and the Public Works Department Manager. The second floor of City Hall contains the offices of the Planning Department Manager, the City Planner, the Senior Building Inspector and the Code Enforcement Officer. Froman Hall is also located on the second floor of City Hall. It is used for conducting meetings of the City Council, Planning Commission, Board of Adjustment, Code Enforcement Board and Forestry Board. The basement of City Hall contains the offices of the Disabled American Veterans and the Crimes Against Women and Children office. In addition to these offices, records are also stored in the basement of City Hall.

Currently, a new roof is being installed at City Hall. An addition has also been planned for City Hall. This proposed addition is to consist of a larger meeting room for City Council, Planning Commission, Board of Adjustment, Code Enforcement Board and Forestry Board meetings. By moving the meeting room from the second floor of City Hall, it will allow for an expanded number of offices in the Planning Department.

The two story Joseph B. Hutcherson Hall of Justice was built in 1988. It is located on Freedom's Way, between City Hall and the Colvin Community Center. This building contains the offices of the Radcliff Police Department and the Hardin County District Court #2. The Radcliff Police Department offices are located on both the first floor and the basement. Hardin County District Court #2 is located on the second floor of the building.

## ELEMENT VII-COMMUNITY FACILITIES



*Pictured above is Radcliff City Hall. A new roof is currently being put on the building.*



*The Joseph B. Hutcherson Hall of Justice is located along Freedom's Way, between City Hall and the Colvin Community Center.*

In addition to these administrative offices, there are also other City-operated offices located throughout Radcliff. The Recreation Department offices are located in the Colvin Community Center. The Colvin Community Center is located at the terminus of Freedom's Way. The Fire Department offices are located in Fire Station #1, on South Wilson Road, north of the Vine Street intersection. The Public Works Department offices are located behind Fire Station #1 on South Wilson Road. The Fire Department offices and the Public Works offices will be relocated in a new building that will house offices for both departments. The building is currently under construction, next to the existing Fire Station #1 on South Wilson Road. The Challenger Learning Center offices are located near the intersection of Joe Prather Highway and South Dixie Boulevard.



*The Colvin Community Center houses the City of Radcliff Recreation Department's offices.*



*Fire Station #1 is the primary location of the Fire Department's offices. Behind the fire station are the Public Works Department Buildings.*

**FUTURE SITE GUIDELINES**

Future public administration office facilities should be strategically located within the community. The following guidelines should be adhered to in regards to choosing a future site for governmental offices in Radcliff:

1. Any new government offices should be constructed in close proximity to existing government offices, in order to create a civic center.
2. New government offices should be located near the Commercial Business District.
3. Government offices should be located in a manner, in which they are easily accessible to all citizens of the community.
4. Government offices should be located in areas where there is abundant land available for future expansion of facilities.
5. Joint governmental offices with County, State and Federal agencies should be encouraged.

**EDUCATION FACILITIES**

A community's educational facilities serve the purpose of both educating citizens and providing social and recreational opportunities. Radcliff residents have a multitude of educational resources to draw upon. These educational resources include various preschools, private schools, public schools, colleges and universities.

**PUBLIC SCHOOLS**

Radcliff is a part of the Hardin County Public School system. The Hardin County Public School system has approximately 13, 700 Radcliff students. These students are distributed in two high schools, two middle schools and three elementary schools. North Hardin High School and John Hardin High School are two of the largest high schools in Kentucky.

Hardin County Public Schools offers a wide range of extracurricular activities for their students. Some of these extracurricular activities include athletic programs, music programs, academic clubs, theater and the arts.



## ELEMENT VII-COMMUNITY FACILITIES

Listed below are all public elementary and secondary schools in Radcliff:

- North Hardin High School
- John Hardin High School
- Radcliff Middle School
- Bluegrass Middle School
- New Highland Elementary
- Meadow View Elementary
- Parkway Elementary

### PRIVATE SCHOOLS

In addition to the public schools located in Radcliff, there are also a number of private schools in the City. These schools offer a Christian-based educational curriculum, which emphasizes spiritual and moral values, as well as academic studies.

Currently, there are four private schools in Radcliff. The four private schools in the City are as follows:

1. Christian Heritage Community School
2. Hardin Christian Academy
3. Dove Christian Academy
4. St. Christopher Catholic School



*McKendree College is the only post-secondary learning institution in Radcliff.*



*Construction on John Hardin High School was completed in 2001. It is the most modern high school in the area.*

### COLLEGES

Two colleges are located within the city limits of Radcliff. Western Kentucky University and McKendree College both have Radcliff Campuses located on West Lincoln Trail Boulevard. Both colleges offer a wide array of business and computer science courses.

**AREA COLLEGES AND UNIVERSITIES**

In addition to Radcliff's two colleges, there are several colleges and universities nearby. Some of these nearby colleges and universities include:

1. Elizabethtown Community College (Elizabethtown, KY)
2. Jefferson Community College (Louisville, KY)
3. Bellarmine College (Louisville, KY)
4. Lindsey Wilson College (Columbia, KY)
5. Campbellsville University (Campbellsville, KY)
6. Spaulding University (Louisville, KY)
7. University of Louisville (Louisville, KY)
8. Western Kentucky University (Fort Knox Campus)
9. Eastern Kentucky University (Fort Knox Campus)

**FUTURE SITE GUIDELINES**

The future site for a school is dependent on the size of the school and the size of the area to be served by the school. Generally, the amount of land to be allocated and the future location of a publicly funded school is determined by government policies. All school systems throughout the state are required to anticipate local needs by completing a district School Facilities Plan. These needs and corresponding improvements must be updated every four years in the School Facilities Plan. Some basic guidelines for choosing a future school site are listed below:

1. New schools should be located in areas where there is abundant land available for future expansion of facilities.
2. New schools should be located as close as possible to the residential areas being served by that school.
3. New schools should be located in close proximity to roads that can handle the traffic volumes generated.
4. New schools should be located adjacent to compatible land uses.

**HEALTH CARE FACILITIES**

Hardin County has a number of health care facilities that serve area residents. In Hardin County, there are over one-hundred and forty-four licensed physicians and forty-five practicing dentists. There are a total of three-hundred and fifteen hospital beds in the County. Listed below are the health care facilities found in Hardin County, along with a



## ELEMENT VII-COMMUNITY FACILITIES

brief description of each facility:

### 1. HARDIN MEMORIAL HOSPITAL, REGIONAL COMPREHENSIVE CARE FACILITY

Hardin Memorial Hospital is the largest hospital in the area. It features both inpatient and outpatient treatment. This hospital is located in Elizabethtown, but it serves the entire Lincoln Trail Region.

### 2. IRELAND ARMY COMMUNITY HOSPITAL

Ireland Army Hospital, located at Fort Knox, is the second largest hospital in the region. This hospital is used to provide health care to both active duty military and military retirees. The hospital operates twenty-six general, medical, surgical, psychiatric and specialty clinics. A military-issued identification card is required to receive service at this facility.

### 3. LINCOLN TRAIL BEHAVIORAL HEALTH SYSTEM

The Lincoln Trail Behavioral Health System is a private health care facility, located in Radcliff. It's physicians provide service to patients suffering from mental health and chemical dependency problems. Treatment programs for depression, anxiety disorders and drug and alcohol addiction are available. Lincoln Trail offers programs to adolescents between twelve and eighteen years of age.

### 4. CAREFIRST EMERGENCY MEDICAL CENTER

CareFirst is an urgent care center that is owned and operated by Hardin Memorial Hospital. The clinic is located in Vine Grove.

### 5. COMMUNICARE

Communicare is a private, regional mental health center that provides health care services to residents in the Lincoln Trail Region. Communicare provides patient services such as drug and alcohol programs, an outpatient counseling center and residential services for those suffering with mental health illnesses.

### 6. HEALTHSOUTH LAKEVIEW REHABILITATION CENTER

The HealthSouth Lakeview Rehabilitation Hospital provides both inpatient and outpatient rehabilitation for persons recovering from surgery, stroke, brain trauma, joint replacement, arthritis, neurological disorders, pulmonary disorders and respiratory difficulties.

## ELEMENT VII-COMMUNITY FACILITIES



*Pictured above is the Hardin Memorial Hospital. It is the largest hospital in the Lincoln Trail Region. The Lincoln Trail Behavioral Health System specializes in treatment of depression, anxiety disorders, drug addiction and alcohol addiction.*

### PARKS AND RECREATION FACILITIES

Parks and recreational areas play an important role within the community, in that they provide a means to promote the physical and mental well-being of its citizens. Due to the importance of parks and recreation, such facilities should receive high priority when ranking the current and future needs of the community.

In order to fully analyze the parks and recreational facilities within a community, it is necessary to conduct a comprehensive inventory of all available facilities. Based on this inventory of all parks and recreation facilities, projections of future needs can be made.

Listed below is a complete inventory of all existing parks and recreational facilities in Radcliff. Specific features attributable to each facility are given.

#### INVENTORY OF EXISTING PARKS AND RECREATIONAL FACILITIES

##### A. COLVIN COMMUNITY CENTER (230 FREEDOM'S WAY)

###### 1. Facility Description:

A City-owned, multi-purpose recreation facility located in the heart of Radcliff. The facility is situated on a five and one-half acre lot.

###### 2. Facility Amenities:

- One Community Center – The Colvin Community Center is a

## ELEMENT VII-COMMUNITY FACILITIES

twelve thousand square foot multi-use building that contains three meeting rooms (one fully equipped with kitchen facilities), restroom facilities (main level restrooms have shower facilities) and an elevator (meets A.D.A. requirements). The Community Center is used for recreational programs and events, civic group meetings and both community and private gatherings. The Community Center is also the location of the Radcliff Parks and Recreation Department administrative offices.

- One Junior Olympic size swimming pool equipped with diving boards and a pool slide.
- One Concession Stand/Pool Entrance Building
- One Designated Walking Course (Concrete Surface)
- One Basketball Goal Area
- One Playground Area
- Two Tennis Courts (Lights) open from Dawn to Midnight

### B. DUVALL BALLPARK (ENTRANCES ON ATCHER ST AND CAROLYN ST)

#### 1. Facility Description:

Duvall Ballpark is a City- owned park, which is used for youth baseball and softball games. The entire park consists of twelve acres.

#### 2. Facility Amenities:

- One Babe Ruth/Senior League Baseball Field (Lights)
- One Youth Softball Field (Lights)
- One Major League Field (Lights)
- One Minor League Field (Lights)
- One Rookie League Field
- One T-Ball Field

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- One Concession/Restroom/Storage Building

### C. RADCLIFF CITY PARK (ENTRANCE ON NORTH DIXIE BLVD)

#### 1. Facility Description:

Radcliff City Park is a City-owned park that is situated on a total of twenty acres of steep, rolling terrain. This park contains a mixture of active and passive recreational facilities.

#### 2. Facility Amenities:

- One Skate Park (120'x120' Concrete Pad) for In-Line Skating
- One Picnic Pavilion with Picnic Tables and Restroom Facilities
- One Volleyball Court
- One Basketball Court
- One Three Station Frisbee Golf Course
- State-of-the-Art Playground Equipment
- Walking Paths (asphalt and dirt surfaces)
- 



*Duvall Park consists of T-ball, softball and baseball fields.*



*Radcliff City Park was the first public park opened in Radcliff*

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### D. DAWLEY PARK (ENTRANCES ON SHELTON RD AND ROGERSVILLE RD)

#### 1. Facility Description:

Dawley Park is a City-owned park, which is located on approximately twenty-six acres. This park supports both active and passive recreational opportunities. Trees provide shade around the pavilion areas and along the backside of the park.

#### 2. Facility Amenities:

- One Regulation U8 Soccer Field – Used for U6 and U8 Games
- One Regulation U10 Soccer Field
- One Regulation Soccer Field capable of being marked for U12 and above games (Lights)
- One Regulation Football Field (Lights)
- One Two Room Storage Building
- Two Regulation Adult Softball Fields (Lights)
- Two Picnic Pavilions with Picnic Tables
- Two Concession/Restroom/Storage Buildings
- State-of-the-Art Playground Equipment

### E. SAUNDERS SPRINGS NATURE PRESERVE (ENTRANCE ON WILSON RD)

#### 1. Facility Description:

Saunders Springs is a City-owned park located on twenty-six acres of land. The park is primarily used for passive recreational uses, due to its rough terrain, flowing streams and cascading waterfalls.

#### 2. Facility Amenities:

- One Reservoir
- One Horseshoe Pit



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- ❑ Two Pavilions with Picnic Tables
- ❑ Several Walking/Hiking Trails
- ❑ Several Non-Designated Picnic Areas



*Dawley Park has a wide array of playing fields, which includes Saunders Springs Nature Preserve is the only nature preserve in the City of Radcliff.*

### FUTURE PARKS AND RECREATIONAL FACILITIES OUTLOOK

The inventory of recreational facilities in Radcliff shows that a wide-array of both active and passive recreational facilities are available to the public. In the past, recreational facilities of schools were also used to meet the public need. Due to the extensive use of recreational facilities at schools, this is no longer a viable option for the public. Sharing private recreational facilities with the public is difficult, because of scheduling conflicts and ownership issues.

Based on the existing recreational facilities within Radcliff, future recreational needs can be projected. Upon thoroughly reviewing the inventory of existing recreational facilities, the following are projected future recreational needs:

1. Indoor Sports Complex – Currently, there is no indoor recreational facility in Radcliff that provides basketball courts, racquetball courts, a weight room, an exercise room, a walking/running track, a soccer field and a swimming pool. Enclosing the existing swimming pool area (With a retractable ceiling and walls) and attaching a gymnasium onto the Colvin Community Center would allow for a more complete, year-round recreational program.
2. Spray Ground – The creation of a spray ground in the vicinity of the old baby pool area would give children another summer play option at the Colvin Center.

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3. Amphitheater – Creating a natural amphitheater at Radcliff City Park would allow for outdoor concerts to be held during summer months, thereby increasing use of this park.
4. Additional Land – Purchasing additional land around Dawley Park and Radcliff City Park would allow for the expansion of new recreational activities in the vicinity of existing facilities.
5. Walking/Running Trails – Developing new walking and running trails throughout the city serves a dual purpose for recreation and transportation.
6. Bicycle Paths – The creation of bicycle paths and bicycle lanes on roadways would give bicyclists recreational areas in the City.
7. Practice Fields – There is a need for additional soccer fields, practice fields and open space for all outdoor sports.
8. Neighborhood Parks – The creation of a network of small (one to two acres) neighborhood parks would provide greater access to recreational opportunities to all residents within the community.

### FUTURE SITE GUIDELINES

Parks and recreational areas should be located in such a way that they take advantage of the existing natural features in close proximity. For example, a nature preserve should be located in an area with unique or special natural features, terrain and wildlife. Listed below are a number of guidelines for developing prospective recreational sites:

1. Active recreational land uses should be located on relatively flat sites.
2. Passive recreational land uses should be located in areas that take advantage of existing natural amenities such as streams, lakes, vegetation and varying topography.
3. Parks and recreational areas should be located next to compatible land uses, in order to minimize the noise, pollution and traffic.
4. When developing a passive recreational land use, the preservation of existing natural features should be maximized.
5. Parks and recreational areas should be located as close as possible to heavily populated areas, in order to maximize use and accessibility.



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6. Optimum utilization of existing parks and recreational facilities should be pursued prior to new construction of similar facilities.
7. Pedestrian paths and bicycle trails should be developed between parks and recreational facilities, in order to maximize access to such facilities.

### PARKS AND RECREATION SUMMARY

It has been noted that recreational facilities and natural open space are critical to the well-being of a community's population. This analysis has proven that the City of Radcliff is doing a good job of providing a wide-array of recreational opportunities to the public, even though there are still needs that must be met. In the past, the City of Radcliff shared the recreational facilities of schools, in order to meet the community's needs. In the future, this sharing concept should be discouraged. Radcliff needs to take ownership of its own recreational facilities, so that the public can have use of these facilities at all times. Due to increasing costs of providing maintenance to all recreational facilities, some type of user fee would be helpful, in terms of providing continued, optimum service to the public. The concept of a user fee should also be explored to subsidize the cost of larger, more expensive parks and recreation projects.

### POLICE PROTECTION FACILITIES

The primary purpose of the Radcliff Police Department is to improve the quality of life in our city, by enhancing public safety through cooperative interaction with the community. The police department is responsible for protecting life and property, enforcing laws and taking all appropriate measures to combat crime. In order to combat crime, the police department must have adequate manpower, equipment and facilities. Listed below is a description of both existing and future police personnel and facilities.

#### EXISTING POLICE DEPARTMENT PERSONNEL

The Radcliff Police Department currently employs thirty-five sworn officers and fifteen civilians. Of the thirty-five sworn officers, there is one police chief, one police captain, one public information officer and four detectives. This leaves twenty-eight officers for patrol purposes. The civilian staff includes one administrative assistant to the police chief, two evidence custodians, four record keepers and eight dispatchers.

Based on current staffing, Radcliff has a ratio of 2.3 full-time employees per 1000 inhabitants. In addition, there is only a ratio of 1.5 sworn officers per 1000 inhabitants. The national average of full-time law enforcement employees per 1000 inhabitants is 3.5 employees. The national average of sworn officers per 1000 inhabitants is 2.3 officers. According to the national average for police department personnel, Radcliff should have seventy-seven employees and fifty sworn officers.

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### FUTURE POLICE DEPARTMENT PERSONNEL

Compared to the national average, Radcliff has less police department employees and less sworn officers than the national average. Due to the fact that the Radcliff Police Department is understaffed in comparison to the national average, it appears that the number of employees will grow substantially in the future. Using the national average of 3.5 full-time employees and 2.3 sworn officers per 1000 inhabitants, the Radcliff Police Department should have a total of seventy-seven employees. Fifty of these employees would be sworn officers. It is unlikely that the Radcliff Police Department personnel will increase by 54% over the next five years, but since it is so understaffed there should be significant growth. There is a need for additional officers on patrol and a separate bike patrol unit. Future projections would add two more officers to the patrol, increasing their total to thirty. In addition, there is a need for two more detectives, one more captain, five more bike patrol members, two more record keepers and three dispatchers.

### EXISTING POLICE DEPARTMENT FACILITIES

The current Police Department headquarters has undergone several renovations to improve the existing facility. The dispatch center, evidence room, squad room and lower level were all renovated. A new roof was installed on the building in 2002. An additional renovation to the records section service area is planned for 2004.

### FUTURE POLICE DEPARTMENT FACILITIES

There are several needs projected, in terms of future Police Department facilities. There is a need for additional space for dispatch and records storage. The detectives section of the building is too small. There are three detectives working in a space that would be better suited to two detectives. There is also one detective working in the lower level of City Hall. Storage space is another major concern. On the lower level of the building, the field training office shares the same space as the briefing or training room. Currently, there is only one interview room available to the patrol. Citizens arriving for interviews or to give statements must use the training room. Finally, three patrol lieutenants share the same office, which is small and crowded. A new Police Department Headquarters should be built within ten to fifteen years. Existing facilities are already hampered by a lack of space.

### FIRE PROTECTION FACILITIES

The protection of the community's population and property from the threat of fire is a service that must be provided at an optimum level. The ability to recognize current as well as future fire protection needs cannot be over-emphasized, if adequate protection is to be maintained. Rapid population growth and urban sprawl can require an expansion

## ELEMENT VII-COMMUNITY FACILITIES

expansion of fire protection facilities. Consideration must also be given to the expansion of the fire department's manpower and equipment in a manner that keeps pace with growth.

### EXISTING FIRE DEPARTMENT PERSONNEL

By definition of the National Fire Protection Association, United States Fire Administration and the Commonwealth of Kentucky Fire Commission, the City of Radcliff Fire Department is a "Combination" Fire Department. The Fire Department currently has one full-time Fire Chief, one full-time secretary, one full-time inspector, three full-time sergeants, fifteen full-time firefighters, two part-time firefighters and twenty volunteer firefighters.

Utilizing the population calculation from the previous Comprehensive Plan, a population of twenty-three thousand with coverage by forty-two paid and volunteer firefighters results in a ratio of 1.82 firefighters per 1000 people. All full-time firefighters are certified by the Kentucky Fire Commission as professional level firefighters and approximately 90% of the volunteer personnel are currently certified by the Kentucky Fire Commission at the volunteer level. The remaining 10% are undergoing the certification process at this time.

### FUTURE FIRE DEPARTMENT PERSONNEL

Current personnel allows for Fire Station #1 to be manned twenty-four hours per day, seven days per week, pursuant to KRS 95.500. Generally, this staff consists of four firefighters, one of which is a sergeant. Station #2 is also staffed twenty-four hours per day, seven days per week, with a minimum of two firefighters per shift.

The average number of volunteers per run has decreased dramatically over the past ten years. Over the past ten years, the average number of volunteers is 8.21 per response. Over the past two years, the average number of volunteers is 4.37 per run. These averages are indicative of a low volunteer turn-out throughout the entire nation. The low number of volunteers is directly attributed to increased run volumes, training requirements, personal economic need, competition with other volunteer groups, usual vocational overtime, change in work ethic, family demands and so on.

Station #2 is operating with two personnel on a twenty-four hour per day, seven-day per week basis. There are a low number of volunteers at this location. As the number of volunteers continues to diminish, the need for additional personnel increases. This creates several challenges including decreased quantity of service, decreased quality of service and decreased safety for personnel.

## EXISTING FIRE DEPARTMENT FACILITIES

The City of Radcliff currently operates two fire stations. Fire Station #1 is located at 604 South Wilson Road (just north of the intersection of South Wilson Road and Vine Street). Currently, a new fire station is being constructed adjacent to the north side of the existing Fire Station #1. This new facility will contain approximately 8000 square feet of apparatus storage space area. It will also be capable of housing up to eight fire vehicles and associated equipment. The new facility will have 3200 square feet of living, kitchen and recreational space. In addition, the facility will have a 6000 square foot basement to be used for storage and shelter. A large work area will also be provided.

Fire Station #2 is located at 4075 South Wilson Road (near the intersection of South Wilson Road and Amy Avenue). This facility was constructed in 1990. The building has a total of 3200 square feet of apparatus storage area, capable of housing up to four pieces of fire apparatus and equipment. There is also 1900 square feet of living, kitchen and personal space within the facility. In addition, this station contains a 600 square foot smoke maze building and confined space training facility.

The two current station locations are adequate based on the existing jurisdictional size of the city. Approximately, 95% of the city is located within a three mile radius of either station and the average call for service is less than four minutes to this region. The remaining 5% of the city is within an average six minute response time. Decreasing these response times would be much easier, if similar and sound-alike street names were eliminated. The problem of similar and sound-alike street names was identified in the previous Comprehensive Plan and it still exists today. These streets have been identified and they continue to lower the level of fire protection by increasing response times.

The City of Radcliff participates in the Enhanced 911 System operated by Hardin County Control. This system has proven to be a valuable tool and it has resulted in improved fire and emergency protection.

The City of Radcliff provides mutual aid response by written agreement to the other fire department outside of the corporate limits. These responses are done at the specific request of the other departments and on a second run basis only. The Fire Department , by inter-local agreement with the Hardin County Ambulance and Hardin Fiscal Court, provides Rescue services throughout northern Hardin County.

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*Pictured above is the new Radcliff Fire Station #1. This Fire Station #2 is located on South Wilson Road. The personnel at this fire station are responsible for covering fires on the south side of the city. The personnel at this fire station are responsible for covering fires on the south side of the city.*

### FUTURE FIRE DEPARTMENT FACILITIES

The existing fire protection facilities are adequate for the provision of timely service by the fire department. However, the need for expanded fire services will increase as the city boundaries grow. Vast improvements made to the facilities and equipment have led to the city receiving a Class 4 Fire Rating. This rating not only improves the fire rate insurance costs to residential areas, but it also has a tremendous impact on both commercial and industrial developments.

The construction of the new fire station should help improve both the quality of service and the overall fire rating for the city.

### FUTURE SITE GUIDELINES

When locating and developing future fire protection facilities, the following guidelines should be used:

1. Fire stations should be located on or near major arterials for improved response time.
2. Fire stations should be located within a minimum distance from densely developed areas, in order to provide optimum protection.
3. Future fire station sites should be large enough to allow for sufficient handling and storage of equipment.
4. The design and location of all future fire stations, especially those located within residential areas, should be compatible with surrounding land uses.