Bridging the Sustainable Development Gap
Promoting Low Impact, Sustainable Development

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Project Objective:
To develop guideline residential infrastructure design standards for Pennsylvania that meet today’s need for affordable and sustainable communities.

Voluntary Adoption
Must have concurrence from appropriate state regulatory agencies and other stakeholders

Oversight Committee
• DEP
• PennDOT
• DCED
• Municipal Officials (PSATS)
• Engineers
• Planners and Landscape Architects
• Surveyors
• Emergency Services
• Builders / Developers
• Site Contractors
• Environmental Groups
Voluntary Adoption

Spectrum of community visions:
- Traditional Neighborhood Development (TND)
- Mixed Use Subdivisions (PUD)
- Suburban Mid to Large Lots
- Suburban Cluster
- Conventional Rural Large Lots
- Rural Cluster

Content:
- Site Design
- Street Standards
- Pedestrian and Bicycle Circulation
- Parking Standards
- Storm water Management & Conveyance Facilities
- Wastewater Facilities
- Potable Water Supply Standards
- Other Utilities

Approach
- Review Existing Ordinances
- Review of Current Research and Literature
  ... Best Science
**Highlights: Chapter 1 – Site Design Considerations**
- A community’s land is a key resource
- How it is developed is responsibility of elected officials
- Community vision for future becomes reality via policies
- Ch. 1 differs from rest of document

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**Highlights: Chapter 2 - Streets**

Municipal Street Classifications a subset of PennDOT Classifications

<table>
<thead>
<tr>
<th>Uniform Street Classification System</th>
<th>PennDOT Classifications</th>
<th>Proposed Municipal Street Classifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterials Rural / Urban</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collectors Rural / Urban</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Rural / Urban</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential Access (A &amp; B)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential Collectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed Use / Collector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Use Streets</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Alley</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divided Streets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial / Industrial Access</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Municipal Collector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Municipal Arterial</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Municipal Street Classifications a subset of PennDOT Classifications
Based on type of use and character of roadway
Proposed Street Classification

<table>
<thead>
<tr>
<th>Street Classification</th>
<th>Maximum Traffic (ADT)</th>
<th>Speed limits (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Access &quot;A&quot;</td>
<td>300</td>
<td>20</td>
</tr>
<tr>
<td>Residential Access &quot;B&quot;</td>
<td>1600</td>
<td>25</td>
</tr>
<tr>
<td>Residential Collector</td>
<td>3000</td>
<td>35</td>
</tr>
<tr>
<td>Mixed Use Collector</td>
<td>2000</td>
<td>30</td>
</tr>
<tr>
<td>Residential Near Alley (TND)</td>
<td>300</td>
<td>15</td>
</tr>
<tr>
<td>Residential Divided Street</td>
<td>3000</td>
<td>35</td>
</tr>
</tbody>
</table>

Curbed and Open Profile Cross Sections

Cross Section – Divided Street, Boulevard with Curb

<table>
<thead>
<tr>
<th>Parking Type</th>
<th>(a) Lane Width (ft)</th>
<th>(b) Parking lane width (ft)</th>
<th>(c) Minimum median Width (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No parking</td>
<td>11</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Parallel</td>
<td>11</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Angled parking</td>
<td>11</td>
<td>18</td>
<td>10</td>
</tr>
</tbody>
</table>

Cross Section – Divided Street, Parkway with Reinforced Shoulder

<table>
<thead>
<tr>
<th>Parking Type</th>
<th>(a) Lane Width (ft)</th>
<th>(b) Shoulder Width</th>
<th>(c) Minimum Median Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>No parking</td>
<td>11</td>
<td>4 one side = 2</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>one side = 6</td>
<td></td>
</tr>
</tbody>
</table>

Highlights: Chapter 2 - Streets

Stormwater runoff volume as a function of street width

Cubic Feet of runoff per 60 foot frontage, 1 inch rainfall

Street width in feet
Chapter 3 – Pedestrian and Bicycle Circulation

- Sidewalks
- Minimum Impact Trails
- Core Circulation Trails
- Bike Lanes

Chapter 4 – Parking

- Consider how parking islands can also serve stormwater function
- Consider shared parking for complimentary uses
- Excessive parking drives up development costs as well as future maintenance costs
- Excessive parking produces unnecessary environmental impacts; increase in run-off

Highlights: Chapter 4 – Parking

Parking Rates

<table>
<thead>
<tr>
<th>Parking Zone</th>
<th>Side Lot</th>
<th>Rear Lot</th>
<th>Parking Rate (per parking unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Family Detached</td>
<td>2.0</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Townhouse, Duplex, Guest</td>
<td>1.1</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Apartment, Studio</td>
<td>1.4</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>1 or 2 bedrooms</td>
<td>1.0</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Efficiency</td>
<td>1.0</td>
<td>0.5</td>
<td></td>
</tr>
</tbody>
</table>

*Source: McCue, 2019*
**Highlights: Chapter 5 – Stormwater Management and Conveyance**

**Stormwater Management**

... Heavy reference to PA DEP's SW BMP Manual

... Standards are similar (some differences with respect to infiltration standard)

**Conveyance**

... Pipes and open swales / channels

... Standards and computational techniques.

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**Highlights: Chapter 5 – Stormwater Management**

➔ Encourages use of natural systems

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**Highlights: Chapter 6 – Wastewater Facilities**

- All residential developments must be served by a wastewater collection and treatment system
- Variety of system options
- Terms are confusing, ex. Individual and on-lot
- Pressures of development versus changing regulatory requirements (Pennsylvania’s Chesapeake Bay Tributary Strategy)
- Conveyance - only gravity systems discussed
Highlights: Chapter 7 – Potable Water Supply Standards

- Provided by variety of sources: private wells, private community systems, municipal authorities, public utilities
- Usage under 10,000 gallons per day over 30-day period is generally unregulated
- Standards focus mostly on private wells, since this is the only system municipalities have direct control over
- Lots of specifics

Highlights: Chapter 8 – Other Utilities

- Covers standards for electricity, cable, TV, phones, gas, etc.
- PA One-Call required
- Backfill standards
- Alternative fire protection standards
  - Storage Tanks
  - Dry Hydrant Systems

Pennsylvania Standards for Residential Site Development, April 2007

Powerpoint presentation on this publication
“Setting a New Standard for Livable Communities” by Dr. Alexander Duran
Press Release on PA Land Development Standards
Clearing a path to reason (article from Keystone Builder Magazine)
“Model for Land Development May Help Townships Plan Growth”

Go to www.engr.psu.edu, then choose “publications”
http://www.engr.psu.edu/phrc/Land%20Development%20Standards.htm
Option 1 (View Sample Files)
Two-side printing with short-edge binding OR Duplex - “head to head”
All files below are PDFs. These are Sample Files.
Cover and Preamble
Chapter 1: Site Design Considerations (5 of 27 pages), (4787 kb)
Chapter 2: Street Standards (9 of 78 pages), (16459 kb)
Chapter 3: Pedestrian and Bicycle Circulation (5 of 30 pages), (9491 kb)
Chapter 4: Parking Standards (5 of 25 pages), (2629 kb)
Chapter 5: Stormwater Chapter (5 of 52 pages), (1666 kb)
Chapter 6: Wastewater Facilities (5 of 49 pages), (4815 kb)
Chapter 7: Potable Water Supply Standards (5 of 26 pages), (1660 kb)
Chapter 8: Other Utilities (5 of 10 pages), (1638 kb)

Option 2 –
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Setting a New Standard for Land Planning

Over the past decade, the trend in land planning has been toward more sustainable, low-impact forms of development. These innovative planning and design techniques are intended to reduce the impact development has on the land by minimizing impervious areas, and conserving natural resources and open space. By incorporating the latest innovations in land planning into a municipality's ordinances, those entities can promote exercise and affordability, while protecting the environment.


The document makes recommendations for subdivision and land development ordinance requirements with an emphasis on sustainable and affordable development practices for residential housing. Topics include: Site Design, Streets, Pedestrian and Bicycle Circulation, Parking, Storm water, Wastewater, Potable Water and Other Utilities.

The document was coordinated by the Pennsylvania Housing Research Center (part of the Penn State University College of Engineering) with assistance from the Hamer Center for Community Design (part of the Department of Landscape Architecture at Penn State). It came about after the Pennsylvania Builders Association (PBA) identified inconsistencies in outdated residential land development ordinances as an issue that the Pennsylvania Housing Research Center should address. The PBA also provided seed funding for the project.

Compiling these standards was a two-year effort by a stakeholder group that included Pennsylvania government agencies, such as the Department of Community and Economic Development; the Department of Environmental Protection and the Department of Transportation; local government associations including the Pennsylvania State Association of Township Supervisors; professional organizations of civil engineers and landscape architects; and environmental groups including the 10,000 Friends of Pennsylvania.

Unlike some land development standards of the past, this publication provides both extensive, high quality illustrations and commentary integrated into the standards section. The commentary explains the basis for each standard and gives references to the documents that support or provide background on that particular standard.

Voluntary Adoption

The publication recommends the standards be adopted voluntarily at the municipal level. However, by adopting the standards, municipalities can provide for sustainable land development practices, minimizing both initial capital and long-term maintenance costs of residential land development infrastructure. The publication also includes information on roads, sidewalks, storm drainage systems, parking areas on roadsides or in parking lots, pedestrian and bicycle trails, sanitary sewers, drinking water supply systems and installation of other power and communication utility services.

The recommended standards are designed to provide some flexibility. By doing so, initial and long-term costs can be minimized while consistency that attains adequate levels of service is assured. For example, in most municipal subdivision rules in Pennsylvania, the current specified width for streets with required on-street parking and curbs ranges from 30 to 36 feet. This publication recommends a standard for a residential access street with up to 30 homes on a cul de sac of either 26 feet, if parking is permitted on one side, or 18 feet for streets with no parking.

The only reason a street needs to be 36-feet wide is to accommodate expected high rates of traffic and to provide for parking lanes on both sides of the street. In most modern subdivisions, sufficient off-street parking exists in individual garages and driveways to provide for parking needs. When a street design standard provides unnecessary parking lanes, drivers tend to use the wider road to drive faster than posted speed limits, making the streets less pedestrian and bicycle friendly. An 18-foot wide road with no on-street parking is safe for 20 mph. When a speed limit of 25 mph is desired, a street with no on-street parking should be 20 feet wide, curb to curb.

Using narrower street designs also means less land is used for the roadway, and less storm water runoff is generated. Also, such road design requires less aggregate and asphalt binder and reduces
the labor needed for road construction. Maintenance costs for snow plowing and for resurfacing are lower. In fact, an 18-foot-wide road costs about half as much as a 36-foot-wide road to construct and maintain. The difference on a per-lot basis can be several thousand dollars. These cost savings can contribute to making housing more affordable by reducing the developer's infrastructure costs, which can in turn reduce the selling price of finished lots or finished housing units.

The standards also address storm water runoff. The Pennsylvania Department of Environmental Protection (DEP) recently released a Stormwater Management Best Management Practice (BMP) manual that applies to residential as well as other land uses. The new standards, like that manual, recommend managing the increase in runoff volume associated with rainfalls of about 3 inches (The PA DEP's BMP manual refers to 24-hour rainfalls of the 2-year frequency. In Harrisburg, PA that is 2.9 inches.) Management options include percolation into the soil, uptake by vegetation or capture in a tank for later reuse. The recommended storm water standards also recognize that, in some instances, site conditions may make it impossible to safely and economically design a management system for the entire amount of runoff from a 3-inch rainstorm that percolates the water into the soil or otherwise removes the entire amount of runoff. In these cases, using extended detention practices to control the rate of outflow can be used as an alternative to infiltration to mitigate impacts from increased runoff volume. Standards are provided for the computational methods to determine the maximum flow rates allowable for those extended detention practices by means of hydrologic analysis of the receiving stream flows for the 2-year, 24-hour rainfall event.

Applying Standards Elsewhere

The need for recommended standards that promote sustainable, affordable residential infrastructure design is nationwide, not just in Pennsylvania. However, little modification of the standards would be needed for parking, streets, site design, pedestrian and bicycle circulation for other areas of the country. When using the Pennsylvania Department of Transportation standards on materials, the new recommended standards would need to reference the American Society of State Highway and Transportation Officials equivalent material. The storm water, wastewater and potable water supply chapters make heavy reference to regulations of the Pennsylvania Department of Environmental Protection. For those infrastructure standards, specific references to the state's environmental protection department should be removed, and the new standards should refer more generically to requirements of state and federal environmental regulatory agencies.

Municipalities and townships should welcome the recommended Pennsylvania Standards for Residential Site Development, especially those entities that have not updated their subdivision ordinances recently. Adopting these standards can provide regulatory consistency and promote lower impact, sustainable development practices while assisting developers in creating housing that is more affordable. In other words, the publishing of these new Pennsylvania Standards provides a unique opportunity to review and improve land use.

PDF versions of each chapter are posted to the Internet at www.psu.edu/phrc (choose "publications").

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