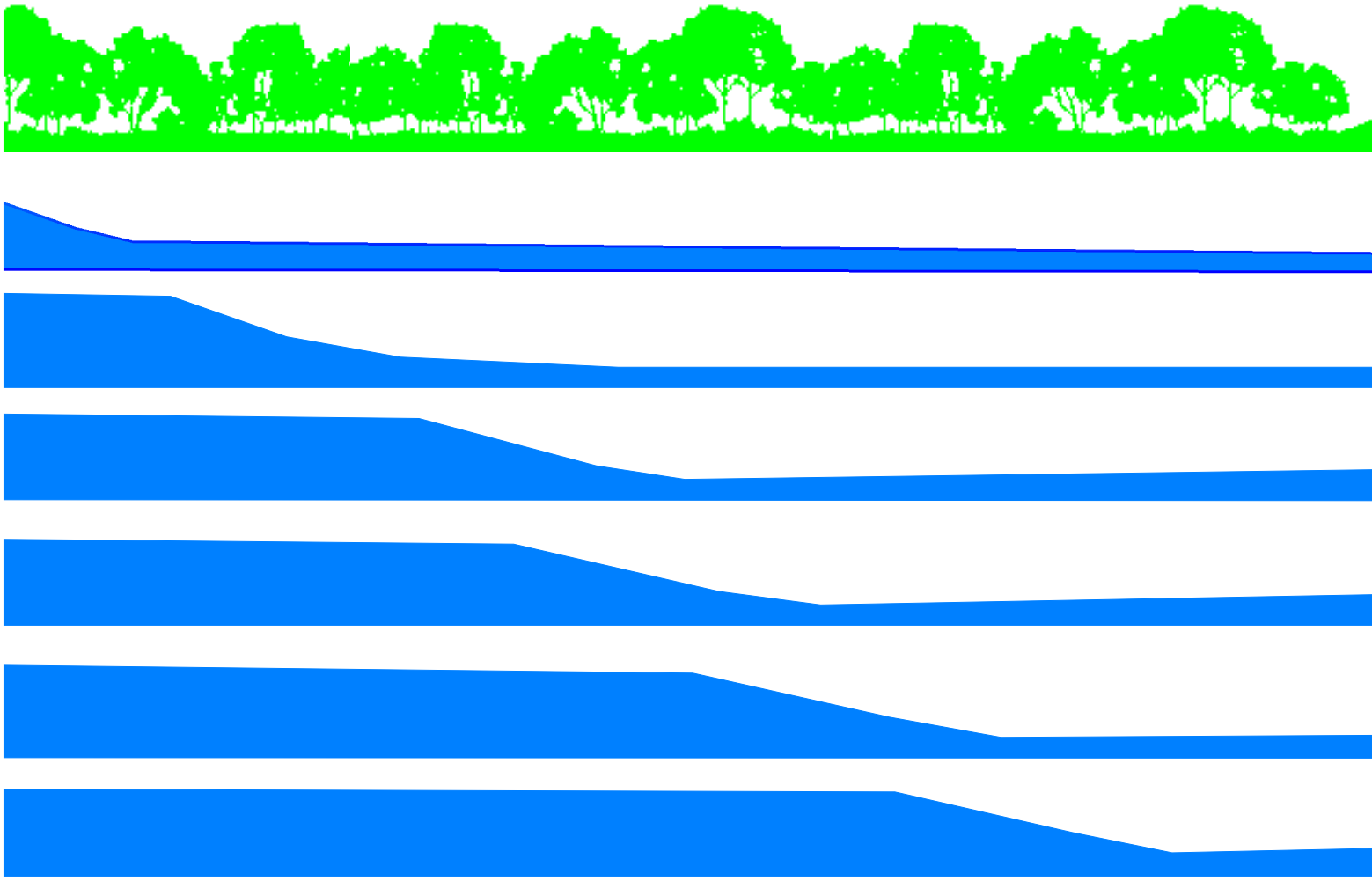
LINKING LAND USE AND TRANSPORTATION PLANNING

CASE STUDIES OF SUCCESSFUL IMPLEMENTATION

REPORT 20



DIRECTION 2020

A Region on the Rise

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

LINKING LAND USE AND TRANSPORTATION PLANNING

CASE STUDIES OF SUCCESSFUL IMPLEMENTATION

DIRECTION 2020 REPORT #20

DELAWARE VALLEY REGIONAL PLANNING COMMISSION
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PHILADELPHIA, PENNSYLVANIA 19106-2515

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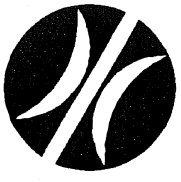
The preparation of this report was funded through federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), as well as by DVRPC's member governments. The authors, however, are solely responsible for its findings and conclusions, which may not represent the official views or policies of the funding agencies.

Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty and intercity agency which provides continuing, comprehensive and coordinated planning for the orderly growth and development of the Delaware Valley region. The region includes Bucks, Chester, Delaware, and Montgomery counties as well as the City of Philadelphia in Pennsylvania and Burlington, Camden, Gloucester, and Mercer counties in New Jersey. The Commission is an advisory agency which divides its planning and service functions between the Office of the Executive Director, the Office of Public Affairs, and three line Divisions: Transportation Planning, Regional Information Services Center, which includes Regional Planning Office, and Finance and Administration. DVRPC's mission for the 1990s is to emphasize technical assistance and services and to conduct high priority studies for member state and local governments, while determining and meeting the needs of the private sector.



The DVRPC logo is adapted from the official seal of the Commission and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole while the diagonal bar signifies the Delaware River flowing through it. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey. The logo combines these elements to depict the areas served by DVRPC.

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Publication Abstract

TITLE	Date Published: September 1994
LINKING LAND USE AND TRANSPORTATION PLANNING: CASE STUDIES OF SUCCESSFUL IMPLEMENTATION	**Publication No. 94020**

Geographic Area Covered: Nine-county DVRPC region. Survey administered to 353 municipalities.

Key Words: Land use and transportation linkages; planning tools: comprehensive/master plans; zoning ordinances; site design and performance standards; official maps; capital facilities plans; traffic impact analyses; impact fees; adequate public facilities ordinances; trip reduction ordinances; highway access management plans.

ABSTRACT

This report provides case studies of ten planning tools which link land use and transportation planning. These tools are designed to be implemented at the local level. The study also presents the findings of a survey administered to the region's 353 municipalities, which indicates the type of planning tools used by municipalities.

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EXECUTIVE SUMMARY

The dramatic economic expansion of the Delaware Valley over the past 20 years has created new jobs, new development and new opportunities. While Philadelphia remains the economic center of the region, much of the region's growth has occurred in suburban areas, which often lack adequate highway and transit facilities to accommodate such growth. This decentralization of population and employment has created new patterns of land use and corresponding new patterns of travel. The challenge facing local officials and planners is to link the land use and transportation planning processes to address these issues in a coherent and coordinated manner.

A 1991 DVRPC report, entitled **Linking Transportation and Land Use Planning in the Delaware Valley**, provided information on a series of tools for municipal planners and decision-makers which could be used to link land use decisions with transportation system planning. The purpose of the current report is to provide case studies of the actual use of each of these ten tools and to review elements needed for successful implementation of the tool. The study also supports DVRPC's long-range plan, DIRECTION 2020, which seeks to closely integrate land use and transportation planning, by providing information useful to the region's municipalities in achieving this integration.

The report uses a case study method to demonstrate the use of each of the ten planning tools identified and discussed in DVRPC's initial report. A survey of the region's 353 municipalities was undertaken, in order to identify municipalities that were currently using any of the ten planning tools to link transportation and land use planning. Case studies were then completed in municipalities that have successfully implemented the planning tool. While most case studies are of municipalities located within the DVRPC nine-county region, case studies were undertaken in areas outside of these nine counties if the particular tool is not currently being used in the region.

The ten planning tools for linking transportation and land use planning and the municipalities or areas where implementation of the tool was studied in greater detail are summarized in matrix form in Chapter X, and are as follows:

- The **master plan** (or **comprehensive plan**) establishes the community's blueprint for the future, by reviewing and integrating existing conditions and decisions that have already been made and defining the goals and objectives of the community. The goals of the local master plan are implemented through **zoning** (perhaps the single most important tool for local land use control), which dictates the community's pattern of land use and development. Additional standards that regulate the general layout and design of development can be established in a local **subdivision and land development ordinance.** Lower Salford Township, in Montgomery County, was used to illustrate the successful use of zoning and subdivision and land development regulations to implement the municipality's transportation goals.

- An **official map** is an ordinance (in map form) adopted by a county or municipality; the map can be used to identify the current and proposed location of streets and public facilities as well as future right-of-way widths. Case studies were completed in East Caln Township (Chester County), which adopted an official map in 1989, and in the Painter's Crossroads area of Delaware County, where proposed official maps are currently being reviewed in two townships.

- A **capital facilities plan** (or **capital improvement plan**) translates priorities and transportation improvements recommended in the master plan into a specific and achievable time frame. The development of the capital improvement program (CIP) developed in West Windsor Township, Mercer County, is discussed in Chapter IV, along with specific components of the program.

- A **traffic impact analysis** submitted by a developer of a proposed project as a part of the development application can assist a community in understanding the potential effects of the project on the local transportation network. Various mitigation measures (both physical, such as improving an intersection, and operational, such as requiring shuttle service to existing rail transit) can also be identified that may be required in order to minimize potential problems. This report discusses transportation impact analysis requirements in several Pennsylvania and New Jersey municipalities and details the impact analysis requirement in Upper Merion Township, Montgomery County, Pennsylvania.

- **Impact fees** are charges imposed on developers to pay for capital improvements necessitated by new development. Impact fees imposed in Winslow (Camden County) and Uwchlan (Chester County) are reviewed in Chapter VI.

- An **adequate public facilities ordinance** assures that new development can only occur in areas where the infrastructure necessary to support the project exists. Since this tool is not utilized in the Delaware Valley, the adequate public facilities ordinance in place in Montgomery County, Maryland, is discussed.

- **Trip reduction ordinances** mandate that new developments incorporate mechanisms to reduce the total number of cars on the road associated with that particular project. None of the survey respondents were using trip reduction ordinances to manage congestion in 1992; a case study was therefore undertaken of a trip reduction ordinance adopted in North Brunswick (Middlesex County).

- A **highway access management plan** manages traffic flow and congestion by regulating the spacing and number of access points and turning movements onto major roadways. An access management study and plan of the Route 113 Corridor in Chester County (extending through Schuylkill, East Pikeland, West Pikeland and Uwchlan Townships and Phoenixville Borough) is discussed in Chapter IX.

I. INTRODUCTION

In FY 1991, the Delaware Valley Regional Planning Commission (DVRPC) produced a report that examined the relationship between land use and transportation planning at the municipal, county, regional and state levels.[1] That report described a series of tools for decision-makers, including techniques to link land use decisions with transportation system planning. Current land use and transportation planning authority in Pennsylvania and New Jersey was reviewed as it related to the ten planning tools. The report concluded with recommendations that, if implemented, would improve the land use and transportation link and facilitate better coordination among the different levels of government. Recognizing and understanding the relationship between land use and transportation is critical if we are to improve the region's quality of life as we plan for the 21st century.

The current study carries the 1991 study a step further by examining local actions needed to successfully implement each of the ten tools at the municipal level. This study also serves to support DIRECTION 2020, DVRPC's long-range comprehensive land use, transportation and air quality plan, initiated in 1993. That plan, to be completed by December of 1994, will seek to closely integrate land use and transportation planning. The planning tools in the current report will assist the region's counties and municipalities with this integration.

The ten planning tools and case studies examined herein are as follows:

- Master/Comprehensive Plans
- Zoning Ordinances
- Site Design Standards
- Official Maps
- Capital Improvement Program
- Traffic Impact Analyses
- Impact Fees Ordinances
- Adequate Public Facilities Ordinances
- Trip Reduction Ordinances
- Highway Access Management Plans

Municipal Survey

During October 1992, surveys were mailed to all 353 municipalities located within the nine-county DVRPC region to identify those planning tools and techniques that are used to manage and link land use and transportation planning at the local level. The ten tools identified in the FY 1991 DVRPC study were the focus of the survey.

As indicated in Table I, 121 of the 353 surveys were returned, for a response rate of 34%. Surveys were received from municipalities in all nine counties and represent a good cross-section of urban, suburban and rural municipalities. Overall, 39% of the region's

[1]DVRPC, *Linking Transportation and Land Use Planning In The Delaware Valley*, (Report #91024), July 1991.

Pennsylvania municipalities responded to the survey as compared to 25% of the New Jersey municipalities. The response rate within the eight suburban counties ranged from 15% to 54% (Philadelphia is both a city and a county, and did respond to the survey).

TABLE I
SURVEY RESULTS

COUNTY	NUMBER OF RESPONDING MUNICIPALITIES	PERCENT OF RESPONDING MUNICIPALITIES
Bucks	20	37%
Chester	30	41%
Delaware	15	31%
Montgomery	27	44%
Philadelphia	1	100%
Subtotal Pennsylvania	93	39%
Burlington	6	15%
Camden	8	22%
Gloucester	7	29%
Mercer	7	54%
Subtotal New Jersey	28	25%
REGION-WIDE TOTAL	**121**	**34%**

Source: Delaware Valley Regional Planning Commission, October, 1992.

Study method

For each of the 10 tools, several municipalities that indicated that they were using the tool to link transportation and land use planning were contacted for further analysis. Case studies are used to demonstrate the application of each tool and the elements needed for successful implementation of the tool. In some cases, where a tool is not currently in use in the Delaware Valley, the case study is from outside the region. In most cases, a municipality or municipalities within the region that clearly illustrate the use of the tool were chosen as case studies. Lower Salford Township (in Montgomery County) was used to illustrate the use of three complementary planning tools (the comprehensive plan, zoning ordinance and subdivision/land development ordinance).

Survey Findings

As shown in Table II, a majority of the survey respondents use two tools to link land use and transportation planning: the comprehensive/master plan (87%) and the zoning ordinance (55%). The majority of municipal comprehensive /master plans contain transportation elements, and 54% of those plans include roadway circulation needs. However, other transportation needs such as public transit, pedestrian and bicycle systems and goods movement needs are addressed in less than one-third of the comprehensive plans. The use of the comprehensive/master plan as a linkage tool is used equally among Pennsylvania and New Jersey respondents.

The zoning ordinance is used slightly more frequently to link transportation and land use planning in New Jersey than in Pennsylvania municipalities. Although approximately 38% of the respondents' zoning ordinances allow mixed-use developments, other tools (such as overlay zones and the transfer of development rights) are used less frequently. In approximately 23% of the responding municipalities, site design standards require public transit and/or pedestrian facilities. Both zoning ordinances and site design standards are used more frequently among New Jersey municipalities than Pennsylvania municipalities.

The majority of survey respondents do not have an official map or a capital facilities/improvement plan. Among those who do use these tools, the official map is used with greater frequency in New Jersey and the capital facilities plan is used by more Pennsylvania municipalities.

The majority of respondents (over 60%) do not have established guidelines for traffic impact analysis studies. Those that do use this tool indicated that their guidelines most often include an analysis of level of service impacts and traffic volumes generated by other projects. Many of those municipalities that require traffic impact analyses do so as the basis for imposing a transportation impact fee.

Only 20% of the survey respondents have an impact fee program for off-site improvements. Although Pennsylvania law allows municipalities to adopt an impact fee requirement for transportation improvements required by new development (Act 209), only 16% of the survey respondents use this tool, as compared to 32% of the New Jersey respondents (where the New Jersey Municipal Land Use Law allows the use of impact fees provided an ordinance has been adopted).

Few municipalities use an adequate public facilities (APF) program to manage growth. Although 13% of the survey respondents use this approach in the review of development proposals, none has an APF ordinance. In New Jersey, adequate public facilities (sewer, water, drainage and streets) are required within the subdivision and site plan review ordinance under Article 6 of New Jersey Municipal Land Use Law. The Pennsylvania Municipalities Planning Code does not require adequate public facilities, with the exception of an adequate public water supply where wells are not used.

TABLE II
SURVEY QUESTIONS AND RESPONSES

	QUESTION	PERCENT YES*		
		TOTAL REGION	Pennsylvania Municipalities	New Jersey Municipalities
1	Does a **Comprehensive Plan** link land use and transportation planning?	87%	87%	86%
2	Does the local **Zoning Ordinance** link land use and transportation planning?	55%	54%	61%
3	Do municipal **Site Design Standards** require transportation facilities, preferential parking or other features that improve access?	38%	34%	50%
4	Does the municipality use an **Official Map** to implement transportation/circulation systems?	33%	30%	43%
5	Does the municipality use a **Capital Facilities Plan** to program transportation improvements?	21%	24%	14%
6	Does the municipality require developers to submit **Traffic Impact Analyses**?	37%	39%	32%
7	Does the municipality impose an **Impact Fee Requirement** on developers for necessary improvements?	20%	16%	32%
8	Has the municipality adopted an **Adequate Public Facilities Ordinance** or similar program?	13%	11%	21%
9	Has the municipality adopted a **Trip Reduction Ordinance**?	0%	0%	0%
10	Does the municipality have an **Access Management Plan**?	45%	43%	50%
11	Does the municipality use other planning tools to link transportation and land use planning?	17%	16%	21%

Source: Delaware Valley Regional Planning Commission, survey administered during October of 1992 to 353 municipalities located within the Delaware Valley region. The overall response rate was 34%; amongst Pennsylvania municipalities, the response rate was 39%, while amongst New Jersey municipalities the response rate was 25%. * "Yes" represents the percentage of respondents that replied affirmatively to at least one part of any multiple-part question.

Approximately 45% of the survey respondents have a roadway access management plan or strategy which applies to county or municipal roads. In New Jersey, where the State Highway Access Management Act of 1989 requires the state's Department of Transportation to regulate access onto state highways and encourages municipalities to adopt local access requirements that are at least as strict as the state's rules, one-half of the respondents use this tool; in Pennsylvania, 43% of the survey's respondents have requirements concerning roadway access. At least one-third of these municipalities have established spacing standards between driveways and intersections and minimum design standards for various driveway types.

The last question of the survey asked respondents if they used any other tools or techniques to link land use and transportation planning. Thirty written comments were received, including five from respondents who stated that they use the negotiating process to obtain transportation improvements from developers rather than any formal (adopted) planning tools or techniques. This informal process has helped municipalities obtain improvements primarily in the form of driveway locations and access points for pedestrians, but results in an ad-hoc planning process with little predictability.

Several municipalities also commented that they examine transportation issues on a per project basis, although no formal guidelines or procedures are used. Five municipalities also stated that they are either too small, rural, or almost fully developed and therefore are not concerned with the issues addressed by the ten planning tools in the survey.

Appendix A lists the questions included in the study survey and summarizes the answers received for each of these questions. The following chapters discuss the ten planning tools in greater detail and illustrate their implementation with specific examples of local usage.

II. PLANNING TOOLS #1, 2 AND 3: THE COMPREHENSIVE PLAN, ZONING ORDINANCE AND SITE DESIGN STANDARDS

The first step towards linking land use and transportation planning functions to obtain better integrated development is the adoption of a local comprehensive or master plan. The comprehensive plan (as authorized in the Pennsylvania Municipalities Planning Code) or master plan (as defined in the New Jersey Municipal Land Use Law) examines the community's existing conditions, defines what the community wants to look like in the future, and develops a set of policies and goals to reach that vision.

New Jersey's Municipal Land Use Law (MLUL) requires that communities develop a master plan and update the plan at least once every six years as a prerequisite to developing a zoning ordinance. Pennsylvania's Municipalities Planning Code authorizes but does not require communities to develop a local comprehensive plan. A carefully developed comprehensive plan is important in both Pennsylvania and New Jersey, since it is a legally required prerequisite for the implementation of many other planning tools.

While the comprehensive plan establishes the community's goals and policies and depicts the vision of how a community wants to develop and look in the future, the plan must be integrated with the specific regulations of the community's zoning ordinance and the site design standards described within the community's subdivision and land development ordinance in order to be effective. The zoning ordinance is probably the single most important planning tool, in that it can dictate the community's pattern of land use and development. Evolving from a restrictive ordinance separating incompatible land uses into a sophisticated and flexible planning tool, zoning now provides the legal and technical means that allows municipalities to develop in the way they see fit. With the subdivision and land development ordinance, local governments can set additional standards that regulate the general design and layout of development.

The following case study examines a township in this region that has succeeded in implementing the goals of its comprehensive plan through the regulations in its zoning ordinance and subdivision and land development ordinance. The result is a well planned community with a well defined sense of place.

CASE STUDY - LOWER SALFORD TOWNSHIP, MONTGOMERY COUNTY, PA.

Lower Salford Township is located west of Lansdale in Montgomery County near the Kulpsville interchange of the Pennsylvania Turnpike. Two primary arterials, Sumneytown Pike (Route 63) and Route 113 traverse the township. Lower Salford Township is predominantly rural, with the majority of development around the Harleysville area. The township also has three other distinct villages (Lederach, Vernfield and Mainland) which it is seeking to maintain through various planning techniques.

During the 1980's, the township had the second highest growth rate (74%) and third highest absolute increase (4,579 people) of all the municipalities in Montgomery County. The population grew from 6,156 in 1980 to 10,735 in 1990. This rate of population growth is expected to slow down in the nineties and into the beginning of the next century. By the year 2020, 15,200 people are forecasted to reside in Lower Salford Township, a 42% increase from 1990. The number of people who work in Lower Salford is also expected to increase, from an estimated 4,662 workers in 1990 to 7,250 workers by 2020. This forecasted increase of about 55% by the year 2020 is more than double the county's forecasted employment increase of 21% during the same time period.

The increase in population and economic activity in the township over the past decade have, not surprisingly, led to increased traffic volumes. On Route 113, north of Sumneytown Pike, daily traffic increased from 8,201 vehicles in 1983 to 12,403 vehicles in 1990, a 51% increase over a 7-year period. Even more dramatic, daily traffic on Sumneytown Pike west of Route 113 increased by 78% between 1981 and 1990, from 8,400 vehicles to 14,947 vehicles.

Lower Salford Township has clearly experienced a surge of growth in the last decade, but through township foresight and good planning, the township has been able to minimize or avoid many of the problems that have plagued other communities. For example, despite the burst in population, the township has remained predominantly rural by concentrating residential development around the Harleysville area. In addition, strip commercial development has been minimized by zoning for discreet shopping centers on both ends of Harleysville as well as zoning for mixed-use development. Because traffic has increased with more people and workers in the region, the township has planned two bypasses around their villages to separate regional and local traffic. Perhaps most impressive, the township had the foresight to start acquiring open space for a park and "community path" system in the early 1970's, before the area began to suburbanize and land prices escalated. These efforts have produced about 420 acres of public parkland, which includes a 4.5 mile community path throughout the township.

Without good planning, Lower Salford's rural vistas and quaint villages could have been lost to suburban sprawl and the traffic hazards and visual clutter of strip commercial development. To continue to prevent this and to guide the township's growth into the 21st century, Lower Salford worked with the Montgomery County Planning Commission to update their 1971 comprehensive plan and elements of their zoning ordinance. The plan and several new ordinances were adopted in the fall of 1993. Future planning efforts will concentrate on additional zoning ordinance and subdivision and land development ordinance amendments to continue integrating land use and transportation planning.

The Comprehensive Plan and Ordinances

Lower Salford's success in community planning revolves around its efforts to use a variety of planning tools to implement its policy of concentrating development in the Harleysville area, thereby maintaining the villages, rural character and farmland in the rest of the township. This overall goal is enhanced through additional ordinances that regulate how

development occurs in the town center, and zoning incentives that build on the township's public open space and community path system. These efforts officially began with the township's first comprehensive plan in 1971 and have remained the central policy of the township through two decades, despite political turnover and the changing of township officials. Efforts to control growth through pro-active planning have intensified as growth pressures have mounted in the community.

The following sections present eleven goals of the 1993 comprehensive plan aimed at linking land use and transportation planning, with each followed by an explanation of how that goal is or will be implemented through the township's zoning ordinance and subdivision and land development ordinance.

Goals Connecting Residential and Commercial Areas

1. *Limit higher density housing to locations near major roads, sewer and water facilities, public buildings, and commercial areas.*

This goal is implemented through the municipal zoning map. Higher density residential districts are adjacent to the C-Commercial, SC-Shopping Center, MU-Mixed Use, VC-Village Commercial, AO-Administrative-Office, and OLC-Office and Limited Commercial Districts. These districts are positioned in the Harleysville vicinity, the township's historic town center where public water and sewer, schools, the town hall, community centers, and businesses are located. Other areas of the township are zoned for rural preservation-low density residential, except Lederach and Mainland (which have village commercial zoning) and the township's northeastern corner (zoned for limited industrial development).

This zoning has apparently worked well for the township with one exception; several use variances have been requested for offices in the existing homes on Sumneytown Pike east of the MU-District. To address this, the township is designating this area for office use in the land use plan of the 1993 comprehensive plan, and will probably rezone the area for office use after the plan's adoption.

2. *Provide retail in a mixed use setting which will encourage walking, control access points to major roads, and push development into a site rather than stripping it out along major roads.*

Most of the R-4 and R-5 high density residential districts are adjacent to the commercial districts in Harleysville. To foster a mixed-use setting, pedestrian and bikeway connections between the two are encouraged (see Goal #6). In addition, an MU-Mixed Use District at the east end of Harleysville was designated with several statements of intent related to the goal above, including to:

> *"provide for a balanced, interrelated combination of offices, stores and residences in a setting with a distinctive community character which will encourage pedestrian circulation and day and evening, weekday and weekend activity"*

and to:

> *"limit the adverse impact of future commercial and office facilities on roads by controlling access and orienting this development towards the interior of the site" (Lower Salford Township Zoning Ordinance Article XIII-B Mixed-Use District Legislative Intent).*

To accomplish these objectives, the MU-District requires minimum and maximum percentages of the tract area to be devoted to residential, non-residential and open space types of uses. To control access and circulation, the ordinance requires that"no more than two street access points to existing exterior roads are permitted per street frontage per tract"; "all lots shall have vehicular access only from streets and main access driveways proposed to be constructed on the tract or existing local access streets. They shall not take vehicular access from any existing primary or secondary arterials"; "any street or main access driveways serving nonresidential/apartment buildings and lots must also serve the central green and connect with streets serving residential lots"; "and all streets and main access driveways in a tract shall be interconnected".[2]

In essence, the MU-District's access and circulation design standards are limiting new access points on the existing road network by requiring that all individual uses within the Mixed-Use District have driveway access from internal on-site roads. Similar access restrictions or bonuses apply in other districts: within the Commercial District, only one driveway per 600 feet of street frontage is permitted; within the Village Commercial Districts there is a bonus of an additional 200 square feet of nonresidential use per 7,500 square feet of net lot size for sharing a common driveway; within the Office-Limited Commercial District there is a bonus of an extra 5% of maximum building coverage and a reduction of 10% of minimum green space required for sharing a common driveway from a primary arterial. Together, these access regulations have served to control the proliferation of driveways typical along highways with commercial uses.

Commercial, Office and Industrial Development Goals

3. *Discourage strip commercial development.*

Some strip commercial development already exists along Sumneytown Pike in Harleysville. The township is making efforts to prevent additional strip commercial development by not adding land zoned C-Commercial and by re-zoning the C-Commercial Districts in Lederach and Mainland to VC-Village Commercial (which discourages development of strip-type highway oriented commercial uses which require incongruous architectural styles, excessive paved area and numerous curb cuts). Nevertheless, in order to allow for more commercial development in the town center without zoning for strip commercial the township instead zoned for discreet shopping centers at each end of Harleysville.

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[2]Lower Salford Township Zoning Ordinance, Article XIII-B

In addition, several zoning regulations were written to improve the access and circulation pattern within the existing strip commercial areas. For example, existing properties in the C-Commercial District are required to guarantee access easements from their parking areas to all abutting lots' parking areas in the C-Commercial District (unless all possible interconnections are constrained by wetlands, floodplains or steep slopes). This interconnection mandate will apply when in-fill development occurs. In this way shoppers in stripped commercial areas may eventually drive or walk from one store's parking lot to another without re-entering the street. The shared driveway bonuses explained in goal #2 above can also improve access and circulation.

4. *Locate office and light industrial development near Towamencin Township and Route 63 so that regional traffic from the Northeast Extension of the Turnpike can reach these uses easily.*

The Zoning Map identifies several LI-Limited Industrial Districts in these locations. The proposed land use map of the 1993 Comprehensive Plan also designates an area at the far east end of Harleysville, along Route 63 near Towamencin Township, for office use. The township will probably re-zone it from residential use to office after the plan is adopted.

Open Space and Bicycle Trail Goals

5. *Expand the bike trail, to eventually connect with trails in abutting municipalities.*

In the past, the Township issued bonds and received grants to purchase open space and convert it to the bike trail (community path). The Township is now using density bonuses, mandatory open space requirements, and negotiation to extend the bike trail. To add "teeth" to the review process, subdivision and land development (SDLD) ordinance language has been proposed requiring trail connections to the existing community path network. Proposed trail extensions are designated on a map in the 1993 comprehensive plan.

According to the township's zoning ordinance, 15% of the tract area in the R-4 and R-5 Medium and High Density Mixed Dwelling Unit Districts must be maintained as common open space. The open space must be usable for recreation, pedestrian and bicycle circulation, environmental and/or aesthetic purposes, and it must be conveniently located for use by residents and preserve and protect environmentally sensitive features of the tract. For each additional 5% of the total tract area (in excess of the required 15%) preserved as common open space, the permitted density may be increased by 0.25 dwelling units per acre.

There are no mandated common open space requirements in the low density districts, but certain voluntary development incentives require open space dedications. In the R-1 district conventional 45,000 square foot lots may be overlayed with the "Planned Community Residential Development District", in which case at least 15% of the total tract area must be dedicated as open space, which may be developed as extensions to the bike trail. Maximum density equals total tract acreage times 0.9 units, and the smallest lot size may be 28,900 square feet.

In the R-3 district, individual building lots may be decreased by up to 15% of the basic required minimum lot area for permanently preserving as open space an equal amount of land, provided the original number of dwelling units permitted in the tract (which varies, depending on provision of public sewer and water facilities) remains the same. Again, the open space may be linear and connected with the existing bike trail.

6. *Connect the bike trail with commercial and civic uses to promote its use as an alternative local transportation mode.*

The Township has proposed adding bike trail requirements to the subdivision and land development ordinance (SDLD) to facilitate trail development. The language proposes that:

> "Bicycle trails shall be installed along proposed public and private streets, common driveways, common parking areas, open space corridors, and trail easements when needed to connect the development with the township's bicycle trail network, as shown in Lower Salford's 1993 Comprehensive Plan, or to continue this network through the development; the Board of Supervisors shall determine whether a bicycle trail is necessary. Engineering design and construction standards shall be those contained in the township engineering standards. Bicycle trails shall comply with the AASHTO standards for bicycle facilities."

The proposed SDLD language requires bicycle trails whenever they fill a gap in the existing network. In addition to these proposed SDLD ordinance requirements, the zoning ordinance contains both mandatory (in the R-3 and R-4 districts) and voluntary (in R-1 and R-3 districts) open space requirements that include provisions for expansion to the bike trail.

7. *Continue expanding the bike trail and sidewalks to encourage trips without automobiles.*

To further facilitate bike trail usage by all population groups, the proposed SDLD ordinance language requiring bicycle trails also mandates that trails be designed to provide access and use by the handicapped, and, for general safety, that they be separated from the curb or edge of the shoulder of public roads by a three foot wide planted strip of grass.

Expansion of the bike trail is also encouraged through the open space requirements and bonus provisions in the residential districts. During the site plan review process, the township planning commission provides guidance on how a development's open space can be integrated into the community path network.

Sidewalks (with curb cuts to accommodate the handicapped) are presently required in the Subdivision and Land Development Ordinance for all new development. However, the Board of Supervisors has been waiving this requirement in the R1A-Rural Density district (two-acre lots), and usually only require sidewalks on one side of the street in the R-1 district (45,000 square-foot lots). In the C-Commercial and MU-Mixed Use Districts, sidewalks are required to connect the non-residential buildings with all parking areas, sidewalks along streets, and any sidewalks or the community path on abutting property.

Circulation Goals

8. *Provide road bypasses around Lederach and Harleysville.*

The Township's comprehensive plan classifies all roads and ultimate right-of-way (UROW) widths in the township. New construction is not permitted within the UROW. Each time a new development or subdivision is proposed, the township requests that the land between the UROW line and the existing property line be dedicated to the township (or other governing body having jurisdiction over the road) for possible future road widenings or improvements. So far, Lower Salford has acquired about 60% of the right-of-way for the Lederach bypass and 90% for the Harleysville bypass. The township must next convince the Pennsylvania Department of Transportation of the need to build these bypasses.

9. *Separate regional traffic from local traffic.*

The Township is planning for two bypasses, as described above, to keep through traffic out of the village areas. In addition, the Mixed-Use District and Commercial Districts require roadway and access design that keeps local traffic within the development.

10. *Encourage provision of bus service to Harleysville by providing sites for future bus stops.*

A recent amendment to the zoning ordinance requires commercial developments of over 100,000 square feet to accommodate buses, including passenger waiting areas, bus parking areas, and driveways and parking areas that can handle the weight and length of a forty foot passenger bus. This amendment was written and adopted in response to a proposal for a large shopping center in Harleysville. Although there is currently no public transit serving the community, it may gain service in the future as it continues to grow. The North Penn/Central Bucks Transit Study, conducted by the Montgomery County Planning Commission in 1991, recommended that SEPTA provide bus service from Harleysville through Lansdale to the Montgomery Mall. If initiated, the buses would probably run along Sumneytown Pike through Harleysville, and adoption of this zoning amendment could facilitate the inclusion of a bus stop at the future shopping center site.

Community Character Goals

11. *Preserve rural character and views; preserve the township's historic, rural heritage; preserve the community's villages, and preserve farmland.*

The township is considering a number of options that will preserve rural character and heritage. Two techniques are described here, the Land Preservation District (LPD) and Transfer of Development Rights program (TDR program), which were both described and recommended in the 1993 comprehensive plan. To implement the comprehensive plan's recommendations, development of these two tools was included in the new planning assistance contract with the Montgomery County Planning Commission.

The TDR program is new to Montgomery County, although within the region it has been used in some municipalities in Bucks County and Burlington County. The Lower Salford TDR program would designate certain rural parcels of land surrounding Lederach and Vernfield villages as sending areas, and other parcels of land in the Harleysville area as receiving areas. These particular sending parcels are presently farms on the borders of the villages. If they were developed under their present low density residential zoning classification, the villages would lose their boundaries and their unique identities to become meshed with suburbia. On the other hand, the receiving parcels have room to intensify because they are in the designated growth area with infrastructure in place, and are close to the community's shopping, employment and civic uses.

The other technique proposed in the comprehensive plan is the Land Preservation District, a cluster development alternative to the township's rural residential zoning of two acre lots. Under the conventional two-acre zoning, certain environmental features of the landscape may be able to be preserved, but the overall pattern is sprawl. Under the LPD alternative, 75% of the tract is maintained as open space, and the individual lot size is reduced from 2 acres to 1/4 acre. The LPD is different from many other cluster development ordinances in that it may be made mandatory, and in that it requires 75% rather than the usual 15% to 25% of the tract to remain in open space. This significantly larger open space requirement maximizes the benefits of the cluster, allowing the original farmland of the tract to continue to be farmed, and/or maintaining more woodlands and rural views from the road. In addition, the cluster reduces infrastructure costs and can promote a feeling of community often absent with conventional two-acre zoning.

There are numerous benefits to the LPD and TDR program. In general, both offer an alternative to conventional zoning that is a more efficient and equitable use of the land. Specific benefits include the following: (1) prime agricultural soils can be preserved to maintain that "critical mass" needed to keep farming a viable industry in the community; (2) preserving agriculture uses contributes to the diversity of the economic base and employment; (3) farming provides a local source of food thereby reducing goods movement distances for feeding the local population; (4) village and rural vista preservation contribute to the character and appeal of an area; and, (5) compacting development in Harleysville reduces infrastructure costs, promotes more affordable housing, reduces conflicts between agriculture and suburbia, encourages pedestrian and bicycle activity and transit potential, and creates more of a sense of place for the community as a whole.

CONCLUSION

Lower Salford Township has benefitted from good planning efforts that began in the early 1970's with the first comprehensive plan and the community's efforts in acquiring land for the now 4.5 mile community path. Since then, subsequent township planning documents have continued to link transportation and land use planning through various techniques. Some of the techniques have been very general, albeit effective, such as concentrating development in the Harleysville area. Other tools are very specific, albeit incremental, such as expanding the bike trail, limiting driveway access points or accommodating buses in

shopping centers. In any case, Lower Salford Township has demonstrated that it is possible for townships in the path of suburbanization to link their land use goals with development ordinance regulations to produce a well-planned community with a sense of place.

For additional information on Lower Salford Township's comprehensive plan, zoning ordinance or subdivision and land development ordinance, please contact the Lower Salford Township Manager, at 215/256-8087.

REFERENCES: COMPREHENSIVE PLAN, ZONING ORDINANCE AND LAND DEVELOPMENT ORDINANCE

Lower Salford Township 1993 Comprehensive Plan, Montgomery County Planning Commission, Norristown, Pennsylvania, 1993.

Lower Salford Township Zoning Ordinance (and proposed amendments), Lower Salford, Pennsylvania.

Lower Salford Township Subdivision and Land Development Ordinance (and proposed amendments), Lower Salford, Pennsylvania.

Telephone interviews with Lower Salford Township's community planner, Brian O'Leary, Principal Planner with the Montgomery County Planning Commission

Telephone interview with Loretta Romanowski, Lower Salford Township Manager

III. PLANNING TOOL #4: THE OFFICIAL MAP

An official map is a comprehensive planning tool that can be used to identify the current and future location and scale of streets and other public facilities, and provide property owners and developers with advance notice that the community intends to develop the property for public use in the future. Official maps are legally binding documents intended to assist municipalities in reserving land for public use until the necessary funds can be secured for public acquisition of the property.

Official maps may identify existing as well as planned streets and public facilities. When properties on the official map are designated for future public use, the property owner retains the title and receives no compensation until such time as development is imminent. Once notified that development of the property is imminent, reservation of the property for public use can last for up to one year; during that time the municipality must either purchase the land outright, acquire the property through eminent domain, negotiate the dedication of the land for its intended purpose through the subdivision and land development review process or abandon their plans and allow the owner to develop the property.

This chapter briefly considers the authority by which municipalities may adopt official map and the purpose of the map. Two examples are then presented: one in an area where two townships are considering adoption of official maps to designate the location of a future road, and the second in a township where the official map was initially adopted to reserve right-of-way for a planned bypass.

Authorization for the Official Map

Authorization to adopt official maps is found in the Pennsylvania Municipalities Planning Code (MPC) and in the New Jersey Municipal Land Use Law (MLUL). Article IV of Pennsylvania's MPC provides that municipalities or counties may adopt an official map. In Pennsylvania, the map may include (but is not limited to) existing and proposed streets (including widenings, narrowings, extensions, openings and closings); watercourses and public grounds; public parks, playgrounds and open space; pedestrian ways and easements; railroad and transit right-of-ways and easements; and flood control basins, flood plains, storm water management areas and drainage easements.

The New Jersey MLUL provides authorization for the adoption of official maps in Article V. Municipal official maps in New Jersey may identify location and width of streets, public drainage ways, flood control basins and public areas. Although the official map should ideally be based on and reflect the locality's adopted master plan, municipalities may adopt a map that is inconsistent with the master plan if a majority of the governing body's authorized membership votes to do so and officially records the reasons for doing so.

The local official map is adopted as an ordinance by the governing body of the municipality, following public hearing and review by the local planning agency, the county planning agency, adjacent municipalities and other appropriate authorities, boards and public bodies. An official map can be drawn using property records, photogrammetric mapping or aerial photographs. Boundaries need not be made and sealed by a licensed surveyor until such time as the municipality opts to acquire the property.

The Purpose of an Official Map

Official mapping can be used to designate existing and future locations of public streets, watercourses, flood control areas, pedestrian ways, railroad and transit right-of-ways, parks, open spaces or other public uses. The map may cover either the entire municipality or any portion of it, depending on the needs of the community.

The adoption of an official map signals a municipality's intention to use designated areas for public purposes. Once adopted by ordinance after proper review procedures have been followed, the map serves notice to property owners of the intended future public use of the designated properties. Developers can also view the local official map and plan the development of prospective sites accordingly.

The map does not by itself serve as an acquisition tool or, for example, constitute the establishment of a public road. Property owners must be offered fair compensation for the use of their property if and when the municipality proceeds with plans to utilize the land as per the official map. The official map does, however, give the municipality legal backing when development of the designated properties is imminent. Designation of the property for public use on the official map provides an important leveraging mechanism for the township in negotiations during the development review process.

Used in addition to other land-use planning tools, an official map can provide an inexpensive and easily adoptable means of designating intended locations for streets and other public uses. Since the map will have a significant effect on the future development and investment needs of the community, an official map should ideally complement both a comprehensive development plan and the local zoning program.

Regional Use of the Official Map as a Planning Tool

Based on the 1992 municipal survey, many municipalities in the region are either unaware of the potential benefits of adopting an official map or are misinformed as to what elements may be included on the map. Thirty-nine municipalities indicated that they had adopted an official map; most of these maps, however, include only existing streets and facilities. Seventy-one percent of the respondents do not identify existing or future right-of-way widths; 78% do not designate future roadway alignments; and 85% do not identify the location or scale of future community or public facilities. Most official maps adopted in the region cover only portions of their respective communities, as opposed to the entire community.

Two areas were chosen for further study: the Painter's Crossroads area in Delaware County, where official map proposals are currently being reviewed; and East Caln Township, the only municipality in Chester County to have adopted an official map to date.

CASE STUDY: PAINTER'S CROSSROADS, DELAWARE COUNTY

One area chosen for further study is located at the intersection of Routes 1 and Route 202 in Delaware County, referred to as Painter's Crossroads. The area includes parts of two townships, both of which have experienced significant growth in the recent past and are projected to grow significantly in the future (as indicated in Table III).

TABLE III
POPULATION AND EMPLOYMENT, 1990-2020
PAINTERS CROSSROADS AREA, DELAWARE COUNTY

	BIRMINGHAM TOWNSHIP	CONCORD TOWNSHIP
POPULATION: 1980	2,057	6,437
1990	3,118	6,933
Percent Change, 1980-1990	51.6%	7.7%
Forecasted Population, 2020	6,100	11,100
Forecasted % Change, 1990-2020	**95.6%**	**60.1%**
EMPLOYMENT: 1980	1,012	2,942
1990	5,487	3,974
Percent Change, 1980-1990	442%	35.1%
Forecasted employment, 2020	9,074	5,439
Forecasted % Change, 1990-2020	**65.4%**	**36.9%**

Source: Delaware Valley Regional Planning Commission, June, 1994

The Delaware Valley Regional Planning Commission (DVRPC) was asked in the early 1990's to consider future land uses in this area and make recommendations to alleviate existing and projected traffic problems at and around the intersection, working with planning officials from Birmingham and Concord townships and Delaware County. The resulting study concluded that a ring-road at this intersection would be of great benefit to both communities, separating local traffic doing business with firms located in the vicinity of the intersection from through-traffic using Routes 1, 202 and 322.

DVRPC's study identified the official map as one mechanism that could be used to begin to implement the ring-road recommendation, by legally designating the intended approximate location of the ring-road. An official map was created by DVRPC using aerial photographs, tax maps and street maps, specifically designating the approximate location of the ring-road. An official map ordinance was drafted, and these maps and ordinances were presented to Birmingham and Concord townships and to Delaware County for further action.

The Birmingham Township Planning Board adapted DVRPC's version of the official map for their own use and presented the concept to the local Board of Supervisors. The Board of Supervisors, however, has not adopted the official map to date. Township representatives indicated that the key stumbling block to adoption of the official map was a lack of understanding on the part of local officials as to the purpose and power of an adopted map. Township supervisors feared that if an official map did in fact yield significant power as to future land use decisions, adoption of the map may be interpreted as a taking of private land for public uses and not survive legal challenges. Conversely, they also believed that if an official map would not significantly effect future land use, than there was no justification for adopting such a tool.

The concept of an official map was presented by the municipal planner to the local planning commission of Concord Township, but received no support from the group. The chairman again cited a lack of understanding as to the purpose and power of the official map as the primary reason for its lack of support.

Although neither township has yet adopted an official map, both municipalities are still actively pursuing adoption of such a tool. Township planning representatives believe that additional education efforts focused on clarifying the purposes and potential power of an adopted official map for local elected and appointed officials may ultimately lead to acceptance of the official map as a valuable tool linking land uses and transportation.

CASE STUDY: EAST CALN TOWNSHIP, CHESTER COUNTY

A second municipality currently using an official map as a tool to implement land use and transportation planning goals is East Caln Township in Chester County, a growing township located along Route 30 in Chester County. The township was in the past primarily a residential community and has experienced moderate growth in recent decades, as indicated in Table IV. The municipality's population and employment base are forecast to continue to grow in the future, as the township faces development pressure due to its location along Route 30 and its proximity to the Exton-Bypass.

East Caln Township's official map was originally adopted on June 15, 1988, as a mechanism for preserving right-of-way for the Exton By-Pass. Although the only future planned element on the original official map was this proposed right-of-way, the map covers the entire township, establishing an official record of the names and locations of public streets and community facilities.

TABLE IV
POPULATION AND EMPLOYMENT, 1990-2020
EAST CALN TOWNSHIP, CHESTER COUNTY

POPULATION: 1980	2,187
1990	2,619
Percent Change, 1980-1990	19.7%
Forecasted Population, 2020	3,680
Forecasted Change, 1990-2020	**40.5%**
EMPLOYMENT: 1980	752
1990	828
Percent Change, 1980-1990	10%
Forecasted Employment, 2020	2,129
Forecasted Percent Change, 1990-2020	**157.1%**

Source: Delaware Valley Regional Planning Commission, June, 1994

The township's official map was developed from a computer base map by their engineer at the request of the local planning commission. The entire process, from initial recommendation to final adoption of the map, took approximately three months and cost little aside from staff time.

The map was amended in January of 1993 after an open space study by a private consultant recommended specific open space areas to be preserved. The amended map includes these proposed open space preservation areas and proposed parks, including mini-parks, neighborhood parks and community parks.

Additionally, the official map now includes a proposed north-south road linking Route 113 to Route 30 (Lancaster Pike). Prior to amending the official map, a developer interested in developing 108 acres of land had agreed to construct this new link as a part of his planned development. The developer completed all plans and design specifications for the roadway, and the roadway was added to the official map when it was amended in 1993.

Adoption of the official map has not yet resulted in any land acquisition, roadway construction, open space preservation or parkland development. The developer who originally offered to build the new north-south road linking Route 113 and Route 30 has not yet proceeded with the project. This lack of development, however, is believed to be due to the developer's individual financial circumstances and to the overall development climate rather than to requirements imposed by the official map. Township officials believe that the official map is an easily implementable planning tool which indicates to prospective developers the intended future locations of open spaces, parks and roadways.

CONCLUSION

An official map can be a relatively inexpensive and easily adoptable tool for linking development and transportation, provided that local officials understand the purpose and powers associated with the map. A local official map can assist developers in planning their projects in a manner consistent with the overall plans of the community, and can be used to establish an official record of existing and planned streets, parks and community facilities. Once established, the map should be amended as often as necessary to accommodate changes in the community, as was the case in East Caln Township.

Official maps can be effective in guiding the location and direction of growth in a community. The map does not, however, influence the type, scale or rate of future development, and is most effective when used in concert with other planning tools such as a comprehensive plan, zoning ordinance or impact fee ordinance. Once adopted, the map should be updated periodically to reflect changes and growth in the community.

For additional information on implementing an official map, please contact Birmingham Township of Delaware County at 215/793-1066 or East Caln Township (Chester County) at 215/269-1989.

REFERENCES: OFFICIAL MAP

Delaware Valley Regional Planning Commission, *Linking Transportation and Land Use Planning in the Delaware Valley*. Philadelphia, Pennsylvania, July, 1991.

Ndubisi, Forster. *Planning Implementation Tools and Techniques: A Resource Book for Local Governments*. University of Georgia Institute of Community and Area Development. Athens, Georgia. 1992.

Pivo, Dr. Gary. *Local Government Planning Tools*. Growth Management Planning and Research Clearinghouse, University of Washington. Seattle, Washington. August, 1992.

East Caln Township, Ordinance No. 1988-03, "An Ordinance Adopting the Official Map of the Township, Pursuant to Pennsylvania Municipalities Planning Code Sections 401 through 408", June 15, 1988.

East Caln Township, Ordinance No. 1993-03, "An Ordinance Amending the Official Map of the Township, Pursuant to Pennsylvania Municipalities Planning Code Sections 401 through 408", January 20, 1993.

IV. PLANNING TOOL #5: CAPITAL IMPROVEMENT PROGRAM

The capital improvement program (CIP) is a working tool to translate transportation improvements identified in the master plan process into a program for improvements to be incurred each year over a set number of years. The CIP sets forth specific projects, their estimated costs, the funding sources and the municipality's contribution to finance the project on an annual and total basis.

Time periods for CIP's may vary from one to 20 years, but most are prepared for a five or six-year period. The projects and budget commitment for the next fiscal year is called the capital budget, which becomes part of the legally-adopted annual operating budget. Future projects and proposed budgets for subsequent years are reviewed and adjusted annually, depending on priority needs and financial conditions.

The benefits of a carefully considered CIP include the assurance that capital projects and improvements are implemented; improving the scheduling of multi-year projects; predicting needs and acquiring land before costs rise; establishing a system for long-range financial planning and management; facilitating better coordination and management of projects among agencies; and offering an opportunity for public participation.

The preparation of a CIP can be simple or complex, depending on the needs of the community. In smaller municipalities or communities experiencing limited growth, capital improvements needed for maintenance or increased capacity may be more straightforward than in high growth communities with increasing demands and competing interests. Fast-growing communities may require sophisticated CIPs that complement other planning tools.

CASE STUDY: WEST WINDSOR TOWNSHIP, MERCER COUNTY

West Windsor Township is an example of a community that has recently undergone one of the highest population and employment growth rates (and absolute increases) in the region, and has subsequently developed advanced strategies to deal with this growth. The township was chosen for this case study because of its tremendous growth rate and its proposals to integrate transportation improvements districts and growth staging initiatives with capital improvement programming. This case study therefore examines a sophisticated CIP process, but other municipalities may achieve similar goals more easily. Data on West Windsor's CIP planning process is current as of March, 1994.

Background

West Windsor Township is located on the boundary of Mercer and Middlesex counties, south of Princeton Township and east of Lawrence Township. West Windsor is a community of contrasts; while the bulk of the Route 1 Growth Corridor runs along the township's northwest boundary and includes major business parks and the busy Princeton Junction commuter station, the southern half of the township contains large tracts of

agricultural and other vacant developable land. During the high-growth period of the 1980's, the Township's population grew faster than any other township in Mercer County, increasing by 88%, from 8,542 to 16,021 people. Employment grew at an even more astonishing rate, from 7,102 jobs in 1980 to 16,392 jobs in 1990, a 131% increase[3].

Growth is predicted to continue into the future, albeit at a somewhat slower rate. The population forecast for year 2020 is 30,702, a 92% increase from 1990, and the employment forecast for 2020 is 27,421, a 67% increase from 1990[4]. This tremendous growth, coupled with increasing amounts of regional traffic due to the township's central location along the Route 1 Corridor, has led to unprecedented demands on the community's road system, which has become inadequate to handle the traffic which uses it.

To respond to these high growth rates and their accompanying challenges, the township revised its 1979 master plan and adopted the *West Windsor Township Master Plan Update* in 1986. Supplements and modifications to the 1986 master plan have been subsequently adopted. Since most of the township's capital improvements program is based on the priorities for improvements and the funding mechanisms put forth in the Master Plan and its supplements, this report first examines Master Plan elements that form the basis of the CIP. It then considers the development of the township's supplemental circulation plan element, funding techniques for capital projects and a proposed growth staging program.

The Foundation for the CIP in the Master Plan

The overall development strategy of West Windsor Township's master plan is to focus higher-density development and mixed land uses within and along the Route 1 Corridor, in order to concentrate jobs and housing and maintain lower-density residential development and limited farmland preservation in most of the rest of the township. The strategy of the circulation element of the master plan is to balance regional needs (especially resulting from Route 1) with local requirements for circulation. Specifically, the plan's policies are to:

- Seek completion and upgrading of regional roadways to aid in improving local circulation movements,

- Develop a local circulation network which minimizes new arterial road construction and emphasizes existing road upgrading and widening where practical,

- Continue the development of a minor collector road network to insure a more even distribution of local traffic,

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[3]Data from the United States Census Bureau, adjusted by the Delaware Valley Regional Planning Commission to account for workers on temporary leave and multiple job holders.

[4]Delaware Valley Regional Planning Commission, *Year 2020 County and Municipal Interim Population and Employment Forecasts*, June, 1993.

- Emphasize short-term road improvements which aid in improving east-west movements, selected key intersections and railroad bridge overpasses, as well as other local roads where higher density land uses are proposed,

- Continue requiring a pro-rata share of the cost of off-tract road improvements from new development, administered either through transportation improvement districts or on an individual project basis, for road improvements called for in the Township's circulation plan,

- Encourage alternate circulation modes and networks to be devised to minimize local auto traffic trips (for example: pedestrian, bicycle or mass transit alternatives),

- Encourage alternate commuter rail parking and rail stops in the region to preserve and minimize future impacts on the Princeton Junction area, and,

- Seek to increase the energy efficiency and long-term capacity of the Township's transportation system by encouraging mixed-use development at appropriate locations served by adequate infrastructure.[5]

Based on these policies and assumptions about future land use in the township, the circulation plan of the master plan identifies various existing roads and intersections that need improvements along with proposed roadways, grade separations, flyovers, underpasses and bridges that will be needed to accommodate future development and traffic volumes.

Finally, the master plan suggests the next steps that the municipality should take to implement the plan's policies. These basic next steps include: (a) establishing a detailed and prioritized list of capital projects (through a supplemental Circulation Plan); (b) exploring and adopting funding techniques to collect private sector support for capital projects; and (c) initiating growth staging mechanisms to manage the timing of capital improvements.

The Circulation Plan Element

In order to further define capital improvement needs, a supplemental *Circulation Plan Element* to the Master Plan was produced and adopted in 1991. A methodology was then developed based on this plan to group required improvements according to road corridors within the township. Within each corridor three levels of capital road improvement programs and corresponding sub-programs were established and prioritized so that a logical progression of completing road links and intersections within a specified road corridor could be accomplished in a coordinated fashion. The ordering of the levels (I, II and III) and sub-programs (A, B and C) therefore implies priority for implementation, but the numbering within the sub-program is for ease in identification and does not imply priority.

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[5]*West Windsor Master Plan Update*, 1986.

For example, capital road improvement priority list I (CRIPL I) identifies all improvements needed to accommodate committed development projects throughout the municipality. According to the circulation plan, the sub-programs under priority list I were based on consideration of an appropriate planning horizon to accommodate the committed development, previous growth history, financial ability of involved funding sources to undertake a package of improvements without being overburdened, and the practical requirements of coordinating improvements amongst three governmental entities.

Capital road improvement priority list II (CRIPL II) covers road improvements identified for build-out development between 1996 and 2020. These improvements receive priority over other areas in the township, based on their proximity to the job base, affordable housing opportunities and transit services, high road volumes, location within an approved sewer service area and consistency with state and county plans for corridor centers which are proposed to receive high funding priority from state and county governments.

Capital road improvements priority list III (CRIPL III) is considered low priority, because the improvements are in areas which lack sewer service; have lower traffic volumes, a slower growth rate or more environmental constraints; are located a greater distance from the township job base; and are basically less consistent with the policies of the master plan. CRIPL III was compiled to accommodate build-out expected from 2021 to 2045+. However, some improvements in this corridor have actually been advanced for implementation in the capital budget for 1993 because of extreme pavement deterioration and the need to maintain the roads, but not increase their capacity.

In addition to the roadway improvements in CRIPL I, II and III, the *Circulation Plan Element Update* covers sidewalk and bicycle planning. Sidewalks are currently required along both sides of all roadways, although sidewalk construction may be delayed until needed (for example, until proposed sidewalks can connect to existing walks). The plan envisions adequate township capital budgeting to connect missing links of sidewalks in priority areas identified in the sidewalk master plan.

The township's comprehensive bicycle plan is divided into two phases. The first phase targets the network covering places where most bicyclists would want to travel; from established residential neighborhoods to schools, recreation centers, employment centers and the train station. The second phase of the network would cover linkages between emerging residential and commercial areas. No time frames were established for either phase's implementation, but the plan anticipates that both phases can be implemented in a timely fashion and coordinated with the capital budget as it is prepared (sidewalks and bicycle paths do appear as a line item on the 1993-1998 six year capital budget).

Funding Techniques for Capital Projects

Identifying and prioritizing capital road improvements is only a wish list unless adequate funding mechanisms are in place. Traditionally, funding for road improvements has been the domain of the government at the local, county, state and/or federal level. However, due

to increasing competition for obtaining public funding for infrastructure improvements, more and more communities are requiring private developers to pay transportation impact fees. West Windsor's Master Plan states that having developers pay their fair share of infrastructure improvements necessitated by their developments is a proven method for a municipality to assure that a modern circulation network can be achieved.

In recognition of this, in 1984 West Windsor initiated the creation of a Transportation Improvement District (TID) Program for a portion of the Route 1 corridor, and the application of an Off-Tract Improvement Ordinance for the remainder of the municipality. Both programs require developers to pay their pro-rata share of road improvements generated by the new growth. The authority to enlist funding for off-site improvements due to the development is provided in New Jersey's Municipal Land Use Law (MLUL). Section 40:55D-42 of the MLUL permits the exaction of a developer's pro-rata share for roadway improvements if such exaction is based on a circulation plan that establishes future needs and if fair and reasonable standards are employed to determine the developer's proportionate cost of such facilities.

The capital road improvement priority lists presented in the *Supplemental Circulation Plan* serve as the basis for the TID program. Rather than deal with each development application individually to figure out its specific traffic impacts and required off-tract contributions, the formation of a TID allows each developer within the district to pay the same pre-determined share, on a pro-rata basis, for local "district" improvements created by the cumulative effects of an individual project's incremental traffic impacts.

Presently, there is one TID (the Route 1 corridor); the rest of the township's impact fees are collected under the *Off-Tract Improvement Ordinance*. In 1991, four additional TIDs were proposed, with the "unincorporated" TID areas still falling under the old off-tract improvement ordinance. Each proposed TID has been mapped and corresponds with a table identifying the project by Program and sub-program, general project description, total cost and portion to be paid by the developer as the off-tract cost. In addition, within each TID a specified proportion of the impact fee would be paid to the township and to the county. In this way funding for improvements on county as well as township roads is collected. The additional TIDs are still being reviewed by local officials.

The Proposed Growth Staging Program

The township's Master Plan concluded that it was necessary to adopt a program that controlled the pace and location of growth, due to tremendous residential and non-residential growth which was resulting in traffic demands exceeding the township's road system capacity. In response, the *Timed Growth Controls Program Ordinance* was proposed, which would serve to schedule new development within the community over time according to a schedule of capital road improvements. The foundation for the ordinance is an integration of the capital improvement needs to accommodate existing development, committed development and build-out, with the schedule for making the proposed improvements listed in the capital road improvement priority lists.

In the ordinance, the township was divided into ten districts which would be applied as overlays to the existing zoning map. In each timed growth district (TGD), the underlying zoning rights for each lot are divided into basic rights and additional rights. The basic rights range from 20% to 50% of the dwelling units or non-residential floor area permitted under the parcel's zoning district. The basic rights may be exercised at any time. For the additional rights, a certain percentage of the additional rights for each property within each TGD may begin to be exercised at a certain date, specific for each TGD. For example, in TGD-1A, which covers the bulk of the business parks and higher density residential areas along the Route 1 corridor, 30% of the zoning rights are basic rights and may be exercised at any time, and 10% of the additional rights may begin to be developed each year starting in year 2011. On the other hand, in TGD-4, which is in the southern, largely undeveloped part of the township, 50% of the zoning rights are basic rights, but only 6.67% of the additional rights may be exercised per year, and not until the year 2031.

The ordinance includes provisions for exchanging basic and additional rights between property owners in the same TGD, and provisions for acceleration of additional rights when there is excess capacity available, or when developers construct or pay for the road improvements located within the associated TGD and set forth in the respective CRIPL. The ordinance does not restrict basic rights for tracts which are zoned to include low- and moderate-income housing, nor for public uses. There are several more exemptions for developments meeting various other criteria.

The proposed timed growth districts were coordinated with the CRIPLs and the TIDs. In addition, road corridors experiencing the worst traffic problems and programmed for near-term improvements by other government agencies were also taken into consideration in the staging designation process. For instance, most of the high priority road improvements (high priority because they are needed for committed developments and because they are receiving near-term funding from other government agencies), are in sub-program A and B of CRIPL I, and are also located in TGD-1A and TGD-2A, the most highly developed and congested areas. Projects listed in sub-program A of CRIPL II generally correspond with TGD-1C, TGD-1D, and TGD-2B, which may begin exercising their additional development rights in 2006, 1996 and 2001, respectively. Sub-program B of CRIPL II corresponds with TGD-2C and TGD-2D, which may begin exercising their additional rights in year 2011. Finally, most improvements listed in CRIPL III correspond to TGDs that may not begin exercising their additional rights until 2021 or 2031.

Translating the CRIPL into the Capital Improvement Program

After the capital road improvement priority lists were adopted, the township's next step was to incorporate projects, costs and funding sources into a capital improvement program for a six-year period and a capital budget for the current fiscal year. According to township officials, at this point the process tends to become more flexible to respond to current needs. Input on priority improvements is received from the public works department, police department, traffic safety office, township engineer, consultants, planning board and

residents. The engineer and Council then decide, by consensus, which road improvements will make up the six-year CIP and which will be funded in the current year's capital budget.

For the six-year CIP beginning in 1993, all capital road (and bicycle/pedestrian) improvements were condensed into four line items. The line items in the CIP are general but are explained in the Capital Budget Message. Table V describes the four capital road improvement-related projects on the 1993 - 1998 CIP.

TABLE V
SIX YEAR CAPITAL PROGRAM, 1993 - 1998
WEST WINDSOR TOWNSHIP
Anticipated Project Schedule and Funding Requirements

PROJECT TITLE	EST. TOTAL COSTS	ESTIMATED COMPLETION TIME	1993	1994	1995	1996	1997	1998
Infrastructure Projects	2,050,000	1998	50,000	400,000	400,000	400,000	400,000	400,000
Growth Mgmt. Improvement Projects	4,719,449	1995	276,800	403,877	4,038,772	0	0	0
Road Maintenance Projects	2,889,520	1998	1,122,555	353,393	353,393	353,393	353,393	353,393
Sidewalks/Bike Paths	363,490	1998	0	60,582	75,727	75,727	75,727	75,727

Source: West Windsor Township, Spring, 1994.

Interestingly, only two of the four line items listed were actually derived from the capital road improvement priority lists. The infrastructure project includes money for engineering work for the review of alternatives to the Edinburg by-pass, which is listed on CRIPL I-C. Most of the road maintenance projects are also derived from the CRIPL. This line item includes improvements to Alexander Road, North Post Road and Village Road, which are on CRIPL I, and improvements to Penn-Lyle Road, which is on CRIPL III-A. Although CRIPL III-A was originally intended for build-out needs in years 2021-2030, Penn-Lyle Road was included on the CIP because of its immediate need for road maintenance work rather than capacity expansion. The growth management improvement project line item is for the installation of medians along new roads that are ready to be dedicated to the township. The sidewalks and bicycle paths project consists of extending the sidewalk along Clarksville Road.

The *Capital Budget* is the current year's action on the six-year CIP. Of the funds planned for expenditure in the current fiscal year, most of the money will be debt authorized

(financed through the issuance of bonds and/or notes and repaid over a period of years). About 5% of the money comes from the township's capital improvement fund, which in essence in the township's down-payment needed by law before it can issue bonds. Whenever possible, money is also received as grants-in-aid for projects. In general, the township pays for the improvements directly and is reimbursed for portions of the costs through the *Transportation Improvement District* and *Off-Tract Improvement Ordinances*.

TABLE VI
CAPITAL BUDGET, 1993
WEST WINDSOR TOWNSHIP

Project Title	Est. Total Costs	Amounts Reserved in Prior Years	1993 Budget Appropriation	Capital Improvement Fund	Capital surplus	Grants in Aid & Other Funds	Debt Authorized
Infrastructure Study	50,000	0	0	2,400	0	0	47,600
Growth Mgmt. Improvement Projects	276,800	0	0	13,200	0	0	263,600
Road Maintenance Projects	1,122,555	0	0	53,455	0	413,000	656,100

Source: West Windsor Township, Spring, 1994.

The specific authorization to expend the funds described in the capital budget is given by executive order of the mayor. Both the CIP and capital budget are monitored by the township business administrator, finance director and engineer.

It should be noted that many of the projects listed in the CRIPLs will be entirely funded by either a developer or a different level of government, and will therefore not appear on the township's CIP or capital budget. For example, $43 million dollars in federal funds have been approved for U.S. Route 1 improvements (part of which will be in West Windsor Township) as part of the Delaware Valley's Regional Transportation Improvement Program (TIP). Other projects on the CRIPL will be entirely funded by developers as on-site improvements, and will also not appear on the CIP.

CONCLUSION

West Windsor Township followed a detailed analysis and logical planning process to develop a prioritized list of capital improvements needed over the next fifty years. The actual capital improvement program, however, was only partially based on the work put into the CRIPL. It appears that unforeseen events will usually intercede and force adjustments to the capital improvement planning process.

The township has devised a funding mechanism to enlist developer contributions and a growth staging technique to pace developments according to a schedule. With their adoption, the township should be able to deal more efficiently with its current and future infrastructure needs. Development of the *Capital Improvement Program* has enabled West Windsor Township to forecast infrastructure needs, improve their scheduling, facilitate better coordination among agencies, secure funding, and ensure that capital projects will be implemented.

For additional information on capital improvements programming, please contact West Windsor Township's Community Development Department, at 609/799-2400.

REFERENCES: CAPITAL IMPROVEMENTS PROGRAM

Interviews with Samuel Surtees, Director of Community Development, and Rob Korkuch, Township Engineer, West Windsor Township, September 8, 1993.

Telephone interview with Bob Bruschui, Business Administrator, West Windsor Township, October 20, 1993.

West Windsor Township Master Plan Update, adopted by the Township Planning Board September 3, 1986, prepared with technical assistance of RPPW, Inc., Princeton, New Jersey.

Circulation Plan Element to the Master Plan of West Windsor Township, adopted with revisions February 13, 1991, prepared in conjunction with the West Windsor Township Planning Board by Lenaz, Mueller and Associates, Princeton, New Jersey.

Transportation Improvement Districts - Sub-Plan Element to the Circulation Plan of West Windsor Township, adopted with revisions on November 20, 1991, prepared in conjunction with the West Windsor Township Planning Board by Lenaz, Mueller and Associates, Planning and Development Consultants, Princeton, NJ.

Memorandums from Lenaz, Mueller and Associates to Steven Decter, Chairman of West Windsor Growth Management Advisory Committee, on:

- Prioritizing and Sequencing of Capital Road Improvements, May 9, 1990.
- Capital Road Improvement Programs/Priority List, November 19, 1990.
- Proposed TID Areas, November 19, 1990
- Proposed Timed Growth Districts, November 19, 1990.

West Windsor Township Provisions Applicable to Site Plans and Subdivisions, Article V - Off-Tract Improvements, revised ordinance 6/92.

Timed Growth Controls Program Ordinance, submitted November, 1990.

1993 Capital Budget and Capital Improvement Program, West Windsor Township, sheets 39 through 39-d.

V. PLANNING TOOL #6: TRAFFIC IMPACT ANALYSIS

Traffic impact analyses are studies which describe a development proposal, examine the existing roadway system, predict the future volume of traffic of a proposed project and estimate the projected impact of the proposed project on the existing local and regional transportation network. These studies also can offer alternatives for mitigation of identified negative impacts.

Traffic impact analyses can be useful in helping local officials to decide whether a project should be accepted or rejected, or whether the developer should be asked to revise his proposal in order to minimize negative impacts on the municipality. Impact studies are essential prerequisites to the use of other planning tools such as impact fees, trip reduction ordinances and adequate public facilities ordinances. They can also assist county and regional agencies in assessing the overall impact of large-scale development proposals on adjacent municipalities, the county and the region as a whole.

Traffic impact studies can range from relatively simple and straight-forward to highly complex. Traffic impact studies should provide enough information to the reviewing planner or board to determine the impact of a proposed project on the existing transportation network, and whether or not (and how) the proposed project and its estimated traffic can be accommodated. A well-done impact analysis should examine the potential impacts of a variety of alternative development scenarios for the property, and can demonstrate the effects that a variety of mitigation measures could have in reducing or eliminating projected negative impacts of the proposal.

Traffic impact analysis are typically required through an amendment to the local land development ordinance, and the cost is generally limited to the cost of staff or consultant time in preparing the amendment. The amendment should ideally include a definition of the type of projects for which impact analyses are required and issues which must be addressed in the analysis. Most traffic planners or engineers utilize a standard methodology and use capacity criteria defined by the Transportation Research Board and the Institute of Transportation Engineers. Given that different proposals will have varying impacts (some of which will be negligible and will not warrant development of a complete traffic impact analysis), localities should develop guidelines as to whether or not an impact study is required and the type of study (if any) that is required, based on the size of the development, traffic characteristics, the location of the project or some combination of these factors.

Authorization to Require Traffic Impact Analyses

In Pennsylvania, the authority to require traffic impact analyses is found in Article V of the Municipalities Planning Code, which directs that subdivision and land development requirements may include "provisions for insuring that streets in and bordering a subdivision or land development shall be coordinated, and be of such widths and grades and in such

locations as deemed necessary to accommodate prospective traffic". No legal standards for traffic impact analyses are defined by either the MPC or the courts, but numerous examples of such studies exist and standard methodologies and criteria have been developed by the Transportation Research Board and the Institute of Transportation Engineers.

In New Jersey, the authority to require developers of large projects to submit traffic impact analyses is granted in Article VI of the Municipal Land Use Law (MLUL). Like Pennsylvania, neither planning legislation nor the courts in New Jersey have specifically defined any required standards for traffic impact analysis studies.

Regional use of traffic impact analysis as a planning tool

Many municipalities that responded to DVRPC's municipal survey do not routinely require developers of large projects to submit a traffic impact analyses as a part of the development proposal approval process. Of 121 survey respondents, eleven New Jersey municipalities and thirty-four Pennsylvania municipalities indicated that they currently require developers to submit a traffic impact analysis as a part of the review process. This planning tool has been used in many types of communities, from urban boroughs (such as Lansdale in Montgomery County) to growing suburban townships (such as Winslow Township in Camden County).

Relationship to Transportation Impact Fees

Those municipalities that do impose a traffic impact analysis requirement often do so only as the basis of charging an impact fee. Of the 45 municipalities that require traffic impact analysis, 53% indicated that they also impose a transportation impact fee on new development, presumably using the traffic impact analysis as a basis for calculating the fee.

For example, Winslow Township (located in Camden County) requires developers of all major subdivisions (meaning those with three or more units) and all non-residential development to submit a traffic impact analysis completed by an engineer as a condition of plan approval. The requirement may be waived, however, if the township engineer decides that the project will have little traffic impact or is located in a very low density portion of the township. The traffic impact analysis requirement is included within the local subdivision and land development ordinance. The township engineer reviews the analysis for accuracy, and uses the findings of the analysis to determine the transportation impact fee that the developer will be required to pay.

Uwchlan Township (in Chester County) requires developers of all proposed non-residential projects and of proposed housing developments of 3 or more units to submit a traffic impact analysis that estimates the amount of traffic that will be generated by their development. This analysis is then reviewed by the township's engineer for legitimacy, and is used as the basis for calculating the traffic impact fee levied against the development. This impact analysis requirement was adopted specifically for use in calculating the required impact fee.

Both Uwchlan and Winslow townships require developers of any residential project with three or more units and all non-residential projects to submit a traffic impact analysis for review, although Winslow Township waives the requirement on a case-by-case basis. Both townships maintain that requiring impact studies from smaller developments is necessary in order to fairly calculate impact fees. However, given the relative impact of smaller projects on the transportation network (and particularly of smaller residential projects), municipalities may find it more practical to limit traffic impact analysis requirements to larger scale developments.

Use of Transportation Impact Analyses in the Absence of Impact Fees

Although traffic impact analysis studies are a necessary prerequisite for the imposition of traffic impact fees, impact studies can also be useful when required in municipalities with no impact fee requirement. Traffic impact analysis studies can define the projected impact of a development on the local and regional transportation network, and can identify changes to the plan and other measures which may mitigate prospective negative impacts of the projects. Typical mitigation measures which might be considered include roadway widening; adding left or right hand turning lanes; providing traffic signals or signage; building traffic islands; changing access locations; or adjusting the timing of traffic signals to improve traffic flow. Other measures could include provision of a shuttle bus to facilitate mass transit usage or changing the mix of land uses in a project to reduce site-generated traffic.

Municipal officials can then use this information in reaching a decision regarding the proposed project, including alterations to the development plan and mitigation techniques that might be requested. For example, the developer of a large corporate center in Valley Township agreed to construct within his development an internal road meeting state roadway standards that connects two local roads, after his mandatory traffic impact analysis determined that the project would have an unreasonable impact on the municipality's local roadway network.

In Kennet Township, Chester County, the right to request a transportation impact analysis is found in the local land development ordinance, adopted in 1985. Impact analyses are required on a case-by-case basis, as determined by the township engineer; typically only larger projects are required to provide one. The township engineer and a traffic consultant evaluate the analysis for validity. Necessary improvements (such as roadway widenings, additional curbs or turning lanes) identified in the analysis are usually incorporated into the proposal and completed by the developer. In one instance (where improvements to Route 1 were necessitated by a large development), the improvement was completed through the cooperative efforts of the private and public sectors: the developer, the Pennsylvania Department of Transportation and Longwood Gardens contributed to a joint fund and a contractor was hired to do the actual construction.

In Upper Southampton, Bucks County, the right to require or request a transportation impact analysis is likewise granted in the local land development ordinance, originally adopted in 1947. As is the case in Kennet Township, there are no established guidelines

as to when an analysis is required; the township engineer determines the need for one on a case-by-case basis. The engineer then evaluates the validity and implications of the analysis, and the township's police department reviews highway safety issues associated with the project. To date, all mitigation has been done by the developers, through compromise and negotiation.

CASE STUDY: UPPER MERION TOWNSHIP, MONTGOMERY COUNTY

Upper Merion Township is located in southeastern Montgomery County, and includes the retail and office center known as King of Prussia. The Township is bisected by several major highways and contains the intersection of the Schuylkill Expressway, Route 202, Route 422 and the Pennsylvania Turnpike (I-276). The Township has established specific transportation impact assessment criteria that are used as one factor in determining whether a proposed development project will be approved. These guidelines identify conditions under which a transportation impact assessment will be required and list factors that will be considered by the township's planning staff in evaluating the impact assessment. They also define a recommended format of the required impact assessment and provide accepted definitions of key factors of the analysis, such as eligible programmed transportation improvements; trip generation standards; level of service definitions; trip distribution, directional split and modal split standards; and parking demand.

When is a Transportation Impact Assessment Required?

All prospective developers must submit an initial Transportation Impact Assessment Statement concerning the need for a local area transportation review (LATR) with their preliminary development application. The Township's planning staff then reviews the initial statement and uses specific criteria to determine whether or not a LATR is warranted. In order to shorten the review process, developers are encouraged to submit the more detailed LATR simultaneously with their initial assessment statement and development proposal if it is obvious (through previous meetings with staff or based on size or location of the proposed project) that an LATR will be required. An LATR is required if one or both of the following conditions are evident:

- Size of Project: An LATR is required if the proposed development is large enough that 50 or more additional peak hour trips will be generated. Potential traffic is estimated based on the Institute of Transportation Engineer's (ITE) trip generation rates or on three directly comparable land use developments within 100 miles of Lower Merion, if standards are not available for the particular land use.

- Nearby Congestion: A local area transportation review is required in instances where the proposed development is located near roadways, intersections or adjacent groups of intersections that are already heavily congested (defined as having an intersection or roadway link operating at a level of service "D" or worse during the A.M. or P.M. peak). The Township's staff maintains an inventory of available traffic counts, collected by the Township, Montgomery County, other public agencies or

private consultants, for use by prospective applicants. This inventory identifies the most congested level of service condition, in either the A.M. or P.M. peak hour.

Preparation of the Local Area Transportation Review (LATR)

Prospective developers are required to include existing traffic, anticipated traffic that will be generated by their proposed project and potential traffic associated with other approved preliminary plans in the local area transportation review. The following issues are decided and agreed upon at an initial meeting between the developer and the township staff:

- Nearby critical intersections that should be included in the analysis, which then define the project area;
- The adequacy of available turning movement counts and the need to obtain additional data;
- Trip generation rates (generally from ITE) that will be used in the analysis;
- The anticipated directional distribution of expected traffic;
- CIP projects that will ultimately increase traffic capacity in the area and which may therefore be incorporated into the analysis;
- Forecasted traffic growth in the area based on current trend;
- The feasibility of various engineering improvements, transit services or travel demand management techniques in the area; and,
- The number and size of buildings on the site (which then effects the trip generation standards that may be used).

Specific items that must be provided in order to consider the preliminary development application to be complete include the following:

- A site plan or map showing all existing roads in the project area;
- The location of applicable programmed improvements that will affect traffic at the critical intersections;
- Existing A.M. and P.M. peak hour traffic counts for nearby critical intersections;
- A description of all nearby approved development projects;
- Morning and evening peak hour traffic volumes that will be generated by nearby approved-but-unbuilt projects;
- Anticipated A.M. and P.M. peak hour traffic volumes to be generated by the proposed project, split into traffic entering and leaving the site;
- The trip distribution pattern (by percent) of traffic from nearby development projects during the A.M. and P.M. peak hours;
- The trip distribution pattern (by percent) of the proposed development project;
- Maps and tables illustrating the overall anticipated morning and evening peak hour traffic volumes and the associated levels of service on the affected highway system;
- A description of any special studies performed to assign recorded or proposed development traffic volumes; and,
- A description of any improvements that the developer agrees to provide as a part of the proposed project in order to mitigate potential traffic problems.

Definition of Specific Criteria and Factors

Accepted definitions and methods for assigning values to key variables in the impact analysis are also identified in the written guidelines. For example, programmed transportation improvements that may mitigate current or anticipated traffic and which the developer would therefore like to see included in the impact analysis must pass three tests: the programmed improvement must be identified on the Township's current capital improvement plan and PennDOT's 12-year capital improvement plan; it must have 100% of its funding appropriated; and construction must be scheduled to begin within two years.

Although case-by-case exceptions can be granted, trip generation rates for all proposed land uses must generally come from the Institute of Transportation Engineer's (ITE's) *Trip Generation Report (5th Edition)*. However, township officials believe that projects which involve either a single office building or a group of adjacent buildings totalling over 300,000 square feet, occupied by a single employer and not part of a larger activity center have the potential for higher than average trip generation rates. In these cases, applicants are required to identify potential traffic impact using both the recommended ITE rate and ITE's more conservative 85th percentile rate. The Township Planning Commission then considers both analyses and decides if additional transportation mitigation measures may be necessary.

Directional split of projected traffic (the percentage of generated trips entering or leaving the proposed development during the peak hours) should also be based on accepted ITE standards where available. Trip assignment to the area roadway network must be discussed, including the impact on both primary and alternate routes. The required level of service (LOS) analysis must be based on the procedure contained in the *1985 Highway Capacity Manual*, and the ability of the highway system to accommodate traffic must be expressed alphabetically ("A" to "F", with "F" being the worst condition) as described in this report.

The guidelines require that present day and historical traffic data be made available whenever possible to the developer for use in his analysis, and that traffic counts be adjusted to the current year by adding the estimated effects of any new developments. Traffic counts for locations where existing counts are more than three years old or for locations for which no data exists must be acquired by the developer using his own resources.

The Township's Review and Analysis

Based on the local area transportation review, the Township's planning staff prepares a report concerning the adequacy of the existing and proposed transportation facilities and provides a recommendation for each of several categories. Factors that must be considered by the Township's planning staff in reviewing the impact assessment and presenting a recommendation to the Planning Commission include the following:

a. Transportation solutions: The staff notifies the developer of potential problems or inadequacies as they arise, and incorporates potential solutions identified by the developer into the final report to the Planning Commission and Board of Supervisors.

The developer may then agree to implement recommended solutions as a condition of site plan approval.

b. Degree of congestion: The staff identifies traffic congestion forecasted for both the morning and evening peak hours; in mixed-use overlay districts, peak hour "LOS" worse than the mid-point of level "E" is considered unacceptable; in other areas, "LOS" of "D" or worse is unacceptable.

c. Unavoidable congestion: The planning staff considers whether alternative routes to serve the traffic associated with the proposal exist, or whether certain roads will absorb the majority of the projected traffic for lack of any alternative.

d. Public transit and TDM availability: The availability of public transit and other transportation alternatives and the potential for developing non-highway improvement alternatives is debated.

e. Project-related traffic: Staff identifies the degree to which the congestion problem is directly attributable to the proposed development, considering existing traffic, potential traffic expected to be generated by any outstanding approved-but-unbuilt projects, and the traffic generated by the proposed project by itself.

Upper Merion Township's Planning Commission and Board of Supervisors then use the staff report to arrive at an overall finding as to the adequacy of transportation facilities and services to accommodate the travel demands associated with the proposed development. Development proposals may be accepted, accepted with conditions or rejected based on this overall finding.

The transportation impact assessment can result in physical improvements being made to the highway network, by either the private or public sector. It may also result in site plan approvals that are conditioned upon the implementation by the developer of various travel demand management (TDM)/traffic mitigation strategies. These TDM programs, for example, may include the operation of shuttle bus system to existing rail transit stations, the establishment of ride-sharing programs, or the establishment within the approved project of a staggered work hour program or a transit incentive program. In such cases, Upper Merion's transportation impact assessment guidelines provide specific procedures for continued monitoring of the effectiveness of these required programs, including periodic traffic counts conducted during peak hours.

CONCLUSION

Municipalities that are currently experiencing growth pressure or are projected to grow significantly in the future should consider requiring prospective developers of larger projects to submit traffic impact analyses for review by the Township planning staff, engineer and planning commission as a condition of project approval. Traffic impact analysis requirements can be incorporated fairly easily into the local subdivision or land development

ordinance, with submission of the impact analysis required before the development application will be considered complete. Ideally, specific criteria should be established as to which type and scale of projects must submit a transportation impact analysis, and a definition of required components of the analysis and acceptable standards (for anticipated trip generation, for example) should be defined.

These studies can assist the municipality in assessing the anticipated impact of the proposed project on the local transportation network, and can assist county and regional planning agencies in assessing the overall impact of development in adjoining municipalities and the region as a whole. Traffic impact studies can lead to alternatives to the original development proposal to mitigate its anticipated negative transportation impacts, including physical improvements to the roadway system, alternative access locations or public transit alternatives to reduce anticipated congestion.

For additional information on implementing a traffic impact analysis requirement, please contact Kennet Township in Chester County (215/388-1300), Upper Southampton in Bucks County (215/322-9700), or Upper Merion Township in Montgomery Township (215/265-2600).

REFERENCES: TRAFFIC IMPACT ANALYSIS

Canter, Atkinson and Leistritz. *Impact of Growth: A Guide for Socio-Economic Assessment and Planning*. Lewis Publishers, Inc., Chelsea, Michigan. 1986.

Delaware Valley Regional Planning Commission, *Linking Transportation and Land Use Planning in the Delaware Valley*. Philadelphia, Pennsylvania, July, 1991.

Institute of Transportation Engineers, *A Toolbox for Alleviating Traffic Congestion*, Washington, D.C., 1989.

Koepke, Frank J. and Stover, Vergil G. *Transportation and Land Development*, Institute of Transportation Engineers, Prentice-Hall, Englewood Cliffs, New Jersey, 1988.

Ndubisi, Forster. *Planning Implementation Tools and Techniques: A Resource Book for Local Governments*. University of Georgia Institute of Community and Area Development. Athens, Georgia. 1992.

Pivo, Dr. Gary. *Local Government Planning Tools*. Growth Management Planning and Research Clearinghouse, University of Washington. Seattle, Washington. August, 1992.

VI. PLANNING TOOL #7: TRANSPORTATION IMPACT FEES

Impact fees are charges imposed on developers as a condition of plan approval to fund capital improvements necessitated by the development. Impact fees represent a means by which municipalities can shift the cost burden of providing infrastructure improvements necessary for growth from resident taxpayers to developers. Such fees have been used to fund off-site transportation improvements, sewer and water facilities, schools and parks. Development exactions have more recently also been utilized to raise money for other necessary services and facilities linked to new development, such as affordable housing, job training or day care facilities.

Impact fees have become popular with local officials in recent years, since a share of the cost of services and facilities necessitated by new development is shifted from local taxpayers (and current voters) to prospective residents. A 1991 nation-wide random survey of 200 local jurisdictions found that 26% of the smaller towns and 34% of the cities surveyed imposed impact fees on new development[6]. Of those jurisdictions imposing fees, 55% of small towns and 38% of cities rated them as highly effective in accomplishing their intended purpose.

Legislative challenges to impact fee requirements clearly indicate that the fees must bear a rational nexus to the anticipated impact of the development in question. Courts have generally agreed that fees must be collected into accounts that are separate from local general funds (to ensure that impact fees are used only for their intended purposes) and must be returned if the required facility is not provided within a reasonable length of time (typically fifteen to twenty years).

Authorization for Imposing Impact Fees: Pennsylvania

Pennsylvania's impact fee legislation was passed in December of 1990 (Act 209 of 1990). The law authorizes municipalities to collect impact fees only for improvements attributable to new development that are designated in a local transportation capital improvement program. Fees may be used to cover land and right-of-way acquisition, legal and planning costs, and other costs directly related to the improvement, including debt service.

In order to adopt impact fee requirements, municipalities must define transportation service areas that are no larger than seven square miles each and prepare land use and growth assumptions for each area for at least five years. They must also conduct an analysis that examines existing deficiencies in the transportation system and defines preferred levels of service for all roads impacted by the fees. A transportation capital improvements plan based on their land use assumptions and their analysis of their existing system must then be

[6]Pivo, Dr. Gary, *Local Government Planning Tools*, page 17.

developed. Impact fees collected within each service area may be used to fund only eligible transportation improvements located within the service area from which they were collected.

Municipalities are allowed by law to use impact fees to pay for their roadway sufficiency analysis. They cannot, however, use revenue from impact fees to fund the development of either their land use assumptions report or the transportation capital improvement program. Additionally, Pennsylvania's impact fee legislation specifically prohibits townships from using impact fees to repair, operate or maintain existing transportation facilities; construct, acquire or expand municipal services not identified in the township's transportation capital improvement plan; upgrade, expand or replace existing capital facilities that serve existing developments in order to meet stricter standards not attributable to new development; or make roadway improvements due to pass-through traffic or correct existing deficiencies.

In addition to Act 209, Pennsylvania also allows municipalities to collect fees for transportation improvements through the establishment of a Transportation Development District (TDD). Act 47 of 1985 (amended in 1986) allows one or more municipalities to delineate a transportation improvement district after completing a comprehensive transportation study that assesses existing conditions in the district and identifies needed improvements. A transportation improvement program must also be prepared, specifying the scheduling, cost and financing for each required improvement. Properties within the TDD may be assessed a share of the cost of needed improvements, based on funding formulas that determine some "fair and reasonable" share given the projected usage by each property of the facilities or services to be expanded or added.

An example of a TDD in the Delaware Valley region is the joint transportation authority formed in 1987 between East Whiteland and Tredyffrin Townships in Chester County. Major improvements to Route 202 and Route 29 were partially funded through bonds sold through the transportation authority. The debt service on the bonds will be funded through an annual assessment levied on all commercial, corporate and industrial properties within the district.

Authorization for Imposing Impact Fees: New Jersey

In New Jersey, the Municipal Land Use Law (MLUL) authorizes municipalities to require developers to pay for off-site improvements necessitated by their development, including water, sewer, drainage facilities and streets. The law requires, however, that the developer be required to pay only a pro-rata share of the cost of improvements necessitated by their development, and does not allow localities to use impact fee revenue to pay for long-range transportation improvements. Additionally, a fee for street improvements can only be charged if the municipality has adopted both an impact fee ordinance and Master Plan which includes both a circulation plan and a transportation element.

New Jersey law also allows for the collection of impact fees in areas designated by the state as Transportation Development Districts through the Transportation Development District (TDD) Act. Counties may apply to the New Jersey Department of Transportation for

designation of a TDD in all or part of their county, based on evidence of high current and projected growth and an assessment of transportation needs generated by that growth. Once the district is approved by the state, the county must then define goals and priorities of the TDD; identify necessary transportation improvements within the district; and develop a financial plan which estimates the costs of the improvements, identifies prospective funding sources and defines a formula for determining the amount of the fee charged. Fees are then collected either at the time of local approval or before building permits are issued, and the revenue is deposited into a special account and used only for the identified improvements.

Regional Use of Impact Fees as a Planning Tool

Of 121 survey respondents, nine New Jersey municipalities and fifteen localities in Pennsylvania have adopted a transportation impact fee ordinance. Most of these municipalities also require developers to submit a traffic impact analysis prior to project approval, which can then be used as a basis for determining the amount of the impact fee. For the purposes of this study, impact fee requirements in Winslow Township, Camden County and in Uwchlan Township, Chester County were chosen for further study.

CASE STUDY: WINSLOW TOWNSHIP, CAMDEN COUNTY

1990 population: 30,087
1990 employment: 7,395
Forecasted population growth: 69.6% through 2020
Forecasted employment growth: 41.2% through 2020

Winslow Township is a growing community located in the southeastern corner of Camden County, at the edge of the Pinelands. The township has grown significantly over the last two decades (increasing in population by 63% since 1970) and is forecast to experience significant growth in both population and employment through the year 2020.

The township's impact fee ordinance (known as the "off-tract improvement ordinance") was adopted in August of 1989 in order to ensure that developers would be responsible for a pro-rata share of the costs of off-tract improvements necessitated by new development. The ordinance follows guidelines established in the New Jersey Municipal Land Use Law (MLUL), requiring payments for circulation improvements (transportation); and water,sewer and drainage facilities, including land and easements. The ordinance was drafted based on a model impact fee ordinance distributed in the late 1980's by the New Jersey League of Municipalities, and was adopted by the township committee after revisions to the model ordinance were made to meet the township's specific needs. The total cost to the township to develop and adopt the ordinance, primarily to cover legal fees, was approximately $1,000.

Transportation improvements that may be funded using impact fee revenue include (but are not limited to) street improvements, alignment, channelization, barriers, new or improved traffic signalization, signs, curbs, sidewalks, trees, utility improvements uncovered elsewhere and the construction or reconstruction of new or existing streets. The ordinance states that

the improvements must bear a rational nexus to the needs created by the development. The impact fee requirement is based on the circulation and utility service elements of the township's adopted master plan.

Winslow Township requires developers of all major subdivisions (meaning those with three or more units) and all non-residential development to submit a traffic impact analysis completed by an engineer as a condition of plan approval. The requirement may be waived, however, if the township engineer decides that the project will have little traffic impact or is located in a very low density portion of the township. The traffic impact analysis requirement is included within the local subdivision and land development ordinance. The township engineer reviews the analysis for accuracy, and uses the findings of the analysis to determine the transportation impact fee that the developer will be required to pay, based on the estimated cost of necessitated improvements.

Winslow Township's impact fee ordinance allows for two types of payment requirements: full cost allocation and proportional allocation. If the development in question necessitates the construction of off-tract improvements that will benefit no other development, the developer may be required to pay the full cost of the improvement. If, however, other properties will benefit from the improvement, the ordinance requires that the developer's share of the cost of the improvement be based on the project's traffic impact analysis, detailing existing and reasonable anticipated future peak hour traffic flows. The developer's share of the total cost is based on the ratio of peak hour traffic generated by the proposed development to the future additional traffic anticipated to impact the improvement.

The off-tract improvement ordinance allows the planning board to decide whether the township or the developer will actually be responsible for constructing the necessary improvement. If the developer is paying a proportional payment, the board decides if the payment must be in cash or if it may be in the form of either a bond or guarantee. Cash for future improvements is deposited into a designated interest-bearing account established by the Township Treasurer, where it is held until actual construction of the improvement begins. Construction of the improvement must begin within fifteen years of the date on which the money is deposited, or the payment is returned to the applicant. Developers are entitled to a pro-rata refund of any fees left over after construction.

Adoption of the off-tract improvement ordinance was itself done relatively quickly. However, the process was of necessity preceded by the adoption of a township master plan, including both a circulation element and a utility service element, increasing the actual time and cost of implementation. Approximately $250,000 has been collected to date from approximately ten developers; all of these funds have been used to fund traffic improvements necessitated by the new development. Additionally, the local land development ordinance requires developers to install on-site curbs, sidewalks and, in some cases, storm drainage, and to provide additional right-of-way for future expansion of certain roads. As of yet, the township has not experienced any problems in implementing the ordinance, and its validity has not been legally challenged.

CASE STUDY: UWCHLAN TOWNSHIP, CHESTER COUNTY

1990 population: 12,999.
1990 employment: 5,241.
Forecasted population growth, 1990-2020: 27%.
Forecasted employment growth, 1990-2020: 22%.

Uwchlan Township is a relatively small community located between Route 30 and the Pennsylvania Turnpike in central Chester County. The township grew significantly in recent decades (increasing in population by 53% between 1970 and 1980 and an additional 55% between 1980 and 1990) and is expected to experience modest growth through the year 2020. Uwchlan Township requires developers to submit traffic impact analyses and to pay impact fees towards a portion of the cost of necessary improvements.

Uwchlan Township began collecting voluntary traffic impact fees in 1984 through negotiation with individual developers on a case-by-case basis. The township formally adopted a traffic impact fee ordinance in June of 1992, in order to comply with Pennsylvania's stricter statewide impact fee legislation. The impact fee ordinance covers seven square miles of the 10.4 square mile township, including all of the township's currently undeveloped areas.

Prior to the drafting of the ordinance, an impact fee advisory committee consisting of four developers and five planning commission members was formed. The composition of the advisory committee was in accordance with state law, which requires that at least 40% of the group represent the building and real estate industry. The first step towards adoption of the ordinance was the completion of a 10-year land use assumptions report and a build-out analysis of future growth and development within the impacted area. Although thought was given to hiring a consultant to develop the required land use assumptions report, the advisory committee decided to complete the report themselves, with assistance provided by the Chester County Planning Commission. As required by law, copies of the build-out analysis and land use assumptions were forwarded to the county and to contiguous municipalities for review and comment prior to adoption by the township of the report.

The township's engineer then completed a traffic impact study and roadway sufficiency analysis, based on this land-use analysis. Using information from both the land use assumptions report and the roadway sufficiency analysis, the committee designated a seven-square mile service area to be covered by the impact fee ordinance, and identified roadway improvements needed both to correct existing deficiencies and to accommodate future development. The projected cost of necessary transportation improvements within the service area was estimated during development of their transportation capital improvement plan. Finally, the advisory committee drafted the impact fee requirement, considering the estimated total cost of the improvements necessitated by growth and the share of these costs attributable to new developments within the service area. Once drafted, the ordinance was forwarded to the Board of Supervisors for approval and adoption, after all public notice and hearing requirements had been fulfilled.

The township's impact fee ordinance took approximately a year and a half to draft and adopt, due primarily to Pennsylvania's mandatory impact fee requirements. The total financial cost to develop and adopt the ordinance was approximately $30,000, including legal fees and the cost of completing the land-use analysis and traffic impact study, in addition to the time and effort expended by advisory committee members.

Uwchlan Township requires developers of all proposed non-residential projects and of proposed housing developments of three or more units to submit a traffic impact analysis prior to approval that estimates the number of trips generated by their proposed development. This analysis is then reviewed by the Township engineer for validity. Once the analysis has been reviewed and accepted by the engineer, the impact fee is calculated by multiplying the estimated number of trips generated at peak evening rush hour by $750 per trip (the state has established $1,000 per peak hour trip as the maximum allowable impact fee).

Since the adoption of the ordinance, no new developments have been constructed (and hence no fees have been collected). This lack of development is due at least in part to the recent sluggish development climate which has followed the development boom of the late 1980's. Township officials also believe, however, that the impact fee requirement has acted as a deterrent to potential developers unwilling to pay the required fee, prompting them to look elsewhere for developable sites. Uwchlan Township officials believe that adoption of the impact fee requirement has slowed local growth, an objective of the fee requirement that they actually anticipated and welcome.

CONCLUSION

Impact fees are generally considered to be most useful in townships that are located in the path of growth and that have significant amounts of suitable land available for development. In townships with little land remaining for development, potential fees to be generated probably will not cover the cost of the studies required before adopting a fee and the administration of the fee requirement.

Impact fees have been challenged in the courts on numerous occasions. Based on these challenges, the courts have defined guidelines that are used when considering the validity of the fees. The courts have generally required that fee requirements be defined in an ordinance and applied equally to all developments creating an impact on the proposed improvement, rather than collected through negotiation on a case-by-case basis. Impact fee revenues should also be kept separate from the community's general funds, as proof that the revenue is used solely for the purpose for which it was intended. Impact fees may only be collected for public services or facilities necessitated by new development, and developers must be charged only a proportionate share of the cost of the new service or facility given the projected impact of their development. Courts have also required that fees be refunded to the developers if provision of the service or construction of the facility for which fees are collected is not commenced within an identified amount of time.

New Jersey law requires that municipalities adopt a Master Plan which includes a circulation and transportation element in order to impose a legally defensible impact fee. Previous comprehensive planning efforts in Winslow Township were primarily responsible for lower implementation cost and time involved in adopting their impact fee requirement as compared to Uwchlan Township. It is recommended that impact fee requirements in Pennsylvania municipalities be preceded by the adoption of a comprehensive plan, including an element that considers current and projected transportation demands and needs of the municipality based on forecasted population and employment growth. Such planning efforts prior to collection of the impact fees identifies the need for transportation improvements, and documents that these needs are created by growth rather than pre-existing deficiencies.

An impact fee requirement can be used as a mechanism to ensure that new development pays its fair share of the cost of mitigating negative impacts associated with growth. An adopted impact fee ordinance also allows for orderly development, since the cost of growth and the fees associated with development are known in advance of the development proposal process. In addition to raising necessary funds from developers for infrastructure development, impact fees may act as an incentive for in-fill development in areas unaffected by fee requirements, where infrastructure is already in place.

Impact fees increase the cost of development, however, and are usually passed on by the developer to new homeowners or tenants. Impact and linkage fees can have the adverse effect of encouraging developers of residential projects to build mainly higher-cost housing and to neglect the production of low or moderate cost units, since the fees are usually unit-based and can be recovered more easily from the sale of higher costs units.

Development fee requirements in one community may also encourage developers to concentrate their development efforts in neighboring communities with less stringent requirements. Communities considering imposing impact fees on new development should weigh all of these issues before deciding whether the fees collected will be worth the cost of preparing, adopting and, in some cases, defending the impact fee requirement.

For additional information on implementing a transportation impact fee, please contact the planning department in Winslow Township (Camden County) at 609/567-0700 or Uwchlan Township in Chester County (610/363-9450).

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VII. PLANNING TOOL #8: ADEQUATE PUBLIC FACILITIES ORDINANCE

An adequate public facilities (APF) ordinance, often referred to as *"concurrency,"* requires public facilities necessary to serve a new development to be in place at the time of construction or within a reasonable time frame thereafter. Such facilities as roads, sewer and water service and schools are critical components of any new development. Although the provision of these facilities as a prerequisite to development seems like common sense, few areas within the United States actually require adequate public facilities prior to new development. In the Delaware Valley region it is common for new development to be approved and constructed even if existing public facilities are inadequate. Municipalities are generally powerless to prevent this from happening unless they negotiate an arrangement with the developer or have an impact fee or other such ordinance in effect.

During the 1980s, several of the growth management states began to realize that a concurrency system was necessary given rampant growth and few public dollars to support new infrastructure facilities. Montgomery County, Maryland is credited with being the first to implement the APF ordinance at the local level (1973) and Florida's application of concurrency is perhaps the best example of a statewide concurrency law. All adequate public facilities ordinances, whether at the local or state level, require certain inherent planning components to make them effective. These components include a tight link between all aspects of planning, particularly between land use and transportation.

In the DVRPC region, 13% of the municipalities which responded to DVRPC's survey on land use and transportation linkages tools have a provision for adequate public facilities in their zoning or subdivision and site plan ordinances. While these local ordinances generally require roads for new development, they rarely address either the adequacy of these facilities or public transit. The requirements in most local site plan and subdivision ordinances address such standards as roadway widths, turning radii and grading. However, these standards usually only address on-site improvements, ignoring off-site facilities such as a nearby intersection which may be adversely impacted by the development. An effective APF ordinance would give municipalities enhanced power by requiring a developer to make improvements to the municipality's infrastructure off-site, as long as the direct impact from the developer's project necessitates the improvements.

CASE STUDY: MONTGOMERY COUNTY, MARYLAND

Montgomery County, Maryland, a suburb of Washington, D.C., had a 1990 population of 757,027, representing a 31% increase in population since 1980. This high growth county includes the cities of Silver Spring, Rockville and Bethesda. In Maryland, county governments have primary responsibility for local planning, including development review and approval. In Montgomery County, these functions are carried out by the Maryland-National Capital Park Planning Commission and the Montgomery County Planning Board.

The Montgomery County Council adopted its adequate public facilities ordinance (APFO) in 1973 as part of the county's subdivision ordinance. In 1986, the Council enacted legislation establishing an annual growth policy (AGP) for the entire county which establishes the location of development opportunities.[7] The AGP is implemented by the Planning Board through the APF ordinance. According to this legislation, the purpose of the AGP is to facilitate and coordinate the use of various powers of government to limit or encourage growth and development in a manner that best enhances the general health, welfare and safety of the residents of the county. County officials are required to use the AGP to match the timing of private development with the availability of public facilities. Although the AGP affects the timing of development, it does not affect the location, amount, type or mix of development, nor does it replace or supersede master plans, sector plans or the county's General Plan.

The APF ordinance requires the Planning Board to disapprove a preliminary subdivision plan if the Board finds that the public facilities in place or programmed in the local and state capital improvements programs will be inadequate to serve the proposed subdivision at the time of occupancy. The test of adequacy must also include all other approved but not built developments. The APF ordinance tests the adequacy of four types of facilities: transportation; schools; water and sewerage facilities; and police, fire and health services. For purposes of this study, this discussion will focus on transportation facilities only.

Tests of Adequacy for Transportation Facilities

According to Montgomery County's Annual Growth Policy, proposals for preliminary plan approval must pass two tests of transportation facilities adequacy before they can receive Planning Board approval: policy area transportation review (PATR) and local area transportation review (LATR).

- Policy area transportation review (PATR): Montgomery County is divided into twenty-two policy areas designated by the County Council. The area boundaries generally follow physical features, similar transportation characteristics and administrative boundaries. The PATR is designed to test the transportation impacts of a proposal (generating 5+ trips) as it relates to its surrounding area. Each year the County Council establishes "staging ceilings" which identify the maximum number of jobs and housing for each policy area. These *"maximums"* are based on excess transportation capacity that exists at that time, based on annual traffic counts as well as forecasted traffic volumes. The PATR adequacy test analyzes upstream and downstream traffic impacts of existing developments and approved but not yet built development within the policy area. The impacts of proposed developments are measured against the capacity of existing and programmed transportation facilities. Under the PATR, programmed transportation facilities are those projects for which

[7]The Maryland-National Capital Park and Planning Commission, *FY-93 Annual Growth Policy Montgomery County, Maryland,* December 1991.

100% of construction costs are scheduled to occur within the first four years of the county or state program. All projects programmed beyond the first four years cannot be included unless they are moved forward. If a new development exceeds the established staging ceilings, it cannot receive preliminary subdivision approval.

- Local area transportation review (LATR): All proposals which generate 50+ peak hour trips must also pass a test to determine its impact on nearby critical intersections known as the Local Area Transportation Review. The traffic impacts of the proposal are measured against predetermined level of service (LOS) standards ranging from A to F.

  These LOS standards vary within each policy area and are based on the type of transportation facilities available. That is, more traffic congestion and thus a worse LOS is acceptable in areas with greater transit availability and less traffic congestion is acceptable in areas without transit. For example, a peak hour level of service of E or even F is acceptable in the Silver Spring CBD, because of the presence of a METRO rail station. By comparison, in the rural policy areas any level of service worse than D is unacceptable (these same LOS standards may or may not apply to the Delaware Valley region.)

  The Montgomery County Planning Board cannot approve a subdivision proposal if an unacceptable LOS during the peak hour will result after taking into consideration existing and programmed roads, mass transit and improvements to be made by the applicant. The applicant is allowed to make intersection improvements and/or provide trip reduction measures to bring the LOS to an acceptable level. The Planning Board may, however, approve a subdivision impacting an intersection already at an unacceptable LOS if the proposal does not make the situation worse.

Although both the PATR and the LATR consider programmed transportation projects, the definition of *"programmed"* is more stringent under the LATR. Under the LATR, only those projects included in the County Executive's most recent *"Approved Road Program"* document may be considered. These projects must be included in the current county or state capital improvements program and construction must begin within two years. In the case of the capital improvement program, 100% of the contract expenditures must be appropriated.

Staging Ceiling Flexibility

There are two options within the Annual Growth Policy that allow flexibility if a subdivision proposal exceeds the maximum allocated jobs and/or housing units for its Policy Area: full-cost developer participation; and partial-cost developer participation. Although either option allows a preliminary plan to pass the PATR, the proposal must still pass the LATR.

- Full-Cost Developer Participation: Full-cost developer participation allows the developer of a proposal which was denied preliminary approval due to insufficient staging ceiling capacity to pay for the construction of public transportation facilities

necessary to provide the capacity to serve the proposed development. The facility must add as much capacity to the transportation system as the proposed project will generate. The public facility project may be in the form of a road, transit service or ride-sharing program or any other measure necessary to cover the projected trip generation of that project.

- Partial-Cost Developer Participation: Developers may be required to only partially pay for improvements related to proposals which exceed staging ceilings if the proposal falls into one of three categories: (1) projects for the expansion or consolidation of employment facilities which have specific and defined employment needs; (2) certain planned development projects including mixed use projects and those within transit station areas; and (3) projects in specifically designated areas. Under one of these three circumstances, preliminary plan approval is granted with a condition that a phasing schedule be established which links the issuance of building permits to the execution of specific transportation improvement contracts.

In some Policy Areas, developer participation may be the only way new subdivision approvals may be approved. In some cases, two or more developers in a Policy Area may pool their resources to jointly make needed improvements.

CONCLUSION

In order to address problems of congestion and overcrowding that have resulted from growth occurring in areas not yet served by the appropriate infrastructure, governments in certain communities or counties have adopted adequate public facilities ordinances. These ordinances effectively prohibit growth in specific areas if existing physical infrastructure and/or social services are inadequate to deal with that growth. These ordinances have been used successfully in other areas of the country, such as Maryland and Florida, but are not currently specifically authorized in either Pennsylvania or New Jersey.

Adequate public facilities ordinances can only work in areas where a reliable and predictable capital facilities planning process is in place, since these ordinances involve a partnership between the public and private sectors, with development scheduled based on identified future improvements. The use of an adequate public facilities ordinance would also be most effective when integrated with existing planning tools, such as a master plan, subdivision or site plan review ordinance, or transportation development districts.

For additional information on Montgomery County, Maryland's adequate public facilities ordinance, please contact the Maryland National Capital Park and Planning Commission in Silver Spring, Maryland, at 301/495-4700.

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VIII. PLANNING TOOL #9: TRIP REDUCTION ORDINANCE

The Trip Reduction Ordinance is one of several tools and techniques that are included in many transportation demand management (TDM) programs aimed at reducing the number of vehicles traveling during peak hours. A TDM program is designed to change the driving habits of employees commuting to and from work. Most TDM programs offer employees incentives to share rides, use public transit or work alternative hours. These incentives generally include priority parking spaces for car-poolers or employer-subsidized fares for public transit riders. These TDM programs are typically administered through the employer in conjunction with a Transportation Management Association (TMA), which assists employers in organizing their demand management programs and encourages others within their service area to participate.

Since most TDM programs are voluntary, their overall results vary tremendously. Although few studies have measured the actual impact of voluntary programs on traffic congestion, it is felt the results are spotty at best since participation is not mandatory and tends to be extremely localized. Additionally, because only the larger employers and developers participate in these programs, most employees do not have the option of participating unless they take the initiative and organize their own TDM program.

The trip reduction ordinance (TRO) has several advantages over these voluntary programs. First, most TROs cover an entire municipality and thus impact a greater area. This creates a more equitable situation, since the TRO can be applied to existing and future developments, thus more equitably distributing the burden of reducing traffic congestion. An adopted ordinance, as opposed to a voluntary program, also provides uniformity for all affected persons and businesses and is less vulnerable to legal challenge.

In 1990, the California Department of Transportation and the Association For Commuter Transportation collected information on TROs and found 58 TROs in effect in 46 jurisdictions, 67% of which were located in California.[8] The main goal of 65% of the TROs was to mitigate existing traffic with 13% mitigating future traffic. Additionally, 76% of the TROs apply to new and existing development.

The California Department of Transportation study found that facility size was typically used to determine applicability of a TRO to a particular business. A minimum gross floor area, number of peak trips generated or number of employees was used to minimize the hardship on small businesses. The study further found that the minimum size used has decreased over time, indicating that smaller employers and developers are being impacted by TROs.

Typically, two to five years is necessary to achieve full results from TDM programs. Of the

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[8]Ferguson, Erik. Autumn 1990. *Transportation Demand Management*. APA Journal: 442-455.

46 TROs, 50% included mandatory TDM strategies, such as an ordinance; 15% included voluntary techniques; and 35% used a combination of the two.

Trip Reduction Programs in the Delaware Valley

The 1990 Clean Air Act Amendments (CAAA) classify the nine-county DVRPC area as a "severe ozone non-attainment" area. The DVRPC region must therefore reduce air pollution through a number of different programs. One such program is the Employer Trip Reduction Program, which, like TROs, is designed to reduce motor vehicle travel during peak commuting hours. Although in the past the primary focus of TROs has been to reduce traffic congestion, they also improve air quality, since less motor vehicles on the roads results in less ozone emissions (a major health-threatening pollutant). The CAAA require New Jersey and Pennsylvania to enact employer-sponsored programs to achieve trip reduction. Both state programs are very similar to a TRO.

The Pennsylvania Department of Environmental Resources (DER), in cooperation with the Pennsylvania Department of Transportation (PennDOT) and the Pennsylvania Department of Commerce, has developed employer trip reduction program regulations. These regulations require all employers with 100 or more employees to reduce the number of employees who drive to work alone. The trip reduction program regulations require employers with 100 or more employees to complete four steps:

- Register with DER;
- Conduct survey to determine employees commuting patterns;
- Develop and submit to DER a trip reduction plan that describes actions to be taken to reduce employee vehicle trips; and,
- Implement the trip reduction plan

Each employer's trip reduction plan must result in an increase in the average passenger vehicle occupancy at the employment site by at least 25% over the average vehicle occupancy established for the target area in which the employment site is located. Employers can meet these regulations by implementing any measures they feel are appropriate, and can include providing subsidies to employees who use public transit; car and van-pools; charging parking fees for those who drive alone; preferential parking; alternative work schedules such as flextime; and ride-share matching services. Trip reduction plans must be submitted to DER one year after the effective date of the regulations. Employers must increase average passenger occupancy by 50% of the target by late 1995; by 80% of the target by late 1996; and by 100% of the target by late 1997.

New Jersey has enacted legislation which requires all employers with 100 or more employees to submit to the New Jersey Department of Transportation (NJDOT) employer trip reduction plans which increase average passenger occupancy 25% above the region's average vehicle occupancy. The New Jersey Traffic Congestion and Pollution Control Act (the Rand

Bill) was approved and signed into law on June 30, 1992. The Act was fashioned after a TRO that is in effect in North Brunswick Township, in Middlesex County, New Jersey. Like Pennsylvania's employer trip reduction program regulations, New Jersey's program allows employers to use any number of transportation demand management techniques to achieve the mandated targets.

Costs Associated with Employer Trip Reduction Programs

The Pennsylvania Department of Environmental Resources (PADER) recently conducted a study of 20 voluntary trip reduction programs in Southeastern Pennsylvania to determine the costs to employers associated with the trip reduction plans.[9] Although these plans are not necessarily implemented by local ordinance, the actions taken by employers (and the consequent costs) are similar under both voluntary or mandatory programs, and average approximately $200 annually per employee. In other areas of the country the costs are somewhat higher. The Bay Area Air Quality Management District in California estimates the average annual cost at $232 per employee for a work site with 300 employees.

These costs are associated with the program planning that each employer will have to undertake. Additionally, employers will need either an employer transportation coordinator or a consultant to write the trip reduction plan, oversee the program, maintain records and act as a liaison between employees and the employer. Additional costs may include any monetary incentives or transit subsidies from the employer to the employee.

CASE STUDY: NORTH BRUNSWICK, MIDDLESEX COUNTY

Based on the results of the DVRPC municipal survey, none of the survey respondents use a trip reduction ordinance to manage traffic congestion. However, several are being used in central and northern New Jersey (research has found no trip reduction ordinances in Pennsylvania). Trip reduction ordinances are in use along the Princeton-New Brunswick/Route 1 Corridor in North Brunswick and Plainsboro townships and in the City of New Brunswick in Middlesex County. The North Brunswick trip reduction ordinance was the model for the others as well as New Jersey's employer trip reduction program legislation, and therefore serves well as a local case study.

North Brunswick Township is at the northern end of the high growth Route 1 Corridor. The township is traversed by Routes 1 and 130 and is easily accessible via the New Jersey Turnpike. North Brunswick has seen a tremendous amount of development both within its borders and within neighboring municipalities. During the 1980s, the township's population grew 41% to 31,000 persons; by comparison all of Middlesex County experienced a 13% growth rate during the same decade. Employment opportunities also increased

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[9]Joint Legislative Air and Water Pollution Control and Conservation Committee, Tony M. Guerrieri, Research Analyst. *Using Employer Trip Reduction Programs To Improve Air Quality*. Research Monograph #11, December 1992.

tremendously along the Route 1 Corridor. The increase in population and jobs has resulted in serious traffic congestion problems during peak periods.

In 1987, North Brunswick Township adopted a traffic management ordinance (TMO) (amended in 1989) to reduce employee single-occupancy vehicular trips during peak commuting periods, defined for the purpose of the ordinance as 7:20-9:10 a.m. and 3:50-5:40 p.m. The TMO applies to all existing businesses with 50 or more employees, all new non-residential businesses with 15,000 or more square feet and all new residential developments of 20 or more units. The TMO does not apply to residential developments in existence prior to enactment of the ordinance.

Implementation of the Traffic Management Ordinance (TMO)

The TMO is the result of a seven-month study by North Brunswick's Traffic Management Task Force, which was appointed by the Mayor and includes representatives from three of the township's largest employers, two members of the Township Council and Planning Board and several residents. The goal of the task force was to study the need for the ordinance.

Township representatives believe that the Mayor's appointment of representatives from both the public and private sectors to the traffic management task force was crucial to the success of its TMO. The early involvement of both public and private interests has resulted in a high level of cooperation and has made the design and implementation of the employer traffic reduction plans a much smoother and more successful process.

Results of the Traffic Management Ordinance (TMO)

In 1992, 27 businesses with a total of 7,456 employees in North Brunswick administered surveys to their employees to determine commuting patterns, representing an increase of approximately 500 employees since the program's inception in 1988. At that time, 328 carpools were in existence, representing a 25% decline in the number of carpools since 1990.

Of the 27 businesses, eleven offer alternate work schedules for their employees and five provide preferential parking for carpoolers. A 100-space park and ride facility has also constructed, provided by a residential developer. This facility is serviced by Suburban Transit, which provides express commuter bus service to the New York City Port Authority Bus Terminal. The Township has also determined that demand exists for shuttle bus connections from four residential developments to train or bus facilities. The Township's Office of Traffic Management is currently seeking a third party to provide this service.

Costs Associated with the TMO

As a result of the TMO, North Brunswick Township has formed an Office of Traffic Management (OTM) to oversee its traffic management program and provide technical assistance to the township's employers and developers. The OTM is staffed by a director who spends approximately one-third of his time (and salary) on OTM-related matters.

Although specific data is not available, the OTM estimates the Township spends approximately $60,000 to $70,000 per year on its traffic management program.

North Brunswick has received $145,000 in grants from UMTA and NJDOT to continue its traffic management efforts, part of which were used for a planning study which resulted in the previously mentioned commuter bus service from the 100-space park and ride facility. Federal and state financial assistance is still available for local transportation management programs. However, funding levels are limited and grant programs are highly competitive.

CONCLUSION

The use of demand management programs can be established quickly at minimum costs to the local government or its citizens. These programs place the burden of remedial traffic congestion and air quality measures on those that generate the problems, namely, commuters. The regulatory approach that trip reduction ordinances provide is becoming more acceptable to local governments. The enactment of a trip reduction ordinance establishes rules and policies that will apply to all responsible individuals, rather than relying on individual negotiations which might benefit some at the expense of others.

To successfully reach the implementation phase, all TROs must obtain the support and consensus of the local government and the business community. As was found in North Brunswick Township, this public/private sector partnership is crucial. Specifically, it is important to have the support of one or more of the community's major employers who can act as a leader and solicit support from others in the business community.

As North Brunswick discovered, a sound educational and technical assistance program is also essential to success. Most businesses do not have the manpower, financial resources or expertise necessary to educate themselves about TROs, survey their employees and develop and implement a traffic reduction plan. The local government, in conjunction with a major employer or business leader, should establish an office and hire personnel to educate and assist members of the business community on an individual basis. This office could establish an education campaign and design generic employee and resident surveys and traffic management plans for businesses to use as a starting point for their own surveys and plans. Above all, an open communication system between the public and private sectors and flexibility in the trip reduction ordinance are essential to achieve the support that ultimately will lead to the success of the ordinance.

North Brunswick's Director of the Office of Traffic Management believes the Township's ordinance will be revised as a result of passage of New Jersey's Employer Trip Reduction Program (ETRP) legislation. The amended ordinance will adopt the state's longer peak hour definition but retain its existing applicability to employers with 50+ employees rather than adopt the state's less strict applicability to employers with 100+ employees.

For additional information on North Brunswick's trip reduction ordinance, please contact the Township of North Brunswick's Office of Traffic Management, at 908/247-0922.

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IX. PLANNING TOOL #10: ACCESS MANAGEMENT PLAN

The Delaware Valley has experienced significant growth and development during the past decade. In many areas of the region, the road network has not been improved sufficiently to accommodate increased vehicular traffic. State, county and local roads have experienced severe traffic congestion and an increase in traffic accidents, especially during the AM and PM peak periods. In some cases, capital improvements such as turning lanes or improved signalization can alleviate some of these traffic problems. However, more often than not, funding restrictions and an increasing awareness of growth management planning preclude major capital improvements. An alternative approach to capital improvements is to manage traffic congestion and improve safety conditions through the use of land development regulations pertaining to access and circulation. An Access Management Plan is a planning tool that enables municipalities to incorporate land development regulations and capital improvements into one strategy designed to improve existing and future land development, access and circulation.

Through an Access Management Plan (AMP), the existing road network can be more efficiently and safely utilized. Access management recognizes the critical link between land use and transportation planning by establishing a unified planning effort which coordinates land use, access and circulation matters at the local, county and state levels. An AMP establishes uniform guidelines and strategies for access points along a specific roadway. These guidelines and strategies are unique to each roadway and consider land use and circulation patterns, such as number of trips generated, roadway type, access types such as driveways, intersecting road or marginal access roads, and physical attributes such as driveway widths and turning radii.

The Traditional Approach to Access Management

Traditionally, during the land development review process that all development proposals must undergo, the applicant must receive an access permit to the adjacent roadway from the governing body with jurisdiction over that road. Each governmental jurisdiction has its own set of regulations governing access, most of which are based on standards adopted by the American Association of State Highway and Transportation Officials, and include the following elements:

- Classification of driveway by land use or traffic volume
- Allowable turning movements for each driveway type
- Spacing standards between driveways and intersections
- Minimum design standards for all driveway types
- Number of permissible driveways based on lot frontage

This traditional approach to access management pays little attention to whether or not the road network can actually accommodate the amount of traffic generated by the applicant's land use. Additionally, most applications for an access permit are considered on a case-by-

case basis. This means that the circulation consequences of a proposed development on an adjacent lot or a lot further down the road are rarely considered.

Local, county and state governments are realizing that this traditional approach does not always result in the safest and most efficient use of the roadway. Efforts to modify the process used to grant access permits are being considered and implemented in some areas. One example of this at the state level occurs in New Jersey, where the state recognizes that the traditional approach to access permits can be improved upon and has adopted a State Highway Access Management Plan.

The New Jersey Approach to Access Management

The New Jersey Department of Transportation has developed draft regulations to implement the State Highway Access Management Act of 1989. This Act requires the NJDOT to regulate access onto state highways (approximately 8% of the state's road network) to improve highway efficiency and safety. The proposed regulations take into consideration existing and proposed developments and trips generated by these uses and then coordinates these with access and circulation needs.

The proposed State Highway Access Code divides the state's highway segments into six access levels. The access level determines the type of access allowed on each segment of the highway from abutting properties. Allowable access can range from limited to unlimited access and depends upon the highway segment's location and function.

The proposed Access Code also classifies lots abutting state highways as either conforming or non-conforming lots. Lot conformance is based on minimum driveway spacing standards that are determined by lot frontage and highway speed limit. A non-conforming lot is subject to a maximum vehicular use limitation formula. This formula determines the number of vehicles allowed access to the state highway that can be generated by the subject lot and may limit the allowable uses. If the use allowed under the zoning ordinance on a non-conforming lot generates more vehicular trips than allowed under the proposed Access Code's maximum vehicular use formula, that use will not be granted an access permit by NJDOT. Thus, New Jersey's Access Management Code may actually override a municipality's zoning map.

The proposed access code strongly encourages access onto alternative roads, the use of shared access and service roads. Counties and municipalities are also encouraged to develop access management codes for roads under their jurisdiction that are at least as strict as the state's access code.

The Pennsylvania Approach to Access Management

Pennsylvania follows the more traditional approach to access management in that permits are reviewed on a case-by-case basis with little consideration given to land use. The Pennsylvania Department of Transportation (PennDOT) has jurisdiction over 38% of all

Pennsylvania roads and requires all developers to obtain a highway occupancy permit before constructing on properties abutting a state highway. Title 67, Chapter 441 of the Pennsylvania Code, *Access To And Occupancy Of Highways By Driveways And Local Roads,* grants PennDOT the power to *"regulate the location, design, construction, maintenance, and drainage of access driveways, local roads, and other property within State highway right-of-way for the purpose of security, economy of maintenance, preservation of proper drainage, and safe and reasonable access".*

The access regulations group driveways into four classifications, based on the amount of traffic they are expected to serve. The regulations establish minimum design standards for each classification and include minimum specifications for such elements as sight distance, curbing, and grade. The standards usually vary with each driveway type, highway speed limit and number of lanes.

Municipal Approach to Access Management

At the municipal level, the location of driveways are reviewed by the municipality through the development review process. During this process, the municipality will review the development proposal and recommend changes or modifications which could include access driveways. Through this process, the municipality may negotiate with the developer to provide roadway improvements necessitated by the increased traffic generated by the proposal. As in New Jersey, municipal access regulations may be incorporated into the zoning or site plan subdivision ordinances and may or may not be linked with land use planning.

The issuance of access permits is based on a development's impact at the point of access only. In other words, no consideration is given to existing or future traffic and access impacts downstream or upstream from the proposed development. In addition, access regulations on the same road corridor may vary from municipality to municipality. Therefore, a municipality with strict access regulations will experience few positive results if its neighbor's access regulations are not as strict.

Municipal Response to the DVRPC Survey

Of those municipalities which responded to the DVRPC survey, 55% stated that they do not have an access management plan or strategy. Of those that do practice access management, approximately one-third responded that they classify driveways by use, utilize spacing and design standards by driveway type and base number of permissible driveways on lot frontage. These standards are typically written into the municipality's subdivision and site plan ordinance and may vary from one municipality to the next, even if they are located along the same roadway.

An increasing number of municipalities are taking a more regional approach to access management by utilizing an access management plan which crosses municipal boundaries. This type of access management planning is particularly evident in Chester County which

has several multi-jurisdictional access management plans. A good example of this type of planning occurs along the County's Route 113 Corridor.

CASE STUDY: ROUTE 113 ACCESS MANAGEMENT STUDY

The Route 113 Access Management Study examines land use, circulation and access along an eight-mile section of Route 113 from its northern terminus at Route 23 in Phoenixville to the Pennsylvania Turnpike overpass in Uwchlan.[10] While not part of the study area, Route 113 continues south through Downingtown where it intersects Route 30. The study area corridor extends through Schuylkill, East Pikeland, West Pikeland and Uwchlan townships and Phoenixville Borough, and includes urban, suburban and rural areas.

Route 113 is a state owned arterial highway serving inter-municipal, intra-county, and to a lesser extent, inter-county traffic. Route 113 averaged between 9,000 and 14,000 vehicles per day and is typical of many suburban/rural roadways in the region, in that it is primarily a two-lane road with few turning lanes and no median divider. It has three intersections controlled by a traffic signal and one controlled by a flashing signal. The remaining side roads are controlled by stop signs.

Development pressure has been felt at both ends of the study area and includes high density residential, light industrial and commercial uses. Development within the central section of the corridor is restricted by environmental constraints.

This development has resulted in significant increases in population, employment and traffic congestion. Between 1980 and 1990 the five study area municipalities experienced a 27% increase in population. New development has also resulted in more jobs along the corridor, with the greatest increases in employment evident in Schuylkill, West Pikeland and East Pikeland townships. These employment-generating land uses have resulted in an increase in traffic destined for the corridor. The Chester County Planning Commission feels this development potential will continue throughout the decade.

Major Elements of the Access Management Study

The Route 113 study provides a detailed analysis of existing land use, circulation and access for the entire study area. All frontage parcels were mapped and several inventories and analyses were undertaken. These included the following:

- land use category
- roadway features inventory, including intersection geometrics, traffic volumes, traffic type (trucks, pedestrians)
- existing traffic distribution, including turning movements at intersections

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[10]Chester County (PA) Planning Commission, *PA Route 113 Access Management Study*, June 1991.

- work trip patterns
- existing traffic problems, including accidents and LOS analysis at intersections
- access analysis which examines conflicts between property access and vehicular mobility

The access management plan also examined future traffic conditions, by devising a future development scenario based on build-out under current zoning. Under this scenario, the County was able to examine future traffic volumes and identify future deficiencies in the road network.

The Plan

These analyses resulted in a plan for the corridor in the form of recommendations on land use, access and highway improvements. The plan presents a series of recommendations for changes to municipal comprehensive plans and zoning ordinances, specific to the Route 113 Corridor. For example, recommended provisions for subdivision and land development ordinances include right-of-way widths and minimum curb radii for each roadway classification. Land use recommendations include review of certain zoning districts and permitted uses and minimum set-backs and off-street parking parameters.

The access management plan includes detailed access point recommendations. For every point of access to Route 113 (including driveways and intersecting roads), potential solutions or improvement options to identified problems were offered. Options included eliminating access points, combining access points to form shared driveways, realignments, new access points and turning lanes. The access management plan also includes a list of short- and long-term options for highway improvements, including pass-around lanes, signalization and turning lanes.

Implementation Strategies

The plan concludes with a matrix of implementation strategies for the land use, access and circulation recommendations. Funding options are also included. The implementation strategies include the land use tools included within this report as well as demand management strategies.

Possible public funding sources recommended include PennDOT's 12-year Transportation Improvement Program (TIP) and PennDOT's Local Match Program, which is available to municipalities. Private funding mechanisms include Transportation Partnership Districts (under Pennsylvania Act 47), transportation impact fees (under Pennsylvania Act 209) and developer agreements.

Impetus Behind the Access Management Study

The Route 113 Access Management Study was initiated by the Chester County Planning Commission. The county believed that an access management plan would help this corridor

develop in an orderly fashion, since the Route 113 Corridor has experienced significant growth in the past and is forecast to have significant growth potential. When initially contacted, all of the municipalities of the study area were interested in participating in the study. Their knowledge of access management, however, was limited. Additionally, the actual implementation of such a study and the subsequent use of its recommendations were unclear to the municipalities.

Results of the Access Management Study

None of the Route 113 municipalities have adopted and implemented the entire access management study to date, although all have endorsed the study by using some of its recommendations in their review of development proposals. For example, East Pikeland Township required a developer to modify the design of a proposal's access points to conform with the recommendations in the access management study. West Pikeland Township has incorporated the study's recommendations into its engineering plans to make improvements to an intersection along Route 113.

Chester County believes that municipalities have not formally adopted the access management study or its amended ordinances for several reasons. First, the study provides municipalities with a long list of access and land development options which vary considerably in scope. Not all of these options are supported by the municipalities. Municipalities generally prefer a more narrow list of options all of which are directly applicable to their situations if they are to adopt them. Second, municipalities need to be educated about the Access Management Study, since most do not have the in-house staff or resources to *"sell"* the study to their governing bodies and citizens. The County needs to educate the municipalities about the study and help them identify how it will be of benefit. Additionally, all municipal zoning and site plan and land development ordinances must be examined to identify where amendments should be made. Again, most municipalities do not have adequate staff or financial resources to do this.

CONCLUSION

An access management plan can be of benefit to a community in managing existing and future land development as it impacts access and circulation. To be most effective, an access management plan must be implemented corridor-wide and should cross municipal boundaries, since traffic obviously does.

Ideally, an access management plan should be adopted and its recommendations incorporated into municipal zoning and site plan and land development ordinances. However, as the Route 113 Access Management Study has demonstrated, the study results can still be successful without legal adoption of the recommendations.

This type of land use and transportation planning tool can be successfully used over time. Although the data in the Route 113 Study may become outdated, its recommendations will not. Additionally, not all recommendations may be applicable today or apply to every

municipality. However, as more development and traffic congestion occurs these recommendations may then become applicable.

As Chester County has learned, municipalities need to be educated about access management. They need to know what it is, how to use it and how it can be of benefit to them. Successful implementation of access management planning can only be realized after municipalities learn the costs and benefits of this land use and transportation planning tool.

For additional information on the Route 113 access management study, please contact East Pikeland Township (610/933-1770), West Pikeland Township (610/827-7660) or Uwchlan Township (610/363-9450).

REFERENCES: ACCESS MANAGEMENT PLANS

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X. SUMMARY MATRIXES OF EACH IDENTIFIED PLANNING TOOL

TOOL #1, #2 and #3: COMPREHENSIVE PLAN, ZONING ORDINANCE and SUBDIVISION AND LAND DEVELOPMENT ORDINANCE LOWER SALFORD TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

LOCATION	Lower Salford Township, Montgomery County, Pennsylvania
POPULATION 1980/1990	6,156/10,735; **74% increase**
POPULATION FORECAST Percent Increase	Year 2000: 12,550; Year 2010: 14,200; Year 2020: 15,200 1990-2000: **17%**; 2000-2010: **13%**; 2010-2020: **7%**; **1990-2020: 42%**
EMPLOYMENT 1980/1990	2,773/4,662; **68% increase**
EMPLOYMENT FORECAST Percent Increase	Year 2000: 5,500; Year 2010: 6,550; Year 2020: 7,250 1990-2000: **18%**; 2000-2010: **19%**; 2010-2020: **11%**; **1990-2020: 56%**
PURPOSE	The comprehensive plan defines how the community wants to look in the future and develops a set of policies and goals to reach that vision. The zoning ordinance regulates distribution, density, and, to some extent, design of development. The subdivision and land development ordinance sets additional standards regulating general design and layout of development.
AREA OF COVERAGE	Entire municipality
MEANS OF IMPLEMENTATION	Zoning ordinance; subdivision and land development (SDLD) ordinance
YEARS IN USE	First comprehensive plan adopted in 1971. First zoning ordinance adopted in 1956. First subdivision and land development ordinance adopted in 1959. Current comprehensive plan adopted fall of 1993; zoning ordinance and SDLD ordinance amendments have been periodically adopted.
HOW DEVELOPED	Planning assistance contract with the Montgomery County Planning Commission.
OVERALL GOAL	To direct growth towards the Harleysville area and maintain the rural character in most of the remainder of the township.
IMPACTED GROUPS	Township residents, present and future; the general public; developers; and, potentially, transit agencies.
REQUIREMENTS	All development in the Township must follow the goals of the comprehensive plan and the regulations of the zoning ordinance and subdivision and land development ordinance.
MANAGEMENT, ENFORCEMENT, COMPLIANCE	Township Manager/zoning officer; Township Planning Commission, Board of Supervisors; Montgomery County Planning Commission.

IMPLEMENTATION COSTS	Three-year contract (expiring December 1993) with the Montgomery County Planning Commission (MCPC) cost $21,931; included writing a new comprehensive plan; drafting a mixed-use district and office-limited-commercial district; revising off-street parking and circulation regulations in the R-3 Residential District and C-Commercial District; and general planning assistance. A new three-year contract with MCPC, effective January, 1994, cost $28,150; contract includes implementation of the 1993 comprehensive plan by writing a Transfer of Development Rights ordinance and a land preservation district ordinance, revising the Village-Commercial district, writing an Office-Residential district, and potentially revising the two-acre low density residential district for performance zoning. Also includes revising other zoning districts and the ordinance's general provisions, creating a new institutional use district, writing a new landscaping ordinance for the subdivision and land development ordinance, and general planning assistance.
RESULTS	New comprehensive plan and zoning ordinance amendments adopted in fall of 1993. Should result in integration of land use and transportation through introduction of a new mixed-use district; improved access controls; requirements and bonuses for open space which may be developed as community path extensions; requirement to accommodate bus service at new shopping center site; and innovative rural preservation techniques.
FUTURE TOOLS NEEDED TO FULLY IMPLEMENT THE COMPREHENSIVE PLAN	Adoption of requirements for community path extensions in SDLD ordinance; zoning ordinance amendments to support community path extensions and transit; adoption of the land preservation district ordinance; and implementation of a transfer of development rights program.

TOOL #4: THE OFFICIAL MAP
EAST CALN TOWNSHIP, CHESTER COUNTY, PENNSYLVANIA

LOCATION	East Caln Township, Chester County
POPULATION 1980/1990	2,187/2,619; **20% increase**
POPULATION FORECAST PERCENT INCREASE	Year 2000: 3,190; Year 2010: 3,540; Year 2020: 3,680 1990-2000: **22%**; 2000-2010: **11%**; 2010-2020: **4%**; **1990-2020: 41%**
EMPLOYMENT 1980/1990	752/828; **10% increase**
EMPLOYMENT FORECASTS	Year 2000: 1,101; Year 2010 1,771; Year 2020: 2,129 1990-2000: **33%**; 2000-2010: **61%**; 2010-2020: **20%**; **1990-2020: 157%**
PURPOSE	Identifies current location of streets; proposed right-of-way for future highways; proposed open space preservation areas and parks.
AREA OF COVERAGE	Entire municipality
IMPLEMENTATION	Map adopted as ordinance
YEARS IN USE	Six years; adopted 1988; amended 1993.
HOW DEVELOPED	Developed from computer base map by the Township Engineer at the request of the local planning commission.
OVERALL GOAL	Preservation of right-of-way for the planned Exton Bypass; amendments to create mechanism for preserving open space and parkland and additional right-of-way for future roadway.
IMPACTED GROUPS	Prospective developers; property owners.
REQUIREMENTS	Upon imminent development or sale of any property designated for future use on the official map, township must be given notice and offered an opportunity to acquire the land for the designated purpose, through purchase, eminent domain or negotiation.
IMPLEMENTATION COSTS	Minimal; staff time preparing map, using existing computerized base map. Reviewed and adopted by local planning commission after appropriate public notice and hearings.
RESULTS	Has not yet resulted in any land acquisition, roadway construction or open space preservation. One developer agreed to construct a designated future roadway as a part of his development project, although development of the parcel has not yet proceeded. Local officials believe that lack of development activity is related to overall economic climate rather than to local development requirements.
OTHER TOOLS NEEDED	Can guide the location and direction of growth; does not influence type, scale or rate of future development. Is most effective when used in concert with a comprehensive plan and zoning ordinance .

TOOL #5: CAPITAL IMPROVEMENT PROGRAM
WEST WINDSOR TOWNSHIP, MERCER COUNTY, NEW JERSEY

LOCATION	West Windsor Township, Mercer County, New Jersey
POPULATION 1980/1990	8,542/16,021; **88% increase**
POPULATION FORECAST Percent Increase	Year 2000: 21,795; Year 2010: 25,311; Year 2020: 30,702 1990-2000: **36%**; 2000-2010: **16%**; 2010-2020: **21%**; **1990-2020: 92%**
EMPLOYMENT 1980/1990	7,102/16,392; **131% increase**
EMPLOYMENT FORECAST Percent Increase	Year 2000: 22,578; Year 2010: 25,298; Year 2020: 27,421 1990-2000: **38%**; 2000-2010: **12%**; 2010-2020: **8%**; **1990-2020: 67%**
PURPOSE	Translate transportation improvement projects from Master Plan into 6-year program for capital expenditures.
AREA OF COVERAGE	Entire municipality
RANGE OF APPROPRIATIONS	Transportation projects including roads, bridges, median construction, intersection improvements, traffic lights, street curbs and sidewalks.
PRIORITY RANKING SYSTEM	Most projects are coordinated with the Capital Road Improvement Priority Lists in the Circulation Plan and with the Route 1 Corridor TID. Future projects will be coordinated with the Timed Growth Controls Ordinance and four additional TID's, if adopted. Priority is granted by consensus between the engineer and council.
WHO DEVELOPS	The engineer, business administrator and Township Council, with input from the Department of Community Development and the Planning Board.
IMPACTED PERSONS/GROUPS	The general public; township and state government; prospective developers.
WHO MONITORS	Township engineer, business administrator and finance director
SOURCE OF FUNDING	Township budget, bonds and notes, grants from county, state and federal governments, and developers
RESULTS	CIP process helps but there is still not enough money in the township budget to cover all needed improvement costs. The township must seek additional funding from other levels of government and developers.
OTHER TOOLS NEEDED	The township needs to move forward with the timed growth controls management ordinance and the adoption of four additional Transportation Improvement Districts (TID's).

TOOL #6: TRANSPORTATION IMPACT ASSESSMENT
UPPER MERION TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA

LOCATION	Upper Merion Township, Montgomery County, Pennsylvania
POPULATION 1980/1990	26,138/25,722; **2% decrease**
POPULATION FORECAST Percent Change	Year 2000: 26,500; Year 2010: 26,400; Year 2020: 26,300 1990-2000: **3%**; 2000-2010: **-0.4%**; 2010-2020: **-0.4%**; **1990-2020: 2%**
EMPLOYMENT 1980/1990	32,926/46,428; **41% increase**
EMPLOYMENT FORECAST Percent Change	Year 2000: 50,350; Year 2010: 53,100; Year 2020: 55,450 1990-2000: **8%**; 2000-2010: **6%**; 2010-2020: **4%**; **1990-2020: 19%**
PURPOSE	Requires developers to submit an assessment of their project's impact on the local transportation network, and to identify potential traffic mitigation alternatives.
AREA OF COVERAGE	Entire municipality
IMPACTED PARTIES	Prospective developers
REQUIREMENTS	Transportation impact assessment statement required of all developers; developers of projects estimated to generate 50 additional peak hour trips and/or located near heavily congested roadways or intersections (level of service "D" or worse) required to submit a detailed local area transportation review (LATR). LATR must consider existing traffic, traffic generated by the proposed development project and potential traffic from nearby approved projects. With few exceptions, trip generation must be calculated based on ITE trip generation standards; level of service analysis must be based on the procedure defined in the *1985 Highway Capacity Manual*. Key issues and variables (adequacy of available traffic counts, project area, etc.) agreed upon at preliminary meeting with staff.
ENFORCEMENT	Development application considered incomplete until the transportation impact assessment statement and LATR (if required) are submitted. Township planning staff reviews the impact assessment/LATR and submits a report to the Planning Commission and Board of Supervisors; decision to approve or reject the development proposal may be based on the results of the transportation assessment. Development approval may be conditioned upon the implementation by the developer of traffic mitigation measures identified in the impact assessment.
OTHER PLANNING TOOLS	Subdivision and land development ordinance; zoning ordinance.

TOOL #7: TRANSPORTATION IMPACT FEE
WINSLOW TOWNSHIP, CAMDEN COUNTY, NEW JERSEY

LOCATION	Winslow Township, Camden County, New Jersey
POPULATION 1980/1990	20,034/30,087; **50% increase**
POPULATION FORECAST Percent Increase	Year 2000: 37,331; Year 2010: 44,385; Year 2020: 51,035 1990-2000: **24%**; 2000-2010: **19%**; 2010-2020: **15%**; **1990-2020: 70%**
EMPLOYMENT 1980/1990	3,334/7,395; **120% increase**
EMPLOYMENT FORECAST Percent Increase	Year 2000: 8,406; Year 2010: 9,341; Year 2020: 10,444 1990-2000: **14%**; 2000-2010: **11%**; 2010-2020: **12%**; **1990-2020: 41%**
PURPOSE	Requires payments from developers of proposed projects to fund improvements necessitated by their developments.
AREA OF COVERAGE	Entire municipality
YEARS IN USE	Five years; adopted in August of 1989
HOW DEVELOPED	Drafted based on model impact fee ordinance distributed in the late 1980's by the New Jersey League of Municipalities; adopted by Township Committee after revisions were made to meet specific township needs.
COST OF DEVELOPMENT	$1,000 to develop impact fee language (primarily to cover legal fees); additional funds to first prepare, adopt and amend as necessary the master plan
IMPACTED PARTIES	Developers; prospective residents
REQUIREMENTS	Developers of all major subdivisions (3 or more units) and all non-residential development must submit a traffic impact analysis; findings of this analysis are reviewed by the Township Engineer for accuracy and used to determine the transportation impact fee. Full cost of a necessary improvement may be required if it benefits no other development; partial cost may be assessed if other properties will ultimately benefit. Share of cost of the improvement is based on existing and reasonably anticipated future peak hour traffic flow.
ENFORCEMENT	Planning board; Township Engineer
FUNDS COLLECTED	Approximately $250,000 (from approximately 10 developers) as of early 1994; all collected funds have been used to fund necessary transportation improvements.
OTHER PLANNING TOOLS NEEDED AS PREREQUISITES	Master plan (including a circulation element), zoning ordinance and subdivision/land development ordinance (including a transportation impact analysis requirement)

TOOL #8: ADEQUATE PUBLIC FACILITIES ORDINANCE MONTGOMERY COUNTY, MARYLAND

LOCATION	Montgomery County, Maryland (suburb of Washington, DC)
POPULATION 1980/1990	579,053/757,027; **31% increase**
PURPOSE	Match timing of new private development with availability of public facilities to service new development
AREA OF COVERAGE	Entire county; county divided into 22 policy areas based on intensity of development and type of transportation facilities
MEANS OF IMPLEMENTATION	Adequate public facilities ordinance adopted 1986 as part of Subdivision of Land [chpt. 50-35(k)]; subdivision application is denied by Planning Board if development fails adequate public facilities test
YEARS IN USE	Five years; adopted guidelines in 1973; amended adequate public facilities ordinance in 1989
HOW DEVELOPED	New county charter (1970) required county Council to design and adopt 6-year capital improvements program (CIP) and 6-year public service program. Planning Board responsible for implementation of county-wide growth policy program.
TARGET/GOAL	Prevent new development from increasing traffic congestion and deteriorating level of service throughout county and at local intersections
IMPACTED PERSONS/GROUPS	All development within policy areas
REQUIREMENTS	All preliminary plans for subdivision must undergo test of adequacy based on level of service thresholds for six types of public facilities AND needed improvements must be funded in county CIP, state TIP or by developer
MANAGEMENT	Administered by county Planning Board through county's annual growth policy as adopted by county Council
ENFORCEMENT	Road projects: developer enters into legally enforceable public improvements agreement with county. Non-road projects: developer enters into joint agreements with county and planning board that contain default clauses enabling county to take over project with developer financing costs.
OTHER TOOLS REQUIRED AS PREREQUISITE	Annual growth policy; county and local capital facilities program (CIP); water and sewerage plan; annual operating budget; and state transportation improvement program (TIP)
COMMENTS	Should be implemented at county, regional or state level in order to have significant impact and to prevent developers from bypassing APF municipalities for non-APF municipalities

DELAWARE VALLEY REGIONAL PLANNING COMMISSION, JUNE, 1994

TOOL #9: TRIP REDUCTION ORDINANCE
NORTH BRUNSWICK TOWNSHIP, MIDDLESEX COUNTY, NEW JERSEY

LOCATION	North Brunswick Township, Middlesex County, New Jersey
POPULATION 1980/1990	22,220/31,287; **41% increase**
PURPOSE	Reduce employee single-occupant vehicles during AM and PM peak hours
AREA OF COVERAGE	Entire municipality
MEANS OF IMPLEMENTATION	Ordinance
YEARS IN USE	Seven years; adopted in 1987; amended in 1989.
HOW DEVELOPED	Task Force with representatives from public and private sectors and citizens
TARGET/GOAL	Reduce peak period trips to 60% or less of total number of employees AND reduce concentration of vehicles in any 15-minute peak time interval to 40% or less of total number of employees
IMPACTED PERSONS/GROUPS	All businesses with 50+ employees and all large scale existing and proposed developments
REQUIREMENTS	All impacted employers and developers: (1) Conduct employee survey; (2) Appoint Employee Transportation Coordinator; (3) Design and implement traffic reduction plan
MANAGEMENT	Impacted employers and developers manage own traffic reduction plan but must report to Township for oversight and compliance
ENFORCEMENT	Office of Traffic Management, North Brunswick Township
IMPLEMENTATION COSTS	Township established Office of Traffic Management with one staff person at an estimated cost of $60,000-$70,000 annually
RESULTS	Twenty-seven businesses required to comply (7,456 employees); 11 businesses have alternate work schedules; 5 offer preferential parking; 322 carpools have been established; a 100-car park and ride lot was constructed; the Township is considering shuttle service from four condominium projects to bus or train services
OTHER TOOLS REQUIRED AS PREREQUISITE	Master Plan with transportation element; zoning ordinance
COMMENTS	Township needs to supply ongoing support to employers; need to allow employers to "individualize" plans; support of business community and governing body crucial.

TOOL #10: ACCESS MANAGEMENT PLAN
ROUTE 113 CORRIDOR, CHESTER COUNTY, PENNSYLVANIA

LOCATION	PA Route 113 from Route 23 to PA Turnpike; travels through Phoenixville, Schuylkill, East Pikeland, West Pikeland & Uwchlan
POPULATION 1980/1990	34,468/41,751; **27% increase**
POPULATION FORECASTS Percent Increase	1990: 41,751; Year 2000: 46,020; Year 2010: 47,710; Year 2020: 49,050 1990-2000: **10%**; 2000-2010: **4%**; 2010-2020: **3%**; **1990-2020: 18%**
EMPLOYMENT 1980/1990	16,511/15,760; **5% decrease**
EMPLOYMENT FORECASTS 1990/2020	1990: 15,760; Year 2000: 15,755; Year 2010: 16,219; Year 2020: 16,958 1990-2000: **0%**; 2000-2010: **3%**; 2010-2020: **5%**; **1990-2020: 8%**
PURPOSE	Provide a coordinated picture of traffic, land use and access to assist municipal officials and PennDot on matters relating to land development
AREA OF COVERAGE	Plan applies to parcels fronting Route 113 and all access points along 8 mile corridor
MEANS OF IMPLEMENTATION	Municipal Comprehensive Plans, Zoning Ordinances, Subdivision and Land Development Ordinances which are amended to include recommendations from *PA Route 113 Access Management Study*
YEARS IN USE	Three years; study endorsed and used but not adopted by municipalities
HOW DEVELOPED	Study initiated by Chester County Planning Commission. Municipalities participated through Task Force
TARGET/GOAL	Preserve and improve operating and safety capabilities of roadway by continuing to provide for through traffic but increase emphasis on separate turning lanes for local traffic; rezone some vacant land to less intensive uses; establish action plan based on 24 strategies identified in Access Management Study
IMPACTED PERSONS/GROUPS	Owners of all parcels of land fronting Route 113; study area municipalities; Chester County and PennDot
REQUIREMENTS	Varies with each land parcel; requirements found in *Route 113 Access Management Study.*
MANAGEMENT	Municipalities; Chester County; PennDot; and developers.
ENFORCEMENT	Enforced through local development review process and developer agreements. Ideally enforcement should be through local zoning and subdivision/land development ordinances and developer agreements
POSSIBLE FUNDING SOURCES	PennDot's transportation improvement program (TIP); PennDot's "Local Match Program"; funds from a transportation partnership district; transportation impact fees; developer agreements.

IMPLEMENTATION COSTS	Unknown; costs associated with undertaking access management study and revising and amending municipal planning documents to incorporate study's recommendations.
RESULTS	Municipalities use study recommendations on informal basis. Recommendations have not been incorporated into municipal ordinances.
OTHER TOOLS REQUIRED AS PREREQUISITE	Mandatory: Comprehensive plan, zoning ordinance, subdivision/land development ordinance. Suggested: Official map, municipal road access permitting procedures, traffic impact study.
COMMENTS	Access management plan should be undertaken corridor-wide; municipalities need to be educated about access management planning; municipalities may not have staff or financial resources to amend ordinances to incorporate access management plan recommendations.

DELAWARE VALLEY REGIONAL PLANNING COMMISSION, JUNE, 1994

APPENDIX A

SURVEY RESPONSES TO "LINKING TRANSPORTATION AND LAND USE IN THE DELAWARE VALLEY"

	YES	NO	DO NOT KNOW	TOTAL
1. Does municipal Comprehensive/Master Plan link land use and transportation planning?	86.7%	13.3%	0.0%	100.0%
1a. Does municipal Comprehensive/Master Plan concentrate highest density development within existing centers, transportation corridors and transit facilities?	74.4%	20.7%	5.0%	100.0%
1b. Does the Plan identify areas for mixed use?	68.6%	28.9%	2.5%	100.0%
1c. Does the Plan contain a transportation element?	60.3%	36.4%	3.3%	100.0%
1d. If yes, does transportation element include plans for:				
o roadway circulation needs?	53.7%	43.8%	2.5%	100.0%
o pedestrian and bikeway systems?	31.4%	66.9%	1.7%	100.0%
o public transit facilities?	24.8%	74.4%	0.8%	100.0%
o goods movement needs?	14.1%	84.3%	1.7%	100.0%
o intermodal connections?	16.5%	81.0%	2.5%	100.0%
2. Does Zoning Ordinance link land use and transportation planning?	55.4%	44.6%	0.0%	100.0%
2a. If yes, does the Zoning Ordinance use any of the following:				
o bonus or incentives related to roadway access, shared or reserved parking or transportation improvements?	15.7%	84.3%	0.0%	100.0%
o overlay zones or special districts?	18.2%	81.8%	0.0%	100.0%
o mixed use developments?	38.0%	62.0%	0.0%	100.0%
o joint zoning ordinances?	5.0%	94.2%	0.8%	100.0%
o transfer of development rights?	8.3%	90.9%	0.8%	100.0%
o other?	5.0%	94.2%	0.8%	100.0%

SURVEY RESPONSES TO "LINKING TRANSPORTATION AND LAND USE IN THE DELAWARE VALLEY"

	YES	NO	DO NOT KNOW	TOTAL
3. Do municipal site design standards require:				
o preferential parking?	0.0%	100.0%	0.0%	100.0%
o paths for pedestrians and/or bicycles or transit facilities?	23.1%	76.9%	0.0%	100.0%
o other features which improve access on site?	25.6%	74.4%	0.0%	100.0%
4. Does municipality have an Official Map?	33.1%	62.0%	5.0%	100.0%
4a. If yes, does the map cover the entire municipality?	38.0%	59.5%	2.5%	100.0%
4b. If yes, does the map show any of the following elements:				
o right-of-way widths?	25.6%	71.9%	2.5%	100.0%
o future road alignments?	19.0%	78.5%	2.5%	100.0%
o future community/public facilities?	12.4%	85.1%	2.5%	100.0%
o other features?	9.9%	88.4%	1.7%	100.0%
5. Does municipality have a Capital Facilities/Improvement Plan which includes all transportation improvements needed to correct existing deficiencies and accomodate future traffic volumes?	21.5%	72.7%	5.8%	100.0%
6. Has municipality established guidelines for conducting traffic impact analysis studies?	37.2%	59.5%	3.3%	100.0%
6a. If yes, do guidelines include:				
o level of service and traffic volumes generated by other projects?	30.6%	66.1%	3.3%	100.0%
o mitigation measures ?	19.8%	76.9%	3.3%	100.0%
o proposed project's impact or potential for public transit?	12.4%	84.3%	3.3%	100.0%
7. Has municipality developed an Impact Fee program for off-site transportation improvements?	19.8%	79.3%	0.8%	100.0%

SURVEY RESPONSES TO "LINKING TRANSPORTATION AND LAND USE IN THE DELAWARE VALLEY"

	YES	NO	DO NOT KNOW	TOTAL
8. Does municipality have an Adequate Public Facilities Ordinance or similar program?	13.2%	81.8%	5.0%	100.0%
9. Has municipality adopted a Trip Reduction Ordinance?	0.0%	97.5%	2.5%	100.0%
9a. If yes, does the ordinance cover the entire municipality?	0.0%	97.5%	2.5%	100.0%
9b. If yes, which of the following measures does the ordinance include:				
o vehicle trip reduction as percentage of total traffic volume?	0.0%	97.5%	2.5%	100.0%
o vehicle trip reduction as percentage of peak traffic volume?	0.0%	97.5%	2.5%	100.0%
o percentage of allowable single-occupant vehicles?	0.0%	97.5%	2.5%	100.0%
o established minimum level of service?	0.0%	97.5%	2.5%	100.0%
10. Does municipality have a Roadway Access Management Plan or strategy?	44.6%	51.3%	4.1%	100.0%
10a. If yes, which of the following elements are included:				
o classification of driveways by use or traffic volume?	25.6%	70.3%	4.1%	100.0%
o allowable turning movements by driveway type?	16.5%	79.3%	4.1%	100.0%
o spacing standards between dirveways and intersections?	36.4%	59.5%	4.1%	100.0%
o minimum design standards for all driveway types?	35.5%	60.3%	4.1%	100.0%
o number of permissible driveways based on lot frontage?	28.9%	66.9%	4.1%	100.0%
11. Does municipality use any other techniques/tools which successfully link land use and transportation planning?	17.4%	82.6%	0.0%	100.0%

Source: Delaware Valley Regional Planning Commission. This survey was administered to all 353 municipalities within the nine county DVRPC region during October 1992. The response rate was 34% (121 surveys returned).

Morris GRAPHICS INC.

Quotation

660 N Broad St. • Woodbury, NJ 08096-1708
phone: 856-845-4980 • fax: 856-853-5787
sales@morrisgraphics.com• www.morrisgraphics.com/

Date: August 29, 2006
Terms: 1% 15 Days, Net 30
__x____delivered price
_____ price does **not** include delivery
*Pricing does **not** include any applicable sales tax, which must be added to prices*

To: DVRPC
Attn: Erin Burke

We are pleased to quote as follows:

Newsletters
Client to provide digital files, ready to output
Any typesetting or layout changes required may be additional.
Trim size is 8.5" x 11" flat.
Print 2 colors, 2 sides. No bleeds. No heavy solids.
(if heavy solids we will need to requite on larger press).
We supply 80lb. white gloss coated text paper.
Fold in third and pack in convenient cartons.
No charge for local southern New Jersey area delivery.
Any delivery out of our area is additional.

PRICES:

Prepress, paper, printing, folding and delivery.	
750 newsletters	$287.00

Joe Robertson

Quote by: Joe Robertson
Morris Graphics Inc.

Accepted by:_____
Date: _____