Lancaster County

Recommended Model Development Principles

for East Hempfield, West Hempfield and Manor Townships, and Lancaster County, Pennsylvania

Consensus of the Local Site Planning Roundtable

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Team members included Pat Devlin, Deb Rudy and Brook Lenker from the Alliance for the Chesapeake Bay and Rebecca Winer and Karen Cappiella from the Center for Watershed Protection.

Copies of this document are available from the Alliance for the Chesapeake Bay, 3310 Market Street, Suite A, Camp Hill, PA 17011/ phone 717-737-8622. Copies are also available from each of the partner organizations and agencies. The final consensus document can be downloaded from the website: www.buildersforthebay.net.

** The views expressed herein are those of the authors and do not necessarily reflect the views of the Pennsylvania Department of Environmental Protection.*

This document was prepared by the
Alliance for the Chesapeake Bay
and the
Center for Watershed Protection

Cover Photo Credit: Karen Cappiella

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Executive Summary

This document is a product of the Lancaster Area Site Planning Roundtable, a year-long consensus process initiated by the Builders for the Bay Program to review existing development codes and identify regulatory barriers to environmentally-sensitive residential and commercial development at the site level. A diverse cross-section of local government, non-profit, environmental, homebuilding, business, development and other community professionals made up the membership of the Lancaster Area Site Planning Roundtable. Through a consensus process, members of the Roundtable adapted the National Model Development Principles to specific local conditions. Roundtable recommendations include specific code and ordinance revisions that would increase flexibility in site design standards and promote the use of open space and flexible design development in the Lancaster area.

The National Model Development Principles adapted by the Lancaster Area Site Planning Roundtable are designed to collectively meet the objectives of Better Site Design (BSD), which are to (1) reduce overall site impervious cover, (2) preserve and enhance existing natural areas, (3) integrate stormwater management, and (4) retain a marketable product. Code modifications and other Roundtable recommendations were crafted to remove regulatory hurdles and provide incentives, flexibility, and guidance for developers implementing BSD. The Roundtable process focused on model development principles at the site level and did not include discussions of zoning or land use.

HIGHLIGHTS

Highlights of the Lancaster Area Site Planning Roundtable

Residential Streets and Parking Lots

- Discourages creation of excessively wide streets by setting maximum widths in lieu of minimum street width requirements.
- Reduces minimum right-of-way width requirements to 33 feet (in accordance with PennDOT liquid fuels tax standard).
- Discourages cul-de-sacs by requiring special approval for use of cul-de-sac streets. Where used, cul-de-sac islands should incorporate vegetative and stormwater treatment design features.
- Promotes review and revision of current parking ratios and use of pervious materials for overflow parking above and beyond required parking.
- Offers guidance on how to calculate requirements for shared parking arrangements.
- Encourages stormwater practices to be located in required landscaped areas in parking lots.

Lot Development

- Promotes use of open space designs as a by-right form of development.
- Reduces minimum yard setbacks for single family residential development.
- Allows for alternative walkways in lieu of prescribed sidewalk standards.
- Provides for shared driveways managed through easement and maintenance agreements.
- Promotes requirements for quality open space management plans implemented by third-party professionals trained in the management of natural lands and stormwater facilities.
- Encourages on-lot stormwater controls that reduce and infiltrate runoff.
- Strongly emphasizes the need for education of property owners about the long term management of on-lot stormwater practices.

Conservation of Natural Areas

- Promotes adoption of a streamside (riparian) buffer ordinance and offers a formula for calculating required minimum buffer widths along various streams for their protection.
- Strengthens clearing and grading requirements along streams to protect buffers.
- Strengthens tree protection measures during site construction.
- Encourages the reconnection of historic floodplains to active stream channels before site development.
- Promotes connection of contiguous natural corridors and replanting of trees through incentives.
- Provides guiding principles on crafting new stormwater ordinances that provide for flood control, water quality protection, and stream channel protection.

Photo courtesy of Randall Arendt

Purpose

This document presents specific recommendations on how to foster more environmentally sensitive local site design in the Lancaster area. The recommendations were crafted in conjunction with a diverse cross-section of development, local government, civic, non-profit, environmental, and other community professionals that participated in the Lancaster Area Site Planning Roundtable initiated by the Builders for the Bay Program.

Introduction and Background

Every year, over two million acres of land are altered as a part of the development process. Development has historically led to degradation in water quality and biological integrity (NRCS, 2001). The impacts of watershed urbanization on the water quality, biology, and physical conditions of aquatic systems have been well documented (CWP, 2003). The development radius around many of our cities and smaller municipalities continues to widen at a rapid rate, far outpacing the rise in population (Leinberger, 1995). In the Chesapeake Bay Region, it is estimated that more than 90,000 acres of open land are converted annually by development, at a rate four to five times greater per person than seen 40 years ago (Chesapeake Bay Foundation, 2002). As a result, local codes and ordinances that promote reduced impact of development on local water resources are critical to future sustainability.

The protection of water resources and the character of the landscape under a continued growth scenario requires local governments, developers, and site designers to fundamentally change the way that land is developed. Deciding where to allow or encourage development, promote redevelopment, and protect natural resources are difficult issues that jurisdictions have to balance. While effective zoning and comprehensive planning are critical, communities should also explore measures to minimize the impact of impervious cover, maintain natural hydrology, and preserve contiguous open space on sites where development is to occur.

Toward this end, the Center for Watershed Protection, in concert with the Alliance for the Chesapeake Bay and the Building Industry Association of Lancaster County, convened a Local Site Planning Roundtable for East Hempfield Township, West Hempfield Township, Manor Township and Lancaster County. The local Roundtable process in the Lancaster area was modeled after the National Site Planning Roundtable, the 22 Model Development Principles and four basic objectives:

1. Reduce overall site impervious cover
2. Preserve and enhance existing natural areas
3. Integrate stormwater management
4. Retain a marketable product

The 22 Model Development Principles act as benchmarks upon which more specific code and ordinance recommendations were adapted for the Lancaster Area. The benefits of applying these 22 Model Development Principles are summarized in the table on the next page.

INTRODUCTION

Benefits of Applying the Model Development Principles

Local Government:

- Increase local property tax revenues
- Facilitate compliance with wetlands and other regulations
- Assist with stormwater regulation compliance

Developers:

- Flexibility in design options
- Reduce development costs
- Allow for more sensible locations for stormwater facilities
- Facilitate compliance with wetlands and other regulations

Homeowners:

- Increase property values
- Create more pedestrian friendly neighborhoods
- Provide open space for recreation
- Result in a more attractive landscape
- Reduce car speed on residential streets
- Promote neighborhood designs that provide a sense of community

Environment:

- Protect sensitive forests, wetlands, and habitats from clearing
- Preserve urban wildlife habitat
- Protect the quality of local streams, lakes, and estuaries
- Generate smaller loads of stormwater pollutants
- Help to reduce soil erosion during construction

Why Lancaster County?

The purpose of a local site planning roundtable is to adapt the national model development principles for local application by identifying how local codes and ordinances can be modified to allow for better site design.

Lancaster County was selected as a location for a roundtable for several reasons:

- Lancaster County is within the Chesapeake Bay watershed.
- Lancaster County is the ninth fastest growing county in Pennsylvania. The three townships involved are among the ten fastest growing municipalities in the County.
- Farmland preservation is of major interest in Lancaster County, which contains some of the most productive non-irrigated farmland in the U.S.
- Large undeveloped lands still remain in Lancaster County.
- The Lancaster County Planning Commission and three townships involved expressed an interest and were willing to commit staff time and resources to the process.
- The timing was appropriate given the County and township schedules for revising current ordinances, and their active involvement in developing a multi-municipal comprehensive plan.
- Modifications to Lancaster County model ordinances will have far-reaching effects; approximately 1/4 of the municipalities use the County's model subdivision and land development ordinance.
- Completion of the Codes and Ordinance Worksheets (COW) indicated that local development rules are insufficient to protect the area's water resources and aquatic communities.
- There was support among the local building community, including the Building Industry Association of Lancaster County (BIALC), who expressed interest in revising local land use ordinances and is a partner in the Coalition for Smart Growth.
- Changes to local stormwater management ordinances recommended by the roundtable can be coordinated with Pennsylvania's new stormwater management requirements for Municipal Separate Storm Sewer System (MS4) communities in Lancaster County.

Lancaster Area Roundtable Process

Lancaster Area Site Planning Roundtable members convened many times over a nine-month period to become familiar with the Model Development Principles, review existing codes and regulations, work in subcommittees, and reach consensus on a final set of recommendations. The Roundtable consisted of 40 dedicated members representing a wide range of professional backgrounds and experience related to local development issues. The process included the following steps:

Kickoff Meeting: March 9, 2004

Approximately 52 stakeholders from across Lancaster County participated in the meeting. Almost every major stakeholder group was represented, including those from Lancaster County Planning Commission, East Hempfield, West Hempfield, and Manor Townships, the development community, environmental groups, and state government agencies. The kickoff meeting introduced stakeholders to the national Model Development Principles, reviewed the local Codes and Ordinance Worksheets (COWs), and had participants apply Better Site Design concepts through a hands-on subdivision site plan redesign exercise.

Detailed Codes Analysis: May 13, 2004

The codes analysis was based on results from the COW, feedback from the March kickoff meeting, and discussions with local code enforcement officials. Completed by the Roundtable facilitators, this analysis provided a concise summary of the regulatory barriers to implementing environmentally-sensitive site design in the Lancaster area and served as the foundation for subcommittee discussions.

The primary documents used for this analysis and for reference during the Roundtable included:

- Zoning Ordinances, Subdivision & Land Development Ordinances, Stormwater Management Ordinances, and Erosion & Sediment Control Ordinances where applicable from Lancaster County, East Hempfield Township, West Hempfield Township and Manor Township
- State and federal regulations related to site design

Subcommittee Meetings and Consensus Building: April – September 2004

The full Roundtable split into three subcommittees with the diversity of interests and expertise represented in each. Each subcommittee was responsible for coming to consensus on a subset of the Model Development Principles.

- Residential Streets and Parking Lots
- Lot Development
- Conservation of Natural Areas

All three subcommittees met three to four times from April through September 2004. In September, the full Roundtable met again to begin the full membership consensus building process.

Consensus on Final Recommendations: November 18, 2004

The Roundtable reached consensus on the full suite of recommendations at its November 18, 2004 meeting.

MEMBERSHIP STATEMENT OF SUPPORT

Membership Statement of Support

This document of recommended development principles was crafted in conjunction with the diverse cross-section of development, local government, nonprofit, environmental, and other community professionals who participated in the Builders for the Bay Lancaster Area Site Planning Roundtable.

Members of the Roundtable provided the technical experience needed to craft and refine the model development principles for East Hempfield, West Hempfield and Manor townships and Lancaster County. These recommendations reflect our professional and personal experience with land development and do not necessarily carry the endorsement of the organizations and agencies represented by their members. Endorsement implies support of the principles and recommendations as a package and does not necessarily imply an equal level of support among individual recommendations by all Roundtable members.

The members of the Lancaster Area Site Planning Roundtable endorse the model development principles presented in this document, known as *Recommended Model Development Principles for East Hempfield, West Hempfield and Manor Townships, and Lancaster County, Pennsylvania.*

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Model Development Principles*

Recommended by the Lancaster Area Site Planning Roundtable

Residential Streets and Parking Lots

Principle #1: Street Width

Design residential streets for the minimum required pavement width needed to encourage traffic calming, support travel lanes, and accommodate on-street parking and emergency management, maintenance, and service vehicle access. These widths should be based on the expected use or function within the street network.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

1. The Townships should revise their street width ordinances so they use standard, consistent street classification definitions and maximum street widths proposed in Table 1.

Table 1. Recommended Street Widths for the Lancaster Area

Street Type		Maximum Street Width (ft)
Alley		16
Local	Urban	32
	Rural	28
Collector	Urban	36
	Rural	32

**Alleys are two-way and do not provide parking. Urban streets are generally closed section and rural roads are generally open section, but should be determined on a case-by-case basis by the township based on function and use. Local and collector widths taken from Guidelines for Residential Subdivision Street Design (ITE, 1997). All road widths meet fire department recommendations.*

* The following abbreviations are used throughout this section:
EHT: East Hempfield Township
WHT: West Hempfield Township
MT: Manor Township
SALDO: Subdivision & Land Development Ordinance
PennDOT: Pennsylvania Department of Transportation

2. Streets widths less than the maximums provided in Table 1 are encouraged where appropriate based on land use, density, road type, ADT, traffic speeds, street layout, lot characteristics and parking, drainage and emergency access needs. Townships should work closely with developers to develop appropriate road widths for each specific project. This recommendation is intended to promote flexibility and innovative design by tailoring the road design to the specific characteristics of the development.

3. These widths can only be exceeded if the developer can show sufficient need for a wider street and must be approved by the township.

Rationale

Residential streets are often unnecessarily wide and these excessive widths contribute to the largest single component of impervious cover in a subdivision (CWP, 1998). Narrower street widths not only reduce impervious cover, but also promote lower vehicular speeds and increased safety and can reduce construction and maintenance costs.

In the interest of reducing impervious cover and providing flexibility in street design, adoption of a maximum street width is recommended. This maximum width would allow developers to use narrower streets without special approval, while special approval would be needed to increase street widths above the maximum. These widths account for the maximum paving necessary when the maximum number of travel lanes and parking lanes are provided for that road type. Recommendation #2 is intended to provide flexibility to developers and also to encourage the use of innovative designs. All proposed road widths meet the recommendations made by local fire officials.

Principle #2: Street Length

Reduce the total length of residential streets by examining alternative street layouts to determine the best option for increasing the number of homes per unit length, while maintaining pedestrian and vehicular connectivity where appropriate.

Recommendation

The Roundtable endorses this principle with no additional recommendations.

Rationale

Total street length is often a function of the frontage, number of entrances, pedestrian safety, and physical site conditions. Guidance encouraging thoughtful, flexible and practical subdivision design criteria that reduces the overall street length can be useful to reduce impervious cover while maintaining the number of desired dwelling units.

No additional recommendations were made for this principle because the Lancaster area codes and ordinances already encourage alternative or efficient street layouts.

Principle #3: Rights-of-Way

Wherever possible, residential street right-of-way widths should reflect the minimum required to accommodate the travel-way, sidewalk, and vegetated open channels. Utilities and storm drains should be located within the pavement section of the right-of-way (ROW) wherever feasible.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

Right-of-way width should meet PennDOT liquid fuels minimum standards (min. 33 feet). Alternatively, if approved by the township, right-of-way widths may go below the PennDOT standards provided a cash contribution is made by the developer to the township to compensate for the loss of liquid fuels funds.

Rationale

This recommendation allows developers the flexibility to reduce right-of-way widths to as narrow as 33 feet if desired. Developers are not likely to reduce right-of-way width below this number because they will not qualify to receive PennDOT liquid fuels funds and therefore townships will be less likely to accept the roadways for dedication. Recommendations made under Principle 11 also help to reduce clearing in the right-of-way by reducing front yard setbacks.

Principle #4: Cul-de-Sacs

The use of residential cul-de-sac streets should be discouraged. Where cul-de-sac streets are necessary to protect natural resources; accommodate infill development; or best serve the community; they should incorporate innovative designs, such as landscaped islands and bioretention, in lieu of a fully paved turnaround. The radius of cul-de-sacs should be the minimum required to accommodate emergency and maintenance vehicles. Alternative turnarounds should be considered.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

1. Cul-de-sac streets should not be by-right and should only be used when in the best interest of the community.
2. When used, cul-de-sac turnarounds should incorporate environmentally sensitive design features. This may include landscaped islands and the incorporation of stormwater treatment practices, such as bioretention areas.
3. When used, cul-de-sac streets should be designed to meet PennDot liquid fuels minimum standards. If cul-de-sac street design does not meet these standards, a cash contribution may be made by the developer to the township to compensate for the loss of liquid fuels funds, provided such an alternative is approved by the township.

Rationale

While the use of cul-de-sac streets is currently discouraged in the Lancaster area, this recommendation further discourages their use by requiring special approval. When used, cul-de-sac streets must meet PennDOT liquid fuels criteria for townships to receive funding. The PennDOT criteria for cul-de-sac streets include use of a circular turnaround with a 40-foot minimum radius. Under the alternative stated in Recommendation #3, impervious cover could be further reduced by reducing the radius below 40 feet or by using alternative turnarounds such as hammerheads.

Principle #5: Vegetated Open Channels

Where density, topography, soils and slope permit, vegetated open channels may be used to convey and treat stormwater runoff from streets and parking lots within the development.

Recommendation

The Roundtable supports this principle and endorses the following recommendation:

Where breakup of the road edge is a concern when using vegetated open channels, methods such as a low-rising concrete strip, grass pavers, geosynthetics or other similar method should be used to provide additional protection from structural failure at the grass/pavement interface.

Rationale

Streets contribute higher loads of pollutants to urban stormwater than any other source area in residential developments (Bannerman, et al., 1993 and Steuer, et al. 1997). The use of vegetated open channels to convey stormwater runoff can remove some of these pollutants and decrease the volume of stormwater generated from a site. This principle encourages the use of vegetated open channels throughout a development rather than solely in the road right-of-way.

Principle #6: Parking Ratios

The required parking ratio governing a particular land use or activity should be enforced to curb excess parking space construction. Existing parking ratios should be reviewed for conformance taking into account local and national experience to see if lower ratios are warranted and feasible.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

1. The townships should review and revise parking ratios to reflect actual parking demands to reduce impervious cover.
2. Once appropriate parking ratios are determined, the townships will define "overflow parking." Parking that is considered overflow should be constructed in a structured pervious material.

Rationale

Parking ratios usually represent the minimum number of spaces needed to accommodate the highest hourly parking at the site (Wells, 1995). In many cases, these ratios are cut and paste recommendations and can result in far more spaces than are actually needed.

Revising the parking ratios to accurately reflect actual parking demand should reduce impervious cover from parking lots. Municipalities may elect to conduct a local parking study or to utilize existing national studies such as ITE (2004) and ULI (1999) for data on parking demand for various land uses. Requiring all overflow parking to be constructed in pervious materials would further reduce parking lot impervious cover.

Principle #7: Parking Codes

Parking codes should be revised to lower parking requirements where a legitimate relationship exists between mass transit routes and facility use, or when enforceable, shared parking arrangements are made.

Recommendation

The Roundtable endorses this principle with the following recommendations:

1. The County and townships should provide specific guidance on calculating appropriate reductions in parking ratios where shared parking is used. The suggested language below is taken from the Baltimore County, MD parking code.
2. Where parking ratios are reduced due to mass transit use, bus shelters and pull-off areas for buses should be provided to facilitate and further encourage mass transit use.

Table 2. Shared Parking Calculation from Baltimore County, MD

Two or more uses shall be permitted to share their off-street parking spaces in a common facility if the hours or days of peak parking for the uses are so different that a lower total will provide adequately for all uses served by the facility, without conflict or encroachment. To assure that no conflict or encroachment occur, shared parking spaces for such uses shall be provided according to the following table.

Land Use	Weekday		Weekend		
	Daytime (6:00 a.m. to 6:00 p.m.)	Evening (6:00 p.m. to midnight)	Daytime (6:00 a.m. to 6:00p.m.)	Evening (6:00 p.m. to midnight)	Nighttime (midnight to 6 a.m.)
Church, house of worship or place of religious assembly*					
Hotel or Motel	75%	100%	75%	100%	75%
Office or industrial	100%	10%	10%	5%	5%
Restaurant	50%	100%	100%	100%	10%
Retail	60%	90%	100%	70%	5%
Shopping center with 100,000 square feet or more of GLA	60%	90%	100%	70%	5%
Theater, commercial recreation, night-club or tavern	40%	100%	80%	100%	10%
Other Uses	100%	100%	100%	100%	100%

**The local municipality shall determine the percentage of parking spaces required for each of the five time periods on a case-by-case basis, depending on the existing and planned weekday and weekend activities.*

a. Method of calculation.
Step I – For each of the five time periods, multiply the minimum number of parking spaces required for each use (including any transit or ride-sharing adjustments) by the corresponding percentage in the table.
Step II – Add the results of each column. The required number of parking spaces shall equal the highest column total.

b. Conditions for approval.
(1) Reserved or otherwise restricted spaces shall not be shared.
(2) The land uses served by the shared parking facility shall be in single ownership or permitted for multiple ownership by the local municipality upon satisfactory guarantees of the continued operation and proper maintenance of the shared parking facility.

Rationale

Parking demand represents the actual number of parking spaces required to accommodate the parking needs of a particular land use. Depending on site conditions, it may be possible to reduce the number of parking spaces needed. For example, when mass transit is available nearby, or when shared parking is utilized, the number of parking spaces constructed may be reduced. Only a handful of communities take advantage of available mass transit as a justification to cap the number of parking spaces, but where they have, transit ridership has risen (CWP, 1998).

These recommendations are intended to ensure that reductions in parking codes could only be given where mass transit use is consistent enough to justify fewer parking spaces. This reflects the character of the Lancaster area, which does not currently rely heavily on mass transit.

Principle #8: Parking Lots

Reduce the overall imperviousness associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, and using pervious materials in spillover parking areas.

Recommendation

The Roundtable supports this principle and endorses the following recommendation:

Once appropriate parking ratios are determined, the townships will define "overflow parking." Parking that is considered overflow should be constructed in a structured pervious material.

Rationale

Parking lots are the largest component of impervious cover in most commercial and industrial zones, but conventional design practices do little to reduce the paved area in parking lots (CWP, 1998). The size of a parking lot is driven by stall geometry, lot layout and parking ratios.

Revisions to parking ratios recommended under Principle #6 will ensure that excessive parking spaces are not created. Requiring parking in excess of these ratios to be constructed of pervious material will further limit impervious cover produced by parking lots.

Principle #9: Parking Lot Runoff

Wherever possible, provide stormwater treatment for parking lot runoff using bioretention areas, filter strips, and/or other practices that can be integrated into landscaped areas and traffic islands, including those required by landscaping codes.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

1. Townships should encourage the integration of Low-Impact Development practices (such as bioretention areas, swales, filter strips, etc.) into landscaped areas, including those required by landscaping codes, to help manage and treat stormwater runoff.
2. Design of landscaped areas for stormwater treatment should promote vegetative health and minimize conflicts with lighting, signage, pavement and visibility. This can be accomplished in part through appropriate species selection.

Rationale

Parking lots are a significant source of stormwater pollutants in the suburban landscape, particularly lots in commercial areas (CWP, 1998). Typically, landscaping requirements are used to enhance the appearance of a parking lot or to visually separate land uses or developments, and account for 10-15% of the total parking lot area (CWP, 1998). These same areas can be used for stormwater management if properly designed.

These recommendations are intended to encourage the use of all appropriate landscaped areas for stormwater treatment, provided proper planning and maintenance procedures are used.

Lot Development

Principle #10: Open Space Development

Advocate open space development that incorporates smaller lot sizes to minimize total impervious areas, reduce total construction costs, conserve natural areas, provide community recreational space, and promote watershed protection.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

1. Pre-application meetings are strongly encouraged to comprehensively discuss site issues. A checklist and sketch plan should be part of this pre-application meeting.
2. If a preliminary plan meets all ordinance requirements, the township provides the option to the developer to modify the final plan submission process and treat the preliminary plan as a final plan.
3. Each township should adopt an Open Space ordinance as a by-right form of development as long as the ordinance includes a detailed list of design standards pertaining to the quantity, quality, and configuration of open space areas.
4. Current ordinances in EHT that establish ratios between types of dwelling units (SFD, Duplex, or Multi-family) and proposed common open space are considered an impediment to reaching allowable densities in designated growth areas and should be eliminated.
5. Townships should consider eliminating minimum lot sizes in open space ordinances. EHT and WHT should review the success of Flex Zones in MT, which allow for reduced setbacks and require no minimum lot sizes in certain residential districts.
6. In order to support the goals of channeling growth into designated growth areas and to meet allowable gross densities in these areas, flexibility should be afforded in the calculation of required open space. For example, narrow buffers and greenbelts should be included in the calculation of required open space if these areas of land are (1) contiguous to other existing or proposed common open spaces and integrated in such a way as to enhance the environmental or recreational value of the open spaces, (2) used to preserve historic resources, and (3) on tracts of land where the applicant can show that, due to natural features or configuration, densities are not possible due to limitations, such as narrowness of lot, steep slopes, etc. Under such allowances, higher density developments must show protection and/or enhancement of a site's natural features.
7. Open space requirements should emphasize the quality and function of open spaces and should be aligned with municipal and/or county comprehensive plans. Open space areas that preserve the natural hydrology of a development site or connect greenways or other common open space areas should be considered high quality areas. The quality and functions of proposed open space should be given greater importance in the review process than the strict interpretation of minimum open space percentage requirements, which can be arbitrary and not always relevant to a particular site.

Rationale

Open space development is a compact form of development that concentrates density on one portion of the site (through clustering) in exchange for more open space elsewhere. Open space development can improve water quality through impervious cover reduction, more efficient stormwater management, increased riparian buffers, increased open space, and avoidance of environmentally sensitive areas.

Requiring Conditional Use or Special Exception reviews for open space developments discourages their use because the process is more expensive and time consuming, particularly for small development firms. Adopting an open space ordinance as by-right levels the playing field for review and approval of all developments, regardless of the design. These recommendations are intended to provide flexibility in innovative designs that work to achieve multiple objectives in smart growth development and to address potential conflicts between meeting allowable densities and open space requirements.

Principle #11: Setback and Frontages

Relax side yard setbacks and allow narrower frontages to reduce total road length in the community and overall site imperviousness. Relax front setback requirements to minimize driveway lengths and reduce overall lot imperviousness. Relax rear setbacks as a means of reducing superfluous lot size and potential impervious lot cover.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

FRONT Yard Setbacks

1. *EHT*: Reduce front yard setback requirement for conventional and cluster development options (R1 and R2) to a minimum of 25 feet (currently 40 feet for conventional and 30 feet for cluster). Where houses have front-loaded garages, this setback shall only apply to the garage structure, allowing the house structure to be placed closer than 25 feet to the street right-of-way.
2. *WHT*: Reduce front yard setback requirement for conventional developments to a minimum of 25 feet in all residential zones (currently ranges from 30 to 40 feet for 5 different residential zones). Where houses have front-loaded garages, this setback shall only apply to the garage structure, allowing the house structure to be placed closer than 25 feet to the street right-of-way.
3. *MT*: Reduce front yard setback requirement for conventional developments from 30 feet to a minimum of 25 feet in RL zone. Where houses have front-loaded garages, this setback shall only apply to the garage structure, allowing the house structure to be placed closer than 25 feet to the street right-of-way.

SIDE Yard Setbacks

4. Side yard setbacks: Require minimum of 5 feet side yard setback with the flexibility to apply zero lot line design while maintaining a minimum of 10 feet separation between buildings. A five-foot wall maintenance /improvement/ drainage easement and the zero lot lines shall be indicated on the final plan when it is submitted for review and approval.

REAR Yard Setbacks

5. *EHT*: Reduce rear yard setback requirement for conventional and cluster development options (R1 and R2) from 35 feet to a minimum of 25 feet.
6. *WHT*: Reduce rear yard setback requirement for conventional design in RR from 35 feet to a minimum of 25 feet.
7. *MT*: Reduce rear yard setback requirement for conventional design in RL and RM to a minimum of 25 feet (currently 35 ft. for RL and 30 ft. for RM).
8. *ALL*: No minimum setback to garages shall apply to garages adjacent to alleys. Garages serviced by alleys shall be set back the minimum distance necessary to allow for vehicle movement to and from the garage.

Rationale

Often zoning codes have very strict requirements that govern the geometry of the lot. Relaxing setbacks and utilizing non-traditional designs can minimize imperviousness while reducing driveway lengths.

While frontage requirements in single-family home developments are not excessive in any of the three townships, some minor reductions in front and rear setback requirements were recommended to help reduce impervious cover contributed by driveways and roads and promote the "walkability" of streets. Manor Township's Flex Zones are a good model for offering flexibility in setback requirements and are reported to be successful in the township.

Principle #12: Sidewalks

Promote more flexible design standards for residential and subdivision sidewalks. Where practical, consider locating sidewalks on only one side of the street and providing common walkways linking pedestrian areas.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

1. In lieu of prescribed sidewalk standards, provide for alternative walkways that balance the need to provide pedestrian travel and connectivity and reduce impervious surfaces.
2. Encourage the use of pervious pavement, especially pervious asphalt on walkways.
3. Site designs should encourage walkability between residential developments, schools, stores, parks, trails and other community amenities.

Rationale

Sidewalk requirements are an important element of many zoning ordinances and are intended to protect pedestrians and address liability concerns. However, requirements should be flexible enough to meet pedestrian demands, while minimizing the amount of impervious cover.

Principle #13: Driveways and Alternative Surfaces

Reduce overall lot imperviousness by promoting alternative driveway surfaces and shared driveways that connect two or more homes together.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

1. Shared driveways should be an option in all residential districts but must be managed through an easement and maintenance agreement that is part of the property deed.
2. Pervious pavement materials should be permitted for driveway construction. Driveways should be designed to drain runoff to pervious areas and away from adjacent streets.
3. *EHT:* Reduce the minimum driveway widths from 12 to 9 feet for single lane and from 22 to 20 feet for double lane driveways.
4. Driveway widths between the road and designated parking areas may be as narrow as 9 feet wide for single lane driveways and 16 feet wide for double lane or shared driveways. Parking areas on driveways will need to be slightly wider.
5. Allow for two-track designs as an incentive to increase infiltration of stormwater.
6. Encourage the use of pervious pavement for alley construction.

Rationale

Studies show that 20% of the impervious cover in residential subdivisions can consist of driveways (Schueler, 1995). Flexible local subdivision codes can allow developers the ability to address this concern.

These recommendations reduce impervious cover by promoting the use of shared driveways, allowing the use of pervious pavement, and reducing driveway widths. An easement agreement for shared driveways is strongly recommended as this prevents future conflicts between homeowners over maintenance responsibility.

Principle #14: Open Space Management

Clearly specify how community open space will be managed and designate a sustainable legal entity responsible for managing both natural and recreational open space.

Recommendation

The Roundtable supports this principle and makes the following recommendations:

1. Permit the designation of open space that would separate areas for use by individual homeowners (restricted open space or limited common open space) and the public (common open space). Both types of open space would be managed by a homeowner's association or other designated third party professional.
2. Encourage the management of open space areas by professional management companies. Such companies must be approved by the local government as qualified in the long term management of open space/natural lands.
3. *MT* and *EHT*: Strengthen existing open space management ordinances to more thoroughly address allowable uses, placement of utilities, and elements of a quality maintenance plan. Consider adopting provisions from West Hempfield Township ordinance.
4. *MT*: Eliminate provision that allows for the sale of open space.
5. When open space areas are designed as part of a larger, integrated system (e.g., greenway or rail trail), these areas should be placed under an easement and managed by a third party for use by the general public.

Rationale

Open space management is often poorly defined in most communities, leaving the design and maintenance of the space up to the homeowner, homeowners associations (HOAs), or other entities that may be ill equipped to properly maintain high quality open space (Heraty, 1992).

Recommendation #1 proposes a departure from common practice in southcentral Pennsylvania regarding the management of land around multi-family or townhouse units. Under this recommendation, a townhouse owner would own the footprint of his unit and be responsible for the building and surrounding foundation plantings. Backyards and frontyards would be part of the restricted open space – the unit's owner could use this area for personal enjoyment but must honor rules on leaving it ready for mowing and other management practices by a third party as decided by a homeowners association. Other common open space would include pathways, sidewalks, stormwater facilities, utility lines, private roads, etc. This approach reduces the maintenance burden on the homeowner and ensures that open space will be managed by a trained professional.

Principle #15: Lot Runoff

Direct stormwater runoff to pervious areas such as yards, open channels, or vegetated areas and avoid routing runoff to the roadway and the stormwater conveyance system.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

1. Stormwater ordinances should prohibit rooftop connection to roadways.
2. Stormwater ordinances should encourage techniques that reduce and infiltrate runoff in a manner consistent with the varied soils and geology of Lancaster County. Practices that meet both water quality and recharge requirements should be encouraged and design standards should be adopted for applicability in this part of Lancaster County.
3. Local ordinances should require strategic, long-term management plans for stormwater management facilities that are located on both private lots and common, open areas. Management options should be included in the ordinance language.

Rationale

Sending lot runoff over a pervious surface before it reaches an impervious surface can decrease annual runoff volume from developed sites by as much as 50% and remove pollutants (Pitt, 1987).

Principle #16: Stormwater Education

Provide education for property owners on the long term maintenance needs of stormwater controls located on private property.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

1. Specific educational messages should target the long term maintenance of landscape designs that use native vegetation in open space areas, stream corridors, roadside and other drainage swales, bioretention gardens, and pervious pavement.
2. Local governments should work with developers and realtors to reach new homeowners.
3. Easement and maintenance agreements should be brought to the attention of all homeowners, especially 2nd and subsequent homeowners, so that they are aware of management responsibilities.
4. Education on disease risks associated with non-conventional stormwater management practices should reflect the latest research. For example, West Nile Virus is a problem with small, stagnant bodies of water and has not been found where stormwater is managed using a variety of techniques, including bioretention areas, raingardens, and drainage swales.

Rationale

It is critical that residential property owners understand how to care for landscape practices that are part of a comprehensive stormwater management strategy. In order to protect the integrity of decentralized stormwater management practices, local government programs must address the ongoing education of homeowners.

Conservation of Natural Areas

Principle #17: Buffer Systems

Create a naturally vegetated buffer system along all perennial streams that also encompasses critical environmental features (such as the 100-year floodplain, steep slopes and freshwater wetlands) and accommodates multiple uses (such as greenways, trails and stormwater management practices that minimize stormwater impacts to streams).

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

The width of the riparian buffer shall be established as the greatest of the following:

1. A specified distance from the top of each stream bank, based on stream order, as given in Table 3
2. The limit of the 100-year floodplain
3. 25 feet from riparian wetland boundary, if present
4. A total topwidth value centered on the existing channel given by the following procedure:
    a. Determine Drainage Area to downstream limit of stream reach
    b. Determine Bankfull Width from Regional Curve given below in Figure 1.
    c. Calculate Valley Slope through the site using best available topography.
    d. For Valley Slopes greater than 5%, multiply Bankfull Width by 2.5. For Valley Slopes less than 5%, multiply Bankfull width by 5.

Table 3. Minimum Buffer Widths by Stream Order

Stream Order	Buffer Width
1-2	35 feet
3-4	50 feet
>4	75 feet

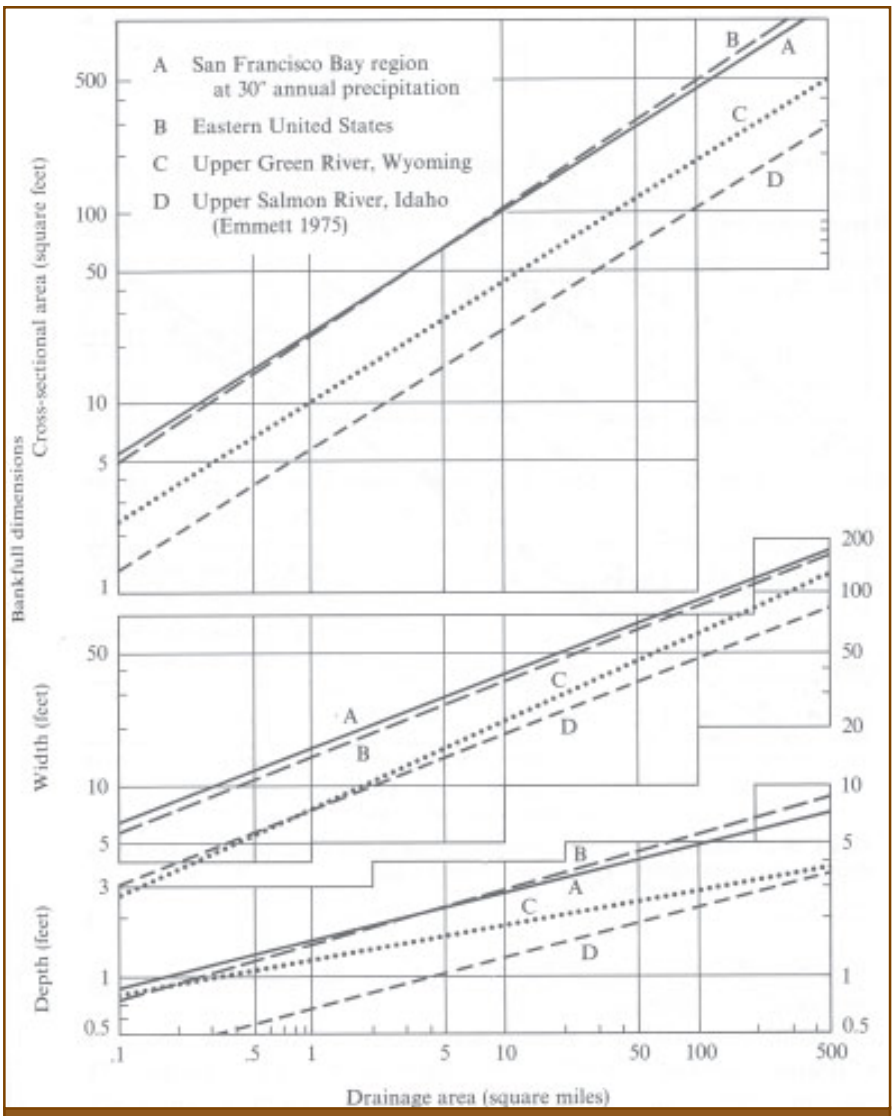

Figure 1. Regional Bankfull Width Curve (Dunne and Leopold, 1978)

Rationale

The proposed formula for determining buffer width is intended to satisfy the need to address site-specific conditions while providing a way to arrive at a quantifiable buffer width. While stream order provides a minimum buffer width, this formula should produce a larger width requirement if the site conditions warrant greater protection. Though dated, the regional bankfull width curves cover a larger geographic area and broader range of stream size than more recent USGS curves.

Principle #18: Buffer Management

The riparian stream buffer should be preserved or restored with native vegetation. The buffer system should be maintained through the plan review delineation, construction, and post-development stages.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

1. To protect stream buffers, show limits of disturbance on the site plan. During construction, use physical barriers to clearly delineate and protect buffer areas.
2. Develop ordinances to outline stages of clearing and grading on development plans.
3. Develop means to enforce and protect established buffers. Design a provision for buffer enforcement.
4. Encourage the reconnection of active stream channels to their historic floodplains before site development. The restoration of a floodplain to an appropriate elevation is necessary to provide a stable stream corridor in which to plant vegetated buffers.
5. New plantings in riparian buffers shall incorporate appropriate native and beneficial, non-native plant species to the greatest extent possible. Existing native and beneficial plants shall also be preserved to the greatest extent possible.
6. Emphasize education of homeowners regarding buffer management rather than the policing of buffers. Permanent signage should be installed in riparian areas to educate property owners about the value and maintenance of riparian areas. Delineate buffer borders using signs, markers, or split rail fencing. No-dumping should be part of the educational message.
7. Make buffer corridors community open space.

Rationale

Few communities specify mature riparian forest as a target for their buffer program (Heraty, 1993). Vegetative goals are often absent from existing riparian buffer ordinances. Encroachment of buffers is the norm given the fact that few communities educate builders and property owners about the value of conserving vegetated buffers. Strong buffer ordinances outline the legal rights and responsibilities of local governments and organizations or landowners responsible for long-term management of the buffer.

Education and incentives to protect and best manage riparian buffers was favored over strict enforcement of buffer zone restrictions. Recommendation #4, which recommends lowering elevated floodplains to their historic levels and replanting native vegetation, was prompted by a policy report by Land Studies, Inc. This report states that many of Lancaster's historic floodplains are disconnected from stream channels due to deposition of 4-5 feet of accumulated sediment from past agricultural and mill activities. Removing this sediment can re-establish historic floodplain levels and create healthy, stable riparian systems.

Principle #19: Clearing and Grading

Clearing and grading of forests and native vegetation at a site should be limited to the minimum amount needed to build lots, allow access, and provide fire protection. A fixed portion of any community open space should be managed as protected green space in a consolidated manner.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

1. Integrate GIS mapping resources to inform local government officials of important natural areas that need to be protected.
2. EHT and WHT should adopt tree protection zone ordinance language from the Lancaster County model ordinance
3. Enforce the tree protection ordinances by requiring site inspections as part of the building permit.
4. Use pre-construction meetings to outline secondary grading at time of building.
5. Encourage forest or tree inventories on wooded parcels and preserve as many quality trees and associated healthy understories (grouping of natural low-level woody, herbaceous or ground cover species) as possible. A tree inventory should be part of a broader natural resource inventory conducted for all new developments early in the planning process.

Rationale

Most communities allow clearing and grading of an entire site except for a few specially regulated areas such as jurisdictional wetlands, steep slopes and floodplains. Common tools to limit clearing and grading are erosion and sediment control ordinances, grading ordinances, forest conservation or tree protection ordinances, and open space development.

These recommendations encourage municipalities to be proactive in protecting their natural areas during development by (1) identifying important conservation areas prior to submittal of land development proposals and (2) by ensuring that the highest quality areas of a development site are targeted for protection during development through the use of forest inventories. These recommendations are intended to ensure that the limits of disturbance shown on subdivision plans translate directly into what is happening on the site by strengthening the site inspection process. The Lancaster County SALDO is a good model for tree protection because it requires preservation of 50% to 80% of trees and requires delineation of tree protection zones. Manor Township has already adopted this ordinance.

Principle #20: Tree Conservation

Conserve trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native plants. Wherever practical, manage community open space, street rights-of-way, parking lot islands, and other landscaped areas.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

1. Require developers to follow existing greenway and park plans to connect contiguous corridors as long as the governing municipality supports such a greenway/park plan.
2. Encourage the connectivity of open space lands through easements provided by developers.
3. New plantings shall incorporate appropriate native and beneficial non-native plant species to the greatest extent possible. Existing native and beneficial plants shall also be preserved to the greatest extent possible.
4. Where there are no trees on site, townships should consider offering incentives for the replanting of trees. Trees can play a valuable role in reducing stormwater runoff. Offering credit toward stormwater runoff calculations for planting new trees is one option.
5. Where there is agreement by all parties, townships should allow for narrower utility easements in environmentally sensitive areas. In some cases, narrower easements through wooded areas to preserve trees may not interfere with the installation and maintenance of utilities.

Rationale

Native trees, shrubs, and grasses are important contributors to the overall quality and viability of the environment. In addition, they can provide noticeable economic benefits to developers and homeowners.

The Lancaster County SALDO tree conservation and landscaping ordinances provide good models for tree conservation as they strongly emphasize native plant material and the connection of larger landscape patches.

Principle #21: Conservation Incentives

Incentives and flexibility in the form of density compensation, buffer averaging, property tax reduction, stormwater credits, and by-right open space development should be encouraged to promote conservation of stream buffers, forests, meadows, and other areas of environmental value. In addition, off-site mitigation consistent with locally adopted watershed plans should be encouraged.

Recommendation

The Roundtable supports this principle and endorses the following recommendations:

1. As an incentive to encourage the reconnection of streams to their historic floodplains (see Principle #18), where deemed appropriate, townships should consider allowing developers to use a restored floodplain area toward meeting stormwater management requirements. In granting this use, consideration should be given to the delineation and long-term preservation of these restored floodplains as part of a comprehensive site design.
2. Where there are no trees on site, townships should consider offering incentives for the replanting of trees and other appropriate native species. Trees can play a valuable role in reducing stormwater runoff and improving property values. Offering credit toward stormwater runoff calculations for planting new trees is one option.

Rationale

Conservation and protection measures that require excessive administrative requirements, such as lengthy plan reviews, additional upfront costs to developers and unclear appeal procedures can create a major barrier to implementation. Incentives and flexibility are an effective way to promote adoption of conservation and protection measures.

Because floodplains are natural systems that store stormwater temporarily and filter pollutants, consideration should be given to recent findings that many of Lancaster's historic floodplains are disconnected from stream channels due to deposition of 4-5 feet of accumulated sediment from past agricultural and mill activities. Removing this sediment can re-establish historic floodplain levels and create healthy, stable riparian systems. The water quality benefits and cost-effectiveness of this proposed practice are not fully known. Academic researchers and state and federal environmental agencies are currently working to answer these questions.

Principle #22: Stormwater Management

Municipal stormwater management programs should minimize both the quantitative and qualitative impacts of stormwater runoff. Natural drainage systems should be preserved and relied upon to manage stormwater wherever possible. New stormwater outfalls should not discharge unmanaged stormwater into any water body, especially jurisdictional wetlands, sole-source aquifers, or sensitive areas.

Recommendation

The Roundtable endorses the following recommendations:

1. Municipalities should provide incentives to reduce the generation of stormwater runoff.
2. Municipal ordinances should include the following:
   a. reference to an accepted technical design manual;
   b. non-exclusive listing of what nonstructural and structural stormwater practices are encouraged in central Lancaster County;
   c. requirement that all development projects require a post-construction stormwater management plan;
   d. required elements of a post-construction stormwater management plan; and
   e. enforcement provisions.
3. Municipalities are encouraged to adopt stormwater ordinances that reflect the following principles:
   a. Integrate stormwater management early in the site design process.
   b. Manage stormwater as close to the source as possible.
   c. Incorporate natural features as functional design elements to manage stormwater. Use natural systems, including undisturbed soil mantle and natural/existing vegetation, for quality and quantity control.
   d. Disconnect and increase Time of Concentration, rather than pipe and accelerate stormwater runoff.
   e. Reduce impacts of flooding by minimizing the volume of stormwater runoff generated. Encourage site designs that reduce impervious cover, disperse flow to pervious areas, and use conservation development design techniques.
   f. *Total runoff volume:* Infiltrate and recharge groundwater to the greatest extent possible.
   g. *Water Quality*: Capture and remove pollutants from runoff prior to discharge to streams by encouraging practices that enhance physical and biological removal of pollutants.
   h. *Channel Protection*: Protect downstream channels from erosion by detaining and releasing runoff so that erosive velocities would not degrade receiving stream channels. Research shows that the best option to provide channel protection is the extended detention of the one-year 24 hour storm event.
   i. Encourage innovative stormwater management design by providing flexibility in the review and permitting process.
   j. Allow comprehensive stormwater management designs by allowing infiltration and other volume reduction practices required by NDPES permits.

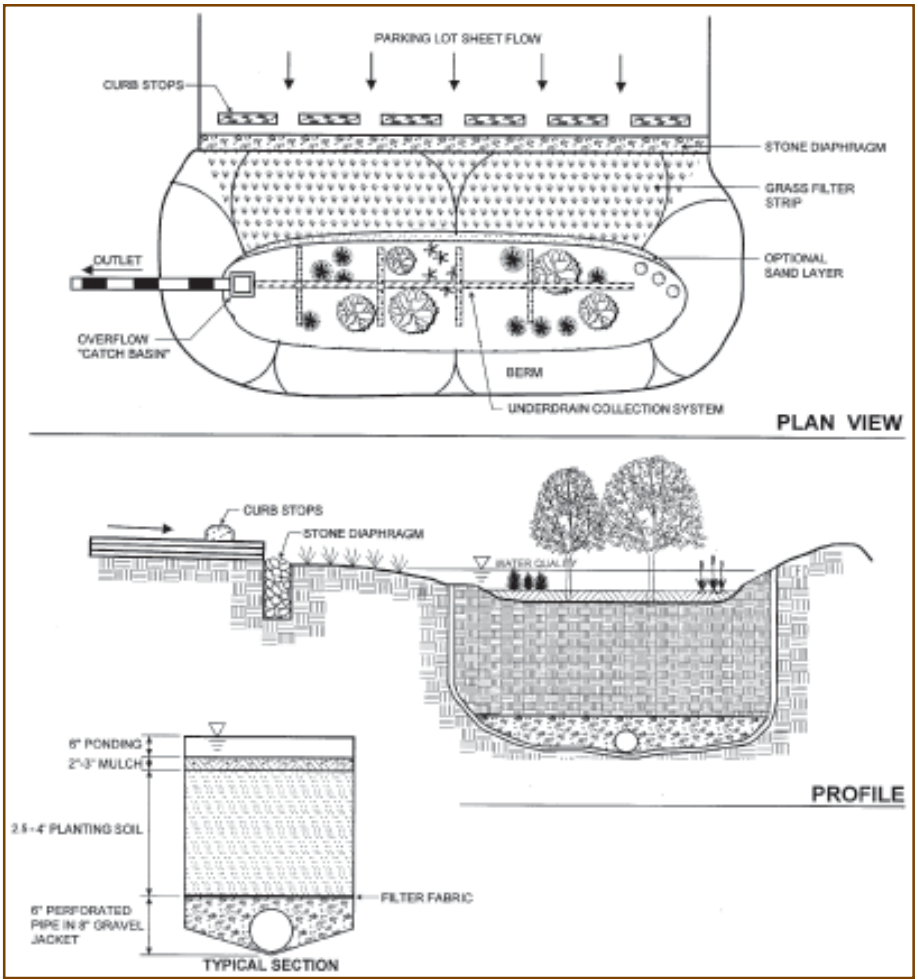

Figure 2. Bioretention Schematic

Rationale

Stormwater management requirements can be used to control the quantity and/or the quality of stormwater runoff from new sites. The stormwater runoff quantity controls can minimize flooding, and sometime reduce downstream erosion. Stormwater runoff quality measures can reduce the level of pollutants that enter the waterway and contaminate water sources.

Recommendation (i) is aimed at obtaining approval for practices that may not have a proven track record in the community but can be shown to be a sound approach based on applications in other areas or on sound engineering principles. Protocols exist for providing sound scientific and engineering evaluations for so-called innovative stormwater management practices. Examples include:

1. Municipal Research & Services Center of Washington at www.mrsc.org/Subjects/Environment/water/apwa/protocol.aspx;
2. Technical Acceptance Reciprocity Partnership or TARP (states of California, Illinois, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, and Virginia) Tier II Stormwater Technology Protocol; and
3. EPA's Environmental Technology Verification (ETV): http://www.epa.gov/etv/

Recommendation (j) is aimed at eliminating a double standard for reviewing practices that may or may not fall under NPDES requirements. Townships may be reluctant to approve practices that they may consider too risky or unproven for their area, despite the approval of these practices under the NPDES stormwater program. This recommendation encourages greater consistency in the approval of practices where the practices are shown to be sound approaches, regardless of permitting authority.

Builders for the Bay

In December 2001, the Alliance for the Chesapeake Bay, the Center for Watershed Protection, and the National Association of Homebuilders launched a partnership known as Builders for the Bay. The primary mission of the Builders for the Bay coalition is to coalesce local builders, developers, environmental groups, governments, and other important stakeholders in a process to review their existing codes and ordinances and begin a locality specific roundtable process. More information and resources related to the Builders for the Bay program can be accessed at www.buildersforthebay.net.

Center for Watershed Protection

Founded in 1992, the Center for Watershed Protection (CWP) is a non-profit organization that works with local, state, and federal governmental agencies, environmental consulting firms, watershed organizations, and the general public to provide objective and scientifically sound information on effective techniques to protect and restore urban watersheds. CWP also acts as a technical resource for local and state governments around the country to develop more effective urban stormwater and watershed protection programs. For more information on CWP visit www.cwp.org.

Alliance for the Chesapeake Bay

The Alliance for the Chesapeake Bay (ACB) is a regional non-profit organization that fosters partnerships for the restoration of the Bay and its rivers. ACB is known as the "Voice of the Bay" for its objective, unbiased information on Bay-related issues. Since 1971, ACB has been helping to build consensus on Bay policies; engaging volunteers in important hands-on restoration projects; educating citizens about the Chesapeake Bay watershed; and strengthening the capacity of grassroots watershed organizations. For more information on ACB visit www.alliancechesbay.org.

Building Industry Association of Lancaster County

Founded in 1956, the Building Industry Association of Lancaster County (BIALC) is a trade organization made up of residential builders, as well as subcontractors, suppliers and other service professionals involved in the home building industry. Its mission is to represent and promote its member companies associated with the residential building industry. This mission is achieved by the development of programs and events designed to educate and entertain the public, as well as to serve a community service.

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