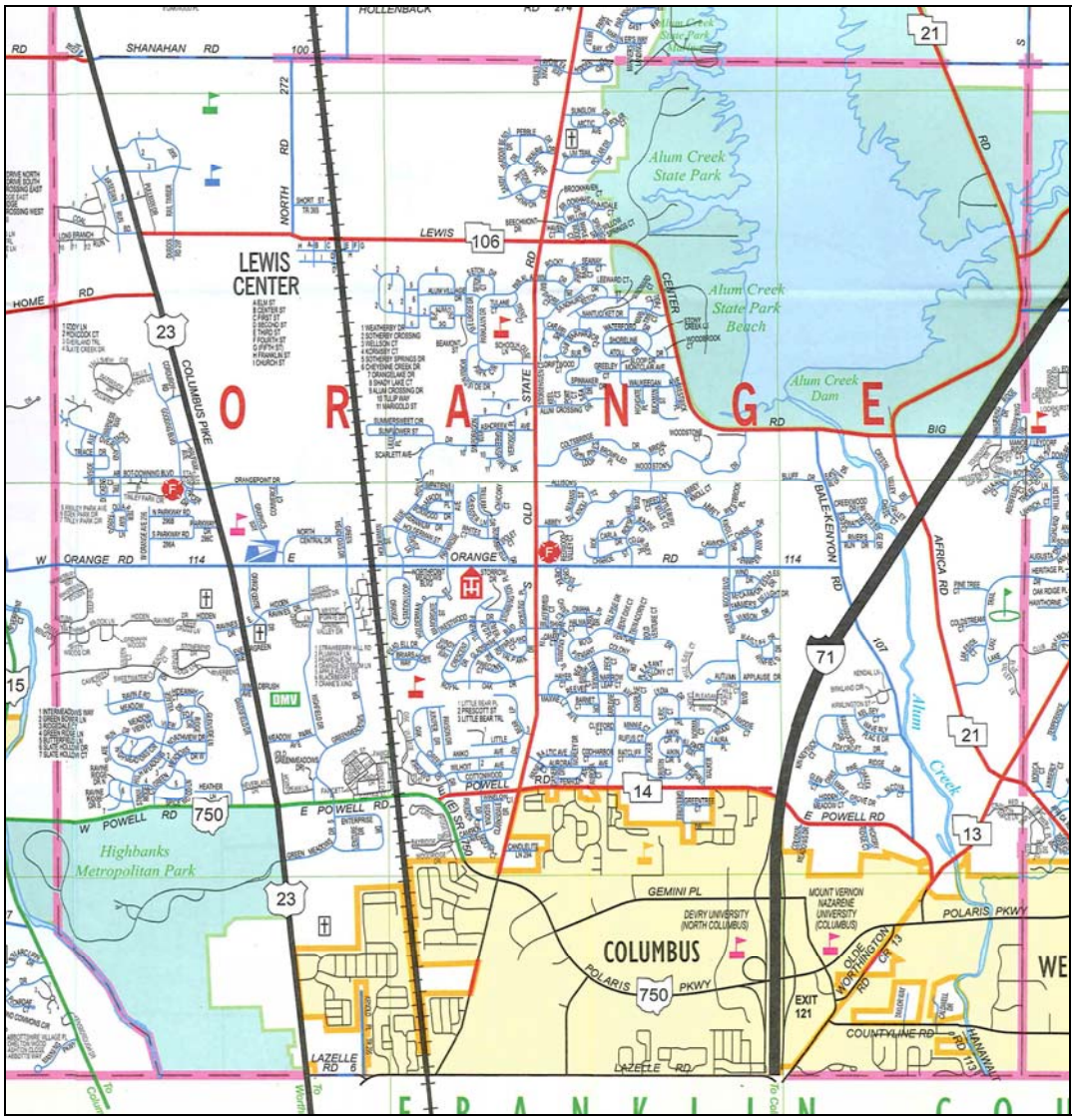
Chapter 8
Roads and Transportation

Introduction

Automobiles are the primary means of transportation in Orange Township in 2010. US 23, a four-lane limited access road that serves as a major commercial corridor benefiting the entire county, traverses the western portion of the township. Many of the state, county and original township roads were laid out in the 1800s for farm-to-market usage. These roads have changed function as the area has become a suburban community. Roadway improvements are needed both to increase capacity and safety, as well as to reduce congestion, which is a significant problem at rush hour on certain major arterial streets. Figure 8.1 delineates roads and streets in Orange Township as of the end of 2008.

Figure 8.1 Orange Township in the Delaware County Engineer's Road Map



Federal and State Roads

U.S. 23 (Columbus Pike): Orange Township has approximately 5.5 miles of U.S. 23 passing through it from north to south. This is a four-lane divided highway with limited access. Access rights were purchased for most of the corridor by the Ohio Department of Transportation in the 1950s. This limits access along the corridor to the access management policies adopted by ODOT. It is possible to upgrade access rights from agricultural or residential driveways to commercial use, but the access rights must be repurchased from ODOT based upon the market value of the property if it were used commercially.

U.S. 23 is the major north-south federal and state highway from Detroit/Toledo to Columbus and Portsmouth, Ohio. This road is heavily traveled by interstate trucks and passenger vehicles. In recent years, commercial development has resulted in the addition of new traffic lights. This slows traffic, which has caused ODOT to finance the Access Management Plan which helped the 2001 Comprehensive Plan in its road and access recommendations.

The U.S. 23 corridor offers an important commercial tax base to Orange Township. There has been a desire to plan and zone some of these frontages for commercial use. Any such commercial use should be subservient to the needs for U.S. 23 to carry high speed through traffic. If commercial development is desirable, it must be a part of a planned network of limited access points, signals placed no more frequently than one half mile spacing, and with parallel access roads to control left turns across traffic a mandatory feature. This has been successful at Owenfield Drive and Gooding Blvd.

The Orange Village Centre and the Kohl's/Wal-Mart Complex have parallel access roads for out lots which front along U.S. 23. Good access management practices should continue to be used along all of U.S. 23 due to the future traffic loads anticipated.

Ohio 750 (West Powell Road): S.R. 750 extends from the Polaris Parkway extension to U.S. 23 and then west on West Powell Road to the Olentangy River and Liberty Township. This is a major east-west two-lane arterial, carrying traffic volumes reported by ODOT to be 32,000 vehicles per day at the U.S. 23 intersection, which is at LOS F or "Failure" from congestion. Long backups across the Olentangy River are common at peak hours, frustrating local commuters and long distance haulers. The south side of West Powell Road is Highbanks Metro Park, which means it will probably not be developed which would add more traffic. It also means that roadway expansion, even one lane into the park land, is difficult and unlikely. Steep hillsides with a sharp curve are hazards descending into the valley from U.S. 23.

Interstate 71: The Interstate is three lanes in both directions from the Franklin County line to U.S. 36 in Berkshire Township. I-71 traffic has had a significant impact on Orange Township since the opening of the Polaris Parkway, Gemini Place and the Polaris Interchange. An interchange at Big Walnut and I-71 is proposed in the 2001 Delaware County Thoroughfare Plan. ODOT is reviewing the justification of such a project. With Polaris Parkway extension across Alum Creek east into Westerville (the former Maxtown Road), and the extension of Hanawalt Road to Cleveland Avenue in Westerville there is greater east-west linkage of roads and traffic movements. This has exacerbated the already congested conditions on Powell Road. Future commercial development will likely occur in the Polaris area and near S.R. 750. The

S.R. 315 and S.R. 750 intersection is paralyzed at rush hour, causing traffic to seek alternative routes. ODOT cannot easily widen S.R. 750 over the Olentangy River because of its status as a state scenic river, and the narrowness of the ascent to the Village of Powell on the west-side of S.R. 315. This congestion may be acting as somewhat of a growth control by annoying commuters to the point of deflecting travel decisions to other roads, or more drastically, deferring home buying decisions based on the avoidance of congested roads.

ODOT is looking at possible solutions to the traffic on S.R. 750. On December 3, 2008, the public was invited to view several proposals for a new project at the intersection. The proposed project will stabilize two sections of S.R. 315 just north of Jewett Road and north of Powell Road. Several stabilization options include adding turn lanes on both the south-bound and north-bound legs of the intersection.

County Roads

The Delaware County Engineer maintains six county roads in Orange Township. There is a great deal of information available from the Delaware County Engineer and ODOT on road inventory, conditions, and so forth. With regard to land use, the carrying capacity of a road is determined in large part by the width of the paved surface and the number of lanes.

Future development will lower the LOS of local farm to market roads. Under current Ohio law, upgrades cannot be required of a land developer for roads that do not abut its development. The community, state, or county is responsible for off-site impact costs. If large-impact development proposals do not offer to reasonably mitigate their traffic impacts, this may be a factor for the township to consider in the rezoning request.

Figure 8.2 County Roads and Conditions in Orange Township, 1999 (ODOT survey)

#	Road Name	Surface Width	Road Width	Surface Type
10	S. Old State	24	26	Mixed bituminous with surface over 7 inches
13	Worthington	18 - 24	22 - 36	Bituminous concrete sheet asphalt or rock asphalt
14	East Powell	19 - 25	25 - 26	Bituminous concrete sheet asphalt or rock asphalt
21	Africa	22 - 24	26 - 40	Bituminous concrete sheet asphalt or rock asphalt
106	Lewis Center	20 - 24	26 - 40	Bituminous concrete sheet asphalt or rock asphalt
124	Home	16	22	Bituminous concrete sheet asphalt or rock asphalt

Road Maintenance

Orange Township roads are maintained by various authorities:

- Federal and state roads are maintained by District 6, Ohio Department of Transportation.
- The Delaware County Engineer maintains county roads.
- The township maintains approximately 92 miles of township roads.
- Homeowner associations maintain private subdivision roads.
- Common Access Driveways (CADs) are private roads serving 2-5 lots, maintained by the lot owners.

Road carrying capacity is determined by the width of the paved surface and the number of lanes. The speed of the road is generally determined by such factors as road width, pavement conditions, curve radii, topography, number of driveways and cross traffic movements.

Future land development will lower the LOS of county roads. Upgrades will be needed to keep pace with the increased traffic counts. The DCRPC has estimated future population per square mile in Figure 8.3.

Figure 8.3 Dwelling Unit Density Per Acre and the Equivalent Population per Square Mile

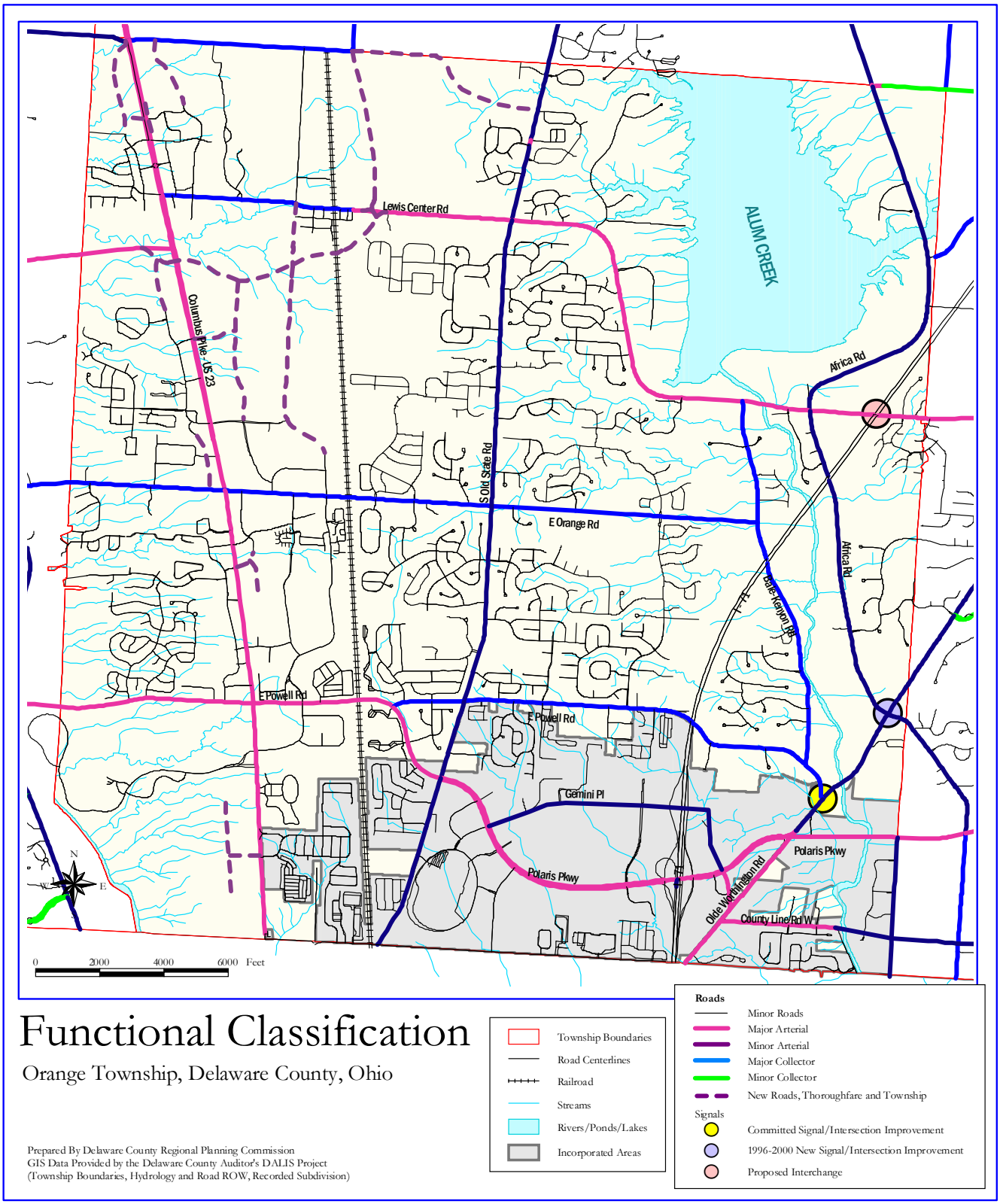
# Units/acre multiplied by	#Persons/unit multiplied by	% Developable/ac multiplied by	Acres/ Square Mile equals	Population per Square Mile
.2 (5 acres lots)	2.7	95 %	640	328
.5 (2 acre lots)	2.7	90 %	640	778
1	2.7	90 %	640	1555
1.25	2.7	85 %	640	1836
1.5	2.7	85 %	640	2203
2	2.7	85 %	640	2938
3	2.7	80 %	640	4147
4	2.7	80 %	640	5530

Engineers anticipate the size of road needed to serve a calculated density of population. A generalized table for road size versus population density at full build-out was generated for the 2001 Delaware County Thoroughfare Plan. Such projections resulted in a listing of recommended road improvements and new road construction. When densities remain less than 1 dwelling unit per acre, two-lane arterial roads with 38 feet of pavement (2 twelve-foot lanes and 2 seven-foot paved breakdown lanes) can handle traffic at LOS C or better. When average densities reach three dwelling units per acre, four-lane arterial roads are needed to maintain LOS C.

Functional classifications

The Delaware County Engineer's Design Standards label each road with a "functional classification". The 2001 Delaware County Thoroughfare Plan identifies Major and Minor Arterials and Major and Minor Collector streets. The following figure depicts these classifications and also includes new roads as recommended by the Thoroughfare Plan and the 2001 Comprehensive Plan, edited to reflect current alignments.

Figure 8.4 Functional Classification of Roads and New Roads



Arterial roads have the primary purpose of carrying through traffic to and from residential, commercial, and industrial areas and the secondary purpose of providing access to abutting property. They are usually a continuous route carrying heavy loads and Average Daily Traffic (ADT) in excess of 3,500 vehicles.

> **Major Arterial** roads in Orange Township: West Powell Road, Home Road, U.S. 23, Lewis Center Road (east of Lewis Center), Polaris Parkway, Olde Worthington Road and Big Walnut Road.
>
> **Minor Arterial** roads in Orange Township: South Old State Road, Worthington Road, Africa Road, and Hyatts Road.

Collector roads have the primary purpose of intercepting traffic from intersecting local streets and handling this movement to the nearest major collector or arterial street. ADT typically ranges from 1,500 to 3,500 vehicles, with AM peak hour traffic about 7-8% of that total and PM peak hour of 10% of the total.

> **Major Collector** roads in Orange Township are Lewis Center Road (from U.S. 23 to Lewis Center), East Powell Road, Orange Road, Bale-Kenyon Road, and Shanahan Road.
>
> **Minor Collector** road in Orange Township is Plumb Road.

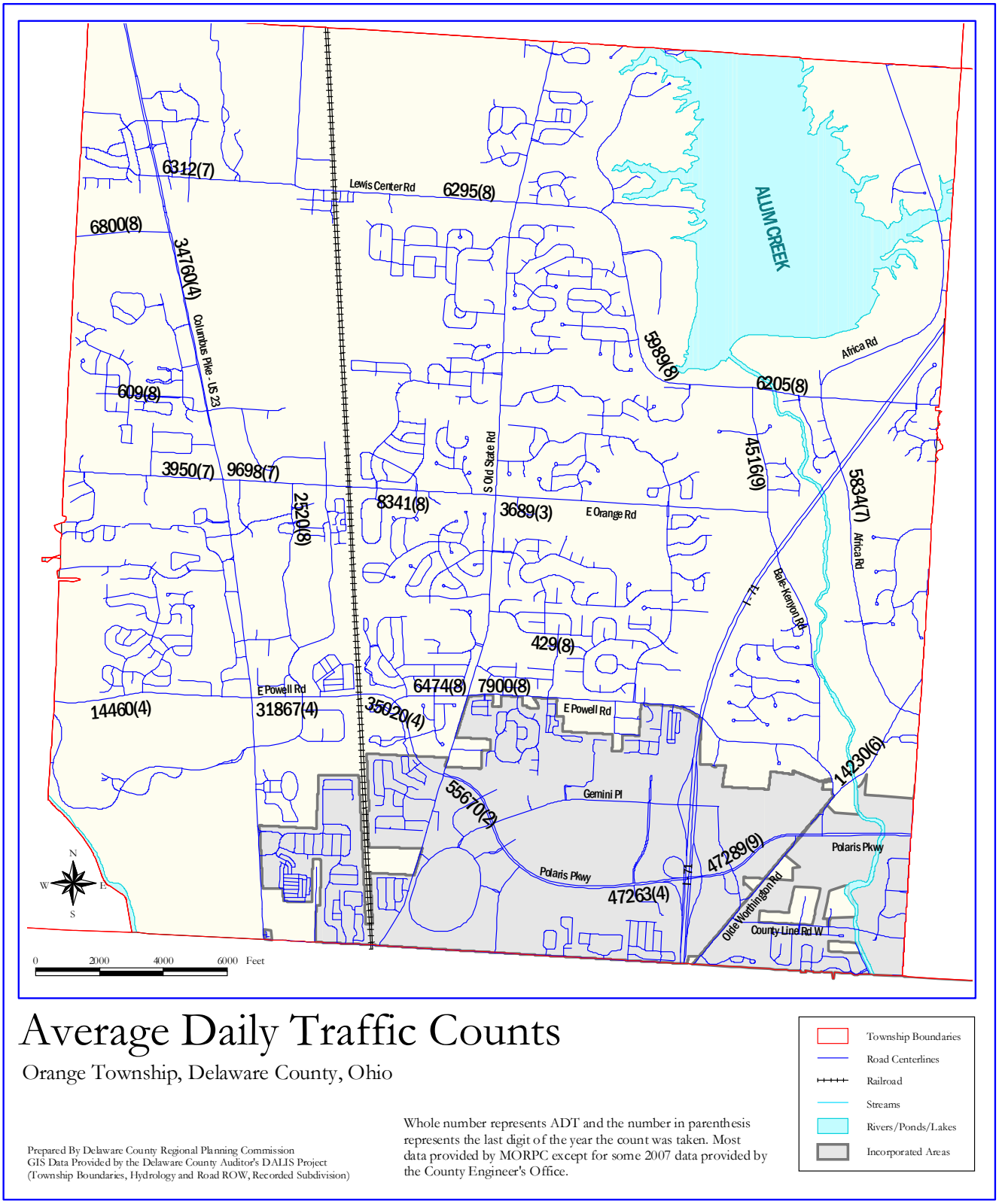
Local Streets represent the lowest category. Their primary function is to serve abutting land use. Typical ADTs range from 100 to 1,500 vehicles. Local streets are further classified as Loop, Through and Cul-de-sac.

Traffic Counts

Traffic counts indicate the ADT in both directions on a road. These counts can be used to determine if the LOS is acceptable or unacceptable. LOS A is considered ideal, Level F is failure. The LOS depends on traffic counts, number of lanes of road in each direction, and width of lanes, including shoulders. Traffic counts are also used to determine functional classification.

The Mid Ohio Regional Planning Commission (MORPC) is the Metropolitan Planning Organization (MPO) for central Ohio. It acts on behalf of Delaware County in certain a transportation planning functions and is a funnel for federal funds. MORPC maintains traffic counts for the central Ohio region. On the following figure, additional counts have been added with information from the Delaware County Engineer's Office.

Figure 8.5 Orange Township Traffic Counts



Average Daily Traffic Counts

Orange Township, Delaware County, Ohio

Township Boundaries
Road Centerlines
Railroad
Streams
Rivers/Ponds/Lakes
Incorporated Areas

Prepared By Delaware County Regional Planning Commission
GIS Data Provided by the Delaware County Auditor's DALIS Project
(Township Boundaries, Hydrology and Road ROW, Recorded Subdivision)

Whole number represents ADT and the number in parenthesis represents the last digit of the year the count was taken. Most data provided by MORPC except for some 2007 data provided by the County Engineer's Office.

Access Management

An access management study was completed shortly before the Thoroughfare Plan was complete. ODOT has requested that Orange Township review the current plan's implementation and make any recommended changes. The study found the following access impacts.

- Poor access management can reduce highway capacity to 20% of its design;
- Delay is as much as 74% greater on highways without access management;
- 60% of urban and 40% of rural crashes are driveway and intersection related;
- 15,000 access related crashes occur each day at an estimated annual cost of $90 billion.

ODOT Access Management Principles:

- Regulate the location, spacing and design of drives.
- Space access points so they do not interact with each other.
- Provide adequate sight distance for driveways.
- Use appropriate curve radius, lane widths, driveway angle.
- Provide turn lanes to separate conflict points for acceleration, deceleration, & storage lanes.
- Prohibit some turns in critical areas; relocate that activity to a less conflicted point.
- Restrict driveways to fewer than 30 per mile (every 350 lineal feet maximum).
- Use feeder roads to relocate critical movements and to handle short trips parallel to the main road or rear access roads connecting commercial uses.
- Locate driveways away from intersections to reduce conflicts (corner clearance).
- Use right in, right out drives to prevent unwanted left turns across traffic.
- Use zoning with access management to develop good site plans.
- Connect parking lots; share driveways.
- Connect frontage roads to collector streets at properly spaced intersections.
- Avoid individual, closely spaced curb cuts to "bowling alley" lots.
- Avoid disconnected street systems.
- Encourage internal access to out-parcels.
- Minimize the number of traffic signals. Two per mile is ideal (half mile spaced).
- Use medians to separate traffic flows.
- Coordinate access permit review between ODOT, local zoning and building departments

The U.S. 23 corridor offers potential additional commercial tax base to Orange Township. When new sites are zoned for commercial use, coordination with ODOT to implement the U.S. 23 Access Management Plan is imperative.

Future Roads - The Thoroughfare Plan

"Original" farm-to-market county and township roads are often narrower than new subdivision streets, and sometimes built to a lighter load bearing standard. The cost of upgrading "original" county and township roads to collector or arterial standards can be factors in land use decisions, although excess traffic by itself is not considered grounds in Ohio to deny a zoning change.

A Thoroughfare Plan is a powerful tool for counties and townships to plan for future land use and traffic conditions. The Thoroughfare Plan is enabled by Ohio Revised Code Section 711.10:

"Whenever a regional planning commission adopts a plan for the major streets or highways of the county or region, then no plat of a subdivision of land within the county or region, other than land within a municipal corporation"… "shall be recorded until it is approved by the regional planning commission."

The Delaware County Thoroughfare Plan was adopted in 2001. The Thoroughfare Plan recommends several improvements in Orange Township:

A new interchange is proposed on I-71 at Big Walnut/Lewis Center Roads. (Network Alternative M)
This is a project that is currently being studied by the County Engineer's office and ODOT. The Federal Government has strict regulations limiting a project's impact on an existing Interstate. Some projections have shown that a new interchange would require new lanes to be added between Big Walnut and Gemini Parkway, adding to the overall cost. The project remains under review.

Piatt Road is recommended to be extended south to Lewis Center (Network Alternative K)
This project has been included in the development plan of Meadows at Lewis Center, a subdivision which has Preliminary Subdivision approval but has not begun improvements. Some preliminary engineering for the road extension has been done, but completion will be developer-driven.

The Home Road-Lewis Center bypass is recommended (Network Alternative J)
This project is part of the development plan for Clear Creek and was part of the Rezoning application for Cobblestone Crossing. Clear Creek is not currently progressing and the Cobblestone project was withdrawn, so no further work is currently being contemplated.

Extension of Cleveland Avenue north from Polaris Road to Worthington Road (Network Alternative R)
This Alternative was considered during the zoning phase for the Villas at Maple Creek condo development. At that time, the road extension was not required to be built through the development. Since that time, the Estates at Polaris Village (Westerville) dedicated an additional 480 feet of right-of-way north of the stub street. It is still possible that a connection could be made when the nursery property (Paul Reiner) develops.

The Thoroughfare Plan also recommended several "build-out" modification recommendations:
South Old State Road upgrade to 5-lane, county line to Lewis Center;
South Old State Road upgrade to 3-lane, Lewis Center to Cheshire;
Lewis Center Road upgrade to 5-lane;
Worthington Road upgrade to 5-lane, county line to Africa;
Worthington Road upgrade to 3-lane, Africa to Big Walnut;
Africa Road upgrade to 3-lane, Lewis Center to Cheshire;
Orange Road and Bale-Kenyon Road, resurface and improve.

Road Improvements – County Engineer Capital Improvement Plan

The County Engineer maintains a list of future county-managed road improvement projects, most of which are funded solely by Delaware County, although some include additional funding. The following is a list of projects that impact Orange Township:

South Old State and Lewis Center Intersection Improvements	$2,311,000	Completion Nov. 2009
Orange Road Bridge over the Olentangy River	$4,600,000	Completion Aug. 2009
East Orange Road Widening and Intersection Improvements	$4,455,000	Utility work

Transit

Delaware Area Transit Agency (DATA) is the public transit system for Delaware County. DATA's services are available to anyone wishing to use them. DATA is owned, operated, and governed by the citizens of Delaware County through the Delaware County Transit Board. DATA offers an on-demand service for residents of Delaware County. By calling 740-363-3355 at least by noon of the business day prior, a pickup and destination can be scheduled. DATA requires a window of 15 minutes prior to the scheduled pick-up time and 15 minutes after the scheduled pickup time. Demand response service is limited.

DATA provides weekday service from downtown Delaware to the Crosswoods development at U.S. 23 and Interstate 270. Known as the Green Route, it is depicted on the Leisure Trail and Sidewalk Map. The service makes numerous stops throughout the day (consult the DATA website for current information).

Stop 5 – **Kroger** (Delaware)
Southbnd **5:38**a, **6:38**a, **12:11**p
Northbnd **1:17**p, **5:47**p, **6:56**p

Stop 6 – **Dooley's Orchard**
Southbnd **12:25**p
Northbnd **1:03**p

Stop 7 – **Super Walmart** (Lewis Center)
Southbnd **5:51**a, **6:51**a, **12:29**p, **4:45**p, **6:20**p
Northbnd **6:16**a, **7:17**a, **12:59**p, **5:27**p, **6:45**p

Stop 8 – **Macy's** (Polaris Mall)
Southbnd **12:38**p
Northbnd **5:19**p

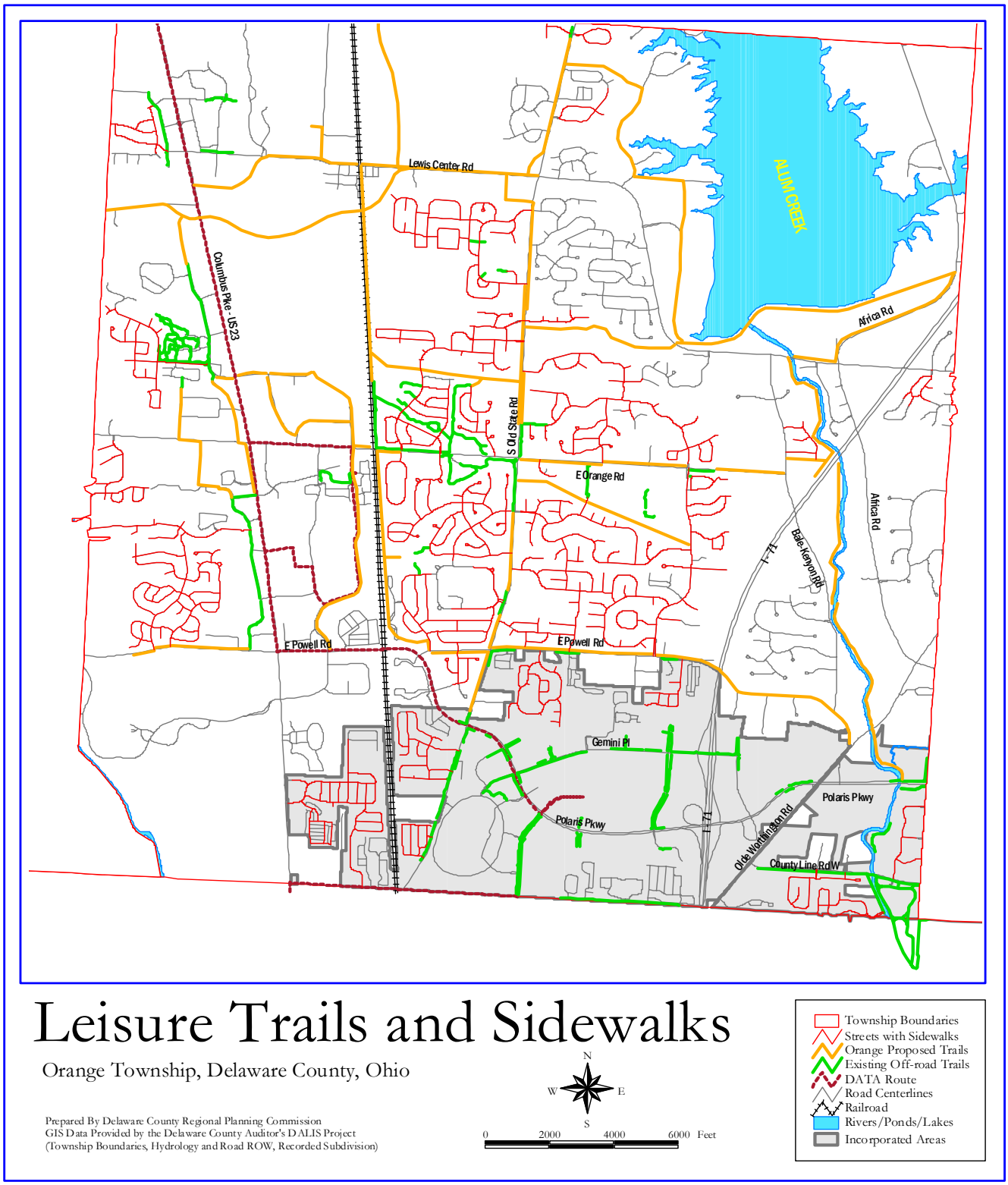
Stop 9 – **Crosswoods Park-n-Ride**
Arrive **6:02**a, **7:02**a, **12:46**p, **4:55**p, **6:30**p
Depart **6:05**a, **7:06**a, **12:50**p, **5:08**p, **6:33**p

DATA is currently looking for a new location for its offices and a transfer station. Based on the large population south of the City of Delaware, it is considering sites on the southern edge of the city. The organization is also looking to upgrade and expand its routes to reach a growing ridership base. Ridership peaked at slightly above 4,500 trips per month in October of 2008 and is currently running (June, 2009) an average of 3,000 trips per month. One trip represents a single passenger riding one way from beginning to end. Customers include the general public, contract service, fixed routes and free/aide rides.

Leisure Trails

Prior to 2001, the only bikeways or bikelanes in the township consisted of one bike lane developed in Polaris which connects to a bike path in the city of Westerville along the east side of Alum Creek. The township's Comprehensive Plan led to a Parks Board and levy for the parks. Out of the desire for more recreational opportunities for the township, 6.5 miles of leisure trails have been built with another 12.5 miles planned. The following map depicts the current and future trail plans, as well as major future roadways on which such trails will be planned. More detail is provided in the Parks and Recreation chapter.

Figure 8.6 Township Current and Future Leisure Trails



Other Transportation Issues

An increase in population yields increased traffic flow on local roads. The following considerations should be made when reviewing rezoning requests:

Patterns of Development – Traffic can be reduced by the design of development and the mix of land uses. Low density (one acre lots or larger) development generates significant traffic per unit, but the number of units is modest overall. In large developments with densities greater than one unit per acre a mix of local convenience commercial uses and a network of sidewalks, trails and bike paths can reduce auto trips. Consideration may be given to neo-traditional development patterns for planned developments with densities greater than one unit per acre. These may occur near existing village centers or as greenfield development. A combination of a grid street core, with curvilinear edges may allow for the preservation of open space. A typical home in an exclusively residential area generates 10 or more trips per day while condominiums generate approximately seven per day. A home located in a neighborhood that is designed to be convenient for walking and biking with mixed commercial and service uses can reduce auto trips to as little as 4 trips per home per day.

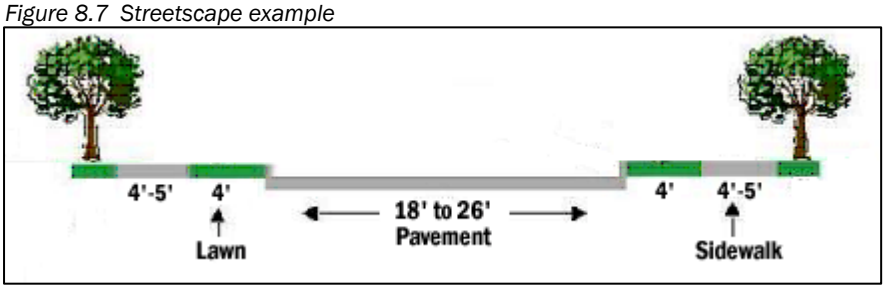
Traffic Impact – New development proposals should be assessed for their trip generation. As a general rule, if the trip generation is more than 1000 vehicles per day, a traffic study should be performed to determine the impact and mitigation measures needed. Current LOS and post-development LOS should be compared. If LOS is predicted to drop below level C, remediation should be part of the development project, with the cost shared on a "fair share" basis.

Impact Fees for Offsite Traffic Improvements – Ohio planning and zoning legislation does not currently empower townships to charge impact fees to offset costs of service expansion (roads, schools, parks, etc.). Generally, road improvements immediately adjacent to the development can be attributable to the project as part of the subdivision and zoning process. If large impact development proposals do not reasonably offer to mitigate their significant off-site impacts, they may impose an undue burden on the township. In such cases the rezoning may be premature.

Light Rail – A proposed light rail extension from Franklin County north to Orange Road would provide an opportunity to reduce traffic. The proposed light rail station would be east of the existing tracks on the north side of Orange Road.

Streetscapes – Streets are a strong part of the look of a community. Every community needs a streetscape standard. For suburban streets with lot widths less than 100 feet, the following is a desirable streetscape cross section. Street pavement widths may range from 18-26 feet depending on the need to provide on-street parking.

Figure 8.7 Streetscape example



The Roundabout, an Alternative Street Design – Intersections typically require stop signs and traffic signals when traffic counts warrant. However, another alternative is useful under certain conditions. Modern, low-speed (11 mph) roundabouts can reduce crashes, flow more traffic than traffic signals, cost less and require less pavement than signalized intersections. Pedestrian crosswalks are located behind the pause line for traffic. The British have constructed 11,000 of them to increase safety, save money and improve traffic flow. Not all intersections are candidates, but the roundabout is a viable traffic management tool, with several planned for East Orange Road.

Figure 8.8 Modern, low-speed roundabout (DLZ Engineers)

"Complete Streets" – (A term coined by the America Bikes Board) accommodate the need for an integrated, connected street network that serves all of its users, including motorists, bicyclists, pedestrians and transit riders of all ages and abilities. As the subdivision authority, the Regional Planning Commission seeks connections between subdivisions by often requiring new subdivision streets to connect to vacant adjacent parcels of land. The main benefits to connectivity are shorter trips, greater travel choice and savings on infrastructure. Township zoning may also provide a policy of neighborhood-to-neighborhood street connections, provided safety and quality of life impacts from the connection are mitigated.

In addition to having a sidewalk requirement for all new streets, townships should create a policy for existing roads as they change from local to collector status. When a street exceeds 1,500 vehicle trips per day it should be classified as a minor collector, and the township should budget for the construction of a pedestrian path or leisure trail along at least one side of the street. Minor collector streets within platted subdivisions should also be considered for traffic calming devices. Major collectors should consider the construction of bike paths on both sides of the street when traffic warrants it. Subdivisions that are platted along existing collector streets may stipulate that bike paths or sidewalks be constructed as part of a township or regional system.

Transportation Goals and Means

Goal	Means
To create a "heart" of the township at Lewis Center with mixed uses.	Work with ODOT and County Engineer to lay out the Home Road-to-Lewis Center Road by-pass "D" south of Lewis Center. Require this road to be built with developer and state and county dollars as part of new development to provide a safe grade separation at the railroad. Ask the County Engineer to use road and bridges sales tax money to construct the grade separation crossing of the railroad tracks on the Lewis Center bypass
Goal To avoid traffic congestion on local, county, and state roads.	Means Use access management controls to minimize highway congestion. Refer to the 2001 Delaware County Thoroughfare Plan as it relates to new and improved roads in Orange Township. Refer to the 2001 ODOT U.S. 23 Access Management Plan as it relates to Orange Township and work with ODOT to prevent the deterioration of U.S. 23 through traffic. Require developer-funded access roads as referenced on the Comprehensive Plan Map as part of new developments. Encourage construction of a Lewis Center extension to Home Road. Extend Shanahan Road easterly to S. Old State Road with limited access as part of new developments as shown on the Comprehensive Plan Map. Connect Piatt Road at the Berlin Township line with the Lewis Center bypass with limited access as shown on the Comprehensive Plan Map as part of new developments. Work with COTA, MORPC, Delaware County Commissioners and ODOT to create a park and ride light rail commuter stop at Lewis Center Road for a Delaware-to-Columbus light rail service or reserve space for one until such time as it is needed. Encourage continued efforts by the County Engineer and ODOT to create a new non-commercial interchange at Big Walnut Road and Interstate 71.