Development patterns strongly influence, and are influenced by, the location and expansion of water infrastructure. Sprawling development can lead to rapid and sometimes costly infrastructure extensions into new areas as service providers accommodate new development. Conversely, infrastructure expansion can catalyze new growth. While the expansion of public water systems by itself is unlikely to be a major driver of sprawl, it can, in combination with sewers and other forms of infrastructure, help stimulate development projects in places where otherwise they would be unlikely to occur. The close connection between water infrastructure and development suggests the need for equally close coordination between land use planning and policies affecting water supply facilities.

How well are land use planning and water supply infrastructure coordinated in southeastern Pennsylvania, and what can be done to coordinate them more effectively? That is the central question addressed in this report, the second phase of a two-part study designed to promote smart growth policies for water and sewer infrastructure. The first phase on sewage facilities and land development was published in 2005.

Both studies were undertaken as part of 10,000 Friends of Pennsylvania’s ongoing effort to examine state investment policies in relation to land use and development. The goal of this effort is to build consensus around policy recommendations to target state infrastructure and economic development spending in and around other developed communities and in newer centers of suburban growth where development makes sense. Over the past 50 years, Pennsylvania’s older cities and towns have suffered from loss of population and economic activity, while new development continues to spread into once rural areas. Whether intended or not, state policies and programs are partly responsible for stimulating growth in exurban and rural areas at the cost of existing older communities. This investigation takes an in-depth look at one factor in growth and development — water supply infrastructure.

Summary

WATER AND GROWTH:
Toward a Stronger Connection Between Water Supply and Land Use in Southeastern Pennsylvania

Introduction

Development patterns strongly influence, and are influenced by, the location and expansion of water infrastructure. Sprawling development can lead to rapid and sometimes costly infrastructure extensions into new areas as service providers accommodate new development. Conversely, infrastructure expansion can catalyze new growth. While the expansion of public water systems by itself is unlikely to be a major driver of sprawl, it can, in combination with sewers and other forms of infrastructure, help stimulate development projects in places where otherwise they would be unlikely to occur. The close connection between water infrastructure and development suggests the need for equally close coordination between land use planning and policies affecting water supply facilities.

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The premise of this study is that a sound land and water strategy — one adhering to widely accepted smart growth principles — would include policies and incentives that direct development to areas where water supply infrastructure already exists, focus on protecting and maintaining the existing infrastructure, and reduce the need to expand the infrastructure to accommodate new development. It would also seek to protect water resources by encouraging coordination among water supply, sewage treatment, and stormwater systems in the recognition that all affect the health of watersheds.

As this report will show, policies and practices in southeastern Pennsylvania fall far short of this ideal. But recent progress has been made, and much more can be done to encourage an integrat-ed and comprehensive approach to land use and water infrastructure planning in Pennsylvania.

The study begins with an analysis of water franchise and service areas in southeastern Pennsylvania and their relationship to development trends. Next it reviews Pennsylvania’s legal and regulatory frameworks governing water supply, land use, and the relationships between land and water resources. It concludes with a series of policy recommendations aimed at managing water and land in accordance with smart water and smart growth principles.
Development Patterns and Water Infrastructure in Southeastern Pennsylvania

For this study, the Delaware Valley Regional Planning Commission (DVRPC) gathered and analyzed data on the 210 public water systems in the five counties of southeastern Pennsylvania—Bucks, Chester, Delaware, Montgomery, and Philadelphia. The analysis shows that the expansion of water supply infrastructure is outpacing population growth and supporting low-density development, despite substantial excess capacity in older communities. In addition, considerable development is occurring where public water services are not available.

- Between 1992 and 2003, the area served by public water supply systems expanded by 23 percent, yet the region’s population grew by only 3 percent during the 1990s. In one part of the region, Bucks County, the water service area increased by as much as 66 percent, compared to a population increase of just 10 percent.

Comparison of Water Service Areas 1992 and 2003

<table>
<thead>
<tr>
<th>Counties</th>
<th>Unused Capacity</th>
<th>Unused Domestic Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bucks</td>
<td>37,706,354</td>
<td>20,361,431</td>
</tr>
<tr>
<td>Chester</td>
<td>10,640,493</td>
<td>5,745,866</td>
</tr>
<tr>
<td>Delaware</td>
<td>38,990,545</td>
<td>21,054,894</td>
</tr>
<tr>
<td>Montgomery</td>
<td>18,084,242</td>
<td>10,197,490</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>277,300,000</td>
<td>127,981,000</td>
</tr>
<tr>
<td>4 Suburban Counties</td>
<td>106,221,633</td>
<td>57,359,682</td>
</tr>
<tr>
<td>Totals</td>
<td>378,521,633</td>
<td>185,340,602</td>
</tr>
</tbody>
</table>

Table 1: Population Served Under Maximum Daily Water Production

<table>
<thead>
<tr>
<th>Counties</th>
<th>Unused Capacity</th>
<th>Unused Domestic Capacity</th>
<th>Population by Per Capita Water Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60 GPD</td>
<td>100 GPD</td>
<td>125 GPD</td>
</tr>
<tr>
<td>Bucks</td>
<td>339,357</td>
<td>203,614</td>
<td>162,891</td>
</tr>
<tr>
<td>Chester</td>
<td>95,744</td>
<td>57,459</td>
<td>45,967</td>
</tr>
<tr>
<td>Delaware</td>
<td>350,915</td>
<td>210,549</td>
<td>168,439</td>
</tr>
<tr>
<td>Montgomery</td>
<td>169,958</td>
<td>101,975</td>
<td>81,580</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>2,133,017</td>
<td>1,279,810</td>
<td>1,023,848</td>
</tr>
<tr>
<td>Totals</td>
<td>3,089,011</td>
<td>1,853,407</td>
<td>1,482,725</td>
</tr>
</tbody>
</table>

The expansion of water supply infrastructure in southeastern Pennsylvania is outpacing population growth and supporting low-density development, despite substantial excess capacity in older communities.

- Public water systems have expanded rapidly into new areas despite the fact more than half of the overall system capacity to treat and deliver water remains unused. In 2002 there was enough unused capacity in public water systems to serve more than 1,000,000 new people, or about 387,000 new households, under maximum daily water production conditions. The loss of population and industry in older cities and boroughs helps explain the excess capacity in some systems.

- The expansion of water infrastructure helped support substantial new residential development in formerly rural areas. Of the 97,334 new homes built in southeastern Pennsylvania between 1991 and 2000, only 55 percent were located within the existing water service area. Thirty percent of the new homes were supported by water infrastructure that was extended into new areas between 1992 and 2003 (Table 2).

- New water infrastructure is supporting fewer people on more land. In 1992, population density in areas served by public water averaged 6.4 people per acre (4.1 people per acre in the suburban counties). But in areas where public water service was recently added (between 1992 and 2003) population density averaged only 1.3 people per acre. This suggests that much of the development supported by the new infrastructure was in the form of low-density, large lot development.

- Individual and community wells have supported extensive development where public water service is not available. Some 15 percent of the new homes in southeastern Pennsylvania were supported by individual and community wells.
Table 2: Location of New Housing Relative to Water Service Areas 1991 to 2000

<table>
<thead>
<tr>
<th>County</th>
<th>Total Building Permits*</th>
<th>Permits in Existing Water Service Area</th>
<th>Percent of Total Permits</th>
<th>Permits in Expanded Water Service Area</th>
<th>Percent of Total Permits</th>
<th>Permits On-Lot</th>
<th>Percent of Total Permits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bucks</td>
<td>27,219</td>
<td>10,201</td>
<td>37%</td>
<td>12,647</td>
<td>46%</td>
<td>4,371</td>
<td>16%</td>
</tr>
<tr>
<td>Chester</td>
<td>25,742</td>
<td>16,413</td>
<td>64%</td>
<td>1,737</td>
<td>7%</td>
<td>7,552</td>
<td>29%</td>
</tr>
<tr>
<td>Delaware</td>
<td>9,256</td>
<td>6,644</td>
<td>72%</td>
<td>2,402</td>
<td>26%</td>
<td>210</td>
<td>2%</td>
</tr>
<tr>
<td>Montgomery</td>
<td>30,845</td>
<td>15,467</td>
<td>51%</td>
<td>12,649</td>
<td>42%</td>
<td>2,199</td>
<td>7%</td>
</tr>
<tr>
<td><strong>4 Suburban Counties</strong></td>
<td><strong>92,262</strong></td>
<td><strong>48,725</strong></td>
<td><strong>53%</strong></td>
<td><strong>29,275</strong></td>
<td><strong>32%</strong></td>
<td><strong>14,262</strong></td>
<td><strong>15%</strong></td>
</tr>
<tr>
<td>Philadelphia*</td>
<td>5,072</td>
<td>5,072</td>
<td>100%</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>97,334</strong></td>
<td><strong>53,797</strong></td>
<td><strong>55%</strong></td>
<td><strong>29,275</strong></td>
<td><strong>30%</strong></td>
<td><strong>14,262</strong></td>
<td><strong>15%</strong></td>
</tr>
</tbody>
</table>

*Total Building Permits are from 1990–1999 Census data, except for Montgomery County, which provided Board of Assessment data for the same period, considered to be more accurate by Montgomery County Planning Commission. Building permits from this period are estimated to best represent homes built from 1991 to 2000.

**The entire City of Philadelphia is considered served, so all new housing units have been assigned to the existing served area.

Table 3: Population Density of Water Service Areas in 1992 and 2003 (people per acre)

<table>
<thead>
<tr>
<th>County</th>
<th>1992 WSA Density</th>
<th>2003 WSA Density</th>
<th>Percent Decrease</th>
<th>Expanded WSA Density</th>
<th>Density of Unserved Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bucks</td>
<td>5.4</td>
<td>3.8</td>
<td>30%</td>
<td>1.4</td>
<td>.4</td>
</tr>
<tr>
<td>Chester</td>
<td>2.1</td>
<td>2.0</td>
<td>5%</td>
<td>.9</td>
<td>.4</td>
</tr>
<tr>
<td>Delaware</td>
<td>6.3</td>
<td>5.5</td>
<td>13%</td>
<td>1.3</td>
<td>.6</td>
</tr>
<tr>
<td>Montgomery</td>
<td>4.2</td>
<td>3.5</td>
<td>19%</td>
<td>1.3</td>
<td>.5</td>
</tr>
<tr>
<td><strong>4 Suburban Counties</strong></td>
<td><strong>4.1</strong></td>
<td><strong>3.5</strong></td>
<td><strong>15%</strong></td>
<td><strong>1.3</strong></td>
<td><strong>.4</strong></td>
</tr>
<tr>
<td>Philadelphia</td>
<td>17.4</td>
<td>16.6</td>
<td>5%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>6.4</strong></td>
<td><strong>5.3</strong></td>
<td><strong>17%</strong></td>
<td><strong>1.3</strong></td>
<td><strong>.4</strong></td>
</tr>
</tbody>
</table>

Pennsylvania Water Law

Water use in Pennsylvania is controlled by a disjointed set of laws and regulations developed over 200 years in response to the demands of growth, environmental concerns, and court disputes. Although individual water policies each address important concerns, they do not add up to a unified legal framework, nor are they integrated with laws governing land use.

- The Water Rights Act (WRA) is the single state statute addressing water acquisition and allocation in Pennsylvania and its scope is very limited. Through water allocation permits granted by the Department of Environmental Protection (DEP), the WRA controls water purveyors that withdraw surface waters for public use. It does not apply to groundwater resources. Although local governments may comment on permit applications, local land use concerns are not within the purview of the WRA, and DEP does not consider local land use plans and ordinances in reviewing WRA permits.

- Another important state law, the Safe Drinking Water Act (SDWA), establishes standards for public drinking water and construction of public water systems. The SDWA applies to both ground and surface water sources and to all but the smallest water systems. Under the SDWA, DEP requires water purveyors to obtain a permit to construct, operate or substantially modify public water facilities, although water line extensions are specifically excluded from the permit requirement. While DEP must ensure that permits comply with other environmental laws, the agency's permit approval is focused on the sanitary features of facility design and public health considerations; local land use as it relates to water infrastructure is not addressed in the law.

- Layered on top of the state's piecemeal approach to water management are interstate federal compacts that control water resources in identified river basins and watersheds. In southeastern Pennsylvania, the Delaware River Basin Compact authorizes the Delaware River Basin Commission (DRBC) to regulate water quality, use of groundwater, and facilities affecting water resources. DRBC reviews and permits projects that may have a substantial effect on the basin's water resources to determine consistency with its comprehensive plan. DRBC has established a 1,000 square-mile Ground Water Protected Area, a region of southeastern Pennsylvania where projects withdrawing more than 10,000 gallons of groundwater per day are subject to DRBC review. (Elsewhere, DRBC reviews projects withdrawing more than 100,000 gallons per day.) Generally, DRBC does not review local or major water distribution lines and appurtenances unless they involve a significant amount of groundwater disturbance or pass through a reservoir or recreation area noted in DRBC's comprehensive plan. However, a state agency can refer projects to DRBC for review. As an interstate agency, DRBC cannot feasibly regulate local land use issues.
Public water systems may be provided by any of three entities in Pennsylvania—municipal water authorities, municipal water systems, and public utilities—each of which is regulated differently.

**Municipal Authorities**, as defined by the Municipality Authorities Act (MAA), may be created individually or jointly by any county or municipality. They are governed by boards appointed by participating municipalities, but otherwise operate independently. Unlike private water companies, they are prohibited from competing with existing enterprises serving the same purpose. While authorities are similar to public utilities in many ways, they are regulated by the common pleas court rather than the Public Utility Commission (PUC).

**Municipal water systems** are operated directly by one or several municipalities. Municipalities are empowered to set their own rates and fees and to use their taxing powers to build or maintain their water systems without state regulation or oversight by the PUC. However, PUC jurisdiction does apply to any services provided beyond the municipal boundaries.

**Public utilities** are private water companies overseen by the PUC, which has authority to regulate services, facilities, and rates. The PUC regulates water service and infrastructure through the granting of Certificates of Public Convenience (certificates). Newly forming public utilities must apply for a certificate in order to begin to supply service. Those utilities that are already operating must apply for a certificate in order to provide a different service, provide service to a different territory, and acquire or transfer property. Water utilities and municipal water systems applying for a certificate must provide information to the PUC establishing that their service is adequate to meet customer demands and financially viable. They must also demonstrate a demand for the service, though such demonstration may consist of nothing more than written request by a developer and a single resident of a subdivision that lacks public water service. Since the proposed service areas need not be tightly drawn around the anticipated customers, they are often larger than necessary. Once a franchise for service is granted, the utility has a “duty to serve” new customers within the service area.

PUC certificates of convenience allow the expansion of water service territories based on demonstration of only a single residential need for service. The PUC tends to approve large service territories in anticipation of future development.

**Pennsylvania Land Use Law**

Since almost all land uses require water services, land use regulation significantly influences the location of infrastructure as well as the quality and quantity of water resources. Pennsylvania’s Municipalities Planning Code (MPC) delegates land use authority exclusively to local governments, which are authorized, but not required, to prepare comprehensive plans. Pennsylvania’s case law has facilitated sprawling growth patterns by requiring each community that chooses to plan to provide for every category of land use—residen-
also authorizes municipalities to plan for water resource protection, its focus is on providing reliable water services to support growth and development. While the MPC directs a water purveyor to notify local governments concerning significant infrastructure expansion, municipalities are allowed only to advise the purveyor as to whether or not its plans are consistent with local plans and ordinances. Since local government recommendations are not binding, the construction or extension of a water line may be valid under the MPC even when it is inconsistent with the local comprehensive plan.

However, land use policies may influence the funding and permitting decisions of state agencies. According to the MPC, state agencies “shall consider and may rely upon comprehensive plans and zoning ordinances when reviewing applications for funding and permitting of infrastructure or facilities.” To obtain such consideration, comprehensive plans and ordinances must be “generally consistent” with each other. Note that the MPC requires only that agencies consider local plans and ordinances. They may still permit or fund infrastructure projects that undermine local planning and zoning.

The MPC requires only that water purveyors notify municipalities of planned infrastructure expansions. It does not require that such expansions be consistent with local plans and ordinances.

While Pennsylvania has far to go in developing a coordinated approach to land use and water infrastructure planning, the state has recently made some significant progress.

- **Acts 67 and 68 amended the MPC in 2000.** The new provisions facilitate multi-municipal planning by permitting contiguous local governments to plan together while retaining individual control of zoning ordinances. An advantage of multi-municipal planning is that it allows participating municipalities to share land uses within the area of the plan, rather than having to duplicate the full range of land uses within their individual boundaries. It also helps municipalities coordinate planning for water infrastructure and other issues that should be considered regionally. Multi-municipal plans may designate growth areas, where public infrastructure will be provided, and rural resource areas, where it will not.

- **The Interagency Letter of Understanding (LOU) establishes a consistent framework for state agencies to follow in carrying out the MPC’s directive to consider local land use plans and ordinances.** The LOU provides criteria to help agencies determine whether or not proposed projects are consistent with local land use policies. Ten state agencies have signed the LOU, including DEP, the Department of Conservation and Natural Resources, the Department of Transportation, PENNVEST, DCED, and the PUC.

- **The Keystone Principles and Criteria for Growth, Investment and Resource Conservation** represent a coordinated effort to encourage state agencies to make funding decisions that are compatible with smart growth objectives. The principles include: providing efficient infrastructure by using and improving existing infrastructure; providing public water in growth areas; requiring expansions to be consistent with local land use; and planning regionally with local implementation.

**Conclusions and Recommendations**

Current policies, practices, and institutional arrangements in Pennsylvania discourage government officials, planners, water purveyors, and other stakeholders from managing water and land as interrelated resources. Water is governed by a complex set of laws and regulations that, for the most part, treat drinking water, wastewater, stormwater, and surface water quality as separate domains, none of which are well integrated with laws governing land use.
sound land use decisions. Uncoordinated laws and regulatory regional planning and intergovernmental coopera-

building on progress that has already been made Commonwealth can overcome these challenges by choosing to plan and zone must provide for every type of land use (unless it shares such planning on a multi-municipal basis under the MPC). That requirement, combined with public utility law establishing a duty to serve new customers, results in scattered development and virtually unlimited extension of water supply infrastructure to support new development.

Uncoordinated laws and regulatory regimes reinforced by court decisions make it almost impossible to integrate infrastructure investments with sound land use decisions.

Local officials in small municipalities, often with limited resources, are charged with planning for all aspects of growth, including the provision of a reliable water supply and the protection of natural resources. Yet state law denies them control over water infrastructure and fails to require water systems to be consistent with local comprehensive land use plans and ordinances. Although the current regulatory regime for water supply and land use presents serious obstacles to smart growth in Pennsylvania, the Commonwealth can overcome these challenges by building on progress that has already been made in targeting state funding policies, promoting regional planning and intergovernmental coopera-

tion, and compiling information to inform water-related plans and policies. The recommendations presented below are intended to strengthen and improve efforts that are already underway, resulting in a legal and regulatory regime that:

1. Align policies and incentives to direct development to areas where infrastructure already exists, protects and maintains existing infrastructure, and reduces the need to extend infrastructure to serve new development.
2. Promotes a comprehensive approach to water and land use that coordinates drinking water, wastewater, stormwater, and land use across municipal boundaries.
3. Provides sufficient information to support integrated land and water planning and decision-making processes.
4. Provides for efficient use of water.

Recommendations

1. Align policies and incentives to direct development to areas where infrastructure already exists, protect and maintain existing infrastructure, and reduce the need to extend infrastructure to serve new development.

DVRPC’s analysis of public water systems in southeastern Pennsylvania shows that water infrastructure has expanded rapidly into new areas despite substantial unused capacity where infrastructure already exists. From the standpoint of both economic efficiency and sound land and water resource management, it would be better to direct a larger share of the region’s development to areas that are already served by public water systems, or to adjacent areas where the infrastructure can be easily extended, and to discourage development in rural areas where public water is not available.

This entails efforts to concentrate development in and around existing developed areas, which are likely to be served not only by water systems, but also by sewerage, adequate roads, and other kinds of public infrastructure. Policies to encourage development where water infrastructure already exists would tend to promote more efficient use of infrastructure in general.

1.1 Use the Keystone Principles and Criteria for Growth, Investment, and Resource Conservation to enable PENNVEST, DCED, DEP and other agencies to give priority consideration and funding to projects that promote revitalization of older communities, maintain and improve existing infrastructure, and are consistent with regional planning initiatives. Consider expanding the Principles and Criteria to permitting decisions.

The Keystone Principles and Criteria have tremendous potential to improve coordination among state agencies and ensure that state funds are used to promote regional approaches and common land use goals. Consistent application of the Keystone Principles would support efficient use of and investments in infrastructure by prioritizing projects that:

• Support revitalization of cities and towns;
• Promote redevelopment of brownfield sites;
• Support rehabilitation of historic buildings and neighborhoods;
• Encourage compact development that is integrated with existing or planned infrastructure;
• “Fix it first” (focus on using and improving existing infrastructure);

• Require infrastructure expansions to be consistent with local comprehensive plans and ordinances, and
• Support county, multi-municipal, and municipal planning and implementation that is consistent with these principles.

Note, however, that PENNVEST funding accounts for just one-third of investments made in water and sewer infrastructure in Pennsylvania. If the Keystone Principles and Criteria also applied to permitting programs (at least on an informa-
tional basis), they could influence investments made by developers, private water companies, and other investors.

1.2 Use designated growth areas, rural resource areas, and other available land use tools, implemented through consistent land use ordinances, to direct development to areas where water infrastructure is available or planned, and to discourage development in areas where public infrastructure is not planned. The Act 67/68 revisions to the Municipalities Planning Code authorize municipal, multi-municipal, and county comprehensive plans to identify growth areas where “a full range of public infrastructure services” can be planned and provided (Section 301(d)). They also authorize county and multi-municipal plans to identify rural resource areas where “infrastructure extensions or improve-
ments are not intended to be publicly financed” except for health, safety or other specified reasons (Section 1103(2)(iii). Designated growth areas can be located adjacent to existing developed areas, or even within such areas, so long as there are sufficient opportunities for infill develop-
ment to accommodate new growth. In
addition, transferable development rights
programs, traditional neighborhood devel-
opments, transit oriented development,
transit revitalization investment districts
and specific plans can all be used to direct
development to areas where infrastructure
is planned for or already available. Since
ordinances, not plans, have the force of
law, it is important for communities that
include such tools in their comprehensive
plans to implement them through zoning
and other land use ordinances.

1.3 Require that water purveyor service
areas be consistent with local plans
and ordinances, and especially with
designated growth areas.

It is important to ensure municipal author-
ities and municipal water systems are
bound to conform to local plans and zon-
ing ordinances, and especially to align
service areas with designated growth areas,
rather than have authorities and purveyors
pursue a development strategy that is at
odds with local comprehensive plans.
To support this recommendation, the
Municipal Authorities Act could be modi-
fied to require that actions by authorities
concerning water (and sewer) infrastruc-
ture be consistent with county, municipal,
and multi-municipal plans and ordinances.

Similarly, for the 20 percent of private
water companies regulated as public utili-
ties, the PUC could modify its regulations
to explicitly require consistency with
county, municipal, or multi-municipal
comprehensive plans and ordinances in
granting certificates of public convenience.
Although the duty to serve new customers
creates pressure to expand public utility
service territories, the PUC could limit the
size of such territories by drawing their
boundaries more tightly around anticipated
new customers and avoiding extensions
beyond designated growth areas.

1.4 Adopt regulatory and educational
programs addressing groundwater
resources in order to ensure that
reliance on individual and community
wells supports development that is
consistent with local plans for growth
and conservation.

Scattered growth patterns in southeastern
Pennsylvania attest to the fact that wells
often support development where public
water systems are not available. When
wells fail or groundwater resources become
stressed, water purveyors may feel com-
pelled to expand public services into areas
where infrastructure was not planned or
desired. County, multi-municipal, and
municipal plans and ordinances should be
used to guide the location and appropriate
use of decentralized water systems relying
on groundwater. In addition, DEP could
create educational systems for homeowners
and operators of small private community
systems to encourage proper location,
design, operation, and maintenance of
wells and satellite community systems to
reduce the need to extend public water
systems for environmental and public
health reasons.

2. Promote a comprehensive approach to
water and land use that coordinates drink-
ing water, wastewater, stormwater, and
land use across municipal boundaries.

The recommendations presented above are
aimed at directing new development to areas
where infrastructure exists or is planned, limit-
ing the need to expand infrastructure to accom-
modate new development, and ensuring that
sufficient resources are available to maintain
existing service and update it as needed. A
truly comprehensive approach would go even
further, promoting integrated water resource
management by aligning policies and incentives
to prevent unsustainable and ecologically
harmful withdrawals from rivers and streams,
protecting groundwater resources, and mini-
mizing the negative environmental impacts
of inter-basin and inter-watershed transfers.

2.1 Consider creating and implementing
a comprehensive water supply, water-
shed, water resources, sewerage
planning process that is coordinated
at the county level (as with Act 167
for stormwater) in order to assure
adequate evaluation of regional needs
and watershed impacts.

A truly comprehensive water and land use
planning process would include the con-
sideration of drinking water, wastewater,
stormwater, and land use on a watershed
basis. Watershed planning efforts are
already underway under Act 167, the
Stormwater Management Act. This
legislation requires each county in
Pennsylvania to “prepare and adopt a
watershed stormwater management plan
for each watershed located in the county.”
The Act 167 program is funded, and coun-
ty and local governments are reimbursed
by DEP. But the program does not address
the full range of water resource manage-
ment needs, and proposals to strengthen
its implementation are currently being
circulated. The Delaware River Basin
Commission also promotes innovative
watershed planning in southeastern
Pennsylvania by encouraging munici-
palities to develop integrated resource
plans on a multi-municipal basis. The goal
is to incorporate comprehensive water
resource planning and land use planning
into municipal comprehensive plans. These
examples indicate the potential value of
integrating the future implementation of
Act 220, local water resources planning,
Act 537 sewage facilities planning, and
land use planning at a level sufficient to
address regional as well as local needs.

2.2 Implement section 301(b) of the
Municipalities Planning Code by
requiring and financially supporting
timely and complete updates of
municipal, county, and multi-municipal
comprehensive plans so that they
“include a plan for the reliable supply
of water, considering current future
water resources availability, uses
and limitations, including provisions
adequate to protect water supply
sources.” Such plans should be
consistent with county, watershed,
regional and state water plans.

The Municipalities Planning Code (MPC),
as amended in 2000, requires all munici-
palities and counties with a comprehensive
plan to include a water resource plan.
(Such plan elements were previously
optional.) But plans need to be updated in
order to include these elements, and once
they are updated they should be kept cur-
cent. Updating comprehensive plans to
include water resource plans will require
financial and technical support, and an
outreach effort that will connect land use
decision-making to a concern for water
resources. This same provision requires
the water resources planning element of
comprehensive plans to be “generally con-
sistent with the State Water Plan,” which
will be released in March 2008 under
Pennsylvania’s Act 220. Implementation
2.3 Revise policies of state agencies for funding or permitting water supply facilities to ensure that they consider local comprehensive plans and zoning ordinances, but only where such plans and ordinances are up to date and take into account water resources as provided by MPC section 301(b).

The Act 67/68 amendments to the MPC require that Commonwealth agencies “shall consider and may rely upon comprehensive plans and zoning ordinances when reviewing applications for the funding or permitting of infrastructure or facilities” for those facilities that develop, rely upon, or deliver a water supply. This deference to local plans and ordinances should be applied only when the plans are up-to-date in incorporating consideration of water supplies and water resources. This will provide a further incentive for the integration of water resources with land use planning.

2.4 DCED should be funded to provide more direct outreach and technical assistance to support water resource planning and encourage multi-municipal planning and implementation.

Multi-municipal planning and implementation is one of the few ways local governments can achieve more rational and coordinated development and infrastructure expansion. With additional funding, the Commonwealth could raise the number and quality of regional planning efforts statewide, improve the implementation of such plans, and increase the potential for integrating water and land use on a regional basis.

2.5 DEP and DCED should be funded to provide training to counties, municipalities, and municipal authorities on effective means to consider and evaluate water resources and water supplies, as well as to provide a forum for local officials and developers to work with regulatory agencies in order to ensure that water resource and supply issues are addressed early in comprehensive planning and in the development process under zoning regulations, taking into account regional watershed concerns.

Local governments need technical support and training to make it possible to integrate decisions about land, water, and growth. Existing training providers, such as the Local Government Academy in western Pennsylvania, can be marshaled toward improving these connections when land use plans and regulations are developed, and land use decisions are made. The Commonwealth can also support collaborative and informational processes to coordinate growth with local land use and watershed priorities.

3. Provide sufficient information to support integrated land and water planning and decision-making processes.

Linking land and water planning with effective decision-making depends upon the continuing availability of reliable information on water resources, watershed integrity, and water demand. Pennsylvania’s Act 220, the Water Resources Planning Act, is designed to produce just this sort of information. The following recommendations could help ensure that the state water plan effectively provides guidance for integrating land and water decisions.

3.1 Provide adequate funding to implement the state water plan being prepared under Act 220.

The State Water Plan will be completed in March 2008. There is no current funding source to enhance the ability of Pennsylvania’s local governments, authorities, state agencies, and private parties to make use of its “information, objectives, priorities and recommendations,” which are by law intended “to be considered and weighed in a broad range of state, local and private decisions” (Act 220, § 3116). Support will be needed to make the plan useful by providing for sharing timely and targeted information to local and regional decision-makers, water suppliers, and land use planners and developers.

3.2 The Commonwealth could adopt financial and technical assistance incentives and enforceable mandates to encourage state agencies, municipalities, municipal authorities, and private water utilities (as well as the Public Utility Commission) to consider and use the plan. DEP, DCED, or another Commonwealth agency should develop standards for determining when county, municipal, or multi-municipal plans are “generally consistent with the State Water Plan” as required by section 301 of the MPC.

4. Provide for efficient use of water.

While stronger connections between land use and water supply infrastructure would help conserve and protect water resources, additional steps could be taken to encourage water purveyors and consumers to use water more efficiently.

4.1 Investigate the feasibility of policies encouraging water suppliers to pursue innovative and cost-effective water strategies that improve efficiency of water use, and conservation of watersheds.

Water supply problems have been “solved” largely with large scale engineering projects for the last century. But greater efficiencies in the use of water can produce substantial benefits without a higher level of public expenditure. Numerous water efficiency...
technologies are available to address water use. Municipal water systems, municipal authorities, and the PUC could establish rates that promote conservation and efficiency by water users, including “conservation rates” that charge more per unit used as water use increases, or raise rates during summer months when water supplies are typically stressed. Additional provisions could allow water suppliers to recover some return on investment where they assist customers with water-efficient technology. Note however that these are complex issues that require further research before policy decisions are reached.

4.2 Provide development incentives and preferences linked to water efficiency and maintenance of water supply health.

The Commonwealth and municipalities could provide funding and permitting incentives for water-efficient development and land conservation. Such incentives could include preferences or requirements for “green buildings,” zoning and permitting advantages for water-efficient buildings and developments, awards and recognition for green infrastructure that protects the health of water sources, and programs to support reuse of grey water in water-limited environments and water-shortage conditions.

Further Research

This report raises issues and draws conclusions about how state policies and practices for water, land use, and public utilities and local planning and zoning practices combine to facilitate sprawling development patterns. But further analysis is needed to promote a truly comprehensive approach to land, water, and growth in Pennsylvania. Significant public investment for infrastructure has already been made in older developed areas of Pennsylvania, but many of these places are still suffering from loss of population and economic activity. In order to revitalize declining cities and boroughs and direct development to areas where infrastructure and other services are currently located, research on costs and maintenance needs is required. Specific questions include:

- How do other states coordinate land use planning with water resource planning and decision-making? What are the models of best practice in integrated land and water planning?
- To what extent could adequate public facilities (“concurrency”) ordinances and impact fees help direct development to areas where infrastructure is already available? What are the possible unintended consequences of such policies?
- What are the capital maintenance needs of water systems in older communities? What are the needs of all systems, five, ten, or twenty years in the future? Who will pay for these needs?
- What are the fiscal impacts of National Pollutant Discharge Elimination System (NPDES) and the Chesapeake Bay Program, especially for small municipal water systems and municipal authorities?
- How are state funds invested in existing systems relative to new systems? What is the extent of the role of private investments in water infrastructure?
- Is a model land/water code needed and, if so, what form should it take?

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