



TMS Engineers, Inc



Traffic Impact Studies & Access Management Policy

October 30, 2024

Prepared for:

**City of Shelby
43 W. Main Street
Shelby, Ohio 44875**

Traffic Impact Study & Access Management Policy

Shelby, Ohio

October 30, 2024

Prepared For:

City of Shelby
43 W. Main Street
Shelby, Ohio 44875

Prepared By:

TMS Engineers, Inc.
2112 Case Parkway South
Unit #7
Twinsburg, Ohio 44087



REGISTERED ENGINEER NO. E56982
CERTIFICATION NO. 2234

"This document was prepared consistent with local agency requirements
and/or applicable guidelines contained in this report."



TABLE OF CONTENTS

SECTION:

PAGE NO.:

1.0	<u>POLICIES AND GUIDELINES</u>	1
1.1	ACCESS MANAGEMENT POLICIES.....	1
1.1.1	Purpose of Access Management.....	2
1.1.2	Application of Access Management.....	2
1.1.3	Access Point Change in Use Criteria.....	3
1.1.4	Review of Roadway Functional Classifications	3
1.1.5	Lane Needs Planning Policy.....	6
1.2	ACCESS MANAGEMENT CATEGORIES AND DESIGNATED ROADWAYS.....	8
1.2.1	Access Category 1	11
1.2.2	Access Category 2	13
1.2.3	Access Category 3	15
1.3	DRIVEWAY STANDARDS	17
1.3.1	Driveway Geometry	17
1.3.2	Driveway Types.....	17
1.3.3	Driveway Location.....	18
1.3.4	Driveway Dimensions	18
1.3.5	Driveway Islands.....	19
1.3.6	Pavement Marking and Signing	20
2.0	<u>TRAFFIC IMPACT STUDY (TIS) AND ACCESS REQUEST STUDY (ARS) POLICY</u>	21
2.1	TRAFFIC IMPACT STUDY (TIS) REQUIREMENTS.....	21
2.2	ACCESS REQUEST STUDY (ARS) REQUIREMENTS	22
2.3	TRAFFIC DATA AND COUNT REQUIREMENTS.....	23
2.4	TRIP GENERATION GUIDELINES	23
3.0	<u>TRAFFIC SIGNAL POLICY, SIGNAL DESIGN PREFERENCES, AND ADA CURB RAMPS</u>	25
3.1	TRAFFIC SIGNAL POLICY.....	25
3.1.1	Public Traffic Signals	25
3.1.2	Private Traffic Signals	25
3.2	TRAFFIC SIGNAL DESIGN PREFERENCES	28
3.3	ADA CURB RAMPS	29
4.0	<u>APPEALS & VARIANCES</u>	30

TABLE OF CONTENTS (Continued)

SECTION:

PAGE NO.:

FIGURES

FIGURE 1.1	EXISTING FUNCTIONAL CLASS	5
FIGURE 1.2	ACCESS MANAGEMENT CORRIDORS	9

TABLES

TABLE 1.1	LANE NEED GUIDELINES	6
TABLE 1.2	TYPICAL VEHICULAR STORAGE NEEDS.....	7
TABLE 1.3	DRIVEWAY SPACING REQUIREMENTS (FOR ALL ACCESS CATEGORIES)	10
TABLE 1.4	ACCESS CATEGORY 1 STANDARDS	12
TABLE 1.5	ACCESS CATEGORY 2 STANDARDS	14
TABLE 1.6	ACCESS CATEGORY 3 STANDARDS	15
TABLE 1.7	RECOMMENDED BASIC DRIVEWAY DIMENSION GUIDELINES.....	18
TABLE 3.1	CITY OF SHELBY TRAFFIC SIGNAL DESIGN PREFERENCES.....	18

APPENDICES

APPENDIX A TURN LANE WARRANTS

APPENDIX B REFERENCES

LINKS:

ODOT'S STATE HIGHWAY ACCESS MANAGEMENT MANUAL:

<https://www.transportation.ohio.gov/wps/portal/gov/odot/working/engineering/roadway/manuals-standards/shamm>

ODOT DRIVEWAY STANDARDS:

<https://www.dot.state.oh.us/SCDs/Roadway/BP-4.1 2013-07-19.pdf>

ODOT INTERSECTION STANDARDS:

<https://www.dot.state.oh.us/Divisions/Engineering/Roadway/DesignStandards/roadway/Location%20and%20Design%20Manual/Section%20400.pdf>

ODOT'S LOCATION AND DESIGN MANUAL – VOLUME 1:

<https://www.dot.state.oh.us/Divisions/Engineering/Roadway/DesignStandards/roadway/Location%20and%20Design%20Manual/Entire%20Manual.pdf>

POLICIES AND GUIDELINES

The City of Shelby is taking a proactive planning approach to maintain the integrity of roadways within the City, by using 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, existing and projected traffic volumes, current/future land uses, and trends; 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 are to:

1. Obtain the most efficient use 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

The City of Shelby obtains its authority to monitor and provide policies and guidelines for access management through the Ohio Revised Code (ORC). The two applicable sections of the ORC include:

- ORC 723.01 – Municipal corporations shall have special power to regulate the use of the streets. The legislative authority of a municipal corporation shall have the care, supervision, and control of the public highways, streets, avenues, alleys, sidewalks, public grounds, bridges, aqueducts, and viaducts within the municipal corporation (includes state/federal routes)
- ORC 723.02 – The legislative authority of a municipal corporation may open, straighten, alter, divert, narrow, or widen any street, alley, or public highway within the limits of the municipal corporation

1.1 Access Management Policies

Access management policies are a systematic method 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 pertains 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, improved traffic flow, 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 the 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.

1.1.1 Purpose of Access Management

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 regarding safety, speed, and capacity. 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 Shelby 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
- Traffic Control Devices Policies
- Turn Lane Requirements
- Traffic Impact and Access Management Studies

1.1.2 Application of Access Management

The first task of the access management policy is to establish a hierarchy of the roadway system within the City of Shelby, Ohio. This is commonly referred to as the roadway functional classification. The functional class of a roadway is based on the function that each 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.

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 key to implementing the access management policy is establishing driveway policies to be followed by properties accessing public roadways. This includes developing standards for the number and location of drives, geometric design of drives, directional driveway design standards, capacity analyses, and lane needs based on the functional classification of the roadway being accessed, and its designated access category.

1.1.3 Access Point Change in Use Criteria

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 Shelby's access management policies and driveway standards established herein.

The property owner or permittee, if applicable, may be required to reconstruct, relocate, redesign, or otherwise modify existing accesses to conform to the City of Shelby'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:

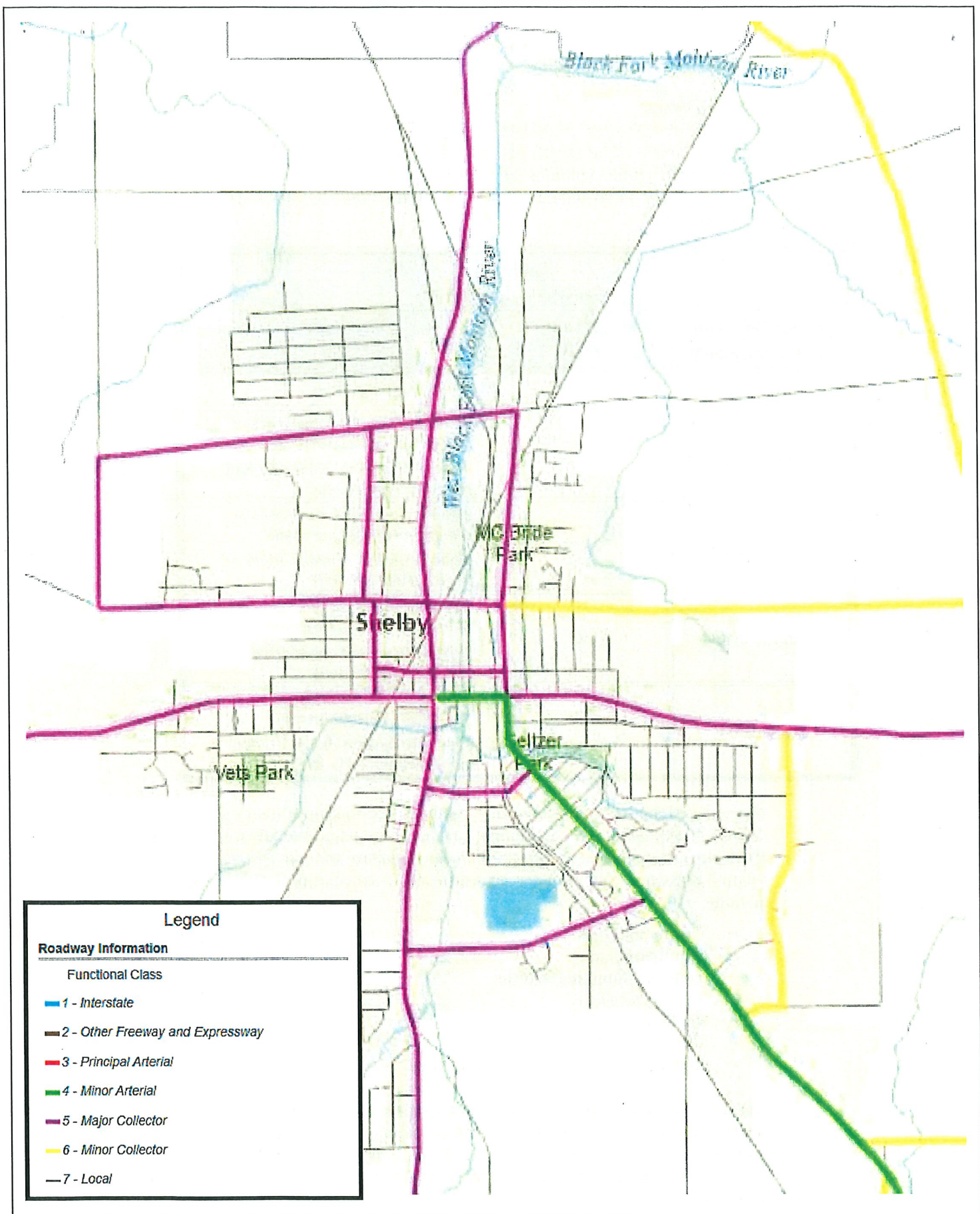
- Access use increases in vehicular volume by 20% or more for a typical weekday, or an actual increase of 10 or more trip ends in the peak hour.
- A left turn movement increases by 20% or more for a typical weekday, or an actual increase of 5 or more trip ends in the peak hour.
- The use of access by 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.

1.1.4 Review of Roadway Functional Classifications

The Ohio Department of Transportation (ODOT) assigns a functional classification to all roadways within Ohio. This classification system includes Interstates, Principal Arterials, Minor Arterials, Major Collectors, Minor Collectors, and Local roads and streets. Urban areas are those places within boundaries as set by the State. These boundaries do not necessarily follow corporation limits, but rather are based on the population density of an area. Roadways within these established urban areas carry urban roadway functional classification categories.

Existing Functional Class

The functional classification designations developed by ODOT classifies 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 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 existing functional classifications of Shelby and adjacent areas can be viewed on *Figure 1.1, Page 5*. All roadways shown without a functional classification designation are classified as Local roadways.



1.1.5 Lane Needs Planning Policy

Through Lanes

The numbers of lanes needed on a roadway are primarily dependent on the traffic volumes of a roadway and its operational characteristics. The approximate traffic volumes at which point the roadways should be considered for additional lanes are shown in *Table 1.1*, which are based on traffic volumes.

Table 1.1 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 using Levels of Service (LOS), which are commonly calculated by using the latest version of Transportation Research Board *Highway Capacity Manual (HCM)*, 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 E 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 should operate at a LOS E 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.

Left Turn Lane Criteria

The need for a left turn lane should be based on the applicable turn lane warrant graph (based on roadway lanes and speed limit) as shown in *Appendix A*. In addition to the left turn lane warrant graphs, considerations of safety, sight distance, LOS, and feasibility should all be considered in determining if a turn lane is needed. Left turns should be considered for all approaches of a signalized intersection or where poor levels of service are found, even if a turn lane warrant is not met. If a proposed development is conducting a traffic impact study to determine if their impacts require adding a left turn lane, the proposed traffic volume used shall be based on the design year traffic (20 years from opening-day) for the left turn lane warrant graphs and LOS.

The left turn lane shall be of sufficient length to accommodate the anticipated peak hour queue. This length can be based on either a queuing analysis from the latest versions of traffic operations software (such as *Synchro* or *HCS*), or from use of the procedures provided in the latest version of the Ohio Department of Transportation's *Location and Design Manual*. A summary of typical storage requirements is provided in *Table 1.2*.

Table 1.2 Typical 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. These are planning level guidelines for storage needs, the actual needs should be determined from either a queuing analysis from traffic operations software, or from the ODOT *Location and Design Manual*.

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 60% lane utilization. Dual left turn lanes are typically applicable at signalized intersections and should include protected only left turn phasing.

Right Turn Lane Criteria

The need for a right turn lane should be based on the applicable turn lane warrant graph (based on roadway lanes and speed limit) as shown in *Appendix A*. In addition to the right turn lane warrant graphs, considerations of safety, sight distance, LOS, and feasibility should all be considered in determining if a turn lane is needed. If a proposed development is conducting a traffic impact study to determine if their impacts require adding a right turn lane, the proposed traffic used shall be based on the design year traffic (20 years from opening day) for the right turn lane warrant graphs and LOS.

The right turn lane shall be of sufficient length to accommodate the anticipated peak hour queue. This length can be based on either a queuing analysis from the latest version of traffic operations software (such as Synchro, HCS or Transmodeler), or from use of the procedures provided in the latest version of the Ohio Department of Transportation's *Location and Design Manual*. The typical vehicle storage needs as provided in *Table 1.2* provides a good planning level guideline for turn storage needs. Where moderate to heavy pedestrian movements exist, 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 be designed to the standards of the latest version of the ODOT *Location and Design Manual* (typically islands should be at least 200 square feet).

1.2 Access Management Categories and Designated Roadways

All roadways or portions thereof, within the City of Shelby, 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 1.3*. The three access category designations established herein are based on functional classification, primary purpose of the roadway, transportation needs, and access needs. These designations are applied to roadways within the City of Shelby, as provided on *Figure 1.2, Page 9*. The categories list 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 Shelby. 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 development proposing to access these routes may be subject to ODOT review in addition to the City.



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 typically 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. The spacing of private driveways for all three access categories will be based on the posted speed limit of the roadway on which the driveway access is being requested and include the minimum distances as outlined in *Table 1.3*:

Table 1.3 Driveway Spacing Requirements (for all Access Categories)	
Posted Speed	Minimum Distance
25 MPH	155'
30 MPH	200'
35 MPH	250'
40 MPH	305'
45 MPH	360'
50 MPH	425'
55 MPH	495'
60 MPH	570'
65 MPH	645'

The driveway spacings outlined above are guidelines and will be required if such distances can be achieved given the property limits and site layout. However, the City of Shelby recognizes that, in many cases, these distances may not be feasible given the existing development and property lines within the City. In these instances, the City will decide as to what spacing will be required, and whether or not a driveway will be required to be directionally restricted in lieu of not meeting the spacings listed above. These guidelines are outlined in the *Table 1.4*, *Table 1.5*, and *Table 1.6* for Access Categories 1, 2, & 3 respectively.

1.2.1 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 intra-city travel. This category typically includes the functional classifications of 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. Speed limits may be reduced to 25 MPH to meet prima facie speed limits through areas that meet urban district status as defined in the *Ohio Revised Code*. An access request may not presume or ask for a lower posted speed to accommodate the access request.

Direct private access shall not be permitted to public roadways carrying a Category 1 designation if the property has other reasonable alternative access to the general, public street system or opportunity to obtain such access. If the City determines that access at an alternative location causes unacceptable safety or traffic operation problems for overall traffic flow, direct access may be allowed. If it is determined that direct private access will be provided, it shall be for right turn movements only. A left turn movement may be permitted if the following applies:

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

Left turns shall not be permitted if a median is already established and the opening of the median would not provide, in the determination of the City, any significant operational or safety benefits to the public. 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 1.4* shall be adhered to for all roadways carrying the Access Category 1 designation (see *Figure 1.2*), 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. When direct private access is allowed to the Category 1 roadway as discussed previously, the location of the drive shall meet the minimum spacing requirements (see *Table 1.3*) from existing adjacent property drives and intersections. If this requirement is not met due to limited lot widths or physical constraints, the City will determine the appropriate drive location based on available spacing and adjacent accesses. All proposed driveways shall follow the driveway design standards as outlined in *Section 1.3*.

Table 1.4		
Access Category 1 Standards		
Access Feature	Minimum Standard	Preferred Standard
Intersection Spacing ¹	¼ mile (1,320 ft.)	½ mile (2,640 ft.)
Signal Spacing ²	1,200 ft.	2,000 ft.
Drive Spacing ³	See Table 1.3 for spacing requirements	
Traffic Movement ⁴	Right-In/Right-OutOnly ⁴	Right-In/Right-OutOnly ⁴
Right Turn Lane	See Appendix A for Turn Lane Warrants for both Right & Left Turns	
Left Turn Lane		
1. If the intersection spacing requirement is not met due to physical or operational constraints, the City may allow reduced spacing if the proposed location would not cause unacceptable traffic operations and safety concerns. 2. If the signal spacing requirement is not met due to physical or operational constraints, the City may allow reduced spacing if the proposed location would not cause unacceptable traffic operations and safety concerns. The signal location would also need to be placed to allow for adequate signal progression on the corridor. All signal installations are required to meet at least one of the eight signal warrants as described in the <i>Ohio Manual of Uniform Traffic Control Devices (OMUTCD)</i>. 3. If the drive spacing requirement (per Table 1.3) is not met between adjacent existing drives or intersections, due to limited frontage of the property or physical constraints, the City may allow reduced spacing. The City will also determine directional restrictions. 4. Direct private access shall not be permitted if the property has other reasonable alternative access to the general, public street system or opportunity to obtain such access. If the City determines that access at an alternative location causes unacceptable safety or traffic operation problems for overall traffic flow, direct access may be allowed. If it is determined that direct private access will be provided; it shall be for right turn movements only.		

1.2.2 Access Category 2

Category 2 Description

Roadways in this category are designed and intended to provide access and mobility at low to moderate speeds and volumes in urban areas for intercity, intra-city, and intra-community travel. In urban areas, these roadways service moderate volumes of traffic at moderate speeds. Functional classifications generally include some moderate speed urban arterials and most urban collectors. Roadways should accommodate a minimum posted speed of 25-45 MPH in developed areas and 35-55 MPH in undeveloped 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

Where a parcel or property has primary access to the general street system or access to an internal street system in the case of a subdivision street, any proposed access to a state highway shall be treated as a request for additional access.

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 general street system. Left turn movements shall not be permitted if a median is already established and the opening of the median would not provide, in the determination of the City, any significant operational or safety benefits to the general public or would be counter to the purpose of the median construction and the continued function of the roadway at the category assigned to it.

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 1.5* shall be adhered to for all roadways carrying the Access Category 2 designation (see *Figure 1.2*), 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. When direct private access is allowed to the Category 2 roadway as discussed above, the location of the drive shall meet the spacing requirements (see *Table 1.3*) from existing adjacent property drives and intersections. If this requirement is not met due to limited lot widths or physical constraints, the City will determine the appropriate drive location based on available spacing and adjacent accesses. All proposed driveways shall follow the driveway design standards as outlined in *Section 1.3*.

Table 1.5		
Access Category 2 Standards		
Access Feature	Minimum Standard	Preferred Standard
Intersection Spacing ¹	¼ mile (1,320 ft.)	½ mile (2,640 ft.)
Signal Spacing ²	1,200 ft.	2,000 ft.
Drive Spacing ³	See Table 1.3 for spacing requirements	
Traffic Movement ⁴	Full	Full
Right Turn Lane	See Appendix A for Turn Lane Warrants for both Right & Left Turns	
Left Turn Lane		

1.

If the intersection spacing requirement is not met due to physical or operational constraints, the City may allow reduced spacing if the proposed location would not cause unacceptable traffic operations and safety concerns.

2.

If the signal spacing requirement is not met due to physical or operational constraints, the City may allow reduced spacing if the proposed location would not cause unacceptable traffic operations and safety concerns. The signal location would also need to be placed to allow for adequate signal progression on the corridor. All signal installations are required to meet at least one of the eight signal warrants as described in the *Ohio Manual of Uniform Traffic Control Devices (OMUTCD)*.

3.

If the drive spacing requirement (per Table 1.3) is not met between adjacent existing drives or intersections, due to limited frontage of the property or physical constraints, the City may allow reduced spacing. The City will also determine directional restrictions.

4.

Left turn movements shall not be permitted if a median is already established and the opening of the median would not provide, in the determination of the City, any significant operational or safety benefits to the general public or would be counter to the purpose of the median construction and the continued function of the roadway at the category assigned to it. Left turn outbound access will not be allowed on multi-lane roadways where the turning vehicle must cross more than 2 lanes of through traffic (not including a two-way left turn lane). Left turn movements may be prohibited if, in the opinion of the City, such movements cannot meet safety, design, and operational standards.

1.2.3 Access Category 3

Category 3 Description

This category applies to roads and streets designed and intended to provide local land access. Typically, this category would not include any state highways. They have low posted speeds of usually 25 MPH or 35 MPH and are for transporting low volumes of traffic over short distances. This category typically includes frontage roads and all local roadways.

One direct private access shall be permitted per parcel. Additional access may be allowed if it is determined by the City that the additional access causes no safety or operational problems. Direct private access shall allow for all turn movements subject to safety considerations.

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 1.6* shall be adhered to for all roadways carrying the Access Category 3 designation (see *Figure 1.2*), 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 location of the drive shall meet the spacing requirements (see *Table 1.3*) from existing adjacent property drives and intersections. If this requirement is not met due to limited lot widths or physical limitations, the City will determine the appropriate drive location based on available spacing and adjacent accesses. All proposed driveways shall follow the driveway design standards as outlined in *Section 1.3*.

Table 1.6 Access Category 3 Standards		
Access Feature	Minimum Standard	Preferred Standard
Intersection Spacing ¹	¼ mile (1,320 ft.)	
Signal Spacing ²	1,200 ft.	2,000 ft.
Drive Spacing ³	See <i>Table 1.3</i> for spacing requirements	
Traffic Movement ⁴	Full	Full
Right Turn Lane	Turn lanes should only be provided when deemed necessary through capacity analysis procedures, or for identified safety concerns.	
Left Turn Lane		

1. If the signal spacing requirement is not met due to physical or operational constraints, the City may allow reduced spacing if the proposed location would not cause unacceptable traffic operations and safety concerns.
2. If the signal spacing requirement is not met due to physical or operational constraints; the City may allow reduced spacing if the proposed location would not cause unacceptable traffic operations and safety concerns. The signal location would also need to be placed to allow for adequate signal progression on the corridor. All signal installations are required to meet at least one of the eight signal warrants as described in the latest version of the Ohio Manual of Uniform Traffic Control Devices (OMUTCD).
3. If the drive spacing requirement (per *Table 1.3*) is not met between adjacent existing drives due to limited frontage of the property or physical limitations; the City may allow reduced spacing.
4. All turning movements allowed subject only to safety considerations

1.3 Driveway Standards

A driveway is an access point that connects adjacent private property to the public roadway network. To promote safety and consistency in access points to the public roadways, the City of Shelby follows the driveway geometry design standards and guidelines as established by the Ohio Department of Transportation (ODOT). This will promote uniformity in driveway standards for those areas in the City as well as those fringe areas just outside the City where many ODOT standards would apply. Given this, the following *Sections 1.3.1* through *1.3.5* are taken directly from the latest version of the Ohio Department of Transportation's *State Highway Access Management Manual*.

1.3.1 Driveway Geometry

A driveway is a point of access connecting an adjacent property to the public roadway. Driveway design is dependent upon several factors. The driveway type will determine what types of vehicles are to be considered in the design which, in turn, affects the access width along with the radius and/or flare dimensions. The volume of traffic using the drive will determine the number of lanes required and whether right or left turns into and out of the access are required. Restrictions on right or left turns will also affect the design..

1.3.2 Driveway Types

Residential

A driveway providing access to a single-family residence or duplex.

Residential, Multiple

A driveway providing common access to more than one family residence or duplex, or to an apartment building containing not more than four dwelling units.

Commercial

A driveway providing access to an office, business, retail or institutional building, or residential facility having five or more dwelling units. These establishments are customarily serviced by trucks as an incidental rather than a principal driveway use. Industrial plant driveways whose primary function is to serve administrative or employee parking lots are considered commercial driveways.

Farm/Field

A driveway providing access to an agricultural tract of land.

Industrial/Retail

A driveway directly serving substantial numbers of truck movements (equal to or greater than 10 trucks per day) to and from loading docks of an industrial facility, warehouse, or truck terminal. A centralized retail development, such as a community or regional shopping center, may have one or more driveways, specially designed, signed and located to provide access for trucks. These also are classified as industrial driveways.

1.3.3 Driveway Location

Driveways shall be located in accordance with applicable spacing requirements of *Table 1.3*.

The effective width will vary with the angle of the driveway and shall be restrictive enough to discourage maneuvers that would cause conflicts. Two-way driveways shall intersect the highway at an intersection angle between 70° and 90°. An angle less than 70° will not be permitted on new two-way driveways. One-way operation driveways (right in only or right out only) shall not have an angle less than 45°.

Any access with a gate shall be designed so that the longest vehicle can completely clear the traveled way when the gate is closed and as it is opened. A gate may not be constructed and/or located within the right-of-way of the highway.

Driveways shall be located where they will not create an offset intersection opposite an existing street, highway, or major commercial driveway.

1.3.4 Driveway Dimensions

Driveway widths and turning radii are determined by the number and use of lanes on the driveway and the design vehicle chosen for the driveway. The width and radii of the driveway shall permit vehicles to enter and exit with a minimum of interference to through traffic yet be restrictive enough to discourage erratic maneuvers. The following table lists recommended design vehicles and widths and radii for various types of driveways:

Table 1.7 Recommended Basic Driveway Dimension Guidelines (Ft.)								
Drive Type =	Farm/Field		Residential		Commercial		Industrial/Retail	
Design Vehicle Type =	Single Unit Truck		Passenger Car		Single Unit Truck with Wheelbase 30'		Truck with Wheelbase 50'	
Nominal Width =	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
One-Way =	---	---	12 Ft.	14 Ft.	14 Ft.	20 Ft.	14 Ft.	26 Ft.
Two-Way =	14 Ft.	20 Ft.	12 Ft.	24 Ft.	26 Ft.	32 Ft. ¹	26 Ft.	38 Ft. ¹
Right Turn Radius =	25 Ft.	35 Ft.	15 Ft.	25 Ft.	25 Ft.	35 Ft.	35 Ft.	75 Ft.

¹ The chart assumes one lane for ingress and one lane for egress. Additional lanes will increase width requirement.

- Driveway widths shall be measured exclusive of radii, flare sections, or transitions. The distance shall be measured perpendicular to the centerline of the driveway at the throat.
- When a public street, road, or highway, or any access intended to become a public street, road, or highway intersects with a state highway, ODOT's design criteria shall be used within the intersection area which is defined as that portion of the intersection located within 60 feet of the edge of the mainline pavement. Local government design criteria may be used outside of the defined intersection area.
- Driveways that enter a public roadway at traffic signals shall have the number of lanes as determined by a capacity analysis.

- In applying the turning radius values from the chart, it should be noted that the radius used at a given driveway is meaningful only when related to the width of the throat. When choosing a radius, the designer must take into consideration the turning limitations of the design vehicle and the driveway width. To reduce turning conflicts and encroachments on traveled lanes and the opposing driveway lanes, turning templates shall be used to evaluate all turning movements and to ensure adequate radius-throat width combinations. The design vehicle's swept path shall be the minimum.
- As an example, using the values from the chart, a commercial two-way drive with a 35-foot radius would have a minimum width of 26 feet. However, if the radius were decreased, a wider drive width would be required to accommodate the turning path of a SU-30 vehicle.
- A turning radius of less than 15 feet may be permitted on a Category 3 highway.
- Driveway radii may be reduced on any roadway with on street parking. The turning radius would be measured from the edge of the through lane.
- Radii drive return treatments (ODOT Std. Dwg. BP-4.1, Type 1) are preferred; however, flared drive treatments (ODOT Std. Dwg. BP-4.1, Type 2) are acceptable for residential and light commercial driveways.

1.3.5 Driveway Islands

In some situations, it is desirable to control or prohibit certain movements using median islands or channelizing islands. Median islands divide the ingress and egress movements and are used to prevent cross movement of internal traffic near the entrance approach of a driveway (See ODOT *Location and Design Manual, Volume 1, Section 803.6* for reference and diagrams or *Appendix B* of this document). Channelizing islands are used to control and direct turning movements on an intersection approach.

Median Islands

A median island is a curbed island which prevents cross movement of internal traffic near the driveway approach. It is necessary to ensure that ingress and egress traffic has the necessary maneuvering space for turns at the intersection. Median Islands shall be at least 6 feet wide. All median islands shall be offset a minimum of 12 feet from the edge of pavement or travel lane of the intersecting road. All median islands shall have a minimum length of 100 feet. The nose of a median island shall taper in height from 2" to 6" in 4 feet or greater.

Channelizing Islands

Channelizing islands are used to control and direct traffic movements on an intersection approach. A properly designed channelizing island will designate the correct turning path and define the merge area thus reducing conflicting movements. The geometry shall physically define the permitted

movements and block the prohibited movements. Careful consideration should be made in design of the island to accommodate design vehicles likely to use the driveway.

The island diagrams are intended to provide a standard practice for design of such islands on highways under State jurisdiction. While not every possible case was developed here, they do show recommended throat widths for passenger car and truck usages, relationship between the island with curbed and uncurbed highways, three curve radius to maximize the turning radius while minimizing overall width of the drive approach, and islands sized to balance their purpose of discouraging prohibited movements with minimizing space requirements.

The diagrams are displayed in *Appendix B* of this document as well as in the latest version of the ODOT *State Highway Access Management Manual*. *Figure 1a*, entitled "Passenger Car Designs" is intended for use in restricted right-of-way conditions or when truck usage is unlikely or prohibited. *Figure 1b*, entitled "Designs for Channelizing Islands - Single Unit Truck Designs" is intended for normal or general usage where occasional trucks may enter or exit. *Figure 1c*, entitled "Design for Channelizing Island - WB-62 Truck Design" is intended for predominant or exclusive truck use. *Figure 1d*, entitled "Typical Islands with Permitted Left Turns" is intended to show how the islands can be modified to enable left turn movements from exiting vehicles. The islands can similarly be modified to permit left-in movements using the same principle.

- Channelizing Islands shall be considered on arterials without a median where left turns are being restricted and on one-way streets to discourage wrong-way turns.
- Channelizing Islands shall be at least 50 sq. feet and preferably 100 sq. feet.
- All Channelizing Islands shall be offset at least 4 feet from the edge of the traveled lane to the face of curb or the width of the paved curbed shoulder whichever is greater on high-speed roadways or where the approach roadway is uncurbed.

1.3.6 Pavement Marking and Signing

Driveway approaches to public roadways shall have signing and pavement markings consistent with the latest versions of *OMUTCD* and ODOT standards.

TRAFFIC IMPACT STUDY (TIS) AND ACCESS REQUEST STUDY (ARS) POLICY

To protect the integrity of the roadway system within the City of Shelby, 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 anticipated traffic impacts by the proposed use or change of use and to further minimize the impacts to the roadways. 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 new 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.

2.1 Traffic Impact Study (TIS) Requirements

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 most current edition 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 upon approval by the City. A licensed professional engineer, specializing in transportation planning, with demonstrated experience in traffic, transportation and/or transportation planning, shall prepare the TIS.

The TIS shall include the evaluation of capacity conditions and roadway operations under current traffic conditions both "without site" and "with site" traffic for a full build out opening day and a 20-year horizon. This shall be done for both the AM & PM peak hour conditions (unless otherwise indicated by the City). The difference in operations of the opening day "without site" and "with site" shall be considered the site impacts to mitigate for improvements. The 20-year horizon traffic in the "with site" conditions shall be used to evaluate turn lane warrants (see *Appendix A*). Roadway improvements shall be developed to address the site impacts such that operations reflect the "without site" conditions. Traffic projections of the background traffic to the 20-year horizon would require the use of an annual growth rate, which should be approved by the City before calculations are conducted.

Operational impacts or lane warrants being met because of background traffic increases may not be required to be mitigated unless such is a result of a proposed development.

The traffic study requires evaluation of lane warrants as provided in *Appendix A*. The permitted access will be based on the Access Category of the roadway as discussed in *Section 1.2*. Signal warrant(s) shall be conducted as provided in *Section 3.1*.

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. Generally, the evaluation of all site accesses to the public roadways and evaluation of the next major intersections in each direction from all proposed access is needed. However, the City may require additional study area if the proposed access is in a high crash area or if traffic operations are a concern. A preliminary site plan of the proposed development and the proposed access location(s) that displays distances between existing and proposed intersections and drives (center to center) is required. Existing drives on the opposite side of the roadway should also be shown on the site plan for the entire length of the roadway frontage that the proposed development involves. The proposed square footage of the development and anticipated land uses (including outlets) should also be provided on the site plan.

2.2 Access Request Study (ARS) Requirements

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 by a registered professional engineer specializing in transportation/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 1.3* herein.
- Permitted Drives and Directional Restrictions as provided in *Section 1.2* herein.
- Drive Spacing and Turn Lane Warrants consistent with the guidelines of *Table 1.3* and *Appendix A* respectively.

2.3 Traffic Data and Count Requirements

Background traffic data can be developed from the use of existing sources if available, however if the data is more than 3 years old, new traffic counts will be required. Traffic counts are preferred to be collected on Tuesday, Wednesday, or Thursday and during weeks in which there is no holiday. Traffic counts shall not be taken on days when school days have been canceled. Both AM and PM peak hour counts are required (unless otherwise approved by the City) and shall consist of counts that are a minimum of 1.5 hours and conducted during the timeframe needed to capture the corresponding peak hour. The count time periods can be determined from hourly data from a 24-hour count. The count time periods should be confirmed with the City prior to conducting the counts.

2.4 Trip Generation Guidelines

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. Predictions of trips for many land uses are included in this publication such as residential (including multi-family and single family), commercial (retail, restaurants, and service industries), industrial, and businesses, among others. The objective of trip generation, or the prediction of site generated traffic, is to determine the anticipated traffic from a development or several 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 because 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, shall 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 the latest version of *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.

The most current version of ITE *Trip Generation* shall be used in determining site generated traffic. If a proposed development does not correspond well to available ITE land uses, then the developer can utilize trip generation from a similar actual site if available. This should be confirmed with the City first, before doing so.

3.0 TRAFFIC SIGNAL POLICY, SIGNAL DESIGN PREFERENCES, AND ADA CURB RAMPS

3.1 Traffic Signal Policy

The City of Shelby traffic signal policies are detailed in this section. These policies were developed to provide a consistent policy on the design, installation, and maintenance of traffic signals for both public roadway signals and private access signals.

3.1.1 Public Traffic Signals

Public traffic signals are defined as those locations where all approaches to the signalized intersection are public roadways. The installation of a traffic signal shall be consistent with the latest requirements of the *Ohio Manual of Uniform Traffic Control Devices (OMUTCD)*. The *OMUTCD* provides the minimum requirements for the installation of a traffic signal, and an intersection must meet at least one warrant to be considered for a signal installation. However, satisfying one or more of the traffic signals warrants does not necessitate the installation of a traffic signal. The installation of a traffic signal must consider additional elements including signal spacing, necessary traffic lanes and the progression of traffic. In urban areas, traffic signals should be spaced at the required spacings as indicated in *Tables 1.4, 1.5, and 1.6* depending on the roadway category. This spacing is needed to allow for adequate lane development and progression of traffic on the roadways.

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, as they will typically be excluded from any roadway or signal upgrade projects involving these types of funds and will be 100% the responsibility of the City.

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 for such specialized purposes.

3.1.2 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 signal warrant study, performed by a professional engineer, consistent with the *OMUTCD*. If the project involves a proposed development, traffic projections can be utilized, consistent with the latest version of the Institute of Transportation Engineers' (ITE) *Trip Generation*, to determine if opening day traffic would meet at least one signal warrant.

A signal may be denied if:

- 3.1.2.1 The results of the warrant analyses appear to have marginal traffic, either existing or projected.
- 3.1.2.2 The proposed signal location would create less than desired intersection signal spacing and/or result in inadequate distances for necessary turn lanes.
- 3.1.2.3 The proposed signal location would create poor progression of traffic on the public roadway.
- 3.1.2.4 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 or its contractor, shall be at the property owner's expense.

Maintenance

The City will provide routine maintenance of the signal. This includes replacement of lamps (or LED's), 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, detectors, detector units, controllers, wire, vehicular signal heads, pedestrian signal heads, poles, underground utilities, and any other signal equipment necessary for operation of 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. Detection shall be to City preferences.
4. *Coordination*
A means of signal coordination and communications between adjacent signals must be provided. This may require hardwire interconnect or radio communications. These shall be to City preferences.
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 symbolic displays, countdown feature and to City preferences.
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. Private drive approaches shall be designed to City standards as outlined in *Section 1.3* and detailed in various figures provided in *Appendix B*.
7. *Equipment Specifications*
Equipment must conform to required City specifications or preferences and ODOT standards.
8. *Easements*
Easements (or dedicated right-of-way) must be provided for signal equipment that is located on private property. This typically involves vehicle detectors, but also may involve conduit, pull boxes, 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, engineering design of signal plans, and construction shall be the responsibility of the owner. The City (or its contractor) will perform construction inspection, at the owner's expense.
10. *Shared Drives*
Any adjacent properties that could 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 preferences and be consistent with the latest version of 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 standards and guidelines of the *OMUTCD* and ODOT. Pavement marking material shall meet ODOT 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.

3.2 Traffic Signal Design Preferences

The City desires to make all signal installations uniform in types of equipment/technology and in appearance. To accomplish this, the City has determined that all future signal installations and signal upgrades shall consist of the preferences listed in *Table 3.1*.

Table 3.1 City of Shelby Traffic Signal Design Preferences	
Poles & Equipment	Controller
• Mast Arm Pole Design • Galvanized Steel Poles <i>-colored blue</i> • Black Polycarbonate (12") LED Signal Heads • Video or Radar Detection • Symbolic Pedestrian LED Signal Heads with Countdown Feature • ADA Compliant Push Buttons • Street Name Signs	Confirm with the City's Service Department on the current preference on signal controllers to be used.

3.3 ADA Curb Ramps

The City of Shelby recognizes the need to comply with the Americans with Disabilities Act (ADA) in providing ADA compliant curb ramps. Given this, the City will require all new construction projects to provide ADA compliant curb ramps for appropriate accessibility. The City will further require intersections being upgraded with new curbing to install ADA compliant curb ramps as part of the project. These measures will assist in providing updated facilities and ramps that meet current ADA standards.

4.0 APPEALS AND VARIANCES

An Appeal to an access decision may be made to the City of Shelby Board of Zoning Appeals. See Chapter 1264 of the Codified Ordinances for procedures and policies. The notice of appeal shall specify the grounds thereof. If deemed necessary by the Board, the Board can select a traffic-engineering firm to make an independent review of the applicant's traffic study and make recommendations to the Board at the expense of the entity making the appeal. An appeal must be filed within thirty (30) days of the date of an access decision.

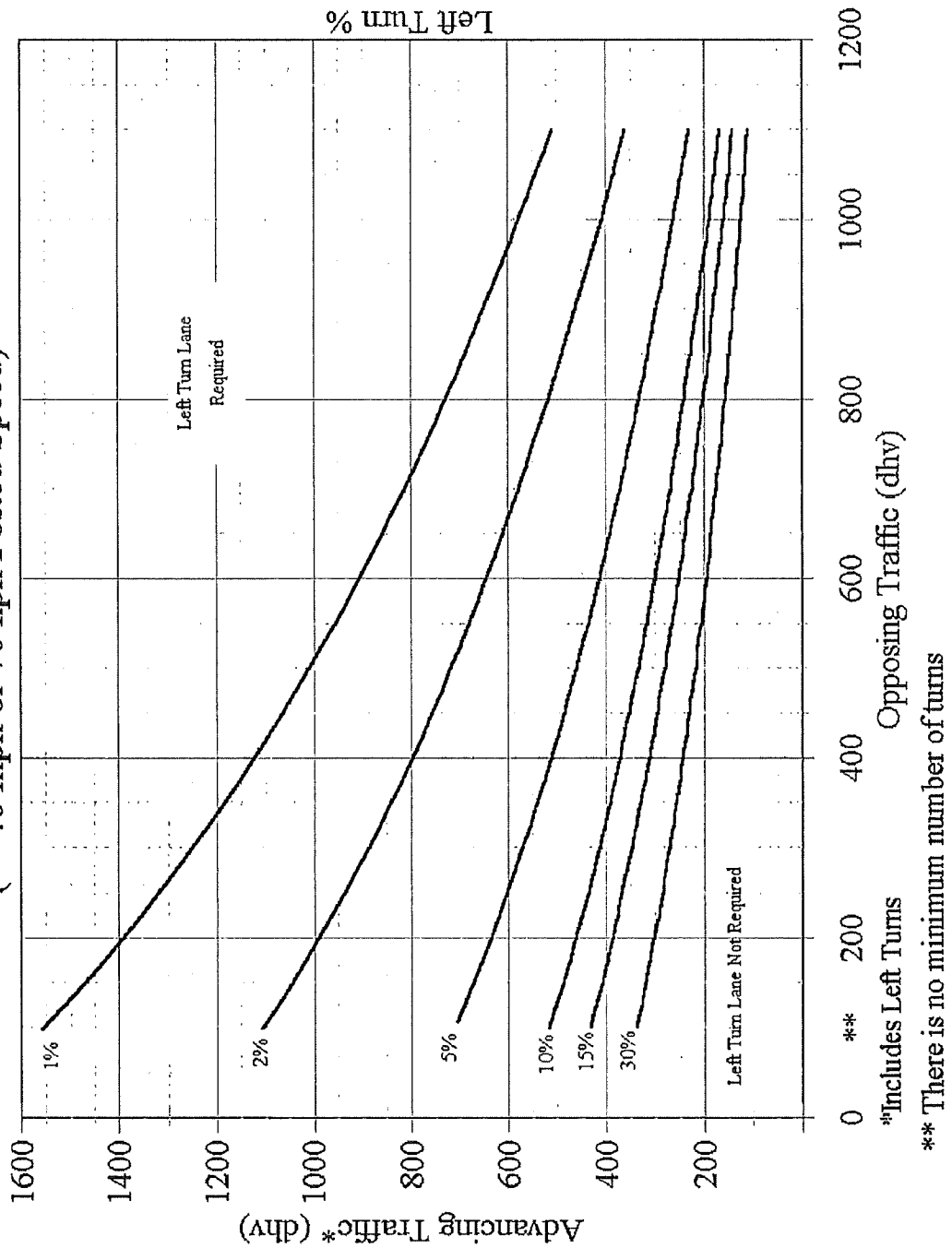
APPENDIX A
TURN LANE WARRANTS

2-LANE LEFT TURN LANE WARRANT (LOW SPEED)

401-5a

REFERENCE SECTION
401.6.1

2-Lane Highway Left Turn Lane Warrant (= $\leq$ 40 mph or 70 kph Posted Speed)



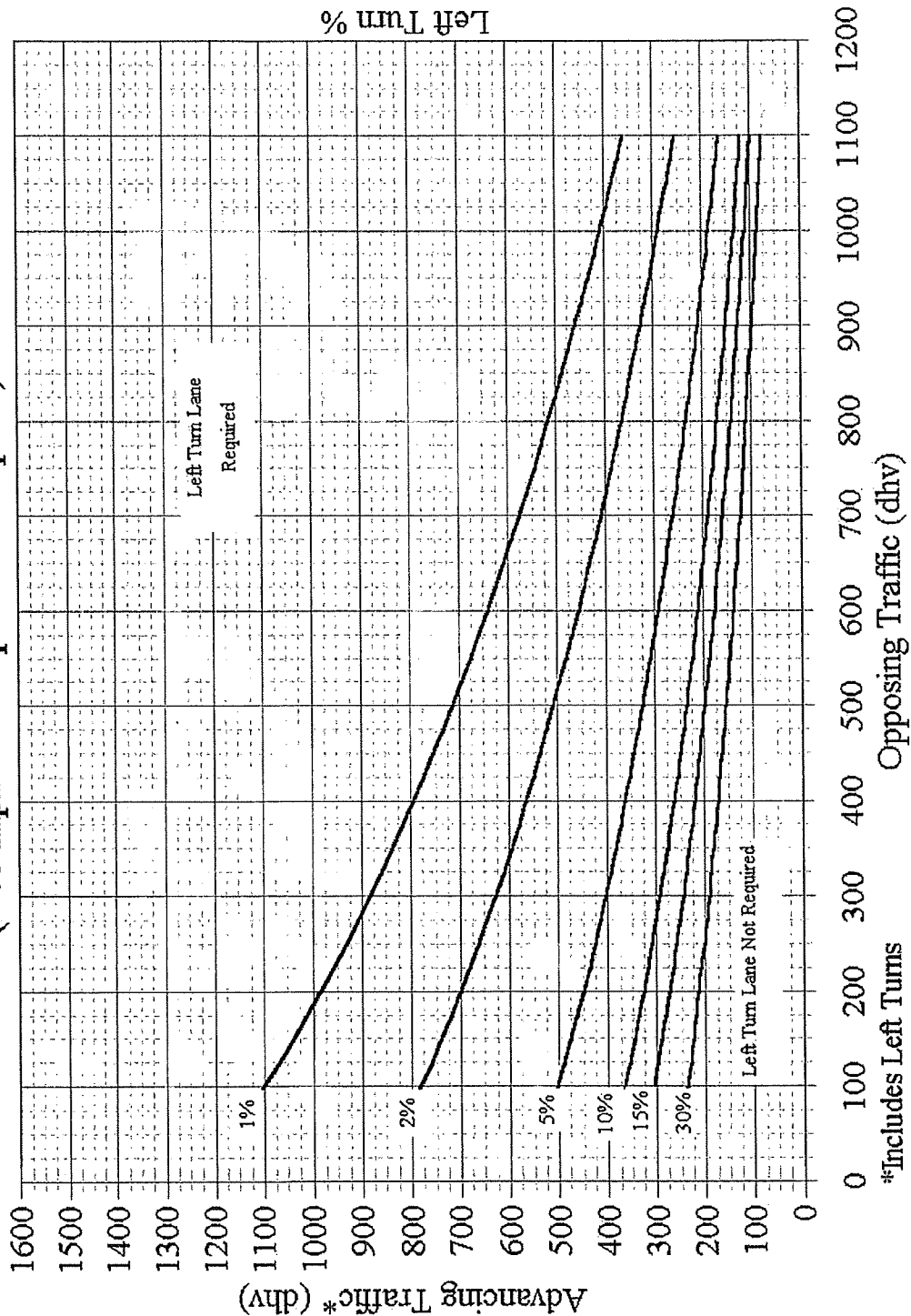
October 2004

2-LANE LEFT TURN LANE WARRANT (HIGH SPEED)

401-5b

REFERENCE SECTION
401.6.1

2-Lane Highway Left Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



*Includes Left Turns

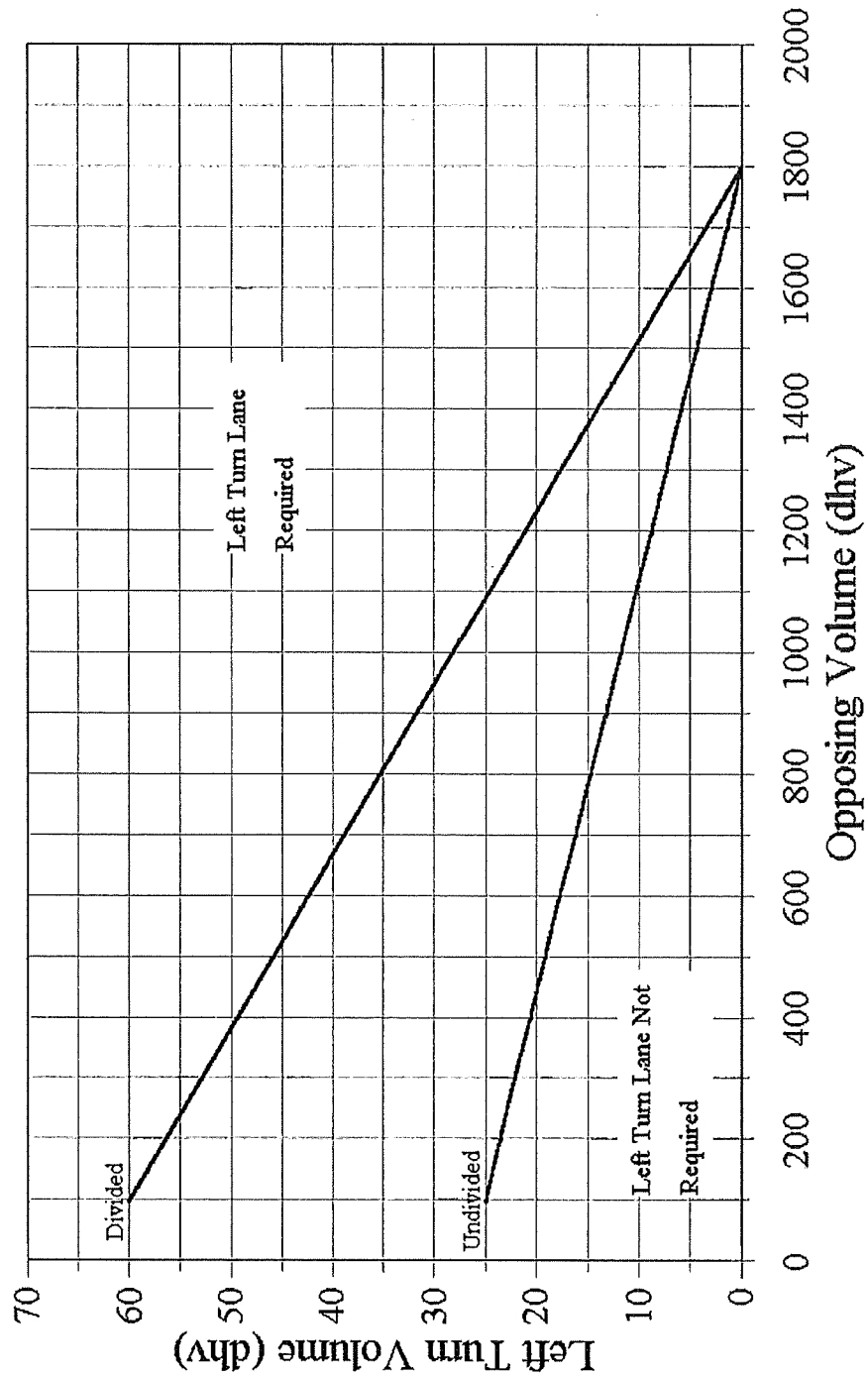
October 2004

4-LANE LEFT TURN LANE WARRANT

401-5c

REFERENCE SECTION
401.6.1

4-Lane Highway Left Turn Lane Warrant



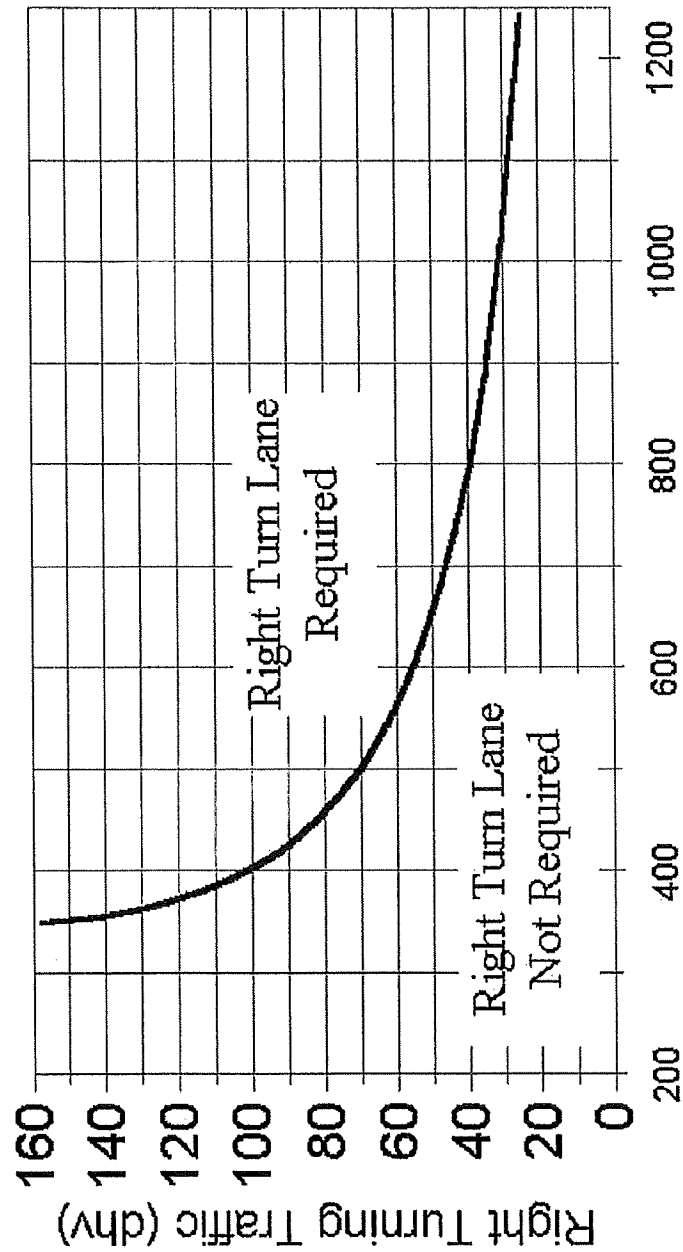
October 2004

2-LANE RIGHT TURN LANE WARRANT (LOW SPEED)

401-6a

REFERENCE SECTION
401.6.3

2-Lane Highway Right Turn Lane Warrant =< 40 mph or 70 kph Posted Speed



Advancing Traffic* (dhv)

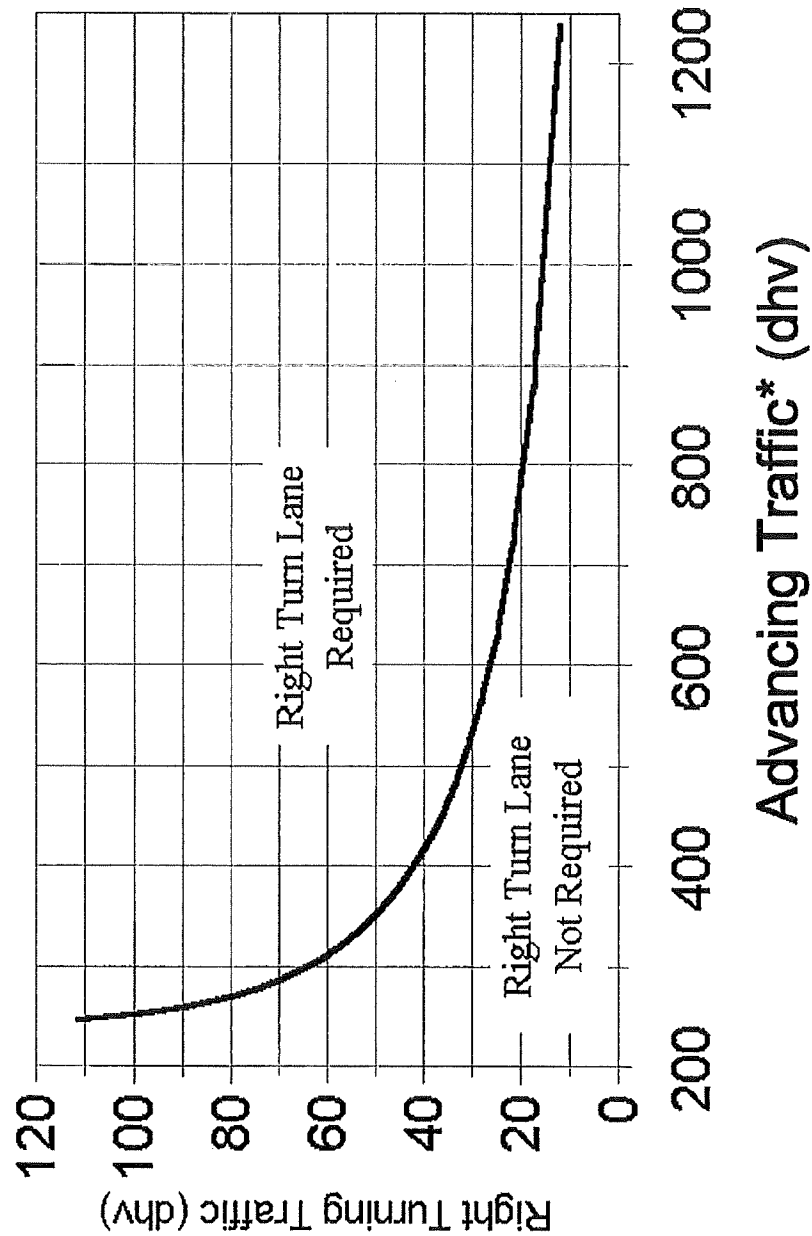
*Includes Right Turns

2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)

401-6b

REFERENCE SECTION
401.6.3

2-Lane Highway Right Turn Lane Warrant > 40 mph or 70 kph Posted Speed



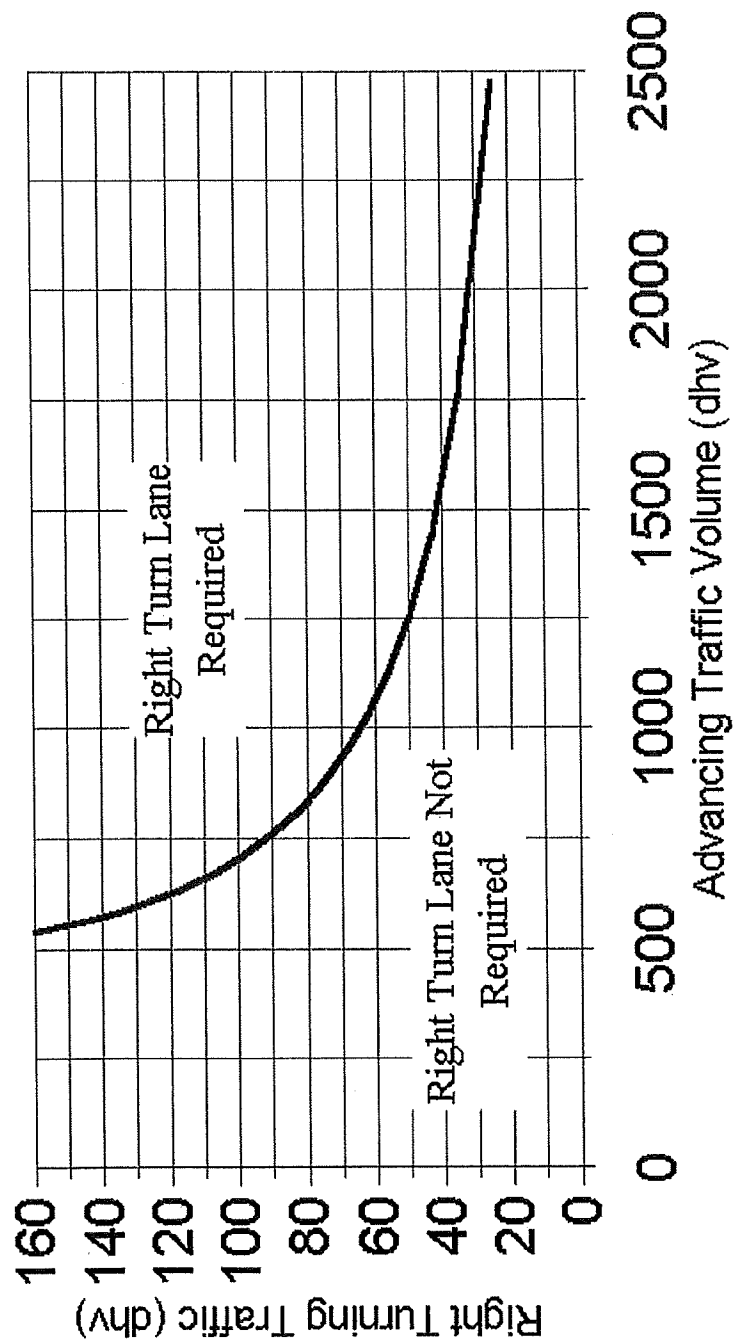
*Includes Right Turns

4-LANE RIGHT TURN LANE WARRANT (LOW SPEED)

401-6c

REFERENCE SECTION
401.6.3

4 Lane Highway Right Turn Lane Warrant (= $\leq$ 40 mph or 70 kph Posted Speed)

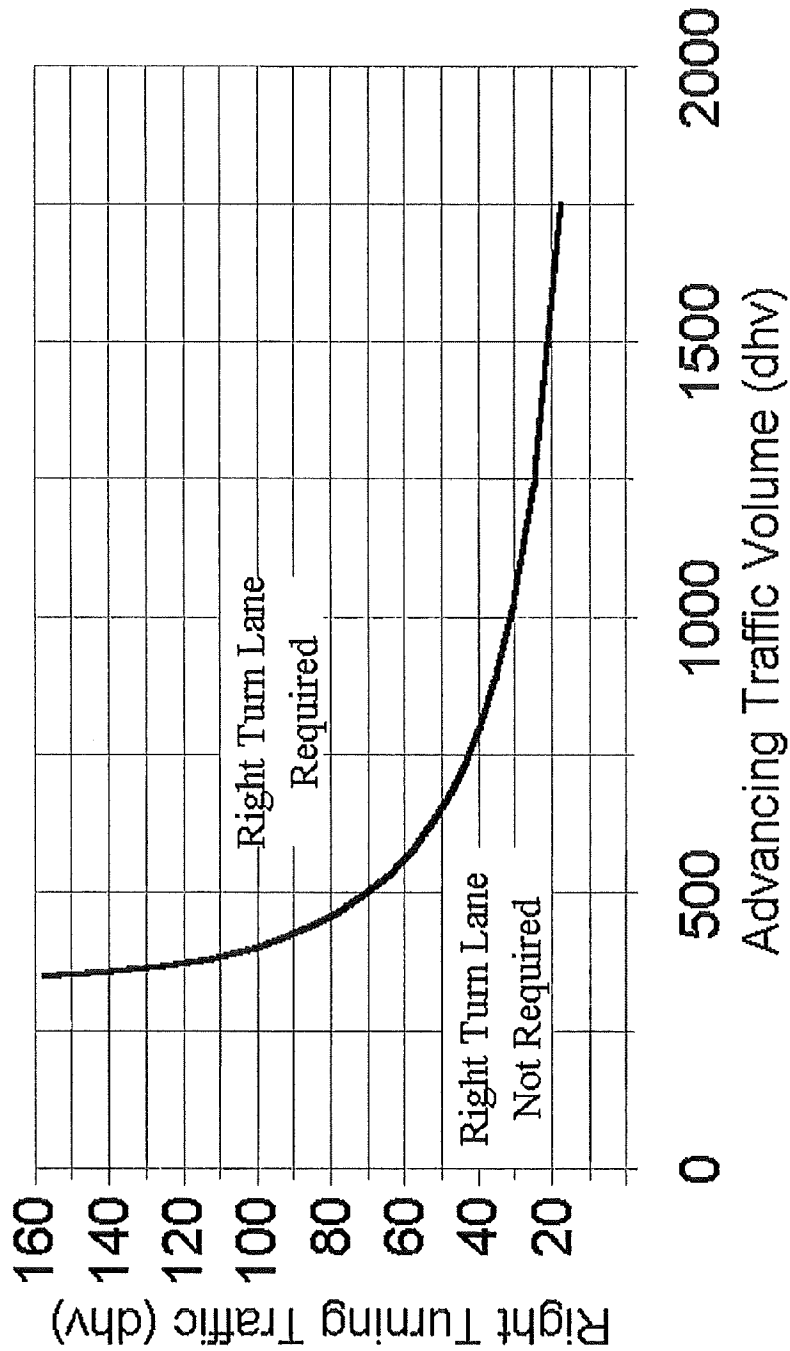


4-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)

401-6d

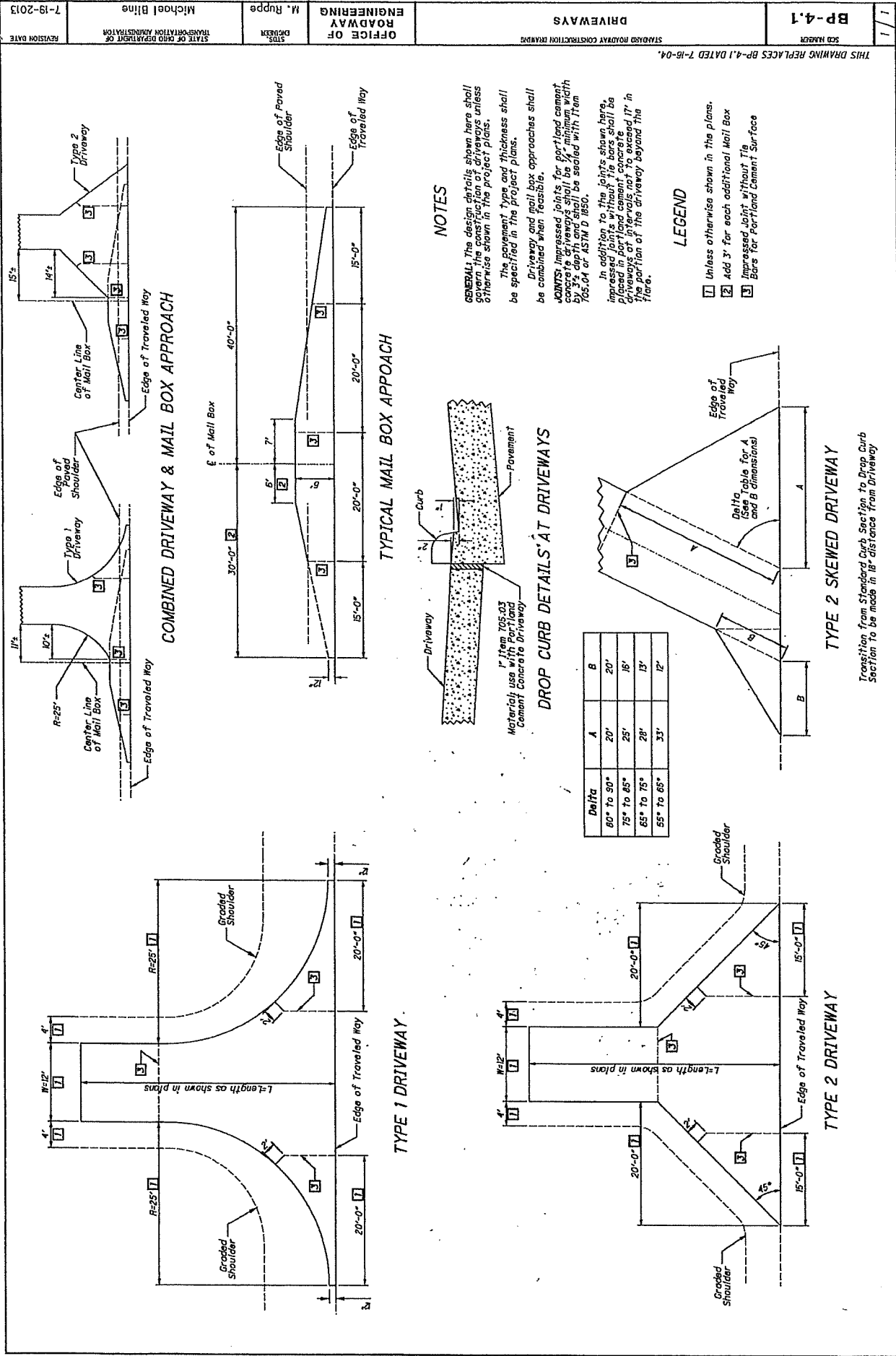
REFERENCE SECTION
401.6.3

4 Lane Highway Right Turn Lane Warrant (>40 mph or 70 kph Posted Speed)



APPENDIX B

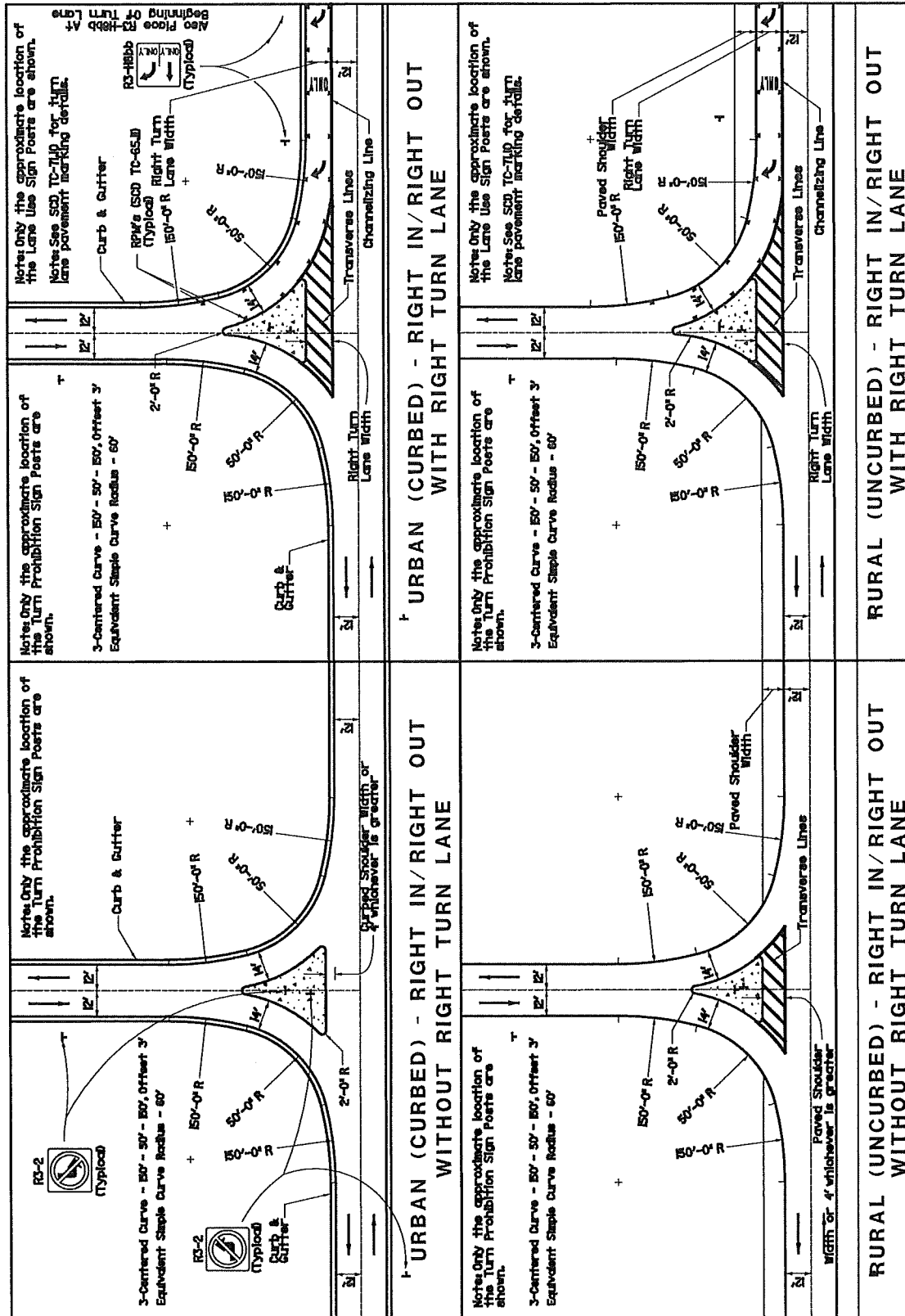
REFERENCES



CHANNELIZING ISLANDS PASSENGER CAR DESIGNS

401-13a

REFERENCE SECTION
401.7.2

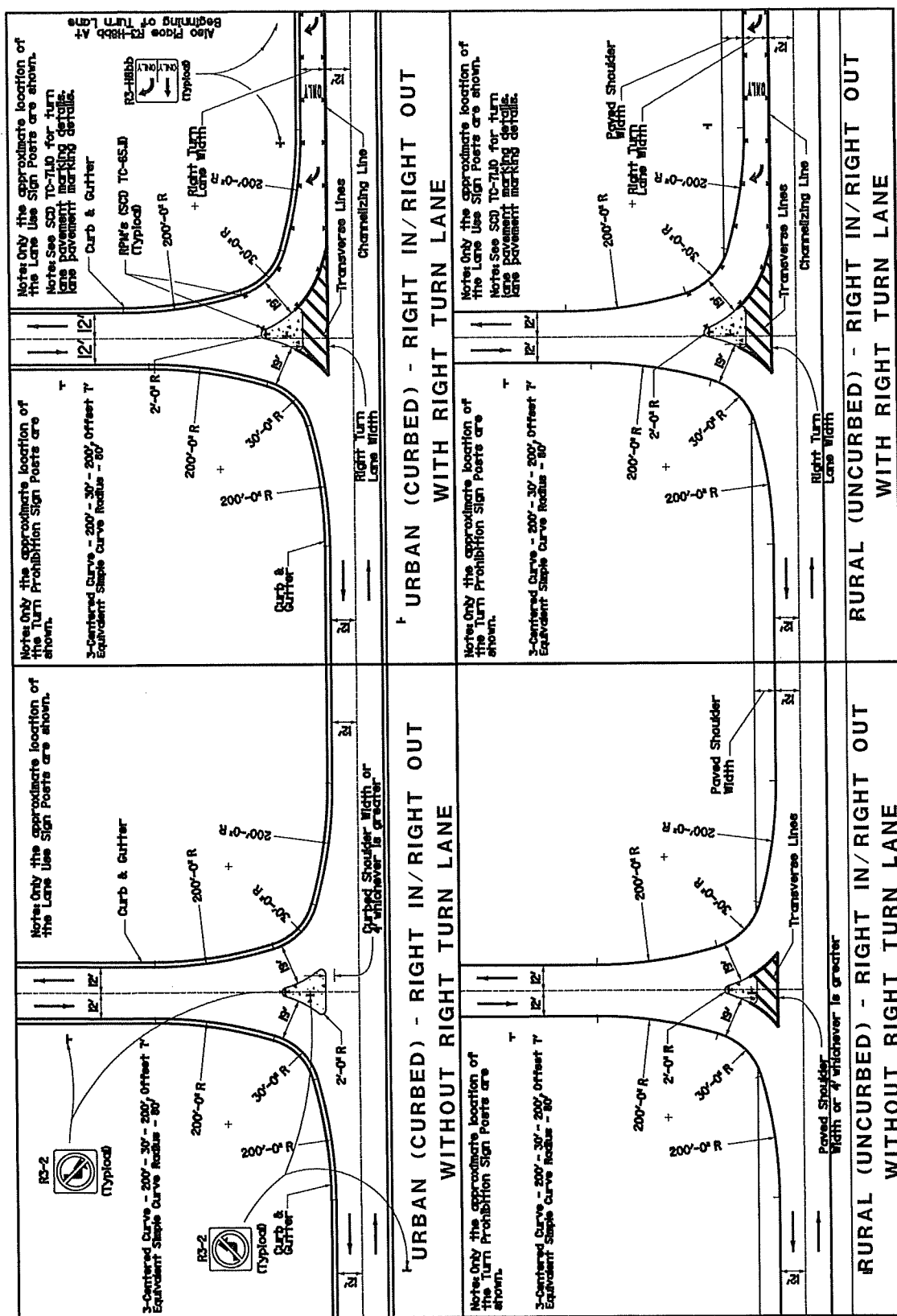


CHANNELIZING ISLANDS SU TRUCK DESIGNS

401-13b

REFERENCE SECTION

401.7.2

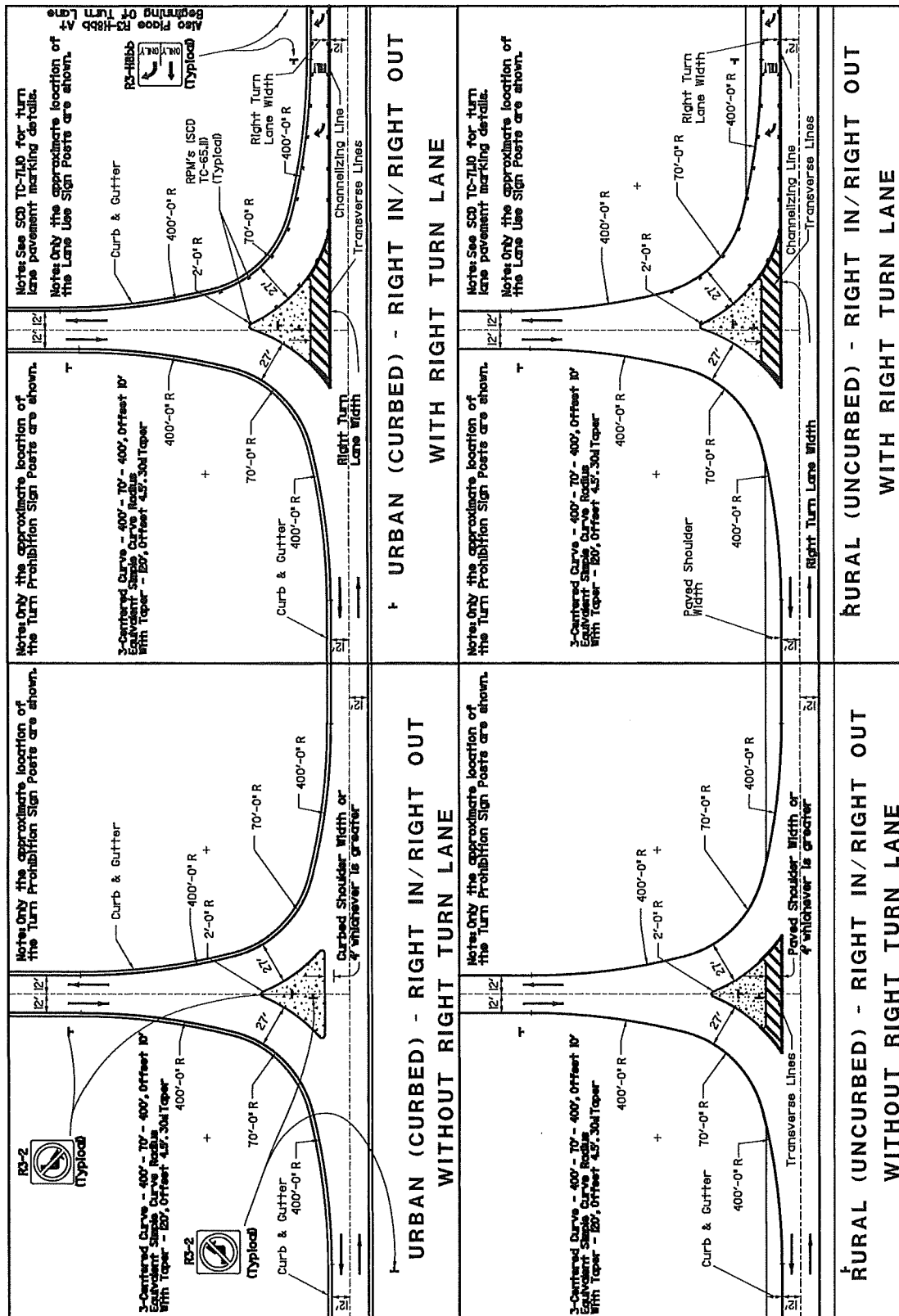


CHANNELIZING ISLANDS WB-62 TRUCK DESIGNS

401-13c

REFERENCE SECTION

401.7.2



CHANNELIZING ISLANDS TYPICAL ISLANDS WITH PERMITTED LEFT TURNS

401-13d

REFERENCE SECTION

401.7.2

