City of Bowling Green
Access Management
Policies and Guidelines

Prepared For:

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City of Bowling Green
Access Management Policies and Guidelines

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REFERENCES

Institute of Transportation Engineers. *Trip Generation – 6th Edition.*

Ohio Department of Transportation. *Location and Design Manual.*

Ohio Department of Transportation. *Ohio Manual of Uniform Traffic Control Devices (OMUTCD).*

Ohio Department of Transportation. *State Highway Access Management Manual.*

City of Bowling Green. *Bowling Green Transportation Master Plan*.

1.0 INTRODUCTION

1.1 INTRODUCTION

The City of Bowling Green is taking a proactive planning approach to maintaining the integrity of roadways within the city through the use of access management and projected roadway need guidelines. Intrinsic to the development of an access management policy is the establishment of the functional classification of roadways. Differing intensities of access management will be developed for each of the functional classification categories. Based on the functional classification of roadways, an access management policy can be developed that will systematically administer standards and policy guidelines needed to maintain safe and operational roadways well into the future.

The objectives of this access management plan is to:

1. Obtain the most efficient use out of existing roadways.
2. Base roadway improvements on traffic demand and capacity constraints.
3. Provide for planned roadway improvements.
4. Maintain the integrity of roadways and provide for safer facilities.

1.2 ACCESS MANAGEMENT - GENERAL

Access management is a systematic plan to maintain a roadway's intended use, which is based in part on the roadway's functional class. This is accomplished by minimizing interference between traffic flow on the roadway mainline and traffic entering and exiting the roadway, while providing necessary and appropriate access to adjacent land uses. The access management policy is comprehensive since it applies to all roadways and recognizes that no roadway operates independently but as part of a total transportation network. It is functional since it considers each road's purpose within the system and applies standards and policies that are appropriate for that purpose. It is systematic because these standards and policies are clearly defined, and are consistently and fairly applied. Once in place, an access management policy will lead to fewer accidents, increased capacity, higher operating speeds, fewer delays, and reduced capital investments in new highways and improvements.

An access management policy is not established to discourage development, but is rather devised to encourage safe and planned access to developments so the roadways will better serve businesses wanting to locate along roadways. Both motorists and businesses benefit from access management. Motorists will have fewer traffic conflicts and accidents, less congestion, and improved travel time. Businesses will experience increased market areas because of improved travel times and their business locations will remain attractive and easily accessible to customers. Numerous studies and reports have established that when drivers become frustrated because of poor access management and roadway congestion they eventually lessen their patronage to businesses within those areas.

1.3 OBJECTIVES

The intent of this access management policy is to provide rules and regulations for managing access to land development from roadways, while preserving traffic flow in regards to safety, speed, and capacity. Additionally, the access management policy will provide guidelines for right-of-way and roadway improvement needs. The major thoroughfares including arterials and collectors within a city are the primary means of moving people and goods and connecting residential areas to business and industrial areas. This access management policy will balance the right of reasonable access to private property with the rights of the citizens of Bowling Green and surrounding areas to safe and efficient travel. A well conceived access management policy will reduce the need for funding to cover premature improvements to a roadway that has come too early due to unmanaged roadway access.

The intent of this access management policy is to establish long range planning for:

- Functional Class
- Traffic Volumes
- Right-of-Way Needs
- Lane Needs
- Traffic Control Devices Policies
- Turn Lane Requirements
- Traffic Impact and Access Management Studies

1.4 OVERVIEW

The first task of the access management policy is to establish a hierarchy of the roadway system within the City of Bowling Green, Ohio. This is commonly referred to as the roadway functional classification. The functional class of a roadway is based on the function that each particular roadway is designed to perform within the roadway network whether it is primarily for moving through traffic or accessing land uses adjacent to the roadway, or somewhere in between. The amount of traffic a roadway is carrying or is expected to carry is also a factor in determining functional class. Once the functional classification is determined, the following items can be established:

- Right-of-Way Need Guidelines
- Lane Need Guidelines
- Traffic Signal Guidelines

With public roadway planning guidelines established, the next step entails developing guidelines for access requests and traffic impact studies. A minimum threshold of trip generation will be established to determine when an access request study or full traffic impact study is necessary.

The final section of the access management policy will outline driveway policies to be followed by anyone accessing public roadways. This will include developing standards for the number and location of drives, geometric design of drives, directional driveway design standards, and lane needs based on the functional classification of the roadway being accessed.

2.0 PUBLIC ROADWAY PLANNING

2.1 EXISTING FUNCTIONAL CLASSIFICATION

The Ohio Department of Transportation (ODOT) has developed a functional classification system for all roadways within Ohio. This classification system includes Interstates, Rural Principal Arterials, Urban Principal Arterials, Rural Minor Arterials, Urban Minor Arterials, Rural Major Collectors, Rural Minor Collectors, Urban Collectors, and Local roads and streets. Urban areas are those places within boundaries, as set by the responsible state and local officials, which have a population of 5,000 or more. Roadways within these established urban areas carry urban roadway functional classification categories. Areas outside these population boundaries shall utilize rural functional classification categories.

The functional classification system, developed by ODOT, groups streets and highways according to the service they are intended to provide. The arterial roadways provide direct service between cities and larger towns and have a high level of mobility. The collector roadways provide more localized transportation and directly and connect them to the arterial network. The collector roadways collect traffic from the local roads and streets that are accessing land uses and distribute them onto the arterials and major thoroughfares. The functional classification of Bowling Green and adjacent areas can be viewed on *Figure 1 - Existing Functional Class*. All roadways shown without a functional classification designation are classified as Local roadways.

Each functional classification requires a different amount of right-of-way depending on the number of lanes and whether or not the roadway is a divided roadway or parkway. *Table 1* shows the guidelines for right-of-way needs for each functional classification for the number of lanes that might be necessary for future traffic demands.

Table 1
Functional Classification Right-of-Way Guidelines

Functional Classification	Right-of-Way Requirements	Comments
Interstate	300 Feet	Additional R/W at interchanges and grade separations.
Freeway	200 – 300 Feet	300 Feet R/W needed if divided roadway or parkway.
Urban Principal Arterial	120 – 140 Feet	140 Feet R/W needed if divided roadway or parkway.
Urban Minor Arterial	100 Feet	Based on eventual need for a 5-lane roadway.
Urban Collector	80 Feet	Based on eventual need for a 3-lane roadway.
Rural Principal Arterial	120 – 140 Feet	140 Feet R/W needed if divided roadway or parkway.
Rural Minor Arterial	100 Feet	Based on eventual need for a 5-lane roadway.
Rural Major Collector	80 Feet	Based on eventual need for a 3-lane roadway.
Rural Minor Collector	80 Feet	Based on eventual need for a 3-lane roadway.
Local	60 Feet	Based on roadway remaining a 2-lane roadway.

The functional classification right-of-way guidelines established in *Table 1* are to be used for planning purposes. The right-of-way width guidelines are subject to modification in areas along a roadway where existing roadside development constricts the expansion of existing right-of-way widths. A development looking to locate along a roadway should be required to incorporate right-of-way need guidelines into their site plan as either an easement or setback. This will allow for less costly roadway improvements once the roadway reaches capacity and must be widened. Public agencies will benefit in this process through less expensive right-of-way purchases, and private businesses will benefit through minimal property disruptions as a result of a future roadway improvements.

2.2 FUTURE FUNCTIONAL CLASSIFICATION

The future functional classifications will be based on existing functional class designations, predicted traffic volumes, land uses, and development trends. The predicted future functional classifications are shown on *Figure 2 – Predicted 2019 Functional Class*. These future functional classification designations are subject to change if development begin to occur in an area where it is currently unanticipated or if traffic does not increase as predicted, thereby changing traffic volumes and patterns on surrounding roadways. These future functional classification designations should be utilized to plan for future right-of-way needs as new developments occur. The easements or setbacks for these predicted functional classifications should be incorporated wherever possible, especially for the predicted arterial roadways, since these roadways will most likely require widening within the next 20 years.

2.3 RIGHT-OF-WAY CORRIDORS

Right-of-way corridors were developed by considering the predicted functional classification designations of *Figure 2*, predicted traffic volumes from the *Bowling Green Transportation Master Plan*, existing land uses, and development trends. These corridors and the recommended right-of-way preservation needs are shown on *Figure 3 – Right-of-Way Corridors*. Several corridors within and around the downtown area have few options of preserving additional right-of-way since existing development restricts such action. In these areas the existing right-of-way must simply be maintained, and if a project ever proposes to redevelop a large area, then the right-of-way widths should be increased to match those widths from *Table 1* which corresponds to the functional classification of the roadway.

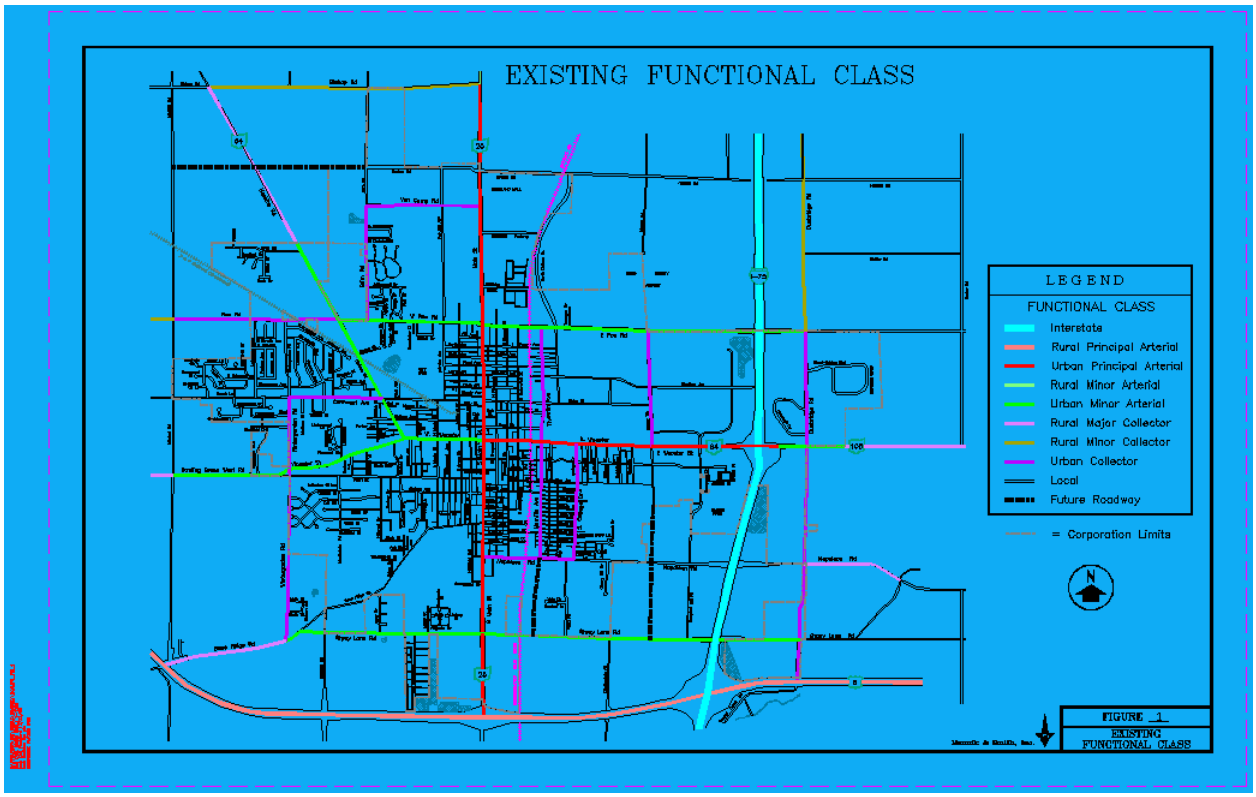

Figure 1 – Existing Functional Class

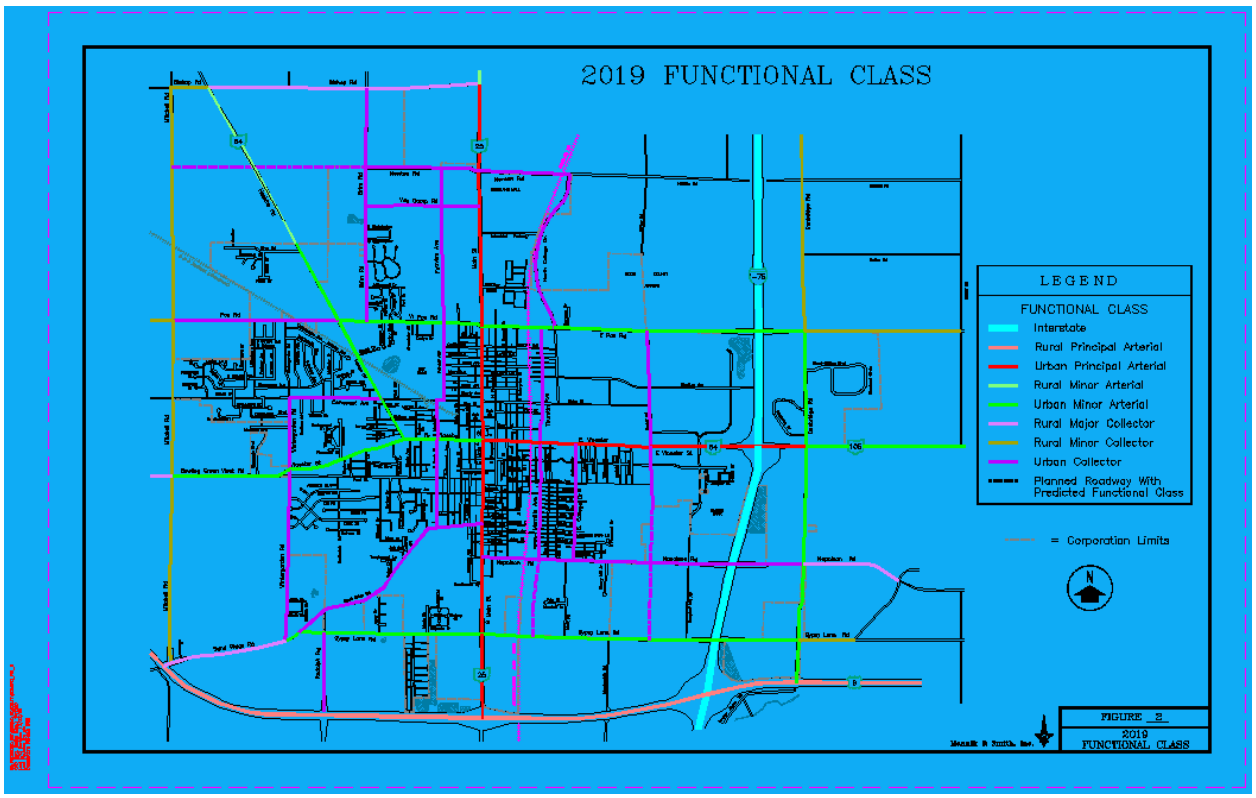

Figure 2 – Predicted 2019 Functional Class

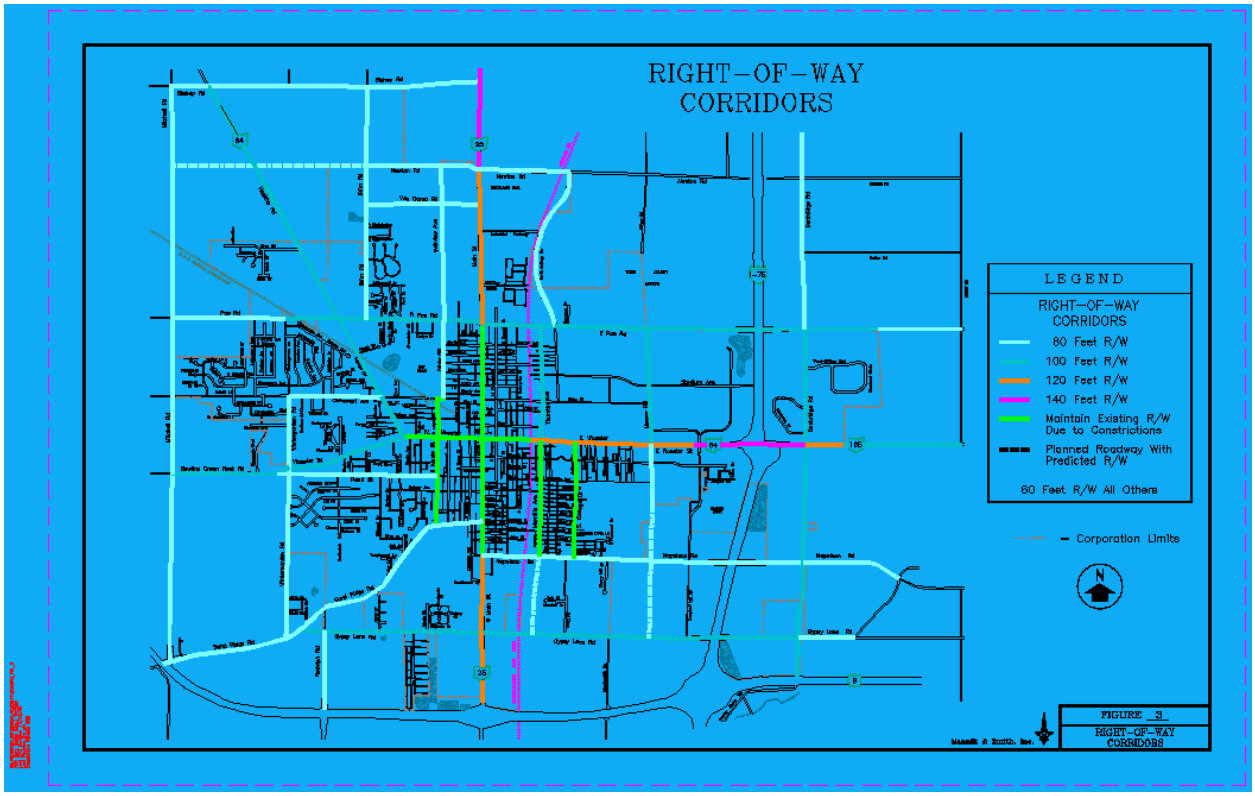

Figure 3 – Right-of-Way Corridors

2.4 RIGHT-OF-WAY NEED BASED ON TYPE OF ROADWAY

The right-of-way needs presented for the Right-of-Way Corridors in *Figure 3* are based primarily on functional classifications. This provides a general planning tool for right-of-way preservation. However, should a development propose to locate on a roadway currently classified as Collector or Local, there may need to be additional right-of-way set aside from those recommended by the Right-of-Way Corridors of *Figure 3*. In this case, right-of-way needs should be based on the number of lanes required for the proposed development. The guideline widths presented in *Table 2 - Roadway Right-of-Way Widths*, provide recommended right-of-way widths based on the number of lanes of a roadway. The right-of-way requirements establish the roadway's future lane number potential.

Table 2
Roadway Right-of-Way Widths

Number of Lanes	Unimproved Right-of-Way Guidelines	Improved (Curb & Gutter) Right-of-Way Guidelines
2-Lane Roadway	60 Feet	60 Feet
3-Lane Roadway	80 Feet	80 Feet
4-Lane Roadway	100 Feet	80 Feet
4-Lane Roadway Divided or Parkway	120 Feet	100 Feet
5-Lane Roadway	120 Feet	100 Feet
5-Lane Roadway Divided or Parkway	140 Feet	120 Feet

2.5 LANE NEEDS PLANNING POLICY

2.5.1 Through Lanes

The numbers of lanes needed on a roadway are primarily dependent on the traffic volumes of a roadway and the operational characteristics of the roadway. The approximate traffic volumes at which point roadways should be considered for additional lanes are shown in *Table 3 - Lane Need Guidelines*, which are based on traffic volumes.

Table 3
Lane Need Guidelines

Average Daily Traffic (vehicles per day)	Through Lanes Needed	Turn Lanes Needed
Up to 7,000	2	• At major intersections.
7,000 to 12,000	2	• Extensive use of left turn lanes or center two-way left turn lane. • Right turn lanes at major drives or roadway intersections.
12,000 to 25,000	4	• Extensive use of left turn lanes or center two-way left turn lane. • Right turn lanes at major drives or roadway intersections.
25,000 to 30,000	4 to 6	• Extensive use of left turn lanes or center two-way left turn lane. • Right turn lanes at major drives or roadway intersections.
Over 30,000	6	• Extensive use of left turn lanes or center two-way left turn lane. • Right turn lanes at major drives or roadway intersections.

The operational characteristics of a roadway are measured by the use of Levels of Service (LOS), which are commonly calculated by using the Transportation Research Board *Highway Capacity Manual (HCM) – Third Edition*, and its related software. The primary criteria used in calculating levels of service include:

- Traffic Volumes
- Number of Lanes
- Lane and Shoulder Widths
- Percent Trucks
- No Passing Zones
- Grade of the Roadway
- Signalized/Unsignalized Intersections

The LOS is a qualitative measure describing a range of traffic operating conditions such as travel speed and time, freedom to maneuver, traffic interruptions, and comfort and convenience as experienced and perceived by motorists and passengers. Levels of Service describe the capacity conditions of a roadway and are categorized into six classifications that range from A through F. Roadways operating with a Level of Service A (LOS A) would generally have traffic conditions that are free-flowing with low volumes, high speeds, and minimal delays. At the opposite end of the spectrum, a roadway designated with a LOS F is experiencing forced or breakdown flow, heavy congestion, significant delays, and low average speeds. Levels B through D are intermediate categories between the two extremes. Depending on a roadway's functional class, a roadway should be functioning above a particular LOS during the peak hour of traffic on the roadway. Generally, most roadways should be operating at a LOS C or better. However, roadways classified as collector or local are permitted to operate at a LOS D or better.

Intersection levels of service should also follow these criteria with intersections functioning at LOS C or better. The major movements, typically through movements, or a large turning volume, should operate at a LOS C or better. In some cases a minor movement at a slightly lower service level would be acceptable (LOS D through F) if improvements would be cost or right-of-way prohibitive.

2.5.2 Left Turn Lane Criteria

Left turn lanes should be considered if one of the following conditions exist:

- A left turn volume over 50 vehicles in the peak hour or 400 per day,
- A left turn volume over 25 vehicles in the peak hour of traffic on a roadway carrying 5,000 or more vehicles per day,
- For all approaches of a signalized intersection,

- Where unfavorable levels of service would exist in the absence of a left turn lane.

The left turn lane shall be of sufficient length to accommodate the anticipated peak hour queue based on a Poisson distribution for random arrivals. A summary of anticipated storage requirements is provided in *Table 4 – Vehicular Storage Needs*.

Table 4
Vehicular Storage Needs

Number of Turning Vehicles (Peak Hour)	Turn Lane Length (Feet)
25	50
40	100
80	150
120	175
160	200
200	250
240	325
280	375

Note: For high speed roadways (40 mph or greater) add 100 feet to storage requirement to provide for deceleration.

For left turn volumes exceeding 300 vehicles in the peak hour dual left turn lanes should be considered. Storage lengths for dual left turn lanes shall be based on the criteria for single lanes for the critical lane utilizing a 60% lane utilization. Dual left turn lanes are typically applicable at signalized intersection and should include protected only left turn phasing.

2.5.3 Right Turn Lane Criteria

Right turn lanes should be considered if one of the following conditions exist:

- A right turn volume over 75 vehicles in the peak hour or 600 per day,

- A right turn volume over 50 vehicles in the peak hour traffic on a roadway carrying 5,000 or more vehicles per day,

- Where unfavorable levels of service would exist in the absence of a right turn lane.

The storage lengths for right turns shall follow the same requirements as left turns, as provided in *Table 4 – Vehicular Storage Needs*. Where there exists moderate to heavy pedestrian movements, or where traffic operation would benefit from channelization, raised concrete channelizing islands shall be provided with the right turn lane. The raised concrete island shall be barrier free and of a minimum size of 200 square feet.

2.6 TRAFFIC SIGNAL POLICY

2.6.1 Public Traffic Signals

Public traffic signals involve traffic signal control for the intersection of public roads. The warrant requirements for the installation of a traffic signal shall be consistent with the requirements of the *Ohio Manual of Uniform Traffic Control Devices (OMUTCD)*. The *OMUTCD* provides the minimum requirements for the installation of a traffic signal. Satisfying one or more of the traffic signal warrants does not necessitate the installation of a traffic signal. The *OMUTCD* provides the minimum traffic requirements needed for signal installation. The installation of a traffic signal must consider additional elements including signal spacing, necessary traffic lanes and the progressive movement of traffic. Generally, signals should be placed at a minimum 1,000 – 2,000 feet apart in urban areas. This typically allows for adequate lane development and progressive signal movements.

A signal warrant analysis should be conducted for all signal installations. The installation of a traffic signal involves a state legal requirement as provided in the *Ohio Revised Code* which dictates that traffic control devices be installed in a uniform manner. Unwarranted traffic control devices could affect federal and state funding for a roadway project.

The *OMUTCD* provides warrants for special circumstances involving peak hour conditions, school crossings, and pedestrian crossings. As with the vehicular warrants, a signal warrant analysis should be conducted prior to the installation of a traffic signal.

2.6.2 Private Traffic Signals

In certain circumstances, traffic signals may be appropriate at private drives. A private drive signal would involve a private drive access at a public right-of-way. Typically these are "T-type" intersections, but in some cases three legs of the intersection may involve public roadway with the fourth approach involving the private drive. Private drive signals must conform to the following:

Warrants

The owner of a property requesting a signalized drive(s) must provide a warrant study consistent with the OMUTCD. If the project involves a proposed development, traffic projections can be utilized consistent with the Institute of Transportation Engineers' (ITE) *Trip Generation*. A signal may be denied if:

- The results of the warrant analyses appear to have marginal traffic, either existing or projected.
- The proposed signal location would create less than desired intersection spacing and/or result in inadequate distances for necessary turn lanes.
- The proposed signal location would create poor progressive movement of traffic on the public roadway.
- There are other alternatives to provide adequate site access through alternate drive locations or shared drives with adjacent properties.

If the private development involves phased development, the signal may be withheld until traffic volumes meet and/or exceed the minimum requirements established in the *OMUTCD*.

If at any time in the future the function or operation of the site changes and a study determines that the traffic does not meet minimum threshold traffic volumes established in the *OMUTCD*, then the property owner may be required to remove the signal at the owner's expense.

Construction Costs

The cost of the installation of the traffic signal shall be the responsibility of the owner of the property requesting the signal. Construction inspection, conducted by the City, shall be at the property owner's expense.

Maintenance

The City will provide routine maintenance of the signal. This includes replacement of bulbs, routine controller maintenance, and other incidental maintenance. Major maintenance will be the responsibility of the owner. This includes replacement of any signal appurtenance that has exceeded its design life. This would involve, but not

be limited to: detector loops, detector loop units, controllers, wire, vehicular signal heads, pedestrian signal heads, poles, underground utilities, and any other signal equipment necessary for the signal installation.

Signal Design

The signal design shall include the following:

1. *Vehicular Signal Heads*
   Twelve-inch vehicular signal heads consistent with current City standards or practices will be required.

2. *Signal Supports*
   Steel mast arm signal poles consistent with ODOT standards painted or galvanized as required by the City.

3. *Detection/Actuation*
   Semi-actuation for the minor private drive will be required, unless an engineering study determines otherwise.

4. *Coordination*
   A means of signal coordination and communications between adjacent signals must be provided. This may require hardwire interconnect.

5. *Pedestrian Signal Heads*
   Pedestrian signals and pedestrian pushbuttons (if actuation is employed) will be required, unless an engineering study determines otherwise. Pedestrian signal heads shall be polycarbonate with symbol displays.

6. *Roadway Geometry*
   Proper roadway geometry for the safe and efficient operation of the traffic signal is required. This will typically require left turn lanes for all signalized approaches. Additionally, the private drive approach must be designed adequately with necessary turn lanes and adequate radii. At-grade drive approaches may be considered for private drive approaches involving signalization. The application of such will be dependent on signal needs and drainage conditions. Driveway geometry shall follow the requirements of *Section 2.7.2* and *Figures 4A, 4B, 5, 6 and 7*.

7. *Equipment Specifications*
   Equipment must conform to required City specifications or practices.

8. *Easements*
   Easements must be provided for signal equipment that is located on private property. This may include detector loops, and in rare cases conduit, pullboxes, and signal poles or pedestals. The easement shall be large enough

to cover equipment and maintenance area. The property owner shall prepare the easement agreement in a format acceptable to the City.

9. *Cost*
The cost of the signal warrant study, construction plan preparation, and construction shall be the responsibility of the owner. The City will perform construction inspection, at the owner's expense.

10. *Shared Drive*
Any adjacent property that can share access to the private drive signal, and would benefit from access to the signal shall be considered for inclusion to the signalized private drive via shared drives and/or cross access easements. The coordination and agreement between private property owners, shared costs, and cross access easements shall be conducted by the owner.

11. *Design*
The signal design shall conform to the City's standards or practices and be consistent with the *OMUTCD*. Final plans shall be provided to the City in the form of reproducible tracings and compatible electronic format.

12. *Pavement Markings*
Pavement markings for private drive approaches shall be consistent with the guidelines provided herein (see *Figure 7*) and the requirements of the *OMUTCD*. Pavement marking material shall meet the Ohio Department of Transportation standards and be maintained in good condition. Annual applications are recommended and will be required by the City if markings have notable fading or wear.

2.7 ACCESS POINT CHANGE IN USE CRITERIA AND DRIVEWAY STANDARDS

This section establishes driveway standards to be used for all newly approved access points or existing access points being affected by a change in the use of a property. All new drives will be classified into one of the driveway types based on the criteria herein and constructed to the standards for that driveway type. Existing access locations upon which a change in property use affects the drive use and operation will be required to conform to the City of Bowling Green's access management policies and driveway standards established herein.

2.7.1 Access Point Change in Use Criteria

The property owner or permittee, if applicable, may be required to reconstruct, relocate, redesign, or otherwise modify existing accesses in order to conform to the City of Bowling Green's access management and driveway standards. A change in use may include, but is not limited to:

- Structural modifications
- Remodeling
- A change in the type of business conducted
- Expansion of an existing business
- A change in zoning
- A division of property creating new parcels
- New developments

Change in use of access type or access operation is considered if one of the following criteria occurs:

- Access use increases in vehicular volume by 20% or more for a typical weekday, or an actual increase of 10 or more trip ends in the peak hour.

- A left turn movement increases by 20% or more for a typical weekday, or an actual increase of 5 or more trip ends in the peak hour.

- The use of access by trucks increases by 20% or more for a typical weekday or an actual increase of 10 or more trip ends in the peak hour.

- The free flow of vehicles entering the property is restricted to a point at which vehicles queue on the highway, creating a highway hazard.

2.7.2 Full Access Driveway Standards

All full access driveways must follow the standards outlined within *Table 5*. These standards are based on expected drive volumes, roadway speeds, roadway traffic volumes and truck traffic utilizing the drive. Geometric diagrams are provided on *Figures 4A and 4B – Full Access Driveway Geometry Standards.* There are a total of five different types of full access driveway geometric designs. These driveways differ depending on the expected driveway volumes, roadway speeds, and roadway traffic volumes.

Table 5
Full Access Drives

Drive Type	Drive Volume In Peak Hour (veh/hour)	Road Speed (MPH)	Roadway Traffic (veh/day)	Permitted Trucks	Comments
FA1	<25	≤25	≤4,000	No Trucks	See Figure 4A
FA2	>25	≥25	≥4,000	No Heavy Trucks Occasional Single Unit Trucks	See Figure 4A
FA3	>25	≥25	≥2,000	No Heavy Trucks	See Figure 4A
FA4	>25	≥25	≥2,000	Single Unit Trucks	See Figure 4B
FA5	Any Volume	Any Speed	Any Road	Low to High Truck Traffic	See Figure 4B

Note:
FA1 = Full Access Low Volume Drive on Minor Road
FA2 = Full Access Low Volume Drive on Major Road
FA3 = Full Access Medium Volume Drive
FA4 = Full Access High Volume Drive
FA5 = Full Access Industrial Drive

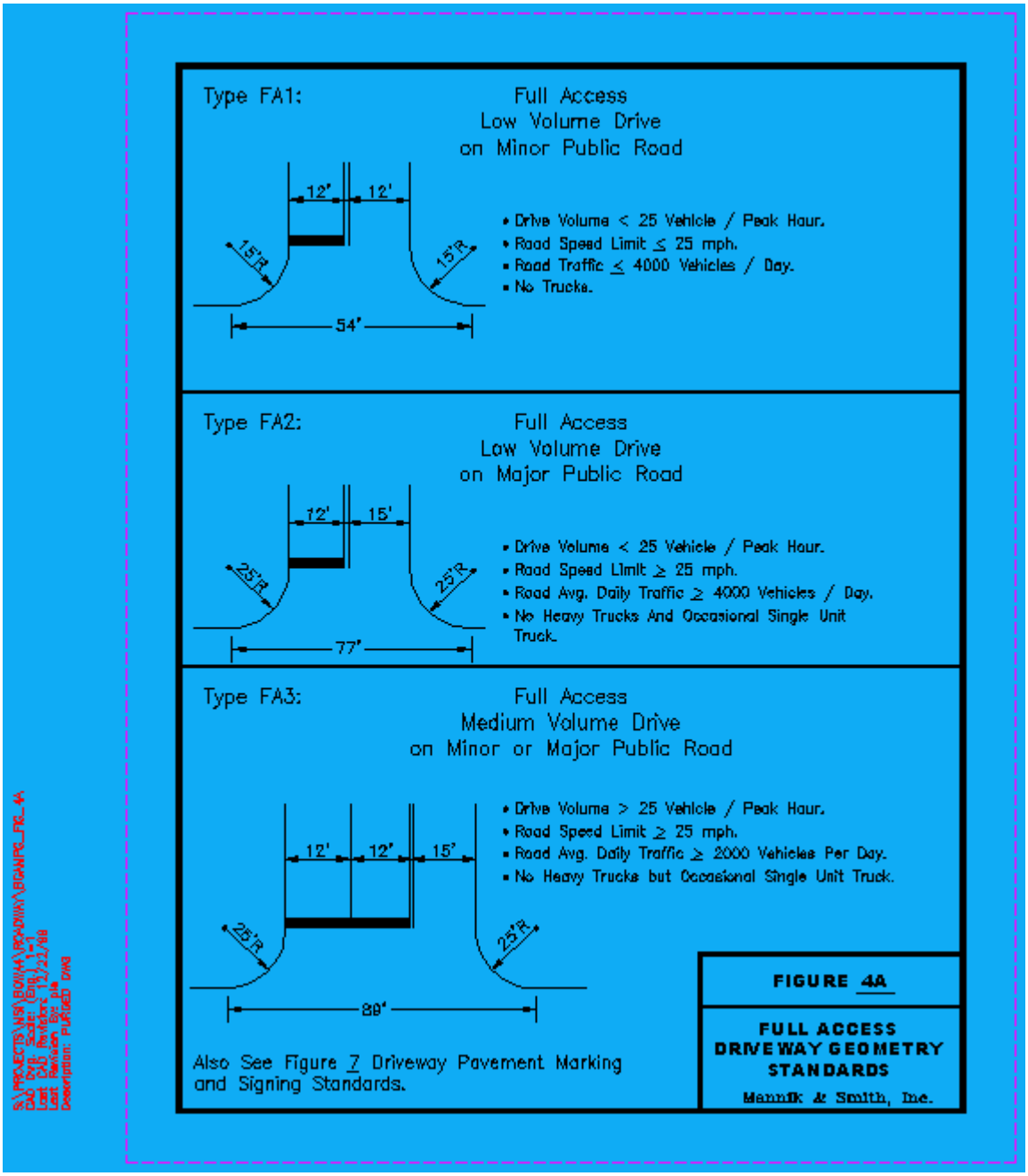

Figure 4A – Full access driveway standards

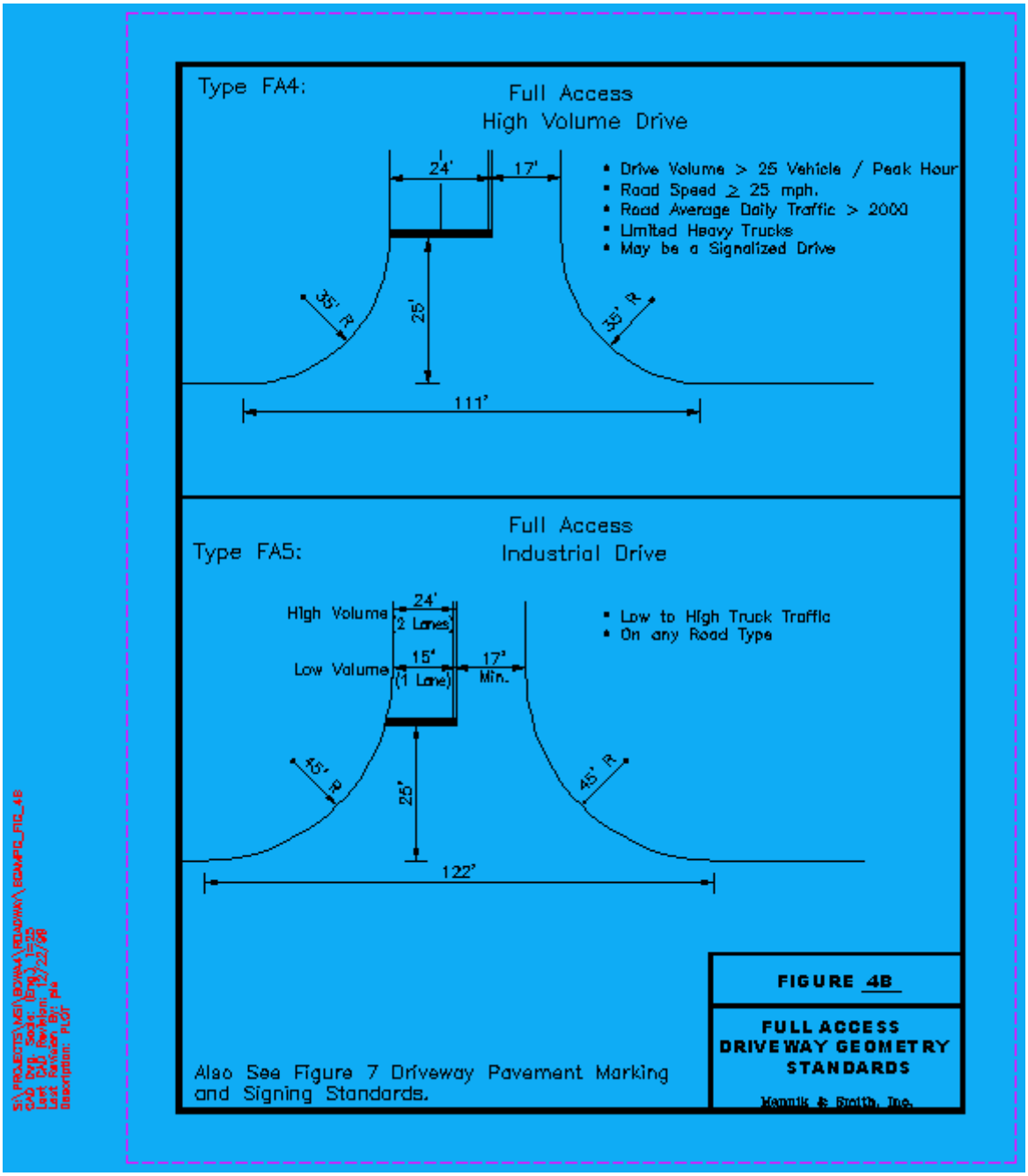

Figure 4B – Full Access Driveway Standards

2.7.3 Left Turn Exit Restricted Driveway Standards

Left turn exit restricted drives involve a restricted left turn exit. This left turn restriction is employed on medium to high volume roads or roadways with capacity constraints. If a left turn exit movement is considered to be hazardous, have excessive delays due to limited available gaps, or would disrupt traffic on the roadway, a left turn exit should be employed. This condition may also apply to median divided highways.

All left turn exit restricted driveways must follow the standards outlined within *Table 6*. The City will make a determination if a driveway will be required to have left turn restrictions based on expected drive volumes, capacity and safety conditions, and the type of roadway being accessed. Geometric diagrams are provided on *Figure 5 – Left Turn Exit Restricted Driveway Geometry Standards.* The standards are based on expected drive volumes, roadway speeds, roadway traffic volumes, and truck traffic utilizing the drive.

Table 6
Left Turn Exit Restricted Drives

Drive Type	Drive Volume In Peak Hour (veh/hour)	Road Speed (mph)	Roadway Traffic (veh/day))	Permitted Trucks	Comments
LR1	<25	≥25	>2,000	No Heavy Trucks	See Figure 5
LR2	<25	≥25	>2,000	Single Trucks	See Figure 5
LR3	>25	≥25	>2,000	Heavy Trucks	See Figure 5

Note:
LR1 = Left Turn Exit Restricted Low Volume Drive
LR2 = Left Turn Exit Restricted Medium Volume Drive
LR3 = Left Turn Exit Restricted High Volume Drive

Note:
Left turn exit restricted drives involve medium to high volume roadways, capacity constrained roadways, median divided roadways, or drive locations where a safety hazard could result from vehicles turning left out of a drive.

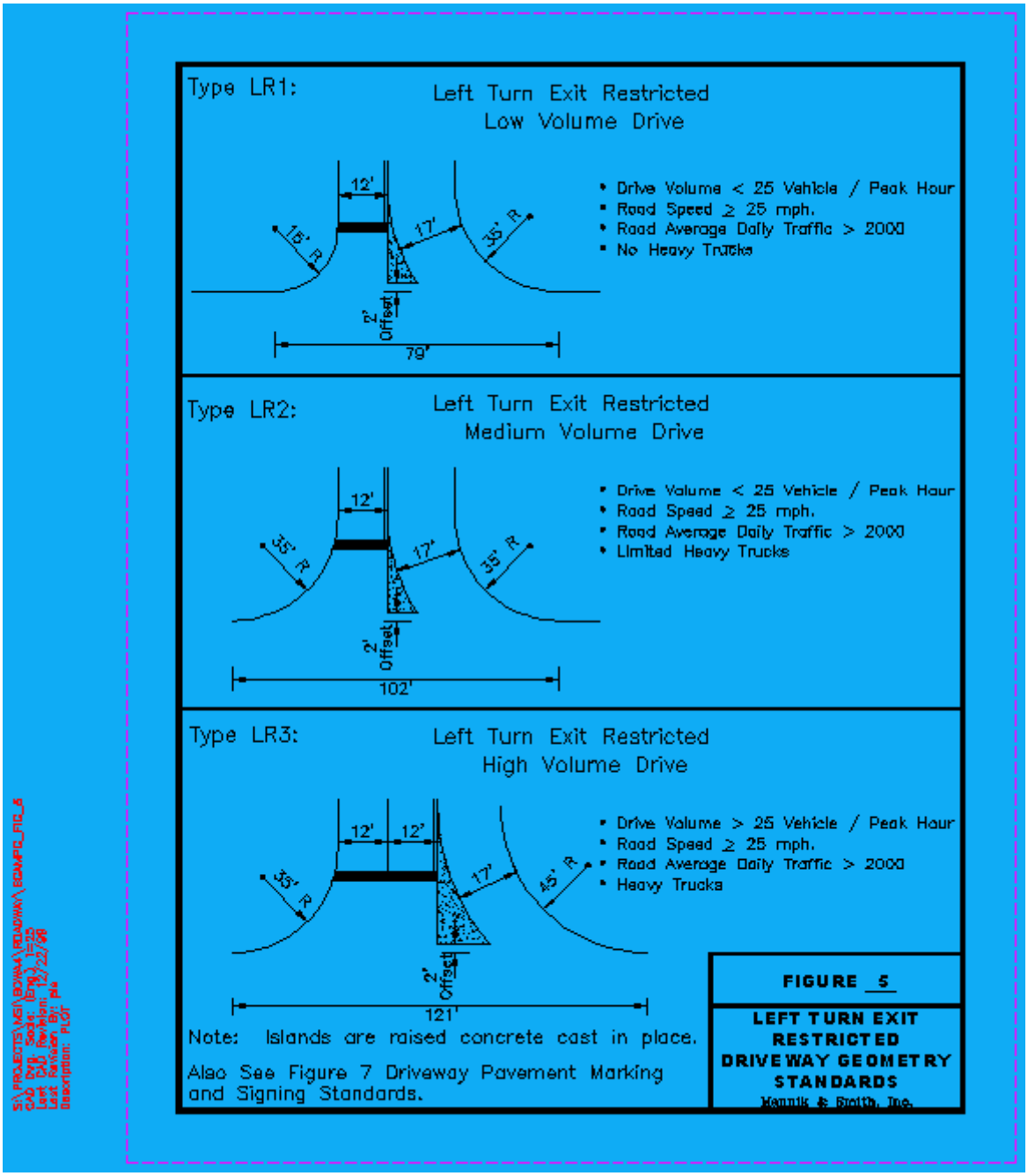

Figure 5 – Left Turn Exit Restricted Driveway Standards

2.7.4 Right-In/Right-Out Only Driveway Standards

All right-in/right-out only driveways must follow the standards outlined within *Table 7*. The City will make a determination if a driveway will be required to have all left turn movements prohibited based on expected drive volumes, placement, and the type of roadway being accessed. Generally, the Right-In/Right-Out Only drive is employed where entering or exiting left turn movements cannot be safely or efficiently conducted. Geometric diagrams are provided on *Figure 6 - Right-In/Right-Out Only Driveway Standards*. The standards are based on expected drive volumes, roadway speeds, roadway traffic volumes, and truck traffic utilizing the drive.

Table 7
Right-In/Right-Out Only Drives

Drive Type	Drive Volume In Peak Hour (veh/hour)	Road Speed (mph)	Roadway Traffic (veh/day)	Permitted Trucks	Comments
RO1	<25	≥25	>2,000	No Heavy Trucks	See Figure 6
RO2	>25	≥25	>2,000	Single Unit Trucks	See Figure 6
RO3	>25	≥25	>2,000	Heavy Trucks	See Figure 6

Note:
RO1 = Right-In/Right-Out Only Low Volume Drive
RO2 = Right-In/Right-Out Only Medium Volume Drive
RO3 = Right-In/Right-Out Only High Volume Drive

2.7.5 Driveway Pavement Marking and Signing Standards

Driveway approaches to public roadways shall have signing and pavement markings consistent with the *OMUTCD*. The standards are displayed graphically on *Figure 7 - Driveway Pavement Marking and Signing Standards.* These guidelines are to be followed when constructing any of the driveway types established within this document.

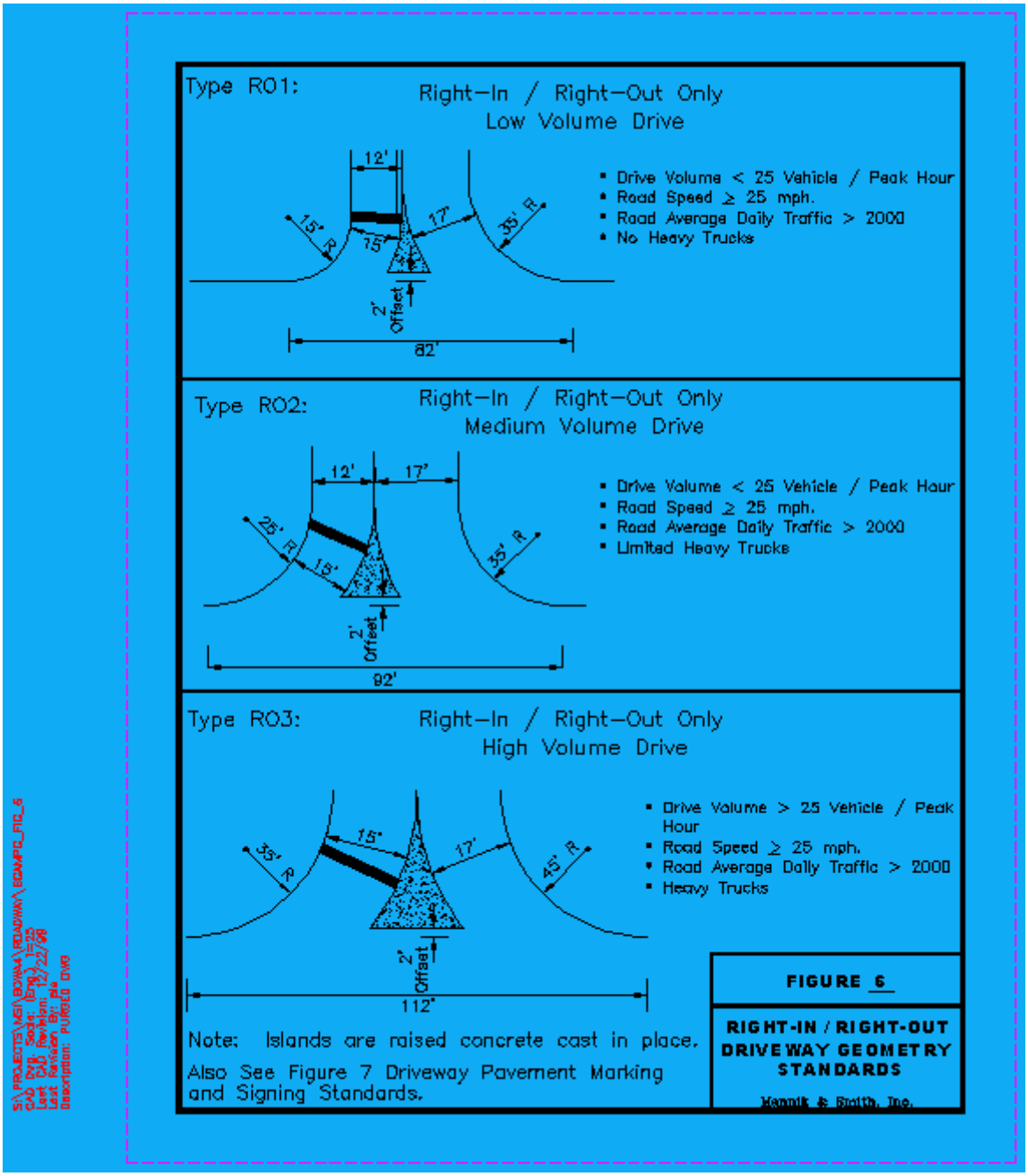

Figure 6 – Right-In/Right-Out Driveway Standards

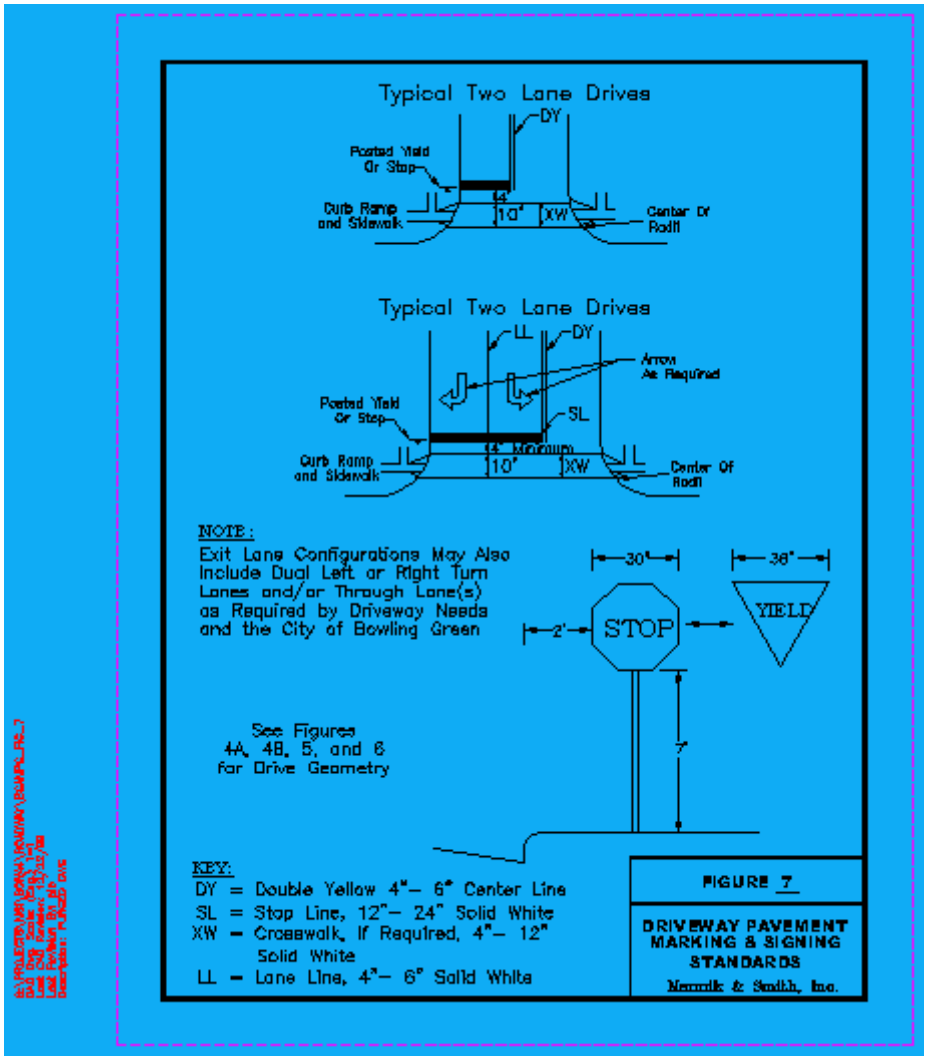

Figure 7 – Pavement Marking and Signing Standards

2.8 ACCESS MANAGEMENT CATEGORIES

All roadways or portions thereof, within the City of Bowling Green, shall be subject to grouping in one of the three access categories described within this section. All access points approved by the City on these roadways must follow the driveway standards described in *Section 2.5*. This section establishes three access category designations based on functional classification, transportation needs, and access needs. These designations are applied to roadways within the City of Bowling Green, as provided on *Figure 8 – Access Category Designations*. These categories describe typical roadways included in the category and the standards to be applied for maintaining a roadway's function in terms of capacity, traffic flow, and safety. The access categories defined herein are for all roadways within the City of Bowling Green. Any roadway carrying an Interstate, Federal, or State Route designation may be subject to additional standards as set forth by the Ohio Department of Transportation (ODOT), and any access or developments proposing to access these routes may be subject to ODOT review.

In addition to the categories defined in this document, particular sections of roadways may also be part of a formal *Access Management Plan*. These are plans that serve as a planning overlay district that are formally adopted by local agencies to further protect the integrity of a roadway in areas where intense development pressures are occurring or are expected to occur. These plans may actually layout conceptual locations for future driveways, require preservation of additional right-of-way for future roadway improvements, propose locations for access roads, and propose locations for future traffic signals and public roadways. If a section of roadway carries an *Access Management Plan* designation, then the standards set forth in that plan shall be followed in place of/or in addition to the standards outlined in this document.

In addition to the three categories established herein, the Ohio Department of Transportation has developed additional categories for Interstates and Freeways. Generally these types of facilities are limited access or controlled access highways and direct access to mainline or interchange ramps is prohibited. However, should a development want to attempt access to these roadways, they will need to follow the guidelines and standards established by ODOT for these facilities.

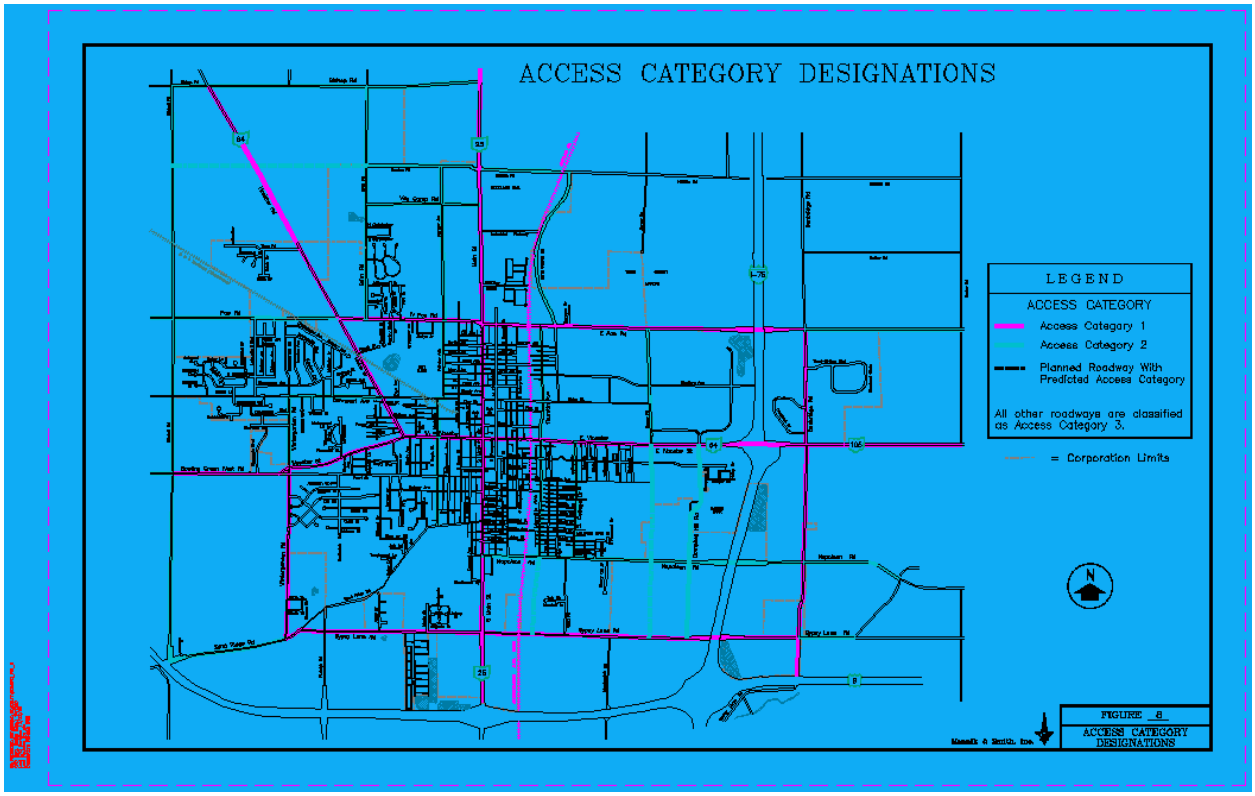

Figure 8 – Access Category Designations

2.8.1 Access Category 1

Category 1 Description

Roadways in this category are designed and intended to provide mobility at moderate to high speeds. The traffic volumes are typically moderate to high, and the roadway's main use is for interregional, intercity, and intracity travel. This category typically includes the functional classifications of urban arterials, rural arterials, and some urban collectors. Roadways should accommodate a posted speed of 45 MPH or greater in areas without signals and a minimum of 35 MPH in areas with signals. An access request may not presume or ask for a lower posted speed to accommodate the access request.

Private access to public roadways carrying a Category 1 designation shall be limited to one drive if no other reasonable access via side streets or access roads is available. A permitted direct access drive to a Category 1 roadway may involve drive access restrictions if the City determines such movements would cause unacceptable safety, capacity, or traffic operation problems to the overall traffic flow. This will involve left turn exit restricted drives or right-in/right-out only drives (see *Sections 2.7.3 and 2.7.4*). However, a left turn movement may be permitted if one of the following applies:

1. The City determines the left turn does not cause a current or projected congestion problem, safety problem, or lower level of service.
2. Alternatives to the left turn would cause roadway and intersection operation and safety problems.
3. The left turn does not interfere with the operation of street system or access to adjacent properties.

No additional access shall be provided for the splitting or dividing of existing parcels under common ownership or control. All access to newly created properties shall be provided internally from the existing access.

Access Category 1 Standards

The standards summarized in *Table 8 – Access Category 1 Standards*, shall be adhered to for all roadways carrying the Access Category 1 designation, unless the City has determined an individual request requires exceptions or if a section of roadway is under ODOT jurisdiction, whereby their standards would apply. The roadways carrying an Access Category 1 designation can be viewed on *Figure 8*. An Access Category 1 roadway has the primary function of providing efficient movement of traffic. Access points are controlled so as not to result in reduced serviceability of the roadway mainline.

Table 8
Access Category 1 Standards

Item	Minimum Standard		Preferred Standard		Comments
Signal Spacing	Urban	Rural	Urban	Rural	All signal placements are to be based on OMUTCD Warrants.
	¼ Mile	½ Mile	½ Mile	1 Mile	
Public Road Intersection Spacing	Urban	Rural	Urban	Rural	
	¼ Mile	½ Mile	½ Mile	1 Mile	
Driveway Spacing	35 MPH		45 MPH	50 MPH	55 MPH minimum driveway spacing is 605 Ft.
	500 Ft.		500 Ft.	600 Ft.	
Posted Speed Limits	35 MPH		45/50/55 MPH		

2.8.2 Access Category 2

Category 2 Description

Roadways in this category are designed and intended to provide access and mobility. In rural areas they service moderate-high volumes of traffic at moderate-high speeds. Rural travel distances are typically for short-moderate distances. In urban areas, these roadways service moderate volumes of traffic at moderate speeds. Functional classifications generally include some moderate speed urban arterials, most urban collectors, and most rural collectors. Roadways should accommodate a minimum posted speed of 35-55 MPH in undeveloped areas and 25-45 MPH in developed areas. An access request may not presume or ask for a lower posted speed to accommodate the access request.

One direct private access shall be permitted per parcel or contiguous parcels under common ownership. Additional access may be permitted if the City determines that an additional access:

1. Would not adversely affect the safety and operation of the highway.
2. Is necessary for the safe and efficient use of the property.
3. Would not adversely affect access to adjacent properties.

Direct private access shall allow for all current and projected turn movements provided the turn movements meet all safety, design, and operational standards. A turn movement may be restricted if the City determines it causes unacceptable traffic and safety problems on the street system. No additional access shall be provided for the splitting or dividing of existing parcels under common ownership or control. All access to newly created properties shall be provided internally from existing access.

Access Category 2 Standards

The standards summarized in *Table 9 – Access Category 2 Standards*, shall be adhered to for all roadways carrying the Access Category 2 designation, unless the City has determined an individual request requires exceptions or if a section of roadway is under ODOT jurisdiction, whereby their standards would apply. Roadways carrying an Access Category 2 designation can be viewed on *Figure 8*.

Table 9
Access Category 2 Standards

Item	Minimum Standard		Preferred Standard		Comments
Signal Spacing	Urban	Rural	Urban	Rural	All signal placements are to be based on OMUTCD Warrants.
	1,000 Ft.	1,000 Ft.	1,500 Ft.	1,500 Ft.	
Public Road Intersection Spacing	Urban	Rural	Urban	Rural	
	½ Mile	1 Mile	¼ Mile	½ Mile	
Driveway Spacing	25 MPH	35 MPH	45 MPH	50 MPH	55 MPH minimum driveway spacing is 605 Ft.
	150 Ft.	250 Ft.	500 Ft.	550 Ft.	
Posted Speed Limits	35 MPH		45/50/55 MPH		

2.8.3 Access Category 3

Category 3 Description

Roadways in this category are designed and intended to provide primarily access to properties. They have low-posted speeds of usually 25 MPH and are for transporting low volumes of traffic over short distances. This category typically includes frontage roads and all local roadways.

No additional access shall be provided for the splitting or dividing of existing parcels under common ownership or control. All access to newly created properties shall be provided internally from the existing access.

Access Category 3 Standards

The standards summarized in *Table 10 – Access Category 3 Standards*, shall be

adhered to for all roadways carrying the Access Category 3 designation, unless the City has determined an individual request requires exceptions or if a section of roadway is under ODOT jurisdiction, whereby their standards would apply. Roadways carrying an Access Category 3 designation can be viewed on *Figure 8*.

Table 10
Access Category 3 Standards

Item	Minimum Standard		Preferred Standard		Comments
Signal Spacing	Urban	Rural	Urban	Rural	All signal placements are to be based on OMUTCD Warrants.
	1,000 Ft.	1,000 Ft.	1,500 Ft.	1,500 Ft.	
Public Road Intersection Spacing	Urban	Rural	Urban	Rural	
	¼ Mile	½ Mile	½ Mile	1 Mile	
Driveway Spacing	25 MPH		25 MPH	35 MPH	
	100 Ft.		150 Ft.	250 Ft.	
Posted Speed Limits	25 MPH		25/35 MPH		

3.0 ACCESS REQUEST STUDIES AND TRAFFIC IMPACT STUDIES

3.1 GENERAL

In order to protect the integrity of the roadway system within the City of Bowling Green, all developments requiring City review will be subject to the processes set forth in this document regarding access request studies (ARS) or traffic impact studies (TIS). Reviews possibly requiring an ARS and/or TIS would include any development requiring:

- Site Plan Review
- Zoning Requests
- Change of Use
- Special Use Permit
- Planned Unit Developments (PUD's)
- Variances, and Remodeling/Additions to Existing Properties and Structures

The purpose of these studies is to evaluate the traffic impacts anticipated by the proposed use or change of use and to further minimize the impacts to the roadway system. In the case of a change of use for a currently developed property, the existing driveway number and location will be reviewed and shall be modified as required to conform to the requirements of the City as provided herein.

Traffic impact studies will be required for developments involving a peak hour traffic generation of more than 100 trips in the peak hour or more than 800 trips on an average day. Developments involving less than this will be required to provide an access request study.

3.2 ACCESS REQUEST STUDY

An access request study (ARS) is required for low traffic generators of less than 100 trips in the peak hour of traffic or less than 800 trips on an average day, and is intended to minimize impacts to the roadway system. The ARS can be prepared as part of the site plan and need not require a registered professional engineer specializing in traffic.

The scope of the ARS shall concentrate on the subject property and the adjacent properties including properties across the road. The objective is to evaluate the access within the immediate area of the proposed site. The requirements of the ARS are for the most part required as part of the planning review and should not be considered a burden of the development.

The elements of an access request study shall include the following:

1. Identification of building size and use, driveways, parking areas, and drive aisles.

2. Identification of road details including right-of-way width, both existing and proposed, pavement widths, identification of vehicular lanes, and adjacent traffic control devices including STOP signs and traffic signals.

3. Identification of adjacent access locations including properties across the road.

4. A formal request to the City for review of the access. This can be conducted with a site plan submittal or plat as part of the current City Planning and Zoning process.

Access requests will be subject to the following:

- *Drive Geometry* consistent with *Section 2.7* herein, including *Figures 4A, 4B, 5, and 6* herein.
- *Drive Number and Location* as provided in *Section 2.8* herein.
- *Directional Restrictions* when providing particular movements would result in the disruption of traffic as provided in *Section 2.8*.

3.3 TRAFFIC IMPACT STUDY

A Traffic Impact Study (TIS) will be required for any development which involves a use (or re-use) of a property which is determined to produce 100 vehicle trips or more in the peak hour or 800 vehicle trips or more per day. The determination of the anticipated vehicle trips shall be based on the guidelines of the Institute of Transportation Engineer's (ITE's) *Trip Generation*. In certain cases, supplemental traffic data based on actual data from similar developments can be included and considered. A licensed professional engineer shall prepare the TIS with experience in the area of traffic, transportation and/or transportation planning.

The TIS shall include the evaluation of capacity conditions under current traffic conditions both with and without the site. The difference in operations shall be considered the site impacts. Roadway improvements shall be developed to address the site impacts such that operations reflect the without site conditions. In special circumstances, typically involving large developments or developments on critical roadways, the City may require either sensitivity testing or 10 to 20 year traffic projections. Sensitivity testing would entail capacity analyses on incremental (5 to 20%) traffic increases. Traffic projections would require evaluation of future traffic operations based on an agreed annual growth rate. Operational impacts as a result of background traffic increases (sensitivity testing or traffic projections) may not be required to be mitigated unless such is a result of a phased development.

The traffic study will also require evaluation of lane needs as provided in *Section 2.5*, Lane

Needs Planning Policy. Drive location, type and geometry shall be as provided in *Section 2.7*, Access Point Criteria and Driveway Standards. Warrant(s) for any proposed signal(s) shall be as provided in *Section 2.6*, Traffic Signal Policy.

The TIS shall be conducted in a manner acceptable to the City. It is recommended that the owner and/or developer confer with the City prior to commencement of the study to determine study parameters.

3.4 TRIP GENERATION

3.4.1 General

Trip generation is a tool utilized by engineers, planners, and public agencies to estimate the expected number of vehicle trips for a particular land use. The most common publication for determining site generated traffic is ITE's *Trip Generation*. This publication is a compilation of actual site generated traffic from various studies based on land use and size. Land uses include residential (including multi-family and single family), commercial (retail, restaurants, and service industries), industrial, and business. The objectives of trip generation, or the prediction of site generated traffic, is to determine the anticipated traffic from a development or a number of developments and utilize this information as part of the roadway planning process. This would include traffic impact mitigation, traffic access planning and internal site circulation planning as a result of proposed developments. Traffic impact mitigation would involve off-site roadway improvements to accommodate the additional predicted traffic to be generated by the site. The number, size, and location of access points could be identified based on the proposed land use type and anticipated transportation needs. Internal circulation issues, such as drive lengths (for vehicular queuing) and lane needs, which would affect the operation of the public roadway system, should be addressed as part of the site impacts.

Trip rates, based on weighted averages, are provided for various times including weekdays, Saturdays, Sundays, AM and PM peak hour of (site) generation and AM and PM peak hour of adjacent street traffic. The trip rates may be based on various factors and commonly include building size (in square feet), acreage, and number of employees. If the size of the site or building is known, the expected daily and peak hour trips can be estimated from *Trip Generation*.

It should be noted that often trip generation data is based on limited sample size and, therefore, application of such could have varying results. Additionally, some land uses may not lend well to direct application of *Trip Generation* and upward or downward adjustments may be justifiable. An example of such might include trip rate factors for apartments in which *Trip Generation* bases such on national apartment profile characteristics. However, in the case of the City of Bowling Green, many of the apartment complexes house 2 to 4 students in a single unit. This would result in a higher number of vehicles than expected (4 vehicles versus 2) and higher

trip numbers per unit.

3.4.2 Trip Generation Based on Land Uses

Table 11 - Trip Generation Guidelines, provides a sample of trip generation rates and expected site generated trips for various land uses. This table is based on the ITE *Trip Generation* and is to be utilized as a planning guide for determination of site generated traffic. This information can be utilized to determine anticipated site traffic when reviewing a traffic impact study or to determine long range traffic volumes on a roadway or roadway network for planning purposes.

Table 11
Trip Generation Guidelines
(Based on ITE's *Trip Generation 6th Edition*)

Land Use	Size	Weekday		Peak Hour		
		Trip Rate	Trips Per Day	Trip Rate	Trips Peak Hour	Weekday Peak Hour Type
Shopping Center	30,000 ft^2	42.92/1000 ft^2	1,288	3.74/1000 ft^2	112	PM Peak Hour of Adjacent Street
Shopping Center	50,000 ft^2	42.92/1000 ft^2	2,146	3.74/1000 ft^2	187	PM Peak Hour of Adjacent Street
Shopping Center	100,000 ft^2	42.92/1000 ft^2	4,292	3.74/1000 ft^2	374	PM Peak Hour of Adjacent Street
Single Family Housing	100 units	9.57/unit	957	1.02/unit	102	PM Peak Hour of Generator
Apartment	100 units	6.63/unit	663	0.67/unit	67	PM Peak Hour of Generator
Condominium/Townhouse	100 units	5.86/unit	586	0.54/unit	54	PM Peak Hour of Generator
Mobile Home Park	100 units	4.81/unit	481	0.58/unit	58	PM Peak Hour of Generator
Motel	100 rooms	5.63/unit	563	0.56/unit	56	PM Peak Hour of Generator
Day Care Center	3,000 ft^2	79.26/1000 ft^2	238	13.94/1000 ft^2	42	PM Peak Hour of Generator
Hospital	50,000 ft^2	16.78/1000 ft^2	839	1.46/1000 ft^2	73	PM Peak Hour of Generator
Nursing Home[1]	100 beds	2.61/bed	261	0.36/bed	36	PM Peak Hour of Generator
General Office	50,000 ft^2	11.01/1000 ft^2	551	1.49/1000 ft^2	75	PM Peak Hour
Medical-Dental Office	50,000 ft^2	36.13/1000 ft^2	1,807	4.36/1000 ft^2	218	PM Peak Hour of Generator
Office Park	100,000 ft^2	11.42/1000 ft^2	1,142	1.50/1000 ft^2	150	PM Peak Hour
General Light Industrial	20 acres	51.80/acre	1,036	8.77/acre	175	PM Peak Hour of Generator
Discount Club	50,000 ft^2	41.80/1000 ft^2	2,090	4.76/1000 ft^2	238	PM Peak Hour of Generator

Table 11
Trip Generation Guidelines
(Based on ITE's *Trip Generation 6th Edition*)

Land Use	Size	Weekday		Peak Hour		
		Trip Rate	Trips Per Day	Trip Rate	Trips Peak Hour	Weekday Peak Hour Type
Quality Restaurant	8,000 ft^2	89.95/1000 ft^2	720	9.02/1000 ft^2	72	PM Peak Hour of Generator
High Turnover Restaurant	5,000 ft^2	130.34/1000 ft^2	652	19.38/1000 ft^2	97	PM Peak Hour of Generator
Fast Food Restaurant (with drive-thru)	4,000 ft^2	496.12/1000 ft^2	1,984	46.28/1000 ft^2	185	PM Peak Hour of Generator
Service Station	8 pumps	168.56/pump	1,348	16.18/pump	129	PM Peak Hour of Generator
Service Station (with convenience mart)	20 pumps	162.78/pump	3,256	13.57/pump	271	PM Peak Hour of Generator
Supermarket[1]	50,000 ft^2	111.51/1000 ft^2	5,576	12.02/1000 ft^2	601	PM Peak Hour of Generator
Drive-in Bank	3,000 ft^2	265.21/1000 ft^2	796	51.23/1000 ft^2	154	PM Peak Hour of Generator
Walk-in Bank[1]	6,000 ft^2	156.48/1000 ft^2	939	42.02/1000 ft^2	252	PM Peak Hour of Generator

[1] ITE Trip Generation indicates small sample size.