TRANSPORTATION

INTRODUCTION

The Transportation Element reflects the changing context of Boone County's transportation network. The text of this element is broken down into three sections: 1. Regional Transportation System (Boone County as an integral part of the Cincinnati metropolitan region), 2. Boone County Transportation Plan, and 3. Transportation/Land Use Connection.

1. REGIONAL TRANSPORTATION SYSTEM

The Region - The first Transportation Goal emphasizes that the transportation network of the county is a significant component of a regional, metropolitan transportation system. As shown in **Figure 11.1**, this Greater Cincinnati metropolitan region includes eight counties in three states: Ohio, Kentucky, and Indiana. The responsibility for transportation planning within this region rests with the Ohio-Kentucky-Indiana Regional Council of Governments (OKI).

OKI's Regional Transportation Plan provides a good history and overview of the transportation network for this region:

Transportation facilities have always been important to this region's growth and prosperity. In the late 1700's, the Ohio River supported Cincinnati's emergence as the gateway to the West, a point of convergence for people and goods. In the 1800's, the Miami and Erie Canal and the railroad system established the Cincinnati area as a commercial and transportation center.

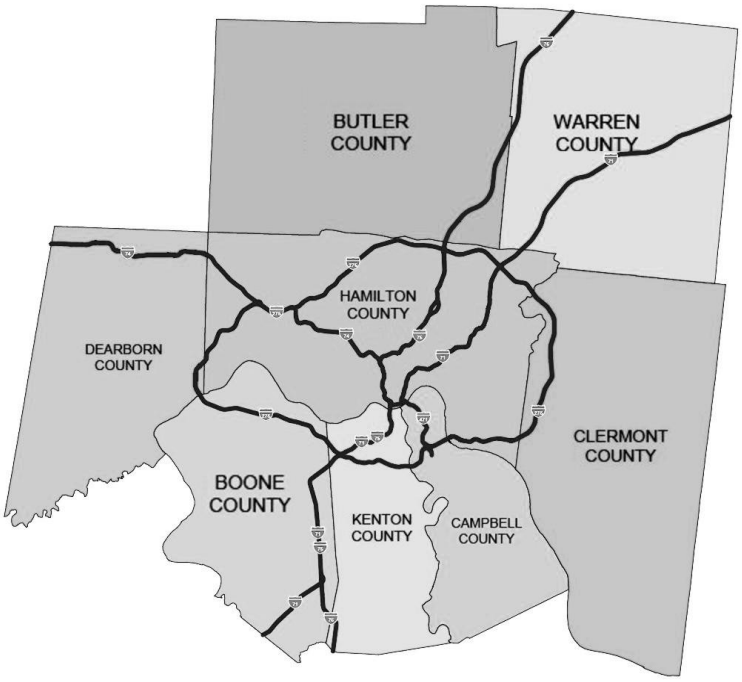


Figure 11.1 *- Greater Cincinnati metropolitan area*

Today, the region's transportation network includes five interstate highways, an international airport, and a web of arterial highways. As one of the most heavily multi-modal networks in the country, the region's transportation system is invaluable both to the health of the region's economy and the mobility of the population.

Boone County is an integral element of the regional transportation system because three of the region's five interstate highways traverse the county, the international airport is located in the county, and the Ohio River borders over half of the county. Boone County's intergovernmental connections with the regional, metropolitan transportation system are maintained through our Metropolitan Planning Organization (MPO), which is OKI, and the Kentucky Transportation Cabinet (KTC).

OKI & Regional Transportation Planning - OKI has been the designated MPO for the Cincinnati metropolitan region since 1964. According to the Federal Aid Highway Act of 1992 and subsequent amendments, OKI has had statutory responsibility for planning and coordinating all aspects of transportation planning on behalf of local governments within its region, with the cooperation of the Ohio Department of Transportation (ODOT) and the Kentucky Transportation Cabinet (KTC).

Since this region qualifies as an urban area (over 50,000 population), OKI has had to maintain a comprehensive planning process for transportation improvement projects. This process includes developing and periodically updating a long-range, regional transportation plan and developing a prioritized capital projects list (Transportation Improvement Plan-TIP). OKI also maintains data management (e.g. population projects, traffic counts) and other planning services (e.g. access management) that assist local governments' transportation planning endeavors specifically, and generally, the overall regional planning efforts.

The Regional Transportation Plan addresses and makes recommendations for what the transportation needs of the region will be in the future (the 2004 adopted plan forecasts to the year 2030). Work on the 2040 Regional Transportation Plan Update has recently been started. The recommendations of the long range plan and other capital projects are prioritized into a four-year schedule called the TIP-Transportation Improvement Plan. The TIP is the region's plan for major transportation improvements in the metropolitan region. It is the mechanism through which local governments prioritize specific projects that will receive federal funding. When the TIP receives final approval by OKI's Executive Committee, it then is recognized as the policy document that directs transportation improvements in the OKI region.

Increased Roadway Capacity, Increased Automobile Travel, and Air Quality - The primary objective of transportation planning in most metropolitan regions, including the OKI region, from the early 1960s to the present was the increase in mobility of automobile drivers by increasing roadway capacity. This was done by either improving roadways or building new roadways. While mobility of automobile drivers seemingly increased during this period, the increase in air pollution problems caused by increased automobile travel was undeniable in most metropolitan areas, including the Cincinnati region.

Since the 1970's, the federal government has attempted to improve air quality in metropolitan regions with the Clean Air Acts, but with little success. This legislation mandated auto manufacturers lower the emissions produced by the automobiles they manufacture. However, during this same period, total vehicles miles traveled (VMT) by automobile increased tremendously. Most of this increase in VMT was caused by individuals driving alone, which defines single occupant vehicles (SOVs). Undoubtedly, much of the increase in VMT is attributed to longer daily commutes to work.

The increase in VMT was greatly facilitated by the completion of the interstate highway system in the 1970's, as evidenced in this region by the completion of I-275, the circle highway around Cincinnati. The highway system also further encouraged low-density suburban land development.

Table 11.1 shows the national trend of increasing automobile travel has recently begun to decrease according to the U.S. Department of Transportation's *2009 Nationwide Household Transportation Survey*. Comparable data is not available for the Cincinnati metropolitan region. However, all indications suggest that the travel trends in our region are similar.

Nationally, a 2009 survey conducted by the Research and Innovative Technology Administration (RITA) Bureau of Transportation Statistics showed that 88 percent of all daily trips take place in personal vehicles. That number has remained basically the same since 1990. Furthermore, 91 percent of commuting trips occur in personal vehicles. Americans average 3.8 trips per day per person at a distance of around 36 miles per day. A third of those trips were for family errands; another third for social or recreation; and the remainder were for other purposes including commuting trips. In addition, the average American spends 55 minutes a day driving a distance of 29 miles per day. The average trip distance is 9.7 miles. 57 percent drive cars; 21 percent drive vans or SUVs; 19 percent drive light trucks.

Table 11.1 – NATIONAL TRAVEL TRENDS

Data per Household	1969	1977	1983	1990	1995	2001	2009
Daily VMT	34.01	32.97	32.16	49.76	57.25	58.05	54.38
Annual VMT	12,414	12,035	11,739	18,161	20,895	21,187	19,850
Daily Vehicle Trips	3.83	3.98	4.07	5.69	6.34	5.95	5.66
Annual Vehicle Trips	1,396	1,443	1,486	2,077	2,321	2,172	2,066
Number of Vehicles	1.16	1.59	1.68	1.77	1.78	1.89	1.86

Source: U.S. Department of Transportation. 2009 Nationwide Household Transportation Survey.

Dispersed Suburban Development and Congestion - Low-density land development began to occur throughout the country with the migration of World War II veterans and their young families to the sub-divisions of single family homes built during the 1950's and 1960's. It continued during the 1960's and 1970's with the movement of commercial uses to the suburbs and the development of large regional shopping centers. Also, during the 1970's and 1980's, and continuing to the present, many manufacturing, office, and other uses relocated in the suburban areas. Boone County has been, and continues to be, impacted by all of these phases of suburban land development.

This dispersed, low-density pattern of suburban development, coupled with limited transit services, necessitates travel by the automobile in Boone County. Like other growing suburban areas of metropolitan regions, Boone County has also experienced acute and chronic traffic congestion on its interstate highways and primary arterial roadways. Of course, this congestion has contributed to the air pollution problems of the overall OKI region.

A solution, during the past few decades, for alleviating this congestion has been to add another lane to the roadways or build new roads, thus "increasing capacity". However, the dilemma has been that when capacity was increased congestion was relieved for only a short time period before returning at even greater levels. The multiple improvements to KY 18 in the Mall Road and Houston Road area exemplify this "congestion, increased capacity, and return to congestion effect" in Boone County.

To address this phenomenon, Congress decided in the early 1990's to take a different tact in dealing with metropolitan air pollution and traffic congestion problems. It decided to link its clean air legislation with its transportation legislation. Now all future transportation projects must conform to air quality standards and contribute in reducing motor vehicle emissions, thereby improving air quality. Increasing mobility, in the future, will be realized by improving mass transit and pedestrian options and improving capacity in the existing roadway system.

The CAAA, ISTEA, TEA-21 And Their Impacts - The Clean Air Act Amendments of 1990 (CAAA), the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Efficiency Act of the Twenty-first Century of 1998 (TEA-21) were the legislative acts that Congress undertook to assure that increasing mobility in the future in metropolitan regions would not have a concurrent, detrimental impact on air quality. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) is the most recent law, enacted in 2005. OKI's 1993 Regional Transportation Plan explained the impact of the CAAA and the ISTEA on transportation planning as follows:

> *For transportation planning, the CAAA is a significant driving force. The CAAA recasts transportation planning as a process for improving air quality as well as mobility. It challenges transportation officials to find ways to reduce emissions from motor vehicles, to increase use of alternatives to single occupant vehicles (SOVs), and to reduce SOV travel in order to help achieve air quality standards by 1996. From now on, the region's transportation plans, programs, and projects must conform to State Implementation Plans (SIPs) for air quality. For highway projects involving new or expanded capacity, federal funds will not be available unless the proposed project will result in an overall reduction of automobile emissions. The reconstruction of U.S. 42 in 2004 is an example.*

The CAAA's impact on the OKI region results from the region's ozone problems. Ozone is one of the pollutants for which the EPA has defined national ambient air quality standards (NAAQS). Based on health impacts, the NAAQS specify allowable pollutant concentrations and exposure limitations. Although ozone is beneficial in the upper atmosphere, it is harmful to breathe near ground level.

Ozone, also known as smog, is not emitted directly into the atmosphere but is formed when precursor emissions--volatile organic compounds (VOCs) and oxides of nitrogen--react in the presence of sunlight. Nearly half of the VOCs from man-made emissions are from mobile sources (primarily vehicle emissions from cars, trucks, and buses). VOCs are also emitted from stationary sources (primarily industries) and area sources (individually insignificant sources that have a cumulative impact, e.g., lawn mowers, consumer solvent use, farm equipment).

The OKI region was one of 96 urban areas in the country identified as not meeting ozone standards. The severity of each area's ozone problems is the basis for its classification as marginal, moderate, serious, severe, or extreme. Cincinnati was identified as a moderate non-attainment area. Areas with more serious problems are required to take more numerous and more stringent actions to attain the NAAQS but have more time to do so than areas with less severe problems. Any area that failed to meet the NAAQS by its 1996 deadline was supposed to be bumped into a more stringent classification with stricter compliance requirements. In December 2004 the area was still listed as a non-attainment area.

The ISTEA, and later TEA-21, replaces the Federal Aid Highway Act of 1962 and all of its subsequent amendments. The primary goal of this law seeks to develop a national intermodal transportation system with logical interconnections between different transportation modes (i.e. light-rail connections with major airports). The law also promotes the secondary goals of simultaneously reducing energy consumption and air pollution.

OKI's regional transportation plan further defines the new direction of this legislation. "ISTEA shifts planning emphasis away from expanding highways and toward constructing a multimodal system in which transit, rideshare, bicycle and pedestrian facilities can offer a viable alternative to single-occupant vehicle travel. It calls for transportation planning to reduce travel demand rather than just manage travel demand; it addresses the transportation system's performance as well as its capacity."

Another important change with ISTEA and TEA-21 is that the decision-making authority for projects is shifted away from the federal government to the states and localities. Coupled with this change is an emphasis on planning. In urban areas, the Metropolitan Planning Organizations (MPOs) and the state transportation agencies both must develop long-range plans and three-year plans (or TIPs) which identify funding for the projects.

Metropolitan Planning Organizations (MPOs), such as OKI, have been given increased influence for deciding how federal dollars will be spent in their regions. According to OKI, the long range planning process now includes attention to land use, travel demand and congestion management, intermodal connectivity, methods to improve transit service, and expanded travel by other modes.

OKI's Regional Transportation Plan - The Cincinnati region's Metropolitan Planning Organization (MPO) the Ohio-Kentucky-Indiana Regional Council of Governments (OKI) updated the Regional Transportation Plan in 2008. The plan is required to be updated every three years. In May 2011 work began on the update to this plan. The Clean Air Act Amendments (CAAA) and the Transportation Efficiency Act (TEA-21) defined the context and direction for the plan. Some actions arising from these planning efforts include:

- use of alternative fuels;
- expansion of transit systems to include light rail and commuter rail, in addition to bus system improvements;
- "smart" highway surveillance systems to reduce delay, vehicle emissions and accidents;
- projects to promote bicycle and pedestrian travel that reduces vehicle trips;
- travel demand strategies such as employee commuting programs;
- corridor studies to further define recommended actions; and
- regional committees to deal with long range issues of land use, financing, and transit expansion.

The Act also required the formation of the Commission on Land Use, Commission on Transit Institutional Restructuring, and the Commission on Transportation Financing.

Implementation of the Regional Transportation Plan will have dramatic, long-term impacts on the residents of Boone County. The greatest of these will involve changes in future land-use patterns necessitating different development approaches. OKI's strategy for future land use development calls for more compact development that includes well-planned, attractive, and dense residential areas, with various multi-family types and smaller lot sizes for detached houses.

This plan also suggests a mixture of land uses that would include neighborhood retail, public uses (i.e. libraries, post offices, parks), and day care. These compact developments would be served by extensive bicycle and pedestrian facilities, thereby reducing the need for many local automobile trips. Also, these developments would have the appropriately high densities that are needed to enable efficient transit service, thus enabling the residents to take transit for the commuting trips to their employment.

The transition to this more compact land use pattern would involve changing municipal zoning and subdivision codes to allow mixed-use and encouraging consistent development of pedestrian and bicycle facilities. OKI's strategy for implementing this change in land development is presented below in the discussion on the Commission on Land Use.

The Commission on Land Use - The Commission on Land Use, which formed during 2000, includes representatives from local and county planning commissions, City of Cincinnati, the OKI Board of Trustees, and others possessing interest in land-use and transportation matters. OKI foresees that the recommendations of the Commission on Land Use should become the policies that would promote the compact land use patterns that foster travel by transit, bicycle or walking. These policies would then be reviewed by the various counties and municipalities for possible use in their zoning and subdivision regulations.

In 2002, the Commission developed a regional vision through extensive public involvement. It identified 28 critical challenges or fundamental policy concerns. These were organized into six general categories: transportation, public facilities and services, natural resources and open space, housing, economic development, and land use. A draft report, describing details of these issues has been issued in 2005, which indicates that OKI will provide and encourage adoption of model ordinances, processes, and techniques to local communities that further the Commission's mission and vision. OKI has no authority to implement policies at a local level, but can affect future transportation projects.

The future pattern of land-use should involve developing at a higher density with a mix of residential, commercial, public and industrial uses. Development will be served by multi-modal and inter-modal transportation facilities. Good pedestrian and bicycle access to transit facilities should become the norm. A better description of this more compact land use pattern will be presented in the final section of this element-LAND-USE/TRANSPORTATION CONNECTION.

The Cincinnati/Northern Kentucky International Airport - The Cincinnati/Northern Kentucky International Airport (CVG) got its start in the early 1940s as a training field for military pilots. As World War II drew to a close, the military relinquished control to the Airport Board in neighboring Kenton County, which sought to create a civilian airport on the land in Boone County. The first commercial flight, an American DC3 – landed at CVG in January 1947. From 1947 CVG continued to grow and expand to serve the local Region. Delta Air Lines selected CVG as its Hub in the 1980s and continued to increase service through 2005, growing CVG to be its second largest hub. Additionally, DHL chose CVG as its home for its North American Hub in the 1980s.

The continued growth and expansion of CVG over the years has required the relocation and closure of roads, as well as the removal of residential and business structures around the airport for construction. During this growth period, the Airport conducted a series of Master Plan Studies and FAR Part 150 Noise Compatibility Studies to balance the operational needs of the Airport with the surrounding community. **Table 11.1** provides a snapshot of these studies through 2005 and some of the major projects implemented from each study.

The 2005 Master Plan recommended two alternatives. One alternative involves making improvements and/or changing operational procedures to existing runways and taxiways to increase airfield capacity. The second set of alternatives includes runway construction. The two main alternatives that appear to meet the future capacity demand forecast include a potential north-south runway located on the east side of the airport, and an east-west runway located south of the existing east-west runway in the area of KY 237 near Burlington. If the airport does not meet or exceed capacity projections during the planning horizon, then it may choose to not build the runway or defer such a decision to a later planning horizon. Either of these alternatives will significantly affect industrial, residential, commercial, public, and recreation land uses, as well as result in the re-routing of significant roadways. In the east-west alternative, seven residential communities would have to be acquired. At this time, no preferred alternative has been selected. Thus, this issue must be addressed in the 2010 Update of the Boone County Comprehensive Plan as well as the next Airport Master Plan Update. According to county records, the Airport owned 7,200 acres in 2011. The Airport needs to consider the long term impact on these areas for the benefit of Boone County and not just for the region.

Table 11.1 *- Airport Studies*

Study	Major Projects
1956 Master Plan Study	Extended Runway 18/36 (original north/south runway) to 8,600 feet; Closed Runway 13/31.
1964 Master Plan Study	Extended Runway 18/36 to 9,500 feet; Development plans for a new terminal expansion began.
1973 Master Plan Study	New Terminal expansion opened; Runway 9R/27L and 18/36 were reconstructed.
1984 Master Plan Study	New north/south runway 18L/36R was constructed and opened in January 1991; Runway 9L/27R was closed; Terminal expansion continued.
1990 FAR Part 150 Noise Compatibility Study	Implemented daytime and nighttime noise abatement operational flight procedures; Implemented land acquisition and sound insulation programs in noise impacted area (noise levels greater than 65 DNL) around the airport.
1994 Master Plan Study	Runway 9/27 extended to 10,000 feet in 1994 and to 12,000 feet in 2004; Runway 18R/36L extended to 11,000 feet; New Runway 17/35 (now named 18R/36L) opened December 2005.
1998 FAR Part 150 Noise Compatibility Study	Continued daytime and nighttime noise abatement operational flight procedures and land use programs.
2004 FAR Part 150 Noise Compatibility Study	Continued daytime and nighttime noise abatement operational flight procedures and land use program.
2005 Master Plan Study	New Terminal 3 Security Screening Building constructed and opened in 2009; Identified 2 future Runway Alternatives.

Figure 11.2 and **Figure 11.3** depict the 2004 and 2010 approved noise exposure maps and noise contours approved in CVG's 2004 Noise Compatibility Study. These contours are currently in effect. As described in the Housing Element, new residential development should only be permitted in the 65 DNL noise contours if structures are designed to be compatible with noise impacts.

The previous Master Plan Update, prepared in 2005, was based upon conditions known at the time and laid the foundation for future development at CVG through 2025. Since the completion of the 2005 Master Plan, the U.S. aviation industry has experienced unpredicted changes, such as the worst economic downturn since the Great Depression, record high fuel prices, multiple network carriers reorganizing under Chapter 11 bankruptcy protection, legacy airline consolidation, increased security measures and processes, advancements in technology of airline check-in procedures, and the evolution of airline fleets.

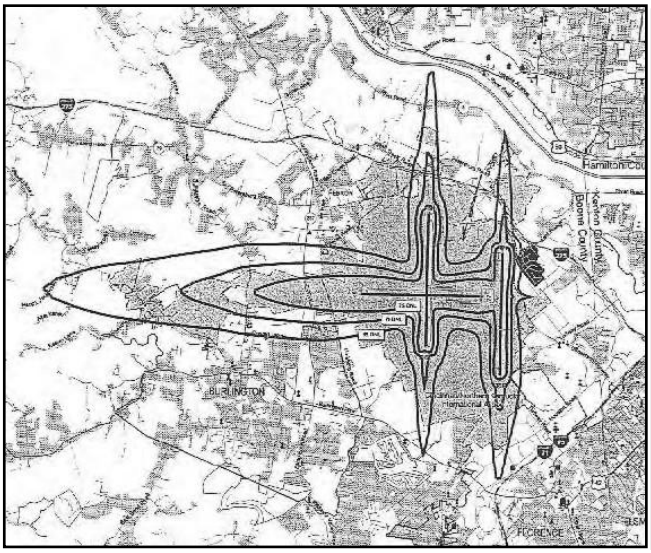


Figure 11.2 *- 2004 Noise Contours*

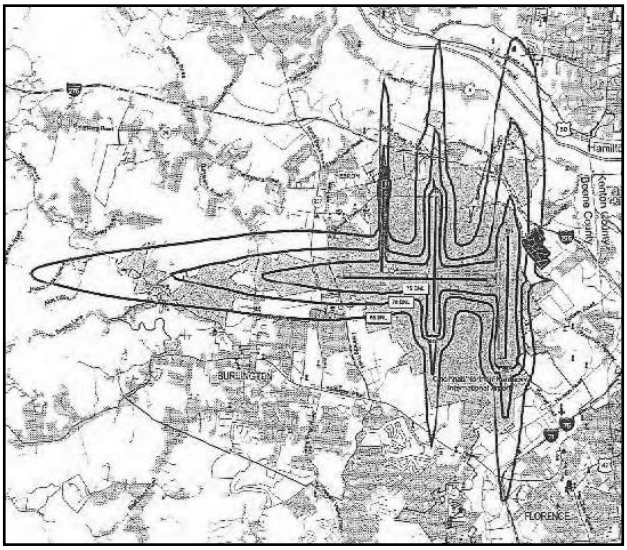


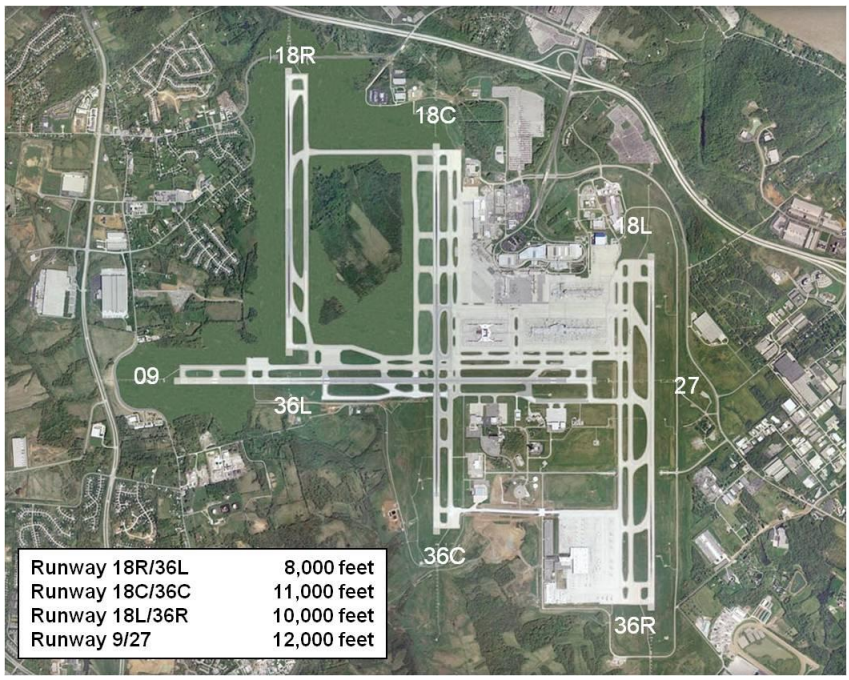
Figure 11.3 *- 2010 Noise Contours*

The 2010 Master Plan Study Update is critical to the future operation and development of the Airport. The Airport is the largest landowner and one of the largest employers in Boone County. It also has regional significance for providing air travel to businesses and consumers in Kentucky, Ohio, and Indiana. Coordinating planning efforts between the Airport, the Planning Commission, and the legislative units is important to explore business opportunities, infrastructure expansion (e.g. roads and utilities), and land use compatibility issues in order to remain competitive in the global economy and to retain an efficient community transportation system.

These events have resulted in a significant change in current and anticipated demand and the future operational model at CVG. In response to these changes, CVG is in the process of conducting a Master Plan Study Update that is expected to be completed in 2012. The 2012 Master Plan Study Update will consider the possible impacts of a potential operational transition through 2035 from a dominant single carrier-large hub airport to a competitive multi-carrier environment. It will also identify and evaluate strategic business opportunities in an ever changing economic environment though 2035. The information identified through the master planning process will also ensure the continued operation of a safe, efficient, and environmentally compatible airport. The Master Plan will recommend cost-effective improvements in accordance with FAA standards, taking into consideration the local, regional, national and international dynamic nature of the aviation industry. The study involves a series of stakeholder meetings to engage the community in the master planning process. Updated information and feedback will be available regularly online at www.cvgairport.com/plan during the process.

Currently, CVG is the Tri-State Area's primary airport and one of the nation's major centers for transportation by air. CVG continues to distinguish itself, and serve a major role in the aviation system, as the only dual hub (passengers and cargo) airport for the region - providing a higher level of air service for local travelers and businesses than the surrounding airports. Additionally, CVG is the only airport in Ohio, Kentucky, and Indiana that provides non-stop trans-oceanic service connecting the Tri-State to the World. CVG's airfield is comprised of three north/south runways and an east/west runway (**Figure 11.4**). CVG currently offers approximately 191 daily departures to 53 non-stop cities (compared to 670 daily departures in 2005), including non-stop international service to Paris, Toronto, and Cancun. CVG is currently served by seven carriers including, Air Canada, American Airlines, Continental Airlines, Delta Air Lines (including regional affiliates), United Airlines, USAirways, DHL, and USA3000.

Figure 11.4 *- CVG Runways, 2011*



Railroad - Rail service in Boone County is provided by two rail lines, the Norfolk and Southern Railroad and the CSX Railroad. Only the eastern portion of the county, specifically the area east of I-75/71, has rail service. The tracks located in the county do provide service to all points in the United States.

In addition to individual companies, freight rail service is provided to three industrial parks in Boone County: Northern Kentucky, Richwood, and Walton. The railroad companies can provide design services to individual users needing rail service. In fact, the Southern Railway participated in the design of the Walton Industrial Park.

At present, the railroads do not expect to expand the railroad network to other parts of Boone County. The topography and expense involved make such an undertaking very unlikely. However, it is expected that new users will be adequately served by the existing tracks. The presence of two major interstate highways, a federal highway and two rail lines in the same corridor create a unique and favorable situation for future industrial areas along the eastern edge of Boone County.

River Transport - The Ohio River comprises approximately one half of Boone County's border. As one of the major rivers in the United States, the Ohio River is part of a vast river transportation network. The 40 mile river shoreline of Boone County has historically been under-utilized by river traffic for docking or storage.

At one time there were three ferry crossings in Boone County. The Anderson Ferry, in the Constance area, is the only vehicular ferry still operating in the county.

The Boone County river shoreline presently lacks the appropriate infrastructure of roadways and rail service needed to accommodate a large river port facility. However, Boone County's Ohio River shoreline is viewed as an undeveloped resource for the county. Therefore, it shall in the future be studied to ascertain its potential for various land uses such as business, residential, resort and port operations, and to determine the needed surface transportation connections to such uses.

2. BOONE COUNTY TRANSPORTATION PLAN

The Boone County Transportation Plan was first adopted in 1996, as recommended by the 1995 Boone County Comprehensive Plan. It constituted a multi-modal transportation plan for the year 2020 with a thoroughfare plan component and a long range Transportation Improvement Program (TIP) component. The transportation plan has served as a guide for long range transportation improvement decisions. The thoroughfare component has assisted in the preservation of rights-of-way and corridors for transportation facilities and established a consistent framework for the design of new transportation facilities. The Transportation Plan was updated in 2006, with a planning horizon of 2030.

The Boone County Transportation Plan views Boone County as an integral part of the Cincinnati Metropolitan region, while also recognizing it as a dynamic community in its own right. It includes a detailed automobile/truck, bicycle and pedestrian thoroughfare plan, and a transit plan. The transportation plan is intended as a step toward developing a formal Capital Improvement Plan (CIP) for the four legislative units in Boone County. Although the

preparation of the Boone County Transportation Plan was recommended in the Goals and Objectives of the Boone County Comprehensive Plan, it is a separate document.

The Transportation Plan is not an amendment to the Comprehensive Plan. Rather, it is intended to be one of many planning tools utilized during the review of applications submitted for development in the county. The plan informs all persons, public and private, of the anticipated road, transit, bike, and pedestrian improvements that will be necessary to accommodate the growth expected through the planning horizon. This plan has helped the county and cities to identify project funding.

The preparation of the 2006 Transportation Plan was guided by a stakeholders group that included many public agencies and citizens. The project was prepared by a consultant, and administered by OKI on behalf of the Boone County Fiscal Court. A project development web site was created to encourage maximum public involvement. The plan was prepared to enable the county to be proactive in accommodating future growth and development. The goals of the plan are:
1. Develop a transportation system plan that is compatible with existing and future land use.
2. Improve the existing system through safety and operational improvements.
3. Identify funding shortfalls and develop strategies to address these shortfalls.
4. Recommend policy changes that will better enable the county to respond to development pressures.

The plan is comprised of two components: 1) a short term Operational Improvement Plan that involves relatively low-cost, easily-implemented safety and operational improvements; and 2) a prioritized long range Transportation Plan consistent of major projects and strategies.

Planned roadway improvements in the KTC six year plan should be related to the future land use map. The intention is to better correlate development and infrastructure. The future planned improvements are included with the map to show how the future land use plan for certain areas can be supported by roadway infrastructure. The Future Land Use Map is to be consulted for land use recommendations, and does not constitute an official transportation map, nor commit to the location and timing of improvements.

The Plan - The 2006 update of the Boone County Transportation Plan includes transit and bike components, and incorporates pedestrian recommendations. The Transit Authority of Northern Kentucky (TANK) maintains a Strategic Plan and periodically evaluates specific corridors for transit needs. Part of the TANK Plan recommends that the organization work with local and regional planning agencies to promote transit sensitive land use and Smart Growth Initiatives.

The 2006 Transportation Plan also updated the capacity needs and recommendations that the roadway system must have to handle existing and future traffic volumes. Similar to the 1996 Transportation Plan, a computer model has provided valuable information about future needs. The Stakeholders Group made qualitative changes based upon “real-world” knowledge in arriving at a final list of needed projects. The 2006 update of the plan considered the constrained financial condition of the State of Kentucky, and the limited roadway improvement funding that existed for the short term at that time. Available funding is even more limited in 2011.

TANK Transit Network Study (2006) – The final report of this plan, completed in mid-2006, contains several recommendations relevant to Boone County. The plan recommends the development of two Major Transitways – one along the I-75/71 corridor and another on the I-471 corridor. The I-75/71 Transitway would include new hubs in Florence and at CVG, which would connect via HOV or Bus Rapid Transit (BRT) lanes to TANK’s existing Covington Transit Center. Several potential locations for the proposed transit hub at CVG are mentioned generally in the plan, but specific sites are not identified. Conversely, since the Transit Network Study was adopted, TANK has acquired property in the vicinity of Height Blvd. and Mall Rd., presumably for the future development of Florence Transit Hub. The proposed Florence hub would result in modification of several existing bus routes that currently serve Florence, Burlington and Walton. Eventually, TANK envisions the Florence Hub as the western end of a Cross-Town transitway that would connect to the TANK hub in Kenton County and east to a hub at NKU.

KY Transportation Cabinet Six-Year Plan - The Six-Year Highway Plan is a bill enacted by the Kentucky state legislature to program funding for specific roadway improvements throughout the state. The plan schedules design, right-of-way acquisition, and construction money in phases for each roadway project. It is updated and re-enacted every two years by the Kentucky Transportation Cabinet. The plan is dependent upon the financial condition of the State of Kentucky. The following list is a summary of the major improvements presently planned for Boone County roadways as indicated in the Six-Year Plan:

- Reconstruction of Pleasant Valley Road (KY 237) from U.S. 42 to Rose Petal Drive – Construction underway.
- Reconstruction of Pleasant Valley Road (KY 237) from Rogers Lane to KY 18 – Construction 2012.
- Reconstruction of Pleasant Valley Road (KY 237) from Rogers Lane to Rose Petal Drive – Not funded.
- Construction of South Airfield Road – Construction underway.
- Phase II of Mall Road Reconstruction – Construction underway.
- Ramp from Mall Road to southbound I-71/75.
- Additional left turn lane from U.S. 42 to Mall Road – Construction 2013.
- Construction of Limaburg Access Road from North Bend Road (KY 237) to Limaburg Road – Construction 2011.
- Richwood Road (KY 338) Add turn lane from Paddock Drive to Triple Crown Blvd. – Construction 2011.
- Reconstruction of I-75/Mt. Zion Road Interchange – Construction 2015/2016.
- Reconstruction of I-75/Richwood Road Interchange – Construction 2016.
- Addition of lanes to I-75 from Mt. Zion Road to U.S. 42 – Construction 2013.
- Reconstruction of Mt. Zion Road from I-75 to Old Union Road – Not funded.
- Reconstruction of I-275/KY 20 Interchange at CVG Airport – Not funded.
- Reconstruction of U.S. 25 from Industrial Road to Richwood Road – Not funded.

In 2010, the State of Kentucky enacted a 2 year construction plan (2010-2012) with an update planned in 2012 for a 2 year cycle (2012-2014). Many projects are shown on paper to have funding intended for certain time periods, but the funding has not been available. As a result, the timing of proposed state and federal roadway projects is often estimated or unknown.

The need for long term maintenance and rehabilitation projects to be listed in the 6 year plan for planning and funding purposes is a subject that should be visited by KYTC. Currently, these projects are not as high visibility as new construction, and therefore often get pushed back leading to a costlier repair in the future.
The Boone County Fiscal Court has contributed funding toward the design of several State roadways including the Frogtown-Richwood Connector and North Bend Road. These actions generally make a project more attractive to the State as well as accelerate a project's schedule of implementation. Similarly, private land owners have in the past dedicated right-of-way needed for reconstruction or improvement of State roadways. Boone County also extended Conrad Lane to Idlewild Road and has begun construction of the South Airfield Road at KY 18 and the relocation of Oakbrook Drive. In order for Boone County to keep up with roadway improvement demands, a consortium of state and local government, developers, builders, and land owners is needed. The Cayton Road extension (Hopeful Church to Mall Road Connector) is a successful example. Local Project Agreements (LPA) represent cooperative funding agreements between KYTC and local governments.

Summary of the 2006 Boone County Transportation Plan Recommendations -
The following is a list of Operational Improvements that are intended to improve operating conditions and level of service on existing roadways. Details can be found in the 2006 Transportation Plan.

- US 42 at Rice Pike sight distance
- KY 18 & KY 237 intersection lane improvements
- US 42 & KY 237 intersection lane improvements
- KY 18 & KY 842 intersection lane improvements
- US 42 & Mall Rd intersection lane improvements
- KY 18 at KY 338 (Jefferson St) signal study
- KY 18 at Taylor Dr east signal study
- KY 18 Access Management study
- KY 18 speed study

- KY 18 at Merchants/Greenview/Ridge signal coordination
- KY 237 and Gateway Blvd signal study - completed
- KY 237 and Conrad Ln lane improvements - completed
- KY 18 at Bankers St signal study
- KY 18 at Commerce Dr signal coordination
- US 42 & Ewing Blvd intersection pedestrian improvements
- US 42 at I-75 corridor study
- Mall Rd at Plaza Blvd signal study – completed as part of Mall Rd. reconstruction
- Mall Rd at Mall Rd Center geometrics – completed as part of Mall Rd. reconstruction

The following are Recommended Capacity Projects in the 2006 Transportation Plan. Some of these are new facilities, and others are improvements to existing facilities.

- Mall Rd extension to Woodspoint Dr.
- KY 338, Richwood Rd, widening
- I-75/US42 Interchange reconstruction
- I-75/Turfway Rd Interchange reconstruction
- Camp Ernst Rd reconstruction and extension at south end to U.S. 42
- I-275 Interchange at Graves/Williams Rd
- Graves Rd improvements
- KY 536, Hathaway Rd improvements
- Rice Pike improvements
- Hicks Pike improvements
- Frogtown Connector extension to Beaver Rd
- Frogtown Connector extension to Mt. Zion Rd
- Beaver Rd improvements connected to Camp Ernst extension system
- US 42 widening to I-71
- Frogtown Rd improvements
- Richwood Church Rd improvements
- Spiral Blvd to Cavalier Ct cross interstate connector
- KY 20 improvements west of Hebron
- Gunpowder Rd improvements
- I-75/I-71 interchange modifications and connector road to KY 16
- Bullittsville Rd improvements
- KY 212 Ohio River Bridge
- Maher Rd - Frogtown Connector
- Longbranch Rd improvements – partially implemented
- Mineola Pike improvements
- US 25 improvements from Richwood to Walton

Upcoming Roadway System Needs

The 2006 Boone County Transportation Plan contains a working list of current, capacity and safety traffic issues (hot spots) throughout Boone County that have been identified by the public, local governments, and the Boone County Planning Commission. This list is updated as conditions change and improvements are implemented.

The purpose of this list is to identify relatively low-cost improvements that can be made over time through various funding sources in order to keep the road system operating effectively and safely. They represent capacity and safety concerns where roadway improvements may not be planned, or where major roadway improvements are expected to be delayed. Improvements at these hot spots can help achieve an acceptable level of service on roadways for a period of time before major improvements are planned to occur. Some improvements may save money by helping to alleviate the need for future high cost projects. For the purposes of this list, bike and pedestrian improvements are mentioned if they can be evaluated for potential transportation benefits, or a traffic-related safety issue is identified.

This list represents a preliminary list of traffic needs, and is not prioritized. This list contains potential improvements in all four legislative units of Boone County, and can be used to support grant requests and other funding efforts. All potential projects need to be evaluated, approved, and coordinated with the Kentucky Transportation Cabinet, since most of the roadway facilities are state owned and maintained. Research will be needed on accident statistics and other detailed characteristics of the entries on this list.

Traffic Safety Committee

This committee meets regularly at Boone County Public Works and was formed as a way to share information between agencies about traffic safety problems, primarily on county roads. It is chaired by the County Engineer and also includes representatives from the Boone County Sheriff Department's Traffic Division, the Boone County Planning Commission, and the Public Works' Engineering and Sign Divisions. The majority of the Committee's work involves identifying and responding to localized issues including speeding, signage and signalization, parking, sight distances, crosswalks and maintenance issues. Solutions range from conducting speed studies, increasing enforcement, or adjusting speed limits to adding signage/signals, installing speed humps or turn lanes. Cases involving roads outside county jurisdiction are forwarded to the proper governing authority with the committee's recommended action.

While most of the problems brought to the committee's attention are localized, others occur throughout varying locations in the county. An example would be the increased auto use for transport to/from schools has resulted in circulation problems on campuses and surrounding road systems, especially at area high schools. Further, the expansion of school systems has increased bus traffic, generating concerns about bus safety on two lane roads across the county. School bus safety is of particular concern Kentucky 18 and Kentucky 20, which experience high volumes of gravel truck traffic throughout the day.

Street Connections

The Boone County Subdivision Regulations contain specific criteria for evaluating potential street connections between developments and adjoining property. The Boone County Planning Commission maintains conceptual maps of possible future street connections for public review as well as to assist the Planning Commission in the development plan review process. These are working maps that change as communities develop.

In addition to already planned improvements, certain geographic areas must develop both an interconnecting collector and local street system, as well as improved routes or connections to the interstate system. Some of these connections will be developer-built. The recommended connections listed here are in addition to existing GIS street connection layer information being used on a daily basis. Individual building lot access to these connector routes should not occur, and the connectors should be designed to serve side streets. Existing examples include Oakbrook Drive, Wetherington Boulevard, Fox Run Drive, Triple Crown Boulevard, Hanover Boulevard, Thornwilde Drive, and Steeplechase Drive. Some connections may need to be three lanes to adequately serve turning movements. These planned connections are based on future land use planning, and are important for the 2030 Future Land Use Plan to develop property. Details regarding the recommended connections can be seen in the 2005 Boone County Transportation Plan. A summary of the connections follows:

- Litton Lane to Graves Road
- Southpark Drive to Elijah's Creek
- KY 237 to Elijah's Creek Road to new KY 20 (south of I-275)
- KY 212 to new KY 20 (south of I-275)
- parallel road system on the north side of I-275 between Graves Road and the Petersburg Interchange and connection to Williams Rd.
- suitable street connections between Bullittsville Road, KY 20 and KY 237
- South Airfield Road to KY 237 at Conrad Lane
- north south route connecting KY 18, Idlewild Road, and KY 20 west of Burlington/Bullittsville area
- interconnection of the Long Branch/Camp Ernst Area with the Pleasant Valley Road area, including the ability to cross the Gunpowder Creek valley
- Pleasant Valley Road to Hopeful Church Road
- improvement of Rosetta Drive and connection to I-75 ramps at Mall Road or similar
- southbound entrance ramp from Mall Road to I -75

- north/south and east/west routes between Longbranch, Hathaway, Camp Ernst and U.S. 42
- north/south and east/west routes between Rice Pike, Hathaway, Big Bone, and Double Eagle/US 42
- Weaver to Beaver Connector implementation by phase
- Richwood Road to US 42 route parallel to Hicks Pike
- Richwood Road to Beaver Road
- Industrial collector system between Richwood Interchange and Chambers Road, parallel to US 25
- Chambers Road to KY 16
- Stephenson Mill Road to Verona Mudlick, parallel to I-71
- Mary Grubbs Hwy extension to Kenton County

The most critical issue is to determine a mechanism to enable the acquisition, or reservation of future rights-of-way to preserve routes for future roadway routes before development occurs in the alignment. Street connections are critical but must be designed to minimize driveway and pedestrian conflicts.

Pedestrian and bike improvements should be included in all the above projects, and should include a high profile pedestrian/bike path system entirely around the airport, and an Ohio River bank system.

Pedestrian/Bike Path Plans

The 2002 Florence Pedestrian and Bike Plan concentrates mainly on the City of Florence, but also addressed some extensions of the network into the county in the West Florence area. It was conducted under the guidance of a joint city/county coordinating committee. The plan recommends that the sidewalk system in the City of Florence be completed where voids exist, that a network of designated bike lanes and routes be established in the City, and that several bike paths and lanes extend into the county. The 2006 Boone County Transportation Plan contained a planned network for the unincorporated county, Union, and Walton areas. It is important to note that small sections of the network can be constructed in preparation for later connections or continuations. Where possible, bike and pedestrian facilities should be separate pavement from the roadway. However, there are instances where attached bike lanes are desired by the State Transportation Cabinet or needed for restricted right-of-way, or similar reasons. Since 2005, KYTC has begun to implement Practical Solutions design in its projects. In general this is a cost-saving approach, and includes the provision typically of separate multi-use paths on each side of new/reconstructed state highways instead of the previous design that included a bike lane, curb, and concrete sidewalk. This has the effect of not only saving cost, but provides bike and pedestrian-friendly amenities apart from the high speed vehicle movements. The general concern and design issue that needs to be addressed properly in these facilities is the safety of bike and pedestrian movements at driveways. These types of facilities are generally safer to use in residential corridors than in commercial corridors where driveway traffic is far greater.

Freight

According to the OKI Regional Freight Plan (2011), over 323 million tons of freight flow through the region annually. Approximately one-third of this total is inbound to major businesses such as Toyota and AK Steel. More than 80% of the region's freight moves by truck and I-75 is one of the country's heaviest truck corridors. Global carriers FedEx and DHL located in Boone County are the key players in freight at CVG, which itself is a significant factor in the movement of freight in the county and across the region. Freight also moves through the region via rail and the Ohio River. OKI believes that improvements in rail capacity by CSX and Norfolk Southern and the 2014 Panama Canal expansion will contribute to an increase of freight movement in the region to 487 tons/year by 2040. The region (as well as Boone County) is well served by having four available transportation modes for freight travel: road, rail, river, and air. However, OKI suggests that challenges relating especially to rail congestion and highway freight capacity should be addressed in order for the region to fully realize its potential in coming years.

In order for Boone County to capitalize on the forecasted increase in regional freight, the OKI Regional Freight Plan recommends a number of improvements. Chief among these is the CVG Air Cargo Park (Est: $50 million), which is identified as an immediate need. Regarding road improvements, the plan recommends improving the I-

75 interchanges at Richwood Rd. (Est. $22.7 million) and Mt. Zion Rd. (Est. $19.7 million) in the near future and identifies the improvement of Gunpowder Road from US42 and Mt. Zion Rd (Est: $21 million) as a long-term need. Concerning Ohio River freight, OKI recommends further study of a New Ohio River Crossing (Est. $350,000) between the Carroll C. Cropper and Brent Spence bridges. This crossing would connect western Hamilton County with Boone County and, in conjunction with a Barge/Inland Waterway Study (Est. $250,000), address the access issues which currently hinder the development of port facilities along the river in Boone County.

Funding Opportunities

Since many road improvements have been planned but not implemented because of funding difficulty, the 2006 Transportation Plan revised strategies for raising money. In addition, travel time, fuel, and money can be saved through telecommuting. Incentives should be considered to increase the amount of telecommuting that occurs, thereby lessening the amount of road improvement that is needed in some circumstances. The 2006 Transportation Plan examined gasoline tax, tolls, and/or electronic road pricing and similar ideas as partial solutions to the funding issues in its Financial Assessment section.

Since most of the major roadways in Boone County are state owned and maintained, Boone County continues to be dependent on state and federal money for improvements to these roads. Under TEA-21, the proposed improvements must be on the OKI region TIP to be funded. Because there are so many projects in need of funding statewide and region-wide, the OKI and KTC priorities for project funding usually do not address all the needs of the local community. In fact, there are not enough funds to cover these needs. Boone County has reached a threshold in its development that it no longer enjoys the provisions of the multi-lane facilities such as KY 18 and KY 237 being in place before the development occurs. The county is now faced with rapid development on a road system that is not designed to serve it, and without the future commitments on the TIP to build it. The following sections from the 1996 Boone County Transportation Plan present major types of funding opportunities that have been considered or may be considered in the future:

State and Local Funding Sources

State funds provide Kentucky with the means to construct, maintain, and repair state, county, and rural roads, many of which do not or cannot receive federal funding. One of the largest sources used for funding these roadway systems comes from the County Road Aid and Municipal Aid Program.

The following alternatives may be able to be utilized for additional funding for roadway improvements and maintenance. Several of these items are successfully used by other states to provide supplemental or additional funding for the roadway system.

Road Levies - On roads where state funding is not available, Boone County could consider establishing a county wide road levy. This levy, collected with county taxes would establish a fund that would provide monies for roadway improvement and maintenance.

Bonds and Gasoline Taxes - The State of Ohio has established a bond program, the State Capital Improvements Program (SCIP), and a Local Transportation Improvement Program (LTIP). The LTIP raises its funds through a one cent per gallon gasoline tax for roadway funding. Funds from the SCIP and LTIP are distributed by the Ohio Public Works Commission on the basis of population among the 19 public works districts in Ohio. In this area, Hamilton County, Ohio is a district in and of itself while Butler, Clermont and Warren Counties, Ohio are another one of 19 districts. The 2006 plan notes that a one cent per gallon local fuel tax in Boone County would generate nearly $1 million of revenue annually. However, this funding mechanism is not currently allowed under Kentucky law and would require enabling legislation.

Traffic Impact Fees - Over the past several decades, many states have been working for alternative revenue sources for funding roadway improvements. As a result, a growing number of states are passing traffic impact fee enabling legislation that shifts the burden of paying for capital facilities to new development. Currently,

Lexington/Fayette County has an extraction fee that can be used for roads. Louisville Metropolitan Government established a similar fee. Impact fees are one-time fees charged to developers to help cover their projects' need for additional infrastructure capacity. The courts have developed three general guidelines to establish traffic impact fees. The first two items establish the impact fee. The third item provides a guideline for the allocation of impact fee revenues. The three guidelines are:

1. There is a reasonable relationship between new development and the need for new roads;
2. The amount of the fee is limited to the new development share of the cost of road improvements;
3. The development will benefit from the use of the fees to construct new roads.

Court decisions have established the following legal guidelines for impact fee development:

- Impact fees are to be predicated on the improvements made necessary by new growth, not improvements made necessary prior to the adoption of the impact fee.
- To minimize the risk of overcharging, an alternative method for calculating an individual's impact fee should be provided. This allows prospective feepayers to calculate a fee based upon the unique aspects of their projected impacts rather than using a standard fee schedule adopted by the government.
- A time limit should be placed on government's use of the impact fee. If the time limit has expired (typically six or seven years), the feepayer can request a refund from the government.
- It is desirable for districts or zones to be created in an impact fee system so that a geographical relationship between the fees paid and the improvements implemented can more readily be demonstrated.

For the implementation of a traffic impact fee, the following procedures are suggested:

Implementation Procedures and Issues - To adopt an equitable schedule of transportation impact fees, several key steps will have to be undertaken. These include:

1. **Develop a transportation plan**. Regardless of whether the impact fee system is to be an improvements-driven or a standards-based system, sound public policy argues that an understanding of transportation improvement needs be established. In an improvements-based system, this plan is essential for the calculation of the cost per trip. In a standards-driven system, the unit construction cost and capacity are natural outgrowths of this plan. This was accomplished in the 1996 Boone County Transportation Plan, and is being reinforced in the 2005 update of the plan.

2. **Adopt traffic demand variable rates**. Three demand variables are found in a standards- driven transportation impact fee: trip generation, trip length, and percentage of new trips. In an improvements-driven system, trip generation and, in some cases, percentage of new trips are considered. Most communities rely on the Institute of Transportation Engineers' (ITE's) Trip Generation Manual for trip generation data. When local trip generation data has been collected for specific land uses, this has been substituted for ITE data. Also, most ordinances allow the developer to provide land use-specific data if they believe either of the following to be true–the land use they are proposing is not represented in the impact fee schedule; or the land use they are proposing is in the impact fee schedule but the trip generation rate is inappropriate. Both trip length and percentage of new trips are typically based on traffic studies, and both can be challenged in an independent impact fee calculation.

3. **Establish accounting procedures**. Impact fees must be maintained in separate accounts from all other revenues, including individual districts' fees, if applicable. Typically, the funds are expended on a first-in, first-out basis. The use of impact fees for ineligible expenses, such as operations and maintenance, must be spent in District A or, in some rare instances, on a project outside District A that will benefit the feepayers in District A.

Tax Increment Financing Districts (TIF) - TIF is the process of allocating increases in property or wage tax revenues resulting from new development to a special fund to be used to pay for public improvements to an area as defined by an established boundary. It is currently permitted under Kentucky statutes. Districts may exist for a 20-year period, after which they sunset. The local government may issue bonds to finance public improvements prior to development in order to encourage upgrading of property in a certain area. The revenues that are

allocated to the special fund as redevelopment occurs can then be used to retire the debt established by the local government. This technique has been found to be an effective means of encouraging growth in a particular area without burdening the public with the excessive costs of new improvements. A tax increment financing district would utilize all increase in taxes from the new development for roadway improvements within that district. Boone County currently has two TIF districts established in the Richwood Area. To date, special wage assessments on new jobs in one district have generated $250,000 that was put toward the extension of water to the site. As additional revenues are collected, the county will evaluate other projects, including contributions to the reconstruction of the I-75/338 (Richwood) interchange. Other TIF districts may be created in the future in order to attract development and create jobs.

Special Assessment District - A special assessment district is an area designed to enable revenue to be collected from those properties that will directly benefit from the specific public improvement. Special assessment districts are a tool that is authorized for use in all 50 states.

For example, a special assessment district can be established for the modification of a highway interchange that would encompass all surrounding properties which directly benefit from the increased safety and convenience that interchange would provide. Unlike a tax increment financing district that only takes the increase in property tax from property improvements, special assessment districts assess properties within an established district and impose a special tax over a predetermined length of time. Special assessment districts can be established for projects such as interchange reconstruction, new roads, road widening, and access improvements.

The legal basis of special assessment districts is the taxing power of the governmental entity. However, special assessments are not taxes; they are a shifting of improvement costs to a relatively small group of property owners in return for publicly constructed improvements that would directly benefit their property. Most states have procedures for implementing special assessment districts which are established in the enabling legislation.

Issues to research when establishing a special assessment district boundary are:

- The district boundaries should be established such that the proposed improvements benefit all properties being assessed within that district at least to the amount assessed;
- Properties outside the district should not derive any benefit from the improvement, or at least not to the same extent that those properties within the district are receiving; and
- The district should be established to encompass all willing participants and exclude any unwilling property owners when possible.

Maintenance of roads built through the Special Assessment Legislation is usually performed by the state or local government as the roads are dedicated to those bodies after completion of construction. Mall Road in Florence is a local example of a roadway built through an assessment district.

Additional funding options mentioned in the 2006 Transportation Plan include the following:

Local Option Sales Tax - Local sales taxes are used elsewhere in the country to generate revenues for locally-provided government infrastructure and services. However, this mechanism is not currently enabled by Kentucky law. The 2006 plan notes that a 1 cent local sales tax would generate $12 to $13 million in annual revenue.

Local Occupational Payroll Tax - This funding mechanism is allowed by Kentucky statute. Boone County currently has a 0.8 percent payroll tax (capped at $373 per year), which goes into the County's General Fund. An additional 0.15 percent tax ($25/year cap) supports mental health/retardation and elderly services. The 2006 plan observes an increase in the existing local payroll tax could be considered with proceeds being transferred to the Public Works Fund.

Accommodations Tax – The 2006 plan noted that an increase of 1 or 2 percent in local accommodation taxes, which currently total 5 percent (city and county combined), could generate revenue for infrastructure improvements in the county.

Utility Fees – These fees are charged to owners of residences and businesses to help pay for public utilities. An incremental rate increase could be used to fund infrastructure improvements.

Parking Fees – A county-wide parking fee could be imposed on all paid public parking facilities in Boone County, but the additional revenues generated would likely be small.

Vehicle Registration Fees – Like Sales Taxes, this mechanism is not currently enabled under Kentucky law, but it could be used to generate funds for local infrastructure.

Roadway Functional Classifications

The recommended Functional Classification of roadways in Boone County consists of an integrated system of interstate, arterial, collector, and local streets. Their delineation serves to specify how a roadway is intended to operate, therefore, the minimum design standards for new construction and major facility upgrades.
Interstates connect major metropolitan areas, provide high levels of mobility, and accommodate trips over long distances.

Arterials provide mobility, by carrying high traffic volumes on a continuous network with no stub routes, but very little direct land access.

Collectors and Sub-Collectors focus on mobility and land access by carrying local traffic over short distances and distributing traffic to arterials and/or to local streets (short- and medium-distance trips). This category may also include frontage roads when used adjacent to arterial facilities. The 2005 Transportation Plan update further divides these roadways into Urban, Rural Major, and Rural Minor Collectors.

Local Streets and Roads focus on land access rather than through trips, and include all other public roads.

One of the major aspects related to Functional Classification of roadways is the degree to which access is provided to adjacent land uses. Within Boone County, access management and access controls along existing facilities, particularly Collector Streets, are an important component of implementation. Residential subdivision connector roads in the sub-collector and collector classifications should be designed to serve subdivisions without on-street parking and individual driveway access. Public safety should be an important feature. Existing examples of this in Boone County include Oakbrook Drive, Wetherington Boulevard, Triple Crown Boulevard, and Steeplechase Boulevard.

3. THE TRANSPORTATION/LAND USE CONNECTION

Land Development and Transportation Use since World War II
The existing land-use pattern in Boone County is the result of a combination of some dynamic trends that have impacted the suburban areas of most major metropolitan areas during the last 45 years. The pursuit of the American Dream of home ownership, realized by World War II veterans with their purchase of single-family homes in new subdivisions, began the process of a more dispersed, suburban settlement pattern.

The G.I.'s were facilitated in the pursuit of their dreams by the Veteran's Housing Authority's (VHA) programs that financed houses at low interest rates on long-term mortgages. Many of the early subdivisions along KY 18 and U.S. 42 in Florence were built to accommodate the desires of G.I.'s and their families to move out from the inner city areas of Covington and Newport.

The construction of the interstate highway system during the 1950's, 1960's, and 1970's was another federal program that promoted development at the edges of the old central city. Major commercial/retail uses in the form of regional shopping centers were developed at the cross roads of interstate highways and older spiral, arterial roadways. Florence Mall, still the only regional shopping center in Northern Kentucky, was developed during the 1970's at the intersection of I-75/71 and KY 18.

Factories migrated from the central city since they were no longer tethered to the railroad lines along the Millcreek Valley. These factories and warehouses were almost always built as very large, single story structures near the interstate highway system. The long-haul tractor trailer, traveling the interstate highway system, replaced the train and its rail car as the primary means for moving manufactured goods. The Northern Kentucky Industrial Park was the initial prototype of this form of industrial development in Boone County, while Park West International is a more recent example.

Along with increased home ownership, there was also a substantial expansion of automobile ownership for the World War II veterans (much beyond their parent's generation). Probably this was initially considered an affordable luxury for the veterans and their families. However, because of the dispersed nature of the land use pattern and the separation of industrial, commercial, and residential uses historically mandated by zoning, the luxury of automobile ownership quickly became an absolute necessity. Travel by automobile became and still is the primary means of transportation in Boone County.

Planned Unit Developments-A Prototype for Residential Development

Many of the early residential subdivisions in Florence did not have sidewalks, but utilized a traditional or modified grid pattern for the layout of the streets (e.g. Grand Avenue, Edward Avenue, Roger Lane, and Circle Drive). Later subdivisions (e.g. Stonegate Meadows), did provide sidewalks, but used multiple cul-de-sac streets connected to internal collector streets, resulting in decreased connectivity.

In the late 1970's and early 1980's, a new prototype of residential development arrived in Boone County-the Planned Unit Development (PUD). Primary examples are Oakbrook, Triple Crown, and Plantation Pointe Subdivisions. This form of development is characterized by being divided into "pods" of separate housing types - i.e. apartments, condominiums, single family houses, and including a commercial area. The "local" streets of the "pods" are connected to an internal collector street, such as Oakbrook Road.

Oakbrook is often used as an example of better than usual pedestrian facilities, exemplified by the meandering pedestrian pathway along Oakbrook Road. Plantation Pointe, Farmview, Steeplechase, Orleans, Thornwilde, and Triple Crown are later examples. However, the pedestrian facilities within the different "pods" are sometimes insufficient within the multifamily areas. Again, because of the separation of the different "pods", automobile travel continues to be necessary for most trips.

Future proposed residential development in Boone County will primarily continue as a system of cul-de-sacs connected to local streets, which then connect to collector streets (in both small and large subdivisions). In other large scale developments, more Planned Unit Developments (PUDs) and Cluster Subdivisions with "pods" connecting to internal collector streets have been approved. Both of these models of residential development will continue to assure that the primary means of transportation for residents will be by automobile.

Recent Growth Patterns

In the past 20 years, regional commercial development has expanded beyond the Florence Mall to include major developments in the form of large national, chain stores along Mall Road and in the Houston Road area. There has also been increased development of local-oriented commercial development, in the form of strip malls located along major arterial roads such as U.S. 42 and KY 18. Industrial development continued to expand south from the Northern Kentucky Industrial Park along U.S. 25 and at other intersections of the interstate highway, such as the Hebron and Mineola I-275 interchanges.

These commercial and industrial expansions have increased chronic traffic congestion problems on the arterial and collector roads. Improvements on these roadway systems have helped alleviate the congestion problems, as clearly exemplified by a series of improvements on KY 18 and Mall Road. The road improvements mean expanded capacity and therefore greater access. Greater access encourages additional development, which brings more traffic, and ultimately, increased congestion.

The Future: Integrating Transportation and Land Use

If Boone County continues to develop in this same low-density, dispersed form of development, which mainly accommodates travel by the automobile, it would almost certainly guarantee chronic traffic congestion, increased air pollution problems and negative impacts on the quality of life for residents of the county.

The first section of the Transportation Element, the Regional Transportation System, describes the need for the Cincinnati Metropolitan Region to evolve, in the future, to a more "transportation-sensitive" land-use development pattern. Spurred by the federal legislation such as the CAAA and TEA-21, OKI's most recent regional transportation plan has established a regional Commission on Land Use that would generate recommendations and policies that may be implemented in local zoning ordinances that would "promote land use patterns consistent with plan objectives to minimize the need for new highway construction and foster travel by transit, bicycle and walking."

A different type of planned development, one that will facilitate the evolution to a more "transportation-sensitive" land-use development pattern, is advocated in the first objective of the third goal the Transportation Element's Goals and Objectives. Unlike the usual form of suburban development of the last 40 years that adhered to the separation of uses, this new type of planned development would incorporate a mixture of uses including residential, retail, office, light-industrial, public parks, and other public uses in a tastefully-designed, compact development. The City of Florence is pursuing this style of development for the Mall Road area with the goal of restoring that area as the most vibrant commercial district in Northern Kentucky. The other defining element of this new type of planned development is that it will be served by an interconnected, multi-modal transportation system.

This system would include appropriately located transit stations or transit stops within walking distance (a quarter mile) of all residential areas. There would be well-designed pedestrian and bicycle facilities that would connect to the transit stations or stops. The bicycle facilities could include bike lanes or routes on roadways and bike lockers at the transit stations. Pedestrian facilities should be built along streets, wherever possible, and should provide an attractive, safe and direct route to the transit stops. As the Union Town Center develops as a center of relatively dense development, transit service should be expanded.

The roadway system within a Transit Oriented Development incorporates a traditional or modified grid pattern, thus allowing multiple access routes, unlike normal suburban development where residents must travel by vehicle from local to collector to arterial road. Arterial streets should be located at the periphery of the grid system assuring that regional traffic will bypass the developments. Arterial streets would then cease to be barriers to pedestrian travel.

Transit Oriented Development (TODs)

The "planned, mixed-use neighborhoods" are exemplified by the planning concept of Transit-Oriented Development (TOD). A Transit-Oriented Development has been defined as: *a mixed-use community within an average 2,000 foot walking distance of a transit stop and core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot, or car.*

Ideally, these Transit-Oriented Development Centers should be located at least a mile from one another to assure an adequate market area for the commercial uses. These developments would also serve the existing and future single-family, residential areas with new opportunities for nearby neighborhood shopping and with transit ridership, by park and ride lots.

The actual development process for these Transit-Oriented Developments would necessarily deviate from the normal single parcel for single use form of development. Though there could be sites, owned by a single entity, that could be developed this way, typically there will be more than one parcel and thus multiple ownership. A Specific Area Plan would be agreed upon and developed for the site requiring meticulous cooperation and coordination between the private and public sectors. It is possible for multiple developers to be involved in the site, building different sections.

To create a TOD, specific design guidelines and development standards for the site would have to be prepared that would replace the standard zoning regulations. Also, financial plans would have to be developed to assure that public improvements, including roads and parks, are developed in a timely manner, and that the costs distributed equitably to the participant private developers and public entities.

These Transit-Oriented Developments will not replace typical residential, commercial, or industrial development. However, with the appropriate siting of these developments, the existing land-use pattern of dispersed, low-density development could be reorganized into a more "transportation-sensitive" land-use pattern. This "transportation-sensitive" land-use pattern would give more options (i.e. transit, bicycle, walking) for travel than the just the automobile for all the residents of the community. Transit-Oriented Developments would offer a mix of housing types and real affordable housing options to its residents (also addressed in the Housing Element). TODs would also offer stronger community identity for residents with its incorporation of public spaces and uses.

The most appropriate area for siting TODs in Boone County would be within the proposed transit service areas and along the light-rail transit alignments. TODs would allow the expected, future growth of this area to happen in a more compact fashion, and also be connected to the future, regional inter-modal transportation system. Two specific sites were described in the Housing Element as being excellent locations for Transit Oriented Developments: the Marydale property on Houston-Donaldson Road and the undeveloped land on the southwest quadrant of the KY 18 and KY 237 intersection. Site selection and planning should consider the recommendations of the 2006 TANK Transit Network Study.

I-71 Corridor Transportation Study

OKI conducted a Major Investment Study (MIS) for the I-71 corridor from Florence and the Airport to Kings Island in Ohio. The study was approved in August of 1998, and OKI has proceeded to study specific priority segments of the corridor. The study was directed by the I-71 Study Oversight Committee, and was intended to identify a preferred mode of transportation for future improvements throughout the corridor. The study recommended Light Rail Transit (LRT) as the preferred mode. A tentative alignment was also selected. Other transportation modes considered include a No-build option, Transportation Systems Management (TSM), Busway, and High Occupancy Vehicle Lanes (HOV), as well as combinations of these options. Simultaneously, Metro and TANK will be expanding the regional bus system as recommended in the I-71 Study. This includes new buses, additional routes, park-and-ride lots, and a restructuring of transit service to serve the light rail system.

Some Environmental Impact Statement (EIS) and Preliminary Engineering efforts have been conducted for Phase I of the light rail system between 12th street in Covington and Pfeiffer Road in Cincinnati. Later phases of the light rail system could be developed as extensions in future years, however, local communities have not supported light rail in ballot measures. Since public sentiment has not supported light rail, and this transportation mode is very expensive, increased bus service or personal rapid transit modes appears to be more economical, efficient, and realistic.

A key issue for Boone County is the proposal of two alignments, Florence and the Airport. Although the Airport is an obvious endpoint/destination for the system, this Comprehensive Plan notes that Florence could potentially generate much demand (ridership) for the system, and therefore, should be studied closely as to which of these alignments is more important to the system. For the Florence alignment, special attention is needed at rail crossings of Donaldson Highway, Turfway Road, and KY 18 to ensure that traffic congestion is not worsened.

Northeast Boone County Major Investment Study

OKI conducted this study to address a critical area in the county identified in the 1996 Boone County Transportation Plan process. It was the first step in the implementation of various transportation improvements that had already been recommended in the Transportation Plan, the OKI Looking Ahead: 2020 Metropolitan Plan, the KYTC 6-Year Plan, and the Airport Master Plan. The study was coordinated by a planning committee comprised of Boone County citizens and business people, and various agency representatives. The study's main purpose was to develop a consensus and support for the prioritization of the improvements.

The final three prioritized recommendations were:

1. The widening of North Bend Road (KY 237) north of I-275.
2. The improvement of the I-275/KY 212 interchange at the airport and the construction of new ramps and a new interchange with Donaldson Highway.
3. Construction of the South Airfield/Burlington Bypass from Zig Zag Road to I-275.

Secondary recommendations included:

- Construction of a connector roadway between Cavalier Boulevard and Woodspoint Drive (over I-75/71)
- Construction of a connector roadway between the South Airfield/Burlington Bypass and Houston Road.
- Addition of a partial interchange between Petersburg Road and I-275 west of the airport.

The following funding alternatives were recommended for project financing:

- Passenger Facility Charges
- Airport Parking Fees
- Car Rental Tax
- Local Occupational Tax
- Development Impact Fees
- Accommodations Tax
- County Sales Tax
- Vehicle Registration Fee
- Motor Vehicle Gas Tax

The study did not evaluate the concept of a new Ohio River bridge in the northernmost part of Boone County nor did it make any recommendations concerning this possible project. However, for the purposes of this Comprehensive Plan, potential impacts of such an improvement could include the following:

- Labor pool accessibility.
- Increased automobile and truck traffic from Western Hills and River Rd (Cincinnati) seeking easier access to interstate system and airport via I-275.
- The need for additional lanes on the proposed reconstruction of North Bend Road.

CONCLUSION

Boone County has outgrown the current road system due to population and business growth and because of the lack of timely funding over the last decade. However, relatively minor, strategic improvements can achieve significant increases in level of service if designed correctly. The Kentucky Transportation Cabinet is often intent on building major roads or reconstructing existing roads into major multi-lane facilities to answer the community's needs. The planning horizon for such improvements is the year 2040 for current design efforts. This correlates with the planning horizon for the Boone County Comprehensive Plan, and reflects the close relationship that is needed between land use and transportation planning. In light of changing economic conditions of the last several years, and the projection of similar conditions into the future, this concept is particularly important.

The development of Boone County over the last two decades has been lower in density than what would be needed to support a significant level of mass transit. School transportation needs to be evaluated for general changes in methodology as the land use pattern of the county, road conditions, and travel habits of the public all continue to change.

Transportation planners and public officials need to realize that safety and capacity projects often overlap and benefit or replace each other. This approach can fulfill the public's needs and save money at the same time by designing projects for a specific time period and implementing them in a timely fashion.

A typical situation in suburban communities like Boone County is the presence of extensive sidewalk networks (miles) within the interior of each subdivision, however, the absence of sidewalk or path facilities that connect subdivisions – even those immediately adjacent to each other. The reconstruction of roads by KYTC will provide some, but not all, of these connections over a long period of time. The connection of existing and planned pieces of the network provides true benefit and cost effectiveness of all the many developer-built sidewalks.