

# **TECHNICAL DESIGN STANDARDS**

## **Pickaway County, Ohio**

**UPDATED 04/18**

## PREFACE

It is the intent of these requirements to provide a standard for subdivisions for the purpose of protecting the public health, safety, comfort, convenience and general welfare; And regulating the development of subdivided areas; Promoting the proper arrangement of streets and layout of lots; Providing for adequate and convenient provision of open spaces, utilities, water, drainage, sewer, and other sanitary facilities.

It is understood that all situations cannot be covered by these requirements and when those situations arise they will be handled as special cases interpreted by the County Engineer's Office.

These Technical Design Standards shall serve as an engineering supplement to the Subdivision Regulations of Pickaway County, Ohio. The County Engineer shall revise the Technical Design Standards from time to time as needed.

# TABLE OF CONTENTS

## ARTICLE 1 STREET DESIGN STANDARDS

|   |   |
|---|---|
| SECTION 100 PURPOSE .....                                 | 1 |
| SECTION 101 STREET DESIGN .....                           | 1 |
| A. Subdivision Street Classifications.....                | 1 |
| B. Traffic Expansion Factor .....                         | 1 |
| C. Vehicle Demand Factor .....                            | 1 |
| D. Terrain Classification.....                            | 2 |
| E. Design Speeds .....                                    | 2 |
| F. Vertical Alignment .....                               | 2 |
| G. Horizontal Alignment .....                             | 3 |
| H. Pavement Width.....                                    | 4 |
| I. Right-of-way Width .....                               | 4 |
| J. Street Curb and Gutters .....                          | 4 |
| K. County Standard Drawings .....                         | 5 |
| L. Street Access Restriction .....                        | 5 |
| SECTION 102 INTERSECTION DESIGN .....                     | 5 |
| A. Angle of Intersection.....                             | 5 |
| B. Number of Allowable Intersecting Streets .....         | 5 |
| C. Offset Intersections(Spacing) .....                    | 6 |
| D. Minimum Curb Radius.....                               | 6 |
| SECTION 103 DESIGN STANDARDS FOR CUL-DE-SAC STREETS ..... | 7 |
| SECTION 104 DRIVEWAYS .....                               | 7 |
| A. General .....  | 7 |
| B. Driveway Dimensions.....                               | 8 |
| C. Driveway Profile .....                                 | 8 |
| D. Driveway Culverts .....                                | 9 |
| E. Other .....  | 9 |

## ARTICLE 2 PAVEMENT DESIGN STANDARDS

|  |    |
|--|----|
| SECTION 200 GENERAL INFORMATION.....   | 11 |
| A. Current Standards .....             | 11 |
| B. Pavement Type .....                 | 11 |
| SECTION 201 FLEXIBLE PAVEMENTS .....   | 12 |
| SECTION 202 RIGID PAVEMENTS.....       | 13 |
| SECTION 203 SUBGRADE DRAINAGE .....    | 13 |
| SECTION 204 SUBGRADE PREPARATION ..... | 13 |

## ARTICLE 3 DRAINAGE DESIGN STANDARDS

|  |    |
|--|----|
| SECTION 300 PURPOSE .....                  | 14 |
| SECTION 301 ADEQUATE DRAINAGE OUTLET ..... | 14 |
| SECTION 302 DRAINAGE EASEMENT .....        | 14 |
| SECTION 303 GENERAL DESIGN CRITERIA .....  | 15 |

## ARTICLE 4 ROADSIDE DESIGN STANDARDS

|   |    |
|---|----|
| SECTION 401 LANDSCAPE IMPROVEMENTS .....      | 18 |
| SECTION 402 STREET LIGHTING IMPROVEMENTS..... | 20 |



## **ARTICLE 1 STREET DESIGN STANDARDS**

### **SECTION 100 PURPOSE**

- A. These design standards shall control the manner in which streets and other elements of subdivision improvements are designed and arranged within the subdivision. These standards shall be considered minimum guidelines to insure the safety and welfare of the public.
- B. The use of standards higher than those, which are required herein, is recommended. In all cases, every effort should be made to use the best possible standards that are consistent with the terrain and type of development proposed. The County Engineer may waive or reduce these requirements based on sound engineering judgement. However, these standards shall not be waived or reduced without prior approval of the County Engineer.

### **SECTION 101 STREET DESIGN**

#### **A. SUBDIVISION STREET CLASSIFICATIONS**

These classifications are the designations of streets and highways according to the function and volume of traffic, measured as Average Daily Traffic (ADT) on each street.

- 1. **Collector Streets** have the primary purpose of intercepting traffic from intersecting local streets and carrying this traffic to higher category roads. A secondary function is to provide access to abutting land uses.
- 2. **Local Streets** represent the lowest category. Their primary function is to provide access to abutting land use.

#### **B. TRAFFIC EXPANSION FACTOR**

Except for local and collector streets, the design traffic count on all streets shall be expanded for a twenty (20) year growth period using a minimum factor of 2.5 percent per year for rural areas and a higher percentage per year shall be used within any planning area as determined by the County Engineer.

#### **C. VEHICLE DEMAND FACTOR**

An A.D.T. demand for street design shall be taken to be ten (10) vehicles per dwelling unit per day. Additional vehicles due to other related factors must also be taken into account when determining vehicle demands. A minimum A.D.T. of two hundred (200) vehicles shall be used for the design.

**D. TERRAIN CLASSIFICATION**

The definitions of terrain classifications within the county are as follows:

1. **Level:** grade range of 0 to 5 percent
2. **Rolling:** grade range of 5 to 15 percent
3. **Hilly:** grade of over 15 percent

**E. DESIGN SPEEDS**

The design speeds are as shown.

| <b>Design Speed</b>          |                     |
|------------------------------|---------------------|
| <b>Street Classification</b> | <b>Design Speed</b> |
| Local Street                 | 25 -30 mph          |
| Collector Street             | 35 mph              |
| All Other Roads              | 55 mph              |

**F. VERTICAL ALIGNMENT**

Vertical Alignment shall be designed in conformance with the **ODOT Location and Design Manual, Volume One, Roadway Design** (latest edition) and the standards listed below, whichever are more restrictive.

- a. A minimum stopping sight distance of two hundred (200) feet or as defined by the road classification.

| <b>Stopping Sight Distance</b> |                 |
|--------------------------------|-----------------|
| <b>Street Classification</b>   | <b>Distance</b> |
| Local Street                   | 200 feet        |
| Collector Street               | 250 feet        |
| All Other Roads                | 495 feet        |

- b. No street grade shall be less than 0.24 percent and in no case shall the grade on a collector street be more than three (3) percent within one hundred (100) feet of an intersection. Lesser classifications of streets shall in no case have a street grade in excess of 6 percent within one hundred (100) feet of an intersection.

| <b>Maximum Street Grades<br/>For Local and Collector Streets</b> |                      |
|--|----------------------|
| <b>Terrain<br/>Classification</b>                                | <b>Street Grades</b> |
| Level  | 6%                   |
| Rolling  | 7%                   |
| Hilly  | 9%                   |

**G. HORIZONTAL ALIGNMENT**

Horizontal Alignment shall be designed in conformance with the **ODOT Location and Design Manual, Volume One, Roadway Design** (latest edition) and the standards listed below, whichever are more restrictive.

Where it is possible, tangent distance of a least one hundred (100) feet should be introduced between reverse curves. The radius of curvature on the centerline of streets shall not be less than the following:

| <b>Minimum Radius of Curvature</b> |  |
|------------------------------------|--|
| <b>Street Classification</b>       | <b>Radius of Curvature</b>                   |
| Local Street                       | 150 feet                                     |
| Collector Street                   | 300 feet                                     |
| All Other Roads                    | Based on the ODOT Location and Design Manual |

Minimum horizontal visibility, measured on the centerline, shall be:

| <b>Minimum Horizontal Visibility</b> |  |
|--------------------------------------|--|
| <b>Street Classification</b>         | <b>Horizontal Visibility</b>                 |
| Local Street                         | 150 feet                                     |
| Collector Street                     | 300 feet                                     |
| All Other Roads                      | Based on the ODOT Location and Design Manual |

**H. PAVEMENT WIDTH**

The pavement widths for each type of street, and type of use, are as shown. These widths shall be considered as the minimum widths allowed, and may be increased as the County Engineer deems necessary, in order to conform to the traffic and parking requirements of the area. Pavement width on curb and gutter type streets is measured from face to face of gutter.

| <b>Minimum Pavement Width</b> |              |                  |
|-------------------------------|--------------|------------------|
| <b>Type</b>                   | <b>Local</b> | <b>Collector</b> |
| Without Curb and Gutter       | 20 feet      | 24 feet          |
| With Curb and Gutter          | 28 feet      | 36 feet          |

**I. RIGHT-OF-WAY WIDTH**

The minimum right-of-way width for all public streets is 60 feet. The minimum right-of-way width for all public roads is 70 feet. This minimum width shall be increased where and to the extent the County Engineer deems it necessary to conform to topographical, construction and drainage features. In addition to the Right-of-way width, there shall be a minimum of 20 feet public utility and drainage easement along both sides of the Right-of-way.

**J. STREET CURB AND GUTTERS AND SIDEWALKS**

The requirement of curbs and gutters will vary according to the character of the area and density of development.

Curbs and gutters shall be required within the following area:

- a. In areas where the predominate lot width is one hundred (100) feet or less.
- b. In areas where curbs exist on abutting properties, their extension shall be required throughout the proposed subdivision.
- c. In commercial developments, or where other similar intensive urban uses exist or are anticipated.

Curb and gutters may be required within the following areas:

- a. In areas of high residential density.
- b. In areas near any city or village as required by municipal regulations.
- c. In areas of notable flash flooding, heavy rain runoff, level topography, hilly topography, where gutters or other water sources are permitted to outlet into Storm Water facilities, or particular drainage problems.



Curbs and combined curbs and gutters shall be constructed in conformance with the current "Construction and Materials Specifications" of the State of Ohio, Department of Transportation and the County Standard Drawings.

Where sidewalks are required, they shall be a minimum of four (4) feet wide and constructed on at least four (4) inches of ODOT CMS Item 304. Sidewalks shall be constructed of a minimum of ODOT CMS Item 608 concrete four (4) inches thick or as determined by the County Engineer. Sidewalks shall be located one (1) foot inside the right of way line.

Curb ramps meeting the current requirements of the American Disability Act are required for all subdivisions having sidewalks. Curb ramps shall be designed and constructed per current ADA standards and current ODOT/City of Columbus standard drawings/requirements or as approved by the County Engineer. Curb ramps are required to be constructed at the same time as the curb and gutter for the subdivision. Curb ramps will generally be constructed within the limits of the crosswalk markings.

**K. COUNTY STANDARD DRAWINGS**

Refer to the County Standard Drawings for other design information.

**L. STREET ACCESS RESTRICTION**

When required by the County Engineer and based on safety considerations and the need to maintain traffic capacity, the direct access to lots along collector streets and other roads may be prohibited or managed.

**SECTION 102 INTERSECTION DESIGN**

Intersections shall be designed in conformance with the **ODOT Location and Design Manual, Volume One, Roadway Design** (latest edition), Access Management Regulations, Traffic Impact Study results, and the standards listed below, whichever are more restrictive.

**A. ANGLE OF INTERSECTION**

Streets shall be laid out to intersect as nearly as possible at right angles and no street shall intersect any other street at an angle of less than eighty-five (85) degrees. Streets shall remain at such an angle of intersection for at least 100 feet beyond the intersection.

**B. NUMBER OF ALLOWABLE INTERSECTING STREETS**

Three-way intersections are encouraged and in no event shall an intersection greater than four way be approved.

**C. OFFSET INTERSECTIONS (SPACING)**

Intersection spacing of less than five hundred (500) feet should be avoided whenever possible.

| <b>Minimum Centerline Offset of Adjacent Intersection</b> |                               |                         |                    |
|---|-------------------------------|-------------------------|--------------------|
| <b>Connection Type</b>                                    | <b>Local Roads or Streets</b> | <b>Collector Street</b> | <b>Other Roads</b> |
| Local Street to   | 500 feet                      | 500 feet                | 1,320 feet         |
| Collector Street to                                       | -                             | 500 feet                | 1,320 feet         |
| Other Roads to  | -                             | -                       | 2,640 feet         |

**D. MINIMUM CURB RADIUS**

The minimum pavement radius at intersections shall be 35 feet; the minimum right of way radius shall be 35 feet. The minimum curb radius shall be as follows:

| <b>Minimum Curb Radius</b> |              |                         |                    |
|----------------------------|--------------|-------------------------|--------------------|
| <b>Connection Type</b>     | <b>Local</b> | <b>Collector Street</b> | <b>Other Roads</b> |
| Local Street to            | 35 feet      | 35 feet                 | 50 feet            |
| Collector Street to        | 35 feet      | 50 feet                 | 50 feet            |
| Other Roads to             | 50 feet      | 50 feet                 | 50 feet            |

**SECTION 103 DESIGN STANDARDS FOR CUL-DE-SAC STREETS**

The design and improvements standards contained herein are minimum for cul-de-sac streets in residential subdivisions. All such streets shall be designed and constructed in accordance with standards as specified in the following table. Cul-de-sacs are required whenever a street is intended to be permanently dead-ended. Cul-de-sacs shall be a minimum of 24 feet in width for roads without Curb and Gutter and 28 feet in width, from face to face of gutter, for roads with Curb and Gutter. Emergency vehicle and school bus requirements and turning radius for the intended user shall also be considered for the radius and possible allowance for islands.

| <b>Street Design Standards for Cul-De-Sac Streets</b> |                  |
|---|------------------|
| Maximum Cul-De-Sac Length                             | 1000 Feet        |
| Minimum Radius of Street Right of Way                 | 80 feet uncurbed |
|   | 60 feet curbed   |
| Minimum Radius of Pavement                            | 50 feet          |

**SECTION 104 DRIVEWAYS**

**A. GENERAL**

1. A common access driveway may be used to provide common access to no more than five lots. A legally binding agreement shall be required to provide for the long term maintenance of the common access driveway. Any driveway serving more than five lots shall be considered a street and shall be designed and constructed according to these regulations.
2. A driveway permit shall be obtained from the office of the county engineer, township trustees, or the Ohio Department of Transportation.
3. Corner lots shall have their drives located on the lower classification roads and as approved by the County Engineer.
4. The purpose of this section is to provide for the proper placement and construction of private entrances onto public road rights of way.
5. The Access Management Regulations for Pickaway County (effective 10-23-06) are incorporated herein by reference.
6. Driveway design is dependent upon the type of vehicles that will regularly use the driveway as well as the volume of traffic. Restrictions on turn movements may also affect the design.
7. Driveways shall be located consistent with the Access Management Regulations.

8. Driveway permits are required along county and township roads in accordance with the Access Management Regulations.
9. Driveway permits are required along state highways in accordance with ODOT regulations.
10. Two-way driveways shall intersect the public road at angles of no less than 80°. One-way driveways or right in/right out driveways shall intersect at angles of no less than 45°.
11. For any driveway with a gate, the gate shall be located such that the gate is at least 100 feet from the nearest pavement edge of the public road. No gate shall be located within the public road right-of-way.
12. Driveways that enter a public road at traffic signals shall have the number of lanes determined by a traffic impact study analysis.
13. Common access driveways are permitted to provide common access to no more than 5 lots. A legally binding agreement shall be required to provide for the long term maintenance of the common access driveway. See Appendix B for Common Access Driveway Regulations.
14. A Traffic Impact Study may be required as per Access Management Regulations or as determined by County Engineer.

**B. DRIVEWAY DIMENSIONS**

1. Driveway widths and turning radii are detailed in Access Standards

**C. DRIVEWAY PROFILE**

1. The driveway profile shall provide a safe transition for entering and leaving the public road.
2. The maximum grade for commercial and industrial driveways shall be 8%, however, 1-3% is preferred for high volume driveways.
3. The maximum grade for residential driveways shall be 10%, however, 1-6% is preferred.
4. All grade breaks and vertical curves shall accommodate the design vehicles expected to use the driveway.
5. Driveway profiles on uncurbed public roads shall slope down and away from the pavement edge for a minimum distance of 6 feet at a grade of 1 inch per 1 foot.
6. Driveway profiles on curbed roads shall slope up and away from the curb to the sidewalk.

7. Concrete driveways on uncurbed roads shall extend no closer to the pavement edge than 6 feet or as determined by County Engineer. Driveway curbs shall extend no closer to the pavement edge than 8 feet. The area between the pavement edge and the concrete driveway shall be filled with 4" asphalt concrete over minimum 6" of 304 crushed aggregate.
8. Concrete driveways on curbed roads shall extend to the curb. Driveway curbs may extend to the curb along the road.

**D. DRIVEWAY CULVERTS**

1. The County Engineer shall determine the size (diameter) of the required driveway culvert. Minimum diameter shall be 12".
2. No culvert shall be less than 40 feet in length as detailed in Access Standards. Longer lengths may be required. Headwalls may be installed only if approved by the County Engineer.
3. The grade of the culvert shall be on the flow line of the existing roadside ditch and shall slope with the natural grade of the ditch unless otherwise directed by the County Engineer.
4. The existing roadside ditch shall be excavated at the location of the driveway culvert to a minimum depth of 6" below the flow line of the ditch. Prior to installing the driveway culvert, 6" of crushed 304 aggregate shall be placed to provide adequate bedding for the driveway culvert. When the culvert is placed on the bedding, the flow line of the culvert shall match the flow line of the roadside ditch.
5. Driveway culverts shall be reinforced concrete pipe (RCP), corrugated metal pipe (CMP) or an approved type of equal strength. All fittings shall be manufactured for the type of pipe being installed.
6. Driveway culverts shall be properly backfilled around and over the culvert to a minimum depth of 12" using crushed aggregate (ODOT Item 304 or ODOT Item 411).

**E. OTHER**

1. The County Engineer is not responsible for the construction or maintenance of driveways, including driveway culverts.
2. The property owners are responsible for the construction and maintenance of private driveways, including all material and installation costs.
3. The completed driveway is subject to inspection and approval by the County Engineer.

4. The driveway and/or driveway culvert shall be replaced by the property owner if not installed properly or not maintained properly. If replacement or maintenance is not completed within 15 days after notification from the County Engineer, the county will remove the driveway or driveway culvert or perform the necessary maintenance the cost of which will be assessed to the property owner.
5. For safety reasons the driveway shall be located to allow a minimum of 495 feet sight distance each way on the public road. The driveway grade shall be no greater than 10%.
6. See standard drawings for additional driveway detail.

## ARTICLE 2 PAVEMENT DESIGN STANDARDS

### SECTION 200 GENERAL INFORMATION

#### A. CURRENT STANDARDS

The current list of standards to be used in the design of new subdivision streets or street improvements are as following:

1. **ODOT Construction and Materials Specifications** by State of Ohio Departments of Transportation (latest edition).
2. Technical Design Standards of Pickaway County.
3. **ODOT Location and Design Manual, Volume One, Roadway Design** (latest edition).
4. Or any alternative approved by the County Engineer.

#### B. PAVEMENT TYPE

1. A developer, through his engineer, shall select the type of pavement to be constructed in his subdivision as follows:
  - a. Item 452 Non-Reinforced Portland Cement Concrete
  - b. Asphalt Concrete

**SECTION 201 FLEXIBLE PAVEMENTS**

| <b>Absolute Minimum Allowable Pavement Cross-Section Designs</b> |  |                                     |
|--|--|-------------------------------------|
| <b>Street Classification</b>                                     | <b>Flexible Pavement Cross-Section</b>         | <b>Notes</b>                        |
| Local  | 1.25" of 448 – Type 1                          |                                     |
|  | 1.75" of 448 – Type 2                          |                                     |
|  | 3" of 301                                      |                                     |
|  | 6" of 304                                      |                                     |
| Minor Collector *  | 1.25" of 448 – Type 1                          | * Or designated construction route. |
|  | 1.75" of 448 – Type 2                          |                                     |
|  | 6" of 301                                      |                                     |
|  | 6" of 304                                      |                                     |
| Major Collector  | 1.25" of 448 – Type 1                          |                                     |
|  | 1.75" of 448 – Type 2                          |                                     |
|  | 8" of 301                                      |                                     |
|  | 6" of 304                                      |                                     |
| Industrial/Other   | 1.25" of 448 – Type 1                          |                                     |
|  | 1.75" of 448 – Type 2                          |                                     |
|  | 12" of 302                                     |                                     |
|  | 6" of 304                                      |                                     |
| Item 448 – Type 1  | Asphalt Concrete (surface course) PG64-22      |                                     |
| Item 448 – Type 2  | Asphalt Concrete (intermediate course) PG64-22 |                                     |
| Item 301   | Bituminous Aggregate Base                      |                                     |
| Item 302   | Bituminous Aggregate Base                      |                                     |
| Item 304   | Aggregate Base                                 |                                     |

A prime coat (Item 408) shall be required between Item 304 and Item 301 or Item 302, if applicable. The application rate shall be at least 0.10 gal per sq. yd. A tack coat (Item 407) shall be required between Item 301 or Item 302, and Item 448 (intermediate), if applicable. The application rate shall be at least 0.075 gal per sq. yd. A tack coat (Item 407) shall be required between Item 448 (intermediate), and Item 448 (surface), if applicable. The application rate shall be at least 0.05 gal per sq. yd.



**SECTION 202 RIGID PAVEMENTS**

| <b>Absolute Minimum Allowable Pavement Cross-Section Designs</b> |  |              |
|--|--|--------------|
| <b>Street Classification</b>                                     | <b>Rigid Pavement Cross-Section</b>              | <b>Notes</b> |
| Local  | N/A  |              |
| Minor Collector  | N/A  |              |
| Major Collector  | 9" of 452  |              |
|  | 6" of 304  |              |
| Industrial/Other   | 13" of 452                                       |              |
|  | 6" of 304  |              |
| Item 452   | Non-Reinforced Portland Cement Concrete Pavement |              |
| Item 304   | Aggregate Base                                   |              |

**SECTION 203 SUBGRADE DRAINAGE**

Where unusually wet soil conditions exist as determined by the County Engineer, or where curbs are proposed, 4" to 6" pipe underdrains and aggregate drains shall be required. The drains shall be placed in accordance with Item 605 Underdrains. The drains shall be located 2 feet behind the curb, or at the outside edge of the berm and placed a minimum of six inches (6") to a maximum of thirty inches (30") below the subgrade. The underdrains shall be placed on a minimum slope of 0.24 feet per 100 feet. Aggregate drains shall be placed in accordance with the standard drawings.

**SECTION 204 SUBGRADE PREPARATION**

All subgrade shall be prepared and compacted according to Item 203 of the Construction and Materials Specification. Compaction tests, if required, will be performed at the expense of the subdivider. The subgrade and base material to be used shall be approved by the County Engineer prior to the application of any base material. Each material course shall be inspected and accepted before the next succeeding course is placed.

## **ARTICLE 3 DRAINAGE DESIGN STANDARDS**

### **SECTION 300 PURPOSE**

These standards shall serve as the minimum design requirements for the handling of surface water and other drainage. Drainage includes but is not limited to foundation discharge, water softener discharge and geothermal system discharges. These procedures and standards shall govern the development of all new and/or modified drainage systems. The development of such drainage systems shall include the conveyance of surface water to an adequate outlet. The Professional Engineer's highest design priority shall be to eliminate the possibility of major loss of property or loss of life.

### **SECTION 301 ADEQUATE DRAINAGE OUTLET**

Surface water runoff from a development shall be drained off site to an adequate outlet, in accordance with this article and applicable Sedimentation Control Regulations. The location of the outlet shall be approved by the County Engineer. The outlet may consist of a ditch, stream, storm sewer, or approved detention basin having sufficient capacity to accommodate the surface water runoff in a proper manner. The outlet downstream of the subdivision shall be improved by the developer as required to properly convey the water runoff from the subdivision and across the adjacent property so that damages from runoff are minimized. The developer shall acquire all easements necessary to perform such work.

### **SECTION 302 DRAINAGE EASEMENT**

- A. An adequate easement shall be required along any tile, detention basin, drainage way, ditch, watercourse, stream, or storm sewer which is not already within the street right-of-way. The easement shall be of sufficient width to allow cleaning, widening, deepening, replacing or otherwise general maintaining of such drainage course.
- B. When required to convey surface water beyond the limits of a proposed subdivision in order to discharge to an approved outlet, the subdivider shall obtain all easements and/or rights-of-way necessary for construction and/or maintenance.
- C. All drainage easements shall be shown on the final plat and the "final engineering and construction plan." The drainage easements shall be recorded for public use and the maintenance of such drainage courses shall be the responsibility of the property owners receiving direct benefit therefrom, unless otherwise provided. The width of drainage easements shall be 20' minimum or the width of the surface water spread, whichever is greater.

**SECTION 303 GENERAL DESIGN CRITERIA**

A. Critical Storms shall be calculated using the criteria established in the most recent edition of the Ohio Department of Natural Resources Rainwater and Land Development manual. Storage facilities and control structures shall be designed such that the post development runoff rate is equal to a one year predevelopment runoff rate up to the critical storm. The rate of runoff for all storms greater than or equal to the critical storm shall be controlled to limit the peak rate of runoff to the predevelopment peak rate from the same frequency storm.

The permissible peak rate shall be determined as follows:

1. Determine the total volume of runoff from a 1-year frequency 24-hour storm, occurring over the area before and after development.
2. Determine the percent of increase in volume due to development and using this percentage, pick the critical storm from the following table:

| If the Percentage of increase in volume of runoff is |               | The critical storm for discharge limitation will be |
|--|---------------|---|
| equal to or greater than                             | and less than |   |
| -  | 10            | 1 year  |
| 10   | 20            | 2 years   |
| 20   | 50            | 5 years   |
| 50   | 100           | 10 years  |
| 100  | 250           | 25 years  |
| 250  | 500           | 50 years  |
| 500  | -             | 100 years   |

- B. Minimum time of concentration shall be 15 minutes in open ditches and 10 minutes for pavement areas.
- i. Storm sewers shall be designed for a minimum of a five year storm (flowing full) and a 10 year storm (to the top of catch basin).
  - ii. Culverts shall be designed for a 100 year storm with the allowable headwater 2 feet below any existing or proposed first floor levels and below elevation of edge of pavement.

A minimum velocity of 3 fps shall be used for designing storm sewers. A maximum velocity of 12 fps shall be used unless special materials are included for protection against scouring. Maximum velocities for discharge into erodible channels depends on the type of soil at the discharge point. See table below:

| <b>Channel Material</b>        | <b>Maximum Velocity (fps)</b> |
|--------------------------------|-------------------------------|
| Sand or sandy loam             | 2.5 fps                       |
| Firm loam or silts             | 3.5 fps                       |
| Clay, fine gravel              | 5.0 fps                       |
| Shale, hard pan, coarse gravel | 6.0 fps                       |

| <b>Vegetative-lined Channels (slopes to 5%)</b> | <b>Maximum Velocity (fps)</b> |
|---|-------------------------------|
| Alfalfa, crabgrass                              | 3.5 fps                       |
| Grass mixture                                   | 5.0 fps                       |
| Kentucky bluegrass                              | 6.0 fps                       |

- C. The development's interior drainage system shall be designed so that it can carry the runoff from a 100 year storm:
  - i. With the street pavement being dry for one ten foot lane on local and collector streets and two ten foot lanes on all other roads, except that water may flow six inches deep across the crown of local or collector streets at designated locations.
  - ii. When the water flow is less than four inches deep in parking stall areas of parking lots.
  - iii. When the overland and channel flows are within easements and at least five feet horizontally and two feet vertically away from any ground level entrances or openings to residential, office, commercial, or industrial building.
  - iv. A routing path for the 100 year storm event shall be planned through the subdivision with drainage easements in place for surface runoff not contained in the storm sewer system.
  - v. Without endangering property or public safety through erosion or high water.
- D. At all intersections, inlets shall be located at the beginning of the upstream curb return before the crosswalk to prevent cross street flow. The maximum spacing for catch basins shall be 350 feet on curb and gutter streets and 500 feet on streets with roadside ditches. Catch basins shall be precast only.
- E. All control structures shall be designed with an emergency spillway or other outlet to allow for the flow of storm water should the primary means of flow be obstructed. All designs shall account for future maintenance considerations.
- F. Open ditches shall be designed as per Pickaway County Standard Ditch

Improvement Section and a 0.4% minimum slope, unless otherwise approved by County Engineer.

- G. A grading plan showing first floor elevations shall be required for all projects falling under these standards, including a suitable permanent benchmark and elevation. All off-site grading needed for future development of lots shall be required when net lot density equals or exceeds 3 lots per acre, including a suitable permanent benchmark and elevation.
- H. All roadway culverts shall be new Reinforced Concrete Pipe unless otherwise approved by the County Engineer.

## **ARTICLE 4 DESIGN STANDARDS**

### **SECTION 401 LANDSCAPING IMPROVEMENTS**

#### **A. LANDSCAPING IMPROVEMENTS (RESIDENTIAL SUBDIVISIONS)**

Landscaping shall be provided at all major subdivisions. An overall landscaping plan shall be submitted with the preliminary plat. The character and amount of landscaping may be varied depending on the type of size of the development. Existing trees, land cover, and natural features shall be retained where practicable. Where natural features and trees are to be retained, the developer shall propose methods of protecting them during the construction phase. All landscaping shall comply with the requirements of township zoning resolution, building regulations, and any other regulations that may apply.

Landscaping improvements shall not be constructed in existing or proposed easements or rights-of-way. However, special consideration will be given at entrances to developments, and in boulevards and parkways which have large rights-of-way where such plantings will not impair visibility at any corner nor will provide a hazard to vehicular traffic.

Dead or dying trees shall be replaced by the developer prior to release of the subdivision maintenance or performance bond. A two (2) year landscape maintenance bond shall be provided as further condition for release of the subdivision performance bond.

All specifications for the specimen quality and planting of trees and shrubs shall be in accordance with the most recent edition of American Standards for Nursery Stock published by the American Association of Nurserymen, or as approved by the Pickaway County Planning Commission.

#### **B. SHADE TREES ALONG NEW STREETS**

Street frontage trees shall be included in all subdivisions that are served by centralized sanitary sewer systems. Trees shall be dedicated to the property owner of the lot upon which such trees are planted. Where curb and gutter are required by the subdivision regulations, one tree (minimum 2 ½" caliper) shall be planted for every 50 feet of lot frontage. Where curb and gutter is not required, one tree (minimum 2 ½" caliper) shall be planted for each lot. Street frontage trees shall not be planted closer than 20 feet from a residential driveway, 10 feet to a fire hydrant, nor 25 feet to an overhead line or utility pole.

Final plats shall include the following language:

*Owners of property on which a street frontage tree is located shall prune or maintain such trees in a manner that trees will not obstruct or shade street lights, obstruct the passage of pedestrians on sidewalks, obstruct vision of traffic signs, obstruct the view of any street intersection or crosswalk, or generally obstruct vehicular traffic.*

### **C. UNDESIRABLE STREET TREES**

The public tree lawn is a unique environment due to its exposure to urban stresses such as road salt, size constraints, and poor soil conditions making it an unsuitable planting site for many tree species. The following trees are undesirable for street tree planting in Pickaway County for a variety of reasons including weak wood, susceptibility to disease or insect pests, overly messy flowers or fruit, aggressive root systems, incompatibility with our soil, and/or early leaf drop:

Box Elder *Acer negundo*  
Silver Maple *Acer saccharinum*  
Tree of Heaven *Ailanthus altissima*  
Catalpa  
Black Walnut *Juglans nigra*  
Mulberry *Morus spp*  
Poplar *Populus spp*  
Black Locust *Robinia pseudoacacia*  
Willow *Salix spp*  
European Mountain Ash *Sorbus spp*  
Siberian Elm (sometimes incorrectly called Chinese Elm) *Ulmus pumila*  
Fruit trees (i.e., apple, pear, etc.)  
Evergreen trees (pines, firs, spruce, etc.)  
Cottonwood *Populus deltoids*

**Emerald Ash Borer Warning:** While both White and Green Ash (*Fraxinus americana* and *pennsylvanica*) have been successful street trees, both are infested in nearby communities by this destructive borer as we go to press. Therefore, we are suspending their planting.

## **SECTION 402 STREET LIGHTING IMPROVEMENTS**

### **A. STREET LIGHTING (RESIDENTIAL SUBDIVISIONS)**

Street lights shall be required for all subdivisions within unincorporated Pickaway County where the lots average one hundred twenty feet (120') or less of frontage along the property line, or where the need for street lighting has been determined by the Pickaway County Engineer.

1. The owner/developer shall consult with the local electric utility company regarding street lighting. Street lights and all appurtenances shall be installed by the owner/developer and shall be of a type acceptable for cost-effective service by the electric utility provider providing service to that subdivision.
2. The Board of Township Trustees of the township within where the subdivision will be constructed shall be consulted, and an agreement between the owner/developer and that township specifying responsibility for energy costs and future maintenance shall be submitted to the Pickaway County Planning Commission for review.
3. Street lights shall be installed at each street intersection and crosswalk within the subdivision and at any other locations deemed necessary by the Pickaway County Engineer.
4. Street lights shall be placed not less than two hundred feet (200') from the closed end of a cul-de-sac, and street lights shall be located not less than two hundred feet (200') apart nor more than three-hundred fifty feet (350') apart unless otherwise approved by the Pickaway County Engineer.
5. Illumination for street lights shall be uniform and shall follow recommendations of the current Illuminating Engineering Society (IES) Handbook or its successor. Street lights shall be designed with appropriate lights and reflectors to minimize light pollution.

### **B. ON-SITE LIGHTING (COMMERCIAL AND INDUSTRIAL SUBDIVISIONS)**

1. On-site lighting shall not trespass beyond property lines and shall be designed to eliminate light pollution and glare off-site.
2. The preliminary plat shall show proposed public street, pedestrian, and private parking lot lighting for review and approval by the Pickaway County Engineer.
3. Lighting shall be designed in consultation with the local township to ensure zoning compliance.
4. On-site lighting standards shall be filed with the final plat.