What the people think…

Cranberry Township Citizen Survey, 2008

The full report is available

The results are comprehensive.

Here is a brief overview.

Understanding the Results

- **The Survey was initiated at the request of the Board of Supervisors, as part of the Board's continuous efforts to monitor the quality of Township services and to provide data for The Cranberry Plan**

- To ensure reliability we contracted with the National Research Center
  - Their analysis provided us with norm ranking comparisons to 500 communities

Results in a ‘nutshell’

- Our survey results are quite positive
- Results point to opportunities for improvement
- Community responses will aid in planning
- We hope to repeat the survey at regular intervals

Benchmarking the best

We are developing **The Cranberry Plan** by combining the best thinking, results and research from

- Citizens Advisory Panel
- Steering Committee
- Business Community
- Residents *(via the survey, focus groups, public meetings)*
- Township Staff
- Regional experts
- Outside Consultants

Community Life

Why did you choose to live in Cranberry Township?

Convenience……39%

✓Proximity to where I work

✓Access to amenities

Value……..36%

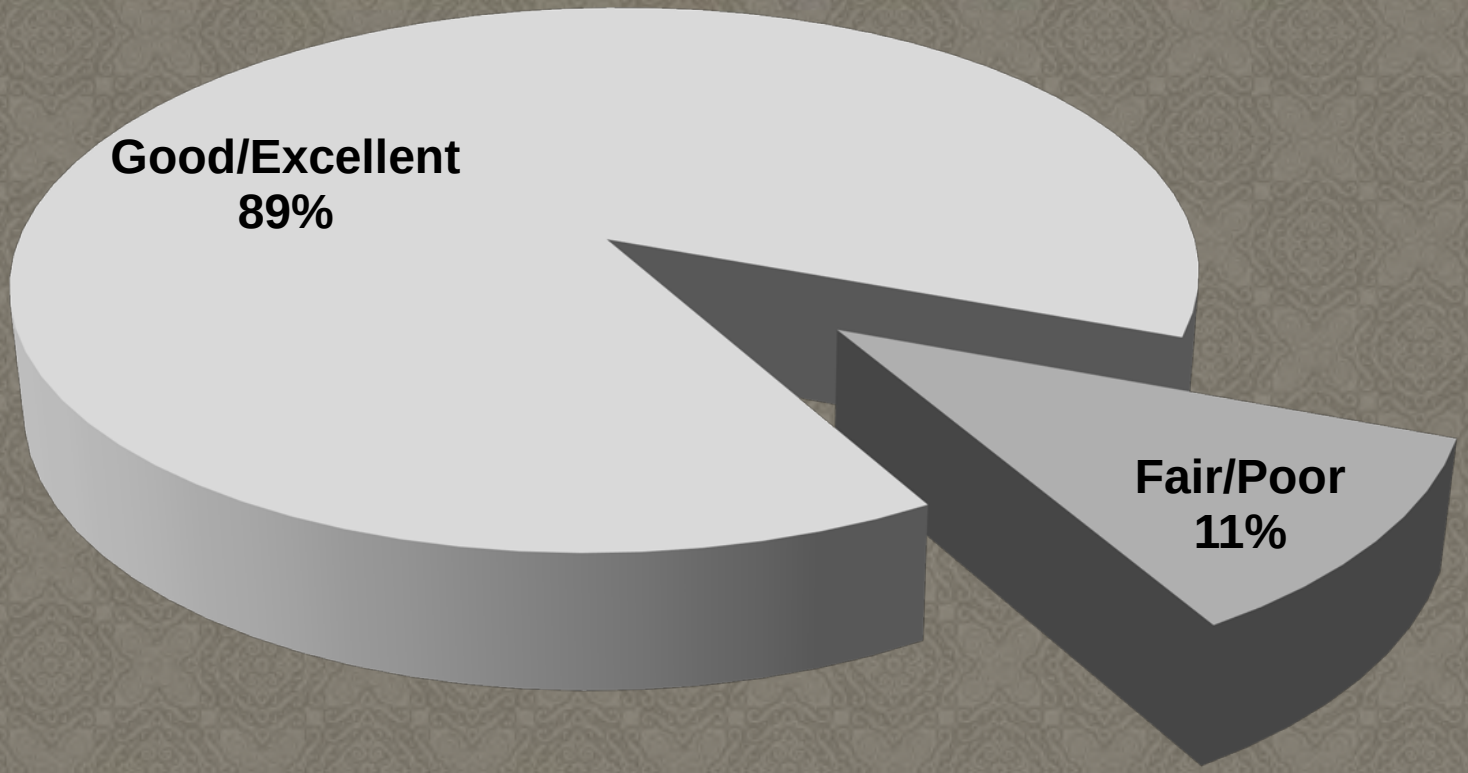
✓My dollar goes farther

Community Feel……..21%

✓Knowing my neighbors; local events

✓Great place to raise my family

Overall Quality of Life

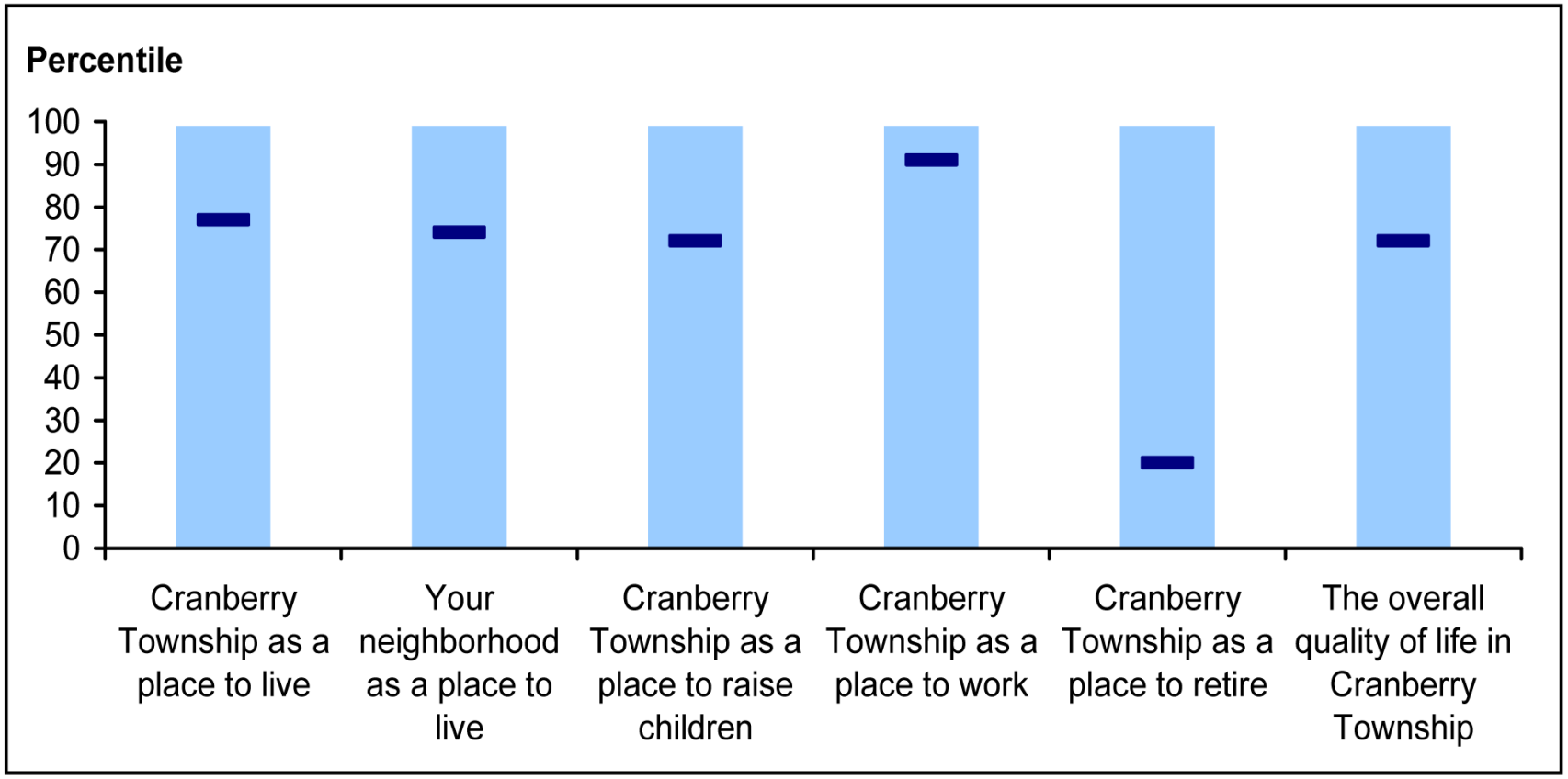


Community Life

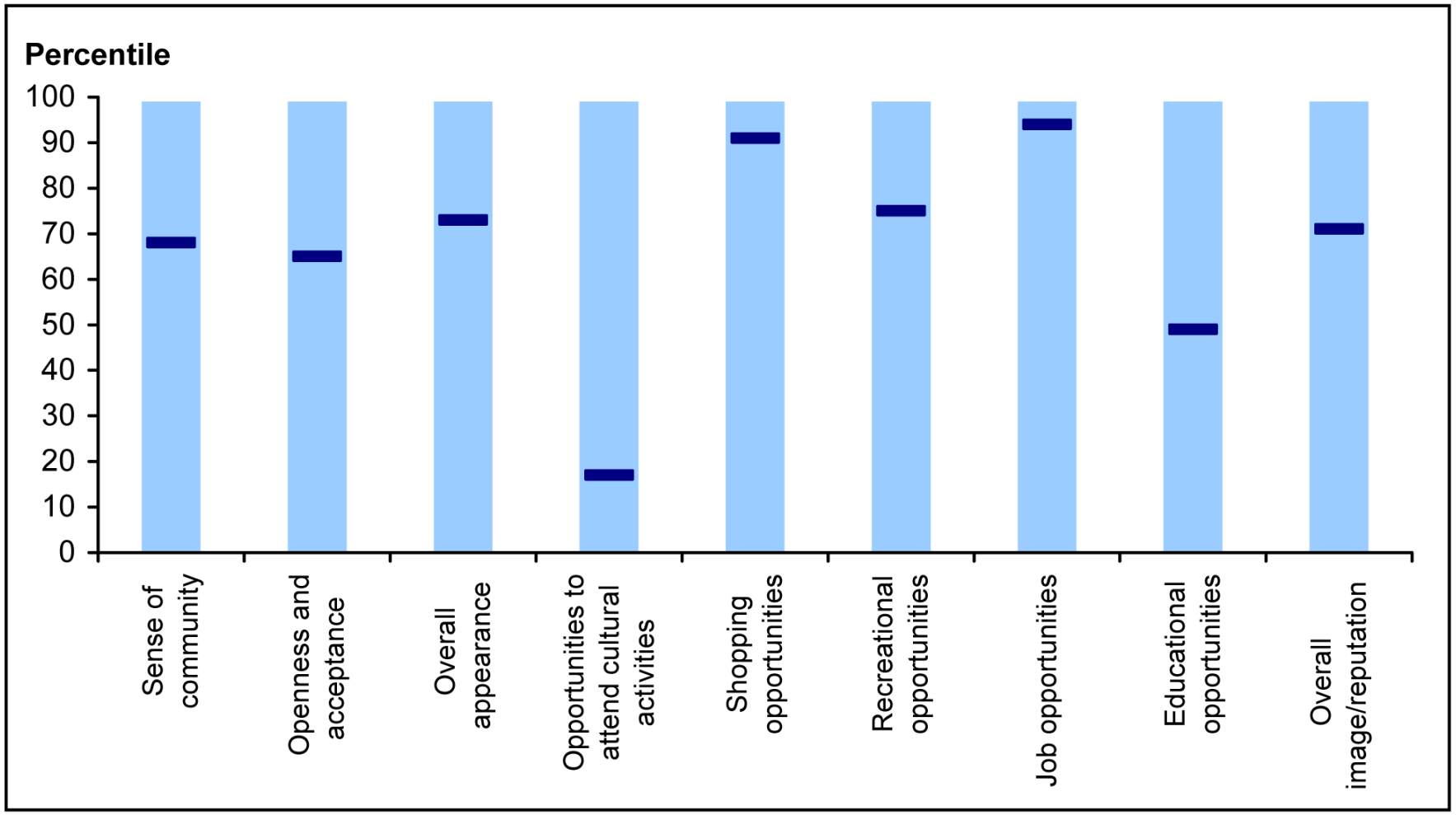
Quality of Life Ratings

Cranberry as a place…	(Excellent/Good)
✓ to live	92%
✓ to raise children	87%
✓ to work	79%
✓ to retire	46%
✓ overall quality of life	89%

Quality of Life Comparisons



Rating Community Characteristics



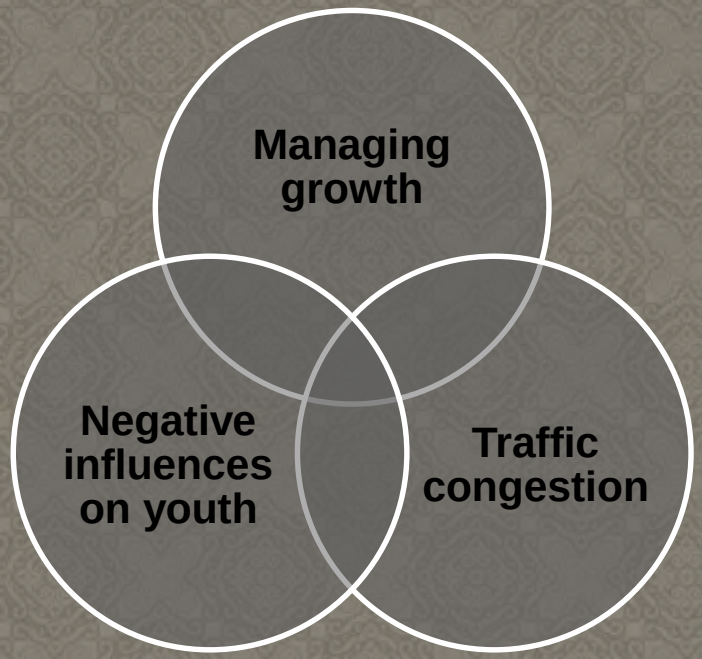
Community Life

Access and Mobility in Cranberry

	Excellent to Good
Access to affordable quality housing	53%
Access to affordable quality health care	71%
Ease of car travel	34%
Ease of bike travel	8%
Ease of walking	17%

Community Life

Asked to respond to a list of problems experienced by similar communities across the nation – Cranberry residents echoed similar opinions.



Local Government

Cranberry Twp. Public Safety

Residents rating services as excellent or good

Police 88%

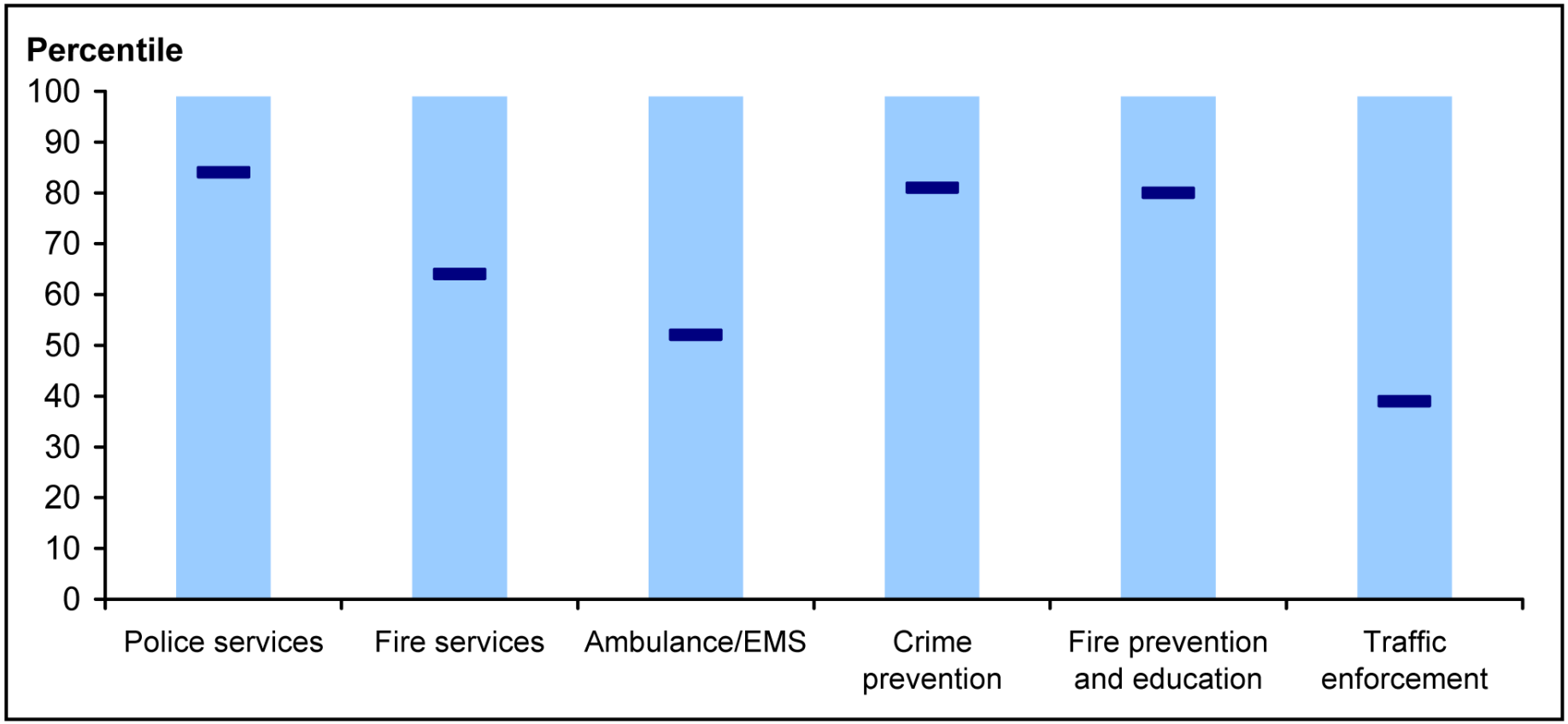
Volunteer Fire Dept. 93%

Community Life

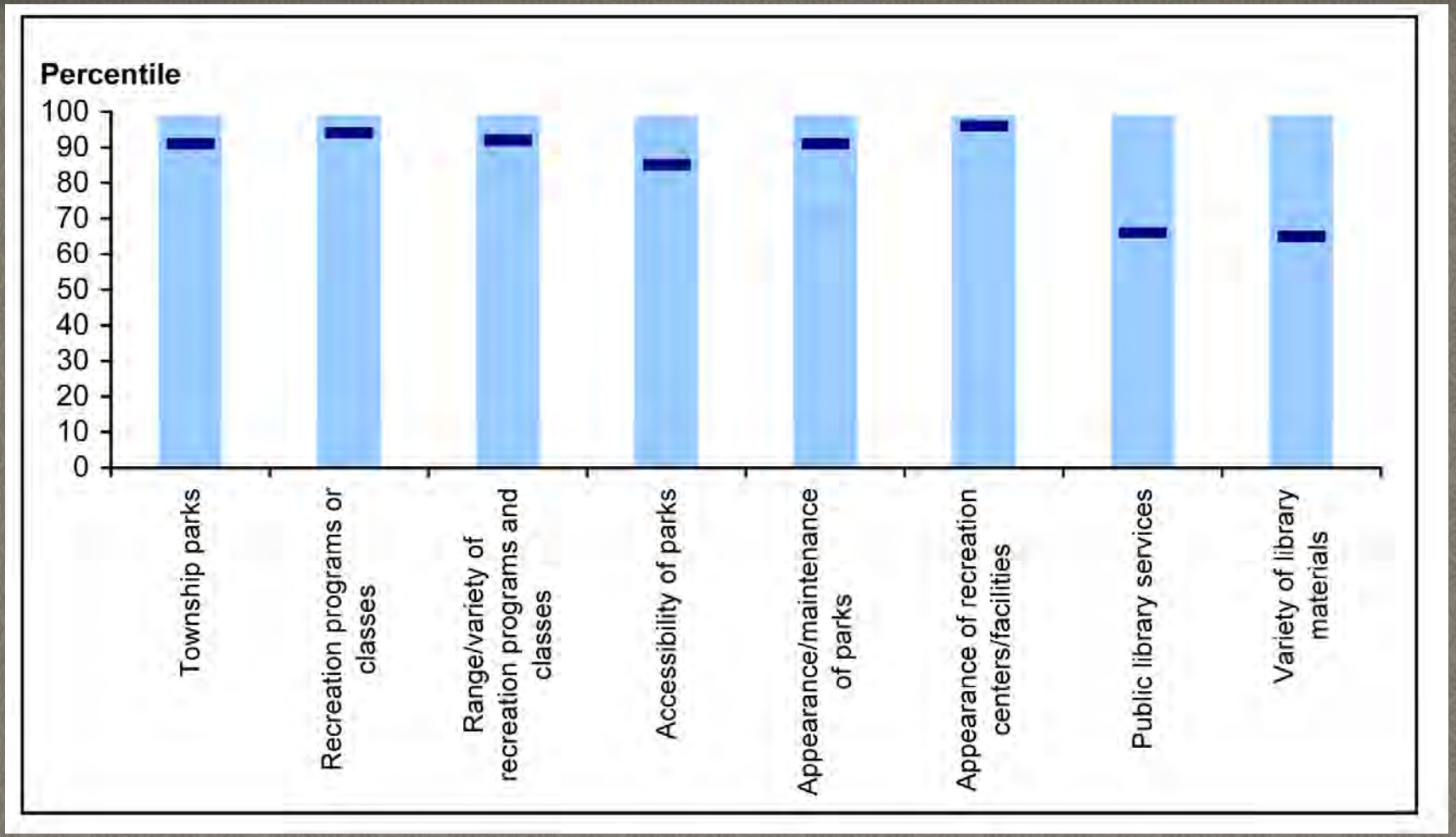
Feeling safe in Cranberry

	Daytime	After dark
Community	94%	82%
Neighborhoods	97%	89%
Parks	94%	62%

Public Safety Service Comparisons



Leisure Service Comparisons



Voter Status and Activity

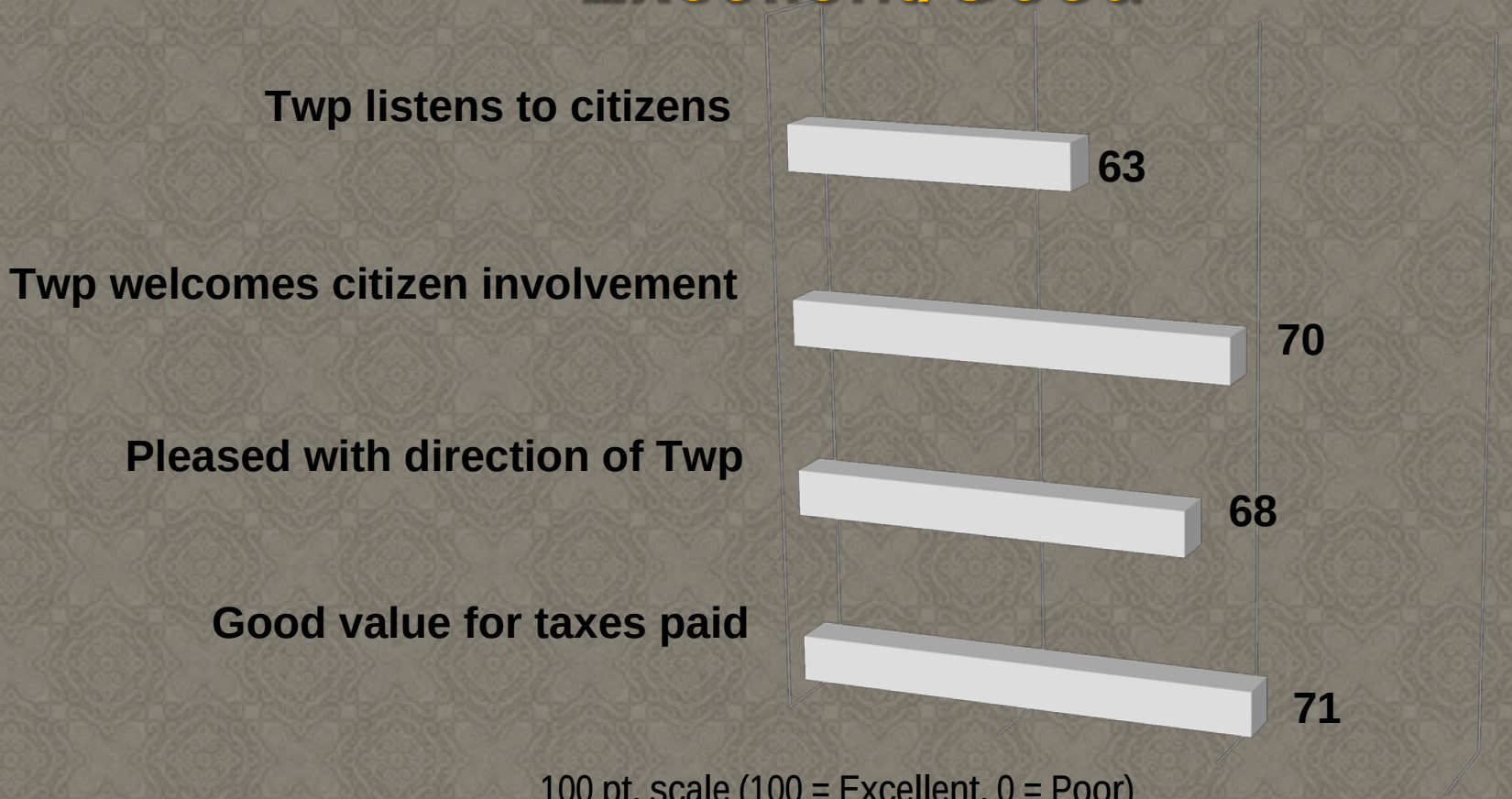
Despite this positive response - historically, voter turnout in Cranberry Twp is low (less than 28%)

- 87% reported being registered to vote
- 71% said the voted in the last election
- 90% indicated they plan to vote in the next election

Quality of Life

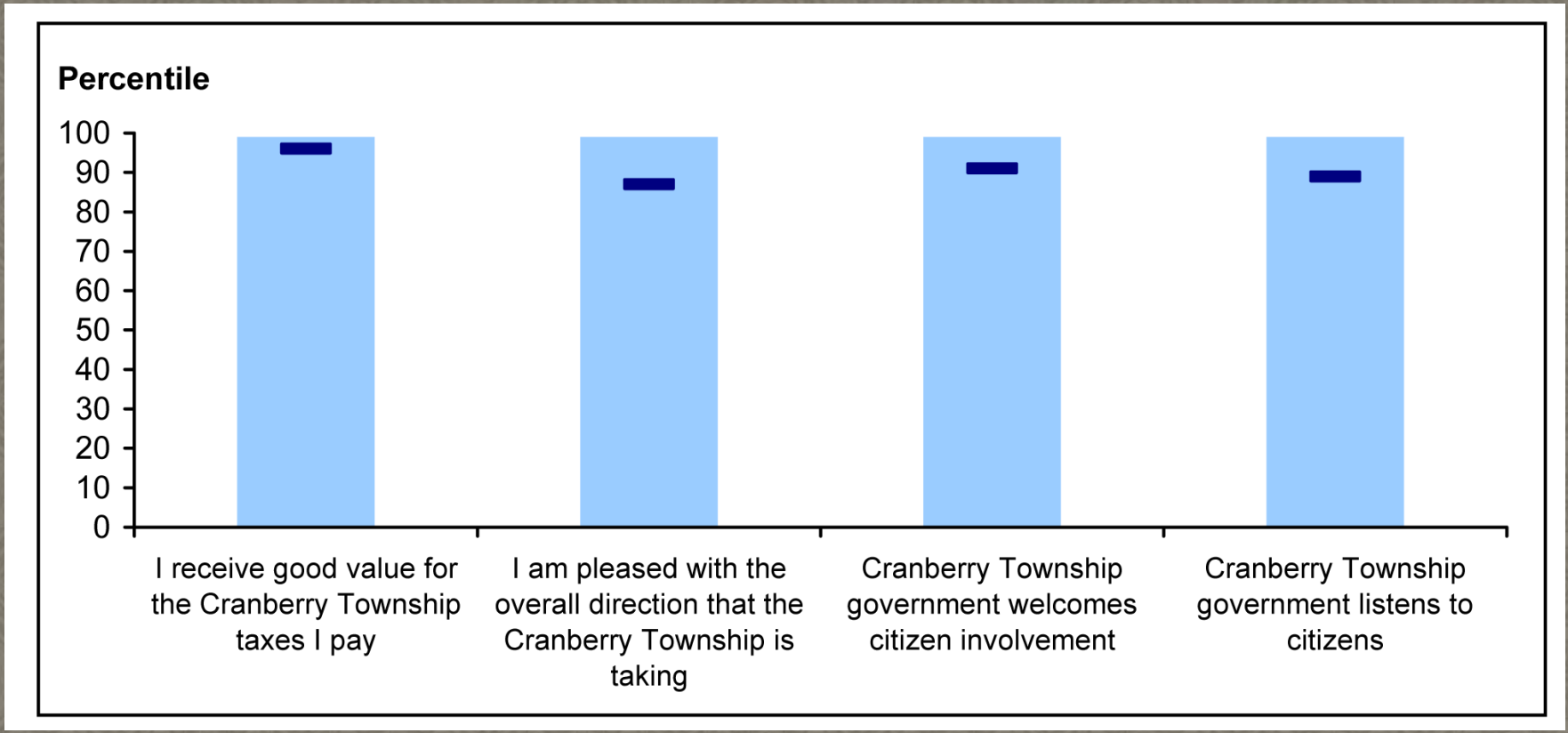
Local Government Public Trust

Excellent/Good



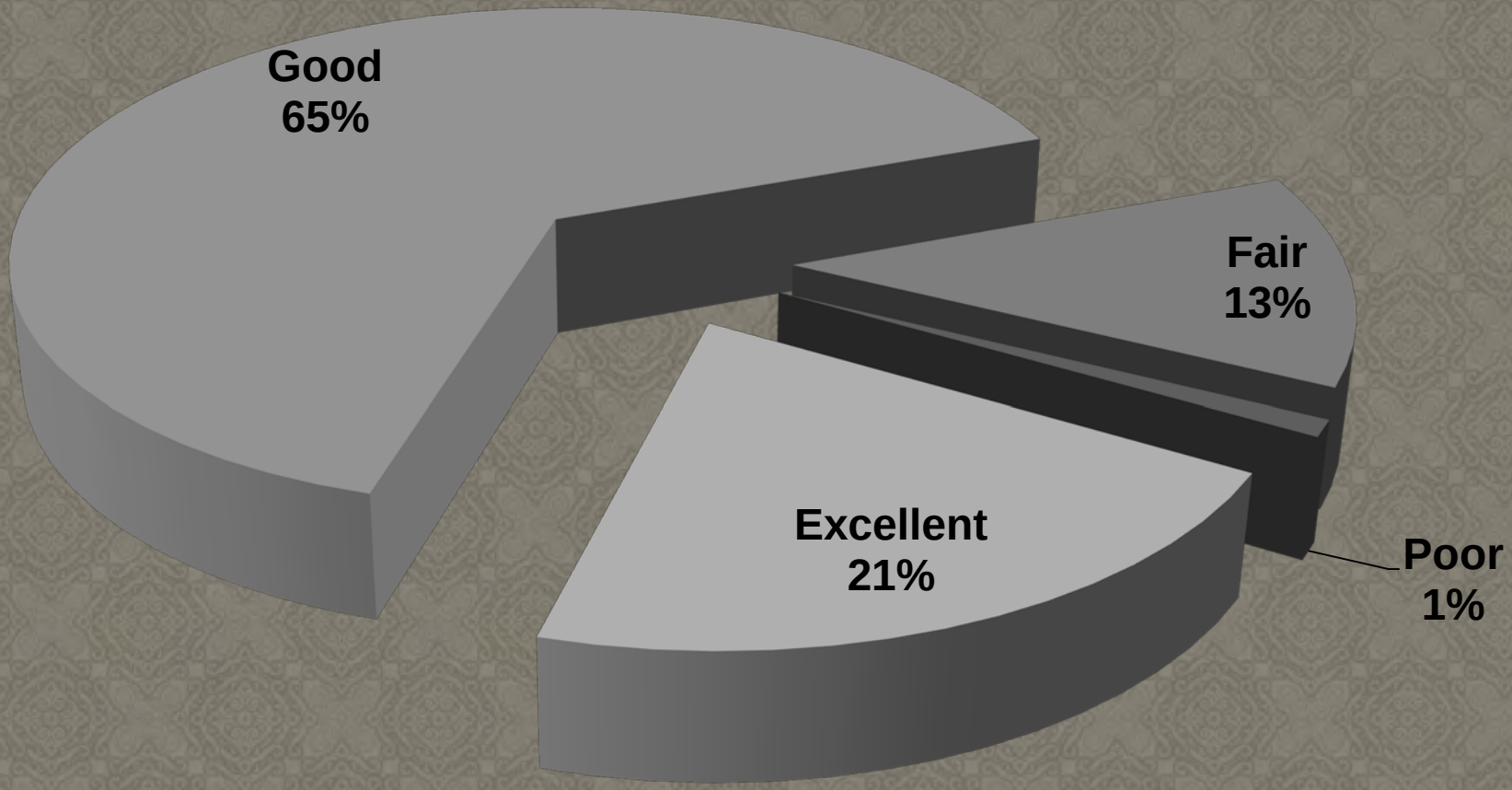
100 pt. scale (100 = Excellent, 0 = Poor)

Comparisons of Public Trust



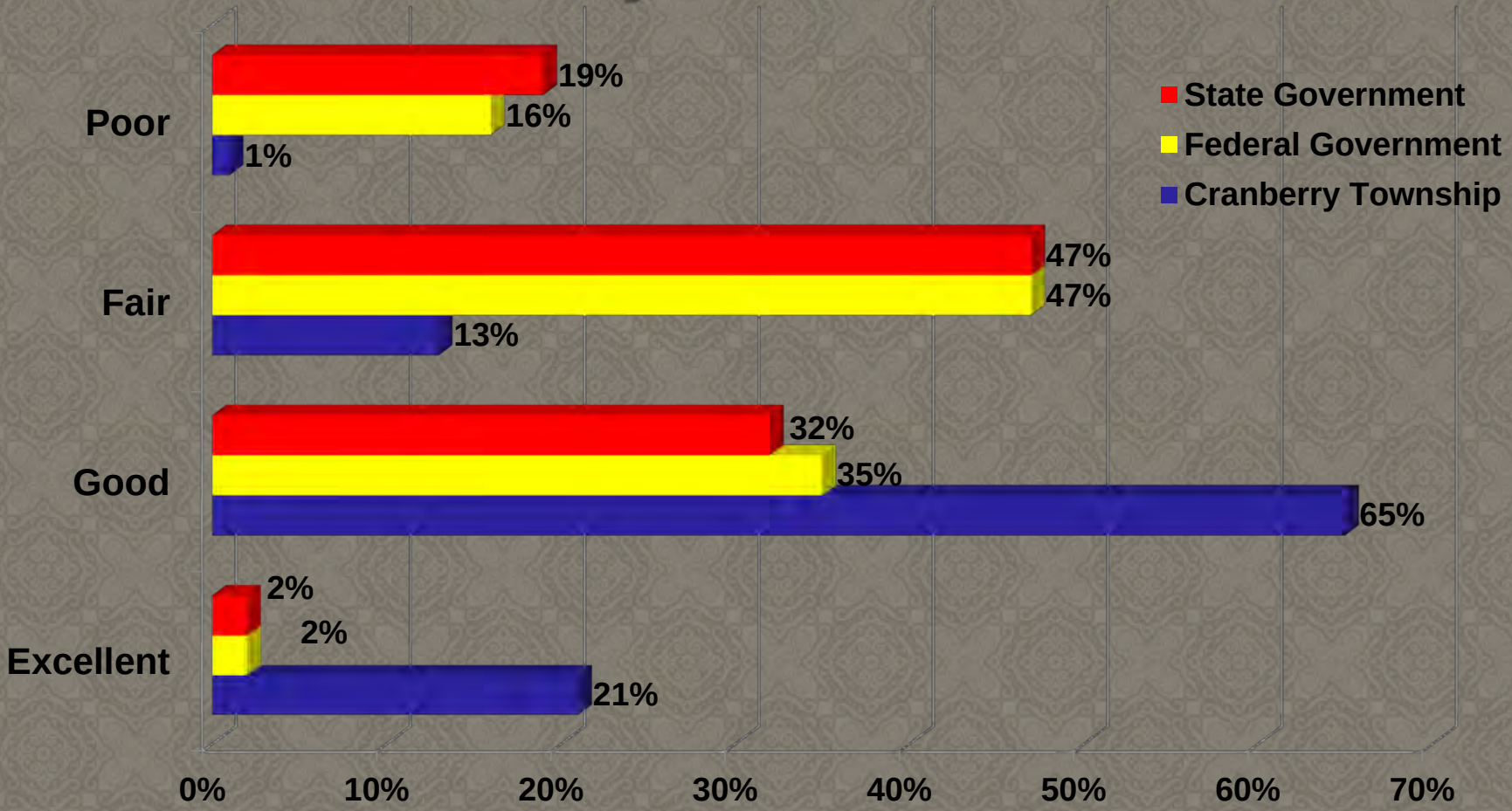
Local Government

Overall Quality of Services Provided by the Township



Local Government

Overall Quality of Government Services



Community Life

Information Services

- ✓ Read the Township newsletter 94%
- ✓ Use the Township website 74%
- ✓ Use the internet to conduct business with the Township 50%

Public Works Services

Excellent/Good

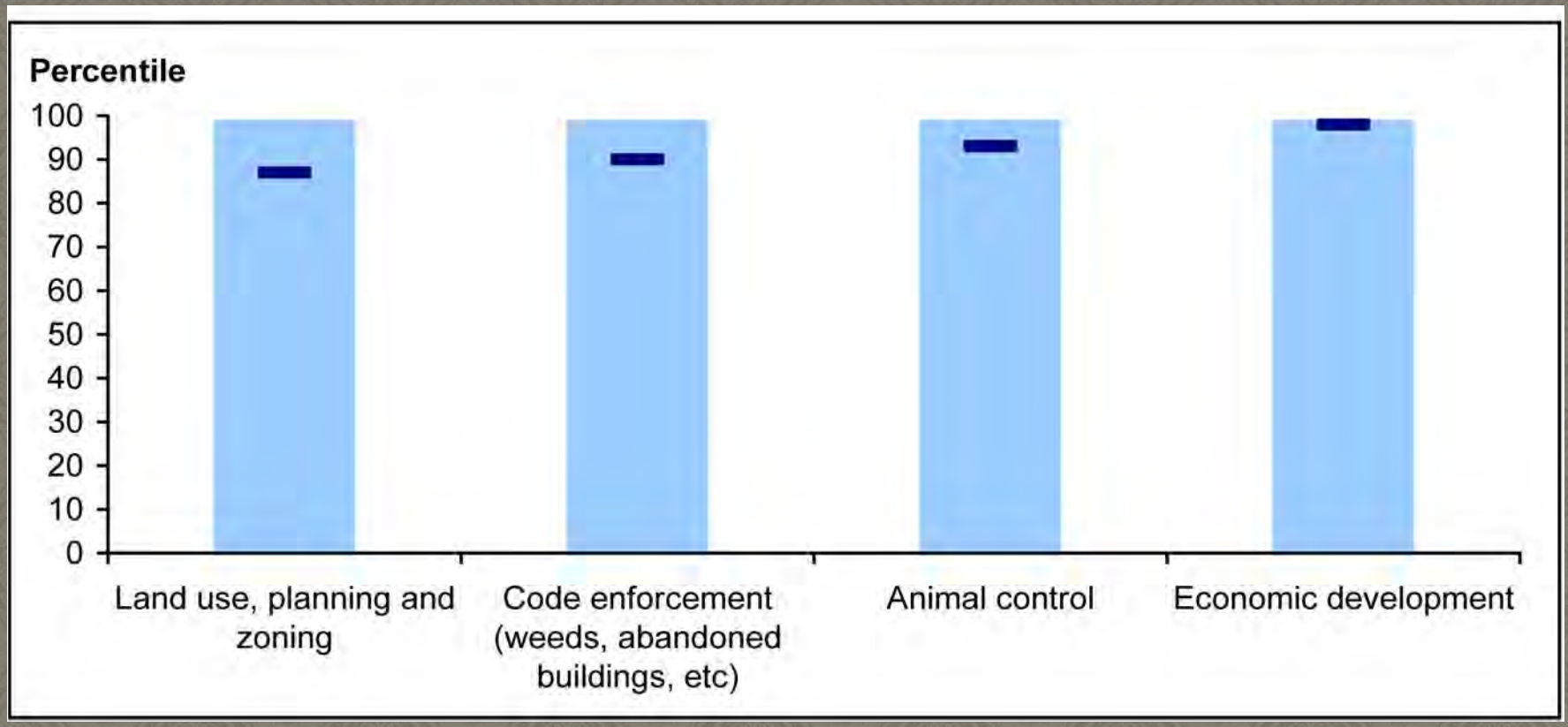
- ✓ Street Repair 48%
- ✓ Snow removal 64%
- ✓ Traffic signal timing 48%

Utility Services

Excellent/Good

- Garbage collection / Yard waste pickup 79%
- Storm drainage 72%
- Drinking water 72%
- Sewer services 78%

Planning and Codes

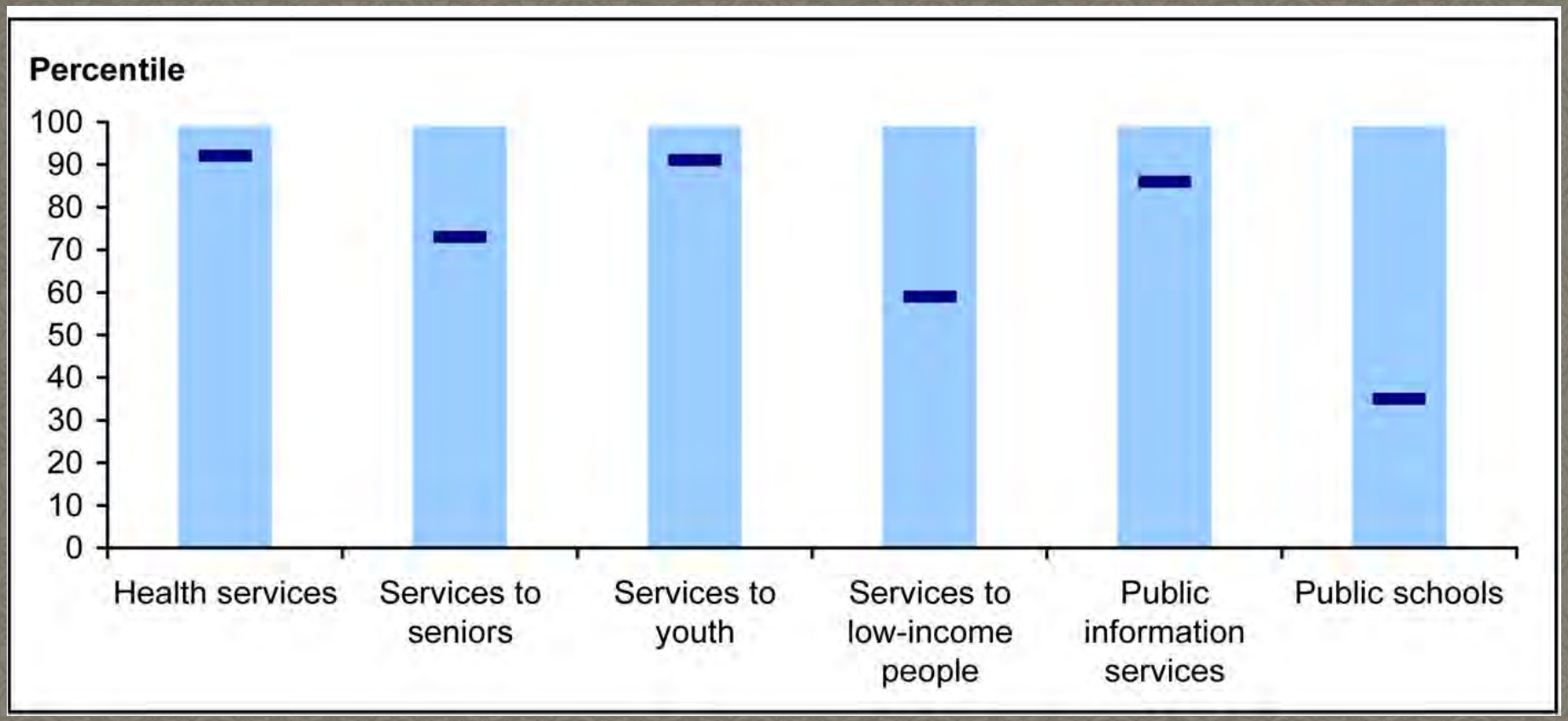


Community Life

Participating in Township activities

Visited the Public Library	79%
Participated in a Recreation program	59%
Visited a Cranberry Park	86%
Attended a local govt. meeting	22%
Volunteered with a local group	35%

Services to special populations



Communicating with the Township

Resident satisfaction when communicating with Township Employees

- ✓ Knowledgeable
- ✓ Responsive
- ✓ Courteous

87% reported their experiences with township employees as good to excellent.

Community Life

Top Ten Reasons to Live in Cranberry Township

1. Overall image and reputation
2. Appearance of Cranberry Township
3. Sense of community
4. Recreational opportunities
5. Educational opportunities
6. Welcoming toward people of diverse backgrounds
7. Job opportunities
8. Quality of new development
9. Shopping opportunities
10. Opportunities to attend cultural events

Why Cranberry?

Which reason comes closest to describing why you chose to live in Cranberry?

Convenience	39%
Value…my dollar goes farther	36%
The community feel…knowing my neighbors; a good place for families	21%
The diverse shopping	4%

To review the complete results

www.cranberryplan.org

The Cranberry Plan

What’s Next?

A BACKGROUND OF CRANBERRY TOWNSHIP

Executive Summary

Cranberry Township is at an important juncture in its history as a rapidly growing suburb of the City of Pittsburgh. Major developments are occurring in the Township, which require the Board of Supervisors and Township Staff to take measures to facilitate and accommodate incoming growth. The keystone of all actions that will be taken by the Township in response to this growth will be the Comprehensive Plan. The Comprehensive Plan will be roughly a two year project that will be created by Township Planning Staff, Delta Development Group, Inc., and other consulting firms, and shaped by the Planning Advisory Committee and the Board of Supervisors. "A Background of Cranberry Township" was created to acclimate Delta Development, Inc. Staff to Cranberry Township by providing a plethora of Township information and statistics.

General Information

Geography

Cranberry Township - Cranberry Township, PA is located in western Pennsylvania (40.70996 N, 80.10605 W) and is a suburb of Pittsburgh. According to the United States Census Bureau, the township has a total area of 59.1 km² (22.8 mi²) (0.04% is water) and 169.23 miles of roadway.

Demographics

Cranberry Township - As of the census of 2000, there were 23,625 people, 8,352 households, and 6,556 families residing in the township. The population density was 400.2/km² (1,036.5/mi²). There were 8,724 housing units at an average density of 147.8/km² (382.8/mi²). The racial makeup of the township was 96.80% White, 0.88% African American, 0.06% Native American, 1.35% Asian, 0.02% Pacific Islander, 0.19% from other races, and 0.69% from two or more races. Hispanic or Latino of any race were 0.70% of the population (See Tables 1 and 2 for more current population information).

There were 8,352 households out of which 44.5% had children under the age of 18 living with them, 70.4% were married couples living together, 6.1% had a female householder with no husband present, and 21.5% were non-families. 17.9% of all households were made up of individuals and 6.4% had someone living alone who was 65 years of age or older. The average household size was 2.81 and the average family size was 3.23.

In the township the population was spread out with 30.7% under the age of 18, 5.4% from 18 to 24, 35.2% from 25 to 44, 20.6% from 45 to 64, and 8.1% who were 65 years of age or older. The median age was 35 years. For every 100 females there were 97.1 males. For every 100 females age 18 and over, there were 92.7 males.

The median income for a household in the township was $66,588, and the median income for a family was $74,113. Males had a median income of $52,675 versus $33,155 for females. The per capita income for the township was $27,349. 2.9% of the population and 2.1% of families were below the poverty line. 3.4% of those under the age of 18 and 5.0% of those 65 and older are living below the poverty line.

Education

Children residing in the township chiefly attend schools of the Seneca Valley School District: There are four elementary schools in the district including: Connoquenessing Valley Elementary (K-4) located in Zelienople, PA, Haine Elementary (K-6) and Rowan Elementary (K-4), both located in Cranberry Township, and Evans City Elementary (K-6) in Evans City, PA; There are also three separate schools on the Seneca Valley high school campus: Seneca Valley Middle School (7-8), Seneca Valley Intermediate High School (9-10), and Seneca Valley Senior High School (11-12), in Harmony, PA, United States. Attendance at one of the four elementary schools is based upon geographic location. Upon graduating high school, the large majority of the teenagers from the town attend college. The largest percentage of students attend nearby Slippery Rock University of Pennsylvania. While Penn State University,

University of Pittsburgh and Indiana University of Pennsylvania are also popular schools for recent high school graduates living in Cranberry Township.

Table 1: Cranberry Township Population Estimates: April 1, 2000 to July 1, 2005								
Geographic Area	Population estimates						April 1, 2000	
	July 1, 2005	July 1, 2004	July 1, 2003	July 1, 2002	July 1, 2001	July 1, 2000	Estimate Base	Census
Cranberry Township	27,033	26,589	26,122	25,613	24,477	23,808	23,625	23,625

Annual Estimates of the Population for Minor Civil Divisions in Pennsylvania, Listed Alphabetically Within County: April 1, 2000 to July 1, 2005 (SUB-EST2005-05-42)
Source: Population Division, U.S. Census Bureau Release Date: June 21, 2006

Table 2: Growth Rates Based Upon Population Estimates						
Township/Borough	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	5-Year Average Growth
Cranberry Township	3.61%	4.64%	1.99%	1.79%	1.67%	2.74%

Annual Estimates of the Population for Minor Civil Divisions in Pennsylvania, Listed Alphabetically Within County: April 1, 2000 to July 1, 2005 (SUB-EST2005-05-42)
Source: Population Division, U.S. Census Bureau Release Date: June 21, 2006

Government

Cranberry Township – Cranberry Township is classified as a Second Class Township of Butler County and follows the Commonwealth of Pennsylvania Second Class Township Code. The Township utilizes a "Council-Manger" or "Board of Supervisors-Manager" style of government where the Board of Supervisors appoint a Township Manager who is responsible for supervising government operations and implementing the policies adopted by the board. Table 3 displays the Cranberry Township Board of Supervisors.

Table 3: Board of Supervisors
Richard Hadley - Chairman
John Skorupan - Vice-Chairman
Dave Root
Bruce Mazzoni
John Milius

http://www.twp.cranberry.pa.us/bos/index.html

Cranberry Township Staff – The Township has assembled a highly motivated and qualified staff to carry out Cranberry Township's day to day responsibilities as well as long term projects. Table 4 below displays all department heads as well as all Township Managers.

Table 4: Employees, Township Managers & Department Director Listing	
Total Number of Cranberry Township Employees	e Employees - 116 Part Time Employees - 30 (Seasonal Employees not
Township Manager	Jerry Andree
Assistant Township Manager	Bettelou Bertoncello
Assistant Township Manager	Duane McKee
Chief Strategic Planning Officer	John Trant, Jr.
Acting Chief Information Officer	Adam Osterrieder
Community Development	Ron Henshaw
Director of Finance	Vanessa Gleason
Parks & Recreation Director	Mike Diehl
Public Safety Director	Steve Mannell
Communications Director	Peter Longini
Human Resource Manager	Richard Cibella
Director, Engineering	Jason M. Kratsas P.E.

http://www.twp.cranberry.pa.us/departments.html

Planning and Development – Cranberry Township has experienced high levels of growth in the last ten to fifteen years with strong commercial development near major highways and abundant residential housing located in residential neighborhoods. The Township has dedicated five employees as well as several consulting firms to conduct planning and development functions for the Township. Township Planning Staff implement a Zoning Ordinance, Subdivision and Land Development Ordinance, and Public and Private Improvements Code and work closely with Code Administration Staff and the Planning Commission.

Utilities

Service Providers

As shown in Table 5 below Cranberry Township uses several gas, phone, and sewage providers. Service provider is determined by where services are needed within the Township.

Table 5: Cranberry Township Utility Companies	
Garbage	Vogel Disposal Services
Electric	Penn Power
Gas	Columbia, Equitable, or Dominion
Phone	North Pittsburgh, Verizon, Sprint, or Armstrong
Water	Cranberry Water
Sewage	Breakneck Creek Regional Authority or Cranberry Sewage
Cable TV	Armstrong Utilities

Township Research

Cost of Services

Table 6 below displays the costs of Water, Sewage, and Trash Disposal services. Tap Fees for sewer and water services are a flat fee for residential usage, but vary for commercial development based upon pipe diameter and usage.

Table 6: Cranberry Township Utility Costs		
Cost of Water	**Cost of Sewage**	**Cost of Trash**
5/8" Meter: $10.00 flat fee	5/8" Meter: $18.00 flat fee	Bags: $36.54 + .65/bag
3/4" Meter: $15.00 flat fee	3/4" Meter: $27.00 flat fee	35 Gal Cart: $41.28
$3.85/1000 gal used	$5.17/1000 gal used	64 Gal Cart: $42.75
Charged quarterly.	Charged quarterly.	96 Gal Cart: $44.58
Residential Tap Fee: $2,097	Residential Tap Fee: $2,100	Charged quarterly

Township Research

Home Sales and Taxes

Home Sales and Real Estate Information

Table 7 below outlines the median sales price for homes in Cranberry Township in 2007, how many days they were listed on the market, and the median sales price appreciation percentage from 2004 to 2007.

Table 7: Cranberry Township Sales Prices and Real Estate Information		
Median Home Value (2007)*	**Median D.O.M. (2007)****	**Median Appreciation***
$309,000.40	77.67	3.48%

Cranberry Township - http://wpn.mlxchange.com/Pub/EmailView.asp?r=1215877170&s=WPN&t=WPN

*Median Home Value based of sold homes from 6-11-06 - 6-11-07. Median appreciation based on sold prices from 2004-2007 **

D.O.M. – Median Days on the Market based upon sold homes from 6-11-06 - 6-11-07.

Tax Information

Cranberry Township taxes are among the lowest of any full-service community in southwestern Pennsylvania. For example, a Cranberry resident with $75,000 in household income who owns a house with a market value of $200,000, pays a total of $659 to the Township in real estate and earned income taxes. In the City of Pittsburgh, that same household would pay the City $2,910. In both communities, that resident would pay $2,303 state income tax, as well as other state surcharges, such as 6% sales tax - 7% in Allegheny County. For their $659, Cranberry residents receive a full range of municipal services including a well-stocked public library, an expansive park system, 24/7 police and fire protection, 169.23 miles of well-maintained roadways and traffic signals, infrastructure maintenance and land use management, as well as general administration of the community. In Tables 8 and 9 below Cranberry Township tax rates, tax revenues, and liabilities are displayed.

Table 8: Cranberry Township Tax Information			
Property Taxes		**Income Taxes**	
Local: **14.2 Mils** (2.5-Fire & 1-Library)		Earned:1% (.5% to Twp. & .5% to school district)	
27.5 Mils			
School District*:	125.39 Mils	Mercantile:	1 Mil
Real Estate Transfer:	.5%	EMS Tax:	$30/year

Statistics taken from Berkheimer Tax Collection

* School District Property tax rates are for Seneca Valley School district. The rates listed are for the year 2006.

Table 9: Tax Collector Liability Sheet for Cranberry Township 2007		
Valuation	Taxable Properties: (No. of Parcels) = 9,981	= $246,140,040
	Exempt Properties: (No. of Parcels) = 605	= $19,390,974
County Taxes	County General	$5,538,162
	County Debt	$1,230,724
	County Total	$6,768,886
Municipal Taxes	Local General	$2,633,700
	Local Fire	$615,361
	Local Library	$246,147
	Total Municipal	$3,495,209
Total Overall Liability	Total County	$6,768,886
	Total Municipal	$3,495,209

Statistics from Cranberry Township Tax Collector P.J. Lynd

Public Safety

Police

The Cranberry Township Police Department is responsible for maintaining public order in Cranberry Township (22.8 mi^2 land and 169.23 miles of roadway) as well as Seven Fields Borough (0.8 mi^2 land and 12.65 miles of roadway). This act of intergovernmental cooperation was agreed upon by Seven Fields and Cranberry Township in January of 2004 and is scheduled to be resigned. The agreement is based upon the current ratio of the population of Seven Fields being approximately 8% of Cranberry Township and the financial contribution will not be less than 5%.

Fire

Cranberry Township - The Cranberry Township Fire Department is a 100% volunteer organization which provides fire and rescue services to the residents of Cranberry Township. The Fire Company created a unique agreement with the Township in 1981, which transferred the assets of the Company to Cranberry Township. As part of the agreement, the township provides financial support for building maintenance, equipment, and apparatus. In return, the professionals of the Cranberry Township Volunteer Fire Company spend their volunteer time training, performing administrative work, and responding to emergency calls. This is a unique arrangement in southwestern Pennsylvania and is a model of cooperation between local government and volunteerism.

Parks and Recreation

Cranberry Township – Cranberry Township's recreational needs are served through comprehensive recreation programs and the provision of recreational facilities that include: Community Park (80 acres with a nature trail), North Boundary Park (128 acres with a water park facility), and the Municipal Center and Gym.

Business in Cranberry Township

Cranberry Township is one of the fastest-growing areas in the United States in both population and business. One reason for the township's tremendous growth is its location. Serving as the intersection of Interstate 76 (the Pennsylvania Turnpike) and 79 and Routes 19 and 228, the community is accessible from virtually anywhere. In addition, the completion of Interstate 279 in 1989 cut travel time to Pittsburgh to under half an hour.

There are many major businesses located in Cranberry Township. One of the main business centers is Thorn Hill Industrial Park, where many businesses reside such as the Pittsburgh Tribune-Review, whose NewsWorks warehouse prints that paper as well as the USA Today for the entire Pittsburgh area. Also, Thorn Hill Industrial Park is the site of the headquarters of the American Eagle Outfitters clothing brand company. In 2005 Wellington Energy, a sub-division of Wellington Power Corporation, located in Lawrenceville, opened in Cranberry and is continuing to grow as a leader in Electric & Gas Meter AMR Deployment and Project Management. Cranberry Township is also home to: TRACO (Three Rivers Aluminum Company), Verizon Wireless, UPMC Health System, the Butler Auto Auction, Coventry Health Care, McKesson Automation, Inc., and many more.

In addition to the many businesses and office parks located in Cranberry Township there is also an abundance of retail stores and centers. Cranberry Township has virtually every single store or restaurant that is serviced in the Pittsburgh area

On March 20, 2007 Westinghouse Electric Company announced that it would locate its headquarters in the Cranberry Woods Office Park in Cranberry Township and build a 140 million dollar research facility that would employ over 3,000 people. This development will be completed in 2009.

Table 10: Cranberry Township Building Permit Fees

Building Permit Fees

	Residential	Residential Alterations	Residential Accessory	Non-Residential	Compliance Permit Residential	Compliance Permit Commercial	Demolition Residential
Cranberry Township	$50 + $7 per $1,000 of Construction Value	$50	$75	$75 + $9.50 per $1,000 of Construction Value	$25	$25	$50

	Demolition Non-Residential	Mobile Homes	Driveway Application	Driveway Opening	Grading Permit Residential
Cranberry Township	$50	$50	($30 Residential) ($50 Commercial)	$30 Residential $50 Commercial	0-5 Acres disturbed - $200 Over 5 Acres disturbed - $300

Table 11: Cranberry Township Development Fees

Subdivision Fees/Deposits

	Application	App. For Pre, Pre./Final, or Final Deposit	Revised Subdivision Plan	Lot Line Relocation	Additional Consultant Fee Deposit/Cost*
Cranberry Township	$400 + $2,000 for 1st 5 + $100 for each additional	(0-4 None) (4-50 $2,500) (>50 $4,000)	$1,000	$125	The applicant shall submit a construction inspection deposit calculated at 3% of the estimated construction costs of all site improvements as defined in the Pennsylvania Municipalities Planning Code if they have sewer or water line extensions. For projects that consist of only sewer and/or water line extensions, the applicant shall submit a construction inspection deposit which is calculated at 15% of the estimated sewer and/or water line extensions. This fee shall not apply to projects which have no sewer and waterline extensions as long as they maintain a balance of $3,500 in the developer's deposit account. The construction deposit shall be submitted prior to receiving a development permit. If, at any time during the progression of the development, it is determined by the Township that the balance available is or will be inadequate to fully cover anticipated costs the applicant will be notified that an additional deposit is required.

Land Development Fees/Deposits

	Application	Deposit	Additional Consultant Fee Deposit/Cost*	Planned Residential Development Application Fee	Planned Residential Development Application Fee	Recreation Fees	Transportation Impact Fee	Water Tap Fees	Sewer Tap Fees
Cranberry Township	$2,000 + $150 for each additional acre (over 2 acres)	(Preliminary - $4,500) or (Pre/Final - $2,700) + .03 x estimated cost of construction	3% of the estimated construction costs will be taken as a deposit and used for consulting cost	Initial Fee $2,000 + $100 per dwelling unit	0-50 Units - $4,000; > 50 Units - $6,000; Revised Tentativeve or Final - $2,000	$1,1050 per new residential dwelling	$1,188 East/$1,186 West per peak hour trip	$2,097	$2,100

* Cranberry Township has specific language within the Township Fee Resolution that the developer will be required to pay for all consultant fees, even if these fees are more than the deposit collected.

Table 12: Cranberry Township Building Permit Fees

Building Permit Fees

	Residential	Residential Alterations	Residential Accessory	Non-Residential	Compliance Permit Residential	Compliance Permit Commercial	Demoliation Residential
Cranberry Township	$50 + $7 per $1,000 of Construction Value	$50	$75	$75 + $9.50 per $1,000 of Construction Value	$25	$25	$50

	Demolition Non-Residential	Mobile Homes	Driveway Application	Driveway Opening	Grading Permit Residential		
Cranberry Township	$50	$50	($30 Residential) ($50 Commercial)	$30 Residential $50 Commercial	0-5 Acres disturbed - $200 Over 5 Acres disturbed - $300		

Table 13: Cranberry Township Development Fees

Subdivision Fees/Deposits

	Application	App. For Pre, Pre./Final, or Final Deposit	Revised Subdivision Plan	Lot Line Relocation	Additional Consultant Fee Deposit/Cost*
Cranberry Township	$400 + $2,000 for 1st 5 + $100 for each additional	(0-4 None) (4-50 $2,500) (>50 $4,000)	$1,000	$125	The applicant shall submit a construction inspection deposit calculated at 3% of the estimated construction costs of all site improvements as defined in the Pennsylvania Municipalities Planning Code if they have sewer or water line extensions. For projects that consist of only sewer and/or water line extensions, the applicant shall submit a construction inspection deposit which is calculated at 15% of the estimated sewer and/or water line extensions. This fee shall not apply to projects which have no sewer and waterline extensions as long as they maintain a balance of $3,500 in the developer's deposit account. The construction deposit shall be submitted prior to receiving a development permit. If, at any time during the progression of the development, it is determined by the Township that the balance available is or will be inadequate to fully cover anticipated costs the applicant will be notified that an additional deposit is required.

Land Development Fees/Deposits

	Application	Deposit	Additional Consultant Fee Deposit/Cost*	Planned Residential Development Application Fee	Planned Residential Development Application Fee	Recreation Fees	Transportation Impact Fee	Water Tap Fees	Sewer Tap Fees
Cranberry Township	$2,000 + $150 for each additional acre (over 2 acres)	(Preliminary - $4,500) or (Pre/Final - $2,700) + .03 x estimated cost of construction	3% of the estimated construction costs will be taken as a deposit and used for consulting cost	Initial Fee $2,000 + $100 per dwelling unit	0-50 Units - $4,000; > 50 Units - $6,000; Revised Tentative or Final - $2,000	$1,1050 per new residential dwelling	$1,188 East/$1,186 West per peak hour trip	$2,097	$2,100

* Cranberry Township has specific language within the Township Fee Resolution that the developer will be required to pay for all consultant fees, even if these fees are more than the deposit collected.

Table 14: Median Household Income Cranberry Township	
Total:	8,399
Less than $10,000	261
$10,000 to $14,999	197
$15,000 to $19,999	211
$20,000 to $24,999	314
$25,000 to $29,999	234
$30,000 to $34,999	344
$35,000 to $39,999	452
$40,000 to $44,999	303
$45,000 to $49,999	452
$50,000 to $59,999	826
$60,000 to $74,999	1,192
$75,000 to $99,999	1,542
$100,000 to $124,999	993
$125,000 to $149,999	458
$150,000 to $199,999	402
$200,000 or more	218

U.S. Census Bureau

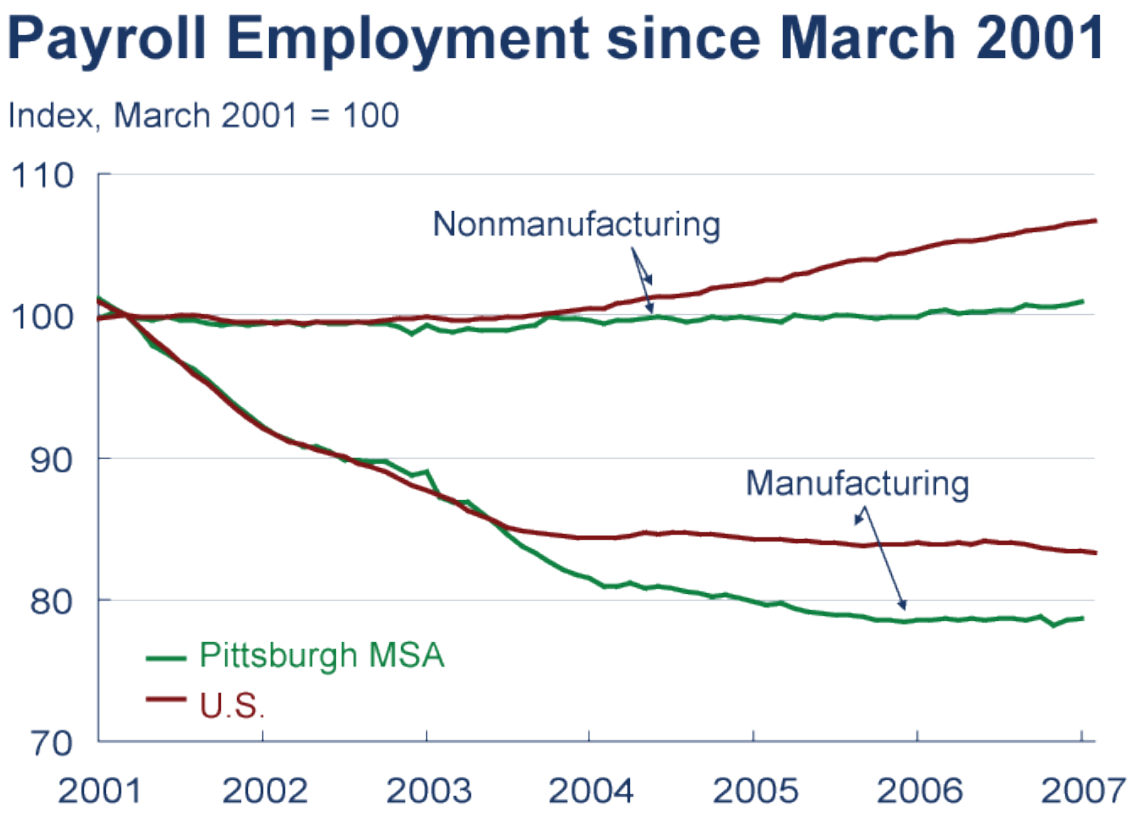
Census 2000

Table 15: Median Family Income Cranberry Township	
Total:	6,574
Less than $10,000	94
$10,000 to $14,999	63
$15,000 to $19,999	140
$20,000 to $24,999	208
$25,000 to $29,999	110
$30,000 to $34,999	251
$35,000 to $39,999	284
$40,000 to $44,999	221
$45,000 to $49,999	262
$50,000 to $59,999	691
$60,000 to $74,999	1,007
$75,000 to $99,999	1,341
$100,000 to $124,999	870
$125,000 to $149,999	441
$150,000 to $199,999	388
$200,000 or more	203

U.S. Census Bureau

Census 2000

Chart 1

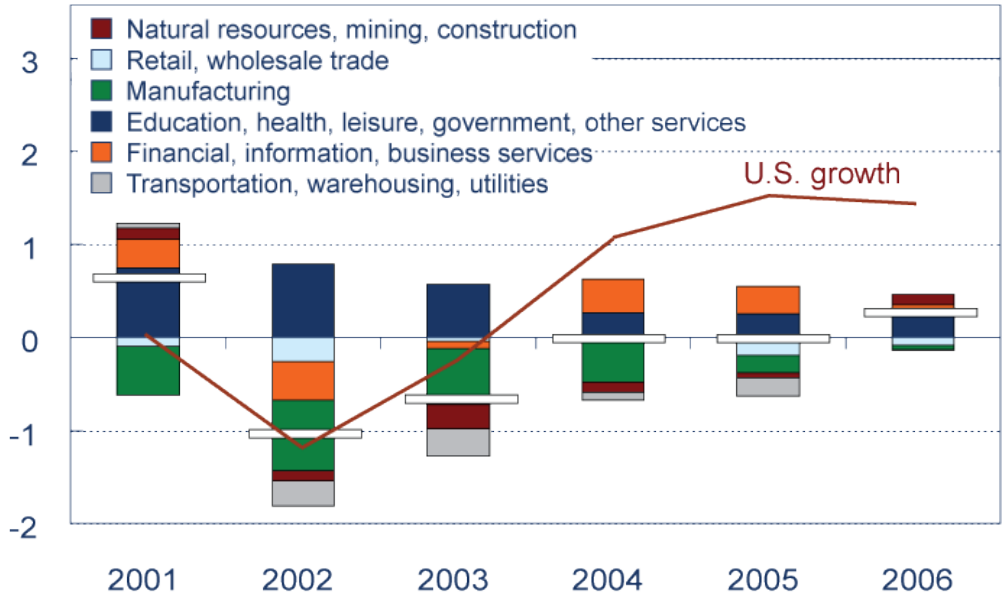


Source: U.S. Department of Labor, Bureau of Labor Statistics

Chart 2

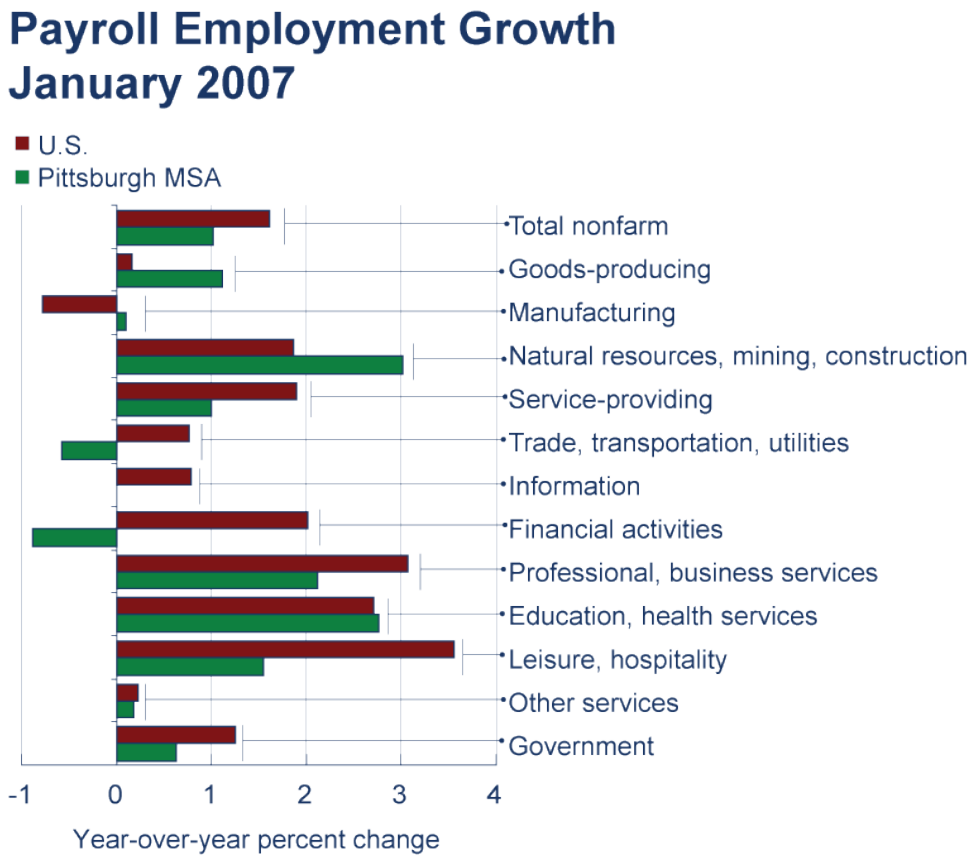
Components of Employment Growth, Pittsburgh MSA

Percent change



*The white bars represent total annual growth for the Pittsburgh MSA.
Source: U.S. Department of Labor, Bureau of Labor Statistics.

Chart 3



Source: U.S. Department of Labor, Bureau of Labor Statistics.

Cranberry Township
Butler County, Pennsylvania

Cranberry Township Water Pollution Control Department Staffing Evaluation

September 2005

Prepared by: David A. Belcastro

Approved by: James R. Bowser, P.E.

Project No.: 05-5158-MC-A-68

ATS CHESTER ENGINEERS

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CRANBERRY TOWNSHIP WATER POLLUTION CONTROL DEPARTMENT STAFFING EVALUATION
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Page No.

LIST OF TABLES

CRANBERRY TOWNSHIP WATER POLLUTION CONTROL DEPARTMENT STAFFING EVALUATION EXECUTIVE SUMMARY

This staffing evaluation has utilized two screening criteria in order to estimate the staffing requirements for the routine operation and maintenance of the Cranberry Township Water Pollution Control Department. The criteria employed are: 1) comparison of similar facilities consisting of the same unit processes, and 2) a systematic evaluation of the facilities, unit processes and local conditions. The results of this staffing evaluation are as follows:

Based upon this evaluation, the staffing requirement of the Water Pollution Control Department is estimated to be 17. The deviation between operating and maintaining the facilities by the existing staff and the estimated staff of 17 is achieved primarily due to the employment of a knowledgeable, experienced, conscientious workforce, and part-time summer employees. Further examination reveals that the staff takes pride in operating and maintaining the facilities that comprise the system. It is evident that morale is very high based upon the exceptionally low absenteeism record, and the team work approach of, "everyone can do everything".

CRANBERRY TOWNSHIP WATER POLLUTION CONTROL DEPARTMENT STAFFING EVALUATION

INTRODUCTION

Cranberry Township has requested that ATS-Chester Engineers evaluate the staffing of the Water Pollution Control Department. This purpose of this evaluation was to determine the adequacy of the current staffing to operate and maintain the facilities that comprise the department. This evaluation will base the staffing needs of the department on a comparison of similar facilities consisting of similar treatment processes and a systematic evaluation of the actual facilities, unit processes and local conditions.

BACKGROUND

The existing staff of this Water Pollution Control Department consists of one manager and ten (10) operators. The operators hold certifications in both water and sewage and perform all duties in the system. Table 1 is a list of the facilities and design capacities of the facilities that are operated and maintained by the department staff.

Table 1
Facilities and Design Capacities

Facility	Name	Design Capacity
Water Storage Tanks	North Tank	3 million gallons
	South Tank	1 million gallons
	West Tank	1 million gallons
Water Booster Station	RIDC Park	3 million gallons
Metering Pits	Commonwealth	N/A
	Dutilh	N/A
Sewage Pump Stations	Wolfe Run	1.728 million gallons per day
	Briar Creek	0.432 million gallons per day
	Franklin Acres	0.288 million gallons per day
Sewage Treatment Plant	Brush Creek	4.5 million gallons per day

One of the main purposes of the department is the operation and maintenance of the Brush Creek Water Pollution Control facility under Pennsylvania Department of Environmental Protection NPDES Permit No. PA0024571. The treatment processes employed at the treatment plant include raw sewage pumping, screening, grit removal, primary sedimentation, conventional activated sludge, final sedimentation, rapid sand filtration and chlorination/dechlorination. Primary sludge solids and waste activated sludge are stabilized utilizing Autothermal Thermophilic Aerobic Digestion (ATAD) process followed by dewatering by belt filtration.

ESTIMATING STAFFING

In estimating the manpower requirements for the facilities and/or unit processes that comprise the system, a USEPA Guidance Document titled *Estimating Staffing for Municipal Wastewater Treatment Facilities*, published in 1973, was used. This guidance document has not been updated since publication, and as a result there is no guidance for some modern day processes. These exceptions will be noted in the estimations for these processes.

This guidance document provides a systematic approach to estimating manpower need and involves the following four steps:

1. Develop from a Table of Adjustment for Local Conditions, factors for increasing or decreasing staffing needs relative to the plant and/or the facility being evaluated.
2. Develop the staffing for the plant and/or facility from a number of curves that show annual man-hour needs for:
   a. Supervisory, clerical laboratory and yard work on the basis of plant/facility design capacity.
   b. Operation and maintenance work on the basis of both the plant/facility design capacity and the types of process units employed.

   In addition, develop from a table the operation and maintenance man-hour needs for certain types of non-continuous processes (sludge dewatering) on the basis of the time that the equipment for these processes is in operation.
3. Increase or decrease the annual-manhour staffing for these six types of work by using the factors taken from the Table of Adjustment for Local Conditions.
4. Identify and categorize the staffing by type of work and job specification.

The existing department staff is unionized and is employed under a Collective Bargaining Agreement. This agreement establishes only one job classification, Operator. Therefore, this evaluation will only investigate Steps 1 through 3.

STAFFING ADJUSTMENT FACTORS

The staffing adjustment factors have been tabulated and summarized on Table 2. These factors have been estimated based upon experience and familiarity in treatment plant layout, design and operations. Additionally, information gathered from interviews with Cranberry Township management and staff have been utilized to more accurately predict the staffing needs of the Water Pollution Control System.

Table 2
Adjustment for Local Conditions

Local Condition	Comment	Adjustment					
		Operation	Maintenance	Supervisory	Clerical	Laboratory	Yardwork
Plant Layout	Extended with remote facilities	5%	5%				
Unit Processes	ATAD, odor control systems and chemical systems	5%	15%				
Level of Treatment	Secondary and tertiary	10%		2%	2%	2%	
Type of removal requirement	Concentration and mass permit limits	5%				5%	
Industrial Wastes	Sampling and surveillance of commercial dischargers	2%		2%		2%	
Productivity of Labor	Above average	-5%	-5%				
Climate	Average						-5%
Training	All staff is certified	-5%	-5%	-5%			
Pattern of Staffing	7 – day coverage						
Automatic Monitoring	Two (2) SCADA systems	-10%	5%				
Automatic Sampling	Influent and effluent	-2%				-2%	
Off-Plant Laboratory	Non-conventional pollutants only						
Off-Plant Maintenance	Major electrical and grounds and buildings						-25%
Age of Equipment	Relatively new. Good PM program						
Present Capacity	65 per cent of design	-5%	-5%				
Total Net Adjustments		**0%**	**10%**	**-1%**	**2%**	**7%**	**-30%**

Plant Layout

Plant layout primarily affects operation and maintenance staffing because of the time required to walk from one piece of equipment or inter-unit process to another. The Brush Creek Water Pollution Control Plant is spread out due in part to the variety of processes employed. The positive adjustment in manhours required for operation and maintenance also reflects the additional travel time required for routine operation and maintenance of the seven (7) remote facilities.

Unit Processes

Adjustments have been made in the areas of operation and maintenance categories because of the "non-standard" processes utilized in the treatment system. Specifically, the ATAD system, five (5) odor control systems and chemical handling and treatment are the non-standard processes currently being used.

Level of Treatment

Treatment performance must achieve either secondary and tertiary levels or standards. Under these conditions, increased allowances are projected for operation, supervision, clerical and laboratory. Maintenance requirements are not adjusted due to economics of scale that can be realized when advanced processes follow secondary processes. For example, BOD_5 and ammonia-nitrogen are both removed in the same aeration tanks which utilize the same blowers. No additional maintenance is required.

Type of Removal Requirement

The removal requirements as listed in the NPDES permit are average and maximum concentration and loadings for both secondary and tertiary pollutants. This entails greater laboratory analyses and operational attention. These two labor categories have been incrementally adjusted by 5 percent each.

Industrial Wastes

This adjustment normally pertains to known industrial discharges that vary in loading and volume which require significant extra operator attention. Currently, some surveillance and sampling activities of commercial dischargers are performed by the department staff. Adjustments have been made in the operation, supervision and laboratory categories to account for these activities.

Productivity of Labor

The productivity of labor in a wastewater treatment plant depends chiefly on two things, which are normally hard to quantify. One is morale, which consists of job satisfaction and pride in the plant working well. The other is rigidity of job classifications and area of work responsibility. Too much rigidity can result in some workers being overworked, while others are underworked.

The Brush Creek Water Pollution Control Plant has been found to be in excellent mechanical and operating condition. The neat and orderly appearance of the entire facility exemplifies the commendable efforts by superintendent and staff. Completion of routine work is not hampered by rigid job classifications or scheduled leaves by other staff members. Cross-training allows everyone to perform any task within the system.

Climate

Normally, extremes in climate have the most impact on maintenance manhours. A moderate climate has been considered in this staffing plan. The only adjustment is in the Yardwork category, because this type of work is contracted out.

Training

Generally speaking, good training makes a treatment plant staff more efficient. The effects of training may also be looked at from a monetary standpoint. Since the staff is entrusted with a very large investment, it is necessary to be sure that they know how to get the most out of the plant and use it efficiently. The experience, certification and continuing education of the plant staff are reflected in the shown adjustments.

Pattern of Staffing

The guidance manual estimates that weekend staffing is about one-third of the weekday staffing. Although current weekend staff level is below this ratio, the workload has been adjusted for this and worker safety has not been compromised. There are no adjustments allocated for Pattern of Staffing.

Automatic Monitoring

Automatic monitoring, as the term is used here, means the continuous instrumented sensing and controlling of process variables. This capability permits closer and more efficient process control, potentially reduces staffing needs, but the potential of more frequent repairs and relatively high maintenance skills are also realized.

Automatic monitoring of the Cranberry Water Pollution Control System includes two SCADA systems. One system monitors and controls the wastewater treatment plant processes, while the other monitors and controls the remote facilities. These systems

lessen the requirements of operator attention and adjustments during both the hours the facilities are staffed and during the off hours. For this reason, the operation hours are negatively adjusted, while the maintenance hours are increased to compensate for routine calibration and repair.

Automatic Sampling

Automatic composite samplers are utilized to collect raw wastewater samples entering the plant and final effluent samples of the discharge to Brush Creek. The NPDES permit requires that these samples be collected a minimum of twice per week. Operation and laboratory hours are reduced by 2 per cent each as compensation for automatic sampling. It should be noted that all process control sampling is manually collected.

Off-Plant Maintenance

Contracts for off-plant maintenance are usually allowed for two types of work. One is grounds and building maintenance and the other is instrument and control system maintenance. The grounds and some building maintenance are performed by an outside contractor, while nearly all repair maintenance is performed in house. The Yardwork category has been reduced by 25 per cent to reflect the outside contract.

Age of Equipment

The Water Pollution Control Department facilities and equipment are relatively new and very well maintained. No adjustment to Maintenance category has been made to the estimated manhours.

Present Plant Capacity

The present loading on the treatment plant is estimated at sixty-five (65) per cent. At this loading level, some facilities and equipment are not in service all of the time. Less equipment and service time requires less operation and maintenance manhours. Both of these categories have been reduced by five (5) per cent accordingly.

DEVELOPING ANNUAL MANHOUR STAFFING

The USEPA guidance document contains curves which were utilized to estimate the annual manhours required for the operation and maintenance of the treatment plant and off-site facilities. These curves, which are included in Attachment A, assume a 24-hour, seven day per week operation. Curves D-1 through D-4 show the annual supervisory, clerical, laboratory and yardwork manhours for the Brush Creek Plant, on the basis of design plant flow. The remaining curves show the annual operation and maintenance manhours also on the basis of design flow and the specific unit processes employed. As

noted earlier, curves for some processes and/or facilities are not provided in this guidance document.

In order to estimate the manhours for the water storage tanks, the curve for Chlorination (D-13) was used. Curve D-13 was also used for dechlorination employed at the plant; however, the operation and maintenance manhours were reduced by fifty (50) per cent each because of the overlap with chlorination.

For the RIDC Water Booster station and the three sewage pump stations, the curve for Raw Sewage Pumping (D-5) was utilized. Although the ATAD system is an aerobic process, it is more complex and consists of more mechanical equipment. Therefore, the curve for Anaerobic Digestion (D-14) was used for estimating manhours.

The guidance document for sludge dewatering (see Table D-34 in Appendix A) only identifies operation and maintenance manhour estimates for centrifugation and vacuum filtration. It is reasoned that the operation and maintenance requirements for belt filter press dewatering are not as much as vacuum filtration, but more than centrifuge dewatering. Therefore, the average between the two processes was used to determine the respective manhour estimates. Operation manhours were calculated to be 0.45 hours/hour of operation and maintenance was estimated at 0.25 hours/hour of operation.

Finally, no correlation between the published curves and the odor control systems could be made. In a way, these units are not operated as much as they are maintained. These units require routine sensor cleaning and recalibration as well as cleaning of the media. For these reasons, only maintenance manhours were estimated and 200 manhours per year per unit or a total 1,000 manhours per year were assessed for maintenance.

Table 3 titled Staffing Estimate Worksheet summarizes the annual manhours required for the system. The sum of the six work categories, shown as Total Annual Manhours, is 24,354.

There are six general classifications of work, which include supervisory, clerical, laboratory, operations, maintenance and yard. Yard includes the jobs that do not fit into the other categories such as custodial, general housekeeping and operator assistance, for example.

The Total Annual Manhours are divided by 1,410 manhours per year per staff to determine the number of staff required in each classification. The basis for 1,410 manhours per year per staff assumes a 5-day work week, and 6-1/2 hours per day of productive work. The existing staff averages approximately 35 additional days per year for holidays, vacations and personal days. The hours for these days are further factored into arriving at the 1,410 manhours per year per staff. It should be noted that each member of the staff also receives 12 sick days per year. It is reported that very few sick days are taken by the staff, except for extended sick leave. Sick hours were not deducted from the available manhours per year per staff.

Table 3
Staffing Estimate Worksheet

Facility/Unit Process	Curve	Category					
		Operation	Maintenance	Supervisory	Clerical	Laboratory	Yardwork
North Water Storage Tank (3 mg)	D-13	200	280				
South Water Storage Tank (1 mg)	D-13	130	200				
West Water Storage Tank (1 mg)	D-13	130	200				
RIDC Water Booster Station (3 mg)	D-5		390				
Raw Sewage Pumping (Wolfe Run, 1.728 mgd)	D-5		380				
Raw Sewage Pumping (Briar Creek, 0.432 mgd)	D-5		300				
Raw Sewage Pumping (Franklin Acres, 0.288 mgd)	D-5		300				
Brush Run Water Pollution Control Plant							
Raw Sewage Pumping	D-5		410				
Screening & Grinding	D-6	350	29				
Grit Removal	D-7	460	41				
Primary Clarification	D-8	1,000	380				
Aeration	D-9	1,050	1,100				
Secondary Clarification	D-11	850	340				
Chlorination	D-13	280	360				
Dechlorination	D-13	140	180				
Anaerobic Digestion (ATAD)	D-14	520	130				
Gravity Thickening	D-16	230	230				
Mixed Media Filtration (Sand Filters)	D-24	950	625				
Belt Filter Press Dewatering	Table D-34	3,942	2,190				
Odor Control Systems (5 Systems)	N/A		1,000				
Total		10,232	9,065	1,400	330	1,450	1,250
Adjustment (From Table 2)		0	907	-14	7	102	-375
Adjusted Total		10,232	9,972	1,386	337	1,552	875
Grand Total		24,354					

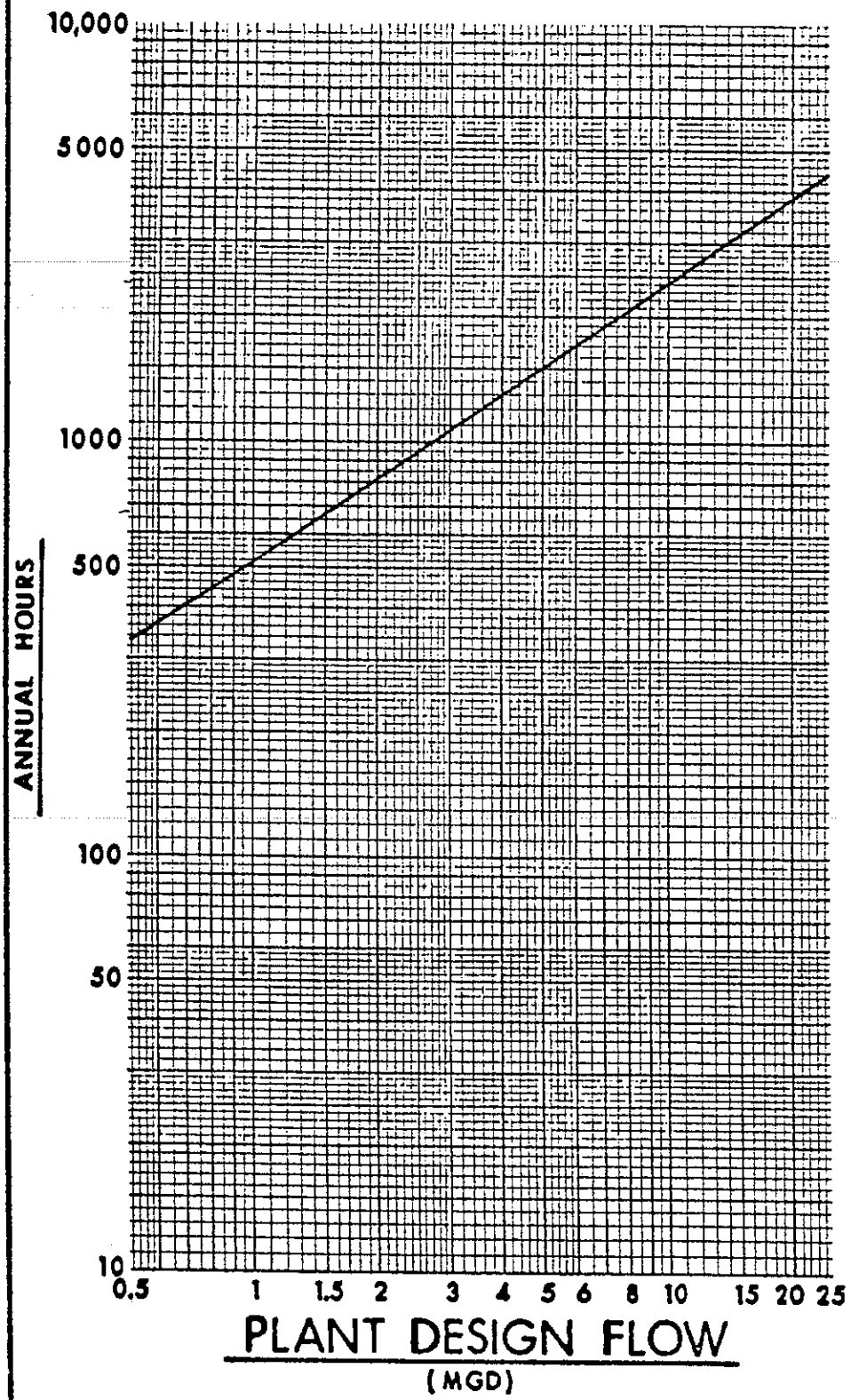
Table 4 shows each of the six work categories along with the estimated number of manhours required and the number of staff these hours represent.

Table 4
Staffing Estimate

Work Category	Annual Manhours	No. of Staff
Supervisory	1,386	1.0
Clerical	337	0.2
Laboratory	1,552	1.1
Yard work	875	0.6
Operations	10,232	7.3
Maintenance	9,972	7.1
Total	**24,354**	**17.3**

Based upon this analysis, it is estimated that approximately 17.3 or 17 employees are needed to operate and maintain the treatment plant and off-site facilities.

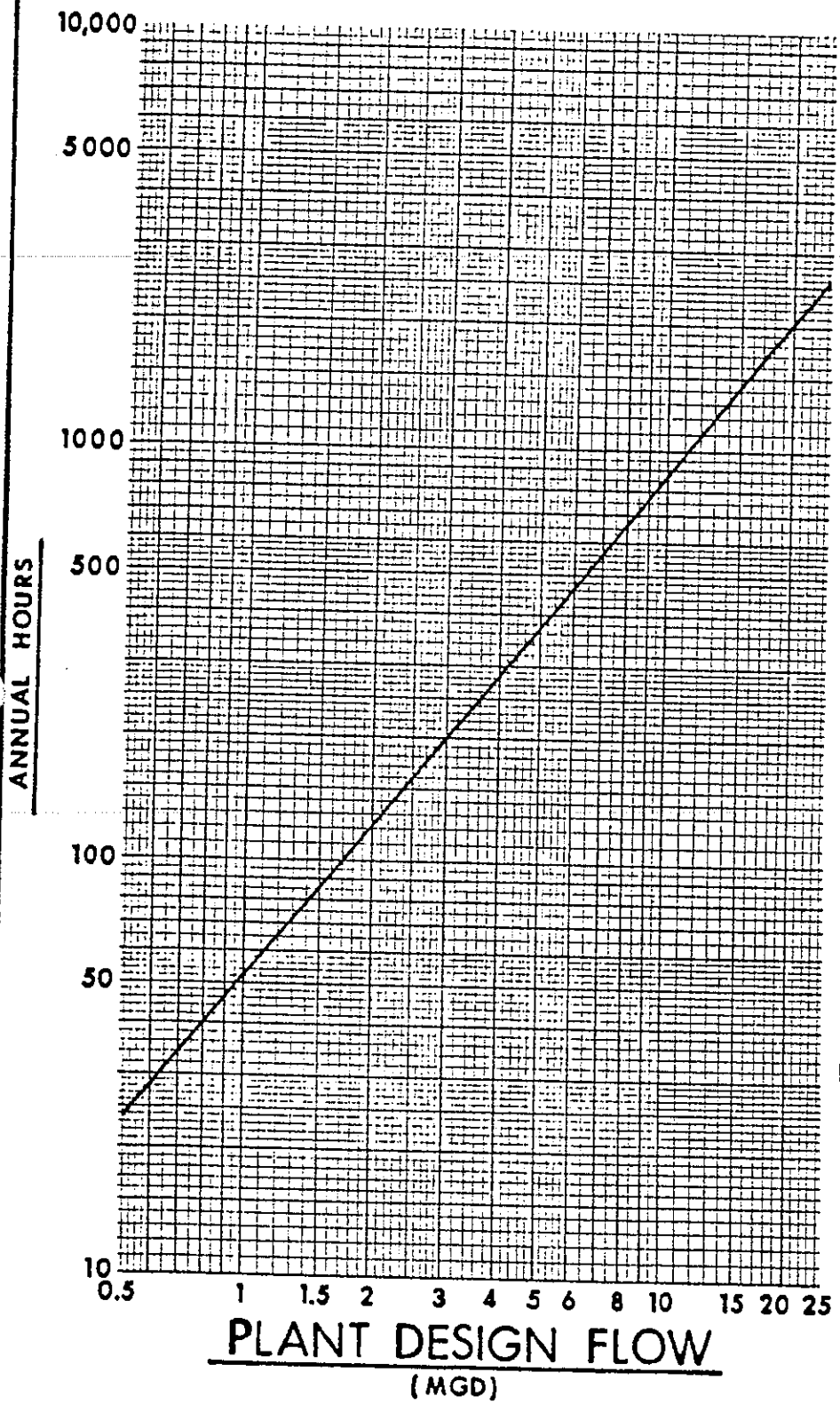
APPENDIX A
STAFFING CURVES



SUPERVISORY AND ADMINISTRATIVE

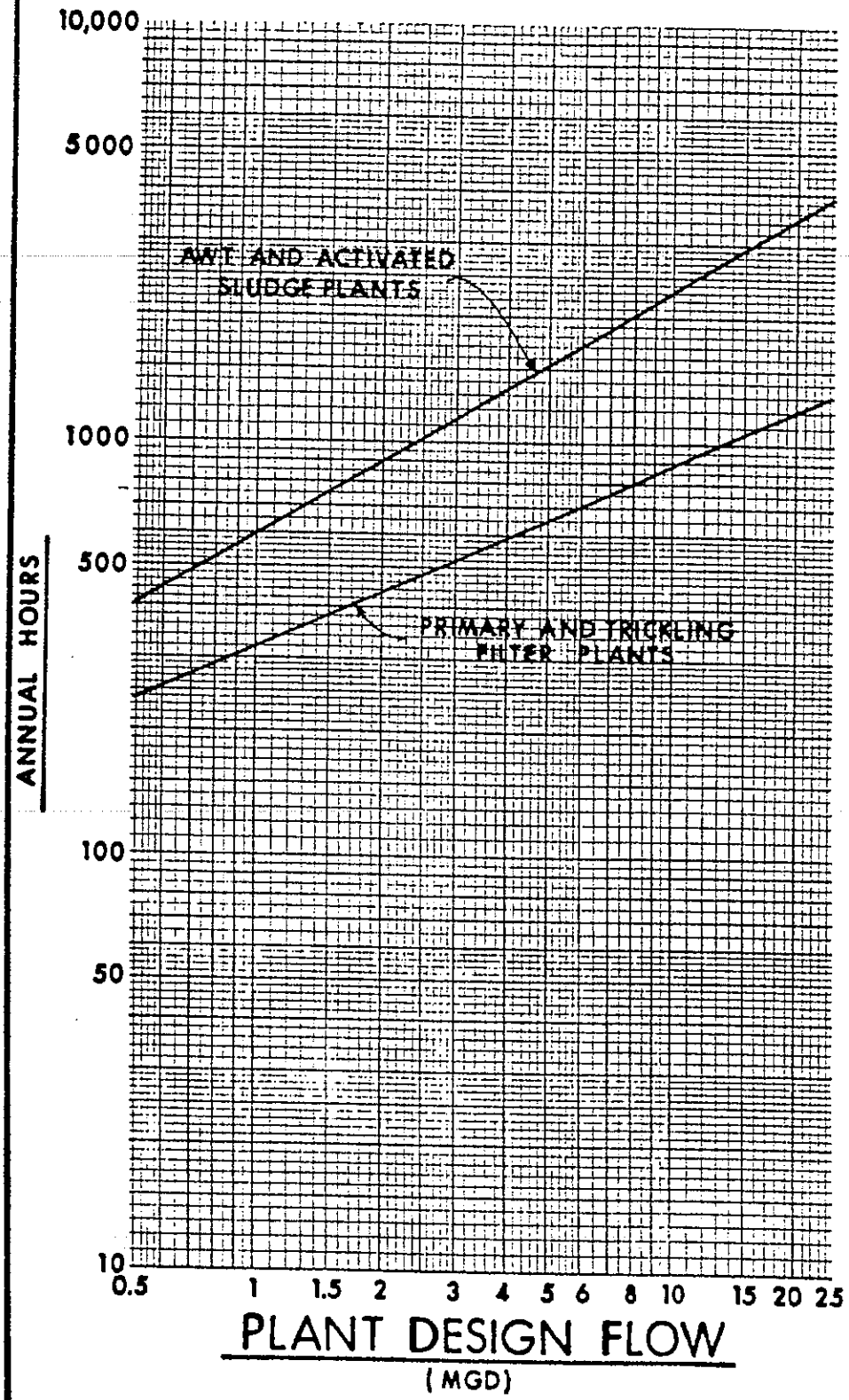
INCLUDES WORK DONE BY SUPERVISOR AS WELL AS SUPERVISION FOREMEN AND OPERATORS.

CLERICAL

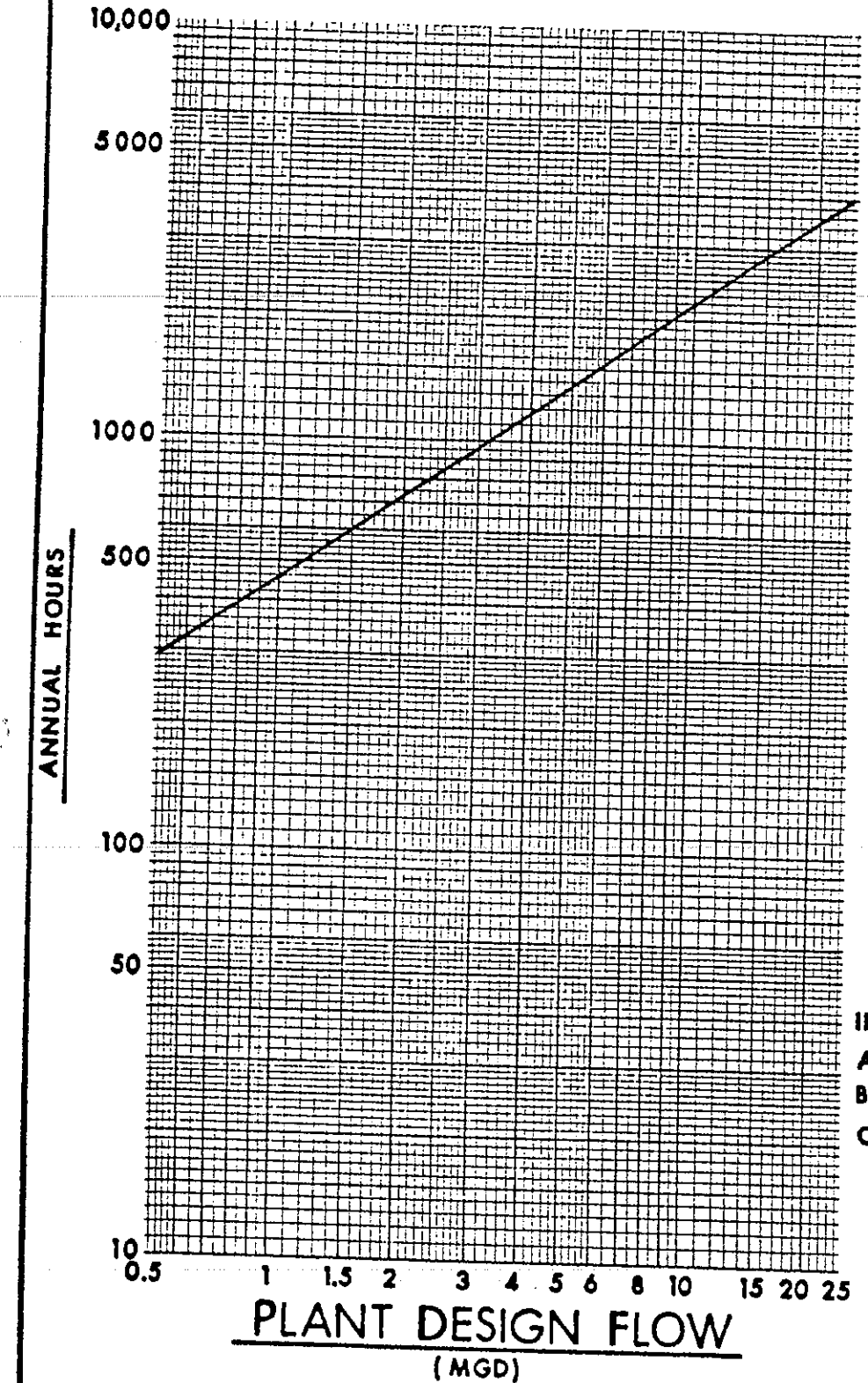


INCLUDES THAT DONE BY OFFICE STAFF AS WELL AS BY FIELD STAFF.

LABORATORY

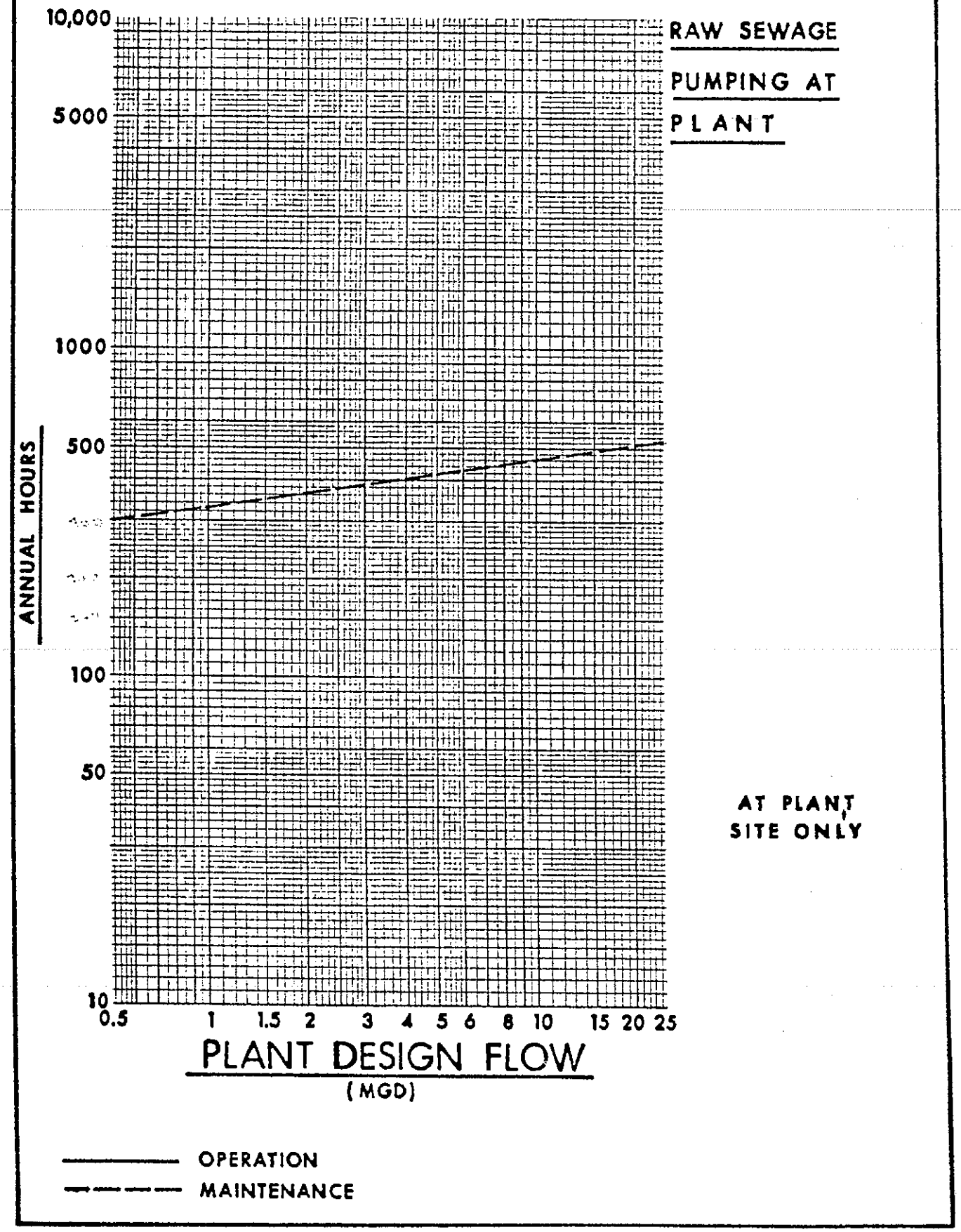


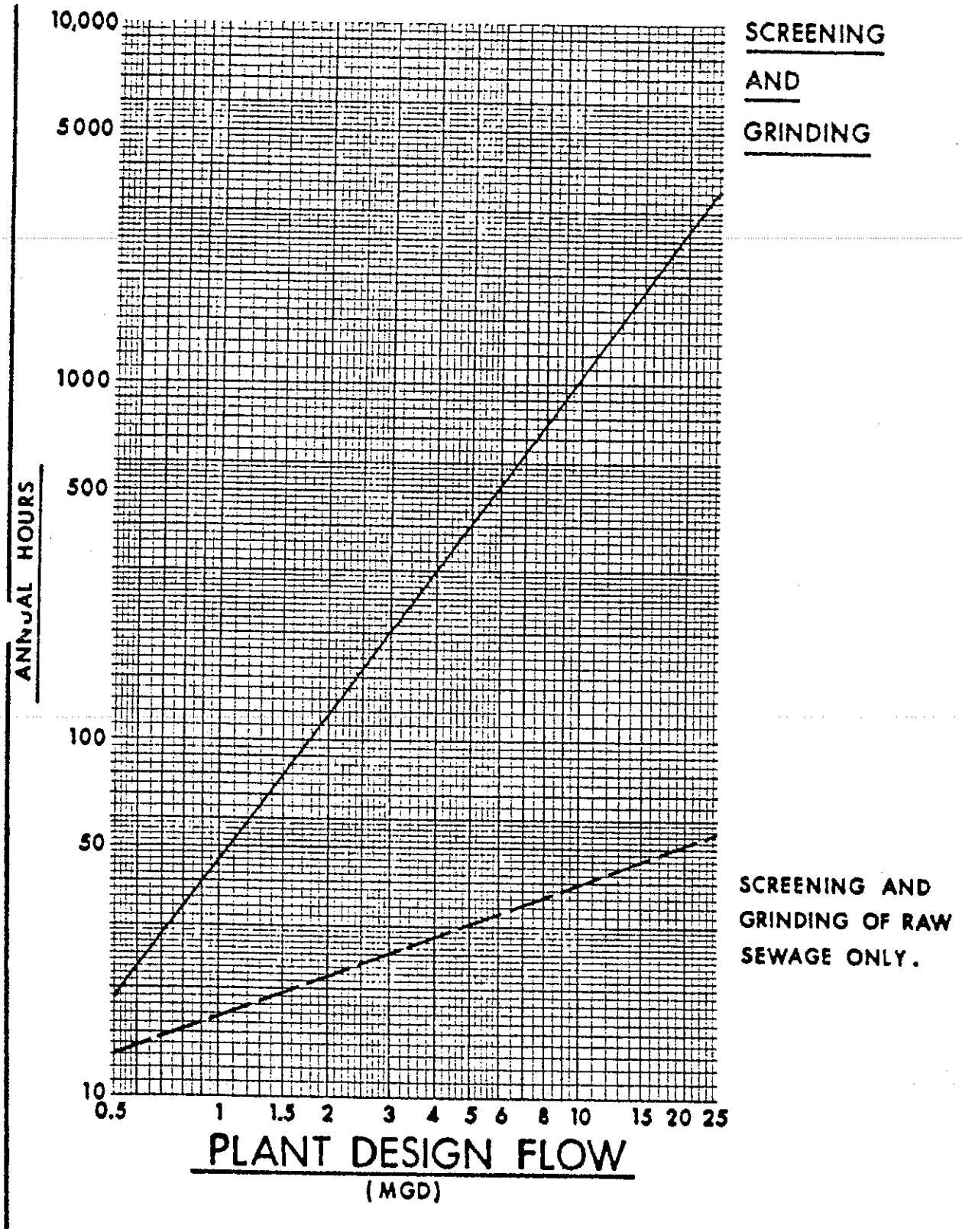
INCLUDES LAB WORK DONE BY LAB STAFF AS WELL AS OPERATORS.



YARDWORK

INCLUDES CUSTODIAL AND JANITORIAL WORK BOTH INSIDE AND OUTSIDE.


RAW SEWAGE
PUMPING AT
PLANT
10,000
5000
1000
500
100
50
10
ANNUAL HOURS
0.5
1
1.5
2
3
4
5
6
8
10
15
20
25
PLANT DESIGN FLOW
(MGD)
AT PLANT
SITE ONLY
OPERATION
MAINTENANCE


SCREENING
AND
GRINDING
10,000
5000
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500
100
50
10
ANNUAL HOURS
0.5
1
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2
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8
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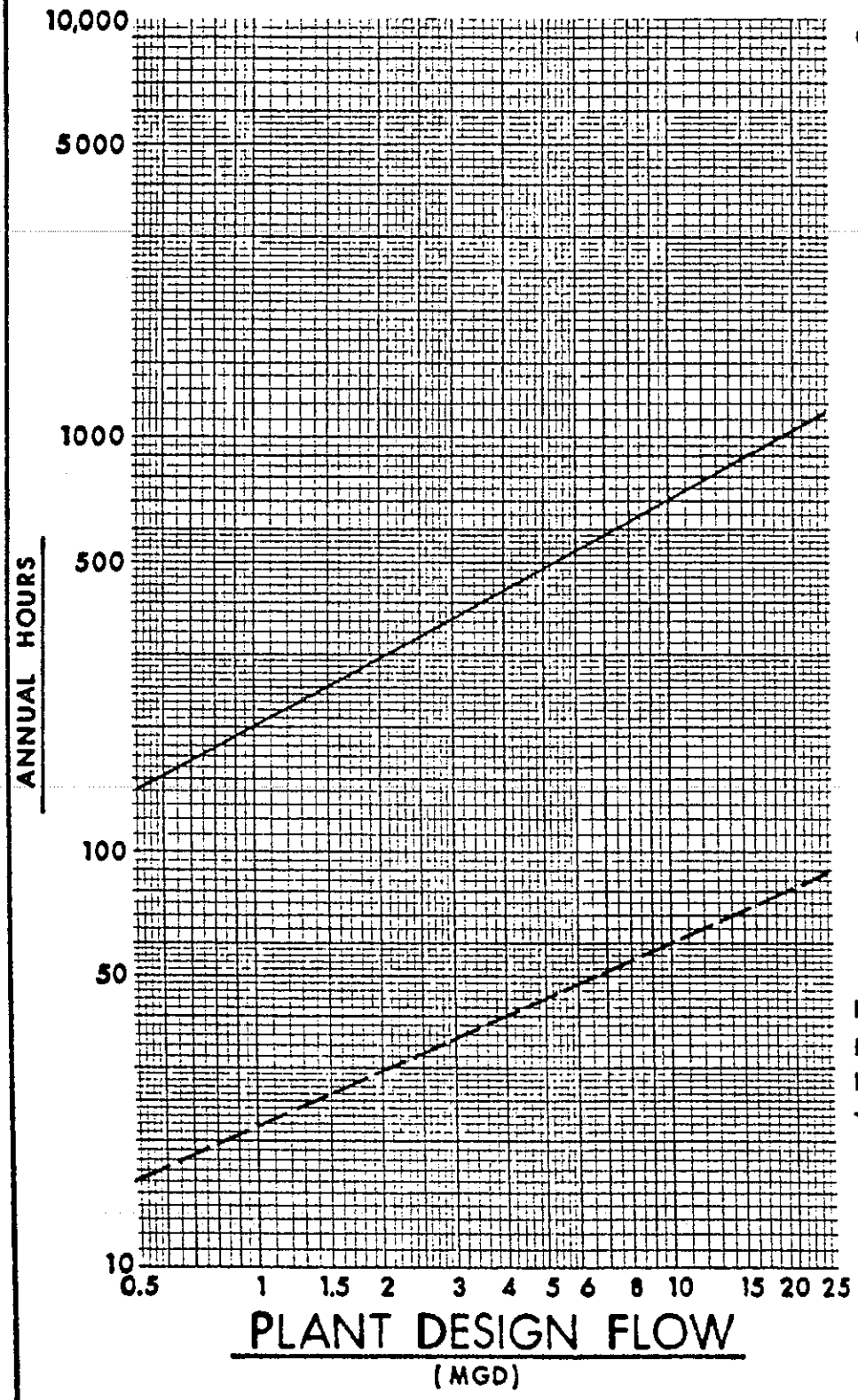
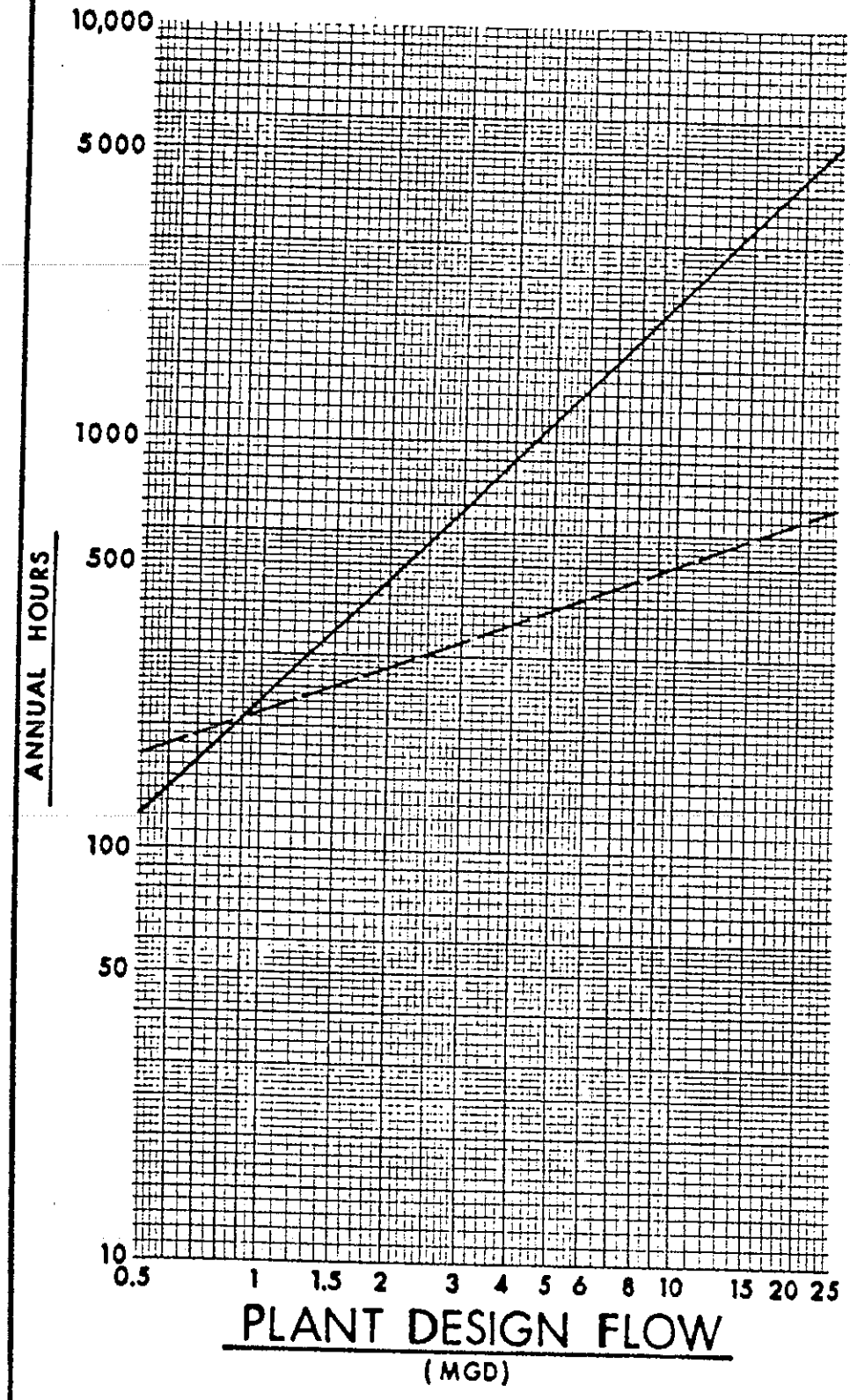
20
25
PLANT DESIGN FLOW
(MGD)
SCREENING AND GRINDING OF RAW SEWAGE ONLY.
OPERATION
MAINTENANCE



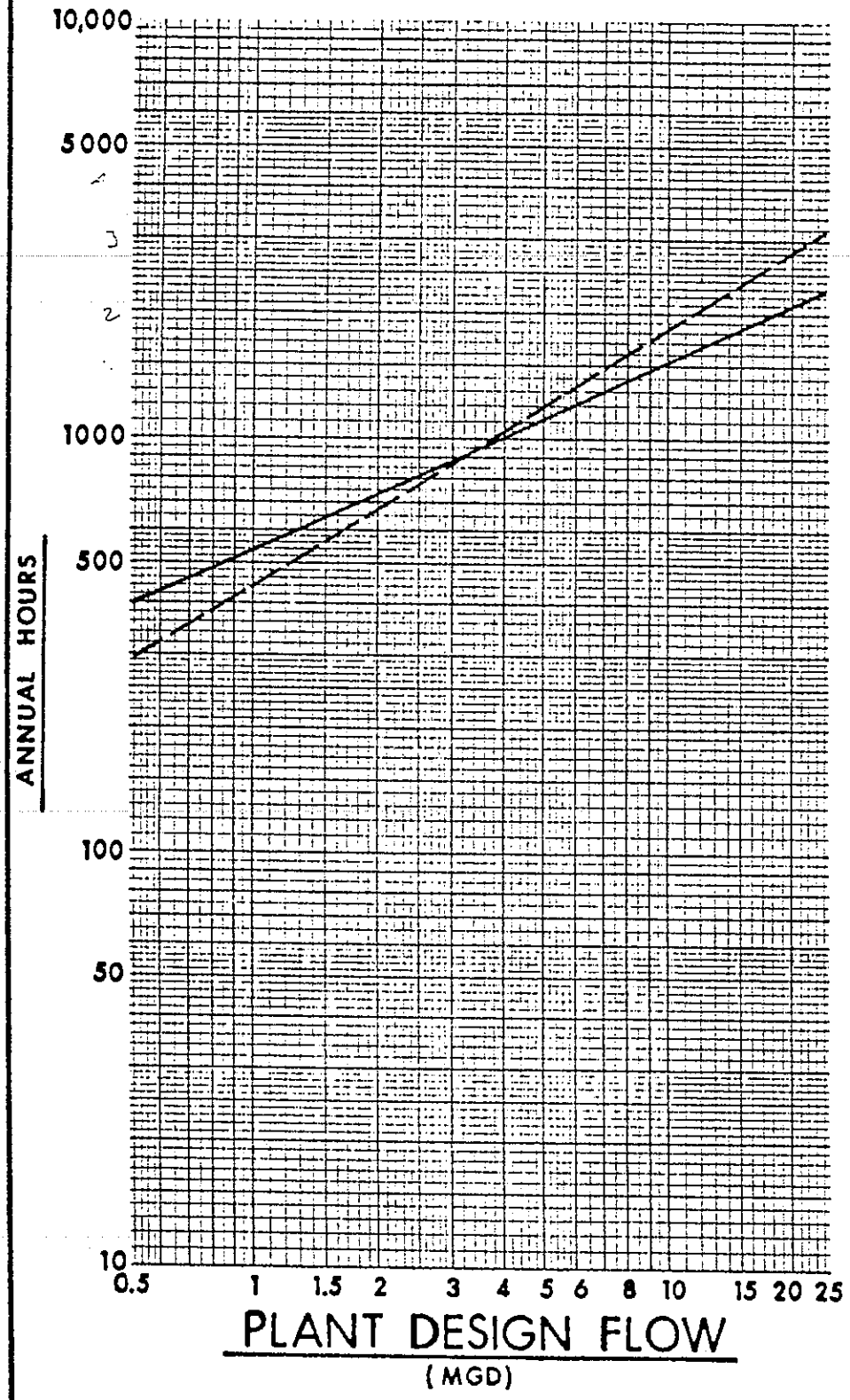
GRIT REMOVAL

INCLUDES GRIT REMOVAL PROCESS, BUT NOT TRANSPORTATION TO THE FINAL DISPOSAL SITE.



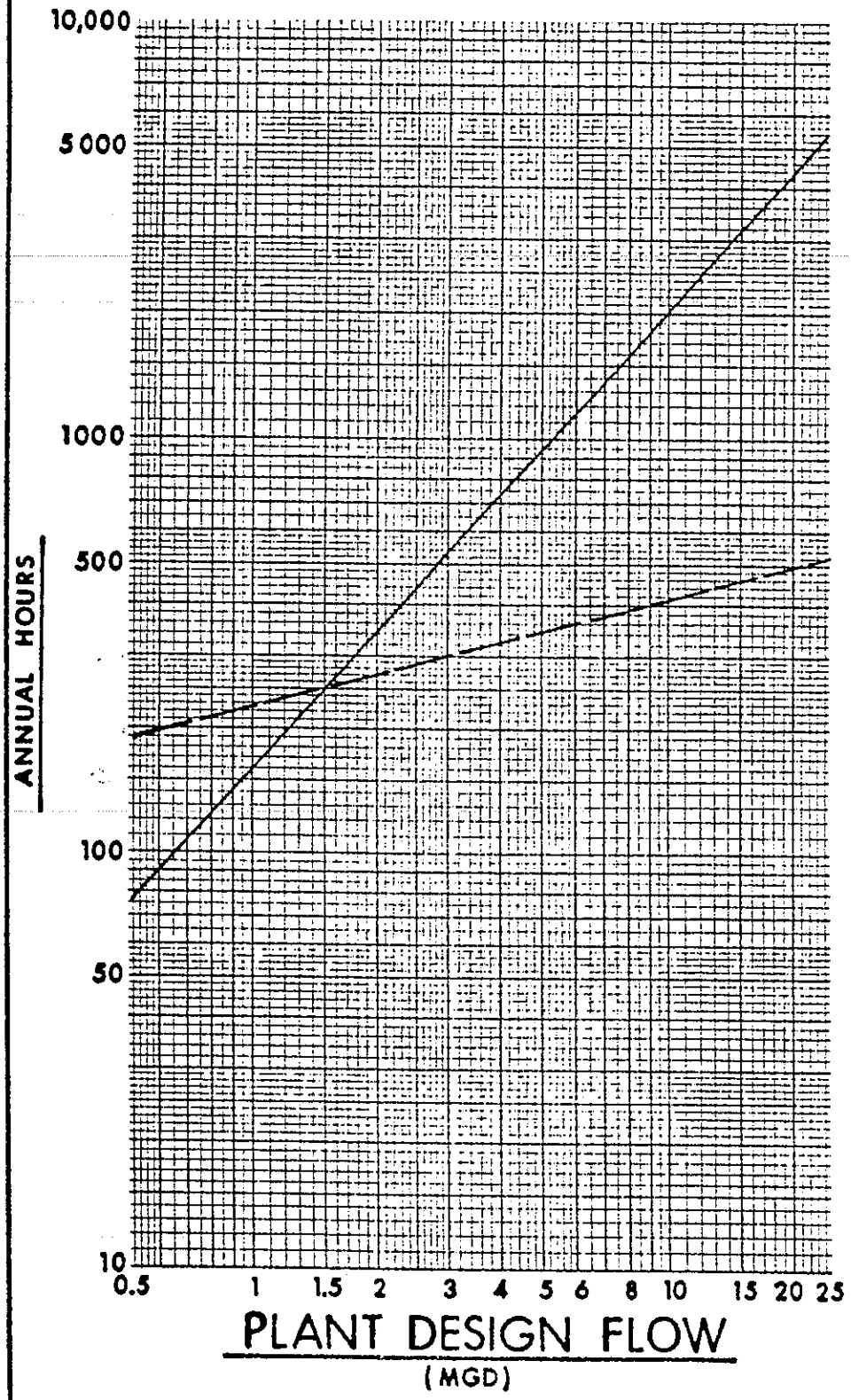
PRIMARY CLARIFICATION

INCLUDES CLARIFICATION AND SLUDGE PUMPING.



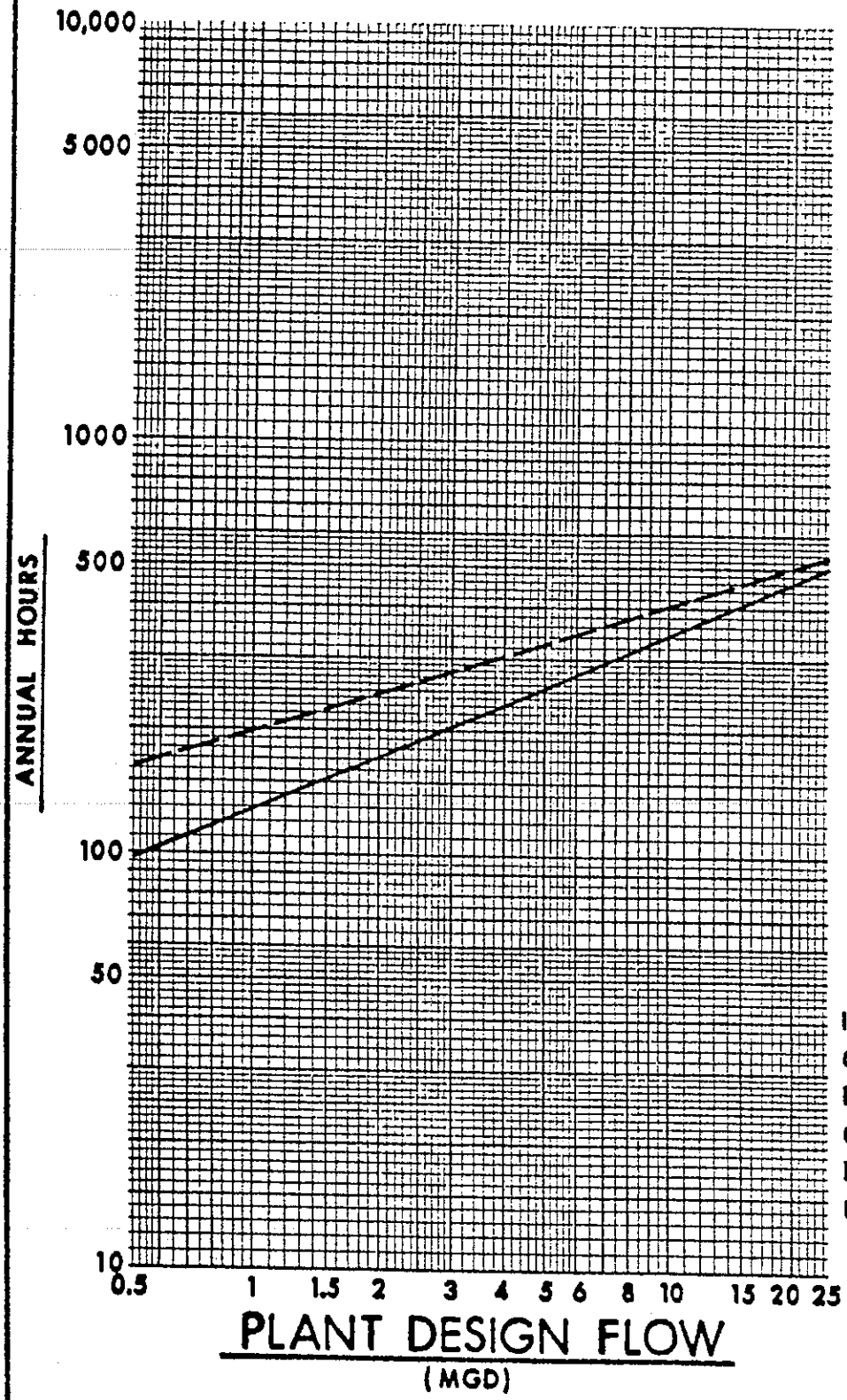
AERATION

INCLUDES AERATION EQUIPMENT.

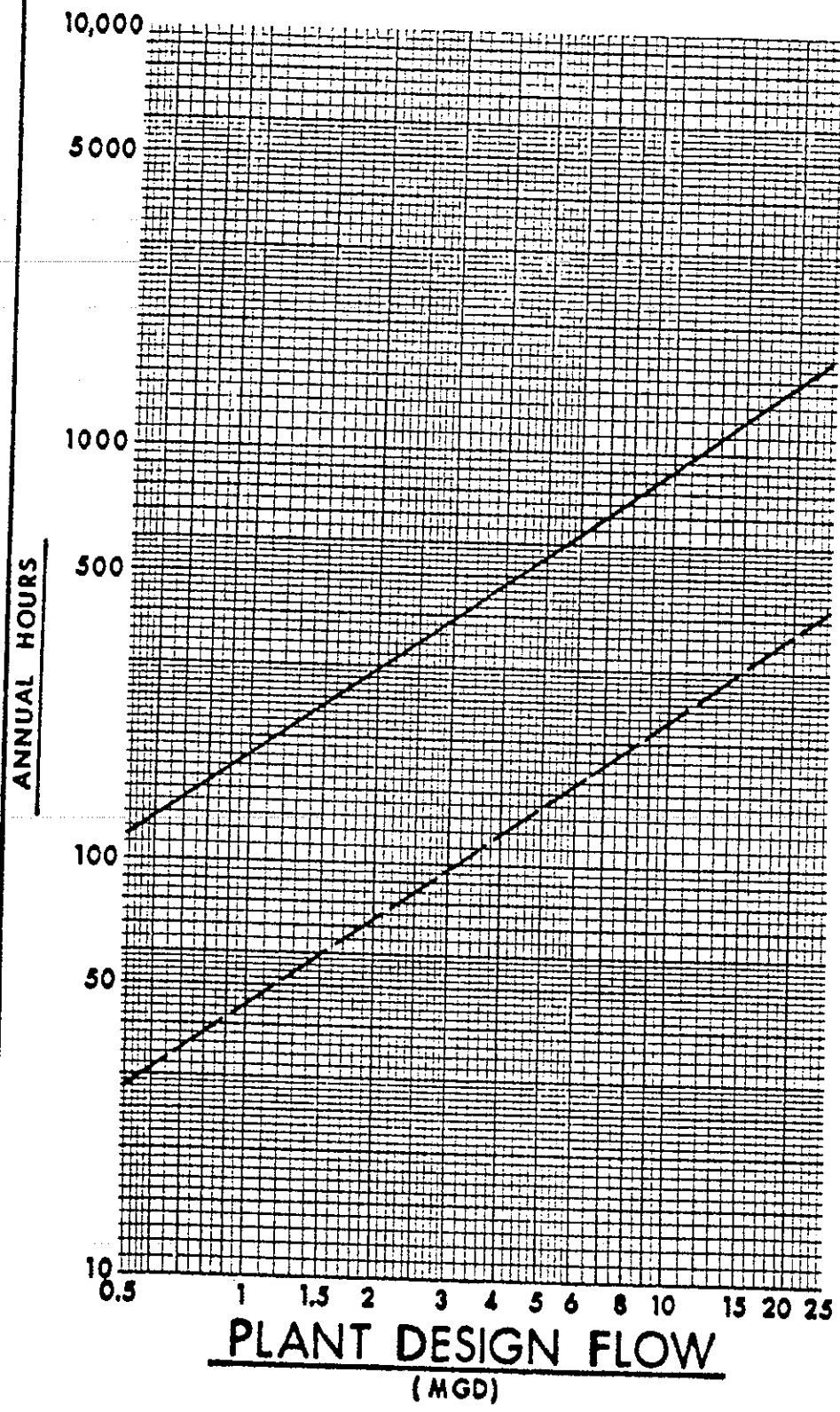


SECONDARY CLARIFICATION ACTIVATED SLUDGE

INCLUDES CLARIFICATION RECYCLE AND WASTE SLUDGE PUMPING.



INCLUDES ENTIRE CHLORINATION SYSTEM EVEN WHERE POINTS OF CHLORINATION ARE LOCATED AT OTHER UNIT PROCESSES.

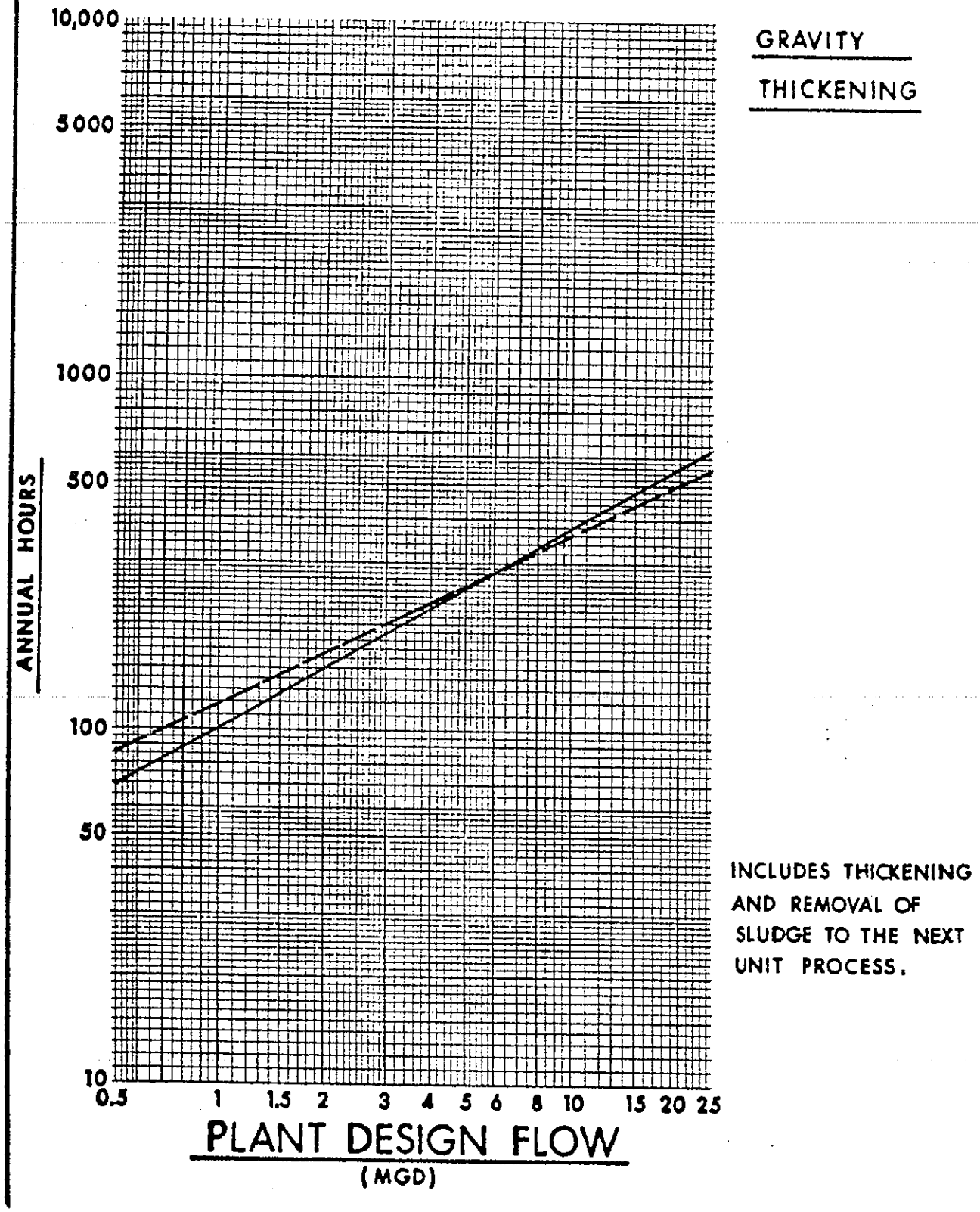


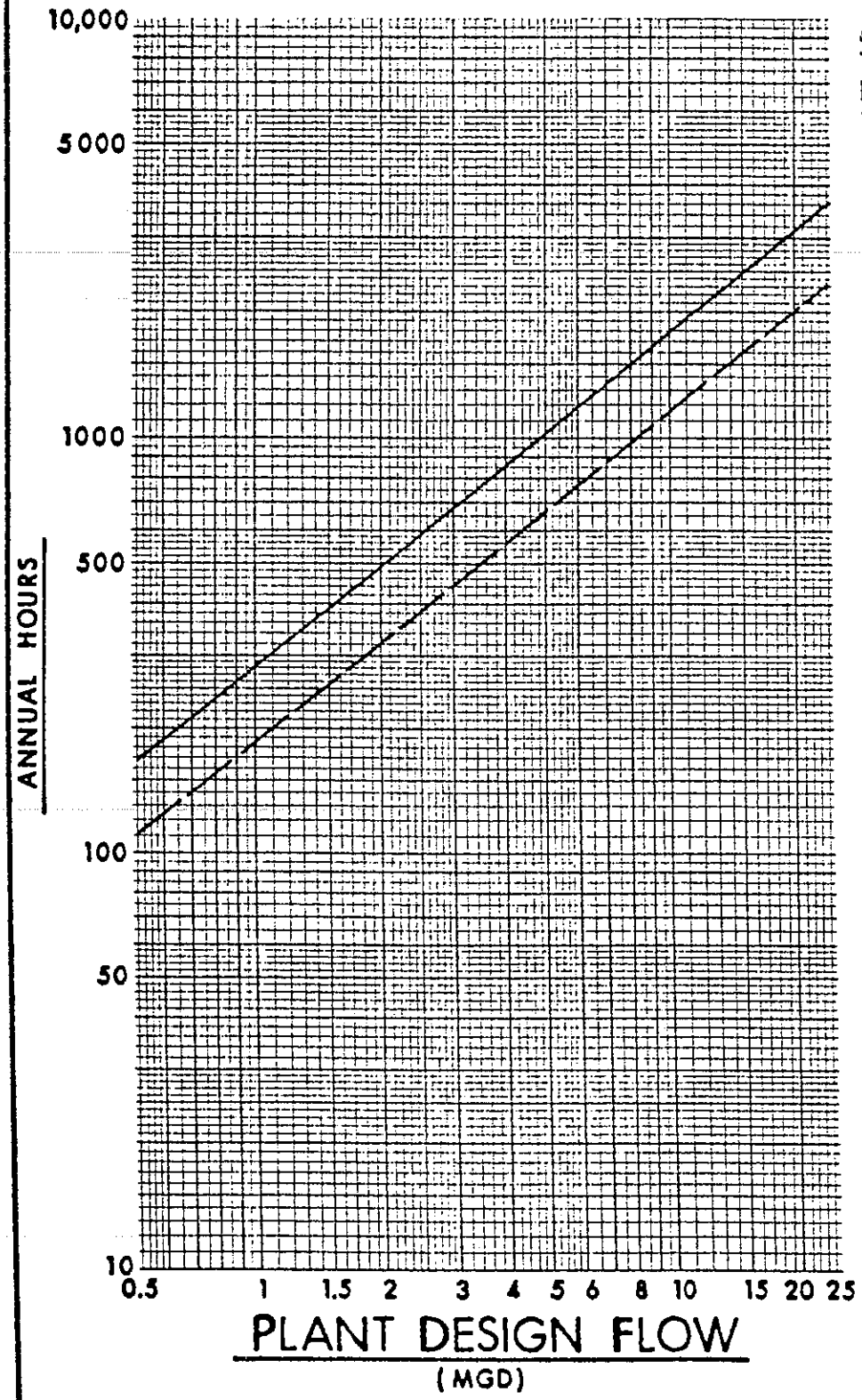
ANAEROBIC DIGESTION

INCLUDES DIGESTION, HANDLING OF WASTE GAS, AND REMOVAL OF SLUDGE TO NEXT UNIT PROCESS.

——— OPERATION

– – – – MAINTENANCE


GRAVITY
THICKENING
10,000
5000
1000
500
100
50
10
ANNUAL HOURS
0.5
1
1.5
2
3
4
5
6
8
10
15
20
25
PLANT DESIGN FLOW
(MGD)
INCLUDES THICKENING AND REMOVAL OF SLUDGE TO THE NEXT UNIT PROCESS.
OPERATION
MAINTENANCE



MIXED MEDIA FILTRATION

ENTIRE PROCESS.

TABLE D-34
UNIT MANHOUR REQUIREMENTS†

CENTRIFUGATION		
	Operation	0.3 hours/hour of operation
	Maintenance	0.2 hours/hour of operation
VACUUM FILTRATION		
	Operation	0.6 hours/hour of operation
	Maintenance	0.3 hours/hour of operation
INCINERATION		
	Operation	0.2 hours/hour of operation
	Maintenance	0.2 hours/hour of operation

† The requirements shown are for single units of equipment. For three or more of these units, of whatever mix, reduce the operation and maintenance requirements by half. For instance, one centrifuge, one vacuum filter, and one incinerator would require a total of about 0.35, rather than 0.7, hours of maintenance per hour of operation.

Cranberry Township 2007 Model Update

Traffic Forecast / Projections Report

Final Report

Prepared for:

Cranberry Township
2525 Rochester Road
Cranberry Township, Pennsylvania 16066

Prepared by:

Foster Plaza 4
501 Holiday
Suite 300
Pittsburgh, PA 15220

June 10, 2008

Traffic Forecast / Projections Report

Report Overview

This study contains three different Landuse Scenarios A, B and C that were developed during the Cranberry Township Comprehensive Plan development and modeled to obtain the travel demand forecasts. This section of the report provides information regarding the data used, assumptions and changes that were made to the regional model calibrated data set in preparing daily traffic assignments for future year scenarios. The 2007 calibration model was used as a basis for this analysis.

Cranberry Township Study Area

The increment of socioeconomic data growth between 2007 and projection years was provided by Cranberry Township. The socioeconomic data contained information about the total residential units, hotels, Industrial areas, office areas, restaurants and retail businesses for the three desired scenarios within the study area. ITE Trip Generation rates from the 7th Edition were used to convert the above information into trips for modeling purposes.

Highway Network

For the Cranberry Township projected year scenarios, it is assumed that the existing 2007 roadway network that was used for model update & calibration will be used as it is with out any improvements.

Highway Paths

The parameters and methods for determining the zone-to-zone minimum time paths for the model network were identical to those developed through the 2000 network calibration and used in 2007 Model Update. Since no TAZ boundary changes were made, the same intra-zonal driving times and terminal times that were used in 2000 were used in scenarios too.

Trip Generation

Within the Cranberry Township travel demand model, there is a direct relationship between changes in socioeconomic data and changes in trip generation. This relationship exists because trip generation is based on a number of land use types for an analysis year. The landuse categories chosen to be reported by the Cranberry Township were summations of – residential units, hotels, industrial areas, office buildings, restaurants and retail owners. ITE Trip Generation Rates from the 7th Edition have been used to convert the land use information to number of trips. The rates used for each purpose are listed below in **Table 1**.

Table 1 – ITE Trip Generation Rates (7th Edition Volumes 2 & 3)

Land Use Type	ITE Code	Independent Variable (I-V)	Average Daily Rate per I-V	PM Peak Rate per I-V
Residential	210	Dwelling Units	9.57	1.01
Hotels	310	Rooms	8.92	0.7
Industrial (Industrial Park)	130	1000 SqFt GFA	6.96	0.86
Office Buildings (General)	710	1000 SqFt GFA	11.01	1.49
Restaurants (Sit-down)	932	1000 SqFt GFA	127.15	10.92
Retail (Shopping Center)	820	1000 SqFt GFA	42.94	3.75

Internal Trip Productions and Attractions

The Future Year total internal trip productions and attractions by purpose for each of the three scenarios A, B & C are listed in **Table 2**. The detailed internal trip information by TAZ can be found in **Appendix A** of this report.

The basic procedure behind the calculations of the productions and attractions per each purpose is as follows:

- each category of socio-economic data provided by the township was converted into daily trips using the ITE trip rates for each scenario

- based on the nature of each category, the trips were distributed to HBW, HBO and NHB purposes. In this particular project the distribution percentages used in 2000 Model Development were assumed to be valid. The percentages are:

		Productions		
Category	ITE Rate	HBW	HBO	NHB
Residential	210	25%	55%	5%
Hotels	310	5%	30%	15%
Industrial	130	0%	0%	25%
Office	710	0%	0%	20%
Restaurants	932	0%	0%	20%
Retail	820	0%	0%	20%

		Attractions		
Category	ITE Rate	HBW	HBO	NHB
Residential	210	25%	55%	5%
Hotels	310	5%	30%	15%
Industrial	130	0%	0%	25%
Office	710	0%	0%	20%
Restaurants	932	0%	0%	20%
Retail	820	0%	0%	20%

Table 2
Scenarios A, B & C - Internal Trip Productions and Attractions

	Projections			Attractions		
	Scenario A	Scenario B	Scenario C	Scenario A	Scenario B	Scenario C
HBW	30,839	41,530	52,285	69,639	72,656	90,717
HBO	70,046	94,201	118,349	168,374	210,023	247,712
NHB	85,922	101,043	120,324	85,922	101,043	120,324

Future Year External Travel

A future trip generation year of future year was selected to interface the internal trips projections with external trip information obtained from the Southwestern Pennsylvania Commission (SPC). Generally, in regional travel model applications, changes in the level of trip making at external stations between the calibration year and the future year were based on historical change in average daily traffic counts at the external stations. In the initial development of the Cranberry Township travel demand model, between the years 2000 and 2020, the following extrapolations were provided by URS for the external-internal and external-internal travel trips:

Future Year External to Internal/Internal to External Trips

This component of travel is forecasted to nearly double by the Year 2020. For the future year model scenarios, the same extrapolations provided by URS were assumed to be valid for modeling purposes.

The traffic volumes for 2007 Model Update were derived from the Cranberry Township ADT count information, the Pittsburgh Regional Travel Model (SPC Model) and the 2006 PennDOT Traffic Count information. These volumes were balanced to get the appropriate external-internal and external-external trips for 2007. The same trip estimates were used as an input for the future model runs with appropriate extrapolation rates to determine the future year external-internal and external-external trip information.

Following **Table 3** has a list of total external-internal (E-I or I-E) trips at all 20 external stations used in the model. The E-I or I-E totals were further equally distributed into productions and attractions per purpose. The same information has been used for the three scenarios A, B & C.

Table 3 – External – Internal (E-I or I-E) Trips

			2030 E-I	Productions = 50% of Total E-I			Attractions = 50% of Total E-I		
Station	*Location*	*2007 E-I*	*2 * 07 E-I*	*HBW 42%*	*HBO 38%*	*NHB 20%*	*HBW 29%*	*HBO 43%*	*NHB 28%*
106	Glen Eden Rd	1,746	3,492	733	663	349	506	751	489
107	Rochester Rd	3,420	6,840	1,436	1,300	684	992	1,471	958
108	Darlington Rd	688	1,376	289	261	138	200	296	193
109	Freedom Rd	6,670	13,340	2,801	2,535	1,334	1,934	2,868	1,868
110	Commonwealth Dr	10,748	21,496	4,514	4,084	2,150	3,117	4,622	3,009
111	US 19 S	18,098	36,196	7,601	6,877	3,620	5,248	7,782	5,067
112	Duithl Rd	3,506	7,012	1,473	1,332	701	1,017	1,508	982
113	Franklin Rd S	5,460	10,920	2,293	2,075	1,092	1,583	2,348	1,529
114	PA 228	8,222	16,444	3,453	3,124	1,644	2,384	3,535	2,302
115	Peters Rd	2,559	5,118	1,075	972	512	742	1,100	717
116	Plains Church Rd	92	184	39	35	18	27	40	26
117	Callery Rd	580	1,160	244	220	116	168	249	162
118	Franklin Rd N	1,530	3,060	643	581	306	444	658	428
119	Old Ehrman Rd	250	500	105	95	50	73	108	70
120	US 19 N	16,320	32,640	6,854	6,202	3,264	4,733	7,018	4,570
121	Freshcorn Rd	411	822	173	156	82	119	177	115
122	Turn pike S	4,412	8,824	1,853	1,677	882	1,279	1,897	1,235
123	I 79 S	16,920	33,840	7,106	6,430	3,384	4,907	7,276	4,738
124	Turnpike N(W)	3,008	6,016	1,263	1,143	602	872	1,293	842
125	I 79 N	6,822	13,644	2,865	2,592	1,364	1,978	2,933	1,910
		111,462	222,924						

External to External Trips

This component is forecasted to increase nearly two and one-half times by 2020 in 2000. The same extrapolation is assumed between now and future scenarios. A FRATAR TRANPLAN Module was used to balance the trips between the external stations. The out put of this module is a trip matrix from & to each external station in the model. This matrix output CEE_30, is used as an essential input file during the model runs. The module is added in **Appendix B** for reference.

Internal Trip Distribution

The same gravity model parameters that were found to be successful for the 2007 model update/calibration were used in the future year internal trip distribution phase. Future Year TAZ trip productions and attractions by purpose as developed in the internal trip generation phase along with the calibrated travel time and friction factors were used for the model runs. No TAZ to TAZ modification or "K" factors were deemed necessary to be applied because of unique development situations.

Modal Split

Similar to 2000 model and 2007 model update, no modal split calculations were considered necessary for the projection year scenarios.

Total Vehicle Trips

The procedures used to convert the future year P/A vehicle trip table to a future year origin-destination vehicle trip table were identical to those developed through calibration of the 2000 network and 2007 model update. External to external trips for the future year were combined with the future year P/A vehicle trip table before the origin-destination conversion step.

Traffic Assignment

The parameters and methods used to assign the future year vehicle trip table to the alternate roadway networks were identical to those developed through calibration of the 2000 network and 2007 model update. The equilibrium assignment option was utilized in all the three scenario traffic assignments for the Cranberry Township study area.

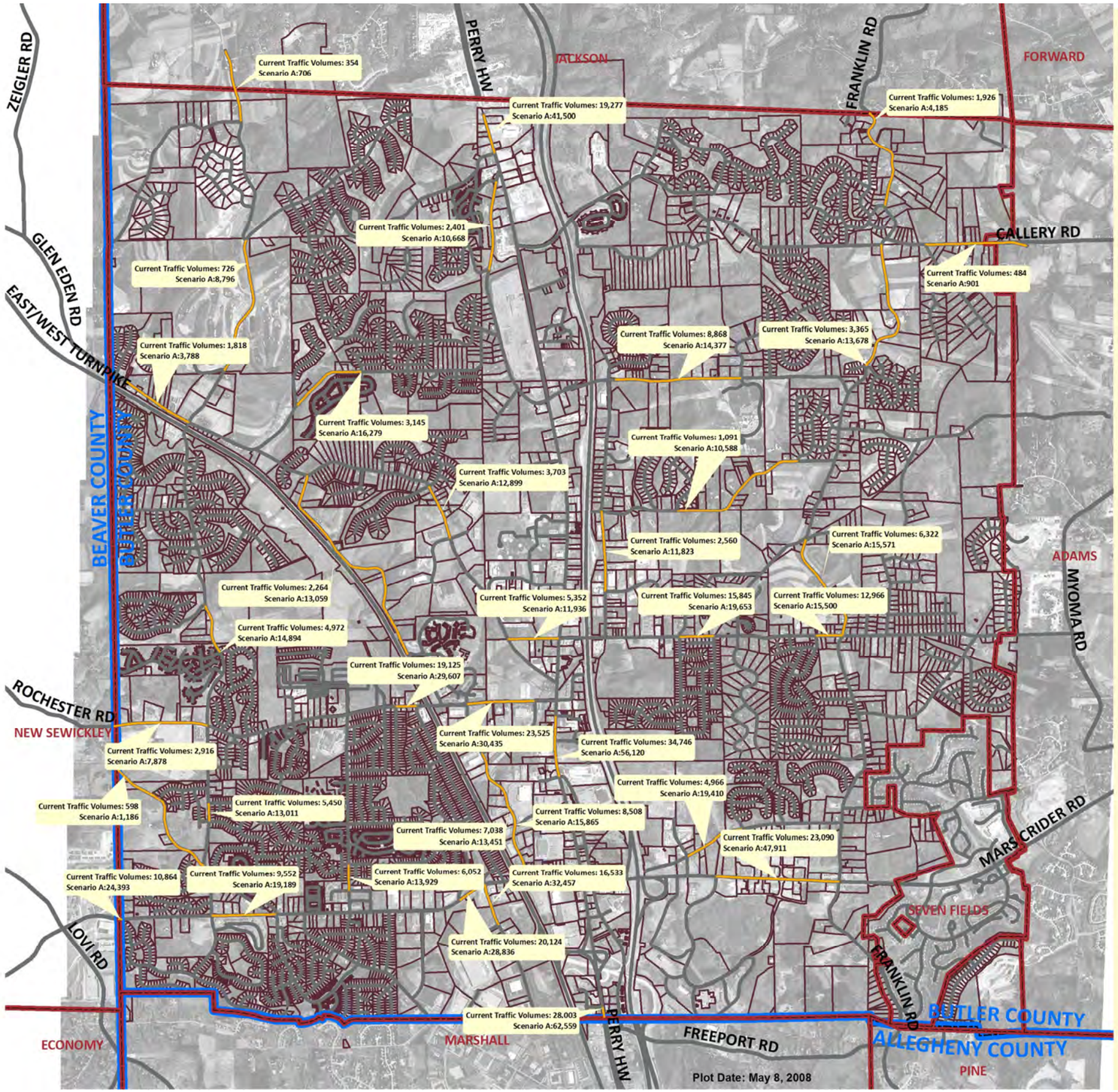
Results

One of the important purposes of this study is to compare the traffic forecasts with the permissible capacities on a given roadway segment and recommend necessary roadway improvements to meet the forecasted volume for a better level of service.

Based on the outputs of the model runs performed for each of the three scenarios, travel forecast volumes were reviewed through out the study area. A detailed summary of the existing 2007 calibrated traffic volumes as well as the forecasted volumes for the three scenarios A, B & C are reported in **Appendix C**. The forecasted traffic volumes for the three Scenarios A, B & C for the corridors listed below can be found in **Figures 1, 2 & 3**:

- Route 19
- Route 228
- Freedom Road
- Rochester Road
- Rowan Road
- Powell Road
- Franklin Road

Figure 1
Scenario A - Modeled Volumes

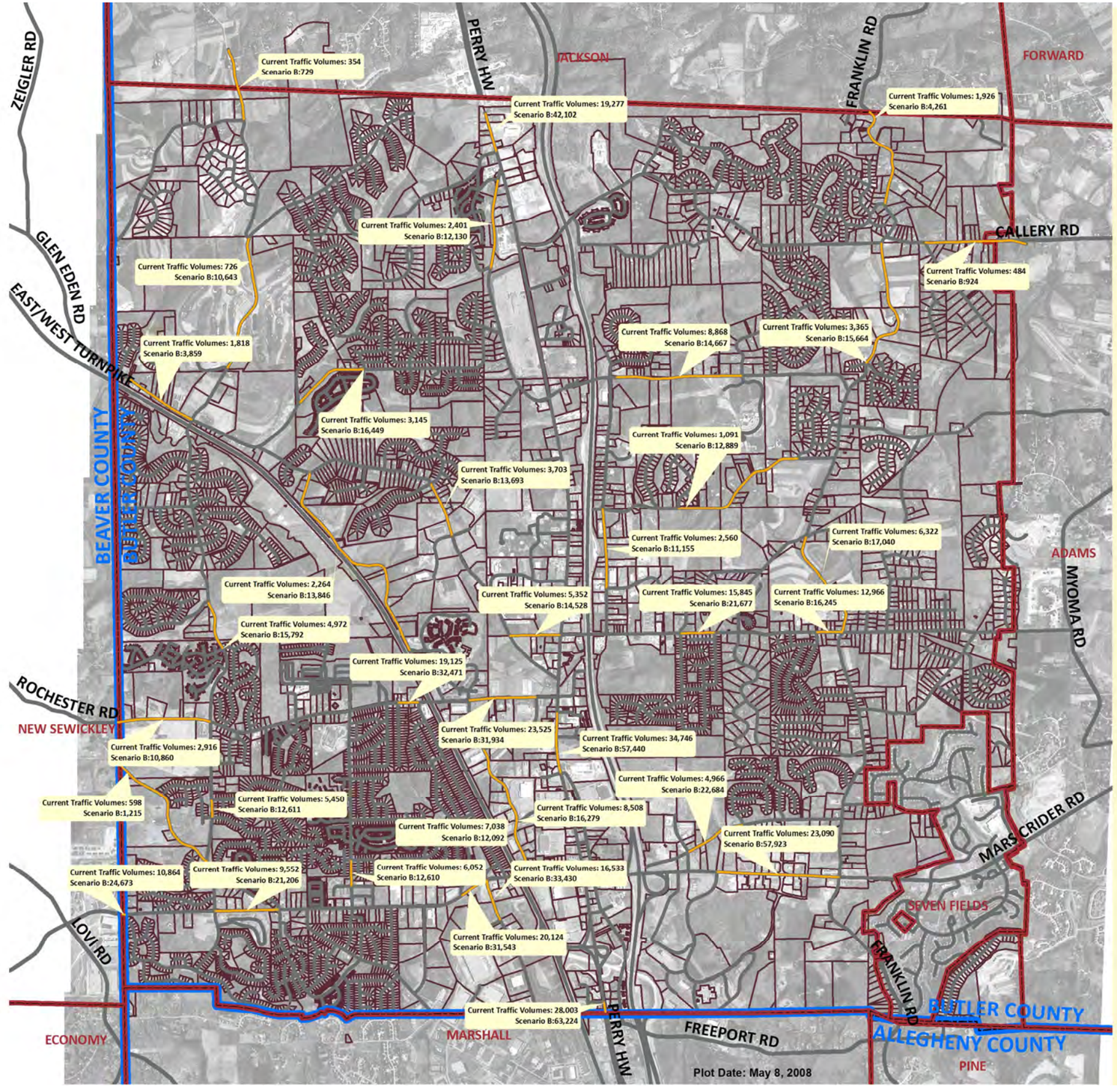


Scenario A Traffic Count Projections

Description:

The traffic calming projections for the Scenario A is based on ADT (Average Daily Traffic) counts in 2007. The projections are total ADT's for the Scenario Build-out and accounts for traffic moving in both directions.

Figure 2
Scenario B - Modeled Volumes

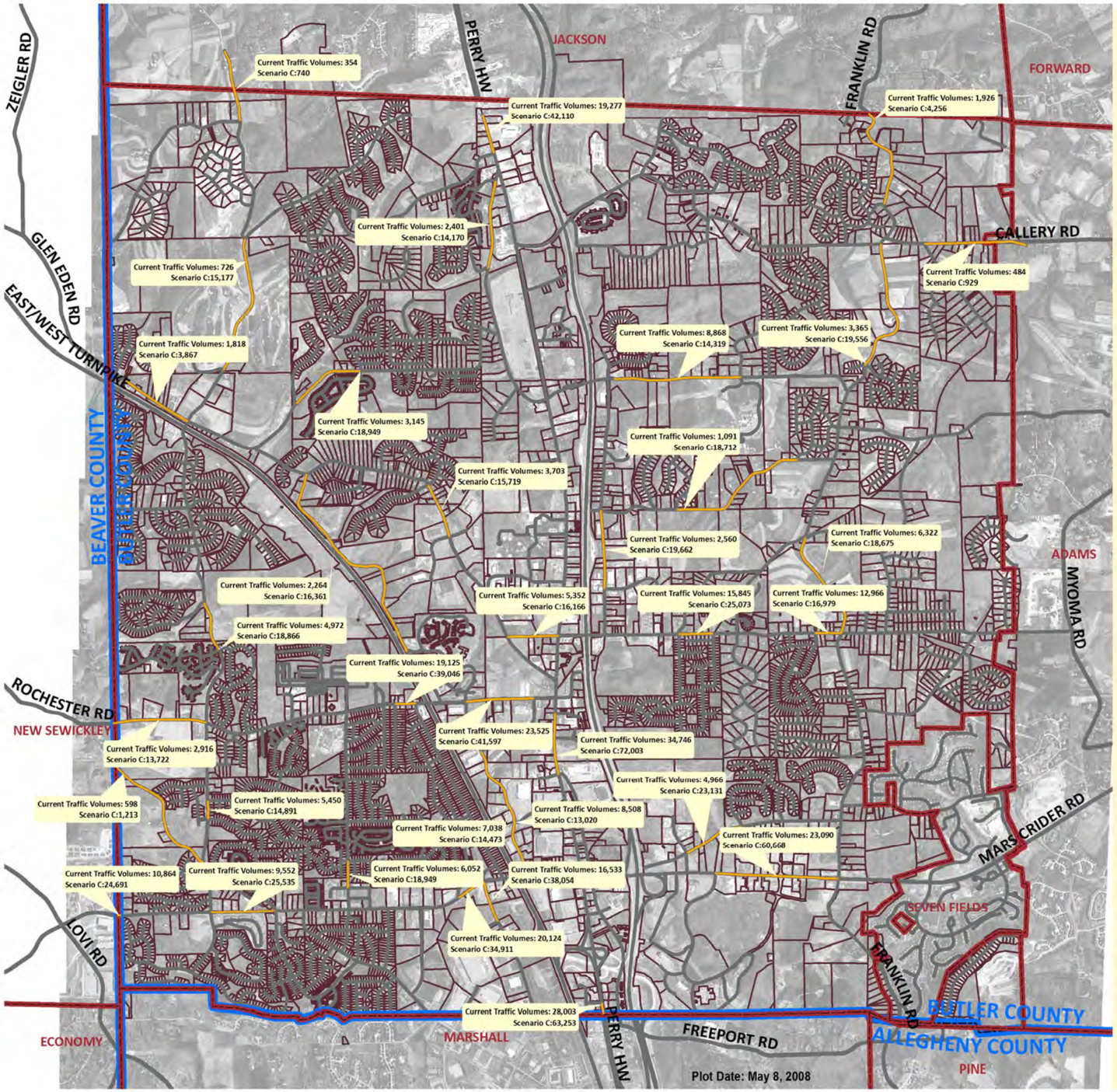


Scenario B Traffic Count Projections

Description:

The traffic calming projections for the Scenario B is based on ADT (Average Daily Traffic) counts in 2007. The projections are total ADT's for the Scenario Build-out and accounts for traffic moving in both directions.

Figure 3
Scenario C - Modeled Volumes



Scenario C Traffic Count Projections

Description:

The traffic calming projections for the Scenario C is based on ADT (Average Daily Traffic) counts in 2007. The projections are total ADT's for the Scenario Build-out and accounts for traffic moving in both directions.

APPENDIX A
Internal Trips Information

Scenario A - Internal Trips Information

		Productions			Attractions		
Model TAZ	TAZ_ID	HBW Trips	HBO Trips	NHB Trips	HBW Trips	HBO Trips	NHB Trips
1	20.1	396	871	79	0	158	79
2	20.2	1,070	2,354	214	0	428	214
3	20.3	14	32	246	438	54	246
4	20.5	7	16	1,931	2,149	3,374	1,931
5	23.1	0	0	101	182	20	101
6	23.2	548	1,205	110	0	219	110
7	23.3	427	939	85	0	171	85
8	23.4	580	1,275	116	0	232	116
9	20.6	385	846	77	0	154	77
10	20.7	9	20	2	0	4	2
11	20.8	409	900	82	0	164	82
12	20.4	26	58	219	203	430	219
13	20.9	26	57	331	506	287	331
14	20.10	2	5	232	311	344	232
15	23.5	138	303	28	0	55	28
16	23.6	291	640	58	0	116	58
17	23.7	906	1,994	181	0	363	181
18	23.8	581	1,278	116	0	232	116
19	23.9	356	783	71	0	142	71
20	23.13	275	606	55	0	110	55
21	23.12	373	821	75	0	149	75
22	23.11	163	358	33	0	65	33
23	23.10	71	205	1,838	2,497	2,689	1,838
24	20.13	660	1,452	132	0	264	132
25	20.12	12	27	1,145	665	2,723	1,145
26	20.11	904	1,990	181	0	362	181
27	20.16	952	2,095	190	0	381	190
28	20.15	224	492	45	0	89	45
29	20.44	188	413	38	0	75	38
30	20.14	350	771	103	45	189	103
31	20.21	7	16	1	0	3	1
32	20.22	344	758	69	0	138	69
33	20.17	26	63	3,260	1,997	7,758	3,260
34	20.18	70	163	5,073	2,895	12,251	5,073
35	23.14	12	29	61	80	91	61
36	23.15	669	1,478	383	342	637	383
37	23.19	305	670	61	0	122	61

38	23.38	489	1,076	98	0	196	98
39	23.16	617	1,357	123	0	247	123
40	23.17	2	5	0	0	1	0
41	23.22	474	1,044	95	0	190	95
42	23.21	241	529	48	0	96	48
43	23.18	39	98	1,412	1,962	1,525	1,412
44	20.27	0	0	1,292	1,338	2,040	1,292
45	20.26	2	6	110	159	106	110
46	20.25	15	64	2,424	2,042	5,134	2,424
47	20.24	164	388	1,737	2,633	1,713	1,737
48	20.23	404	889	81	0	162	81
49	20.20	410	902	82	0	164	82
50	20.19	1,307	2,876	261	0	523	261
51	20.28	364	800	73	0	145	73
52	20.29	17	57	974	1,163	1,624	974
53	20.31	220	484	44	0	88	44
54	20.30	27	159	84	33	166	84
55	20.32	0	0	2,323	4,156	510	2,323
56	20.34	0	1	575	581	965	575
57	20.33	7	16	1,438	1,372	2,702	1,438
58	20.35	0	0	871	436	2,178	871
59	23.20	33	142	2,537	3,459	3,790	2,537
60	23.23	1,422	3,130	297	17	587	297
61	23.24	497	1,093	99	0	199	99
62	23.25	176	388	35	0	71	35
63	23.26	257	566	51	0	103	51
64	23.28	59	129	12	0	24	12
65	23.31	236	519	47	0	94	47
66	23.30	432	949	86	0	173	86
67	23.27	0	0	1,583	2,849	317	1,583
68	20.45	479	1,053	96	0	191	96
69	20.39	1	4	1,084	608	2,636	1,084
70	20.38	3	9	1,134	648	2,730	1,134
71	20.37	5	13	1,357	799	3,208	1,357
72	20.36	12	73	2,629	2,482	4,759	2,629
73	21.5	574	1,263	176	52	351	176
74	21.4	953	2,097	191	0	381	191
75	21.3	1,615	3,552	323	0	646	323
76	21.2	659	1,451	132	0	264	132
77	21.1	489	1,075	98	0	195	98
78	21.6	443	975	89	0	177	89
79	21.7	7	16	248	156	587	248
80	21.8	687	1,511	218	51	465	218
82	21.9	1,206	2,653	241	0	482	241
83	21.11	6	18	771	559	1,714	771
84	22.4	0	0	94	169	19	94
85	21.10	7	16	63	39	148	63
86	20.40	3	9	184	155	391	184
87	20.41	10	23	5,510	2,780	13,746	5,510

88	20.42	0	0	711	356	1,778	711
89	20.43	34	96	1,681	1,412	3,561	1,681
90	23.29	0	0	5,290	2,841	12,943	5,290
91	23.32	156	343	8,465	4,296	21,037	8,465
92	23.33	44	98	9	0	18	9
93	23.37b	108	237	22	0	43	22
94	23.36	48	105	10	0	19	10
95	23.35	140	324	2,935	2,883	5,109	2,935
96	23.34	365	1,851	2,819	2,697	4,981	2,819
97	22.9	93	205	19	0	37	19
98	22.8	200	882	1,166	603	2,639	1,166
99	22.7	0	0	5,259	2,629	13,147	5,259
100	22.6	56	337	3,434	4,431	4,615	3,434
101	22.5	25	116	3,009	4,483	3,396	3,009
102	22.3	443	974	89	0	177	89
103	22.2	1,725	3,796	345	0	690	345
104	22.1	407	896	81	0	163	81
105	20.46	149	327	30	0	59	30
TOTALS		**30,839**	**70,046**	**85,922**	**69,639**	**168,374**	**85,922**

Scenario B - Internal Trips Information

		Productions			Attractions		
Model TAZ	**TAZ_ID**	**HBW Trips**	**HBO Trips**	**NHB Trips**	**HBW Trips**	**HBO Trips**	**NHB Trips**
1	20.1	396	871	79	0	158	79
2	20.2	1,483	3,298	840	338	1,868	840
3	20.3	329	748	432	228	990	432
4	20.5	867	1,973	1,738	931	4,058	1,738
5	23.1	0	0	101	182	20	101
6	23.2	548	1,205	110	0	219	110
7	23.3	427	939	85	0	171	85
8	23.4	580	1,275	116	0	232	116
9	20.6	385	846	77	0	154	77
10	20.7	11	23	2	0	5	2
11	20.8	409	900	82	0	164	82
12	20.4	97	219	202	101	483	202
13	20.9	118	267	308	374	356	308
14	20.10	147	334	197	104	452	197
15	23.5	138	303	28	0	55	28
16	23.6	291	640	58	0	116	58
17	23.7	906	1,994	181	0	363	181
18	23.8	581	1,278	116	0	232	116
19	23.9	356	783	71	0	142	71
20	23.13	275	606	55	0	110	55
21	23.12	373	821	75	0	149	75

22	23.11	163	358	33	0	65	33
23	23.10	71	205	1,838	2,497	2,689	1,838
24	20.13	775	1,763	1,039	550	2,383	1,039
25	20.12	12	27	1,145	665	2,723	1,145
26	20.11	904	1,990	181	0	362	181
27	20.16	952	2,095	190	0	381	190
28	20.15	1,276	2,807	435	113	938	435
29	20.44	895	1,970	300	76	645	300
30	20.14	350	771	103	45	189	103
31	20.21	7	16	1	0	3	1
32	20.22	344	758	69	0	138	69
33	20.17	26	63	3,260	1,997	7,758	3,260
34	20.18	70	163	5,073	2,895	12,251	5,073
35	23.14	12	29	61	80	91	61
36	23.15	669	1,478	383	342	637	383
37	23.19	698	1,535	216	48	460	216
38	23.38	1,805	3,971	616	160	1,326	616
39	23.16	621	1,367	125	1	250	125
40	23.17	2	5	0	0	1	0
41	23.22	474	1,044	95	0	190	95
42	23.21	393	866	108	19	228	108
43	23.18	39	98	1,412	1,962	1,525	1,412
44	20.27	0	0	1,292	1,338	2,040	1,292
45	20.26	2	6	110	159	106	110
46	20.25	15	64	2,424	2,042	5,134	2,424
47	20.24	164	388	1,737	2,633	1,713	1,737
48	20.23	404	889	81	0	162	81
49	20.20	410	902	82	0	164	82
50	20.19	1,307	2,876	261	0	523	261
51	20.28	364	800	73	0	145	73
52	20.29	17	57	974	1,163	1,624	974
53	20.31	220	484	44	0	88	44
54	20.30	27	159	84	33	166	84
55	20.32	0	0	2,323	4,156	510	2,323
56	20.34	0	1	575	581	965	575
57	20.33	857	2,231	5,736	3,486	13,386	5,736
58	20.35	0	0	871	436	2,178	871
59	23.20	33	142	2,537	3,459	3,790	2,537
60	23.23	1,422	3,130	297	17	587	297
61	23.24	497	1,093	99	0	199	99
62	23.25	176	388	35	0	71	35
63	23.26	257	566	51	0	103	51
64	23.28	59	129	12	0	24	12
65	23.31	1,509	3,430	1,978	1,043	4,536	1,978
66	23.30	432	949	86	0	173	86
67	23.27	0	0	1,583	2,849	317	1,583
68	20.45	479	1,053	96	0	191	96
69	20.39	1	4	1,084	608	2,636	1,084
70	20.38	3	9	1,134	648	2,730	1,134

71	20.37	5	13	1,357	799	3,208	1,357
72	20.36	12	73	2,629	2,482	4,759	2,629
73	21.5	574	1,263	176	52	351	176
74	21.4	953	2,097	191	0	381	191
75	21.3	1,615	3,552	323	0	646	323
76	21.2	659	1,451	132	0	264	132
77	21.1	1,350	2,969	437	105	935	437
78	21.6	443	975	89	0	177	89
79	21.7	7	16	248	156	587	248
80	21.8	687	1,511	218	51	465	218
82	21.9	1,206	2,653	241	0	482	241
83	21.11	6	18	771	559	1,714	771
84	22.4	0	0	94	169	19	94
85	21.10	7	16	63	39	148	63
86	20.40	3	9	184	155	391	184
87	20.41	10	23	5,510	2,780	13,746	5,510
88	20.42	0	0	711	356	1,778	711
89	20.43	34	96	1,681	1,412	3,561	1,681
90	23.29	0	0	5,290	2,841	12,943	5,290
91	23.32	156	343	15,644	7,841	39,046	15,644
92	23.33	235	533	297	156	681	297
93	23.37b	108	237	22	0	43	22
94	23.36	48	105	10	0	19	10
95	23.35	1,398	3,092	2,565	1,672	5,659	2,565
96	23.34	1,041	3,293	1,447	526	3,132	1,447
97	22.9	93	205	19	0	37	19
98	22.8	200	882	1,166	603	2,639	1,166
99	22.7	0	0	5,259	2,629	13,147	5,259
100	22.6	56	337	3,434	4,431	4,615	3,434
101	22.5	25	116	3,009	4,483	3,396	3,009
102	22.3	443	974	89	0	177	89
103	22.2	1,725	3,796	345	0	690	345
104	22.1	353	777	71	0	141	71
105	20.46	149	327	30	0	59	30
TOTALS		**41,530**	**94,201**	**101,043**	**72,656**	**210,023**	**101,043**

Scenario C - Internal Trips Information

		Productions			Attractions		
Model TAZ	**TAZ_ID**	**HBW Trips**	**HBO Trips**	**NHB Trips**	**HBW Trips**	**HBO Trips**	**NHB Trips**
1	20.1	396	871	79	0	158	79
2	20.2	3,524	7,789	1,597	558	3,513	1,597
3	20.3	329	748	432	228	990	432
4	20.5	751	1,690	1,556	1,035	3,445	1,556
5	23.1	0	0	101	182	20	101
6	23.2	548	1,205	110	0	219	110

7	23.3	427	939	85	0	171	85
8	23.4	580	1,275	116	0	232	116
9	20.6	385	846	77	0	154	77
10	20.7	11	23	2	0	5	2
11	20.8	409	900	82	0	164	82
12	20.4	97	219	202	101	483	202
13	20.9	89	196	205	313	115	205
14	20.10	101	222	156	192	256	156
15	23.5	138	303	28	0	55	28
16	23.6	291	640	58	0	116	58
17	23.7	906	1,994	181	0	363	181
18	23.8	2,018	4,440	650	155	1,391	650
19	23.9	356	783	71	0	142	71
20	23.13	1,460	3,213	495	127	1,065	495
21	23.12	373	821	75	0	149	75
22	23.11	163	358	35	3	68	35
23	23.10	71	205	1,929	2,633	2,824	1,929
24	20.13	534	1,174	180	46	388	180
25	20.12	12	27	1,145	665	2,723	1,145
26	20.11	904	1,990	181	0	362	181
27	20.16	952	2,095	190	0	381	190
28	20.15	1,276	2,807	435	113	938	435
29	20.44	895	1,970	300	76	645	300
30	20.14	350	771	103	45	189	103
31	20.21	7	16	1	0	3	1
32	20.22	344	758	69	0	138	69
33	20.17	26	63	3,274	2,017	7,778	3,274
34	20.18	70	163	5,240	3,146	12,503	5,240
35	23.14	12	29	61	80	91	61
36	23.15	669	1,478	383	342	637	383
37	23.19	948	2,145	1,104	569	2,524	1,104
38	23.38	2,641	6,013	3,589	1,906	8,237	3,589
39	23.16	3,064	6,741	1,040	269	2,239	1,040
40	23.17	2	5	0	0	1	0
41	23.22	474	1,044	95	0	190	95
42	23.21	491	1,103	454	221	1,030	454
43	23.18	39	98	1,590	2,229	1,791	1,590
44	20.27	0	0	1,493	1,640	2,341	1,493
45	20.26	2	6	110	159	106	110
46	20.25	15	64	2,424	2,042	5,134	2,424
47	20.24	164	388	2,750	4,153	3,233	2,750
48	20.23	404	889	81	0	162	81
49	20.20	410	902	82	0	164	82
50	20.19	1,307	2,876	261	0	523	261
51	20.28	364	800	73	0	145	73
52	20.29	17	57	1,168	1,456	1,916	1,168
53	20.31	220	484	44	0	88	44
54	20.30	27	159	84	33	166	84
55	20.32	0	0	2,323	4,156	510	2,323

56	20.34	0	1	634	671	1,054	634
57	20.33	857	2,231	5,736	3,486	13,386	5,736
58	20.35	0	0	871	436	2,178	871
59	23.20	948	2,094	955	976	1,658	955
60	23.23	1,428	3,141	286	0	573	286
61	23.24	497	1,093	99	0	199	99
62	23.25	176	388	35	0	71	35
63	23.26	257	566	51	0	103	51
64	23.28	59	129	12	0	24	12
65	23.31	1,509	3,430	1,978	1,043	4,536	1,978
66	23.30	432	949	86	0	173	86
67	23.27	0	0	1,583	2,849	317	1,583
68	20.45	479	1,053	96	0	191	96
69	20.39	1	4	1,084	608	2,636	1,084
70	20.38	3	9	1,134	648	2,730	1,134
71	20.37	5	13	1,386	842	3,252	1,386
72	20.36	12	73	3,491	3,774	6,051	3,491
73	21.5	574	1,263	193	77	376	193
74	21.4	953	2,097	191	0	381	191
75	21.3	1,615	3,552	323	0	646	323
76	21.2	659	1,451	132	0	264	132
77	21.1	1,896	4,305	2,381	1,246	5,455	2,381
78	21.6	443	975	89	0	177	89
79	21.7	7	16	248	156	587	248
80	21.8	687	1,511	218	51	465	218
82	21.9	1,206	2,653	241	0	482	241
83	21.11	6	18	2,189	2,686	3,841	2,189
84	22.4	0	0	228	370	220	228
85	21.10	7	16	95	87	196	95
86	20.40	3	9	341	390	626	341
87	20.41	10	23	5,703	3,069	14,035	5,703
88	20.42	0	0	825	527	1,949	825
89	20.43	34	96	1,753	1,520	3,669	1,753
90	23.29	0	0	5,303	2,860	12,962	5,303
91	23.32	156	343	15,700	7,925	39,131	15,700
92	23.33	235	533	297	156	681	297
93	23.37b	108	237	22	0	43	22
94	23.36	48	105	10	0	19	10
95	23.35	2,043	4,667	4,863	3,028	10,993	4,863
96	23.34	1,361	4,074	4,974	4,777	9,360	4,974
97	22.9	93	205	19	0	37	19
98	22.8	200	882	1,477	1,068	3,104	1,477
99	22.7	0	0	5,277	2,658	13,175	5,277
100	22.6	56	337	4,868	6,583	6,767	4,868
101	22.5	25	116	3,464	5,165	4,078	3,464
102	22.3	443	974	89	0	177	89
103	22.2	1,725	3,796	375	44	735	375
104	22.1	820	1,804	244	50	517	244
105	20.46	149	327	30	0	59	30

TOTALS		52,285	118,349	120,324	90,717	247,712	120,324

APPENDIX B
External – External Trips Balancing
FRATAR Module

```
$FRATAR MODEL
$FILES
  INPUT FILE = FRATIN, USER ID = $T:\Forecast\Cranberry\2030PROJ\CEE.TRP$
  OUTPUT FILE = FRATOUT, USERID = $T:\Forecast\Cranberry\2030PROJ\CEE_30.TRP$
$HEADERS
ACTUAL FRATAR PROCESS RESULTING IN E TO E TRIP TABLE
$PARAMETERS
   NUMBER OF ITERATIONS =  25
$DATA
FO  106 1    250
FO  107 1    250
FO  108 1    250
FO  109 1    250
FO  110 1    250
FO  111 1    250
FO  112 1    250
FO  113 1    250
FO  114 1    250
FO  115 1    250
FO  116 1    250
FO  117 1    250
FO  118 1    250
FO  119 1    250
FO  120 1    250
FO  121 1    250
FO  122 1    250
FO  123 1    250
FO  124 1    250
FO  125 1    250
FD  106 1    250
FD  107 1    250
FD  108 1    250
FD  109 1    250
FD  110 1    250
FD  111 1    250
FD  112 1    250
FD  113 1    250
FD  114 1    250
FD  115 1    250
FD  116 1    250
FD  117 1    250
FD  118 1    250
FD  119 1    250
FD  120 1    250
FD  121 1    250
FD  122 1    250
FD  123 1    250
FD  124 1    250
FD  125 1    250
$END TP FUNCTION
```

APPENDIX C
Results
2007 Calibrated & Forecasted Volumes for Scenarios A, B & C

Modeled Input Data				Calibrated	Forecasted Traffic Volumes from Model		
A node	*B node*	*CAPACITY*	*Lanes*	*2007 VOL*	*Scn A_VOL*	*Scn B_VOL*	*Scn C_VOL*
1	1212	99999	1	0	18	16	12
1	1229	99999	1	56	676	682	692
2	1229	99999	1	70	881	1,641	4,117
2	1235	99999	1	49	1,013	1,722	2,875
3	1239	99999	1	10	421	1,246	1,252
4	1293	99999	1	0	965	1,286	1,143
4	1482	99999	1	164	2,369	2,912	2,659
5	1353	99999	1	14	165	176	173
6	1355	99999	1	313	998	1,004	1,001
7	1424	99999	1	17	54	111	129
7	1472	99999	1	236	711	662	651
8	1351	99999	1	112	960	972	1,004
8	1424	99999	1	7	55	48	37
9	1209	99999	1	1	32	59	90
9	1219	99999	1	80	660	639	610
10	1231	99999	1	4	16	21	19
11	1237	99999	1	565	744	749	747
12	1482	99999	1	183	434	509	515
13	1244	99999	1	335	605	719	489
14	1480	99999	1	1,210	423	580	451
15	1353	99999	1	9	254	255	264
16	1369	99999	1	250	537	534	540
17	1373	99999	1	46	404	465	585
17	1381	99999	1	1,235	1,255	1,207	1,089
18	1417	99999	1	370	1,061	1,070	4,023
19	1351	99999	1	243	632	638	641
20	1347	99999	1	79	500	503	2,935
21	1343	99999	1	99	384	368	309
21	1481	99999	1	83	305	319	383
22	1381	99999	1	66	198	207	181
22	1383	99999	1	29	100	104	126
23	1379	99999	1	138	363	952	375
23	1437	99999	1	739	2,994	2,523	3,260
24	1473	99999	1	530	1,220	2,990	1,130
25	1473	99999	1	39	2,002	2,055	2,071
26	1225	99999	1	92	1,205	1,268	1,389
26	1471	99999	1	52	452	394	280
27	1471	99999	1	1,241	1,738	1,743	1,757

28	1221	99999	1	4	410	2,610	2,623
29	1528	99999	1	31	346	1,838	1,853
30	1128	99999	1	143	658	585	542
30	1208	99999	1	7	30	114	154
31	1258	99999	1	21	12	14	13
32	1260	99999	1	634	641	639	644
33	1248	99999	1	49	2,708	2,628	2,120
33	1483	99999	1	468	2,894	3,124	3,715
34	1250	99999	1	4,345	8,619	8,859	9,255
35	1389	99999	1	36	131	131	138
36	1387	99999	1	102	1,668	1,695	1,703
37	1335	99999	1	539	565	1,426	3,349
38	1413	99999	1	15	906	3,722	9,493
39	1435	99999	1	73	1,127	1,138	6,061
40	1326	99999	1	0	4	5	4
41	1394	99999	1	514	867	874	881
42	1393	99999	1	273	447	786	1,556
44	1289	99999	1	2,065	2,208	2,284	2,660
45	1254	99999	1	240	192	202	203
46	1442	99999	1	12	4,248	4,373	4,392
47	1261	99999	1	1,420	3,225	3,352	5,204
48	1260	99999	1	151	449	426	443
48	1281	99999	1	168	303	320	310
49	1124	99999	1	254	325	394	398
49	1128	99999	1	242	421	359	356
50	1118	99999	1	0	173	63	73
50	1123	99999	1	993	493	401	550
50	1162	99999	1	60	723	962	908
50	1470	99999	1	552	971	951	857
51	1120	99999	1	93	170	154	167
51	1178	99999	1	576	504	520	511
52	1180	99999	1	246	1,765	1,834	2,199
53	1182	99999	1	1,611	418	413	411
54	1285	99999	1	0	223	228	228
55	1484	99999	1	782	2,638	2,196	2,660
55	1485	99999	1	242	1,144	1,764	1,259
56	1484	99999	1	136	476	398	538
56	1486	99999	1	218	534	641	606
57	1183	99999	1	0	1,331	5,886	6,420
57	1264	99999	1	0	1,206	5,185	4,804
58	1486	99999	1	743	1,535	1,568	1,579
59	1488	99999	1	2,529	4,575	4,753	3,190
60	1333	99999	1	2,475	2,644	2,653	2,660
61	1407	99999	1	386	914	927	927
62	1328	99999	1	45	164	180	171
62	1408	99999	1	62	168	143	161
63	1474	99999	1	298	474	484	481
64	1318	99999	1	33	108	109	110
65	1314	99999	1	109	438	5,329	5,435

66	1321	99999	1	561	802	808	811
67	1239	99999	1	2	226	365	325
67	1243	99999	1	87	2,274	2,260	2,264
68	1323	99999	1	578	888	886	896
69	1443	99999	1	0	1,915	1,958	1,975
70	1487	99999	1	2,541	2,003	2,052	2,064
71	1192	99999	1	922	1,109	1,330	1,044
71	1443	99999	1	1,458	1,266	1,107	1,469
72	1189	99999	1	6,990	4,540	4,676	6,296
73	1475	99999	1	1,151	1,174	1,179	1,217
74	1180	99999	1	1,114	1,337	1,303	1,239
74	1469	99999	1	432	426	470	542
75	1179	99999	1	307	1,122	1,281	703
75	1469	99999	1	2,523	1,855	1,706	2,291
76	1113	99999	1	444	398	361	447
76	1114	99999	1	702	812	851	776
77	1114	99999	1	0	4	127	430
77	1153	99999	1	5	289	812	2,190
77	1162	99999	1	4	606	1,785	3,810
78	1110	99999	1	738	817	824	825
79	1109	99999	1	48	447	455	461
80	1160	99999	1	1,031	1,404	1,415	1,420
81	1134	99999	1	119	0	0	0
82	1175	99999	1	1,247	1,389	1,425	1,451
82	1490	99999	1	489	845	820	800
83	1136	99999	1	1,008	673	678	1,855
83	1489	99999	1	829	700	725	2,239
84	1136	99999	1	168	156	163	423
85	1525	99999	1	883	127	127	189
86	1196	99999	1	445	336	346	651
87	1194	99999	1	2,662	4,194	4,060	3,504
87	1445	99999	1	6,101	5,174	5,534	6,553
88	1303	99999	1	3,189	1,259	1,282	1,526
89	1303	99999	1	2,430	3,045	3,134	3,279
90	1529	99999	1	99	8,714	8,994	9,147
91	1493	99999	1	7,747	13,391	23,623	24,497
92	1320	99999	1	31	84	893	895
93	1309	99999	1	3	165	178	176
93	1397	99999	1	1	35	21	23
94	1400	99999	1	81	88	90	91
95	1403	99999	1	39	2,226	2,349	3,959
95	1493	99999	1	48	2,779	3,948	6,748
96	1307	99999	1	1,461	5,708	4,373	10,897
97	1299	99999	1	813	171	177	178
98	1492	99999	1	3,578	2,506	2,544	3,151
99	1150	99999	1	8,360	7,431	7,779	8,064
99	1491	99999	1	3,397	1,509	1,370	1,231
100	1205	99999	1	3,309	5,955	6,160	8,687
101	1172	99999	1	2,029	5,099	5,303	6,093

102	1166	99999	1	25	55	52	90
102	1170	99999	1	774	770	778	739
103	1106	99999	1	78	628	597	535
103	1160	99999	1	1,925	802	651	939
103	1166	99999	1	100	1,709	1,896	1,737
104	1105	99999	1	326	666	597	1,519
104	1295	99999	1	31	83	64	138
105	1246	99999	1	91	275	275	273
106	1219	99999	1	908	1,892	1,928	1,932
107	1162	99999	1	1,513	3,077	3,137	3,147
108	1152	99999	1	299	595	609	608
109	1295	99999	1	5,432	12,203	12,342	12,350
110	1206	99999	2	5,497	11,514	11,710	11,726
111	1492	99999	2	14,002	31,315	31,651	31,665
112	1296	99999	1	0	0	0	0
113	1397	99999	1	2,445	4,976	5,089	5,095
114	1310	99999	2	10,311	24,085	24,239	24,261
115	1326	99999	1	1,185	2,387	2,439	2,439
116	1348	99999	1	45	89	92	89
117	1351	99999	1	246	454	462	465
118	1428	99999	1	961	2,091	2,130	2,129
119	1358	99999	1	113	226	230	229
120	1544	99999	2	9,637	20,751	21,050	21,056
121	1217	99999	1	177	352	365	368
122	1635	99999	0	14,635	35,686	35,769	35,772
123	1607	99999	0	30,112	71,770	72,092	72,107
124	1630	99999	0	17,848	43,999	44,053	44,053
125	1602	99999	0	18,914	45,863	46,004	46,016
1105	104	99999	1	326	661	597	1,521
1105	1106	4900	1	326	666	597	1,519
1106	103	99999	1	78	569	573	569
1106	1105	4900	1	326	661	597	1,521
1106	1107	4900	1	396	1,278	1,178	2,010
1107	1106	4900	1	396	1,214	1,154	2,046
1107	1108	4900	1	396	1,278	1,178	2,010
1108	1107	4900	1	396	1,214	1,154	2,046
1108	1109	4900	1	5,653	13,058	13,137	13,988
1108	1295	5650	1	5,401	12,107	12,267	12,203
1109	79	99999	1	48	453	457	465
1109	1108	4900	1	5,653	12,983	13,103	14,014
1109	1110	4900	1	3,128	7,201	7,133	9,996
1109	1160	5650	1	4,882	9,522	10,721	12,747
1110	78	99999	1	731	814	824	823
1110	1109	4900	1	3,341	6,987	7,337	9,984
1110	1111	4900	1	3,010	7,223	7,130	10,049
1111	1110	4900	1	3,215	7,006	7,334	10,035
1111	1112	4900	1	3,013	7,028	6,563	7,809
1111	1157	4900	1	302	912	1,372	2,882
1112	1111	4900	1	3,216	6,861	6,776	8,016

1112	1113	4900	1	3,013	7,028	6,563	7,809
1113	76	99999	1	335	481	367	487
1113	1112	4900	1	3,216	6,861	6,776	8,016
1113	1114	4900	1	2,678	6,548	6,196	7,323
1114	76	99999	1	816	731	844	733
1114	77	99999	1	0	3	16	430
1114	1113	4900	1	2,772	6,463	6,415	7,568
1114	1115	4900	1	3,380	7,357	7,142	8,402
1115	1114	4900	1	3,589	7,190	7,243	8,606
1115	1116	4900	1	4,497	10,304	11,506	13,642
1115	1163	5650	1	1,458	3,789	5,435	6,758
1116	1115	4900	1	4,706	9,838	11,617	13,640
1116	1117	4900	1	2,373	7,722	7,675	9,265
1116	1177	5650	1	4,538	8,192	9,357	10,988
1117	1116	4900	1	2,412	7,353	7,958	9,496
1117	1118	4900	1	2,373	7,722	7,675	9,265
1118	50	99999	1	0	354	78	72
1118	1117	4900	1	2,412	7,353	7,958	9,496
1118	1119	4900	1	2,373	7,370	7,602	9,199
1119	1118	4900	1	2,412	7,181	7,899	9,428
1119	1120	4900	1	2,373	7,370	7,602	9,199
1120	51	99999	1	94	190	156	148
1120	1119	4900	1	2,412	7,181	7,899	9,428
1120	1121	4900	1	2,466	7,531	7,746	9,328
1121	1120	4900	1	2,506	7,363	8,046	9,538
1121	1122	4900	1	2,466	7,531	7,746	9,328
1122	1121	4900	1	2,506	7,363	8,046	9,538
1122	1123	4900	1	2,466	7,531	7,746	9,328
1123	50	99999	1	988	494	400	549
1123	1122	4900	1	2,506	7,363	8,046	9,538
1123	1124	4900	1	1,498	7,058	7,366	8,796
1124	49	99999	1	269	342	306	389
1124	1123	4900	1	1,532	6,891	7,665	9,004
1124	1125	4900	1	1,229	6,716	7,061	8,407
1125	1124	4900	1	1,278	6,566	7,272	8,606
1125	1126	4900	1	1,229	6,716	7,061	8,407
1126	1125	4900	1	1,278	6,566	7,272	8,606
1126	1127	4900	1	1,229	6,716	7,061	8,407
1127	1126	4900	1	1,278	6,566	7,272	8,606
1127	1128	4900	1	1,774	7,655	7,896	9,128
1127	1470	2950	1	548	1,046	1,116	960
1128	30	99999	1	137	658	589	560
1128	49	99999	1	229	403	452	367
1128	1127	4900	1	1,827	7,575	8,178	9,298
1128	1129	4900	1	2,099	8,456	8,690	9,879
1129	1128	4900	1	2,133	8,358	9,070	10,078
1129	1130	4900	1	2,926	10,550	10,754	11,835
1130	1129	4900	1	1,831	7,671	8,349	9,373
1130	1131	4900	1	2,926	10,550	10,754	11,835

1131	1130	4900	1	1,831	7,671	8,349	9,373
1131	1528	4900	1	2,631	9,916	10,132	11,195
1131	1641	10800	1	1,111	2,774	2,726	2,679
1132	1151	4900	1	176	355	401	447
1132	1228	4900	1	176	354	399	438
1133	1134	5650	1	6,875	9,262	9,977	10,690
1133	1160	5650	1	6,949	10,886	11,655	14,174
1133	1168	4150	1	280	1,477	1,922	3,450
1134	81	99999	1	118	0	0	0
1134	1133	5650	1	6,669	9,441	9,662	11,122
1134	1135	5650	1	6,940	9,262	9,977	10,690
1135	1134	5650	1	6,732	9,441	9,662	11,122
1135	1136	5650	1	6,737	9,516	9,319	9,103
1135	1170	3300	1	1,112	3,786	3,419	4,152
1135	1489	4900	1	2,733	5,676	6,063	8,519
1136	83	99999	1	1,022	600	699	1,634
1136	84	99999	1	169	157	162	421
1136	1135	5650	1	6,518	8,010	9,239	9,411
1136	1137	5650	1	8,991	13,981	14,438	16,228
1136	1172	4150	1	1,366	3,739	4,518	5,180
1137	1136	5650	1	8,876	12,228	14,333	15,909
1137	1175	5650	1	8,991	13,981	14,438	16,228
1138	1139	5650	1	10,107	15,276	15,817	17,595
1138	1175	5650	1	10,017	13,560	15,726	17,316
1139	1138	5650	1	10,017	13,560	15,726	17,316
1139	1205	9650	2	8,265	16,228	16,712	19,025
1139	1525	5650	1	11,477	16,628	17,652	18,277
1139	1526	3300	1	3,489	8,396	8,219	10,756
1140	1141	5650	1	13,860	21,610	22,501	26,438
1140	1478	3300	1	5,698	8,502	6,285	8,387
1140	1525	5650	1	10,451	13,504	18,355	18,492
1141	1140	5650	1	14,239	19,437	22,228	26,111
1141	1142	5650	1	13,860	21,610	22,501	26,438
1142	1141	5650	1	14,239	19,437	22,228	26,111
1142	1143	5650	1	11,068	15,639	19,467	21,568
1142	1196	4900	1	4,041	9,208	8,532	6,410
1143	1142	5650	1	11,020	16,017	19,979	21,040
1143	1144	5650	1	11,068	15,639	19,467	21,568
1144	1143	5650	1	11,020	16,017	19,979	21,040
1144	1150	5650	1	11,068	15,639	19,467	21,568
1145	1148	11000	2	13,753	37,640	41,045	46,322
1145	1150	5650	1	8,540	13,303	12,495	16,337
1145	1491	11000	2	17,929	34,040	34,579	35,248
1145	1620	5650	1	16,206	32,826	37,069	42,584
1146	1616	5650	1	16,517	36,701	42,519	48,354
1146	1626	15400	3	11,421	25,511	30,122	35,901
1147	1148	4900	1	4,788	8,294	10,125	10,043
1147	1149	4900	1	4,539	10,553	10,802	9,174
1148	1145	11000	2	14,743	37,635	41,821	47,501

1148	1147	4900	1	4,539	10,553	10,802	9,174
1148	1445	11000	2	18,101	36,735	35,540	43,200
1149	1147	4900	1	4,788	8,294	10,125	10,043
1149	1150	8000	2	4,539	10,553	10,802	9,174
1149	1527	4900	1	0	0	0	0
1150	99	99999	1	8,363	7,428	7,780	8,064
1150	1144	5650	1	11,020	16,017	19,979	21,040
1150	1145	5650	1	8,335	15,187	12,660	15,995
1150	1149	8000	1	4,788	8,294	10,125	10,043
1151	1132	4900	1	176	354	399	438
1151	1217	4900	1	176	355	401	447
1152	108	99999	1	299	591	606	605
1152	1153	4900	1	299	595	609	608
1153	77	99999	1	3	343	825	2,413
1153	1152	4900	1	299	591	606	605
1153	1154	4900	1	304	862	1,362	2,662
1154	1153	4900	1	302	912	1,372	2,882
1154	1155	4900	1	304	862	1,362	2,662
1155	1154	4900	1	302	912	1,372	2,882
1155	1156	4900	1	304	862	1,362	2,662
1156	1155	4900	1	302	912	1,372	2,882
1156	1157	4900	1	304	862	1,362	2,662
1157	1111	4900	1	304	862	1,362	2,662
1157	1156	4900	1	302	912	1,372	2,882
1160	80	99999	1	1,038	1,406	1,407	1,413
1160	103	99999	1	1,924	802	651	939
1160	1109	5650	1	4,670	9,667	10,485	12,788
1160	1133	5650	1	7,156	10,739	11,899	14,140
1162	50	99999	1	59	475	875	919
1162	77	99999	1	5	552	1,887	3,592
1162	107	99999	1	1,513	3,079	3,132	3,149
1162	1163	5650	1	1,458	4,089	5,425	6,964
1163	1115	5650	1	1,458	4,089	5,425	6,964
1163	1162	5650	1	1,458	3,789	5,435	6,758
1164	1171	4150	1	0	0	0	0
1165	1166	4150	1	760	3,217	4,087	4,970
1165	1171	4150	1	669	3,383	4,137	5,380
1166	102	99999	1	26	38	49	89
1166	103	99999	1	99	1,766	1,921	1,704
1166	1165	4150	1	669	3,383	4,137	5,380
1166	1167	4150	1	709	3,385	4,212	5,813
1167	1166	4150	1	618	3,590	4,284	6,189
1167	1168	4150	1	280	1,446	1,992	3,052
1167	1169	3300	1	429	2,841	2,578	3,508
1168	1133	4150	1	280	1,446	1,992	3,052
1168	1167	4150	1	280	1,477	1,922	3,450
1169	1167	3300	1	338	3,015	2,721	3,485
1169	1170	3300	1	429	2,841	2,578	3,508
1170	102	99999	1	774	792	775	733

1170	1135	3300	1	1,203	3,590	3,279	4,181
1170	1169	3300	1	338	3,015	2,721	3,485
1171	1164	4150	1	0	0	0	0
1171	1165	4150	1	760	3,217	4,087	4,970
1171	1172	4150	1	669	3,383	4,137	5,380
1172	101	99999	1	2,028	5,090	5,309	6,099
1172	1136	4150	1	1,277	3,913	4,562	5,584
1172	1171	4150	1	760	3,217	4,087	4,970
1174	1179	5650	1	4,926	8,468	9,949	10,918
1174	1180	5650	1	8,292	11,870	14,316	17,332
1174	1469	4900	1	4,074	8,866	6,936	10,225
1175	82	99999	1	1,272	1,426	1,440	1,491
1175	1137	5650	1	8,876	12,228	14,333	15,909
1175	1138	5650	1	10,107	15,276	15,817	17,595
1177	1116	5650	1	4,707	8,095	9,185	10,755
1177	1178	5650	1	4,538	8,192	9,357	10,988
1178	51	99999	1	580	477	517	526
1178	1177	5650	1	4,707	8,095	9,185	10,755
1178	1179	5650	1	5,009	8,571	9,755	11,377
1179	75	99999	1	295	1,088	1,410	758
1179	1174	5650	1	4,764	8,626	9,994	11,080
1179	1178	5650	1	5,183	8,446	9,581	11,159
1180	52	99999	1	245	1,768	1,830	2,200
1180	74	99999	1	1,194	1,183	1,324	1,152
1180	1174	5650	1	8,266	13,802	14,000	17,482
1180	1181	5650	1	9,536	13,913	16,385	19,491
1181	1180	5650	1	9,589	15,694	16,086	19,555
1181	1204	3300	1	1,955	5,608	6,332	6,772
1181	1286	8000	2	11,563	17,211	19,641	21,790
1182	53	99999	1	1,615	414	415	412
1182	1183	8000	2	11,844	15,156	16,079	20,539
1182	1203	4900	1	5,397	10,053	11,852	12,083
1182	1286	8000	1	11,556	20,664	22,521	26,184
1183	57	99999	1	0	1,241	5,816	6,632
1183	1182	8000	1	11,681	15,279	15,855	21,058
1183	1184	8000	2	11,844	15,320	16,520	21,680
1184	1183	8000	1	11,681	15,353	16,227	22,410
1184	1265	11000	2	21,729	33,068	33,234	36,784
1184	1487	11000	2	18,270	29,552	29,836	36,905
1189	72	99999	1	6,997	4,538	4,675	6,286
1189	1202	4900	1	5,070	9,660	10,943	11,094
1189	1203	4900	1	5,067	12,024	11,876	11,912
1190	1193	11000	2	15,680	21,257	17,780	26,880
1190	1305	11000	2	14,126	22,636	24,236	26,282
1192	71	99999	1	887	1,044	1,107	1,133
1192	1201	4900	1	4,876	9,967	11,218	11,519
1192	1202	4900	1	4,747	11,629	10,967	10,914
1193	1190	11000	2	14,126	22,636	24,236	26,282
1193	1194	3300	1	2,551	5,515	4,301	6,198

1193	1445	11000	2	15,862	27,290	20,426	30,563
1194	87	99999	1	2,865	4,255	4,410	3,866
1194	1193	3300	1	1,775	8,357	5,055	5,524
1194	1195	3300	1	5,213	7,654	6,381	8,814
1195	1194	3300	1	4,640	10,557	7,485	8,502
1195	1197	4900	1	4,370	6,639	7,708	6,487
1195	1198	4900	1	3,593	6,551	5,887	7,292
1196	86	99999	1	443	333	344	651
1196	1142	4900	1	4,467	6,657	7,747	6,610
1196	1197	4900	1	3,945	9,193	8,495	6,287
1197	1195	4900	1	3,945	9,193	8,495	6,287
1197	1196	4900	1	4,370	6,639	7,708	6,487
1198	1195	4900	1	3,445	6,900	6,205	7,181
1198	1199	4900	1	3,593	6,551	5,887	7,292
1199	1198	4900	1	3,445	6,900	6,205	7,181
1199	1200	4900	1	3,593	6,551	5,887	7,292
1200	1199	4900	1	3,445	6,900	6,205	7,181
1200	1201	4900	1	3,593	6,551	5,887	7,292
1201	1192	4900	1	4,519	11,872	11,019	11,428
1201	1200	4900	1	3,445	6,900	6,205	7,181
1201	1305	3300	1	1,461	4,336	6,043	4,995
1202	1189	4900	1	4,747	11,629	10,967	10,914
1202	1192	4900	1	5,070	9,660	10,943	11,094
1203	1182	4900	1	5,067	12,024	11,876	11,912
1203	1189	4900	1	5,397	10,053	11,852	12,083
1204	1181	3300	1	2,432	5,144	6,162	6,724
1204	1475	3300	1	1,955	5,608	6,332	6,772
1205	100	99999	1	3,308	5,956	6,156	8,688
1205	1139	9650	2	8,268	16,229	16,718	19,029
1205	1206	9650	2	5,495	11,512	11,708	11,721
1206	110	99999	2	5,495	11,512	11,708	11,721
1206	1205	9650	2	5,497	11,514	11,710	11,726
1208	30	99999	1	7	32	116	136
1208	1531	2950	1	7	30	114	154
1209	9	99999	1	0	31	62	95
1209	1210	3500	1	1	32	59	90
1210	1209	3500	1	0	31	62	95
1210	1211	3500	1	1	32	59	90
1211	1210	3500	1	0	31	62	95
1211	1212	3500	1	1	32	59	90
1212	1	99999	1	1	18	16	12
1212	1211	3500	1	0	31	62	95
1212	1213	3500	1	1	40	65	94
1213	1212	3500	1	1	39	68	99
1213	1214	3500	1	1	40	65	94
1214	1213	3500	1	1	39	68	99
1214	1215	3500	1	1	40	65	94
1215	1214	3500	1	1	39	68	99
1215	1216	3500	1	1	40	65	94

1216	1215	3500	1	1	39	68	99
1216	1217	3500	1	1	40	65	94
1217	121	99999	1	177	354	364	372
1217	1151	4900	1	176	354	399	438
1217	1216	3500	1	1	39	68	99
1219	9	99999	1	81	656	636	609
1219	106	99999	1	910	1,896	1,931	1,935
1219	1528	4900	1	980	2,504	2,529	2,510
1220	1221	4900	1	3,385	10,014	10,477	12,006
1220	1528	4900	1	3,398	9,419	10,769	12,143
1221	28	99999	1	5	416	2,611	2,625
1221	1220	4900	1	3,398	9,419	10,769	12,143
1221	1222	4900	1	1,468	8,382	8,323	9,252
1221	1258	4900	1	2,259	9,167	10,624	13,087
1222	1221	4900	1	1,677	7,897	8,126	9,697
1222	1471	4900	1	1,468	8,382	8,323	9,252
1223	1224	4900	1	2,106	8,454	8,458	9,566
1223	1471	4900	1	2,314	7,965	8,224	10,080
1224	1223	4900	1	2,314	7,965	8,224	10,080
1224	1225	4900	1	2,106	8,454	8,458	9,566
1225	26	99999	1	92	1,206	1,311	1,321
1225	1224	4900	1	2,314	7,965	8,224	10,080
1225	1226	4900	1	2,199	9,659	9,726	10,955
1226	1225	4900	1	2,406	9,171	9,535	11,401
1226	1245	4900	1	1,187	5,426	6,128	7,297
1226	1246	4900	1	1,355	7,581	8,166	10,179
1228	1132	4900	1	176	355	401	447
1228	1229	4900	1	176	354	399	438
1229	1	99999	1	67	700	709	723
1229	2	99999	1	67	901	1,571	3,974
1229	1228	4900	1	176	355	401	447
1229	1230	4900	1	299	1,830	2,547	4,968
1230	1229	4900	1	307	1,876	2,504	4,864
1230	1231	4900	1	366	4,632	5,322	7,620
1230	1234	2650	1	112	2,813	3,479	3,234
1231	10	99999	1	4	19	19	15
1231	1230	4900	1	358	4,140	5,302	7,539
1231	1232	4900	1	367	4,643	5,333	7,631
1232	1231	4900	1	359	4,153	5,310	7,546
1232	1233	4900	1	367	4,643	5,333	7,631
1233	1232	4900	1	359	4,153	5,310	7,546
1233	1528	4900	1	367	4,643	5,333	7,631
1234	1230	2650	1	129	3,351	3,457	3,211
1234	1235	2650	1	112	2,813	3,479	3,234
1235	2	99999	1	57	996	1,790	3,015
1235	1234	2650	1	129	3,351	3,457	3,211
1235	1236	2650	1	162	3,826	5,200	6,108
1236	1235	2650	1	186	4,347	5,247	6,226
1236	1237	2650	1	162	3,826	5,200	6,108

1237	11	99999	1	567	750	751	747
1237	1236	2650	1	186	4,347	5,247	6,226
1237	1238	2650	1	538	4,071	5,436	6,322
1238	1237	2650	1	564	4,597	5,485	6,440
1238	1239	2650	1	538	4,071	5,436	6,322
1239	3	99999	1	9	421	1,249	1,251
1239	67	99999	1	2	217	360	285
1239	1238	2650	1	564	4,597	5,485	6,440
1239	1240	2650	1	544	4,279	6,042	6,977
1240	1239	2650	1	569	4,797	6,089	7,054
1240	1241	2650	1	544	4,279	6,042	6,977
1241	1240	2650	1	569	4,797	6,089	7,054
1241	1479	11000	2	9,640	20,749	21,052	21,054
1241	1482	11000	2	9,904	22,038	22,235	24,201
1242	1243	4900	1	1,189	5,819	6,958	8,173
1242	1292	11000	2	9,010	19,239	20,907	21,423
1242	1482	11000	2	10,085	22,782	22,912	25,079
1243	67	99999	1	90	2,277	2,263	2,303
1243	1242	4900	1	1,164	5,998	7,088	8,557
1243	1244	4900	1	1,121	5,247	5,976	6,960
1244	13	99999	1	330	607	712	490
1244	1243	4900	1	1,099	5,428	6,108	7,383
1244	1245	4900	1	1,214	5,242	6,002	6,873
1245	1226	4900	1	1,214	5,242	6,002	6,873
1245	1244	4900	1	1,187	5,426	6,128	7,297
1246	105	99999	1	90	274	277	270
1246	1226	4900	1	1,536	7,277	8,100	11,048
1246	1247	4900	1	1,437	7,727	8,316	10,353
1247	1246	4900	1	1,617	7,422	8,252	11,220
1247	1248	4900	1	1,437	7,727	8,316	10,353
1248	33	99999	1	157	2,449	2,512	2,161
1248	1247	4900	1	1,617	7,422	8,252	11,220
1248	1249	4900	1	1,397	8,464	9,189	10,686
1249	1248	4900	1	1,684	7,900	9,009	11,594
1249	1375	4900	1	5,466	12,886	13,196	16,127
1249	1473	11000	2	10,533	18,765	21,156	21,019
1249	1483	11000	2	10,739	20,889	22,313	25,357
1250	34	99999	1	4,347	8,623	8,865	9,259
1250	1251	3300	1	0	341	305	1,557
1250	1255	11000	2	12,849	23,794	25,127	26,571
1250	1442	11000	2	11,258	22,767	23,868	27,693
1251	1250	3300	1	0	306	292	1,602
1251	1252	3300	1	0	341	305	1,557
1252	1251	3300	1	0	306	292	1,602
1252	1253	3300	1	0	341	305	1,557
1253	1252	3300	1	0	306	292	1,602
1253	1254	3300	1	0	341	305	1,557
1254	45	99999	1	235	198	202	206
1254	1253	3300	1	0	306	292	1,602

1254	1255	3300	1	240	415	371	1,628
1254	1256	3300	1	0	0	0	0
1255	1250	11000	2	13,159	23,742	24,963	27,575
1255	1254	3300	1	235	385	358	1,677
1255	1287	11000	2	12,940	24,176	25,471	28,160
1256	1254	3300	1	0	0	0	0
1256	1257	3300	1	0	0	0	0
1257	1256	3300	1	0	0	0	0
1258	31	99999	1	20	12	13	15
1258	1221	4900	1	2,063	9,064	11,114	12,780
1258	1259	4900	1	1,352	5,730	5,863	7,441
1258	1280	4900	1	1,036	6,400	6,788	7,851
1259	1258	4900	1	1,217	5,730	6,419	6,891
1259	1260	4900	1	1,352	5,730	5,863	7,441
1260	32	99999	1	640	644	633	637
1260	48	99999	1	160	499	431	443
1260	1259	4900	1	1,217	5,730	6,419	6,891
1260	1261	4900	1	1,912	6,423	6,569	8,138
1261	47	99999	1	1,419	3,220	3,361	5,207
1261	1260	4900	1	1,791	6,476	7,124	7,581
1261	1262	4900	1	2,949	8,234	8,194	10,653
1262	1261	4900	1	2,827	8,282	8,758	10,100
1262	1263	4900	1	2,584	7,241	7,543	9,801
1262	1290	4900	1	1,139	6,577	6,410	7,846
1263	1262	4900	1	2,393	7,355	8,119	9,333
1263	1264	4900	1	2,452	8,665	10,230	11,376
1263	1484	4900	1	3,140	5,948	7,531	8,504
1264	57	99999	1	0	1,299	5,262	4,598
1264	1263	4900	1	3,871	8,247	10,661	11,589
1264	1265	4900	1	2,452	7,979	8,761	9,155
1265	1184	11000	2	22,402	34,767	33,631	37,847
1265	1264	4900	1	3,871	7,654	9,268	9,163
1265	1486	11000	2	17,883	26,316	28,038	30,348
1273	1284	4900	1	1,096	6,454	6,886	8,302
1273	1285	4900	1	1,168	6,605	6,960	8,059
1280	1258	4900	1	973	6,297	6,722	8,096
1280	1281	4900	1	1,036	6,400	6,788	7,851
1281	48	99999	1	158	255	313	309
1281	1280	4900	1	973	6,297	6,722	8,096
1281	1282	4900	1	1,168	6,605	6,960	8,059
1282	1281	4900	1	1,096	6,454	6,886	8,302
1282	1283	4900	1	1,168	6,605	6,960	8,059
1283	1282	4900	1	1,096	6,454	6,886	8,302
1283	1284	4900	1	1,168	6,605	6,960	8,059
1284	1273	4900	1	1,168	6,605	6,960	8,059
1284	1283	4900	1	1,096	6,454	6,886	8,302
1285	54	99999	1	0	227	229	220
1285	1273	4900	1	1,096	6,454	6,886	8,302
1285	1286	4900	1	1,168	6,740	7,115	8,217

1286	1181	8000	1	11,138	19,456	19,514	21,901
1286	1182	8000	2	12,052	18,566	22,722	25,836
1286	1285	4900	1	1,096	6,593	7,042	8,453
1287	1255	11000	2	13,246	24,094	25,294	29,212
1287	1288	4900	1	2,163	6,810	6,989	8,654
1287	1485	11000	2	12,771	19,724	20,977	22,489
1288	1287	4900	1	2,097	6,879	7,007	8,743
1288	1289	4900	1	2,163	6,810	6,989	8,654
1289	44	99999	1	2,062	2,206	2,278	2,657
1289	1288	4900	1	2,097	6,879	7,007	8,743
1289	1290	4900	1	1,209	6,510	6,398	7,761
1290	1262	4900	1	1,209	6,510	6,398	7,761
1290	1289	4900	1	1,139	6,577	6,410	7,846
1291	1440	4900	1	9,026	14,035	16,039	16,677
1291	1484	4900	1	1,882	6,041	7,186	7,592
1291	1485	11000	2	12,902	19,343	21,209	23,251
1291	1486	11000	2	19,628	27,101	28,384	30,800
1292	1242	11000	2	9,071	19,368	20,760	20,990
1292	1293	4900	1	887	7,444	8,259	9,178
1292	1480	11000	2	9,542	18,200	20,507	21,965
1293	4	99999	1	0	1,171	1,347	1,259
1293	1292	4900	1	1,092	8,439	9,525	11,025
1293	1294	4900	1	887	7,136	7,885	8,832
1294	1293	4900	1	1,092	8,336	9,213	10,794
1294	1361	4900	1	887	7,136	7,885	8,832
1295	104	99999	1	31	84	65	137
1295	109	99999	1	5,432	12,190	12,331	12,341
1295	1108	5650	1	5,401	12,119	12,277	12,213
1296	112	99999	1	0	0	0	0
1296	1297	4900	1	0	0	0	0
1297	1296	4900	1	0	0	0	0
1298	1299	4900	1	0	0	0	0
1299	97	99999	1	813	170	176	176
1299	1298	4900	1	0	0	0	0
1299	1300	4900	1	813	171	177	178
1300	1299	4900	1	813	170	176	176
1300	1301	4900	1	813	171	177	178
1301	1300	4900	1	813	170	176	176
1301	1302	4900	1	813	171	177	178
1302	1301	4900	1	813	170	176	176
1302	1303	4900	1	3,307	8,936	8,182	12,406
1302	1445	3900	1	3,638	9,765	15,079	12,532
1303	88	99999	1	3,186	1,254	1,281	1,525
1303	89	99999	1	2,431	3,048	3,138	3,273
1303	1302	4900	1	3,070	9,665	14,988	12,432
1303	1304	4900	1	3,502	9,796	9,230	13,529
1304	1303	4900	1	3,263	10,522	16,039	13,547
1304	1305	4900	1	3,502	9,796	9,230	13,529
1305	1190	11000	2	15,680	21,257	17,780	26,880

1305	1201	3300	1	955	6,589	6,162	4,792
1305	1304	4900	1	3,263	10,522	16,039	13,547
1305	1443	11000	2	16,816	26,624	27,743	34,915
1306	1530	15400	3	15,246	37,966	41,811	47,078
1306	1628	15400	2	14,479	36,022	40,849	46,138
1307	96	99999	1	1,457	5,712	4,377	10,899
1307	1493	15400	3	12,142	29,155	37,212	40,903
1307	1530	15400	2	12,617	30,873	39,509	44,735
1308	1309	15400	3	10,319	24,204	24,376	24,417
1308	1320	4900	1	6,648	14,397	15,093	18,266
1308	1404	4900	1	2,535	6,589	6,756	8,322
1308	1493	15400	2	11,657	23,489	29,406	29,959
1309	93	99999	1	5	167	174	177
1309	1308	15400	2	10,314	24,201	24,381	24,409
1309	1310	15400	3	10,314	24,086	24,238	24,268
1310	114	99999	3	10,314	24,086	24,238	24,268
1310	1309	15400	2	10,311	24,085	24,239	24,261
1312	1313	4900	1	139	547	5,421	5,534
1312	1320	4900	1	8,575	20,519	24,270	26,526
1312	1405	4900	1	9,322	22,291	24,159	26,415
1313	1312	4900	1	142	546	5,424	5,533
1313	1314	4900	1	139	547	5,421	5,534
1314	65	99999	1	104	436	5,331	5,436
1314	1313	4900	1	142	546	5,424	5,533
1314	1315	4900	1	35	111	104	110
1315	1314	4900	1	33	108	109	110
1315	1316	4900	1	35	111	104	110
1316	1315	4900	1	33	108	109	110
1316	1317	4900	1	35	111	104	110
1317	1316	4900	1	33	108	109	110
1317	1318	4900	1	35	111	104	110
1318	64	99999	1	35	111	104	110
1318	1317	4900	1	33	108	109	110
1318	1319	4900	1	0	0	0	0
1319	1318	4900	1	0	0	0	0
1320	92	99999	1	29	85	896	889
1320	1308	4900	1	6,874	13,473	15,875	17,610
1320	1312	4900	1	9,352	22,454	25,227	27,465
1320	1321	4900	1	1,844	8,948	10,280	11,231
1321	66	99999	1	560	804	810	811
1321	1320	4900	1	2,845	9,959	12,021	11,509
1321	1322	4900	1	1,983	9,198	10,470	11,427
1322	1321	4900	1	2,983	10,212	12,214	11,704
1322	1323	4900	1	1,983	9,198	10,470	11,427
1323	68	99999	1	574	892	892	894
1323	1322	4900	1	2,983	10,212	12,214	11,704
1323	1529	4900	1	2,339	9,704	10,964	11,952
1324	1325	4900	1	0	0	0	0
1324	1529	4900	1	0	0	0	0

1325	1324	4900	1	0	0	0	0
1326	40	99999	1	0	3	4	4
1326	115	99999	1	1,183	2,482	2,525	2,527
1326	1394	4900	1	1,332	8,913	9,173	12,456
1326	1474	4900	1	756	7,350	7,965	12,069
1327	1328	4900	1	700	7,343	7,920	12,021
1327	1474	4900	1	645	7,935	8,318	11,618
1328	62	99999	1	48	161	189	178
1328	1327	4900	1	645	7,935	8,318	11,618
1328	1329	4900	1	738	7,475	8,031	12,130
1329	1328	4900	1	688	8,065	8,439	11,734
1329	1330	4900	1	738	7,475	8,031	12,130
1330	1329	4900	1	688	8,065	8,439	11,734
1330	1407	4900	1	8,539	20,194	23,040	25,335
1330	1408	4900	1	8,627	14,110	15,566	14,806
1331	1332	3300	1	2,473	2,645	2,652	2,665
1331	1334	4900	1	790	2,599	3,680	7,394
1331	1391	4900	1	6,619	7,205	7,981	8,497
1331	1488	4900	1	7,934	10,510	11,123	12,891
1332	1331	3300	1	2,475	2,644	2,653	2,660
1332	1333	3300	1	2,473	2,645	2,652	2,665
1333	60	99999	1	2,473	2,645	2,652	2,665
1333	1332	3300	1	2,475	2,644	2,653	2,660
1334	1331	4900	1	897	2,593	3,677	7,691
1334	1335	4900	1	790	2,599	3,680	7,394
1335	37	99999	1	542	565	1,425	3,353
1335	1334	4900	1	897	2,593	3,677	7,691
1335	1336	4900	1	509	2,509	3,170	6,906
1336	1335	4900	1	618	2,503	3,166	7,206
1336	1337	4900	1	509	2,509	3,170	6,906
1337	1336	4900	1	618	2,503	3,166	7,206
1337	1338	3500	1	30	2,269	1,642	5,960
1337	1382	4900	1	3,836	10,410	8,575	12,092
1337	1413	4900	1	2,789	8,384	11,001	13,305
1338	1337	3500	1	13	3,863	1,692	6,844
1338	1339	3500	1	30	2,269	1,642	5,960
1339	1338	3500	1	13	3,863	1,692	6,844
1339	1340	3500	1	30	2,269	1,642	5,960
1340	1339	3500	1	13	3,863	1,692	6,844
1340	1341	3500	1	30	2,269	1,642	5,960
1341	1340	3500	1	13	3,863	1,692	6,844
1341	1342	3500	1	0	0	0	0
1341	1433	4900	1	52	6,318	6,740	8,707
1341	1434	4900	1	187	5,935	9,609	12,427
1342	1341	3500	1	0	0	0	0
1343	21	99999	1	106	422	344	290
1343	1344	4900	1	108	6,378	6,834	9,864
1343	1378	4900	1	3,746	11,047	11,600	14,489
1343	1382	4900	1	3,629	8,964	8,893	8,705

1344	1343	4900	1	230	5,803	9,292	11,564
1344	1345	4900	1	108	6,378	6,834	9,864
1345	1344	4900	1	230	5,803	9,292	11,564
1345	1346	4900	1	108	6,378	6,834	9,864
1346	1345	4900	1	230	5,803	9,292	11,564
1346	1347	4900	1	125	587	597	3,021
1346	1436	4900	1	59	6,232	6,726	9,206
1347	20	99999	1	80	500	501	2,934
1347	1346	4900	1	122	586	595	3,017
1347	1348	4900	1	47	90	96	94
1348	116	99999	1	47	90	96	94
1348	1347	4900	1	45	89	92	89
1350	1351	3500	1	572	1,980	2,025	2,060
1350	1374	4900	1	1,502	3,945	4,100	4,207
1350	1422	4900	1	943	2,010	2,127	2,170
1351	8	99999	1	108	959	971	992
1351	19	99999	1	244	627	637	639
1351	117	99999	1	238	447	462	464
1351	1350	3500	1	583	1,993	2,027	2,075
1353	5	99999	1	15	167	181	176
1353	15	99999	1	8	250	256	272
1353	1354	4900	1	418	1,211	1,221	1,219
1353	1361	4900	1	443	1,627	1,647	1,650
1354	1353	4900	1	422	1,212	1,224	1,220
1354	1358	4900	1	111	224	228	223
1354	1360	4900	1	311	999	1,003	1,006
1355	6	99999	1	311	999	1,003	1,006
1355	1360	4900	1	313	998	1,004	1,001
1355	1538	4900	1	0	0	0	0
1356	1538	4900	1	0	0	0	0
1358	119	99999	1	111	224	228	223
1358	1354	4900	1	113	226	230	229
1360	1354	4900	1	313	998	1,004	1,001
1360	1355	4900	1	311	999	1,003	1,006
1361	1294	4900	1	1,092	8,336	9,213	10,794
1361	1353	4900	1	439	1,624	1,650	1,660
1361	1362	4900	1	514	5,967	6,696	7,683
1362	1361	4900	1	715	7,164	8,027	9,656
1362	1363	4900	1	514	5,967	6,696	7,683
1363	1362	4900	1	715	7,164	8,027	9,656
1363	1364	4900	1	514	5,967	6,696	7,683
1364	1363	4900	1	715	7,164	8,027	9,656
1364	1365	4900	1	514	5,967	6,696	7,683
1365	1364	4900	1	715	7,164	8,027	9,656
1365	1366	4900	1	514	5,967	6,696	7,683
1366	1365	4900	1	715	7,164	8,027	9,656
1366	1367	4900	1	514	5,967	6,696	7,683
1367	1366	4900	1	715	7,164	8,027	9,656
1367	1368	4900	1	514	5,967	6,696	7,683

1368	1367	4900	1	715	7,164	8,027	9,656
1368	1369	4900	1	514	5,967	6,696	7,683
1369	16	99999	1	254	535	536	538
1369	1368	4900	1	715	7,164	8,027	9,656
1369	1370	4900	1	346	5,659	6,403	7,418
1370	1369	4900	1	551	6,854	7,736	9,388
1370	1371	4900	1	346	5,659	6,403	7,418
1371	1370	4900	1	551	6,854	7,736	9,388
1371	1372	4900	1	346	5,659	6,403	7,418
1372	1371	4900	1	551	6,854	7,736	9,388
1372	1373	4900	1	346	5,659	6,403	7,418
1373	17	99999	1	45	355	446	499
1373	1372	4900	1	551	6,854	7,736	9,388
1373	1472	4900	1	382	5,495	6,114	7,035
1374	1350	4900	1	1,495	3,936	4,103	4,196
1374	1421	4900	1	1,273	5,672	6,729	7,701
1374	1472	4900	1	511	6,607	7,288	8,870
1375	1249	4900	1	5,191	11,797	11,895	13,661
1375	1376	4900	1	5,466	12,886	13,196	16,127
1376	1375	4900	1	5,191	11,797	11,895	13,661
1376	1379	4900	1	4,346	7,441	7,642	7,103
1376	1437	4900	1	1,209	6,334	7,467	9,556
1377	1378	4900	1	3,604	6,762	7,022	6,641
1377	1381	4900	1	3,506	5,589	5,638	6,071
1378	1343	4900	1	3,643	11,083	11,672	13,183
1378	1377	4900	1	3,506	5,589	5,638	6,071
1378	1414	4900	1	1,783	7,408	8,488	10,716
1379	23	99999	1	109	372	630	431
1379	1376	4900	1	4,274	6,200	6,568	6,410
1379	1380	4900	1	4,485	7,805	8,031	7,478
1380	1379	4900	1	4,383	6,572	6,636	6,841
1380	1381	4900	1	4,485	7,805	8,031	7,478
1381	17	99999	1	1,235	1,304	1,220	1,175
1381	22	99999	1	70	208	205	162
1381	1377	4900	1	3,604	6,762	7,022	6,641
1381	1380	4900	1	4,383	6,572	6,636	6,841
1382	1337	4900	1	3,210	9,361	10,731	13,659
1382	1343	4900	1	3,617	9,543	6,339	8,291
1382	1481	4900	1	813	5,368	6,477	8,633
1383	22	99999	1	26	89	105	148
1383	1384	4900	1	871	5,553	6,629	8,759
1383	1481	4900	1	248	5,089	6,312	10,003
1384	1383	4900	1	220	5,035	6,260	9,953
1384	1385	4900	1	871	5,553	6,629	8,759
1385	1384	4900	1	220	5,035	6,260	9,953
1385	1386	4900	1	871	5,553	6,629	8,759
1386	1385	4900	1	220	5,035	6,260	9,953
1386	1387	4900	1	871	5,553	6,629	8,759
1387	36	99999	1	102	1,665	1,696	1,705

1387	1386	4900	1	220	5,035	6,260	9,953
1387	1388	4900	1	943	6,652	7,710	9,713
1388	1387	4900	1	292	6,130	7,342	10,908
1388	1389	4900	1	943	6,652	7,710	9,713
1389	35	99999	1	35	127	130	132
1389	1388	4900	1	292	6,130	7,342	10,908
1389	1438	4900	1	969	6,743	7,793	9,796
1390	1438	4900	1	0	0	0	0
1391	1331	4900	1	6,533	8,578	8,553	8,914
1391	1392	4900	1	6,619	7,205	7,981	8,497
1392	1391	4900	1	6,533	8,578	8,553	8,914
1392	1393	4900	1	6,619	7,205	7,981	8,497
1393	42	99999	1	277	445	788	1,558
1393	1392	4900	1	6,533	8,578	8,553	8,914
1393	1410	4900	1	6,524	7,064	7,836	8,280
1394	41	99999	1	518	868	873	880
1394	1326	4900	1	1,388	8,414	8,860	12,947
1394	1430	4900	1	1,417	9,044	9,329	12,617
1397	93	99999	1	1	34	21	24
1397	113	99999	1	2,443	4,975	5,091	5,089
1397	1398	4900	1	2,444	4,977	5,086	5,098
1398	1397	4900	1	2,442	4,975	5,088	5,093
1398	1399	4900	1	2,444	4,977	5,086	5,098
1399	1398	4900	1	2,442	4,975	5,088	5,093
1399	1400	4900	1	2,444	4,977	5,086	5,098
1400	94	99999	1	78	87	87	91
1400	1399	4900	1	2,442	4,975	5,088	5,093
1400	1401	4900	1	2,511	5,048	5,164	5,181
1401	1400	4900	1	2,506	5,045	5,163	5,176
1401	1402	4900	1	2,511	5,048	5,164	5,181
1402	1401	4900	1	2,506	5,045	5,163	5,176
1402	1403	4900	1	2,511	5,048	5,164	5,181
1403	95	99999	1	41	2,234	2,249	4,050
1403	1402	4900	1	2,506	5,045	5,163	5,176
1403	1404	4900	1	2,538	6,584	6,857	8,236
1404	1308	4900	1	2,538	6,584	6,857	8,236
1404	1403	4900	1	2,535	6,589	6,756	8,322
1405	1312	4900	1	8,542	20,357	23,199	25,477
1405	1406	4900	1	9,322	22,291	24,159	26,415
1406	1405	4900	1	8,542	20,357	23,199	25,477
1406	1407	4900	1	9,322	22,291	24,159	26,415
1407	61	99999	1	390	913	922	918
1407	1330	4900	1	9,314	22,129	24,005	26,281
1407	1406	4900	1	8,542	20,357	23,199	25,477
1408	62	99999	1	52	169	137	157
1408	1330	4900	1	7,801	12,765	15,009	13,463
1408	1409	4900	1	8,689	14,279	15,710	14,957
1409	1408	4900	1	7,852	12,934	15,146	13,610
1409	1410	4900	1	8,689	14,279	15,710	14,957

1410	1393	4900	1	6,442	8,436	8,409	8,699
1410	1409	4900	1	7,852	12,934	15,146	13,610
1410	1411	4900	1	3,537	7,508	7,414	8,259
1410	1430	4900	1	1,462	6,231	6,600	9,471
1411	1410	4900	1	2,785	8,063	9,626	10,416
1411	1412	4900	1	3,537	7,508	7,414	8,259
1412	1411	4900	1	2,785	8,063	9,626	10,416
1412	1413	4900	1	3,537	7,508	7,414	8,259
1413	38	99999	1	14	902	3,721	9,488
1413	1337	4900	1	3,542	7,834	8,790	11,153
1413	1412	4900	1	2,785	8,063	9,626	10,416
1414	1378	4900	1	1,582	6,270	7,176	8,840
1414	1415	4900	1	1,783	7,408	8,488	10,716
1415	1414	4900	1	1,582	6,270	7,176	8,840
1415	1416	4900	1	1,783	7,408	8,488	10,716
1416	1415	4900	1	1,582	6,270	7,176	8,840
1416	1417	4900	1	1,783	7,408	8,488	10,716
1417	18	99999	1	369	1,064	1,069	4,024
1417	1416	4900	1	1,582	6,270	7,176	8,840
1417	1418	4900	1	1,475	6,807	8,042	9,576
1418	1417	4900	1	1,273	5,672	6,729	7,701
1418	1419	4900	1	1,475	6,807	8,042	9,576
1419	1418	4900	1	1,273	5,672	6,729	7,701
1419	1420	4900	1	1,475	6,807	8,042	9,576
1420	1419	4900	1	1,273	5,672	6,729	7,701
1420	1421	4900	1	1,475	6,807	8,042	9,576
1421	1374	4900	1	1,475	6,807	8,042	9,576
1421	1420	4900	1	1,273	5,672	6,729	7,701
1422	1350	4900	1	939	2,006	2,122	2,166
1422	1423	4900	1	943	2,010	2,127	2,170
1423	1422	4900	1	939	2,006	2,122	2,166
1423	1424	4900	1	943	2,010	2,127	2,170
1424	7	99999	1	17	55	114	134
1424	8	99999	1	7	55	49	38
1424	1423	4900	1	939	2,006	2,122	2,166
1424	1425	4900	1	965	2,094	2,131	2,127
1425	1424	4900	1	961	2,091	2,130	2,129
1425	1426	4900	1	965	2,094	2,131	2,127
1426	1425	4900	1	961	2,091	2,130	2,129
1426	1427	4900	1	965	2,094	2,131	2,127
1427	1426	4900	1	961	2,091	2,130	2,129
1427	1428	4900	1	965	2,094	2,131	2,127
1428	118	99999	1	965	2,094	2,131	2,127
1428	1427	4900	1	961	2,091	2,130	2,129
1430	1394	4900	1	1,478	8,546	9,016	13,107
1430	1410	4900	1	1,296	5,703	4,398	6,387
1430	1431	4900	1	158	7,344	9,255	11,301
1431	1430	4900	1	52	6,318	6,740	8,707
1431	1432	4900	1	158	7,344	9,255	11,301

1432	1431	4900	1	52	6,318	6,740	8,707
1432	1433	4900	1	158	7,344	9,255	11,301
1433	1341	4900	1	158	7,344	9,255	11,301
1433	1432	4900	1	52	6,318	6,740	8,707
1434	1341	4900	1	65	6,503	7,145	10,718
1434	1435	4900	1	187	5,935	9,609	12,427
1435	39	99999	1	71	1,134	1,142	6,066
1435	1434	4900	1	65	6,503	7,145	10,718
1435	1436	4900	1	183	5,657	9,186	10,911
1436	1346	4900	1	183	5,657	9,186	10,911
1436	1435	4900	1	59	6,232	6,726	9,206
1437	23	99999	1	766	2,984	2,845	3,203
1437	1376	4900	1	1,007	6,486	7,240	7,784
1437	1438	4900	1	839	5,827	7,189	9,309
1438	1389	4900	1	317	6,218	7,424	10,986
1438	1390	4900	1	0	0	0	0
1438	1437	4900	1	665	5,969	7,283	7,480
1438	1440	4900	1	1,693	6,103	5,715	10,151
1440	1291	4900	1	9,873	15,787	16,882	18,028
1440	1438	4900	1	867	5,720	5,440	9,511
1440	1488	4900	1	9,346	11,714	12,986	13,902
1442	46	99999	1	17	4,245	4,370	4,390
1442	1250	11000	2	10,949	22,859	24,050	26,647
1442	1532	11000	2	11,247	22,503	23,836	27,791
1443	69	99999	1	0	1,914	1,955	1,981
1443	71	99999	1	1,487	1,334	1,325	1,383
1443	1305	11000	2	17,626	28,225	28,214	35,328
1443	1487	11000	2	16,954	27,226	28,377	35,835
1445	87	99999	1	5,901	5,113	5,185	6,194
1445	1148	11000	2	18,842	38,989	36,994	43,511
1445	1193	11000	2	15,084	25,827	26,128	30,639
1445	1302	3900	1	3,876	9,036	8,272	12,505
1469	74	99999	1	352	582	452	626
1469	75	99999	1	2,535	1,884	1,578	2,240
1469	1174	4900	1	4,263	6,775	7,206	9,913
1469	1490	4900	1	3,280	8,446	6,715	9,943
1470	50	99999	1	555	1,039	1,021	846
1470	1127	2950	1	545	976	1,045	989
1470	1531	2950	1	7	32	116	136
1471	26	99999	1	54	449	356	348
1471	27	99999	1	1,237	1,738	1,744	1,757
1471	1222	4900	1	1,677	7,897	8,126	9,697
1471	1223	4900	1	2,106	8,454	8,458	9,566
1472	7	99999	1	241	709	659	652
1472	1373	4900	1	586	6,641	7,427	8,920
1472	1374	4900	1	302	5,463	5,978	6,985
1473	24	99999	1	524	1,226	2,987	1,130
1473	25	99999	1	43	1,997	2,057	2,069
1473	1249	11000	2	10,679	19,629	22,567	23,302

1473	1480	11000	2	10,140	17,335	19,190	19,751
1474	63	99999	1	302	473	485	481
1474	1326	4900	1	698	7,944	8,362	11,666
1474	1327	4900	1	700	7,343	7,920	12,021
1475	73	99999	1	1,146	1,174	1,176	1,219
1475	1204	3300	1	2,432	5,144	6,162	6,724
1475	1478	3300	1	2,085	5,585	6,196	6,833
1478	1140	3300	1	3,895	7,493	7,211	8,826
1478	1475	3300	1	2,557	5,121	6,023	6,787
1478	1526	3300	1	4,820	9,869	7,466	10,363
1479	1241	11000	2	9,637	20,751	21,050	21,056
1479	1544	11000	2	9,640	20,749	21,052	21,054
1480	14	99999	1	1,211	424	584	450
1480	1292	11000	2	9,397	17,334	19,092	19,685
1480	1473	11000	2	10,284	18,200	20,601	22,032
1481	21	99999	1	74	268	347	401
1481	1382	4900	1	174	4,898	6,079	9,787
1481	1383	4900	1	896	5,597	6,682	8,832
1482	4	99999	1	168	2,162	2,845	2,540
1482	12	99999	1	186	432	509	510
1482	1241	11000	2	9,932	22,554	22,284	24,276
1482	1242	11000	2	10,050	22,474	22,930	25,128
1483	33	99999	1	355	3,144	3,234	3,672
1483	1249	11000	2	11,155	20,550	22,023	26,448
1483	1532	11000	2	10,943	22,592	24,016	26,743
1484	55	99999	1	785	2,193	1,752	2,369
1484	56	99999	1	156	536	540	529
1484	1263	4900	1	1,530	6,479	7,677	7,823
1484	1291	4900	1	3,470	5,895	7,342	8,574
1485	55	99999	1	228	1,588	2,206	1,559
1485	1287	11000	2	13,144	19,574	20,783	23,454
1485	1291	11000	2	12,544	19,048	20,962	21,986
1486	56	99999	1	198	467	496	608
1486	58	99999	1	747	1,540	1,561	1,574
1486	1265	11000	2	19,974	27,689	28,943	31,419
1486	1291	11000	2	17,552	25,790	27,632	29,732
1487	70	99999	1	2,539	2,001	2,056	2,064
1487	1184	11000	2	17,434	27,887	29,146	36,572
1487	1443	11000	2	17,792	28,894	29,063	36,168
1488	59	99999	1	2,531	4,573	4,754	3,188
1488	1331	4900	1	7,911	9,143	10,554	12,182
1488	1440	4900	1	9,367	13,083	13,555	14,613
1489	83	99999	1	817	770	708	2,463
1489	1135	4900	1	2,655	7,557	5,968	8,615
1489	1490	4900	1	3,071	5,989	6,361	9,315
1490	82	99999	1	459	800	807	760
1490	1469	4900	1	3,401	6,541	6,838	9,664
1490	1489	4900	1	2,981	7,940	6,249	9,634
1491	99	99999	1	3,394	1,509	1,368	1,233

1491	1145	11000	2	17,882	33,721	34,442	35,210
1491	1494	11000	2	18,269	35,549	35,949	36,479
1492	98	99999	1	3,581	2,506	2,544	3,146
1492	111	99999	2	14,001	31,244	31,573	31,588
1492	1504	11000	2	16,692	33,023	33,489	34,041
1493	91	99999	1	7,751	13,390	23,620	24,496
1493	95	99999	1	45	2,770	4,046	6,659
1493	1307	15400	2	12,365	28,232	38,005	40,243
1493	1308	15400	3	11,433	24,422	28,517	30,709
1494	1491	11000	2	18,219	35,230	35,810	36,443
1494	1657	11000	1	18,269	35,549	35,949	36,479
1504	1492	11000	2	16,694	32,952	33,411	33,959
1504	1676	11000	1	16,692	33,023	33,489	34,041
1525	85	99999	1	883	134	125	190
1525	1139	5650	1	10,052	13,438	18,307	18,388
1525	1140	5650	1	11,875	16,687	17,702	18,380
1526	1139	3300	1	4,820	9,869	7,466	10,363
1526	1478	3300	1	3,489	8,396	8,219	10,756
1527	1149	4900	1	0	0	0	0
1528	29	99999	1	33	346	1,831	1,855
1528	1131	4900	1	2,647	9,812	10,453	11,413
1528	1219	4900	1	983	2,504	2,529	2,512
1528	1220	4900	1	3,385	10,014	10,477	12,006
1528	1233	4900	1	359	4,153	5,310	7,546
1529	90	99999	1	98	8,713	8,996	9,150
1529	1323	4900	1	3,335	10,722	12,714	12,228
1529	1324	4900	1	0	0	0	0
1529	1530	4900	1	2,398	12,867	14,292	15,394
1530	1306	15400	2	14,479	36,022	40,849	46,138
1530	1307	15400	3	12,389	31,800	38,720	45,396
1530	1529	4900	1	3,393	13,883	16,043	15,672
1531	1208	2950	1	7	32	116	136
1531	1470	2950	1	7	30	114	154
1532	1442	11000	2	10,943	22,592	24,016	26,743
1532	1483	11000	2	11,247	22,503	23,836	27,791
1538	1355	4900	1	0	0	0	0
1538	1356	4900	1	0	0	0	0
1544	120	99999	2	9,640	20,749	21,052	21,054
1544	1479	11000	2	9,637	20,751	21,050	21,056
1602	1603	36000	2	18,914	45,863	46,004	46,016
1603	1604	36000	2	18,914	45,863	46,004	46,016
1604	1612	36000	2	18,914	45,863	46,004	46,016
1605	1618	36000	2	12,000	30,000	30,000	30,000
1606	123	99999	0	30,113	71,770	72,092	72,107
1607	1648	36000	2	30,112	71,770	72,092	72,107
1608	1629	36000	2	14,000	35,000	35,000	35,000
1609	1610	36000	2	18,920	45,867	46,011	46,017
1610	1611	36000	2	18,920	45,867	46,011	46,017
1611	125	99999	0	18,920	45,867	46,011	46,017

1612	1605	36000	2	12,000	30,000	30,000	30,000
1612	1613	10800	1	6,914	15,863	16,004	16,016
1613	1615	10800	1	6,914	15,863	16,004	16,016
1614	1655	10800	1	12,748	28,613	29,206	29,268
1615	1619	10800	1	6,914	15,863	16,004	16,016
1616	1146	5650	1	11,421	25,511	30,122	35,901
1616	1614	10800	1	6,569	15,959	16,557	16,613
1616	1620	5650	1	11,947	24,107	29,197	34,777
1617	1618	10800	1	18,113	41,770	42,092	42,107
1618	1606	36000	2	30,113	71,770	72,092	72,107
1619	1616	10800	1	3,394	7,068	7,172	7,044
1619	1620	10800	1	3,520	8,795	8,832	8,972
1620	1145	5650	1	15,467	31,266	36,264	41,784
1620	1614	10800	1	6,179	12,654	12,649	12,655
1620	1616	5650	1	10,027	21,807	26,184	31,892
1623	1608	36000	2	14,000	35,000	35,000	35,000
1623	1624	10800	1	10,783	24,001	24,371	24,409
1624	1627	10800	1	10,783	24,001	24,371	24,409
1625	1626	15400	2	18,784	42,683	48,131	53,806
1625	1628	15400	3	8,769	20,625	24,723	30,337
1626	1146	15400	2	16,517	36,701	42,519	48,354
1626	1625	15400	3	8,769	20,625	24,723	30,337
1626	1678	10800	1	4,920	10,867	11,011	11,017
1627	1625	10800	1	4,305	6,660	7,282	7,668
1627	1628	10800	1	6,478	17,340	17,088	16,741
1628	1306	15400	3	15,246	37,966	41,811	47,078
1628	1625	15400	2	14,479	36,022	40,849	46,138
1629	1609	36000	2	18,920	45,867	46,011	46,017
1630	1677	36000	2	17,848	43,999	44,053	44,053
1631	1632	36000	2	16,719	41,218	41,268	41,392
1632	1633	36000	2	16,719	41,218	41,268	41,392
1633	1665	10800	1	8,169	19,843	19,893	20,017
1633	1666	36000	2	8,550	21,375	21,375	21,375
1634	122	99999	0	14,635	35,686	35,766	35,774
1635	1667	36000	2	14,635	35,686	35,769	35,772
1636	1637	36000	2	16,731	41,221	41,323	41,367
1637	1638	36000	2	16,731	41,221	41,323	41,367
1638	1641	36000	2	16,731	41,221	41,323	41,367
1639	124	99999	0	17,842	43,995	44,049	44,046
1641	1639	36000	2	17,842	43,995	44,049	44,046
1643	1669	10800	1	8,169	19,843	19,893	20,017
1644	1651	10800	1	2,671	7,231	7,279	7,302
1645	1660	10800	1	8,000	20,000	20,000	20,000
1646	1666	10800	1	6,085	14,311	14,391	14,399
1648	1649	10800	1	8,000	20,000	20,000	20,000
1648	1652	36000	2	22,112	51,770	52,092	52,107
1649	1650	10800	1	8,000	20,000	20,000	20,000
1650	1645	10800	1	8,000	20,000	20,000	20,000
1651	1652	10800	1	2,671	7,231	7,279	7,302

1652	1623	36000	2	24,783	59,001	59,371	59,409
1653	1644	10800	1	2,671	7,231	7,279	7,302
1653	1654	10800	1	8,000	20,000	20,000	20,000
1654	1617	10800	1	18,113	41,770	42,092	42,107
1655	1654	10800	1	10,113	21,770	22,092	22,107
1655	1656	10800	1	2,635	6,843	7,114	7,161
1656	1660	10800	1	5,445	12,689	12,885	12,893
1657	1494	11000	1	18,219	35,230	35,810	36,443
1657	1658	10800	1	2,276	4,647	4,583	4,537
1657	1659	10800	1	15,667	30,594	31,067	31,604
1657	1661	10800	1	821	1,468	1,454	1,498
1658	1656	10800	1	2,809	5,845	5,771	5,732
1659	1657	10800	1	18,715	36,390	36,965	37,603
1659	1658	10800	1	533	1,198	1,188	1,195
1659	1675	11000	1	15,667	30,594	31,067	31,604
1660	1662	10800	1	13,445	32,689	32,885	32,893
1661	1658	10800	1	0	0	0	0
1661	1664	10800	1	821	1,468	1,454	1,498
1662	1646	10800	1	6,085	14,311	14,391	14,399
1662	1664	10800	1	7,360	18,378	18,494	18,494
1663	1636	36000	2	16,731	41,221	41,323	41,367
1664	1663	10800	1	8,181	19,846	19,948	19,992
1665	1643	10800	1	8,169	19,843	19,893	20,017
1666	1634	36000	2	14,635	35,686	35,766	35,774
1667	1663	36000	2	8,550	21,375	21,375	21,375
1667	1668	10800	1	6,085	14,311	14,394	14,397
1668	1669	10800	1	3,304	8,783	8,775	8,739
1668	1670	10800	1	2,781	5,528	5,619	5,658
1669	1672	10800	1	11,473	28,626	28,668	28,756
1670	1504	10800	1	532	1,198	1,189	1,195
1670	1671	10800	1	2,249	4,330	4,430	4,463
1671	1675	11000	1	18,941	37,353	37,919	38,504
1671	1676	11000	1	15,667	30,594	31,067	31,604
1672	1653	10800	1	10,671	27,231	27,279	27,302
1672	1673	10800	1	802	1,395	1,389	1,453
1673	1674	10800	1	802	1,395	1,389	1,453
1674	1675	10800	1	307	235	234	293
1674	1676	10800	1	495	1,160	1,155	1,160
1675	1659	11000	1	19,248	37,588	38,153	38,798
1675	1671	11000	1	15,667	30,594	31,067	31,604
1676	1504	11000	1	16,162	31,754	32,222	32,764
1676	1671	11000	1	16,692	33,023	33,489	34,041
1677	1129	10800	1	1,129	2,781	2,785	2,661
1677	1631	36000	2	16,719	41,218	41,268	41,392
1678	1679	10800	1	4,920	10,867	11,011	11,017
1679	1629	10800	1	4,920	10,867	11,011	11,017

TO: Jason Kratsas
Lorin Meeder

FROM: John Maslanik

cc.: James Bowser
John Trant
Eric Kaunert

DATE: May 13, 2008

SUBJECT: Identified Water Distribution System Facilities Improvements Required to Accommodate Comprehensive Plan Growth Scenarios

This memo identifies improvements to the existing water distribution system facilities that have been determined to be required to accommodate Growth Scenarios A, B, and C defined by the Comprehensive Plan development team. Pursuant to our previous discussions, we are providing this information for your use in developing planning level cost estimates for constructing the improvements. These improvements were identified using the following general procedure:

1. The Cranberry Township Water Distribution System model was modified to reflect recent water demand information.

2. Future development statistics by parcel and development type through the year 2030 were provided by the planning team for each of the three development scenarios (Scenarios A, B and C). This information was provided in the form of estimated future population (defining residential development), and acreages defining various other developed land uses.

3. Unit water demand data for residential consumption and the various land uses were calculated based upon the current Cranberry Township billed water consumption and existing land use mapping.

4. Water demands associated with anticipated future increases were produced by applying the unit residential and other land water demands to the future residential and other land use projections provided for the three development scenarios.

5. Significant approved but not yet constructed developments were located and demand estimates based upon previously collected information.

6. Water demand allowances were included for potential future service to southern Jackson Township (as described previously in a July 11, 2007 memorandum report titled Feasibility of Water Service Extensions into Jackson Township, prepared by Chester Engineers. The water demand associated with the existing emergency supply connection to Evans City was included.

7. The updated Cranberry Township Water Distribution System Model was used as the basis for evaluating the impact of future development on the Cranberry sewer system and identifying required improvements to the existing facilities.

8. The locations of the projected future water demands associated with the alternative development scenarios were mapped. Based upon the locations of the new development and the configuration of the existing water distribution system, conceptual layouts were developed representing distribution mains required to reach new development areas that lie outside of the existing distribution system.

9. Total system average and maximum day demand projections were produced and the current and projected future demands were assigned to nodes in the model based upon the geolocated existing customer data and the locations of the future development sites. The demands include allowances for non-revenue water and the time variation of usage reflective of existing conditions. The projected increases in average and maximum day demands are illustrate in Figures 1 and 2.

10. The performance of the system was modeled under the projected maximum day demand conditions. The computer model was used to simulate system performance under existing and future development conditions for each of the scenarios. Starting with Scenario A (the lowest development projection) and minimal improvements, system performance was simulated and sets of distribution system improvements were sequentially identified and tested until acceptable system performance was attained under the projected future conditions. The process was designed to identify the minimal sets of improvements required to achieve acceptable system performance.

    System performance was measured using the following parameters:

    - Maintaining the essentially the same level or better level of service throughout the system in the future as is currently provided. The level of service was measured based upon the 1) the computed minimum working pressures at all nodes and 2) computed available fire flow rates at a 20-psi residual at all nodes in the system. This was evaluated by first modeling the existing system to compute minimum pressures and available fire flow rates. Candidate sets improvements to the distribution system for each development scenario were modeled to compute the associated minimum pressures and available fire flow rates. These results were compared to existing system performance to determine the change in working pressures and fire flow delivery capacities. The sets of system improvements were sequentially modified and modeled (starting the most minimal improvements) until the future level of service exceeded or nearly matched the existing level of service.

    - Providing the ability to pump the projected maximum day water demand rate into the system while maintaining acceptable storage tank levels and producing an acceptable rate of circulation of water through the storage tanks. It is important from a water quality standpoint that an acceptable rate of circulation through the tanks is maintained to prevent stagnation of the water.

    - Providing total water distribution system storage equivalent to the average daily total water demand.

    Cranberry Township is supplied with water by the West View Municipal Authority. A key factor in the analysis is the capacity and locations of the future supply connections to the West View Municipal Authority. Based upon information provided by Cranberry Township staff, this analysis anticipates that up to approximately 4.4-mgd of supply will be available from the West View Municipal Authority at the existing Commonwealth Drive Pump Station and that the required additional supplies will be available (in the future) at a location on Freedom Road at the western border of Cranberry Township.

The results of this analysis are presented in Table 1. Table 1 presents the projected required future pump station design capacities and additional storage volumes. It also lists the lengths of water mains by pipe diameter required to achieve acceptable performance under each development scenario. Water main improvements are identified separately for the following categories: 1) reinforcing mains within the existing system; 2) conceptual extensions required to reach future development sites within Cranberry Township that lie outside of the existing distribution system service area; and 3) conceptual extensions to serve southern Jackson Township.

Figure 1
Projected Average Day Water Demands

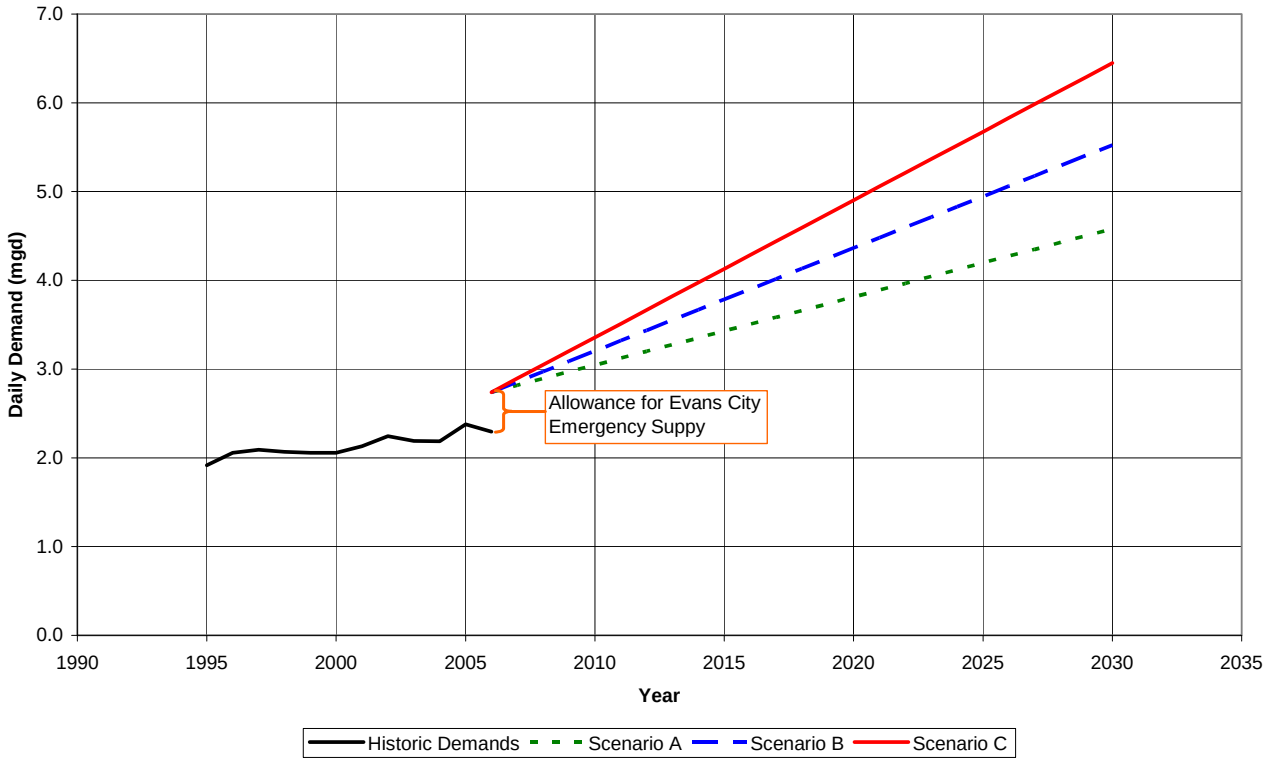


Figure 2
Projected Maximum Day Water Demands

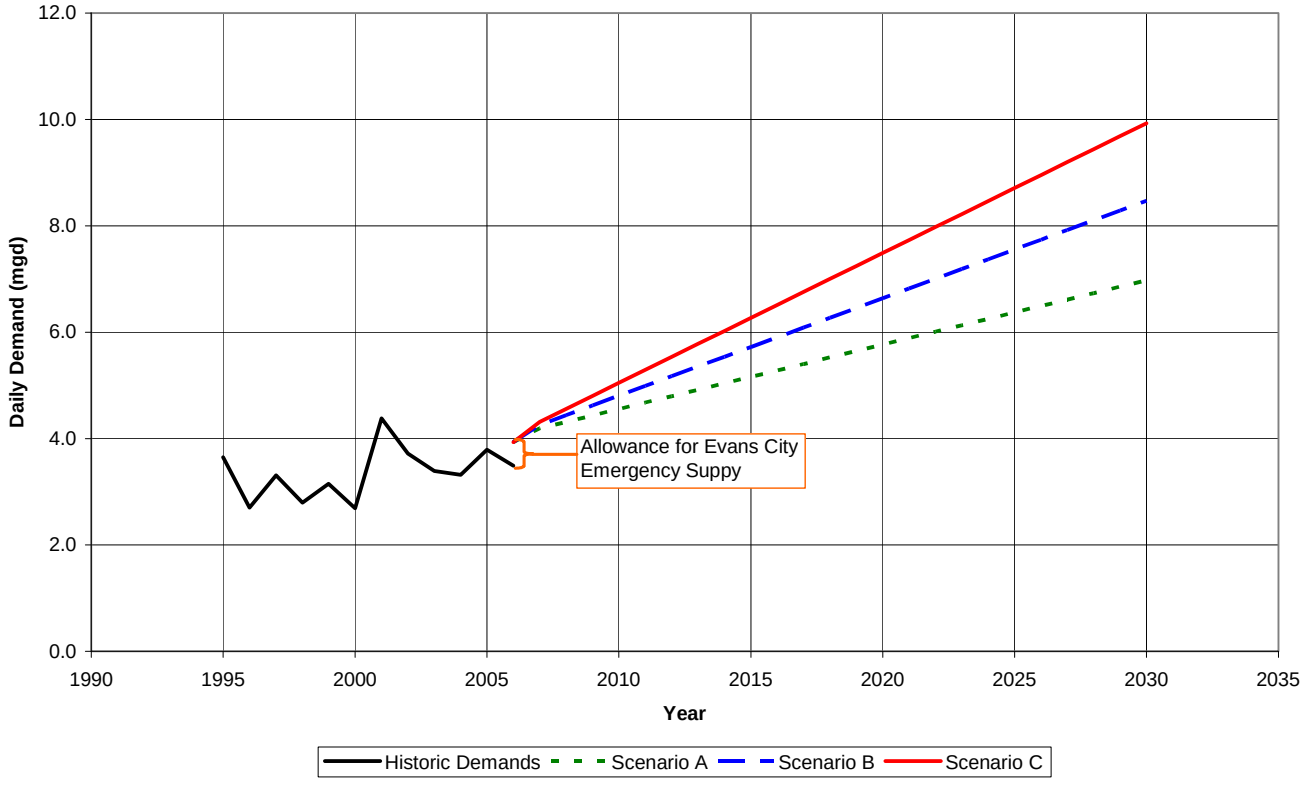


Table 1
Required Water Distribution System Improvements

Required System	Reinforcing the Existing System			Extensions to New Cranberry Development			Extensions into Jackson Township		
Improvement Component	**Scenario A**	**Scenario B**	**Scenario C**	**Scenario A**	**Scenario B**	**Scenario C**	**Scenario A**	**Scenario B**	**Scenario C**
Water Mains (feet of mains)									
8-inch	0	0	0	57,500	57,500	53,000	11,700	11,700	11,700
12-inch	10,400	10,400	16,600	8,400	8,400	12,900	25,100	25,100	25,100
16-inch	13,300	5,900	5,200	7,700	7,700	7,700	0	0	0
24-inch	17,800	27,300	12,500	0	0	0	0	0	0
36-inch	0	0	16,600	0	0	0	0	0	0
Pump Station (maximum pumping capacity - gpm)									
Commonwealth Drive Pump Station	3,050	3,050	3,050	---	---	---	---	---	---
Freedom Road Pump Station	3,450	4,250	6,650	---	---	---	---	---	---
Additional Storage Capacity (million gallons)									
North Tank Site	0	0.5	1.5	---	---	---	---	---	---

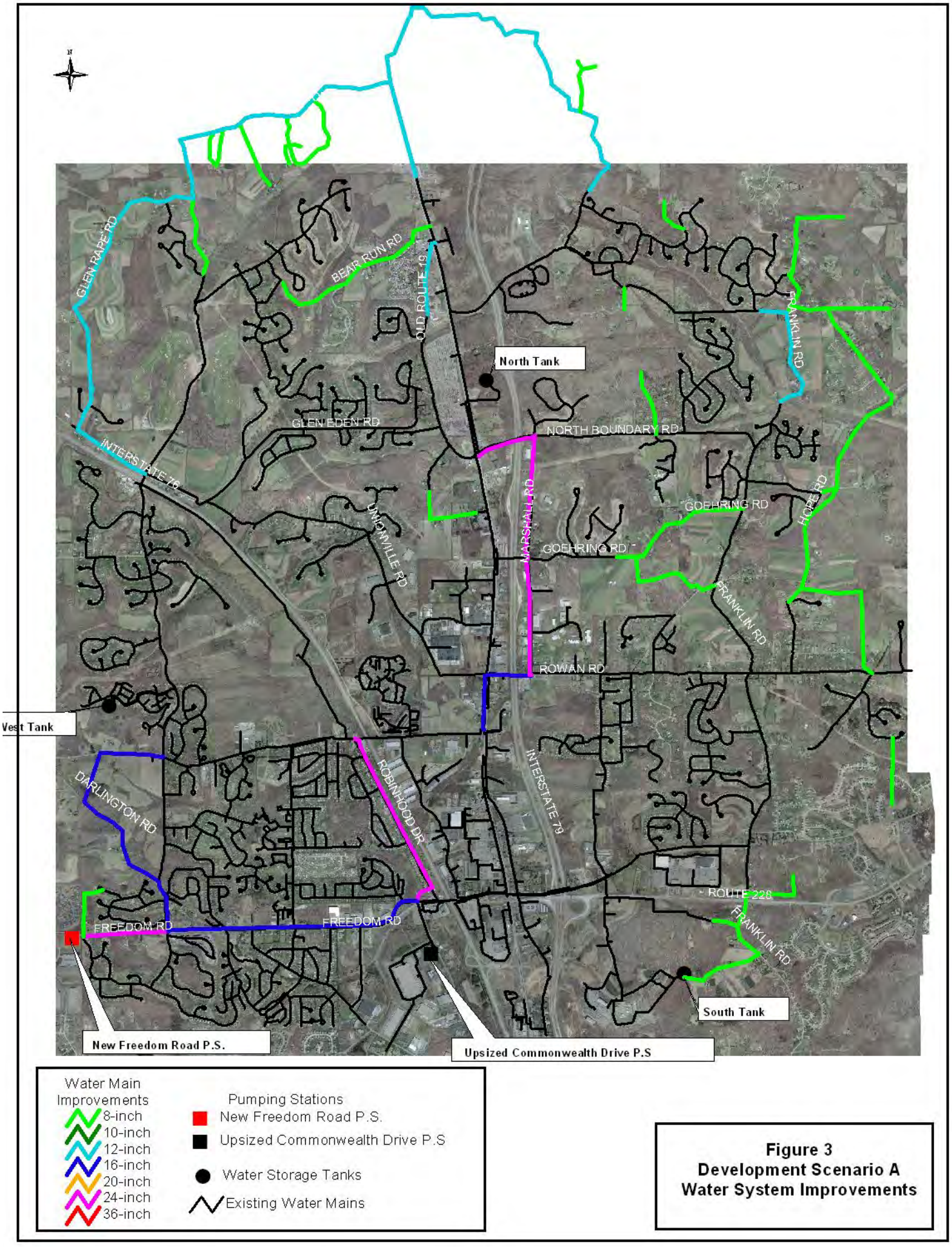


Figure 3
Development Scenario A
Water System Improvements

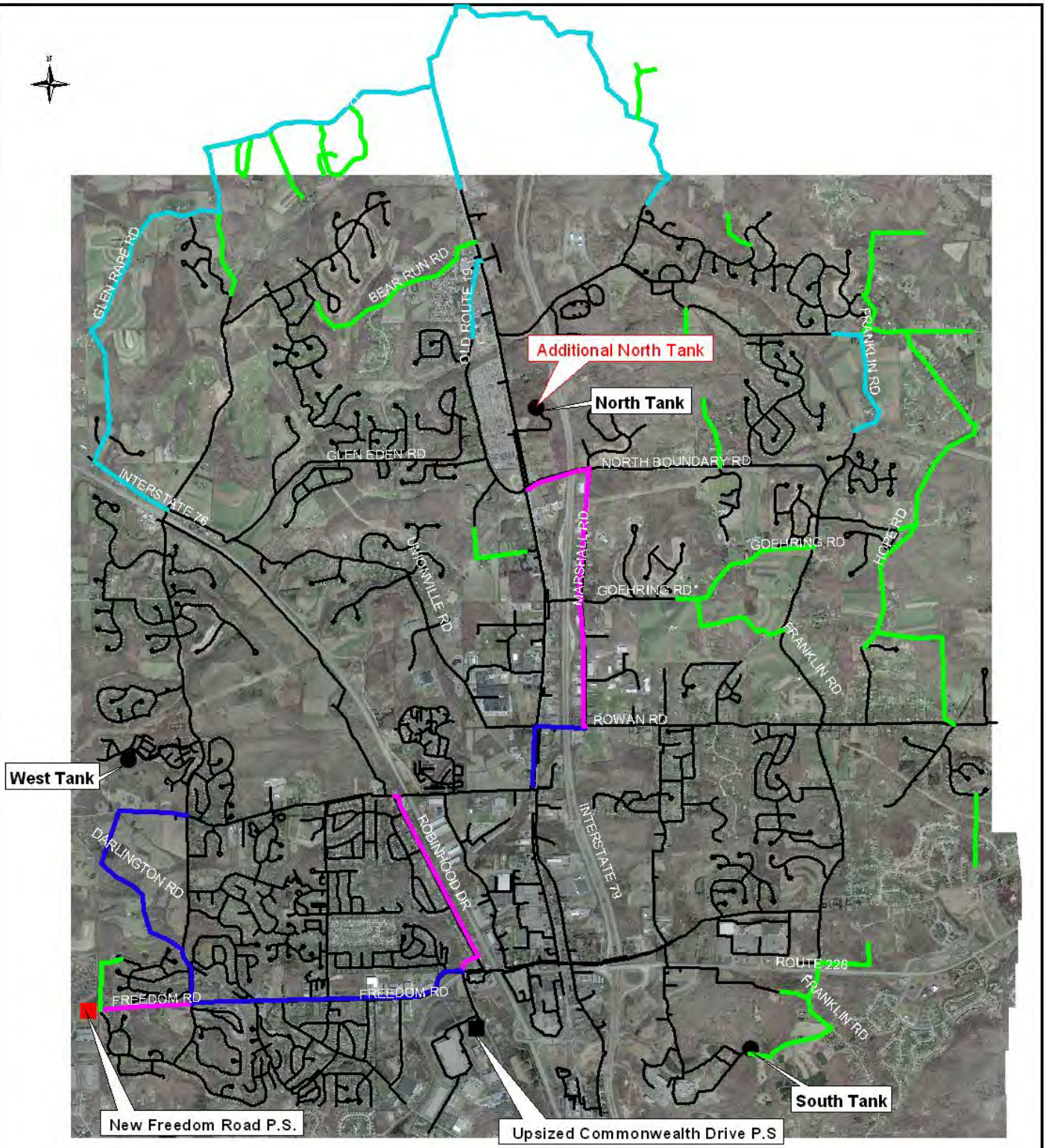


Figure 4
Development Scenario B
Water System Improvements

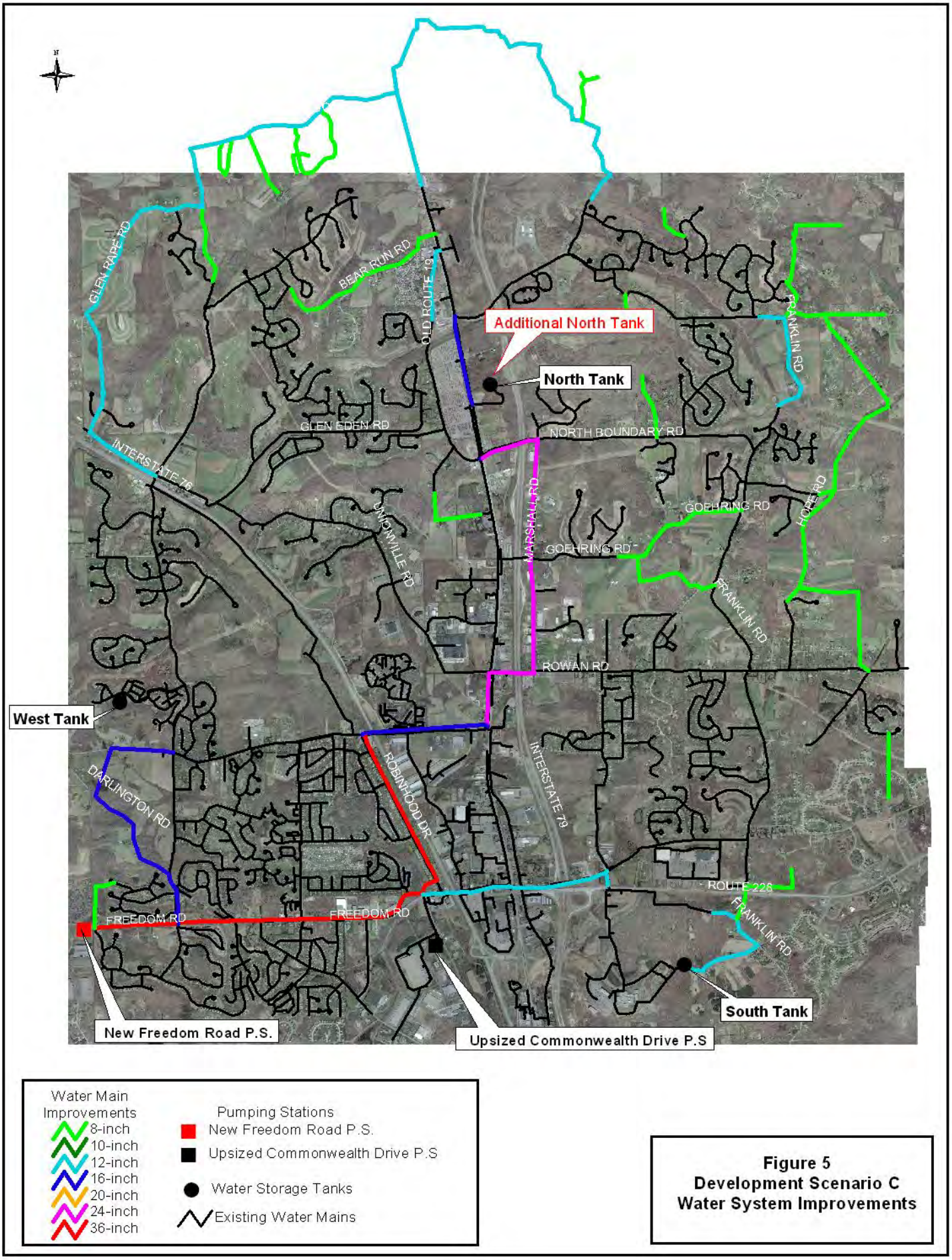
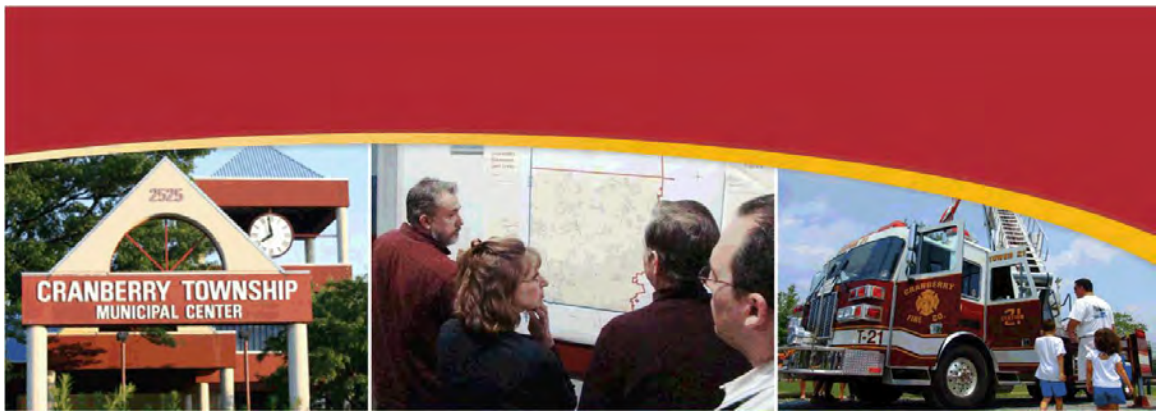


Figure 5
Development Scenario C
Water System Improvements



Staffing and Financial Impact Assessment

the CRANBERRY PLAN
2005 2030

TABLE OF CONTENTS

Scenario Assessment

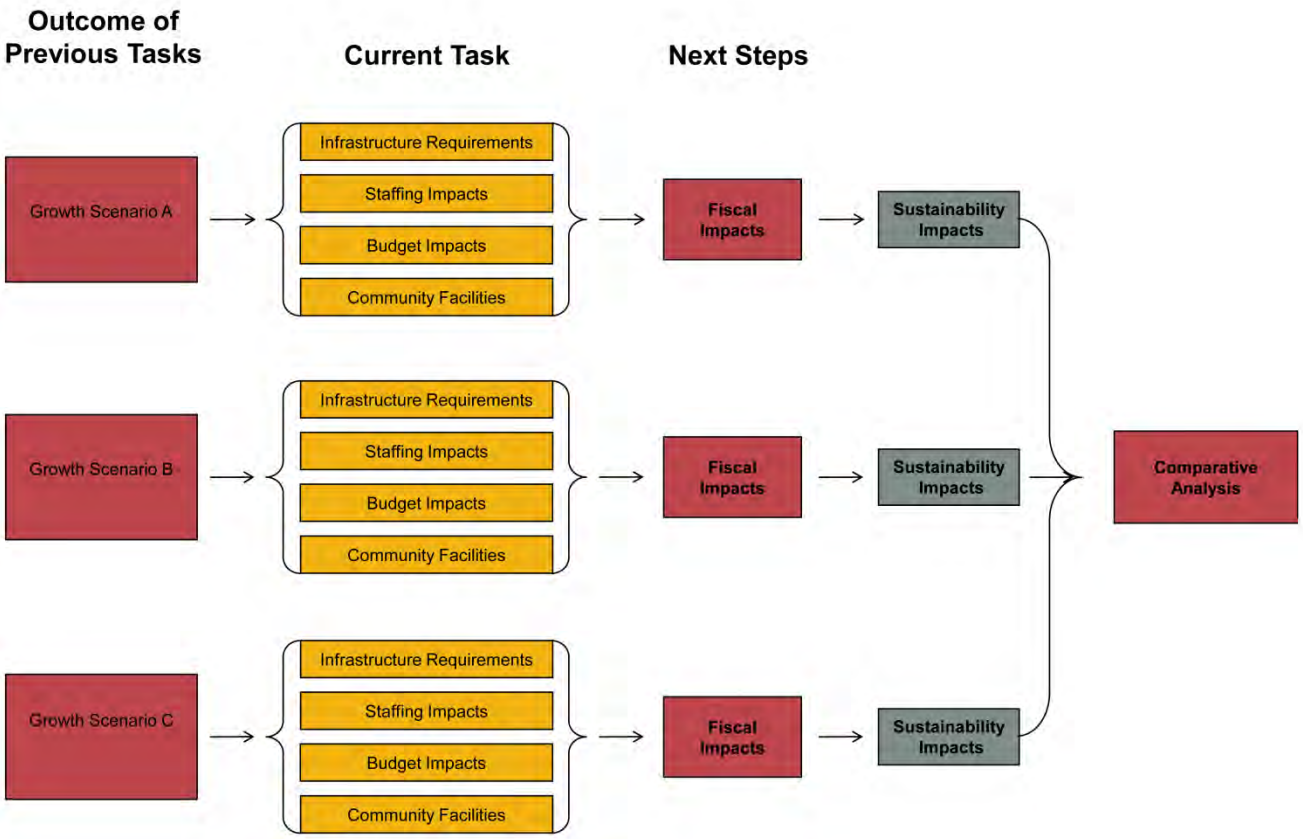
Methodology

In determining the preferred growth scenario for Cranberry Township, it is important to understand the municipal impacts associated with each scenario to guide decision making. The impact assessment includes an assessment of four elements:

1. **Municipal Services**
   - **Operating Budget**
   - **Employment**
   - **Community Facilities**
   - **Capital Improvements**
2. **Infrastructure**
   - **Sewer**
   - **Water**
3. **Sustainability**
   - **Social Equity**
   - **Environment**
   - **Economic**
4. **Vision for the Future**

The chart on page 2 presents an overview of the work steps involved in preparing the fiscal impact assessment.

Figure 1 – Municipal Impact Assessment Process



Introduction

The fiscal impact measures the differences in estimated monetary outlay required by Cranberry Township in response to the changes in land use and levels of build-out associated with each growth scenario. The impact analysis is not intended to be a predictor of actual budgetary numbers, but instead an evaluation of the differences of alternative growth scenarios on municipal operations. By establishing assumptions about operational levels of services, it is possible to evaluate the differences in staffing levels necessary to support the growth scenarios. Staffing projections coupled with projected increases in expenditures provide a basis for evaluating overall financial needs relative to each growth scenario. Infrastructure revenues and expenditures were also projected as part of the process, but were calculated separately from the budgeting and staffing impact figures, which can be seen in the "Capital Requirements" section of the report.

Municipal Services – Budget Impacts

Understanding the impacts of each growth scenario on Cranberry Township's budget is key in the decision making process. The following methodology was used to estimate the budgetary impacts of each growth scenario.

Baseline Information - In order to develop baseline information for revenues and expenditures for the purpose of recognizing budget impacts a decision was made by the consultant team to use the 2007 Department of Community and Economic Development (DCED) report as the most accurate baseline.

Budget Drivers – For each budget category, a "driver" was established, such as population, staffing, calls for service, road miles, or acres.

Inflation Factors – Inflation factors were applied to each budget projection to capture the dynamics of natural increases in cost over time.

Baseline Benchmark – For each driver, a baseline was established that represented the benchmark for 2007 for the driver that was calculated by dividing the baseline information by the budget driver.

Multipliers – To project budget categories, a multiplier was calculated by dividing the 2007 budget by the baseline benchmark.

Results

Budget and Staffing Impact

Models were constructed in for each growth scenario, using the above benchmarks and calculations to estimate annual revenues and expenses from 2007 to 2030. The revenue is primarily driven by population increases and inflationary factors.

Tables 1, 2, and 3 provide a summary of the budgetary impacts for each of the Scenarios. Table 4 provides a summary of staffing levels for each scenario by department.

Scenario A

Estimated Population: 38,095

Scenario B

Estimated Population: 50,011

Scenario C

Estimated Population: 64,293

The complete results for each scenario are as follows:

Table 1 – Scenario A - Summary of Results

	Scenario A						
	Revenue General Fund	Expenses-General Fund	Net Revenue General Fund	Revenue Sewer & Water	Expenses Sewer & Water	Net Revenue Sewer & Water	Total Net Revenue
2008	15,761,869	13,077,443	2,684,426	11,184,088	10,922,313	261,775	2,946,201
2009	16,608,697	14,134,774	2,473,923	11,857,934	11,529,200	328,734	2,802,657
2010	17,445,607	14,937,689	2,507,918	12,558,069	12,140,267	417,802	2,925,720
2011	18,310,643	15,875,306	2,435,337	13,285,403	12,780,019	505,384	2,940,721
2012	19,204,770	16,845,889	2,358,880	14,040,878	13,446,445	594,433	2,953,313
2013	20,143,905	17,866,420	2,277,485	14,825,463	14,148,342	677,122	2,954,607
2014	21,114,441	18,953,069	2,161,372	15,640,161	14,876,237	763,924	2,925,296
2015	22,117,446	20,082,049	2,035,397	16,486,006	15,631,095	854,911	2,890,308
2016	23,154,025	21,279,227	1,874,798	17,364,064	16,422,778	941,287	2,816,084
2017	23,742,793	22,280,952	1,461,841	17,786,125	17,247,952	538,174	2,000,015
2018	24,346,781	23,146,977	1,199,803	18,218,863	17,653,434	565,428	1,765,232
2019	24,966,415	24,047,189	919,226	18,662,547	18,070,602	591,945	1,511,171
2020	25,682,204	24,998,955	683,249	19,117,455	18,498,008	619,447	1,302,696
2021	26,335,324	26,000,687	334,637	19,583,870	18,933,326	650,545	985,182
2022	27,005,470	27,015,379	(9,909)	20,062,084	19,391,865	670,219	660,310
2023	27,693,120	28,079,261	(386,141)	20,552,395	19,853,196	699,200	313,059
2024	28,397,688	28,299,549	98,138	21,055,109	20,327,896	727,213	825,352
2025	29,120,471	28,502,321	618,150	21,570,541	20,816,053	754,487	1,372,638
2026	29,862,251	29,619,954	242,297	22,099,010	19,367,764	2,731,246	2,973,543
2027	30,623,560	30,908,534	(284,973)	22,640,848	19,880,636	2,760,212	2,475,239
2028	31,404,946	32,261,776	(856,831)	23,196,393	20,407,283	2,789,109	1,932,279
2029	32,206,971	33,683,405	(1,476,434)	23,765,990	20,948,084	2,817,906	1,341,472
2030	33,030,215	35,175,049	(2,144,834)	24,349,997	21,503,426	2,846,571	701,737
Total			21,207,755			25,107,075	46,314,830

Table 2 – Scenario B - Summary of Results

	Revenue General Fund	Expenses General Fund	Net Revenue General Fund	Revenue Sewer & Water	Expenses Sewer & Water	Net Revenue Sewer & Water	Total Net Revenue
2008	15,706,268	13,089,308	2,616,960	11,245,602	10,922,313	323,288	2,940,248
2009	16,613,215	14,200,925	2,412,290	11,983,920	11,584,568	399,351	2,811,642
2010	17,551,144	15,062,702	2,488,442	12,751,598	12,253,918	497,680	2,986,122
2011	18,521,134	16,063,539	2,457,595	13,549,663	12,954,985	594,678	3,052,273
2012	19,524,297	17,101,565	2,422,732	14,379,176	13,685,878	693,299	3,116,031
2013	20,576,707	18,194,370	2,382,336	15,241,231	14,455,519	785,712	3,168,048
2014	21,664,912	19,358,446	2,306,466	16,136,959	15,254,567	882,392	3,188,858
2015	22,790,149	20,570,347	2,219,802	17,067,525	16,084,118	983,407	3,203,209
2016	23,953,690	21,856,297	2,097,394	18,034,134	16,954,174	1,079,959	3,177,353
2017	25,156,852	23,193,679	1,963,172	19,038,027	17,861,547	1,176,479	3,139,652
2018	26,368,818	24,616,446	1,752,372	20,080,487	18,802,205	1,278,281	3,030,653
2019	27,615,112	26,113,551	1,501,560	21,162,837	19,782,388	1,380,448	2,882,009
2020	28,983,836	27,704,975	1,278,860	22,286,442	20,801,762	1,484,680	2,763,540
2021	30,317,149	29,391,927	925,223	23,452,712	21,859,152	1,593,560	2,518,783
2022	31,695,765	31,134,378	561,387	24,663,100	22,971,062	1,692,038	2,253,425
2023	33,121,210	32,971,960	149,251	25,919,107	24,118,300	1,800,807	1,950,057
2024	34,595,063	34,019,785	575,278	27,222,279	25,312,724	1,909,555	2,484,833
2025	35,456,762	34,706,434	750,328	27,888,489	26,555,751	1,332,738	2,083,067
2026	36,340,997	36,053,448	287,549	28,571,552	25,259,397	3,312,155	3,599,704
2027	37,248,392	37,580,911	(332,519)	29,271,893	25,928,282	3,343,611	3,011,092
2028	38,179,590	39,182,973	(1,003,383)	29,989,951	26,615,135	3,374,816	2,371,432
2029	39,135,248	40,863,812	(1,728,564)	30,726,173	27,320,447	3,405,726	1,677,162
2030	40,116,044	42,625,530	(2,509,487)	31,481,019	28,044,722	3,436,297	926,810
Total			25,575,046			36,760,959	62,336,004

Table 3 – Scenario C - Summary of Results

Year	Revenues General Fund	Expenses General Fund	Net Revenue General Fund	Revenue Sewer & Water	Expenses Sewer & Water	Net Revenue Sewer & Water	Total Net Revenue
2008	15,756,347	13,111,005	2,645,343	11,306,035	10,922,313	383,722	3,029,065
2009	16,712,569	14,271,032	2,441,537	12,107,695	11,638,965	468,730	2,910,267
2010	17,701,908	15,185,105	2,516,803	12,941,731	12,365,575	576,156	3,092,959
2011	18,725,521	16,241,856	2,483,665	13,809,287	13,126,881	682,405	3,166,071
2012	19,784,607	17,339,338	2,445,269	14,711,539	13,921,110	790,429	3,235,698
2013	20,895,323	18,495,716	2,399,607	15,649,705	14,757,308	892,398	3,292,004
2014	22,044,309	19,727,749	2,316,560	16,625,041	15,626,259	998,782	3,315,341
2015	23,232,890	21,012,278	2,220,612	17,638,842	16,529,193	1,109,649	3,330,261
2016	24,462,438	22,375,826	2,086,612	18,692,447	17,476,248	1,216,199	3,302,810
2017	25,734,364	23,795,402	1,938,962	19,787,238	18,464,378	1,322,860	3,261,822
2018	27,050,127	25,310,491	1,739,636	20,924,640	19,489,697	1,434,942	3,174,578
2019	28,411,233	26,906,146	1,505,087	22,106,124	20,558,598	1,547,527	3,052,613
2020	29,899,302	28,602,748	1,296,554	23,333,210	21,670,903	1,662,307	2,958,861
2021	31,356,660	30,401,932	954,728	24,607,464	22,825,600	1,781,864	2,736,592
2022	32,864,192	32,262,470	601,722	25,930,505	24,039,363	1,891,142	2,492,864
2023	34,423,606	34,224,849	198,757	27,304,000	25,293,173	2,010,827	2,209,584
2024	36,036,662	35,405,241	631,421	28,729,673	26,599,072	2,130,601	2,762,022
2025	37,705,177	36,630,464	1,074,713	30,209,301	27,958,661	2,250,640	3,325,353
2026	39,431,027	38,836,511	594,516	31,744,716	27,423,607	4,321,110	4,915,625
2027	41,216,146	41,283,294	(67,148)	33,337,812	28,893,142	4,444,670	4,377,522
2028	43,062,529	43,868,575	(806,045)	34,990,540	30,421,567	4,568,973	3,762,928
2029	44,972,235	46,600,355	(1,628,119)	36,704,914	32,011,003	4,693,911	3,065,792
2030	46,947,387	49,484,831	(2,537,444)	38,483,011	33,663,643	4,819,369	2,281,925
Total			27,053,345			45,999,213	73,052,558

Table 4 – Staffing Requirements Comparison

	Scenario	2008	2010	2015	2020	2025	2030
Total	A	158	167	190	196	200	202
Total	B	158	169	195	220	243	245
Total	C	159	170	199	228	268	286
Building & Plants	A	3	3	4	4	4	4
Building & Plants	B	3	3	4	5	5	5
Building & Plants	C	3	3	4	5	6	6
Financial Administration	A	5	6	7	7	7	7
Financial Administration	B	5	6	7	8	9	9
Financial Administration	C	5	6	7	8	10	11
Legislative & Executive	A	6	7	8	8	8	8
Legislative & Executive	B	6	7	8	9	11	11
Legislative & Executive	C	6	7	8	10	12	13
Tax Collection	A	2	2	3	3	3	3
Tax Collection	B	2	2	3	3	4	4
Tax Collection	C	2	2	3	3	4	4
Public Safety - Police							
Uniform	A	29	31	36	38	40	41
Uniform	B	29	31	37	43	48	49
Uniform	C	29	32	39	45	52	57
Non-Uniform	A	5	6	7	7	7	7
Non-Uniform	B	5	6	7	8	9	9
Non-Uniform	C	5	6	7	8	9	10
Health, Welfare, Recreation							
Parks Maintenance	A	10	11	13	13	13	13
Parks Maintenance	B	10	11	14	16	18	18
Parks Maintenance	C	10	12	15	17	20	22

Table 4 – Staffing Requirements Comparison (cont.)

	Scenario	2008	2010	2015	2020	2025	2030
Planning, Code Enforcement, Customer Service & UCC	A	16	16	16	16	16	16
Planning, Code Enforcement, Customer Service & UCC	B	16	16	16	16	16	16
Planning, Code Enforcement, Customer Service & UCC	C	16	16	16	16	16	16
Engineering	A	5	5	5	5	5	5
Engineering	B	5	5	5	5	5	5
Engineering	C	5	5	5	5	5	5
Highways & Streets	A	17	18	19	20	22	23
Highways & Streets	B	17	18	19	20	22	23
Highways & Streets	C	17	18	19	20	21	23
Traffic Control System	A	1	1	1	1	1	1
Traffic Control System	B	1	1	1	1	1	1
Traffic Control System	C	1	1	1	1	1	1
Winter Maintenance	A	1	1	1	1	1	1
Winter Maintenance	B	1	1	1	1	1	1
Winter Maintenance	C	1	1	1	1	1	1
Culture and Recreation	A	34	37	43	44	44	44
Culture and Recreation	B	34	37	45	52	58	58
Culture and Recreation	C	34	38	46	55	63	71
Wastewater	A	11	12	14	15	15	15
Wastewater	B	11	12	15	17	19	19
Wastewater	C	11	13	15	18	21	24
Water System	A	10	11	13	13	13	13
Water System	B	10	11	14	16	18	18
Water System	C	10	12	14	17	19	22
Scenario A Totals		313	334	380	391	399	403
Scenario B Totals		313	336	391	440	487	491
Scenario C Totals		318	342	399	457	528	572

NOTE: Actual staffing decisions will be made by management from time to time based on work load ***and*** available resources. The numbers shown in the Scenario Charts are for comparison purposes only.

Figures 2-5 – Staff/Per Capita Trend Comparisons

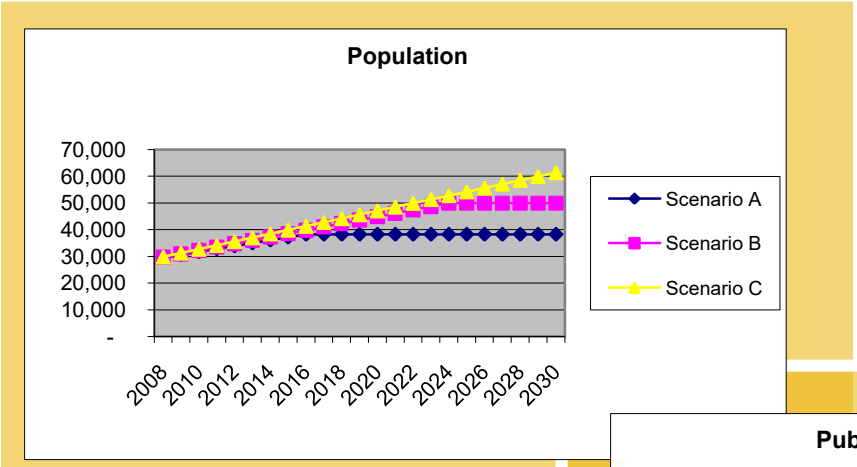


Figure 2

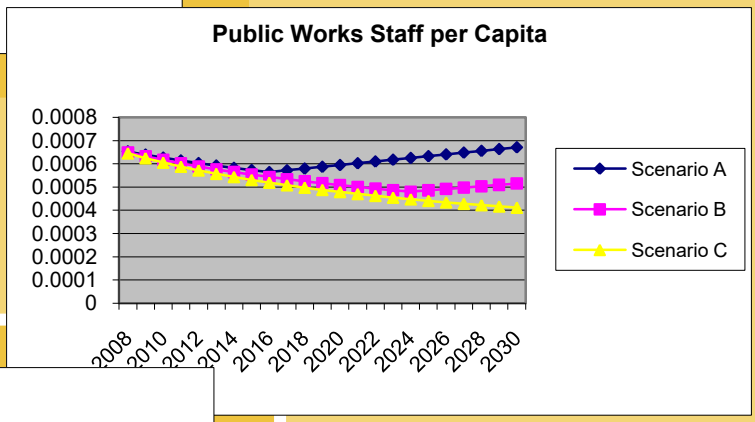


Figure 3

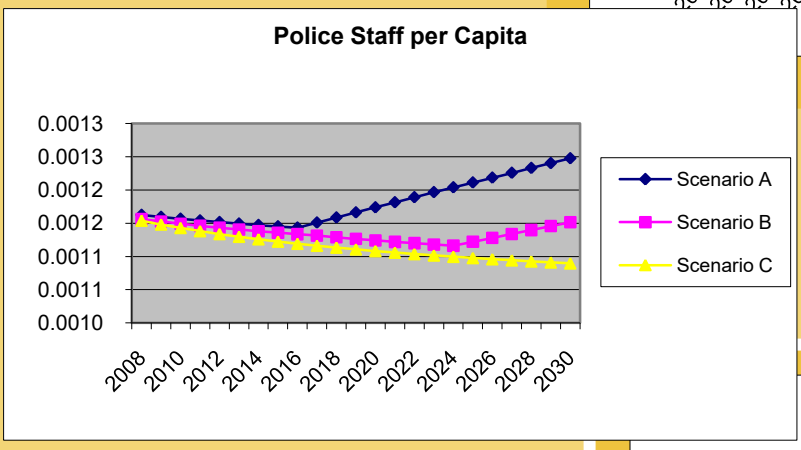


Figure 4

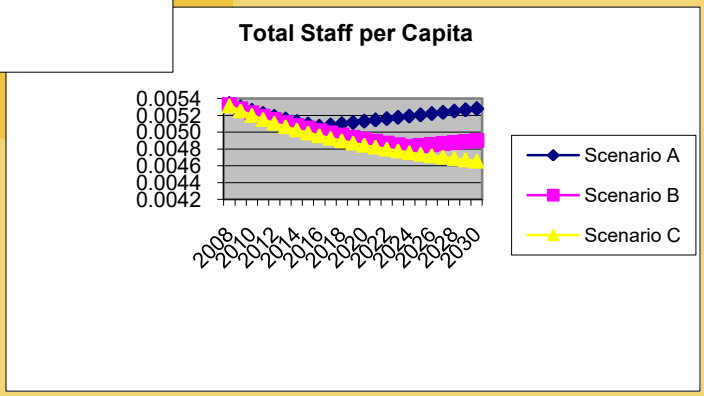


Figure 5

Impact Observations and Scenario Comparisons

Land Use Mix Observations

– Residential growth is the primary driver of the retail market, office growth is the primary driver of the hotel market, and the ease of highway access has greatly amplified all types of development in the Township. While the current land use ratios are not representative of a "balanced" mix of land uses, it is evident that the growth in related land uses is not consistent across the three growth scenarios. For instance, growth in Scenario A is directed toward office uses, but hotel use doesn't increase accordingly. Residential growth is greatest in Scenario C, but retail use doesn't increase accordingly. The following table shows the current ratio of selected related land uses, compared to the ratio of additional square feet (or units) for each growth scenario.

Table 5 – Ratio of Related Land Uses by Growth Category

Ratio	Current	Scenario A	Scenario B	Scenario C
Retail Square Feet per Residential Unit	302	519	394	268
Restaurant Square Feet per Residential Unit	28	58	48	41
Restaurant Square Feet per 1,000 Office Square Feet	65	32	68	100
Hotel Square Feet per 1,000 Office Square Feet	216	42	117	176

Revenue Observations

– Residential land uses in 2007 made up 67 percent of the total real estate tax revenue in the Township. Office and retail uses were the next largest generators of real estate tax revenue, making up about 10 percent of the revenue for each use.

- Restaurants generated the largest amount of real estate taxes per square foot, generating 12 cents per square foot. Retail uses generated 08 cents per square foot, office uses generated 06 cents per square foot, and industrial and hotels generated only 03 cents per square foot.

- Residential units generated an average of $174.90 of real estate tax revenue per unit. Assuming that the average housing unit in Cranberry Township is approximately 1800 square feet, a resident pays about 10 cents per square foot.

- Earned income tax accounted for 65.5 percent of the Act 511 revenues for an average of $167.41 per capita. Since the average family size in Cranberry Township according to the 2000 census is 2.81, it is estimated that each household pays about $470 in earned income tax.

- Business privilege/mercantile accounted for 23.7 percent of the revenue, and the local services tax (paid by employees who work in the Township) accounted for 10.8 percent.

- Residential uses generated 66 percent of the total taxes levied (real estate, deed transfer, and earned income) in the Township, leading to the assumption that residential properties are carrying a larger tax burden than non-residential uses. It is estimated that the costs for providing services to residents is approximately $475 per household for operating purposes and another $100 annually for capital expenses.

Expenditure Observations

- Police services make up 30 percent of the Township's total annual budget expenditures. This is the largest single expenditure in the Township budget. Of the police budget, a full 80 percent of expenditures is related to salary and benefits. This is by far the highest ratio of personnel costs to other operating costs of any of the departments and service delivery areas.

- The second highest expenditure in the annual budget is for Public Works (highways, streets, winter maintenance, traffic control, fleet maintenance, and administration) at 15 percent of the budget, excluding the sewer and water funds.

- Debt service currently makes up 9 percent of the operating budget and will rise to approximately 10 percent of the operating budget with the decision by the Township to issue additional debt in summer of 2008.

Scenario Comparisons and Observations

- For purposes of this comparison, total build-out was driven by market projections. In a market-driven environment, the build-outs occur closer to the years that have been identified in the market study previously completed than to the forced target year of 2030, which may extend the period of time when expenditures outpace revenues. The impacts of staffing and budgets become less predictable beyond the first 10 years of the projections and should not be considered for future budgets.

- In all three growth scenarios, general fund expenditures outpace revenues after 2021: in Scenario A, it is 2022; in Scenarios B and C, it is 2027. In Scenario A, revenues rise again in 2024 to exceed expenses, but dip below expenses again after three years. This is primarily due to changes in debt service that are not offset by an increase in other expenses as seen in Scenarios B and C.

- The actual reserves that are available for capital expenditures and/or additional debt service to finance capital projects begin to drop after 2016 as inflation associated with expenses begins to “catch up” with real estate tax revenue.

- While general fund reserves that are available for capital expenditures increase by around 20 percent from Scenario A to Scenario B, there is only a 5 percent increase from Scenario B to Scenario C. Driven by population increase, sewer and water reserves that are available for capital expenditures increase by around 45 percent from Scenario A to Scenario B, with only a 25 percent increase from Scenario B to Scenario C.

- In all three scenarios, the projected general fund net revenue begins to slow between 2016 and 2020. The largest sources of revenue for the Township, real estate tax and earned income tax, are directly tied to the addition of housing units. While real estate tax plateaus with residential build-out in each scenario, charges for services and earned income tax continue to grow with inflation. Charges for services revenues outpace real estate tax revenue between 2017 and 2019 in all three scenarios.

- For water, sewer and other population and fee-driven services, residential population and commercial build-out are the primary drivers and are therefore treated the same in all three scenarios.

- Because most of the Township budget is personnel costs, increased staffing costs will eventually outpace the revenue that is generated by increases to residential and commercial development. This is due to the fact that, while public-sector salary and benefits exceed CPI increases, assessments are frozen at 1970 values and therefore do not reflect the natural market value increases of property in the Township, thereby limiting the revenue that can be generated.

- In scenarios A and B, the expenditures begin to outpace the revenues soon after the full residential build-out occurs. Additional build-out for commercial, retail, and industrial do not have a significant impact in terms of providing additional revenue or increasing the demand for municipal services.

Staffing Observations

- The total FTE (Full Time Equivalent) staffing requirement at full build-out for Scenario A is 202, and is 245 and 286 for Scenarios B and C, respectively. Cranberry Township currently employs 153 FTE staff members.

- Scenario C provides some benefit for the Township by creating some economies of scale for staffing requirements, as seen in Figures 3, 4, and 5 on page 10. For example, by year 2030, the number of police officers required to support the estimated calls for service generated by the increased population is:

Base	28	1.3 officers/1,000
Scenario A	41	1.1 officers/1,000
Scenario B	49	1.0 officers/1,000
Scenario C	57	.93 officers /1,000

- Scenario C also provides lower staffing costs in the public works department because the miles per acre (.0085) is less for TND development than for traditional development (.0138) as contemplated in Scenarios A and B.

Fire Staffing

The Township operates a completely volunteer fire department, with one paid fire administrator responsible for completion of routine administrative tasks associated with a volunteer department. Staffing evaluations were not conducted for fire department personnel because of the volunteer department status. It is assumed the Township will continue to maintain an all-volunteer fire department to service future growth. However, as the population grows and calls for services increase it is assumed the administrative responsibilities will also increase requiring additional personnel in an administrative role. The addition of administrative support for this function will have a minimal impact on the overall analysis, and therefore, no projection was included.

Municipal Facilities Requirements

Another consideration in comparing the three growth scenarios involves an assessment of additional facilities that would be required to house the required staffing. To assess facility requirements, the consultant considered: (1) staff categories, (2) current facility square footage by staff category, and (3) current facility capacity. Current staff were assigned to four categories: administration, police, public works and parks & recreation.

The consultant team recognized that in some departments, staff are included that are not necessarily associated with square footage; however, it was assumed that the ratio of staff associated with square footage would remain consistent. The square footage per staff was calculated by dividing the current square footage by the facility capacity. This benchmark was then applied to the staff requirements for each of the three scenarios as follows.

Table 6 – Space Requirements by Growth Scenario

	Administration	Police	Public Works	Parks & Recreation
Current Employees	37	33	40	43
Current S.F.	18,310	44,958	18,310	13,000
Current Capacity	55	50	70	43
S.F. per Staff (based on capacity)	333	899	262	302
Scenario A Staffing (2030)	43	48	54	58
Scenario B Staffing (2030)	49	58	63	75
Scenario C Staffing (2030)	56	67	71	93
Scenario A Total Space Requirement	14,161	42,950	14,111	17,499
Scenario B Total Space Requirement	16,342	51,705	16,372	22,822
Scenario C Total Space Requirement	18,483	60,133	18,451	28,048
Scenario A Additional S.F. (1)	4,149	2,008	4,199	(4,499)
Scenario B Additional S.F. (1)	1,968	(6,747)	1,938	(9,822)
Scenario C Additional S.F. (1)	(173)	(15,175)	(141)	(15,048)

(1) *Negative numbers represent additional square feet required, positive numbers represent additional capacity.*

The current administrative and public works facility space is adequate for Scenarios A and B, with only 173 additional square feet required for Scenario C for administrative space, and 141 square feet for public works. Current police square footage is adequate for Scenario A, with 6,747 additional square feet required for Scenario B, and 15,175 additional square feet required for Scenario C. Parks and recreation facilities are currently operating at capacity, so additional space would be needed in all three scenarios. An additional 4,499 square feet of parks and recreation facilities space would be needed in Scenario A, 9,822 square feet in Scenario B, and 15,048 square feet in Scenario C.

The Cranberry Public Library has 15,300 square feet of space. The library recently assessed space needs based on a 2030 population projection of 45,412. The gross square footage requirement for 2030 is estimated at 36,122 square feet, representing an additional 20,822 square feet. While the actual space requirement calculation is complex, for estimating purposes, this requirement is equivalent to around .8 square feet per capita. An “order of magnitude” estimate based on population projections for 2030 for Scenarios A, B, and C suggests total space requirements of 30,448 square feet for Scenario A, 39,710 square feet for Scenario B, and 48,805 square feet for Scenario C.

Capital Requirements

An important step in the assessment process is to quantify the capital improvements that will be required to support the growth in each scenario. Based on the land use mix and the square footage and dwelling unit estimates for each scenario, the following was calculated: (1) a description of the required improvements, (2) an estimated cost of improvements, and (3) an estimated time that the improvements will be made.

Transportation Impact Costs

A transportation impact study on the Township's roadway infrastructure was conducted by HRG Associates. Following the updated data collection and analysis of each of 18 roadway segments and 35 intersections for all three Growth Scenarios, a summary of likely transportation improvement projects based on the study findings is shown in the Traffic Impact Summary Table. The roadway improvements are listed by corridor with the location and 2008 estimated cost of improvements.

The recommendations listed are suggested to correct projected deficiencies anticipated within the next 22-year period to provide a preferred operational level of service. HRG recommends that the Township use these findings as a guide to further evaluate the growth scenarios. The areas of capacity concern identified should be further evaluated upon selection of a preferred development scenario and in conjunction with the Transportation Impact Fee Update to follow the comprehensive plan update.

Cranberry Township uses Transportation Impact fees to fund transportation related infrastructure needs that result from new growth. This program requires new development to pay a fee based on the projected number of new trips. Transportation impact fee revenues were not projected as part of the overall revenue projections in the impact assessments because they are development and traffic specific and do not relate to revenue factors used in the overall impact assessment. New vehicle trips generated by new development and forecasted from the model are used to calculate revenue for this program. The total impact fee revenue for each scenario was calculated by taking the projected number of trips and multiplying by Cranberry's current impact fee amount. No inflation or change of fee was assumed for the evaluation

however it must be noted that future adjustments in the amount of the fees can significantly impact the net cost of new transportation infrastructure.

Table 7 identifies the cost of transportation infrastructure relative to each of the growth scenarios. It is also important to estimate the revenue generated relative to each of the growth scenarios to get a total picture of the net cost of each development scenario. Scenario A generates a total transportation cost of $120,400,000 and impact fees will bring an additional $64,031,252 in revenue for a net cost of transportation improvements of $56,368,748. Scenario B transportation cost are $132,500,000, with impact fee revenue of $77,790,650 for a net transportation cost of $54,709,350. Scenario C construction cost are $164,000,000, with revenue of $93,993,098 for a net transportation cost of $70,006,902.

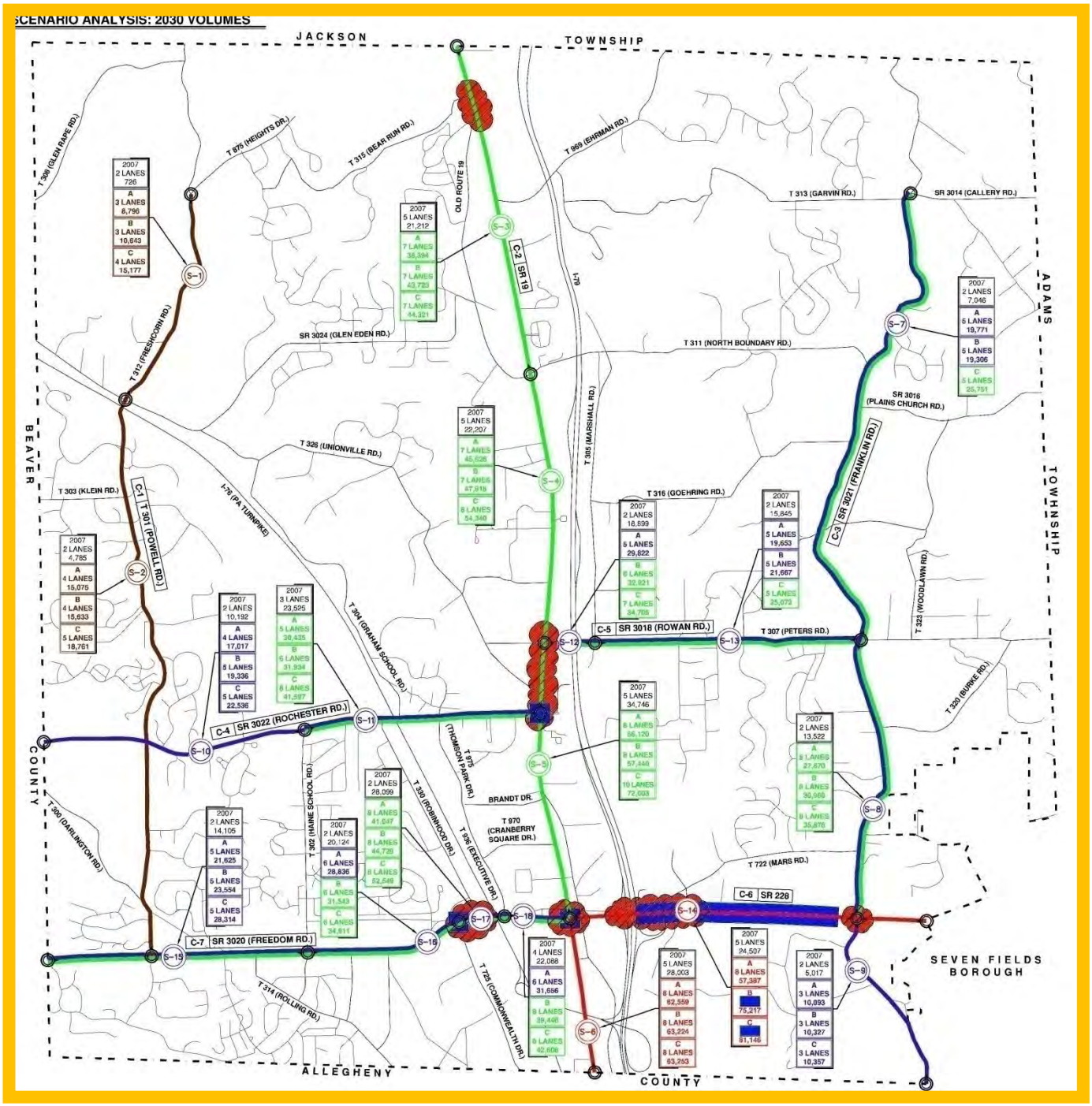
Table 7. Cranberry Plan Traffic Impact Summary Table

Year 2030 Scenario Corridor Improvements Required/Probably Corridor Improvement Costs (2008 Dollars)

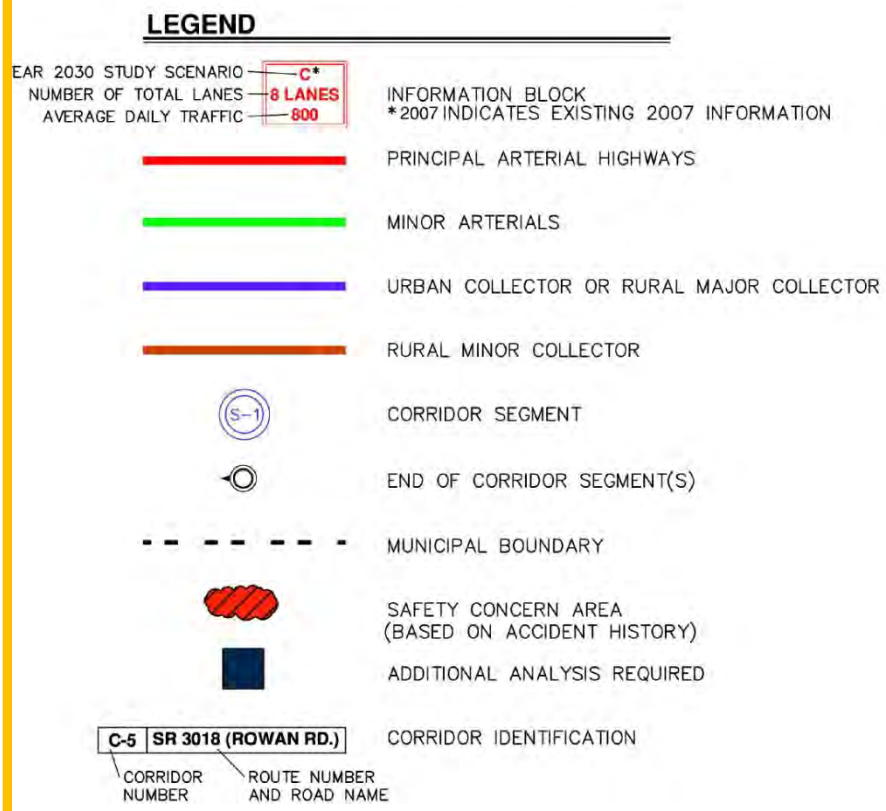
Roadway Corridor	***Growth Scenario A***	***Growth Scenario B***	***Growth Scenario C***
Powell Road -T-301 (Corridor 1)	$4,900,000	$5,100,000	$7,000,000
S.R. 0019 Route 19 (Corridor 2)	$22,800,000	$24,000,000	$33,800,000
S.R. 3021, Franklin Rd.(Corridor 3)	$26,400,000	$28,000,000	$34,500,000
S.R. 3022,Rochester Rd(Corridor 4)	$18,700,000	$22,800,000	$29,000,000
S.R. 3018, Rowan Rd. (Corridor 5)	$17,200,000	$19,100,000	$22,500,000
S.R. 0228, Route 228 (Corridor 6)	$2,500,000	$2,500,000	$2,800,000
S.R. 3020, Freedom Rd.(Corridor 7)	$27,900,000	$31,000,000	$34,400,000
Total Improvements	**$120,400,000**	**$132,500,000**	**$164,000,000**
Impact Fee Revenue	($64,031,252)	($77,790,650)	($93,993,098)
Net Transportation Cost	***$56,368,748***	***$54,709,350***	***$70,006,902***

Note: The analysis conducted for this report consisted of capacity analysis based on passenger vehicle traffic projections based on standard trip generation principles. Other variables should be considered as part of the future transportation needs. Proper land use planning may reduce required vehicle trips from levels that have historically occurred and are the basis for standard trip generation methods. Other modes such as pedestrian, bike, and transit may help to alleviate the projected strain on the Township's roadway infrastructure.

Map 1 – Transportation Improvements by Scenario



Map 1 – Legend


LEGEND
EAR 2030 STUDY SCENARIO
C*
NUMBER OF TOTAL LANES
8 LANES
AVERAGE DAILY TRAFFIC
800
INFORMATION BLOCK
*2007 INDICATES EXISTING 2007 INFORMATION
PRINCIPAL ARTERIAL HIGHWAYS
MINOR ARTERIALS
URBAN COLLECTOR OR RURAL MAJOR COLLECTOR
RURAL MINOR COLLECTOR
S-1
CORRIDOR SEGMENT
END OF CORRIDOR SEGMENT(S)
MUNICIPAL BOUNDARY
SAFETY CONCERN AREA
(BASED ON ACCIDENT HISTORY)
ADDITIONAL ANALYSIS REQUIRED
C-5
SR 3018 (ROWAN RD.)
CORRIDOR IDENTIFICATION
CORRIDOR NUMBER
ROUTE NUMBER AND ROAD NAME

Improvements to Sewer Facilities

Based on information from Chester Engineers, improvements to the existing sewerage facilities were identified to accommodate the respective Growth Scenarios A, B, and C. Pursuant to previous discussions, Chester provided this information for use in developing planning-level cost estimates for constructing the improvements. The results of this analysis are presented in Table 8 which sets forth the costs for the projected future wastewater treatment plant and pump station design capacities. Appendix ____ illustrates the locations of lines, manholes, and the required interceptor sewer upsizing. This analysis is limited to the impact of the future development activities on existing interceptor, pumping, and treatment facilities. It does not reflect required sewer extensions to reach the new development areas. This calculation was based on information provided by the planning team in the form of estimated future population (defining residential development), and acreages defining various other developed land uses.

Water Distribution Requirements

Chester Engineers also identified improvements to the existing water distribution system facilities that are necessary to accommodate respective Growth Scenarios A, B, and C. Pursuant to previous discussions, Chester provided this information for use in developing planning-level cost estimates for constructing the improvements. The results of this analysis are also presented in Table 8 which sets forth the costs for projected future pump station design capacities and additional storage volumes.

Supporting documents in Appendix ___ also list the lengths of water mains by pipe diameter required to achieve acceptable performance under each development scenario. Water main improvements are identified separately for the following categories: 1) reinforcing mains within the existing system; 2) conceptual extensions required to reach future development sites within Cranberry Township that lie outside of the existing distribution system service area; and 3) conceptual extensions to serve southern Jackson Township.

The estimated costs associated with the water and sewerage systems for the respective Scenarios A, B and C are summarized in Table 10 below.

Table 8
Required Improvements to Existing Sewer Facilities

Required System Improvement Component		Growth Scenario		
		Scenario A	Scenario B	Scenario C
Increased Pumping and Treatment Facility Capacities (total required capacity - mgd)				
Expand Brush Creek WWTP average daily flow capacity to (mgd)		6.14	7.47	8.76
Expand Wolfe Run Pump Station peak flow capacity to (mgd)		---	---	2.81
Expand Franklin Acres Pump Station peak flow capacity to (mgd)		---	---	0.92
Expand Briar Creek Pump Station peak flow capacity to (mgd)		0.56	0.56	1.15
Upsized replacement sewers (feet of sewer)				
10-inch diameter		5,000	5,100	10,500
12-inch diameter		3,600	3,600	5,500
15-inch diameter		3,300	3,400	3,400
18-inch diameter		3,100	5,700	4,600
24-inch diameter		1,900	2,500	5,000
30-inch diameter		4,900	6,600	6,600
36-inch diameter		8,500	5,700	5,700
42-inch diameter		7,900	10,400	9,500
48-inch diameter		400	400	1,300
54- inch diameter		0	400	500
Replacement manholes associated with upsizing sewers (number of manholes)				
Manholes on sewers 36-inch diameter & larger		50	51	55
Manholes on sewers smaller than 36-inch diameter		108	139	172

Table 9: Required Water Distribution System Improvements

Required System	Reinforcing the Existing System			Extensions to New Cranberry Development			Extensions into Jackson Township		
Improvement Component	Scenario A	Scenario B	Scenario C	Scenario A	Scenario B	Scenario C	Scenario A	Scenario B	Scenario C
Water Mains (feet of mains)									
8-inch	0	0	0	57,500	57,500	53,000	11,700	11,700	11,700
12-inch	10,400	10,400	16,600	8,400	8,400	12,900	25,100	25,100	25,100
16-inch	13,300	5,900	5,200	7,700	7,700	7,700	0	0	0
24-inch	17,800	27,300	12,500	0	0	0	0	0	0
36-inch	0	0	16,600	0	0	0	0	0	0
Pump Station (maximum pumping capacity - gpm)									
Commonwealth Drive Pump Station	3,050	3,050	3,050	---	---	---	---	---	---
Freedom Road Pump Station	3,450	4,250	6,650	---	---	---	---	---	---
Additional Storage Capacity (million gallons)									
North Tank Site	0	0.5	1.5	---	---	---	---	---	---

Table 10: Estimated Costs of Water and Sewerage System Improvements

Development Scenario	Sewer System Improvements	Water System Improvements	Total System Improvements	Estimated Number of Additional Equivalent Dwelling Units	
				Sewer System	Water System
	Estimated Design and Construction Costs				
Scenario A	$15,500,000	$13,800,000	$29,300,000	9,156	10,760
Scenario B	$24,700,000	$16,200,000	$40,900,000	13,769	16,287
Scenario C	$37,700,000	$23,800,000	$61,500,000	18,277	21,690
	Estimated Cost per Additional Equivalent Dwelling Unit				
Scenario A	$1,693	$1,283	$2,975		
Scenario B	$1,794	$995	$2,789		
Scenario C	$2.063	$1.097	$3.160		

Scenario D (No Growth)

For comparison purposes, the consultant ran the budget model for a fourth scenario to show no growth in land uses, population or in staffing.

This comparison clearly shows deficits that would be incurred if no growth occurs in Cranberry Township over the next two decades.

Real estate taxes remain fixed throughout the projection period, while operating costs increase with inflation.

After only ten years, the general fund is operating at a deficit. With Sewer & Water revenues only $27,843 more than expenses in 2007, there is a immediate deficit in the Sewer & Water Fund in 2008; however, by 2014, revenues once again outpace expenses since changes in debt service are fixed, and the annual rate of change in debt service is less than one percent.

Table 11 – Scenario D (No Growth) Budget Summary

	Revenue - General Fund	Expenses - General Fund	Net Revenue - General Fund	Revenue - Sewer & Water	Expenses - Sewer & Water	Net Revenue - Sewer & Water	Total Net Revenue
2008	15,139,725	12,863,361	2,276,365	10,789,393	10,922,313	(132,920)	2,143,444
2009	15,418,237	13,540,451	1,877,786	11,049,557	11,173,934	(124,377)	1,753,409
2010	15,703,898	13,930,917	1,772,980	11,316,302	11,411,030	(94,728)	1,678,252
2011	15,996,884	14,426,703	1,570,181	11,589,795	11,657,361	(67,565)	1,502,615
2012	16,297,377	14,926,663	1,370,714	11,870,207	11,910,137	(39,930)	1,330,784
2013	16,620,489	15,442,771	1,177,718	12,157,711	12,177,354	(19,643)	1,158,076
2014	16,951,775	15,988,974	962,801	12,452,489	12,448,708	3,781	966,582
2015	17,291,441	16,539,102	752,339	12,754,723	12,724,300	30,423	782,762
2016	17,639,699	17,116,540	523,159	13,064,603	13,013,100	51,503	574,662
2017	17,996,767	17,700,871	295,896	13,382,321	13,310,850	71,471	367,368
2018	18,362,867	18,323,910	38,958	13,708,077	13,612,412	95,665	134,623
2019	18,738,229	18,967,090	(228,862)	14,042,073	13,922,878	119,195	(109,666)
2020	19,203,153	19,646,926	(443,773)	14,384,518	14,240,727	143,791	(299,982)
2021	19,598,604	20,360,921	(762,317)	14,735,626	14,563,554	172,072	(590,245)
2022	20,004,059	21,077,601	(1,073,542)	15,095,616	14,906,589	189,026	(884,516)
2023	20,419,770	21,829,606	(1,409,836)	15,464,712	15,249,320	215,391	(1,194,445)
2024	20,845,997	21,723,465	(877,468)	15,843,144	15,602,241	240,904	(636,564)
2025	21,283,006	21,581,580	(298,574)	16,231,150	15,965,351	265,799	(32,776)
2026	21,731,070	22,335,276	(604,206)	16,628,971	14,388,660	2,240,311	1,636,105
2027	22,190,468	23,239,521	(1,049,053)	17,036,855	14,769,681	2,267,174	1,218,121
2028	22,661,487	24,186,847	(1,525,360)	17,455,057	15,160,937	2,294,120	768,760
2029	23,144,421	25,179,722	(2,035,300)	17,883,838	15,562,708	2,321,130	285,830
2030	23,639,572	26,219,052	(2,579,480)	18,323,466	15,975,281	2,348,185	(231,295)
Total			(268,874)			12,590,780	12,321,906

PEL Report: Structuring Healthy Communities

In March of 2007, the Pennsylvania Economy League (PEL) released a report that is relevant to the future and strategic vision for Cranberry Township. The PEL report states that with the current legislative environment, the structure of the municipal codes, and the state-controlled regulations for revenue generation, local leaders are faced with revenue streams that are "largely inelastic, capped, and out of sync with budget needs." The PEL report defines a direct link between the fiscal health of the community and its ability to continue healthy revenue generation. This observation is consistent with the Scenarios described in this Executive Summary demonstrating that when build-out occurs, particulary residential build-out because of the relatively small financial impact of nonresidential development in comparison to residential development, it becomes increasingly difficult to continue the revenue generation necessary to support the demand for local services such as police, public works, community development, and recreation. Revenue simply does not keep pace with the cost of providing municipal services.

The PEL report states that "the fiscal health of Pennsylvania's municipalities is moving in the wrong direction" and outlines five stages of fiscal decline for all communities, or as PEL describes it, "a continuing path toward distress." These five stages are:

1. *Prosperity with low taxes* - New development increases the revenue base, and there is limited demand for services. The developers are paying for infrastructure, and revenues are increasing faster than the cost of services.

2. *Increasing demand for services and gradually rising tax rates* - The pace of development has slowed, but the residents who have moved into the community are demanding more and higher quality services. Tax rates and service fees have increased – but there is still a strong tax base. (This is the stage that most accurately describes the circumstances for Cranberry Township at the time of this study in fiscal year 2008.)

3. *Reductions in non-core services* – Tax base increases (i.e. revenue generation) are minimal – but demand for services continues to increase. Taxes increase and some non-core services are reduced or cut (usually related to community services, recreation, public relations, technology, public information, etc.)

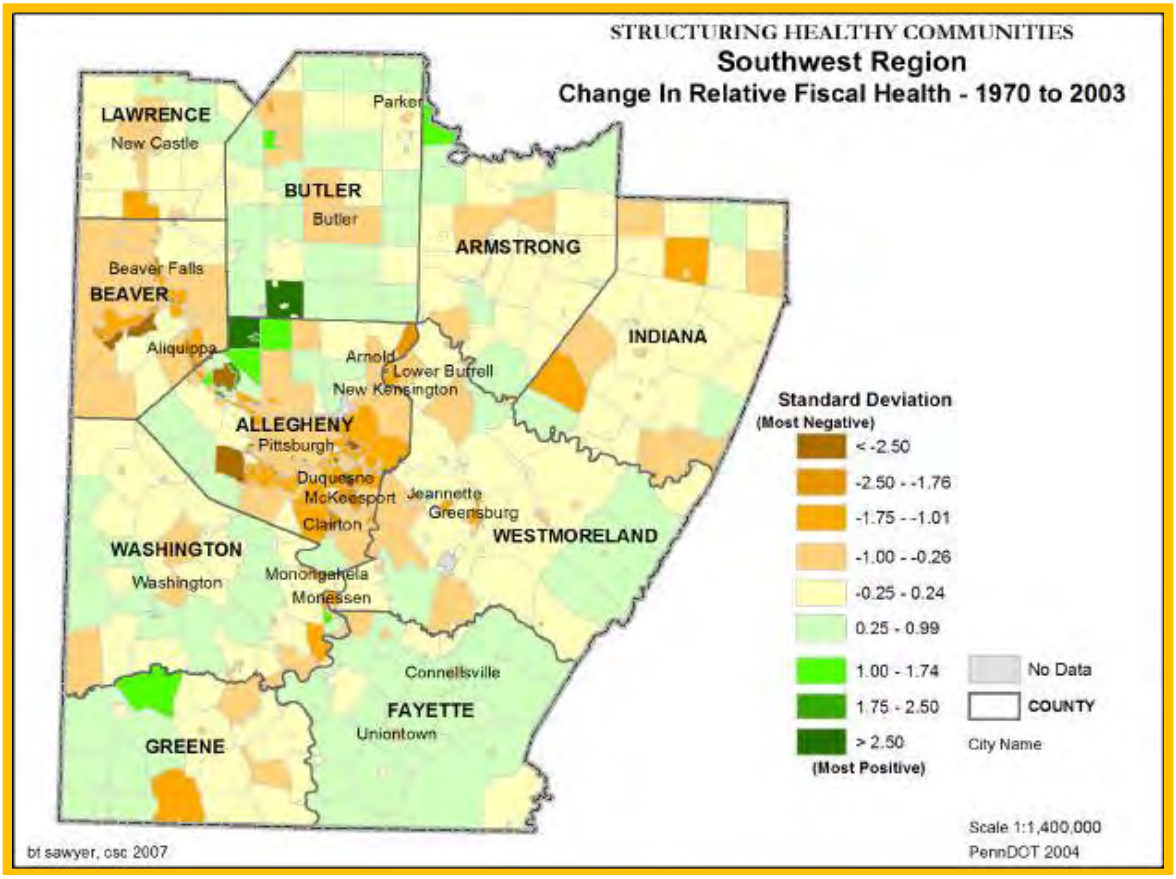
4. *Reductions in core services* – There is a mismatch between revenue and expenditures. The cost of providing services is escalating at a far greater pace than the revenue generated. In fact, the revenue may be declining – and there are reductions in staffing through attrition or layoffs.

5. *Loss of tax base and distress* – Revenue continues to decline, services are cut, and people begin to "vote with their feet," which causes a continually declining tax base related to population decline. Infrastructure replacement needs are high, but the ability to support the costs of replacement is almost non-existent.

In order to identify the level of fiscal difficulty for communities across the Commonwealth, PEL developed a distress factor index that focused on two concepts: tax effort and tax capacity. Tax effort is tax collections as compared to the tax base. Tax capacity is defined as the tax base per household. A ranking was then calculated for 2,551 municipalities in PA. Individual rankings were compared to a state average score to identify a standard deviation from the average for each community– a lower ranking implies a poorer condition; a higher ranking implies a better condition. Fiscal health was then measured over time, from 1970 through 2003, to determine whether fiscal health was decreasing or increasing for the communities measured. PEL also used focus groups to test the perception of fiscal health or fiscal distress in communities.

The results of the PEL research for southwest Pennsylvania are shown in the map below:

Figure 6. Southwest PA - PEL Structuring Healthy Communities Report



The southwest region consists of municipalities from 10 counties: Allegheny, Armstrong, Beaver, Butler, Fayette, Greene, Indiana, Lawrence, Washington, and Westmoreland. There is a fairly consistent pattern of distress concentrated in and around the city of Pittsburgh. The relatively healthy portions of the region are located north and south of the City, close to Interstate 79. Most municipalities in Butler County are demonstrating increasing fiscal health. This, of course, includes municipalities such as Cranberry Township, Marshall Township, and Adams Township.

Based on the distress index factor, the municipalities were categorized by Stage of Fiscal Decline in order to analyze the relative fiscal health of the communities by municipal code type. The results are shown in Table 10 below.

Table 10. Five Stages of Fiscal Decline PEL Structuring Healthy Communities

**The boroughs column does not include 43 boroughs with declining populations but growing tax revenues.*

The Five Stages of Fiscal Decline: The Number of Municipalities, by Type, Identified by the Five Progressive Stages of Fiscal Decline, 1970 to 2003				
Progression	**Cities**	**Boroughs**	**1st Class Townships**	**2nd Class Townships**
Stage 1: *Low taxes with prosperity*	0	0	27	399
Stage 2: Gradually rising tax rates and *increasing demand for services*	15	99	26	259
Stage 3: Plateau of tax base with reductions in *non-core services*	1	213	1	512
Stage 4: Insufficient taxes or tax base with *reductions in core services*	1	366	29	256
Stage 5 Loss of tax base and onset of significant *fiscal distress*	39	228	8	29
Totals	*56*	*906**	*91*	*1,455*

Townships of the second class like Cranberry Township, the most numerous (1,455) type of local governments in Pennsylvania, have in recent decades shown the most rapid growth in population and number of households. For many reasons, for the past 30 to 40 years, Pennsylvanians have chosen to move from more urban areas to live in these townships. This migration, sometimes called “urban sprawl” or “suburbanization,” reflects the reality of population growth or change during the second part of the twentieth century. This reality changed the economic and social patterns in Pennsylvania forever. This group, on average, shows relatively good fiscal health with 948 townships (65 percent) above the state average in 2003 for tax effort/capacity. Of these 948 fiscally sound townships, however, 400 (42 percent) have experienced a decline in relative fiscal health since 1970.

The PEL report concluded with the following recommendations:

Recommendation #1: Allow municipalities to locally decide how and how much to tax (with minimum restrictions by legislation and maximum input by constituents)

Recommendation #2: To the greatest extent possible, expand and enhance existing revenue-generating options

Recommendation #3: As soon as possible, place a wide menu of necessary revenue-generating tools in communities to prevent future fiscal distress

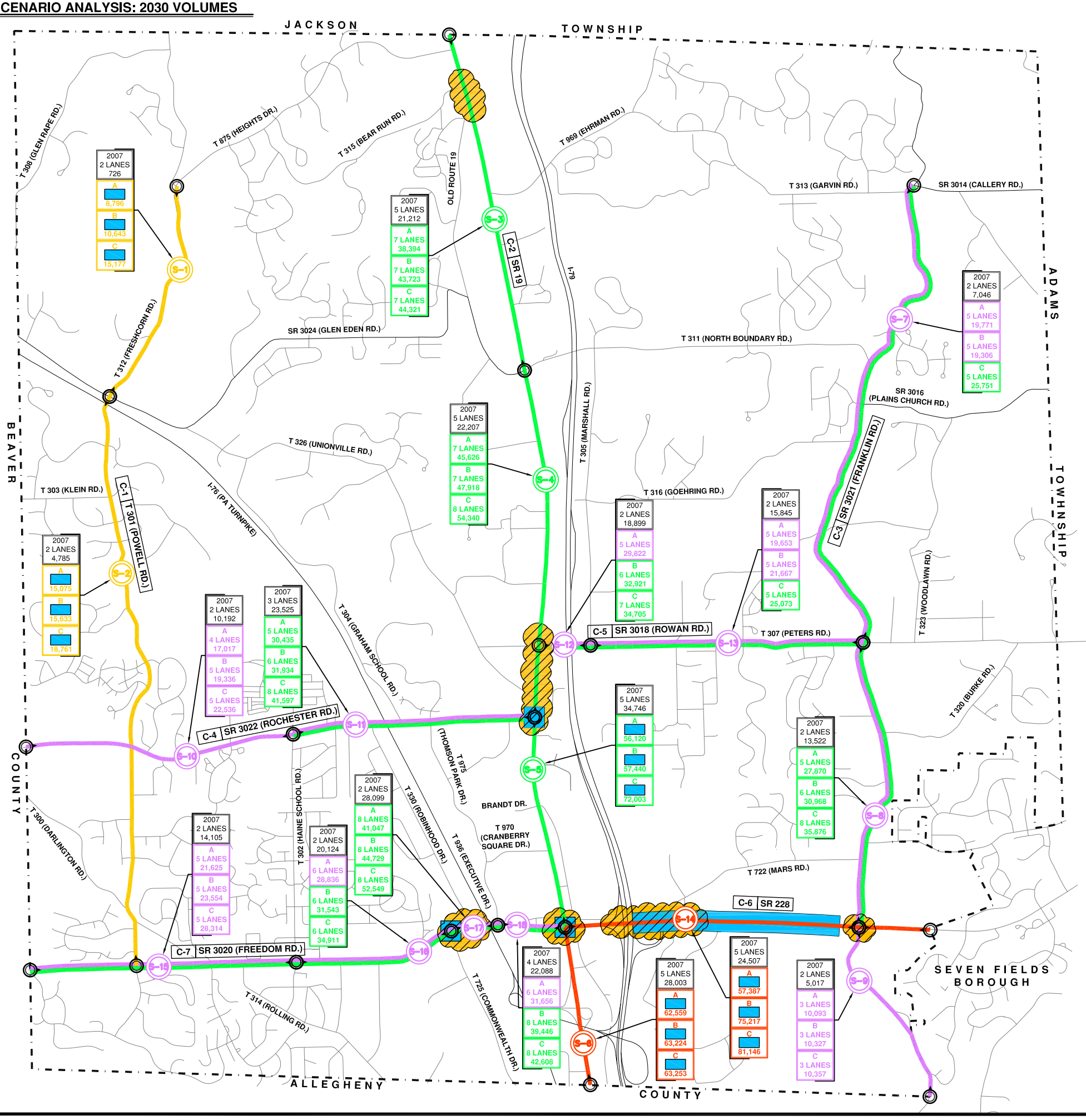
Recommendation #4: Provide shared expertise for very complex planning and fiscal issues

Recommendation #5: Keep and enhance current DCED programs and resources for municipalities

Recommendation #6: Conduct further study related to the fiscal distress profiles and solutions

The recommendations from the PEL study include a combination of statewide legislative "fixes" and improvements to policy and administration at the local level. The recommendations are consistent with the findings and observations from the Growth Scenario impact summaries prepared in this Executive Summary for Cranberry Township: specifically that revenue generation is key to the fiscal health in the community and that innovative tax and fee structures must be an important part of the strategic vision for the future.

SCENARIO ANALYSIS: 2030 VOLUMES



LEGEND

YEAR 2030 STUDY SCENARIO — C*
NUMBER OF TOTAL LANES — 8 LANES
AVERAGE DAILY TRAFFIC — 800

INFORMATION BLOCK
*2007 INDICATES EXISTING 2007 INFORMATION

PRINCIPAL ARTERIAL HIGHWAYS

MINOR ARTERIALS

URBAN COLLECTOR OR RURAL MAJOR COLLECTOR

RURAL MINOR COLLECTOR

CORRIDOR SEGMENT

END OF CORRIDOR SEGMENT(S)

MUNICIPAL BOUNDARY

SAFETY CONCERN AREA
(BASED ON ACCIDENT HISTORY)

LEVEL OF SERVICE "D" MAY NOT BE ATTAINED

C-5 | SR 3018 (ROWAN RD.) — CORRIDOR IDENTIFICATION
(CORRIDOR NUMBER; ROUTE NUMBER AND ROAD NAME)

DRAFT FINAL

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Cranberry Township, PA 16066-6499
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TRAFFIC IMPACT MAP

CRANBERRY TOWNSHIP
BUTLER COUNTY, PENNSYLVANIA
SCALE: 1" = 1/2 MILE JOB#: 1261.265 APRIL 2008

Cranberry Plan - Traffic Impact Summary Table

Future Build-Out Corridor Improvements Required/ Probable Corridor Improvement Costs (2008 Dollars)

DRAFT FINAL - 6/30/08

Roadway Corridor	Existing Description	Growth Scenario A	Growth Scenario B	Growth Scenario C
Powell Road T-301 (Corridor 1)	● Two-lane local collector from Heights Drive to Freedom Road ● Glen Eden, Klein, and Darlington intersections are stop controlled ● Single lane approaches at all intersections	Corridor Improvements: ● Level of Service "D" may not be attained to the north of Glen Eden Road ● Level of Service "D" may not be attained to the south of Glen Eden Road Glen Eden/Powell/Freshcorn Intersection: ● Signalize ● requires a northbound right- and left-turn lane (widening of structure)	Corridor Improvements: ● Level of Service "D" may not be attained to the north of Glen Eden Road ● Level of Service "D" may not be attained to the south of Glen Eden Road Glen Eden/Powell/Freshcorn Intersection: ● Signalize ● requires a northbound right- and left-turn lane (widening of structure)	Corridor Improvements: ● Level of Service "D" may not be attained to the north of Glen Eden Road ● Level of Service "D" may not be attained to the south of Glen Eden Road Glen Eden/Powell/Freshcorn Intersection: ● Signalize ● requires dual westbound and northbound left-turn lanes (widening of structure)
		$4,900,000	**$5,100,000**	**$7,000,000**
Route 19 S.R. 0019 (Corridor 2)	● Five-lane minor arterial from the northern to the southern border ● All major intersections from Ogle View/Rowan to the southern border are signalized ● Glen Eden/North Boundary and Old Route 19 signalized as well ● Dual westbound lefts at Rowan ● Dual northbound and eastbound lefts at Rochester ● Dual northbound and eastbound lefts at Rochester ● Dual eastbound lefts at Cranberry Square ● Dual eastbound, westbound, northbound and southbound lefts at Freedom/Route 228	Corridor Improvements: ● Widen to seven-lane arterial north of Glen Eden Road ● Widen to seven-lane arterial from North Boundary Road to Rochester Road ● Level of Service "D" may not be attained from Rochester Road to Freedom Road ● Level of Service "D" may not be attained from Freedom Road to the southern border Glen Eden/North Boundary Intersection: ● requires dual westbound lefts Ogle View/Rowan Intersection: ● requires dual southbound and westbound lefts Rochester/Wisconsin Intersection: ● Level of Service "D" may not be attained Cranberry Square Intersection: ● requires dual eastbound and northbound lefts Route 228/Freedom Intersection: ● Level of Service "D" may not be attained	Corridor Improvements: ● Widen to seven-lane arterial north of Glen Eden Road ● Widen to seven-lane arterial from North Boundary Road to Rochester Road ● Level of Service "D" may not be attained from Rochester Road to Freedom Road ● Level of Service "D" may not be attained from Freedom Road to the southern border Glen Eden/North Boundary Intersection: ● requires dual westbound lefts Ogle View/Rowan Intersection: ● requires dual southbound and westbound lefts Rochester/Wisconsin Intersection: ● Level of Service "D" may not be attained Cranberry Square Intersection: ● requires dual eastbound and northbound lefts Route 228/Freedom Intersection: ● Level of Service "D" may not be attained	Corridor Improvements: ● Widen to seven-lane arterial north of Glen Eden Road ● Widen to eight-lane arterial from North Boundary Road to Rochester Road ● Level of Service "D" may not be attained from Rochester Road to Freedom Road ● Level of Service "D" may not be attained from Freedom Road to the southern border Glen Eden/North Boundary Intersection: ● requires dual westbound lefts ● requires dual southbound lefts Ogle View/Rowan Intersection: ● Level of Service "D" may not be attained Rochester/Wisconsin Intersection: ● Level of Service "D" may not be attained Dutilh/Brandt Intersection: ● requires dual eastbound, northbound, southbound and westbound lefts Cranberry Square Intersection: ● requires major improvements Route 228/Freedom Intersection: ● Level of Service "D" may not be attained
		$22,800,000	**$24,000,000**	**$33,800,000**
Franklin Road S.R. 3021 (Corridor 3)	● Two-lane major collector from Callery Road to the southern border ● Garvin and Callery, Rowan and Hope, and Mars and Mars-Crider currently exist as separate intersections ● All intersections are stop controlled	Corridor Improvements: ● Realign and widen to five-lane collector from Callery Road to Peters Road ● Realign and widen to five-lane arterial from Peters Road to Route 228 ● Realign and widen to three-lane collector to the south of Route 228 Goehring, Rowan/Hope, Peters, and Mars/Mars-Crider Intersections: ● Realign and signalize	Corridor Improvements: ● Realign and widen to five-lane collector from Callery Road to Peters Road ● Realign and widen to six-lane arterial from Peters Road to Route 228 ● Realign and widen to three-lane collector to the south of Route 228 Goehring, Rowan/Hope, Peters, and Mars/Mars-Crider Intersections: ● Realign and signalize	Corridor Improvements: ● Realign and widen to five-lane arterial from Callery Road to Peters Road ● Realign and widen to eight-lane arterial from Peters Road to Route 228 ● Realign and widen to three-lane collector to the south of Route 228 Goehring, Rowan/Hope, Peters, and Mars/Mars-Crider Intersections: ● Realign and signalize
		$26,400,000	**$28,000,000**	**$34,500,000**
Rochester Road S.R. 3022 (Corridor 4)	● Two-lane major collector from the western border to Thomson Park Drive ● Three-lane major collector from Thomson Park Drive to Route 19 ● Powell, Haine School, and Thomson Park are signalized intersections ● Robinhood and Graham School are stop controlled	Corridor Improvements: ● Widen to four-lane collector from the western border to Thomson Park Drive (widening of structure) ● Widen to five-lane arterial from Thomson Park Drive to Route 19 Thomson Park Intersection: ● requires dual northbound lefts	Corridor Improvements: ● Widen to five-lane collector from the western border to Thomson Park Drive (widening of structure) ● Widen to six-lane arterial from Thomson Park Drive to Route 19 Thomson Park Intersection: ● requires dual northbound lefts and an eastbound right	Corridor Improvements: ● Widen to five-lane collector from the western border to Thomson Park Drive (widening of structure) ● Widen to eight-lane arterial from Thomson Park Drive to Route 19 Powell Intersection: ● Requires dual westbound lefts Thomson Park Intersection: ● Level of Service "D" may not be attained
		$18,700,000	**$22,800,000**	**$29,000,000**
Rowan Road S.R. 3018 (Corridor 5)	● Two-lane major collector from Route 19 to Franklin Road ● All intersections are stop controlled ● Single lane approaches at all intersections	Corridor Improvements: ● Widen to five-lane arterial from Route 19 to Marshall Road (widening of structure) ● Widen to five-lane collector from Marshall Road to Franklin Road Peters Intersection: ● requires signalization and an eastbound left	Corridor Improvements: ● Widen to six-lane arterial from Route 19 to Marshall Road (widening of structure) ● Widen to five-lane collector from Marshall Road to Franklin Road Peters Intersection: ● requires signalization and an eastbound left	Corridor Improvements: ● Widen to seven-lane arterial from Route 19 to Marshall Road (widening of structure) ● Widen to five-lane arterial from Marshall Road to Franklin Road Peters Intersection: ● requires signalization and dual eastbound lefts
		$17,200,000	**$19,100,000**	**$22,500,000**
Route 228 S.R. 0228 (Corridor 6)	● Five-lane principal arterial from Route 19 to Franklin Road ● Two-lane principal arterial from Franklin Road to eastern border ● Dual eastbound and westbound lefts at Kristoffer and Cranberry Commons	Corridor Improvements: ● Level of Service "D" may not be attained from Route 19 to the eastern border Franklin Intersection: ● requires dual eastbound, westbound, northbound and southbound lefts	Corridor Improvements: ● Level of Service "D" may not be attained from Route 19 to the eastern border Franklin Intersection: ● requires dual eastbound, westbound, northbound and southbound lefts	Corridor Improvements: ● Level of Service "D" may not be attained from Route 19 to the eastern border Franklin Intersection: ● Level of Service "D" may not be attained
		$2,500,000	**$2,500,000**	**$2,800,000**
Freedom Road S.R. 3020 (Corridor 7)	● Two-lane major collector from the western border to Executive Drive ● Three-four lane major collector from Executive Drive to ● All major intersections are signalized	Corridor Improvements: ● Widen to five-lane collector from the western border to Haine School Road ● Widen to six-lane collector from Haine School Road to Commonwealth Drive ● Widen to eight-lane arterial from Commonwealth Drive to Executive Drive ● Widen to six-lane collector from Executive Drive to Route 19 Haine School Intersection: ● requires dual eastbound and southbound lefts Commonwealth/McIntyre Intersection: ● Level of Service "D" may not be attained Executive Intersection: ● requires dual southbound lefts	Corridor Improvements: ● Widen to five-lane collector from the western border to Haine School Road ● Widen to six-lane arterial from Haine School Road to Commonwealth Drive ● Widen to eight-lane arterial from Commonwealth Drive to Executive Drive ● Widen to eight-lane arterial from Executive Drive to Route 19 Haine School Intersection: ● requires dual eastbound, northbound and southbound lefts Commonwealth/McIntyre Intersection: ● Level of Service "D" may not be attained Executive Intersection: ● requires dual southbound lefts	Corridor Improvements: ● Widen to five-lane collector from the western border to Haine School Road ● Widen to six-lane arterial from Haine School Road to Commonwealth Drive ● Widen to eight-lane arterial from Commonwealth Drive to Executive Drive ● Widen to eight-lane arterial from Executive Drive to Route 19 Haine School Intersection: ● requires dual eastbound, northbound and southbound lefts and dual northbound thru lanes Commonwealth/McIntyre Intersection: ● Level of Service "D" may not be attained Executive Intersection: ● requires dual southbound and eastbound lefts
		$27,900,000	**$31,000,000**	**$34,400,000**
Total		**$120,400,000**	**$132,500,000**	**$164,000,000**

CRANBERRY • TOWNSHIP •

HRG Herbert, Rowland & Grubic, Inc. Engineering & Related Services

***Capacity improvements based on maintaining Township preferred Highway Capacity Manual Level of Service D for intersections/roadway segments.**

****Please note it is the intent that the costs shown are to be used by the Township only for the purposes of comparing the three future development scenarios. The level of effort and detail undertaken in preparing the estimated project/corridor improvement costs are for comparison purposes based on the model results for the three scenarios analyzed. These estimates are not to a level of detail to be used for public improvement budgeting, capital forecasting, etc. Right-of-way acquisition costs and utility relocation costs are not included in these estimates.****

Cranberry Township Comprehensive Plan Update Report
Traffic Component
DRAFT FINAL 6/30/08

INTRODUCTION

In coordination with the Cranberry Township Comprehensive Plan Update, a traffic component was also completed by Herbert, Rowland and Grubic (HRG) with assistance from the Township and URS Corporation (URS). The primary objective of the traffic component was to supplement the Comprehensive Plan with an assessment of the projected transportation infrastructure improvements and associated cost that will be required under the development scenarios outlined in the Comprehensive Plan. The findings will be used to assist Cranberry Township in implementing the proposed Comprehensive Plan while considering the potential impacts to the Township‟s transportation infrastructure. This report summarizes the data collection, analysis of traffic impacts, projected corridor and intersection improvements and associated cost projections.

This traffic analysis is based on the three future development scenarios being evaluated as part of the Cranberry Comprehensive Plan Update. The three development scenarios that were analyzed are as follows and are referenced in this report and accompanying map and table.

Cranberry Comprehensive Plan Update – Growth Scenarios

- **Growth Scenario A –** Baseline (current land use projections)
- **Growth Scenario B –** First alternative (more dense development option)
- **Growth Scenario C –** Second alternative (most dense development option)

Note: This study was based on similar means and methods used to establish the basis for the Township‟s Transportation Impact Fee Program. However, it is noted that the level of analysis was not as detailed as required for an impact fee update. The Cranberry Transportation Impact Fee Program update in 2001 was used as a basis for the methods employed in this study. The modeling process used and the selected development scenario analysis may serve as a strong foundation for a full update to the Township‟s Transportation Impact Fee Program in the future.

TRAFFIC PROJECTIONS

To assess the impact of the proposed Growth Scenarios (A, B and C) on the Township‟s transportation infrastructure, it was necessary to forecast the future traffic volumes onto area roadways. To accomplish this, the traffic model that was utilized in implementation of the Transportation Impact Fee Program update in 2001 was revisited. To reflect current 2007 base conditions, a data collection effort was undertaken.

Data Collection

To assess traffic data collection needs, a review was made of recent Average Daily Traffic (ADT) data available. The following sources were used for updated ADT data:

- Traffic impact studies (TIS) performed for site developments in the Township since 2004.
- Traffic counts conducted previously as part of new signal designs or other intersection improvements.
- Miscellaneous Township traffic studies.

- Automatic traffic recorder (ATR) counts conducted by others (PennDOT, SPC, etc.).

Subsequently, a data collection plan to obtain supplemental information where needed was prepared for the Township staff for review and implementation. This data collection was completed by the Township in October and November 2007 including obtaining ATR counts for 44 locations throughout the Township.

The final data collection component included transportation network projects completed since the traffic model was last updated (intersections and roadway upgrades) for incorporation into the base traffic network model. The future roadway connections of Heights Drive to Route 19 (NW Connector Project) and the Ehrman Road connection to Garvin Road were assumed to be in place in the existing 2007 model.

The traffic data was then provided to URS for the purpose of calibrating the previous travel demand model to current 2007 roadway conditions.

Traffic Model Update and Future Traffic Modeling

Upon completion, URS prepared a report summarizing the modeling process which is included separately.

After calibrating the model to current conditions, URS was able to use land use projections for the three Growth Scenarios to provide ADT data for the entire Township roadway network for each Scenario. This future traffic data was used for analysis contained in this traffic component completed by HRG.

IDENTIFICATION OF IMPROVEMENTS

Based on the traffic modeling results obtained from URS, a list of conceptual improvements and costs was developed that could then be used to select the degree of development most favorable to the long term growth of the Township. The following summarizes the process and results of the study, which involved an evaluation of the future traffic needs for the Township.

Traffic Analysis

Analyzing all of the segments and intersections that were analyzed as part of the Traffic Impact Fee Update for all three Growth Scenarios would result in an extremely large amount of data. The Township and HRG agreed that to limit the scope for purposes of this study to focus on an evaluation of seven major/critical corridors within the township. The seven corridors that were evaluated included:

- Powell Road
- US Route 19
- Franklin Road
- Rochester Road
- Rowan Road
- PA Route 228
- Freedom Road

For analysis purposes, each of the seven corridors was broken up into smaller roadway segments. All major intersections were also included. As a result, the seven major corridors are made up of a total of eighteen segments and thirty-five intersections. These correspond primarily to intersections and segments

selected in the Capital Improvements Plan and Roadway Sufficiency Analysis. The study area, including the total roadway network, major corridors, roadway segments and major intersections is depicted on the associated **Traffic Impact Map**.

Various methods were used to identify projected transportation network deficiencies (i.e. intersection and roadway segment deficiencies). Analysis was conducted for each of the three Growth Scenarios using the following criteria:

- The analysis was conducted for projected future build-out conditions assuming full build-out of each development scenario occurred.

- The analysis was based on providing a preferred operational Level of Service (LOS) "D" for intersection and roadway segments as determined by Cranberry Township in the original Impact Fee Program. (See Note below).

- For intersections, a network of the Township"s roadways was modeled using Synchro Version 6 software. Factors such as lane configurations, intersection control, and peak hour factors (PHF) were used in order to accurately reflect the roadway network and future traffic demands. The resulting levels of service were projected based the criteria listed on Tables1 and 2.

- For roadway segments, traffic modeling ADT information for each Growth Scenario was compared to Table 3 to determine the number of lanes necessary to accommodate future traffic volumes. (See example provided).

Note: Level of Service (LOS) is defined by the *2000 Highway Capacity Manual* as a function of the delay encountered by motorists, which is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. LOS are assigned a letter grade that corresponds to a given average control delay per vehicle. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The LOS of an intersection is determined by each vehicle"s delay. The LOS criteria and characteristics for signalized intersections and unsignalized intersections are described in Table 1 and 2.

TABLE 1: SIGNALIZED INTERSECTIONS – LOS CRITERIA		
LEVEL OF SERVICE	**AVERAGE CONTROL DELAY (SEC/VEH)**	**EXPECTED DELAY TO MINOR STREET TRAFFIC**
A	< 10	Very low delay. Occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all.
B	> 10 and ≤ 20	Occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A.
C	> 20 and ≤ 35	Higher delays result from fair progression and/or long cycle lengths. Individual cycle failures may begin to appear in this level. Significant numbers of vehicles stop although many still pass through the intersection without stopping.
D	**> 35 and ≤ 55**	**Longer delays may result from unfavorable progression, long cycle lengths and/or high volume to capacity (v/c) ratios. Many vehicles stop and the proportion of vehicles not stopping declines.**
E	> 55 and ≤ 80	Considered to be the limit of acceptable delay, these high delay values generally indicate poor progression, long cycle lengths and high v/c ratios. Individual cycle failures are frequent occurrences.
F	> 80	Considered to be unacceptable to most drivers, this condition often occurs with oversaturation. It may also occur at high v/c ratios below 1.00 with many individual cycle failures.

TABLE 2: UNSIGNALIZED INTERSECTIONS – LOS CRITERIA		
LEVEL OF SERVICE	**AVERAGE CONTROL DELAY (SEC/VEH)**	**EXPECTED DELAY TO MINOR STREET TRAFFIC**
A	< 10	Little or no delay
B	> 10 and ≤ 15	Short traffic delays
C	> 15 and ≤ 25	Average traffic delays
D	**> 25 and ≤ 35**	**Long traffic delays**
E	> 35 and ≤ 50	Very long delays
F	> 50	Volume exceeds capacity

Cranberry Township falls under the "Developing Area Type" (middle column) in the following table:

TABLE 3: TRAVEL DEMAND MODEL DAILY ROADWAY CAPACITIES

	Daily Capacity at Level of Service D		
Facility Type	**Developed Area Type**	**Developing Area Type**	**Rural Area Type**
Freeway			
6 lane	Not Available	99,000	Not Available
4 lane	Not Available	67,500	Not Available
Expressway			
6 lane	45,200	56,500	40,700
4 lane	30,200	37,800	27,200
Divided Arterial			
6 lane	39,000	48,800	35,100
4 lane	26,000	32,500	23,400
Primary Arterial			
One way	28,200	35,300	25,400
5 lane	24,600	30,800	22,100
4 lane	17,600	22,000	15,800
3 lane	12,800	16,000	11,500
2 lane	9,000	11,300	8,100
Secondary Arterial			
One way	24,600	30,800	22,100
5 lane	22,600	28,300	20,300
4 lane	15,400	19,300	13,900
3 lane	11,200	14,000	10,100
2 lane	7,800	9,800	7,000
Collector			
One way	22,800	28,500	20,500
5 lane	19,600	24,500	17,600
4 lane	14,400	18,000	13,000
3 lane	9,400	11,800	8,500
2 lane	6,600	8,300	5,900
Ramp			
1 lane	Not Available	10,800	Not Available
2 lane	Not Available	20,300	Not Available

Example: To find the number of lanes required to accommodate the anticipated traffic volumes obtained from URS, the selected roadway segments were compared against the volumes found in the aforementioned table and column. If a two-lane collector segment was anticipated to have an ADT of 12,000 vehicles in the build out year, in order to maintain a LOS "D", according to the table the roadway would need to be widened to either four lane collector standards or to three lane arterial standards. This process was repeated for each of the eighteen segments in all three scenarios analyzed to determine the required lane configuration and roadway classification.

Results

The traffic analysis was completed for each of the eighteen roadway segments and thirty-five intersections for all three Growth Scenarios. A summary of the analysis findings for each Growth Scenario is summarized on the associated **Traffic Impact Summary Table.** The improvements are broken up by each of the seven major corridors studied. Required roadway widening for each roadway classification is listed. For intersections, required improvements (such as signalization, turn lanes, etc.) are also indicated. Again, the analysis was based on providing a preferred operational Level of Service (LOS) "D" for the future build-out scenarios. Data is depicted on the **Traffic Impact Map**.

Note: Some items on the **Traffic Impact Summary Table** and **Traffic Impact Map** are indicated as"Level of Service „D‟ may not be attained." In these cases, it was determined through analysis that several segments and intersections, based on future traffic demands indicated in the traffic model, will require mitigations that are beyond the scope of this study. These areas included the intersection of Route 19 and Route 228, Freedom Road and Commonwealth Drive, Route 19 and Rochester Road and the Route 228 corridor. These areas are projected to experience extremely high traffic volumes based on all development scenarios analyzed making mitigation forecasting difficult using standard road widening/capacity increasing practices. While the Powell Road Corridor is not expected to experience extremely high traffic volumes in the future, discussions with the Township based on roadway geometry as well as other issues have deemed improvements necessary to maintain a Level of Service "D" not likely to be constructed. Alternative corridor connections, an additional I-79 interchange in the north of the Township, and grade separated interchanges should all be considered to help alleviate these future traffic congestion areas. A preferred level of service lower than "D" may also be an adoptable policy for these areas given the future build out scenarios analyzed. It should also be noted that some areas such as the Route 228 and Route 19 intersection do not currently operate at the Cranberry Township preferred LOS "D." Project costs for areas that are indicated Level of Service „D‟ may not be attainable for all three scenarios were not included in the summary table.

Safety Review

The traffic counts, analysis and field view were supplemented by information from the Cranberry Township Public Safety Department. HRG conducted an interview with the Public Safety Department in March 2008 to review any safety concerns they are aware of and obtain historical accident data for the Township. Crash data from 2001-2005 was given in list and graphic form and reviewed as part of the traffic component.

Crash corridors were listed in order of significance of Route 19, Route 228, Freedom Road, Franklin Road, Rochester Road, Glen Eden Road, Cranberry Square Drive, Powell Road, Rowan Road, and Unionville Road. Further information was provided on the Police Accident Map of 2005 that was also referenced and was suggested to be updated as part of the Comprehensive Plan Update.

Areas of safety concern that were identified are graphically shown on the **Traffic Impact Map**. These areas were taken into account with the capacity analysis to determine likely mitigations.

Corridor Improvement Costs

After determining the intersection and segment improvements necessary to mitigate the forecasted traffic volumes for the three Growth Scenarios, planning level project costs were estimated for each improvement. Field views of select areas of concern were conducted by HRG staff to assist in the

development of conceptual cost estimates for transportation improvements involving proposed roadway and intersection widening.

Projected quantities for items such as required pavement widening, pavement overlay, cut/fill needed, new pavement markings, and replacement drainage structures and pipes were calculated based on the area of the anticipated widening as well as engineering judgment. Utility relocation and possible acquisition of right-of-way were not considered in the estimation of project costs.

The intersection and roadway segment recommendations were made to alleviate future traffic demands in order to enhance capacity and safety. These improvement projects are based on technical analyses and professional experience.

The costs associated with each project were then tallied for each corridor and future development scenario in order to compare the impacts associated with each of the three Growth Scenarios analyzed. All estimates were based on 2008 construction costs. The estimated costs are included in the **Traffic Impact Summary Table**.

Note: As noted on the Table in further detail, the costs shown are for comparison purposes only and further study of individual projects would be necessary prior to any project budgeting.

In addition to those improvements listed in this section, other less costly improvements can also be considered to optimize the transportation network without the need for costly capacity increasing projects, such as:

- Optimization of traffic signal intersection and corridor timings on a regular basis based on real time traffic data
- Continued increased coordination between Township emergency services, staff and traffic operations to identify traffic concerns and potential solutions
- Offering incentives for businesses to stagger employee work hours to avoid peak hour traffic periods

Cranberry Township is on the forefront of Pennsylvania municipalities in providing resources to optimize effectiveness in traffic signal operations. Continuation of this effort will yield great benefits to the community by reducing delay and maximizing the roadway infrastructure currently in place.

CONCLUSIONS AND RECOMMENDATIONS

Following the updated data collection and analysis of each of eighteen roadway segments and thirty-five intersections for all three Growth Scenarios, a summary of likely transportation improvement projects based on our study findings is shown in the **Traffic Impact Summary Table**. The roadway improvements are listed by corridor with the location, type of improvement, and 2008 estimated cost of improvements. The suggested corridor widening improvements are also represented graphically on the **Traffic Impact Map**.

The recommendations listed are suggested to correct projected deficiencies anticipated within the next 22-year period to provide a preferred operational level of service of “D” (as determined by Cranberry Township in the original Impact Fee Program).

HRG recommends that the Township use these findings as a guide to further evaluate the growth scenarios. The areas identified as "Level of Service „D" may not be attained" should be further evaluated upon selection of a preferred development scenario and in conjunction with the Traffic Impact Fee Update to follow the comprehensive plan update.

Note: The analysis conducted for this report consisted of capacity analysis based on passenger vehicle traffic projections based on standard trip generation principles. Other variables should be considered as part of the future transportation needs. Proper land use planning may reduce required vehicle trips from levels that have historically occurred and are the basis for standard trip generation methods. Other modes such as pedestrian, bike and transit may help to alleviate the projected strain on the Township's roadway infrastructure.

Redevelopment Funding Matrix			
Source	**Description**	**Eligibility**	**Award**
Community Revitalization Program (CRP)	Provides grant funds to support local initiatives that promote community stability and quality of life such as: Construction or rehabilitation of infrastructure, building rehabilitation, acquisition and demolition of structures/land, revitalization or construction of community facilities, purchase or upgrade of machinery and equipment, planning of community assets, public safety, crime prevention, recreation, and training	Local Government, municipal and redevelopment authorities and agencies, industrial development authorities and agencies, non-profit organizations incorporated under the laws of the Commonwealth, community organizations engaged in activities consistent with the program guidelines	Varies
Industrial Sites Reuse Program (ISRP)	Grant and low-interest loan financing to perform environmental site assessment and remediation work at former industrial sites	Public entities, private nonprofit economic development entities, and companies involved in reuse of former industrial land; entities that did not cause or contribute to environmental contamination	Grants and loans up to $200,000 for environmental assessments; grants and loans up to $1 million for remediation
PENNVEST Brownfields Remediation Program	Funds for specific assessment and remediation activities on contaminated properties that result in a water quality benefit, which can include the prevention of contamination Drinking water, wastewater and storm water infrastructure facilities are also eligible	A unit of municipal or county government or an affiliated industrial or economic development or redevelopment entity A public entity may apply for financing on behalf of a private party	Up to $11 million per project for one municipality Up to $20 million per project that serves 2 or 3 municipalities Amounts more than $20 million for comprehensive projects that serve four or more municipalities require a special vote of the PENNVEST Board of Directors
Infrastructure Development Program (IDP)	Grant and low-interest loan financing for public and private infrastructure	Municipalities, industrial development authorities and corporations,	Loans and grants up to $1.25 million No more than 20% of

Redevelopment Funding Matrix			
Source	**Description**	**Eligibility**	**Award**
	improvements including: Transportation facilities, airports; clearing and preparation of land and environmental remediation; water and sewer systems, storm sewers; energy facilities; parking facilities; bridges, waterways; rail and port facilities; telecommunications infrastructure	redevelopment authorities and local development districts may apply for IDP assistance for themselves or on behalf of eligible private companies	the annual appropriation for a single municipality No more than 10% of the annual appropriation will be loans or granted to applicant for speculative Greenfield projects not involving private companies Public investment must reach $2 for every $1 of IDP funds awarded
Pennsylvania Industrial Development Authority (PIDA)	Low-interest loan financing through Industrial Development Corporations for land and building acquisition, construction and renovation, resulting in the creation or retention of jobs	Manufacturing; industrial; research and development; agricultural processors; firms establishing a national or regional headquarters; computer/clerical operation centers	Loans up to $2 million (within Enterprise Zones, Act 47 Industrial Communities, Brownfield Sites, and Keystone Opportunity Zones, $2.25 million) No more than 30% to 70% of total eligible project costs, based on firm size and unemployment rate
Housing Redevelopment Assistance Program	Community development grants include activities necessary to enhance the quality of life including: acquisition, rehabilitation or restoration of older or underutilized buildings for reuse, demolition of blighted structure when a reuse plan has been adopted, and business site and property improvements creating "family sustaining" jobs as a loan to the business	Local governments; Redevelopment Authorities; Housing Authorities; Non-profits on a case by case basis	Varies Grants average between $150,000 and $200,000

Redevelopment Funding Matrix			
Source	**Description**	**Eligibility**	**Award**
Community Conservation Partnership Program (C2P2)	The Community Conservation Partnerships Program is a combination of several funding sources and grant programs that provide technical assistance or grant funding for recreation and conservation projects.	Communities and nonprofit organizations	Varies
Transportation, Community, and System Preservation Program (TCSP)	A federal discretionary grant program providing a comprehensive initiative of research and grants to investigate the relationships between transportation, community, and system preservation plans and practices and identify private sector-based initiatives to improve such relationships.	States, metropolitan planning organizations, local governments, and tribal governments	Varies
State and Tribal Assistance Grant Program (STAG)	Federal grant program to assist states and tribes in implementing environmental protection compliance	States and recognized tribes	Varies
Business Improvement District (BID)	Public-private partnership in which businesses in a defined area elect to pay an additional tax in order to fund improvements to the district's public realm and trading environment	Businesses in a certain area	N/A
Downtown Improvement District (DID)	Organizations initiated by local governing bodies designed to revitalize communities.	Overseen by the municipality	N/A
Local Economic Revitalization Tax Assistance Act (LERTA)	A local government decision allows local municipalities; school districts and counties can offer abatements on property taxes for up to 10 years.	Local taxing body	Equates to specified tax liability
Tax Increment Financing (TIF) Guarantee	Pursuant to local government approval of a	Local taxing body	Depends upon project costs

Redevelopment Funding Matrix			
Source	**Description**	**Eligibility**	**Award**
	TIF district and bond amount. The state will guarantee projects located within the TIF district. Eligible activities include acquisition, demolition, and infrastructure costs associated with redevelopment. An increase in property tax revenues is (increment) used to retire bonds.		

Commonwealth of Pennsylvania

Keystone Principles for Growth, Investment and Resource Conservation

PREAMBLE

The Keystone Principles & Criteria for Growth, Investment & Resource Conservation were adopted by the Economic Development Cabinet May 31, 2005. They were developed by the Interagency Land Use Team, a working group of the Cabinet over two years. The Principles & Criteria are designed as a coordinated interagency approach to fostering sustainable economic development and conservation of resources through the state's investments in Pennsylvania's diverse communities. The Principles lay out general goals and objectives for economic development and resource conservation agreed upon among the agencies and programs that participated in their development.

The Criteria are designed to help measure the extent to which particular projects accomplish these goals. The Criteria do not replace agency program guidelines or criteria. Rather, at each agency's discretion, they will either be integrated into existing program criteria (preferable) or used as additional, favorable considerations in the scoring or decision making process. The Principles and Criteria are designed to encourage multifaceted project development that will integrate programs and funding sources from a variety of state agencies into a comprehensive strategy to address issues affecting whole communities.

There are two categories of criteria: *Core Criteria*, where relevant, should be given primary consideration in all investment decisions made by Commonwealth agencies when making grants or loans to public or private projects using agency funds. *Preferential Criteria* should be used by Commonwealth agencies in all programs to which they are applicable to evaluate projects and make decisions on grants or loans using agency funds. Projects are to be evaluated with the recognition that rural, suburban, and urban areas have different characteristics and needs, and that what might work in an urban area might not work in a rural area (the "Be Fair" standard).

The Cabinet also approved a process to implement the Principles and Criteria over the next six months during which each agency will determine how they will integrate the criteria into each of their programs. A committee of the Interagency Team, led by the Governor's Office, will review the plans and offer feedback with the goal of fine tuning the use of the Principles and Criteria for full implementation in the next calendar year.

Keystone Principles for Growth, Investment and Resource Conservation

PRINCIPLES

1. REDEVELOP FIRST. Support revitalization of Pennsylvania's many cities and towns. Give funding preference to reuse and redevelopment of "Brownfield" and previously developed sites in urban, suburban, and rural communities for economic activity that creates jobs, housing, mixed use

development, and recreational assets. Conserve Pennsylvania's exceptional heritage resources. Support rehabilitation of historic buildings and neighborhoods for compatible contemporary uses.

2. PROVIDE EFFICIENT INFRASTRUCTURE. Fix it first: use and improve existing infrastructure. Make highway and public transportation investments that use context sensitive design to improve existing developed areas and attract residents and visitors to these places. Provide transportation choice and intermodal connections for air travel, driving, public transit, bicycling, and walking. Increase rail freight. Provide public water and sewer service for dense development in designated growth areas. Use on-lot and community systems in rural areas. Require private and public expansions of service to be consistent with approved comprehensive plans and consistent implementing ordinances.

3. CONCENTRATE DEVELOPMENT. Support infill and "Greenfield" development that is compact, conserves land, and is integrated with existing or planned transportation, water and sewer services, and schools. Foster creation of well-designed developments and walkable, bikeable neighborhoods that offer healthy life style opportunities for Pennsylvania residents. Recognize the importance of projects that can document measurable impacts and are deemed "most-ready" to move to successful completion.

4. INCREASE JOB OPPORTUNITIES. Retain and attract a diverse, educated workforce through the quality of economic opportunity and quality of life offered in Pennsylvania's varied communities. Integrate educational and job training opportunities for workers of all ages with the workforce needs of businesses. Invest in businesses that offer good paying, high quality jobs, and that are located near existing or planned water & sewer infrastructure, housing, existing workforce, and transportation access (highway or transit).

5. FOSTER SUSTAINABLE BUSINESSES. Strengthen natural resource based businesses that use sustainable practices in energy production and use, agriculture, forestry, fisheries, recreation and tourism. Increase our supply of renewable energy. Reduce consumption of water, energy and materials to reduce foreign energy dependence and address climate change. Lead by example: support conservation strategies, clean power and innovative industries. Construct and promote green buildings and infrastructure that use land, energy, water and materials efficiently. Support economic development that increases or replenishes knowledge-based employment, or builds on existing industry clusters.

6. RESTORE AND ENHANCE THE ENVIRONMENT. Maintain and expand our land, air and water protection and conservation programs. Conserve and restore environmentally sensitive lands and natural areas for ecological health, biodiversity and wildlife habitat. Promote development that respects and enhances the state's natural lands and resources.

7. ENHANCE RECREATIONAL AND HERITAGE RESOURCES. Maintain and improve recreational and heritage assets and infrastructure throughout the Commonwealth, including parks & forests, greenways & trails, heritage parks, historic sites & resources, fishing and boating areas and game lands offering recreational and cultural opportunities to Pennsylvanians and visitors.

8. EXPAND HOUSING OPPORTUNITIES. Support the construction and rehabilitation of housing of all types to meet the needs of people of all incomes and abilities. Support local projects that are based on a comprehensive vision or plan, have significant potential impact (e.g., increased tax base, private investment), and demonstrate local capacity, technical ability and leadership to implement the project. Coordinate the provision of housing with the location of jobs, public transit, services, schools and other

existing infrastructure. Foster the development of housing, home partnerships, and rental housing opportunities that are compatible with county and local plans and community character.

9. PLAN REGIONALY; IMPLEMENT LOCALLY. Support multi-municipal, county and local government planning and implementation that has broad public input and support and is consistent with these principles. Provide education, training, technical assistance, and funding for such planning and for transportation, infrastructure, economic development, housing, mixed use and conservation projects that implement such plans.

10. BE FAIR. Support equitable sharing of the benefits and burdens of development. Provide technical and strategic support for inclusive community planning to ensure social, economic, and environmental goals are met. Ensure that in applying the principles and criteria, fair consideration is given to rural projects that may have less existing infrastructure, workforce, and jobs than urban and suburban areas, but that offer sustainable development benefits to a defined rural community.

Criteria for Growth, Investment and Resource Conservation

Implementing the Keystone Principles

I. Core Criteria

1 Project avoids or mitigates high hazard locations (e.g., floodplain, subsidence or landslide prone areas).

2 Project/infrastructure does not adversely impact environmentally sensitive areas, productive agricultural lands, or significant historic resources.

3 Project in suburban or rural area: Project and supporting infrastructure are consistent with multi-municipal or county & local comprehensive plans and implementing ordinances, and there is local public/private capacity, technical ability, and leadership to implement project.

4 Project in “core community” (city, borough or developed area of township): Project is supported by local comprehensive vision & plan, and there is local public/private capacity, technical ability, and leadership to implement project.

5 Project supports other state investments and community partnerships.

II. Preferential Criteria

1. Development/Site Location
1a Brownfield or previously developed site.
1b Rehabilitation or reuse of existing buildings (including schools and historic buildings).
1c Infill in or around city, borough, or developed area of township.
1d If greenfield site, located in or adjacent to developed area with infrastructure.
1e Located in distressed city, borough or township.

2. Efficient Infrastructure
2a Use of existing highway capacity &/or public transit access available.

2b Within ½ mile of existing or planned public transit access (rail, bus, shared ride or welfare to work services).
2c Use of context sensitive design for transportation improvements.
2d Use/improvement of existing public or private water & sewer capacity and services.

3. Density, design, and diversity of uses.
3a Mixed residential, commercial & institutional uses within development or area adjacent by walking.
3b Sidewalks, street trees, connected walkways & bikeways, greenways, parks, or open space amenities included or nearby.
3c Interconnected project streets connected to public streets.
3d Design of new water, sewer & storm water facilities follows Best Management
Practices, including emphasizing groundwater recharge & infiltration, and use of permeable surfaces for parking and community areas.

4. Expand Housing Opportunities
4a Adopted county and multi-municipal or local municipal plans include plan for affordable housing; and implementing zoning provides for such housing through measures such as inclusion of affordable housing in developments over a certain number of units (e.g., 50), provision for accessory units, and zoning by right for multifamily units.
4b Project provides affordable housing located near jobs (extra weight for employer assisted housing).
4c Project adds to supply of affordable rental housing in areas of demonstrated need.

5. Increase Job Opportunities
5a Number of permanent jobs created and impact on local labor market.
5b Number of temporary jobs created and impact on local labor market.
5c Number of jobs paying family sustaining wages.
5d Increased job training coordinated with business needs & locations.

6. Foster Sustainable Businesses
6a Sustainable natural resource industry improvement or expansion: agriculture, forestry, recreation (fisheries, game lands, boating), tourism.
6b Business or project is energy efficient; uses energy conservation standards; produces, sells or uses renewable energy; expands energy recovery; promotes innovation in energy production and use; or expands renewable energy sources, clean power, or use of Pennsylvania resources to produce such energy.
6c Project meets green building standards.
6d Project supports identified regional industry cluster(s).

7. Restore/Enhance Environment
7a Cleans up/ reclaims polluted lands and/or waters.
7b Protects environmentally sensitive lands for health, habitat, and biodiversity through acquisition, conservation easements, planning and zoning, or other conservation measures.
7c Development incorporates natural resource features and protection of wetlands, surface & groundwater resources, and air quality.

8. Enhance Recreational/Heritage Resources
8a Improves parks, forests, heritage parks, greenways, trails, fisheries, boating areas, game lands and/or infrastructure to increase recreational potential for residents & visitors.

8b Historic, cultural, greenways and/or opens space resources incorporated in municipal plans and project plan.
8c Makes adaptive reuse of significant architectural or historic resources or buildings.

9. Plan regionally; Implement Locally
9a Consistent county and multi-municipal plan (or county and local municipal plan) adopted and implemented by county and local governments with consistent ordinances.
9b County or multi-municipal plan addresses regional issues and needs to achieve participating municipalities' economic, social, and environmental goals. All plans (county, multi-municipal, and local) follow standards for good planning, including:
1. Is up-to-date.
2. Plans for designated growth and rural resource areas, and developments of regional impact.
3. Plans for infrastructure, community facilities, and services, including transportation, water & sewer, storm water, schools.
4. Plans for tax base and fair share needs for housing, commercial, institutional, & industrial development.
5. Identification of high hazard areas where development is to be avoided.
6. Identification of and plans for prime agricultural land, natural areas, historic resources, and appropriate mineral resource areas to be conserved.
7. Open space plan for parks, greenways, important natural & scenic areas and connected recreational resources.
9c County and local ordinances implement the governing plans and use innovative techniques, such as mixed use zoning districts, allowable densities of 6 or more units per acre in growth areas, and/or clustered development by right, transfer of development rights, Specific Plans, and tax and revenue sharing.

###

The Cranberry Plan

A Long Range Comprehensive Plan for Cranberry Township, Butler County, Pennsylvania

Appendix F: Market Assessment

Cranberry Township
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Market Assessment

Purpose

As a component of the Cranberry Plan, Cranberry Township is developing a strategy to shape its future growth. While it is impossible to know exactly what the future holds, there are tools the Township can use to make more informed decisions. Creating policies that address potential outcomes now is the best way to achieve the desired vision for the future.

Cranberry Township has included a market assessment in The Cranberry Plan process as a tool to allow for more informed decision making. Just as the citizens have a voice in shaping the future of Cranberry, the market will also help to shape the future. The market and growth can drive land use, but conversely, land use can impact growth and the market. Market demand can not be captured if land uses do not support the market. Similarly, land zoned for a use the market cannot support is lost opportunity for uses the market could support. The market assessment will help Cranberry Township understand where opportunities lie by providing input about the highest and best uses of land. It will also provide benchmarks for projecting future growth and impacts. Its inclusion in The Cranberry Plan will garner more complete information for decision making. It is meant to be a component of consideration for policy, but not the sole determinant.

Introduction

Located in Butler County, Pennsylvania, Cranberry Township is one of the fastest growing municipalities in the state. Given its attractiveness for both residential and commercial development, its growth is expected to continue at a similar pace. Township management is faced with two options: (1) Allow growth to be shaped primarily by the current regulatory environment; or (2) Create a regulatory environment that helps shape growth, based on a strategically developed growth plan. To develop a strategic growth plan, it is important to understand the market dynamics within the Township. To provide a foundation for evaluating potential growth scenarios, Delta Development Group, Inc. (Delta) conducted a market assessment to answer the following questions:

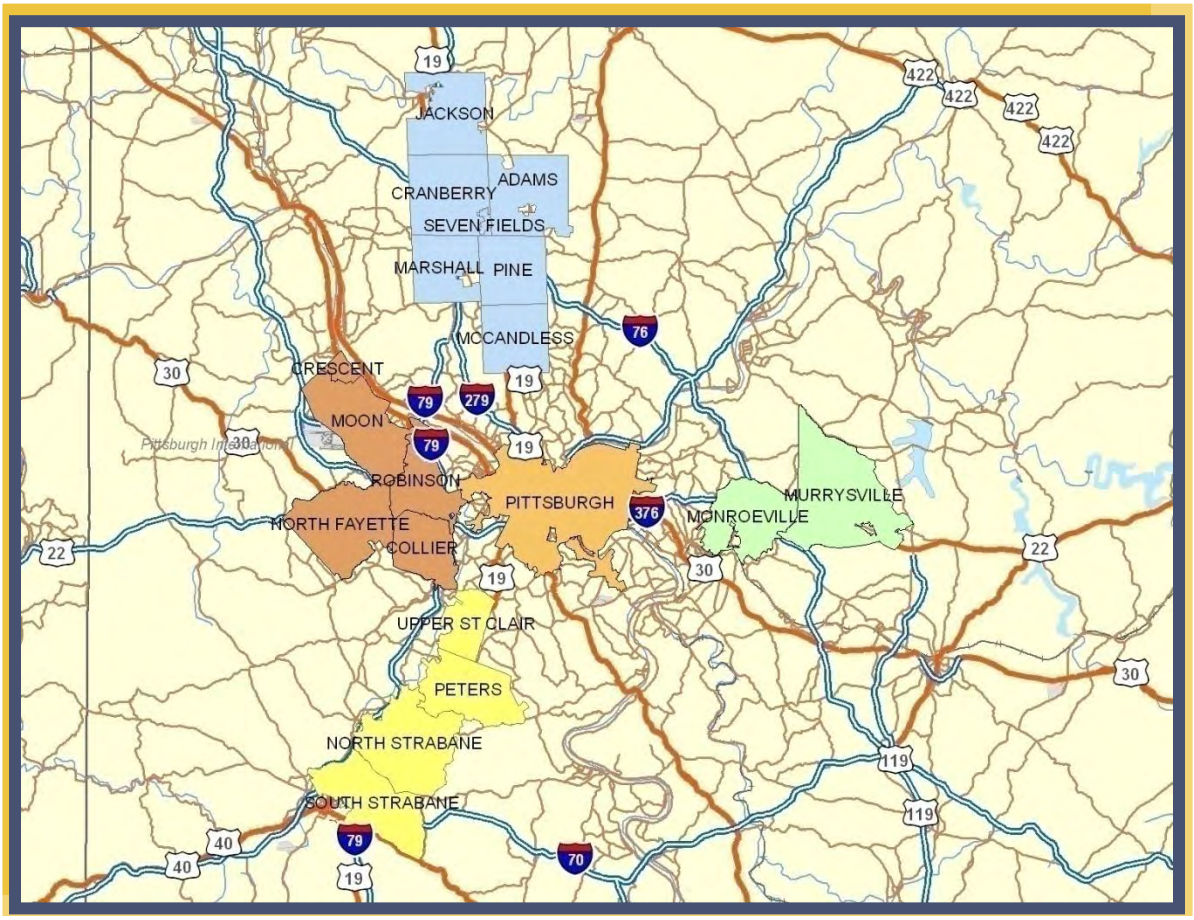
1. Who lives in the Township and what are their demographic characteristics?
2. Who lives here and works there, and who lives there and works here?
3. What are the Township's regional comparable areas and how does the Township compare to those areas?
4. What are the growth trends in the Township and its comparable areas?
5. What is the economic profile of the Township and its larger economic region?
6. What local and regional assets and strengths can be leveraged to create new business opportunities in the region?
7. What is the expected impact of the new or planned business operations in the Township?
8. What are the Township's greatest weaknesses/ challenges to economic growth?
9. What level of business development can the Township support, and what types of businesses should be targeted?

The Study Area

The market assessment is designed to look at market indicators and trends in Cranberry Township, as well as to present peer-to-peer comparisons with comparable areas in the Pittsburgh region, and micro-to-macro comparisons to the Township's larger economic region. Based on growth patterns and anecdotal information, it was determined areas in the region most comparable to the Township from both residential and business standpoints are: (1) the City of Pittsburgh; (2) the Monroeville/Murrysville Corridor; (3) the North Washington Corridor; and (4) the Airport Corridor. These comparable areas are presented in Figure 1. This study will present peer-to-peer comparisons of the Township with these areas to identify comparative strengths and weaknesses in its ability to attract new residents and businesses. In assessing the economic environment in the region, this study will compare the Township to a larger economic region that includes Butler and Allegheny Counties, and selected adjacent zip codes in Beaver, Westmoreland, and Washington Counties.

Figure 1

Comparative Study Areas



Executive Summary of Findings

Population

- Cranberry Township is growing rapidly. Cranberry Township's growth rate clearly outpaces its comparative areas, with an estimated growth of 20.5 percent between 2000 and 2007, and an expected 9.9 percent growth by 2012. The estimated population of Cranberry Township in 2007 is 28,445. Within the Cranberry Corridor, only Seven Fields and Adams have growth rates that surpass Cranberry Township. Butler County is the seventh fastest growing county in Pennsylvania with a growth rate of 14.5 percent between 1990 and 2000.
- Cranberry Township's population is younger than the population of the surrounding areas. Cranberry Township's median age of 34.7 clearly indicates the Township attracts a younger population than its comparative corridors. While more densely populated urban areas typically attract a younger population, Cranberry's median age is lower than that of the City of Pittsburgh, which is 35.5.
- Cranberry Township is less ethnically diverse than its comparable corridors. According to the Environmental Systems Research Institute (ESRI), a community's "diversity index" measures the probability that two people in the same community would be from a different race/ethnic group. On a scale of 1 to 100, a higher index represents a more diverse community. Cranberry Township lags behind its comparable corridors, with a diversity index of 7.7. The North Washington Corridor measures slightly above Cranberry Township with an index of 8.4. The City of Pittsburgh is the most diverse comparative area with a diversity index of 48.2.
- Cranberry Township has a large commuting population. Most of the people who work in Cranberry live somewhere else, and most of the people who live in Cranberry work somewhere else. According to the 2000 U.S. Census, less than 20 percent of the 14,956 individuals who *worked* in Cranberry Township actually *lived* in the Township. Similarly, less than 25 percent of the 12,079 working *residents* in Cranberry Township *worked* in the Township.

Housing

- Cranberry Township has a high percentage of owner-occupied housing. Approximately 80 percent of housing units in Cranberry Township are owner-occupied, compared to 87 percent in the North Washington Corridor. The Monroeville/Murrysville and Airport Corridors owner-occupied housing units are estimated at 72 percent. The City of Pittsburgh is more transient oriented, with only 46 percent of its housing units owner-occupied.
- Cranberry Township is a regional leader in home sales. Approximately 2,712 housing units were sold in Cranberry Township between 2003 and August 2007, 19 percent of which were new construction. Of the other comparable market areas, only the City of Pittsburgh witnessed more home sales (approximately 10,644) during that time period.

- The majority of homes sold in Cranberry Township have four bedrooms. Of the 2,190 resale units sold in Cranberry Township, 58 percent (1,257) contained at least four bedrooms, compared to 72 percent of new homes constructed. Compared to the other comparative markets, only Peters and Upper St. Clair Townships had a higher percentage of four or more bedroom resale homes (66 percent and 64 percent, respectively). Over 58 percent of the newly construction homes in the region are four bedroom.
- Four-year home resale prices in Cranberry Township are fourth highest in the region. The average sale price of a resale home in Cranberry Township between 2003 and August 2007 was $233,016, the fourth highest among all the comparative market areas. Collier Township had an average home sale price of $318,147. However, only 271 total housing units were sold in Peters Township during this time period, compared to 2,190 in Cranberry Township. Similarly, Peters Township and Upper St. Clair Township, both of which had a higher average sale price than Cranberry Township during this time period, sold less housing units, at 1,138 and 1,283, respectively.
- Current home prices in Cranberry Township are fifth highest in the region. As of August 28, 2007, there were 76 homes on the market in Cranberry Township. The average price of the 56 resale homes on the market is $258,128, with over half of the homes between $200,000 and $400,000. At the same date, there were 20 new homes on the market in Cranberry Township with an average price of $392,910, with 75 percent of the homes between $200,000 and $400,000.

Economy

Income/Earnings

- The Cranberry Corridor leads the region in household income. The median household income in Cranberry Township of $90,411 (2007 Estimated) is over 35 percent higher than that in the Monroeville/Murrysville, over 27 percent higher than that in the Airport Corridor, and more than double that in Pittsburgh City. The median household income in the North Washington Corridor is slightly less than Cranberry at $84,059. Only five municipalities in the study areas have median incomes higher than Cranberry Township.
- New Westinghouse jobs will increase the earnings per worker in Cranberry Township. The weighted average earnings per worker in Cranberry Township in 2007 is estimated to be $35,895. With annual salaries around of $86,000, the new Westinghouse jobs will increase the weighted average earnings per worker to $42,201 (in 2007 dollars), an increase of nearly 18 percent.

Economic Base

- Cranberry's economy is heavily reliant on the wholesale and retail trade sectors. This year, approximately one of every three workers in Cranberry Township is employed in wholesale trade (11 percent) or retail trade (17 percent) industries. Another five industries individually employ between eight percent and ten percent of Cranberry

workers: manufacturing (9 percent); professional and technical services (8 percent); administrative and waste services (10 percent); accommodation and food services (9 percent); and other services, except public administration (8 percent). Industries outside these seven core industries employ the remaining 28 percent of Cranberry Township workers.

- The addition of Westinghouse will help diversify Cranberry's economy. Cranberry Township has a marked concentration of wholesale trade employment compared with Pennsylvania. Other industries relatively highly concentrated in Cranberry compared with Pennsylvania include: retail trade, administrative and waste services, accommodation and food services, and other services (except public administration). The addition of Westinghouse jobs to the local economy will bring the professional and technical services sector into the list at 17 percent.
- Nearly 30 percent of jobs in Cranberry are supported by service sector spending. Twenty-nine percent of Cranberry Township's jobs are supported by spending in the service sector, 20 percent by spending of outside income, 13 percent by spending on manufactured goods, and 10 percent by visitor spending from outside the Township.
- Twenty percent of the jobs in Cranberry are supported by spending from outside sources. Spending by Cranberry Township residents' outside income (e.g., income from sources outside the Township, such as pensions, investments, and business ventures outside the Township) generates 20 percent of the jobs in Cranberry. Some of this income is subject to risks and uncertainties.
- Accessibility and amenities are attracting new business to Cranberry. In a March 2007 memo to its Monroeville employees, Westinghouse indicated that the key attractiveness factors for moving to Cranberry Township included its proximity to the airport; pedestrian access to amenities such as hotels, restaurants an shops; and flexibility for expansion for future growth.
- Commercial office space is in demand in Cranberry, particularly in business parks. Over the past 10 years, Cranberry Township has added 1.4 million square feet of office space, with approximately 66 percent located in business parks. This trend indicates a potential increase of around 140,000 square feet of office space annually.
- Commercial office space in Cranberry is less expensive than in the Pittsburgh Central Business District. Cranberry Township's asking rent for Class A and B commercial office space was below the average for the western Pennsylvania region. Cranberry's asking rent was approximately $19.46 per square foot for Class A space and $15.08 per square foot for Class B space. The Pittsburgh-CBD's asking rent was $21.60 for Class A and $16.27 for Class B. Given that Cranberry's main competition is the Pittsburgh CBD and Parkway West area, Cranberry's rates have remained competitive. However, with the supply of the Pittsburgh-CBD commercial office space rising by 320,000 square feet, Cranberry may face increasing competition.

Retail Sector

- Nearly one-third of Cranberry's retail space is less than 10 years old. There is currently over 3.8 million square feet of retail space in Cranberry Township, with approximately 1.1 million square feet of that space added over the past 10 years.

- Retail sales in Cranberry are estimated at over $725 million annually. If sales per square foot in Cranberry Township align with Northeast U.S. regional sales benchmarks, it could be estimated that average sales per square foot are around $242, for total estimated annual sales of around $930 million.
- Cranberry Township has a higher-than-average retail spending potential. Relative to a national spending potential of 100, it is estimated that the spending potential index for Cranberry Township residents is 139, compared to 121 within a 10-mile radius, and 103 within a 15-mile radius. More specifically, based on household income estimates, Cranberry Township residents have disposable income that would allow them to spend 30 percent more for retail goods and services than the average American household.
- Over half of the retail sales in Cranberry Township come from non-resident spending. ESRI Business Information System estimates retail spending for Cranberry Township residents to be around $356.5 million annually, which means that approximately $368.5 million of the estimated annual retail sales in the Township is spent by individuals who reside outside the Township.
- Cranberry Township can potentially support an additional 1.9 million square feet of retail. Assuming a 10 percent capture rate for retail spending within a 15-mile radius of Cranberry and an average annual sales volume of $242 per square foot, the Township could support an additional 1.9 million square feet of retail.

Key Local Assets/Challenges

- Cranberry Township is highly accessible. Cranberry is located at the nexus of two major interstates, I-76 and I-79, which bring over 80,000 vehicles through the Township each day. It is also served by a regional airport within a 15-minute drive, and is within a 40-minute drive of Pittsburgh International Airport.
- Cranberry has good primary schools. Cranberry Township is located in the Seneca Valley School District, which consistently scores higher than both national and state averages on the all sections of the SAT. Compared to other school districts in the study area, Seneca Valley has the fourth highest verbal score on the SAT, the seventh highest score in math, and the fourth highest score in writing.
- Cranberry has access to a large number of colleges and vocational schools, which can provide a strong labor pool. There is a high concentration of secondary education facilities in the region, including Carnegie Mellon, Duquesne, and the University of Pittsburgh. In the 2005-2006 school year, there were 4,266 scientific/high tech degrees awarded by area colleges and universities in fields such as computers/webdesign, architecture/design, engineering, mathematics, science, medicine, and robotics. Cranberry Township is located close enough to these colleges/universities that businesses located in the Township, or are considering relocating to the Township, can take advantage of this well-educated workforce.
- Cranberry Township has no public transportation. There is no public transportation directly linking Cranberry to Pittsburgh or other key regional destinations. With over 21,000 workforce commuters, 3,000 of whom commute daily between Cranberry and Pittsburgh, the lack of public transportation forces Cranberry Township to be automobile oriented. An average of 80,000 vehicles travel through the Township each day.
- Nearly half (49%) of the jobs in Cranberry Township pay less than $30,000 per year – With increased reliance on the retail and service sectors in today's economy, very often, new jobs that are created in a community are lower paying jobs with less impact on the local economy. Nearly half of the jobs in Cranberry Township in 2007 are estimated to pay less than $30,000 a year and more retail and service sector jobs will likely be required to support the expected growth in the Township over the next few years. The lack of affordable housing and public transportation in Cranberry Township could mean a lack of available workforce for retail and service sector jobs in the future.

Key Planning Opportunities

Create a "Live, Work, Play" Environment

Cranberry Township has made significant strides in becoming a commercial center rather than a bedroom community with the number of local jobs growing at nearly twice the rate of the population between 2000 and 2007. However, Cranberry Township earnings data suggests that the majority of people who work in Cranberry Township likely can not afford to live there. Therefore, Cranberry is still likely a bedroom community. A "live, work, play" environment is critical to creating a "sense of place" in the Township. Providing housing opportunities that are affordable to the local workforce can help to create that environment.

Target Higher Wage Industry Sectors to Strengthen the Economic Base

Target industries with higher earnings per worker can provide a stronger economic base for the Township, and will help to minimize the risks associated with an economy primarily driven by service sector spending. The *professional and technical sector* and *wholesale trade* industries provide not only higher wages, but a concentrated presence in Cranberry Township, with recent growth attributed to local competitive factors. The highest paying sector, *management of companies and enterprises*, has minimal presence in Township; however, the sector has seen regional growth and could represent another potential target sector. Opportunities also exist to improve the Township's competitiveness in the construction and manufacturing sectors.

Create a Business Climate that Nurtures Entrepreneurship

The majority of office space absorbed over the past 10 years has been in business park settings. In a new economy that is driven by innovation and entrepreneurship, consideration should be given to providing an office/commercial environment that attracts and nurtures small businesses and entrepreneurs. In addition, for every large business that moves into the community, there are likely opportunities for small business development through its "supply chain" and required business support services.

Create a Social Climate that Accepts and Encourages Diversity

Cranberry Township is less diverse than the comparable corridors with a diversity index of 7.7. According to U.S. Census Bureau projections, by 2050, only half the population will be non-Hispanic white. The Hispanic and Asian populations will both triple; the black population will almost double; and the white population will barely hold its own.

This trend suggests that communities that can appeal to diverse populations will be increasingly attractive to future residents and workforce. The Township can take proactive steps to create an inclusionary environment through deliberate "inquiry" to understand diversity, and through seeking active community leadership and participation from under-represented ethnic/social groups. This leadership could emerge from current community members or from new businesses in the community. In addition, the Township can sponsor activities, such as ethnic festivals and the celebration of ethnic holidays, and through targeted media coverage and advertising.

Stay "Ahead of the Curve" with a Redevelopment Strategy

The real estate market is dynamic and continually changes to meet consumer demands. For instance, over the past decade, the retail development market has shifted from enclosed malls to upscale outdoor retail centers, or "lifestyle centers," providing stiff competition for traditional malls. While Cranberry Township's location and amenities make it attractive for growth in today's market, trends will change and structures will age – potentially leaving the Township less attractive for growth in a few years. In addition to a development strategy, a redevelopment strategy is critical to ensure the Township is always "ahead of the curve" to meet the demands of a changing market.

Leverage Transportation Opportunities

With no public transportation, a commuting workforce, a regional shopping destination, and limited pedestrian linkages, the Township relies heavily on the automobile. Providing public transportation and more coordinated pedestrian linkages can help to alleviate traffic congestion, and encourage growth. Development of traditional mixed-use neighborhoods centered around transportation is a potential way to incorporate public transportation and pedestrian linkages into an economic development plan.

Demographic Environment

The residents of Cranberry Township are one of its greatest assets. The residents of the Township are consumers of goods and services, which will help drive the type and amount of retail development in the Township. Residents are also part of the workforce that supports existing business and industry, and in today's economy, residents are also a knowledge resource that serves to attract new businesses to the area with higher salaries commensurate with local knowledge and skills.

The following tables present an overview of seven key demographic indicators, comparing Cranberry Township to its comparative areas.

Table 1
Population

	2000	2007	2012	% Change 2000 to 2007	% Change 2006 to 2012
Cranberry Corridor					
Cranberry	23,614	28,445	31,253	20.5%	9.9%
Adams	6,901	9,030	10,215	30.9%	13.1%
Jackson	3,672	3,799	3,927	3.5%	3.4%
Marshall	6,007	6,369	6,369	6.0%	0.0%
McCandless	28,884	27,921	27,225	-3.3%	-2.5%
Pine	7,683	9,301	9,642	21.1%	3.7%
Seven Fields	1,986	2,753	3,168	38.6%	15.1%
Total Cranberry Corridor	78,747	87,618	91,799	11.3%	4.8%
Pittsburgh					
Pittsburgh City	334,527	318,430	309,365	-4.8%	-2.8%
Monroeville/Murysville Corridor					
Monroeville	29,270	28,151	27,412	-3.8%	-2.6%
Murrysville	18,762	19,184	19,350	2.2%	0.9%
Total Monroeville/Murrysville Corridor	48,032	47,335	46,762	-1.5%	-1.2%
Airport Corridor					
Collier	5,435	6,285	6,446	15.6%	2.6%
Crescent	2,314	2,204	2,136	-4.8%	-3.1%
Moon	22,290	22,717	22,518	1.9%	-0.9%
North Fayette	12,325	13,058	13,077	5.9%	0.1%
Robinson	12,272	12,152	11,935	-1.0%	-1.8%
Total Airport Corridor	54,636	56,416	56,112	3.3%	-0.5%
Washington Corridor					
North Strabane	10,054	11,695	12,540	16.3%	7.2%
Peters	17,571	20,323	21,797	15.7%	7.3%
South Strabane	8,280	9,374	10,007	13.2%	6.8%
Upper St. Claire	20,073	19,322	18,810	-3.7%	-2.6%
Total Washington Corridor	55,978	60,714	63,154	8.5%	4.0%

Source: U.S. Census Bureau and ESRI BIS 2007 and 2012 estimates and projections.

Table 2
Households

	2000	2007	2012	% Change 2000 to 2007	% Change 2006 to 2012
Cranberry Corridor					
Cranberry	8,346	10,054	11,068	20.5%	10.1%
Adams	2,428	3,236	3,691	33.3%	14.1%
Jackson	1,371	1,461	1,530	6.6%	4.7%
Marshall	1,950	2,076	2,081	6.5%	0.2%
McCandless	11,117	10,928	10,725	-1.7%	-1.9%
Pine	2,411	2,908	3,015	20.6%	3.7%
Seven Fields	1,986	2,753	3,168	38.6%	15.1%
Total Cranberry Corridor	29,609	33,416	35,278	12.9%	5.6%
Pittsburgh					
Pittsburgh City	143,578	138,893	135,658	-3.3%	-2.3%
Monroeville/Murysville Corridor					
Monroeville	12,346	12,039	11,860	-2.5%	-1.5%
Murrysville	7,046	7,350	7,477	4.3%	1.7%
Total Monroeville/Murrysville Corridor	19,392	19,389	19,337	0.0%	-0.3%
Airport Corridor					
Collier	2,298	2,692	2,779	17.1%	3.2%
Crescent	886	859	839	-3.0%	-2.3%
Moon	8,445	8,743	8,707	3.5%	-0.4%
North Fayette	12,325	13,058	13,077	5.9%	0.1%
Robinson	4,822	4,834	4,771	0.2%	-1.3%
Total Airport Corridor	28,776	30,186	30,173	4.9%	0.0%
Washington Corridor					
North Strabane	3,975	4,736	5,133	19.1%	8.4%
Peters	6,028	7,019	7,557	16.4%	7.7%
South Strabane	3,447	3,978	4,284	15.4%	7.7%
Upper St. Claire	6,974	6,829	6,695	-2.1%	-2.0%
Total Washington Corridor	20,424	22,562	23,669	10.5%	4.9%

Source: U.S. Census Bureau and ESRI BIS 2007 and 2012 estimates and projections.

Table 3
Household Size

	2000	2007	2012	% Change 2000 to 2007	% Change 2006 to 2012
Cranberry Corridor					
Cranberry	2.80	2.81	2.80	0.4%	-0.4%
Adams	2.77	2.74	2.72	-1.1%	-0.7%
Jackson	2.59	2.52	2.49	-2.7%	-1.2%
Marshall	3.07	3.06	3.05	-0.3%	-0.3%
McCandless	2.49	2.44	2.42	-2.0%	-0.8%
Pine	3.14	3.16	3.16	0.6%	0.0%
Seven Fields	2.61	2.64	2.65	1.1%	0.4%
Total Cranberry Corridor	2.66	2.62	2.60	-1.4%	-0.8%
Pittsburgh					
Pittsburgh City	2.17	2.13	2.11	-1.8%	-0.9%
Monroeville/Murysville Corridor					
Monroeville	2.29	2.25	2.23	-1.7%	-0.9%
Murrysville	2.63	2.58	2.56	-1.9%	-0.8%
Total Monroeville/Murrysville Corridor	2.48	2.44	2.42	-1.4%	-0.9%
Airport Corridor					
Collier	2.35	2.32	2.31	-1.3%	-0.4%
Crescent	2.60	2.55	2.53	-1.9%	-0.8%
Moon	2.44	2.40	2.39	-1.6%	-0.4%
North Fayette	2.44	2.41	2.40	-1.2%	-0.4%
Robinson	2.45	2.42	2.40	-1.2%	-0.8%
Total Airport Corridor	1.90	1.87	1.86	-1.6%	-0.5%
Washington Corridor					
North Strabane	2.45	2.40	2.38	-2.0%	-0.8%
Peters	2.87	2.85	2.85	-0.7%	0.0%
South Strabane	2.33	2.29	2.28	-1.7%	-0.4%
Upper St. Claire	2.81	2.76	2.74	-1.8%	-0.7%
Total Washington Corridor	2.74	2.69	2.67	-1.8%	-0.8%

Source: U.S. Census Bureau and ESRI BIS 2007 and 2012 estimates and projections.

Table 4
Median Household Income

	2000	2007	2012	% Change 2000 to 2007	% Change 2006 to 2012
Cranberry Corridor					
Cranberry	66,994	90,411	113,388	35.0%	25.4%
Adams	64,305	80,731	95,063	25.5%	17.8%
Jackson	47,155	56,901	63,977	20.7%	12.4%
Marshall	102,270	133,654	164,928	30.7%	23.4%
McCandless	62,183	81,170	100,295	30.5%	23.6%
Pine	86,692	119,790	153,017	38.2%	27.7%
Seven Fields	66,818	91,801	119,579	37.4%	30.3%
Total Cranberry Corridor	66,818	90,411	113,388	35.3%	25.4%
Pittsburgh					
Pittsburgh City	28,668	36,731	43,501	28.1%	18.4%
Monroeville/Murysville Corridor					
Monroeville	44,585	57,971	69,356	30.0%	19.6%
Murrysville	63,151	83,828	101,615	32.7%	21.2%
Total Monroeville/Murrysville Corridor	53,868	70,900	85,486	31.6%	20.6%
Airport Corridor					
Collier	41,057	54,720	65,711	33.3%	20.1%
Crescent	49,465	61,625	75,060	24.6%	21.8%
Moon	57,208	75,195	88,148	31.4%	17.2%
North Fayette	51,534	66,792	79,507	29.6%	19.0%
Robinson	55,061	72,482	85,517	31.6%	18.0%
Total Airport Corridor	51,534	66,792	79,507	29.6%	19.0%
Washington Corridor					
North Strabane	50,654	64,992	77,816	28.3%	19.7%
Peters	77,110	103,126	127,787	33.7%	23.9%
South Strabane	42,264	53,735	63,922	27.1%	19.0%
Upper St. Claire	85,292	110,958	134,927	30.1%	21.6%
Total Washington Corridor	63,882	84,059	102,802	31.6%	22.3%

Source: U.S. Census Bureau and ESRI BIS 2007 and 2012 estimates and projections.

Table 5
Owner Occupied Housing Units

	2000	2007	2012	% Change 2000 to 2007	% Change 2006 to 2012
Cranberry Corridor					
Cranberry	80.4%	81.4%	81.3%	1.2%	-0.1%
Adams	82.3%	81.3%	80.9%	-1.2%	-0.5%
Jackson	78.9%	78.4%	77.8%	-0.6%	-0.8%
Marshall	90.5%	89.7%	89.4%	-0.9%	-0.3%
McCandless	74.5%	73.9%	72.8%	-0.8%	-1.5%
Pine	92.0%	90.6%	89.9%	-1.5%	-0.8%
Seven Fields	80.0%	75.3%	74.3%	-5.9%	-1.3%
Total Cranberry Corridor	82.7%	81.5%	80.9%	-1.4%	-0.7%
Pittsburgh					
Pittsburgh City	45.9%	45.2%	43.6%	-1.5%	-3.5%
Monroeville/Murysville Corridor					
Monroeville	65.4%	64.6%	63.6%	-1.2%	-1.5%
Murrysville	86.1%	85.6%	85.0%	-0.6%	-0.7%
Total Monroeville/Murrysville Corridor	75.8%	75.1%	74.3%	-0.9%	-1.1%
Airport Corridor					
Collier	85.3%	82.8%	81.8%	-2.9%	-1.2%
Crescent	81.7%	81.0%	79.8%	-0.9%	-1.5%
Moon	68.0%	67.0%	65.8%	-1.5%	-1.8%
North Fayette	71.4%	71.3%	69.8%	-0.1%	-2.1%
Robinson	73.7%	73.2%	72.1%	-0.7%	-1.5%
Total Airport Corridor	76.0%	75.1%	73.9%	-1.3%	-1.6%
Washington Corridor					
North Strabane	85.7%	85.0%	84.3%	-0.8%	-0.8%
Peters	91.3%	90.4%	89.9%	-1.0%	-0.6%
South Strabane	72.4%	73.2%	73.1%	1.1%	-0.1%
Upper St. Claire	90.9%	90.0%	88.7%	-1.0%	-1.4%
Total Washington Corridor	85.1%	84.7%	84.0%	-0.5%	-0.8%

Source: U.S. Census Bureau and ESRI BIS 2007 and 2012 estimates and projection

Table 6
Median Age

	2000	2007	2012	% Change 2000 to 2007	% Change 2006 to 2012
Cranberry Corridor					
Cranberry	34.7	36.2	36.1	4.3%	-0.3%
Adams	36.2	37.5	38.6	3.6%	2.9%
Jackson	40.8	43.9	45.2	7.6%	3.0%
Marshall	37.4	40.0	40.8	7.0%	2.0%
McCandless	40.3	42.8	43.8	6.2%	2.3%
Pine	37.1	39.5	40.8	6.5%	3.3%
Seven Fields	33.3	35.4	36.8	6.3%	4.0%
Total Cranberry Corridor	37.1	39.5	40.8	6.5%	3.3%
Pittsburgh					
Pittsburgh City	35.5	36.6	38.1	3.1%	4.1%
Monroeville/Murysville Corridor					
Monroeville	42.6	45.7	47.2	7.3%	3.3%
Murrysville	42.6	46.1	47.5	8.2%	3.0%
Total Monroeville/Murrysville Corridor	42.6	45.9	47.4	7.7%	3.2%
Airport Corridor					
Collier	45.9	48.7	50.9	6.1%	4.5%
Crescent	38.6	41.3	42.6	7.0%	3.1%
Moon	37.7	41.0	42.7	8.8%	4.1%
North Fayette	35.6	37.8	38.3	6.2%	1.3%
Robinson	39.9	42.7	44.3	7.0%	3.7%
Total Airport Corridor	38.6	41.3	42.7	7.0%	3.4%
Washington Corridor					
North Strabane	40.4	42.6	43.8	5.4%	2.8%
Peters	40.6	43.4	44.9	6.9%	3.5%
South Strabane	44.6	46.8	48.5	4.9%	3.6%
Upper St. Claire	41.9	45.2	46.4	7.9%	2.7%
Total Washington Corridor	41.3	44.3	45.7	7.4%	3.0%

Source: U.S. Census Bureau and ESRI BIS 2007 and 2012 estimates and projections.

Table 7
Diversity Index

	2000	2007	2012	% Change 2000 to 2007	% Change 2006 to 2012
Cranberry Corridor					
Cranberry	7.7	9.7	11.3	26.0%	16.5%
Adams	5.7	7.6	9.1	33.3%	19.7%
Jackson	4.5	5.3	6.1	17.8%	15.1%
Marshall	9.2	13.4	16.4	45.7%	22.4%
McCandless	11.7	15.9	19.5	35.9%	22.6%
Pine	7.0	9.7	12.0	38.6%	23.7%
Seven Fields	10.0	12.4	14.7	24.0%	18.5%
Total Cranberry Corridor	8.0	10.6	12.7	32.6%	20.4%
Pittsburgh					
Pittsburgh City	48.2	51.9	54.3	7.7%	4.6%
Monroeville/Murysville Corridor					
Monroeville	27.0	34.5	39.6	27.8%	14.8%
Murrysville	10.0	13.0	15.6	30.0%	20.0%
Total Monroeville/Murrysville Corridor	18.5	23.8	27.6	28.4%	16.2%
Airport Corridor					
Collier	4.5	7.3	9.0	62.2%	23.3%
Crescent	6.9	9.3	11.3	34.8%	21.5%
Moon	14.7	19.6	23.3	33.3%	18.9%
North Fayette	13.0	17.6	21.0	35.4%	19.3%
Robinson	10.5	14.3	17.3	36.2%	21.0%
Total Airport Corridor	9.9	13.6	16.4	37.3%	20.3%
Washington Corridor					
North Strabane	8.0	10.2	11.8	27.5%	15.7%
Peters	5.7	7.8	9.4	36.8%	20.5%
South Strabane	8.0	9.1	10.1	13.8%	11.0%
Upper St. Claire	11.8	16.2	19.9	37.3%	22.8%
Total Washington Corridor	8.4	10.8	12.8	29.3%	18.2%

Source: U.S. Census Bureau and ESRI BIS 2007 and 2012 estimates and projections.

Key Observations

- The Cranberry Township's growth rate clearly outpaces its comparative areas, with an estimated growth of 20.5 percent between 2000 and 2007, and an expected 9.9 percent growth by 2012. Within the Cranberry Corridor, only Seven Fields and Adams have growth rates that surpass Cranberry Township; however both have much lower population bases than Cranberry Township. Butler County is the seventh fastest growing county in Pennsylvania with a growth rate of 14.5 percent between 1990 and 2000.

- The median household income in Cranberry Township of $90,411 (2007 Estimated) is over 35 percent higher than that in the Monroeville/Murrysville, over 27 percent higher than that in the Airport Corridor, and more than double that in Pittsburgh City. The median household income in the North Washington Corridor is slightly less than Cranberry at $84,059. Only five municipalities in the study areas have median incomes higher than Cranberry Township.

- Approximately 80 percent of housing units in Cranberry Township are owner occupied, compared to 85 percent in the North Washington Corridor. The Monroeville/Murrysville and Airport Corridors owner occupied housing units are estimated at 76 percent. The City of Pittsburgh is more transient oriented with only 46 percent of its housing units owner occupied.

- Cranberry Township clearly attracts a younger population than its comparative corridors with a median age of 34.7. While more densely populated urban areas typically attract a younger population, Cranberry's median age is lower than that in the City of Pittsburgh.

- ESRI measures the diversity of a community using a "diversity index" that measures the probability that two people in the same community would be from a different race/ethnic group. Cranberry Township is less diverse than the comparative corridors with a diversity index of 7.7. The North Washington Corridor measures slightly above Cranberry Township with an index of 8.4. The City of Pittsburgh is the most diverse comparative area with a diversity index of 48.2.

Cranberry Township Worker Flows

Understanding the patterns of commuting to work can help to assess the potential market for both residential growth and for economic growth. Individuals who work in Cranberry Township, but live outside the Township represent a key market for residential growth. In today's economy, one of the key criteria in site selection for business is the presence of a qualified workforce. Therefore, individuals who live in Cranberry Township and commute outside the Township to work represent a knowledge resource that could be attractive to businesses.

According to 2000 Census data, less than 20 percent of the 14,956 individuals who work in Cranberry Township actually lived in the Township. Table 8 depicts the municipalities that are home to least 100 Cranberry Township workers.

Table 8

Total Workers in Cranberry Township (2000) = 14,956		
Cranberry Township workers who live in…	Number of Workers	% of Workers
Cranberry Twp. Butler Co. PA	2,947	19.7%
New Sewickley Twp. Beaver Co. PA	610	4.1%
Pittsburgh City Allegheny Co. PA	464	3.1%
Butler city Butler Co. PA	441	2.9%
Economy Bor. Beaver Co. PA	434	2.9%
Adams Twp. Butler Co. PA	384	2.6%
Jackson Twp. Butler Co. PA	317	2.1%
Butler Twp. Butler Co. PA	315	2.1%
McCandless Twp. Allegheny Co. PA	220	1.5%
Middlesex Twp. Butler Co. PA	202	1.4%
Hampton Twp. Allegheny Co. PA	202	1.4%

Total Workers in Cranberry Township (2000) = 14,956		
Cranberry Township workers who live in…	Number of Workers	% of Workers
Ross Twp. Allegheny Co. PA	184	1.2%
North Sewickley Twp. Beaver Co. PA	172	1.2%
Penn Twp. Butler Co. PA	169	1.1%
Evans City Bor. Butler Co. PA	168	1.1%
Franklin Twp. Beaver Co. PA	167	1.1%
Zelienople Bor. Butler Co. PA	161	1.1%
Pine Twp. Allegheny Co. PA	159	1.1%
Lancaster Twp. Butler Co. PA	149	1.0%
Seven Fields Bor. Butler Co. PA	145	1.0%
Shaler Twp. Allegheny Co. PA	143	1.0%
West Deer Twp. Allegheny Co. PA	134	0.9%
Marshall Twp. Allegheny Co. PA	130	0.9%
Ambridge Bor. Beaver Co. PA	125	0.8%
Ellwood City Bor. Lawrence Co. PA	124	0.8%
Richland Twp. Allegheny Co. PA	124	0.8%
Forward Twp. Butler Co. PA	120	0.8%
Summit Twp. Butler Co. PA	112	0.7%

Total Workers in Cranberry Township (2000) = 14,956		
Cranberry Township workers who live in…	Number of Workers	% of Workers
New Brighton Bor. Beaver Co. PA	112	0.7%
Center Twp. Butler Co. PA	111	0.7%
Connoquenessing Twp. Butler Co. PA	109	0.7%
Monaca Bor. Beaver Co. PA	108	0.7%
Oakland Twp. Butler Co. PA	106	0.7%

Source: U.S. Census Bureau

Similarly, less than 25% of the 12,079 working residents in Cranberry Township worked in the Township. Table 9 shows the where Cranberry Township residents drive to work. It is estimated that there are approximately 19,558 workers in Cranberry Township in 2007, a 30.8 percent increase since 2000. While the Township has experienced significant growth over the past few years, it is estimated that employment has grown at nearly twice the rate of housing.

Table 9

Total Working Residents in Cranberry Township (2000) = 12,079		
Cranberry Township Residents who work in…	Number of Workers	% of Workers
Cranberry Twp. Butler Co. PA	2,947	24.4%
Pittsburgh City Allegheny Co. PA	2,696	22.3%
Marshall Twp. Allegheny Co. PA	869	7.2%
Ross Twp. Allegheny Co. PA	377	3.1%
McCandless Twp. Allegheny Co. PA	353	2.9%
Pine Twp. Allegheny Co. PA	274	2.3%
Mun. of Monroeville Bor. Allegheny Co. PA	212	1.8%
Robinson Twp. Allegheny Co. PA	199	1.6%
Jackson Twp. Butler Co. PA	184	1.5%
Zelienople Bor. Butler Co. PA	174	1.4%
Green Tree Bor. Allegheny Co. PA	168	1.4%
Butler Twp. Butler Co. PA	155	1.3%
Moon Twp. Allegheny Co. PA	144	1.2%
Butler City Butler Co. PA	116	1.0%

Source: U.S. Census Bureau

Residential Market Overview

Home Sale Trends

To assess the housing market in Cranberry Township and the surrounding comparable areas, real estate data was requested from a realtor located in Cranberry Township. The municipalities in the four comparative markets were compared to the housing market of Cranberry Township: the City of Pittsburgh, the Airport Corridor Area, the Northern Washington County Area, and the Monroeville/Murrysville Area. The municipalities included in each of these comparable market areas are listed in Table 10.

Table 10

Comparative Real Estate Market Areas			
City of Pittsburgh	Airport Corridor	Northern Washington County	Monroeville/ Murrysville
City of Pittsburgh, Allegheny County	North Fayette Township, Allegheny County	Upper St. Clair Township, Allegheny County	Monroeville Borough, Allegheny County
	Collier Township, Allegheny County	Peters Township, Washington County	Murrysville Borough, Westmorland County
	Robinson Township, Allegheny County	North Strabane Township, Washington County	
	Moon Township/ Crescent Township, Allegheny County	South Strabane Township, Washington County	

According to ESRI Business Analyst data, the median home value across Pennsylvania for 2006 was estimated at $158,106. The median home value for Cranberry Township for 2006 was estimated at $215,158. The average price of a home sold in Cranberry Township has increased each year from 2004 through June 2007. As shown in Table 11, the average price of a home sold in Cranberry Township in 2007 was more than $309,000, a 3.3 percent increase from the previous year and a 7.2 percent increase from 2004.

Table 11

Cranberry Township Home Sales 2004-2007			
Year	Homes Sold	Average Price	Average # DOM
2004-2005	486	$289,121	68
2005-2006	451	$299,933	72
June 2006-June 2007	458	$309,900	78

Source: Prudential Preferred Reality

Table 12 presents an overview of the homes sold in Cranberry Township and the comparable market areas (excluding new construction) between 2003 and August 2007. Approximately 2,190 housing units were sold in Cranberry Township between 2003 and August 2007. Of the other comparative market areas, only the South Pittsburgh area (2,598) and the East Pittsburgh area (5,983) witnessed more home sales during that time period. Of the 2,190 units sold in Cranberry Township, 57.9 percent (1,269) contained at least four bedrooms. Compared to the other comparative markets, only Peters Township (64.4 percent) and Upper St. Clair Township (65.9 percent) had a higher percentage of four or more bedroom homes sold.

The average sale price of a home in Cranberry Township during this time period was $233,016, the fourth highest among all the comparable market areas. Collier Township had an average home sale price of $318,147. However, only 271 homes sold in Collier Township between 2003 and August 2007. Peters Township had an average home sale price of $284,191 and Upper St. Clair Township had an average home sale price of $254,129 and both townships sold more than 1,000 homes during this time period.

Cranberry Township homes tended to be on the market for a very limited time, as well. Approximately 36.9 percent of all homes sold in Cranberry Township between 2003 and August 2007 were on the market for 30 days or less. Only, Murrysville Borough (37.2 percent) and North Strabane Township (37.4 percent) had more homes sell in 30 days or less during this time period. More than 60 percent of the homes sold in Cranberry Township between 2003 through August 2007 were on the market for 60 days or less, the most of any of the identified areas. Upper St. Clair Township witnessed a similar trend, as 59.8 percent of the homes sold there were on the market for 60 days or less.

An analysis of housing sales must also include newly constructed homes. Table 13 presents an overview of the sale of newly constructed housing in Cranberry Township and the comparable market areas between 2003 and August 2007. During the five-year period between 2003 and August 2007, Cranberry Township saw the sale of 522 newly constructed housing units. Approximately 34.9 percent (182) of the 522 newly constructed housing units were on the market for 30 days or less. Of the comparable market areas, Peters Township saw the second highest number of sales of newly constructed homes during this time period, at 263. Also, North Strabane Township witnessed the sale of 239 newly constructed homes.

Upper St. Clair Township had the highest average sale price ($531,248) of newly constructed housing units during the period between 2003 and August 2007. Peters Township had the second highest average sale price, at $473,868. Cranberry Township's average sale price of newly constructed homes during this period was $347,351. However, Cranberry Township's sale of 522 newly constructed homes is significantly greater than that of Upper St. Clair Township (34 units) and Peters Township (263 units) during the same time period.

Table 12

Home Sales - Resale, 2003 - August 2007											
Area	**≤ 2 bed**	**3 bed**	**≥ 4 bed**	**Condo**	**Total Units Sold**	**Average Price**	**DOM**				
							0-30	**31-60**	**61-90**	**91-120**	**121+**
Cranberry Township	11.1%	31.0%	57.9%	0.0%	2,190	$233,016	36.9%	23.7%	14.5%	10.1%	14.7%
City of Pittsburgh											
North Pittsburgh	24.6%	49.3%	26.1%	0.0%	1,864	$76,185	22.9%	17.4%	12.9%	11.4%	35.5%
South Pittsburgh	33.9%	48.5%	17.6%	0.0%	2,598	$83,604	26.6%	17.3%	13.2%	10.1%	32.8%
East Pittsburgh	27.4%	39.5%	33.1%	0.0%	5,983	$158,128	32.5%	18.1%	12.2%	9.1%	28.0%
Airport Corridor											
North Fayette Township	25.8%	52.5%	21.7%	0.0%	695	$139,920	32.7%	19.4%	14.4%	9.1%	24.5%
Collier Township	22.9%	41.7%	35.4%	0.0%	271	$318,147	18.8%	19.9%	14.4%	8.1%	38.7%
Robinson Township	26.8%	42.4%	30.7%	0.0%	589	$165,658	28.9%	21.7%	14.9%	11.5%	22.9%
Moon Township/Crescent Township	20.3%	46.3%	33.4%	0.0%	1,506	$162,396	35.1%	19.6%	12.4%	10.6%	22.4%
Monroeville / Murrysville Area											
Monroeville Borough	16.0%	59.0%	25.0%	0.0%	1,217	$127,950	34.2%	19.6%	12.5%	9.0%	24.8%
Murrysville Borough	8.7%	37.1%	54.2%	0.0%	986	$223,318	37.2%	18.8%	12.6%	8.1%	23.3%
North Washington County Area											
Upper St. Clair Township	2.9%	31.2%	65.9%	0.0%	1,283	$254,129	31.8%	19.6%	12.9%	10.0%	25.7%
Peters Township	7.1%	28.5%	64.4%	0.0%	1,138	$284,191	32.3%	20.8%	13.7%	11.6%	21.5%
North Strabane Township	18.8%	52.4%	28.8%	0.0%	893	$184,134	37.4%	22.4%	12.8%	8.5%	18.9%
South Strabane Township	18.0%	52.2%	29.8%	0.0%	372	$166,242	30.6%	16.7%	14.0%	8.3%	30.4%

Table 13

Home Sales - New Construction, 2003 - August 2007											
Area	≤ 2 bed	3 bed	≥ 4 bed	Condo	Total Units Sold	Average Price	DOM				
							0-30	31-60	61-90	91-120	121+
Cranberry Township	13.0%	14.2%	72.8%	0.0%	522	$347,351	34.9%	10.9%	8.8%	6.9%	38.5%
City of Pittsburgh											
North Pittsburgh	0.0%	85.7%	14.3%	0.0%	7	$238,641	28.6%	14.3%	0.0%	0.0%	57.1%
South Pittsburgh	58.8%	41.2%	0.0%	0.0%	68	$282,685	8.8%	8.8%	14.7%	8.8%	58.8%
East Pittsburgh	68.5%	26.6%	4.8%	0.0%	124	$354,405	34.7%	13.7%	6.5%	7.3%	37.9%
Airport Corridor											
North Fayette Township	2.7%	66.7%	30.7%	0.0%	75	$225,246	33.3%	8.0%	9.3%	16.0%	33.3%
Collier Township	7.2%	65.8%	27.0%	0.0%	152	$292,201	16.4%	7.2%	15.8%	8.6%	52.0%
Robinson Township	0.0%	37.5%	62.5%	0.0%	24	$252,780	33.3%	16.7%	0.0%	4.2%	45.8%
Moon Township/Crescent Township	2.7%	12.1%	85.2%	0.0%	149	$360,819	40.9%	12.1%	4.0%	10.1%	32.9%
Monroeville / Murrysville Area											
Monroeville Borough	22.0%	34.1%	44.0%	0.0%	91	$342,360	48.4%	8.8%	7.7%	6.6%	28.6%
Murrysville Borough	13.8%	26.6%	59.6%	0.0%	188	$322,801	50.0%	4.8%	3.7%	5.3%	36.2%
North Washington County Area											
Upper St. Clair Township	0.0%	14.7%	85.3%	0.0%	34	$531,248	52.9%	5.9%	2.9%	2.9%	35.3%
Peters Township	0.8%	8.7%	90.5%	0.0%	263	$473,868	32.7%	9.1%	11.8%	11.8%	34.6%
North Strabane Township	15.9%	54.4%	29.7%	0.0%	239	$256,878	46.4%	8.8%	5.4%	4.6%	34.7%
South Strabane Township	10.8%	43.2%	45.9%	0.0%	37	$201,592	27.0%	21.6%	18.9%	10.8%	21.6%

Current Housing Market

The current housing market listings for Cranberry Township and the comparable market areas also provide insight into the local housing market. The real estate data requested contains the current housing market listings for Cranberry Township and the comparative market areas for housing re-sales as well as the sale of newly constructed housing units as of August 2007.

Table 13Table presents an overview of the houses currently on the market in Cranberry Township and the comparative market areas (excluding new construction). As of August, 2007, there were 56 housing units on the market in Cranberry Township. The average price of these homes was $258,128 and they have been on the market for an average of 61 days. The City of Pittsburgh had the most homes on the market. East Pittsburgh had 301 homes on the market, while North Pittsburgh had 98 and South Pittsburgh 75 during this time period. Of the market areas listed for the City of Pittsburgh, the East Pittsburgh area has the highest average price ($246,534) and highest average number of days on the market (191).

Excluding the City of Pittsburgh, only three comparative market areas have more homes on the market than Cranberry Township: Monroeville Borough (66), Murrysville Borough (60), and Upper St. Clair Township (65). Of these municipalities, only Monroeville Borough has a lower number of average days on the market (59) than Cranberry Township.

Cranberry Township's average days on the market is the fifth smallest of all the identified comparable market areas. Of those with smaller average days on the market, only South Strabane Township ($255,660) and Peters Township ($301,733) have an average price similar to Cranberry Township.

A majority of the homes on the market in Cranberry Township (46 percent) fall within the price range of $200,001 - $400,000. Cranberry Township also has four properties for sale with a value greater than $400,000. Only Murrysville (51 percent), Upper St. Clair Township (51 percent), and Peters Township (62 percent) have a higher percentage of their available residential properties for sale within this range. Approximately 38 percent of Cranberry Township's available residential properties fall within the $100,000 - $200,000 range, while only three properties are listed at less than $100,000.

The current new construction listings for Cranberry Township provide great insight into the local housing market.

Table 14 presents an overview of the new construction residential properties on the market for Cranberry Township and the comparable market areas, as of August 2007. Cranberry Township has 20 new construction properties on the market. Six other comparable areas also have 20 or more new construction housing units on the market. Of those, only Peters Township ($527,353) and Murrysville Borough ($402,876) have a higher average list price than Cranberry Township ($392,910). Murrysville Borough is the only comparable area with at least 20 new construction properties on the market to have a lower number of average days on the market (39) than Cranberry Township (55).

New construction in Cranberry Township appears to be priced quite higher than the resale properties listed in Table 14. Approximately 45 percent of Cranberry Township's new construction is listed at a price greater than $400,000, while only five properties are at $200,000 or less. Murrysville also has 45 percent of their new construction listed a price greater than $400,000. Only Peters Township (76 percent) has a greater percentage of its new construction listed at a price greater than $400,000.

Table 14

Current Home Market Listings – Resale, August 2007							
Area	Number of Homes on the Market	Average Price	Average DOM	Number of Homes in Price Range			
				< $100,000	$100,000-$200,000	$200,001-$400,000	> $400,000
Cranberry Township	56	$258,128	61	3	21	28	4
City of Pittsburgh							
North Pittsburgh	98	$117,066	91	69	13	9	7
South Pittsburgh	75	$106,106	103	48	15	12	0
East Pittsburgh	301	$246,534	191	94	64	86	57
Airport Corridor							
North Fayette Township	48	$161,162	116	10	28	10	0
Collier Township	22	$304,228	112	5	6	7	4
Robinson Township	13	$153,608	54	4	7	2	0
Moon Township/Crescent Township	53	$199,172	89	14	19	15	5
Monroeville / Murrysville Area							
Monroeville Borough	66	$153,809	59	15	38	10	3
Murrysville Borough	60	$260,442	71	4	21	30	5
North Washington County Area							
Upper St. Clair Township	65	$289,518	117	0	21	33	11
Peters Township	50	$301,733	41	0	11	31	8
North Strabane Township	30	$198,057	70	0	20	10	0
South Strabane Township	28	$255,660	56	1	14	11	2

Source: Prudential Preferred Reality August 28, 2007

Table 15

Current Home Market Listings - New Construction, August 2007							
Area	Number of Homes on the Market	Average Price	Average DOM	Listed Price Range			
				< $100,000	$100,000-$200,000	$200,001-$400,000	> $400,000
Cranberry Township	20	$392,910	55	0	5	6	9
City of Pittsburgh							
North Pittsburgh	0	-	-	0	0	0	0
South Pittsburgh	2	$450,000	-	0	0	1	1
East Pittsburgh	0	-	-	0	0	0	0
Airport Corridor							
North Fayette Township	25	$250,638	73	0	9	13	3
Collier Township	35	$309,488	162	0	3	28	4
Robinson Township	19	$257,547	161	0	4	14	1
Moon Township/Crescent Township	29	$389,320	156	0	4	13	12
Monroeville / Murrysville Area							
Monroeville Borough	7	$365,514	-	1	0	4	2
Murrysville Borough	22	$402,876	39	0	4	8	10
North Washington County Area							
Upper St. Clair Township	4	$782,000	-	0	0	1	3
Peters Township	38	$527,353	186	0	1	8	29
North Strabane Township	46	$300,256	100	0	5	34	7
South Strabane Township	16	$220,697	27	0	4	11	1

Source: Prudential Preferred Reality August 28, 2007

Key Observations

- The average price of a home sold in Cranberry Township has increased 3.3 percent from 2006 to 2007, and 7.2 percent from 2004 to 2007.
- Only the City of Pittsburgh witnessed the sale of more homes than Cranberry Township between 2003 and 2007.
- 58 percent of the homes sold in Cranberry Township between 2003 and 2007 had at least four bedrooms.
- The average sale price of a home in Cranberry Township between 2003 and 2007 was $232,786.
- Thirty seven (37) percent of the homes sold in Cranberry Township between 2003 and 2007 were on the market for less than 30 days.
- The average sale price of a newly-constructed home in Cranberry Township between 2003 and 2007 was $346,034.
- Of the 514 newly-constructed homes in Cranberry Township between 2003 and 2007, 34 percent were on the market for less than 30 days.
- The average price of a home currently on the market in Cranberry Township is $258,128.
- A home on the market in Cranberry Township has been on the market an average of 61 days.
- Forty six (46) percent of the homes on the market in Cranberry Township are listed at a price greater than $200,000.
- Twenty (20) new construction properties are on the market in Cranberry Township.
- The average list price of a newly-constructed home in Cranberry Township is $392,910.
- Newly-constructed homes in Cranberry Township have been on the market an average of 55 days.
- Forty five (45) percent of Cranberry Township's newly-constructed homes are listed at a price greater than $400,000.
- Only five newly-constructed homes are listed at a price of $200,000 or less.

Non-Residential Land Uses

Currently in Cranberry Township, there are approximately 1,689 with non-residential land uses. These land uses are as follows:

Table 16
Cranberry Township Non-Residential Land Uses

Land Use	Total Square Feet	Total Acres
Hotel	473,445	32.6
Industrial	4,260,433	368.9
Office	5,653,338	747.4
Restaurant	288,151	64.2
Retail	3,846,154	475.9
Total	14,521,520	1,689.1

Retail Market

It is estimated that there is currently over 3.8 million square feet of retail space in Cranberry Township. Relative to a national spending potential index of 100, it is estimated that the spending potential index for Cranberry Township is 139, compared to 121 within a 10-mile radius, and 103 within a 15-mile radius. The following table presents of summary of the current estimated retail demand/potential in Cranberry Township.

Table 17

Retail Market Potential			
Estimated SF of Retail in Cranberry Township		3,846,154	
Estimated Sales per Square Foot - Upper Decile		$437	
Estimated Sales per Square Foot - Average		$242	
Estimated Total Sales - Upper Decile		$1,680,769,298	
Estimated Total Sales - Average		$930,038,499	
	Cranberry Township	**10 Mile Radius**	**15-Mile Radius**
Consumer Spending			
Retail Goods Residents	$356,883,358	$1,950,125,826	$5,001,122,054
Assumed Workforce Spending	$50,850,800	N/A	N/A
Total Retail Spending	$407,734,158	$1,950,125,826	$5,001,122,054
Spending Potential Index [(1)]	139	121	103
Surplus/Leakage - Upper Decile Residents	$(1,323,885,940)	$269,356,528	$3,320,352,756
Surplus/Leakage - Average Residents	$(573,155,141)	$1,020,087,327	$4,071,083,555
Additional Square Feet Supported [(2)]			
Upper Decile @ 10% Capture Rate	(186,585)	61,638	759,806
Average @ 10% Capture Rate	(26,735)	632,147	1,893,880
Upper Decile @ 20% Capture Rate	(489,534)	123,275	1,519,612
Average @ 20% Capture Rate	(263,762)	843,710	3,367,176

Source: ESRI BIS and Dollars and Cents of Shopping Centers 2006

(1) The spending potential index is a measure of potential household spending power relative to the household spending of the average household in the U.S., with the national average represented by a measure of 100. Therefore, the Spending Potential Index in Cranberry Township of 139 means that households in Cranberry Township are estimated to spend 39 percent more for goods and services annually than the average U.S. household.

(2) Calculations assume 10% and 20% capture rates for resident spending, and 100% capture rate for all workforce spending, assuming that the local worker is a "captive" consumer.

Economic Environment

Penn State's Workforce Education and Development (WED) Initiative analyzed the following 2007 information about Cranberry Township, as well as for the entire western Pennsylvania region, of which Cranberry is a part:

- Numbers of industry jobs and their concentration, earning, and sales;
- Dependence of jobs on spending patterns; and
- Recent shifts in industry employment.

Information for 2007 is based on partial year data and projections through the remainder of the year. Analysis for Cranberry Township include information for the area defined by the 16066 zip code. The entire region encompassing Cranberry includes all of Allegheny and Butler Counties, along with parts of Westmoreland[1] and Beaver[2] Counties. Information analyzed by the WED Initiative was leased from Economic Modeling Specialists, Inc., a state-of-the-art provider of regional demographic, economic, and workforce data.

Jobs, Earnings, Sales and Industry Job Concentration

Provided in Table 18 are the 2007 jobs, earnings, and sales for industries in Cranberry Township and the entire region composed of Allegheny and Butler Counties and portions of Westmoreland and Beaver counties. Cranberry Township is the place of employment for 19,558 workers. Clearly, Cranberry draws a portion of its workforce from outside the Township. Analysis of U.S. Bureau of Census commuting patterns reveals that 88 percent of people working in Cranberry Township in 2004 lived in Butler, Allegheny, and Beaver Counties. The entire region employs 1,185,631 workers and is populated by 1,781,322 residents.

Approximately one of every three workers in Cranberry Township is employed during 2007 in wholesale trade (11%) or retail trade (17%) industries. Another five industries individually employ between eight percent to ten percent of Cranberry workers: manufacturing (9%); professional and technical services (8%); administrative and waste services (10%); accommodation and food services (9%); and other services, except public administration (8%). Industries outside these seven core industries employ the remaining 28 percent of Cranberry Township workers. Descriptions of each of the 20 industry sectors included in this study are included in Appendix A.

In the entire region, on the other hand, the health care and social assistance industry employs the highest percentage of workers (14%), followed by retail trade (11%). Governments employ over three times the proportion of total workers in the entire region (9%) than does Cranberry (2%). Neither Cranberry Township nor the

[1] Murrysville (zip codes 15668, 15068, 15632, 15644), Penn Township (15085, 15642, 15636, 15644, 15675, 15626), North Huntingdon (15131, 15642, 15615, 15647, 15692, 15085), and Salem Township (15632, 15613, 15684, 15626, 15644, 15670, 15601).
[2] New Sewickley (15066, 15074, 16063, 15042) and Economy (15005, 15042, 15027, 15143, 15003).

entire region supports much employment in agriculture, mining, or utilities industries.

Employment in Cranberry Township during 2007 produces earnings totaling over $700 million. The top five industries with the highest average earnings per worker are: management of companies and enterprises ($71,000/worker); government ($64,000/worker); finance and insurance ($61,000/worker); wholesale trade ($60,000/worker); and transportation and warehousing ($57,000/worker). Wholesale trade accounts for almost 18 percent of all earning disbursed by industries in Cranberry Township. In the entire region, almost 60 percent of the $164 billion in industry sales is produced by five industries: government; manufacturing; finance and insurance; health care and social assistance; and professional and technical services.

Table 18

Jobs, Earnings, Sales and Earning Per Worker (EPW) by Industry, 2007										
Industry	Cranberry Township					Economic Region				
	Jobs	Jobs (%)	Earnings ($000)	Sales ($000)	EPW ($000)	Jobs	Jobs (%)	Earnings ($000)	Sales ($000)	EPW ($000)
Agriculture, Forestry, Fishing and Hunting	162	1	1,145	4,899	7	5,477	<1	42,514	140,008	8
Mining	<10	<1	78	301	51	4,886	<1	688,381	2,596,269	141
Utilities	0	0	0	0	0	2,202	<1	494,691	3,089,648	225
Construction	935	5	38,739	88,132	41	69,027	6	3,579,500	8,143,556	52
Manufacturing	1,707	9	88,336	278,722	52	76,175	6	5,499,487	23,777,940	72
Wholesale Trade	2,103	11	125,724	320,083	60	47,175	4	3,215,341	8,185,958	67
Retail Trade	3,352	17	80,932	172,893	24	133,438	11	3,525,227	7,530,813	26
Transportation and Warehousing	403	2	22,953	48,917	57	40,648	3	2,445,919	5,990,237	60
Information	214	1	12,015	50,795	56	24,286	2	1,622,317	5,733,552	67
Finance and Insurance	604	3	36,661	100,097	61	64,294	5	4,905,881	14,701,085	76
Real Estate Rental and Leasing	789	4	18,890	114,316	24	37,416	3	1,344,884	8,601,571	36

Jobs, Earnings, Sales and Earning Per Worker (EPW) by Industry, 2007										
Industry	Cranberry Township					Economic Region				
	Jobs	Jobs (%)	Earnings ($000)	Sales ($000)	EPW ($000)	Jobs	Jobs (%)	Earnings ($000)	Sales ($000)	EPW ($000)
Professional and Technical Services	1,581	8	69,302	115,698	44	96,444	8	6,424,352	11,382,406	67
Management of Companies and Enterprises	30	<1	2,088	3,409	71	17,840	2	2,253,268	3,678,314	126
Administrative and Waste Services	2,028	10	55,901	86,144	28	68,889	6	1,894,627	3,727,578	29
Educational Services	67	<1	1,074	2,528	16	51,809	4	2,007,314	3,691,028	39
Health Care and Social Assistance	1,610	8	55,868	106,492	35	165,253	14	7,515,545	13,432,450	45
Arts, Entertainment, and Recreation	117	1	1,009	2,410	9	25,175	2	838,137	1,835,178	33
Accommodation and Food Services	1,828	9	28,410	83,878	16	80,986	7	1,316,267	3,892,559	16
Other Services, with the exception of Public Administration	1,656	8	37,114	82,981	22	72,834	6	1,567,676	3,524,041	22
Government	372	2	23,835	51,137	64	103,818	9	5,535,822	30,430,732	53
Total	19,558	100	700,075	1,713,831		1,185,631	100	56,717,151	164,057,924	

Source: Analysis of economic data by Penn State Workforce Education and Development Initiative provided by Economic Modeling Specialists, Inc. (2007)

Figures describing total earnings and earnings per worker for industries do not necessarily follow industry employment patterns. Some industries pay at higher rates than other industries. Some industries use a mix of higher priced labor than others.
An employment location quotient equals the ratio of the proportion of local workers employed in a particular industry to the proportion of Pennsylvania workers employed in the same industry. Industry employment location quotients are shown in that allows three industry employment concentration comparisons:

- Cranberry Township with employment in the entire region composed of Allegheny and Butler Counties and portions of Westmoreland and Beaver Counties;
- Cranberry with employment in all of Pennsylvania; and
- The economic region with all of Pennsylvania.

An industry employment location quotient greater than 1.0 indicates that a relatively higher proportion or workers are employed in the industry locally than in all of Pennsylvania. For example, in Cranberry Township is shown to have a much higher concentration of wholesale trade employment than in the Commonwealth of Pennsylvania as a whole, because the location quotient for wholesale trade is 2.78. In other words, wholesale trade workers comprise 2.78 times the share of employment in Cranberry than it does as a share of Pennsylvania employment.

An industry employment location quotient less than 1.0 indicates that a relatively lower proportion or workers are employed in the industry locally than in all of Pennsylvania. In another example from, the economic region has quite a low concentration of employment in agriculture than does all of Pennsylvania, because the employment location quotient for the agriculture, forestry, fishing, and hunting industry is 0.22.
Cranberry Township has a marked concentration of wholesale trade employment compared with all of Pennsylvania. Other industries relatively highly concentrated in Cranberry compared with Pennsylvania include: retail trade; administrative and waste services; accommodation and food services; and other services, except public administration.

Cranberry Township also has a marked concentration of wholesale trade employment when compared to the economic region as well. Other industries relatively concentrated in Cranberry compared with the economic region include: agriculture, forestry, fishing, and hunting; manufacturing; retail trade; real estate, rental, and leasing; administrative and waste services; accommodation and food services, and other services, except public administration.
Industry employment location quotients provide evidence about employment-generating strengths of the region. Accounting for these strengths might be regional concentrations of natural resources, human talent, transportation, infrastructure, or proximity to markets that promote clusters of industry activity in a region.

Table 19

Location Quotients by Industry, 2007			
Industry	Cranberry Township Compared with…		Economic Region Compared with Pennsylvania
	Economic Region	Pennsylvania	
Agriculture, Forestry, Fishing and Hunting	1.69	0.38	0.22
Mining	nc[a]	nc	0.91
Utilities	nc	nc	0.62
Construction	0.80	0.72	0.89
Manufacturing	1.36	1.04	0.77
Wholesale Trade	2.78	2.99	1.07
Retail Trade	1.53	1.58	1.03
Transportation and Warehousing	0.59	0.54	0.93
Information	0.58	0.58	1.00
Finance and Insurance	0.55	0.69	1.25
Real estate and Rental and Leasing	1.28	1.04	0.82
Professional and Technical Services	0.98	1.17	1.19
Management of Companies and Enterprises	0.10	0.15	1.58
Administrative and Waste Services	1.94	1.74	0.90
Educational Services	0.07	0.15	2.15
Health Care and Social Assistance	0.60	0.82	1.37
Arts, Entertainment, and Recreation	0.28	0.29	1.04
Accommodation and Food Services	1.34	1.36	1.01
Other Services, except Public Administration	1.36	1.50	1.10
Government	0.21	0.14	0.66

Source: Analysis of economic data by Penn State Workforce Education and Development Initiative provided by Economic Modeling Specialists, Inc. (2007).
Note: [a] *nc* stands for not calculable.

Dependence of Jobs on Spending

Jobs are created because people, businesses, and governments purchase goods and services. The number and kinds of jobs generated in Cranberry Township and the entire region depend on the type and amount of Township and regional spending that occurs. Displayed in Table are the number of jobs and amount of earnings generated in 2007 by various types of spending in Cranberry Township and in the entire region.

Approximately nine of every 10 jobs and dollars earned in Cranberry Township, as well as the entire region, are generated (in order of magnitude): by spending on services; by spending of local residents' income earned outside the region; by spending on manufactured products; by spending by visitors to the region; and by a mix of other goods and services. This pattern of jobs and earnings generated by various types of spending reveal potentially uncertain and risky employment dependencies for Cranberry and the entire region.

- *Transfer payments, social assistance, investments, and profits*. Spending of resident's outside income generates 20 percent and 15 percent of jobs in Cranberry and in the entire region, respectively. Sources of outside income of residents include: payments from pension plans; transfer payments from Social Security retirement and disability programs; income from investments and property owned outside the region; and profits from business ventures located outside the region. Much of residents' outside income is subject to risks and uncertainties associated with, for example, the future viability of pension programs, government policy toward transfer payments, and the ebb and flow of investments and profit opportunities. Realization of these and other potential risks and uncertainties could affect job opportunities in Cranberry and in the entire region.
- *Manufacturing trends*. Approximately one of every 10 jobs in Cranberry and the entire region are driven by spending on manufactured products. A long–term secular decline in manufacturing employment in Pennsylvania and the U.S. has occurred over the previous 20 years. Yet, at the same time, Pennsylvania and the U.S. have enjoyed steady growth in manufacturing productivity and output. As a consequence, many durable and nondurable goods have become less expensive, higher quality, and more reliable, even though fewer workers are required to create these goods. Further technological advancements, social and political pressures, and environmental regulations that affect price/quality/availability of manufactured goods for consumers are likely also to affect employment in Cranberry and the economic region.
- *Movement to service economy*. Service industry employment first surpassed manufacturing employment in Pennsylvania in 1984. The movement to a service–based economy from a manufacturing–based economy has continued steadily in Pennsylvania and across the nation. One catch, however, is that each dollar spent on services does not generate as much employment as each dollar spent on manufactured goods. The relative employment payoff between service and manufacturing spending results because service industries usually do not require the same rich, varied, and deep local supply chain that many manufacturing industries require. Policies, such as local land use decisions, and

market trends that result in more service spending at the expense of spending on manufactured goods are likely to affect employment in Cranberry and the entire region.

Table 20

Dependence of Jobs and Earnings on Regional Spending by Sector, 2007										
Industry	Cranberry Township					Economic Region				
	Jobs	Jobs (%)	Earnings ($000)	Earnings (%)	EPW ($000)	Jobs	Jobs (%)	Earnings ($000)	Earnings (%)	EPW ($000)
Services	5,714	29	186,963	27	33	352,362	30	16,739,563	30	48
Residents' Outside Income	3,906	20	109,186	16	28	173,712	15	6,638,871	12	38
All Other	2,860	15	137,657	20	48	146,636	12	8,244,515	15	56
Manufacturing	2,503	13	113,869	16	45	145,511	12	7,070,939	12	49
Visitors	1,912	10	42,221	6	22	126,766	11	6,754,201	12	53
Finance	771	4	32,623	5	42	72,944	6	3,412,717	6	47
Construction	723	4	27,572	4	38	50,298	4	2,682,088	5	53
Government	552	3	29,742	4	54	41,370	3	1,514,408	3	37
Exogenous Investment	389	2	14,719	2	38	39,225	3	1,881,499	3	48
Agriculture	128	1	1,281	0	10	25,886	2	1,319,627	2	51
Communications	98	1	4,146	1	42	6,086	1	394,828	1	65
Mining	<10	<1	97	<1	44	4,806	<1	63,886	<1	13

Source: *Source: Analysis of economic data by Penn State Workforce Education and Development Initiative provided by Economic Modeling Specialists, Inc. (2007)*

- *Travel to and through the region*. Spending by visitor's accounts for about one of every 10 jobs in Cranberry Township and in the entire region. Visitor spending generates 6 percent and 12 percent of earnings in Cranberry and in the entire region, respectively. Shifts in vehicle fuel costs and availability, travel time, road quality, technology available to substitute for travel (e.g., videoconferencing). Further, the price and availability of accommodations could affect the amount and duration of day-visitor and overnight-visitor travel to and through Cranberry Township and the entire region. In these ways, employment in Cranberry and in the entire region is dependent on visitor-days of travel in the area.

Recent Job Shifts

Employment in Cranberry Township and in the entire region, composed of Allegheny and Butler Counties and portions of Westmoreland and Beaver Counties, changes over time in response to national and regional trends. First, employment in the region follows the ebbs and flows of the national economy. As the saying goes, a rising tide floats all boats, just as a receding tide beaches them. Second, Cranberry and the entire region has its own special mixes of industries that set them apart from the rest of the nation. For instance, Cranberry might have a greater or fewer number of high growth industries than the entire nation and, therefore, would be affected differently than the nation as those industries wax and wane. Third, Cranberry and the entire region might hold a number of unique, local factors that affect its competitiveness. This bundle of factors includes access of an industry to local comparative advantages, such as natural resources, linked industries, or favorable local labor situations.
Presented in Table 21 are calculations of national, regional industry mix, and regional competitiveness components of changes in the number of jobs by industry in Cranberry Township and in the economic region between 2002 and 2007. Table 21 contains three important columns of information:

- *National*. This column contains change in employment due to national employment trends. For example, 84 jobs added to the construction sector in Cranberry Township between 2002 and 2007 are due to national employment trends in the construction industry.
- *Regional Industrial Mix*. This column shows changes that result from the particular mix of industries in the region. Construction employment in Cranberry increased by 99 jobs because of Cranberry industry mix.
- *Regional Competitiveness*. This column displays change in employment resulting from regional competitiveness factors. Construction employment in Cranberry declined by 203 jobs because of relative lack of competitiveness of the Cranberry construction industry.

The sum of national, regional industry mix, and regional competitiveness components equals the actual job change that occurred between 2002 and 2007.

Although national trends and historical industrial mix factors are hard to affect regionally, regional leaders, planners, and developers can consider how the region's industries can become more competitive, especially if uncompetitive industries are key to regional growth and change. Opportunities for improving Cranberry Township competitiveness are evident, especially in construction and manufacturing industries.

Table 21

Shift Share Analysis for Cranberry Township and Entire Region by Industry, 2002-2007				
Industry	Shift in Employment Due to:			
	National Trend	Regional Industrial Mix	Regional Competitiveness	Total Shift in Employment
Agriculture, forestry, fishing and hunting				
Cranberry Township	19	-36	-36	-53
Economic Region	493	-944	452	1
Mining				
Cranberry Township	ncb	nc	-36	-36
Economic Region	410	20	-126	304
Utilities				
Cranberry Township	nc	nc	nc	0
Economic Region	474	-765	-2,711	-3,002
Construction				
Cranberry Township	84	99	-203	-20
Economic Region	6,081	7,132	-13,602	-389
Manufacturing				
Cranberry Township	192	-346	-289	-443
Economic Region	7,617	-13,744	-5,383	-11,510
Wholesale Trade				
Cranberry Township	104	-17	953	1040
Economic Region	3,933	-634	-711	2,588
Retail Trade				
Cranberry Township	286	-82	44	248
Economic Region	11,707	-3,341	-6,192	2,174

Shift Share Analysis for Cranberry Township and Entire Region by Industry, 2002-2007				
Industry	Shift in Employment Due to:			
	National Trend	Regional Industrial Mix	Regional Competitiveness	Total Shift in Employment
Transportation and Warehousing				
Cranberry Township	32	-11	14	35
Economic Region	4,261	-1,419	-10,559	-7,717
Information				
Cranberry Township	19	-27	28	20
Economic Region	2,364	-3,367	-1,890	-2,893
Finance and Insurance				
Cranberry Township	48	-45	74	77
Economic Region	6,247	-5,861	-5,014	-4628
Real Estate and Rental and Leasing				
Cranberry Township	49	102	145	296
Economic Region	2,985	6,214	-3,771	5,428
Professional and Technical Services				
Cranberry Township	94	78	366	538
Economic Region	7,844	6,515	-6,990	7,369
Management of Companies and Enterprises				
Cranberry Township	2	-2	11	11
Economic Region	1,406	-1,183	3,090	3,313
Administrative and Waste Services				
Cranberry Township	74	85	1,243	1,402
Economic Region	5,622	6,486	-7,373	4,735
Educational Services				
Cranberry Township	16	21	-154	-117

Shift Share Analysis for Cranberry Township and Entire Region by Industry, 2002-2007				
Industry	Shift in Employment Due to:			
	National Trend	Regional Industrial Mix	Regional Competitiveness	Total Shift in Employment
Economic Region	4,287	5,565	-3,417	6,435
Health Care and Social Assistance				
Cranberry Township	97	82	463	642
Economic Region	13,782	11,703	-11,808	13,677
Arts, Entertainment, and Recreation				
Cranberry Township	9	5	10	24
Economic Region	2,066	1,179	-372	2,873
Accommodation and Food Services				
Cranberry Township	139	65	116	320
Economic Region	6,665	3,105	-2,386	7,384
Other Services, except Public Administration				
Cranberry Township	136	0	50	186
Economic Region	6,128	-18	-294	5,816
Government				
Cranberry Township	31	-11	-4	16
Economic Region	9,063	-3,125	-4,077	1,861

Source: Analysis of economic data by Penn State Workforce Education and Development Initiative provided by Economic Modeling Specialists, Inc. (2007). Note: [a]A base year is 2002. [b]nc stands for not calculable.

Development of Regional Impact

In 2007 Westinghouse Electric Company, a world leader in nuclear fuel and engineering, announced its intention to construct a new facility in Cranberry Township. Westinghouse will locate its new engineering campus and headquarters facility on a large tract of land in the Cranberry Woods Office Park, located along Route 228.

Westinghouse anticipates building 770,000 square feet of office space over the next several years, with the potential to add another 300,000 square feet in future years. This investment will have a significant positive economic impact in the region.

The expected investment for land and building construction of these new Westinghouse facilities is $137.4 million, with an additional $27.2 million to be invested in furniture, fixtures, and equipment. The proposed facility is expected to provide employment for direct, contract, and construction workers totaling 2,816 persons within five years of initial construction. The average salary is $86,100, and the total annual payroll is expected to be $242.6 million. The facility is also anticipated to generate an additional 4,382 indirect jobs within the first five years, generating a total of 7,198 jobs.[3] The job growth will fuel housing purchases within the area and will likely accelerate market consumption of available housing in the market, and increase new home starts.

The direct and indirect impacts of the Westinghouse development will fuel economic growth within the region. An impact assessment prepared for Westinghouse indicates that it will make $5.8 million in purchases annually. While all of these purchases will not be local, a significant portion will be local goods and services. The cumulative impact of spending over multiple years will strengthen the local market.

The economic assessment prepared for Westinghouse estimates that the combination of these purchases will generate indirect tax benefits to Cranberry Township, Seneca Valley School District, and Butler County of approximately $80 million dollars over the first 10 years. The direct tax benefits to these jurisdictions have been abated by the creation of a Special Business District (Act 151 of 2006). This legislation was created to compete with other states offering incentives to Westinghouse to relocate its facilities.

Currently, the retail sector is the largest sector in Cranberry representing 17% of the economic base, with the professional and technical services sector representing 8% of the economic base. The addition of Westinghouse will mean that the professional and technical services sector will become the largest sector, representing 20% of the economic base.

[3] Economic Impact Analysis Proposed New Facility Westinghouse Electric Company Cranberry, Pennsylvania, April 2007, Copyright 2007. Insight Research Corporation, 9441 LBJ Freeway, Lock Box 20, Dallas, TX 75243 (972) 238-8838.

Commercial Real Estate Market

The commercial real estate market, much like other real estate markets, follows a cyclical economic path, as typically seen with most markets in general. This cycle usually follows the recession, recovery, expansion, and contraction path, and is particularly important to investors when contemplating potential development projects. While other factors do play into investment decisions, the past and present conditions of the market are the key to forecasting the potential gains from any commercial development investment. Likewise, this cycle will impact regional lease, vacancy, and absorption rates, and often leads to pre-leasing activity in weaker economies. Typically, with a strong local economy, more speculative development is seen.

The Nation

Nationally, the second quarter of 2007 was a positive period for commercial office developers. CB Richard Ellis reported that office vacancy rates fell from 12.8 percent to 12.6 percent. One year prior, vacancy rates were at 13.7 percent.

Within the geographic sub-sectors of the office market, the suburban office vacancy rate was 13.7 percent while the urban vacancy rate was 10.6 percent during the second quarter of 2007. CB Richard Ellis reported that this was the lowest vacancy rate since the third quarter of 2001. The suburban market absorbed 14 million SF of office space, while the urban market absorbed three million SF. This absorption was coupled with a 3.6 percent suburban rent increase and a 5.7 percent urban rent increase.

Table 22

National Commercial Office Market	
	2nd Quarter 2007
Vacancy Rate	12.6%
Suburban Absorption	14,000,000 SF
Urban Absorption	3,000,000 SF
Suburban Rent Increase	3.6%
Urban Rent Increase	5.7%
Source: CB Richard Ellis - 2007 Q2 CBRE US Office Vacancy and Industrial Availability Indices	

The Region and Competition

Throughout the western Pennsylvania region, a vacancy rate of 18.40 percent was present in the second quarter of 2007. The suburban market fared better than the urban market. The surrounding suburban Pittsburgh area saw a 17.50 percent vacancy rate while the City of Pittsburgh saw a 19.50 percent vacancy rate.

Considered part of the north suburbs, Cranberry Township was part of a region that experienced an 18.50 percent vacancy rate. As seen in Table 16, there is a direct connection between total square feet of commercial office space and vacancy rates. Those areas with more commercial office space tend to have a higher vacancy rate. As the supply of commercial office space increases, the demand goes down. In many areas, higher demands one day can often lead to an overbuilt market the next.

Given the announcement that Westinghouse Electric Corporation will build and lease a new 775,000 SF office and research campus, property values and additional development demands will rise in Cranberry Township and the surrounding region. This rise is premature and is not reflected in the vacancy and rental rates in Table 23**Error! Not a valid bookmark self-reference.**. A similar trend can be seen in the City of Pittsburgh. A high absorption rate was seen with the University of Pittsburgh Medical Center (UPMC) leasing activity in the US Steel Tower in downtown Pittsburgh.

Table 23

Western Pennsylvania Commercial Office Market – July 2007			
Region	Total Square Feet	Vacancy	% Vacant
Pittsburgh – CBD	21,358,505	4,155,626	19.50%
East	3,001,445	368,210	12.30%
Fringe	6,354,196	1,264,568	19.90%
North Suburbs	5,100,516	945,701	18.50%
Oakland	1,453,689	181,939	12.50%
West Suburbs	7,065,958	1,499,569	21.20%
South Suburbs	3,331,628	336,907	10.10%
Suburban Total	26,307,432	4,596,894	17.50%
CBD Total	21,358,505	4,155,626	19.50%
Region Total	47,665,937	8,752,520	18.40%

Source: Grubb& Ellis Company – Second Quarter 2007
Note: Inventory includes multi-tenant and single tenant buildings with at least 20,000SF / Space under construction includes speculative and build-to-suit for lease projects / Vacant space includes both vacant direct and vacant sublease space.

As seen in Table 24, Cranberry Township's asking rent for Class A and B commercial office space was below the average for the western Pennsylvania region. Cranberry's asking rent was approximately $19.46 per SF for Class A space and $15.08 per SF for Class B space. The Pittsburgh-CBD's asking rent was $21.60 for Class A and $16.27 for class B. Given that Cranberry's main competition is the Pittsburgh CBD and Parkway West area, Cranberry's rates have remained competitive. However, with the supply of the Pittsburgh-CBD commercial office space rising by 320,000 square feet, Cranberry may face increasing competition.

Table 24

Western Pennsylvania Commercial Office Market – July 2007				
			Asking Rent	
Region	Absorption – YTD	Under Construction	Class A	Class B
Pittsburgh – CBD	262,298	320,000	$21.60	$16.27
East	3,662	-	$18.85	$14.33
Fringe	130,229	-	$19.62	$16.40
North Suburbs	205,341	106,435	$19.46	$15.08
Oakland	25,931	-	$19.66	$16.08
West Suburbs	80,612	81,000	$19.65	$15.69
South Suburbs	156,612	384,000	$18.90	$15.60
Overall Market	864,685	891,435	$20.73	$15.82

Source: Grubb& Ellis Company – Second Quarter 2007
Note: Inventory includes multi-tenant and single tenant buildings with at least 20,000SF / Space under construction includes speculative and build-to-suit for lease projects / Vacant space includes both vacant direct and vacant sublease space.

According to Grubb & Ellis Company, the supply of commercial office space will diminish in the suburban office market. This decrease in supply will prompt landlords to propose for higher asking rates. The opportunities for large amounts of Class A office space on the fringe of the CBD will also diminish. With these limited opportunities, Grubb & Ellis predict an increase in the reuse of second generation office space occupying at least 50,000 SF.

Industrial and Commercial Office Supply

As seen in 25, Cranberry Township currently has over 2,200,000 SF in commercial office and industrial space. The Southwestern Pennsylvania Commission reports that over 1.5 million SF is office space and 700,000 SF is industrial space. In addition to the existing space, over 2.1 million SF is proposed within the next few years. The proposed development is primarily proposed for commercial office users. The existing facilities are located on approximately 1,143 acres within the Township.

Table 25

Cranberry Township – Industrial and Commercial Office Space					
Facility	Type	Total Acreage	Vacant Acreage	Total Existing Square Feet	Planned Square Feet
Anderson Industrial Park	Industrial	47	-	32,000	-
Cranberry Business Park	Office	180	57	615,000	300,000
Cranberry Commerce Center	Industrial	25	0	170,000	0
Cranberry Corporate Center	Office	32	0	216,356	0
Cranberry Industrial Park	Industrial	62	-	234,800	-
Cranberry Professional Park	Office	20	0	81,100	-
Cranberry Woods Office Park	Office	327	200	452,788	1,200,000
H.J. Schneider Industrial Park	Industrial	174	-	-	-
Hannibal Industrial Park	Industrial	14	-	47,365	-
Interstate Industrial Park	Industrial	62	-	49,900	-
LNC Business Park	Office	10	-	-	-
Mashuda Industrial Park	Industrial	40	-	188,500	-
NorthChase Corporate Center	Office	113	-	-	600,000
Thomson Business Park	Office	37	0	202,000	-
TOTALS	-	**1,143**	**257**	**2,289,809**	**2,100,000**

Source: Southwestern Pennsylvania Commission – Industrial and Office Park Database

Local and Regional Assets and Challenges

Butler County is the seventh fastest growing county in Pennsylvania, and Cranberry Township is growing even faster. People and companies are moving to the area, and to Cranberry Township in particular. An examination of both local and regional assets provides insight into what is fueling the growth of Cranberry Township and the area, as well as potential problem areas that could affect the area's ability to continue growing at a similar rate in the future.

Transportation

Interstates and Highways

One of Cranberry Township's greatest assets is its accessibility. Located at the crossroads of Interstate 76, the Pennsylvania Turnpike, and Interstate 79, the Township is easily accessible from all directions. The Pennsylvania Turnpike is the main east/west connector across the state, linking the Township to eastern Pennsylvania and Philadelphia, and to Akron, Cleveland, and eventually Chicago to the west. Interstate 79 is the major north-south artery connecting the Township to Pittsburgh and Erie. Near Erie, it connects with Interstate 80, heading into New York and Canada. Many of the nation's largest cities are within a day's drive of Cranberry Township. Table 26 refers to the distance of specific major cities from Cranberry Township.

Table 26

Cities with Populations over 500,000 within a Day's Drive	Miles from Cranberry Township	Drive Times (in hours)
Columbus	200	3
Baltimore	260	4
Washington D.C.	260	4.5
Detroit	270	4
Toronto, Canada	300	5
Philadelphia	320	5
New York City	370	6.5
Indianapolis	370	6
Chicago	445	7
Charlotte	460	7

Note: A day's drive is estimated to be about 7 hours

The interstates not only make Cranberry Township accessible, but the presence of pass-by traffic makes the location viable for many businesses. The Pennsylvania Department of Transportation (PennDOT) estimates an average of 80,000 vehicles travel through Cranberry Township each day.

While the interstates are heavily traveled, Cranberry's local roads also carry heavy traffic loads. State Route 19 serves as the main north-south connector throughout the county, and according to PennDOT, certain portions of the road carry as many as 40,000 vehicles on average per day. State Route 228 functions as the main east-west connector, and carries as many as 38,000 vehicles per day. While these vehicles bring business to Cranberry Township, they also contribute to the congestion of these roads. If this problem is not addressed it could affect development and future businesses' decisions to locate in Cranberry Township. The Cranberry Area Transit Study, conducted by the Michael Baker Corporation in 2004, estimates trips within Cranberry Township will increase by 14 percent by the year 2020, slowing the average speeds on these roads at peak times to less than five miles per hour.

Airports

In addition to being accessible by road, Cranberry Township is also connected to numerous destinations by air travel. Seventy percent (70%) of North America's population can reach western Pennsylvania in under a 90-minute flight. Cranberry Township is served by several regional airports and the Pittsburgh International Airport. Table 27 provides the drive times and the number of flight operations per day to various airports in the region

Table 27

Airports	Drive Time from Cranberry	Operations / Day
Zelienople	15 minutes	85
Butler County	30 minutes	172
Beaver County	30 minutes	189
Pittsburgh International	40 minutes	651
Allegheny County	45 minutes	262

Westinghouse reported that one reason for the relocation to Cranberry Township was the proximity to the Pittsburgh International Airport. The Pittsburgh International Airport has been listed by OAG Worldwide as one of the best airports in the world for four years consecutively. It is the second busiest airport in Pennsylvania, and one of the 40 busiest airports in the United States. It occupies 12,900 acres and is the fourth largest airport in the United States. Pittsburgh provides non-stop flights daily to destinations detailed in Table 2928:

Table 28

Daily Non-Stop Flights from Pittsburgh International Airport	
San Francisco, CA	Los Angeles, CA
Las Vegas, NV	Phoenix, AZ
Salt Lake City, UT	Denver, CO
Dallas, TX	Houston, TX
Minnesota, MN	Kansas City, KS
St. Louis, MO	Memphis, TN
Milwaukee, WI	Chicago, IL
Detroit, MI	Indianapolis, IN
Louisville, KY	Nashville, TN
Atlanta, GA	Cleveland
Cincinnati	Columbus, OH
Parkersburg, WV	Charleston, WV
Morgantown, WV	Hagerstown, MD
Lewisburg, PA	Clarksburg, PA
Johnstown, PA	Du Bois, PA
Bradford, PA	Jamestown, PA
Erie, PA	Franklin, PA
Baltimore, MD	Washington DC
Richmond, VA	Norfolk, VA
Raleigh, NC	Charlotte, NC
Myrtle Beach, SC	Savannah, GA
Orlando, FL	Tampa, FL
Miami, FL	Fort Meyers, FL
Fort Lauderdale, FL	Albany, NY
Boston, MA	Providence, RI
Windsor Locks, CT	New York City, NY
Newark, NJ	Harrisburg, PA
Lancaster, PA	Philadelphia, PA
Toronto, Canada	Cancun, Mexico
Higuey, Dominican Republic	San Juan, Puerto Rico

Daily access to these destinations proves to be invaluable for businesses located in Pittsburgh, and conversely for employees who choose to live in Pittsburgh and work elsewhere.

Rail

There are no train lines running to Cranberry Township, though Amtrak does provide service to Pittsburgh. Three trains run to Pittsburgh daily: the Capitol Limited, Pennsylvanian, and Three Rivers.

Several freight trains also run through Pittsburgh. The main lines include Norfolk Southern and CSX. Coal is the most common freight carried on those trains.

Public Transportation

An environment where residents can live, work and play requires that the resident has a choice of transportation modes. Furthermore, multiple forms of transportation better the needs of more people. Public transportation with convenient and frequent stops, pedestrian friendly trails, and well maintained roads will increase Cranberry Township's appeal to a wider group of people. In addition to providing residents with more choices, providing multiple forms of transportation can be a catalyst for social diversity.

According to the journey-to-work information from the 2000 U.S. Census data and the Cranberry Transit Study, only 24 percent of Cranberry Township's working residents work in the Township, and 22 percent work in Pittsburgh. There is no public transportation that directly connects Cranberry Township to Pittsburgh. The lack of public transportation forces the community to be automobile-dependent, and contributes to local congestion problems.

Myers Coach offers service during peak times from Grove City in Mercer County to Pittsburgh. Myers Coach stops at Butler Station six times each day. The New Castle Area Transit Authority provides bus service from the park-n-ride in Evans City to downtown Pittsburgh during peak weekday times.

Formerly, the Port Authority of Allegheny County (PAAC) ran two lines to the Cranberry area. However, in 2004, PAAC exercised massive budget cuts that eliminated those lines. It has been suggested The Butler Transit Authority (BTA) will try to offer service to downtown Pittsburgh. Currently, BTA and the Butler Township-City Joint Municipal Transit Authority run "The Bus," a fleet of five buses that make five different routes that run from Butler City and Butler Township throughout the day. The bus currently does not stop in Cranberry Township.

Cranberry has two park-n-rides, but no bus service is provided to either of them. The lots are used solely for ride-sharing. The lots are typically 25-50 percent vacant at 10 a.m. according the Michael Baker Study.

The Cranberry Transit Area Study highly recommended that Cranberry Township invest in public transportation to help ease the local congestion.

Knowledge Assets

Cranberry Township has a significant amount of "knowledge-based" assets that it can utilize to continue to provide an attractive place for people to live and for businesses to locate and/or expand. The Township is part of a high-achieving public school system, Seneca Valley School District. There are branch campuses of 11 colleges and universities located in the Township. There is a significant opportunity for companies to capitalize on the highly educated workforce. In addition the schools in the area would be attractive to families thinking about relocating into Cranberry Township.

Cranberry Township and the following competitive areas were reviewed for the purpose of assessing knowledge-based assets: Cranberry Township region; Monroeville/Murrysville Corridor; Airport Corridor (Robinson, Collier, N. Fayette, and Moon Townships); City of Pittsburgh; and N. Washington (Southpoint, Strabane, and Peters Townships).

Primary Education

Residents commonly cite a good school system as a major factor in selecting a location. School districts in the entire study area consistently score well on the SAT. Most school districts are above or at the national averages for SAT scores. Only three schools in the region did not meet their adequate yearly progress target for the "No Child Left Behind Act." The availability of a good school system makes Cranberry Township an attractive place to locate for families.

The Seneca Valley School District is comprised of Cranberry Township and eight other municipalities. It has 7,575 students enrolled in grades K-12. In 2006 Seneca Valley's SAT scores averaged 507 for writing (higher than the state and national average), 515 for math (higher than the state average) and 511 for critical reading (higher than state and national average). School districts in the competitive area and are shown in Table 3029.

2006 AYP Target status and SAT Scores by School District

All but three of the schools in the competitive areas met their required Adequate Yearly Progress Target (AYP). In regards to the average SAT score for each of the school districts, Seneca Valley has the ninth highest Verbal Scores on the SAT, the fifteenth highest Math Scores on the SAT; and has the ninth highest Writing SAT score. The Seneca Valley School District is a very competitive school district and appears to be able to offer a quality education.

Table 29

Knowledge-Based Assets				
School Districts	No Child Left Behind AYP Rating- 2006	SAT Verbal Scores- 2006	SAT Math Scores- 2006	SAT Written Scores- 2006
Cranberry Township Region				
Seneca Valley	Met AYP Target	511	515	507
Mars Area	Met AYP Target	503	523	506
South Butler County	Met AYP Target	Not available	Not available	Not available
Butler Area	Met AYP Target	506	523	494
Slippery Rock Area	Met AYP Target	511	490	487
Ambridge Area	Met AYP Target	484	505	485
Freedom Area	Met AYP Target	494	498	465
Pine-Richland	Met AYP Target	496	500	501
North Allegheny	Met AYP Target	559	571	546
Economic Region				
Woodland Hills	Did Not Meet AYP Target	473	452	447
Penn Hills	Did Not Meet AYP Target	463	457	445
Gateway	Met AYP Target	508	524	502
City of Pittsburgh	Did Not Meet AYP Target	496	478	496
Upper St. Clair	Met AYP Target	561	589	575
Bethel Park	Met AYP Target	511	535	506
South Park	Met AYP Target	494	511	490
Baldwin/Whitehall	Met AYP Target	481	510	468
Brentwood	Met AYP Target	482	489	479
Mt. Lebanon	Met AYP Target	578	590	573
Moon Area	Met AYP Target	524	535	519
Peter's Township	Met AYP Target	531	546	527
West Allegheny	Met AYP Target	477	490	479
Chartier's Valley	Met AYP Target	493	521	496
Montour	Met AYP Target	496	500	485
Avonworth	Met AYP Target	541	524	523
Hampton Township	Met AYP Target	543	556	542
North Hills	Met AYP Target	524	530	518
Shaler Area	Met AYP Target	489	500	489
Northgate	Met AYP Target	470	481	451
Sto-Rox	Met AYP Target	428	423	405
South Fayette	Met AYP Target	499	526	497
Canon McMillan	Met AYP Target	499	499	486
Washington	Met AYP Target	487	451	472
Chartiers-Houston	Met AYP Target	480	493	467

Knowledge-Based Assets				
School Districts	No Child Left Behind AYP Rating- 2006	SAT Verbal Scores- 2006	SAT Math Scores- 2006	SAT Written Scores- 2006
Trinity Area	Met AYP Target	499	504	482
Ringgold	Met AYP Target	486	480	477
West Mifflin	Met AYP Target	461	461	451

Colleges/Universities

The presence of many colleges in the region gives Cranberry Township access to highly skilled workers. A highly skilled workforce has the potential to bring technical and professional businesses to the Township. In today's employment market access to skilled labor is just an important decision factor as affordable operating expenses when choosing a location. Cranberry Township can capitalize on its proximity to several major universities to attract recent graduates to the area by offering internships with local companies. New college graduates not only supply a consistent labor pool, but also diversify the economic make-up of Cranberry Township, which will further contribute to its "live, work, play" environment.

There are many opportunities for post-secondary and higher education in Cranberry Township and its competitive areas. Located at Cranberry Woods in Cranberry Township, The Regional Learning Alliance (RLA) is managed by Slippery Rock University. The RLA includes fourteen educational partners, and was created to meet the educational, professional, and conferencing needs of the region. It serves both employers and students with comprehensive and diverse professional development and training opportunities. Its focus is to improve the region's economy through professional and economic development.

All of the colleges and universities in the RLA offer programs at their main campuses in other locations, and at the satellite campus located in Cranberry Woods. The colleges and universities offer various types of degrees in the areas of technology, computers, sciences, business, nursing and others. These colleges, universities and other educational programs include: DeVry University; Carlo University; La Roche College; Slippery Rock University; Geneva College; Robert Morris University; Community College of Allegheny County, North; Butler County Community College; Stryer University; Art Institute of Pittsburgh; Heartmints Center for Early Education; Pennsylvania Cyber Charter School; Pennsylvania State University- Beaver and New Kensington campus; and Pittsburgh Technical Institute.

The Township also has the advantage of being located close to other significant educational institutions in the region. Two of the most significant ones include the University of Pittsburgh and Carnegie Mellon University. While located in Pittsburgh, they can and should play a significant role to foster entrepreneurship in

Cranberry Township. The University of Pittsburgh offers Bachelor's, Master's, and Doctoral degrees. It has a wide array of academic programs, such as medicine, healthcare, technology, arts, and business. The University of Pittsburgh's Medical Center (UPMC) is the premier health system in western Pennsylvania, and is one of the most renowned academic medical centers in the United States. It is the region's largest employer. UPMC has recruited physicians and researchers to develop internationally-renowned centers in transplantation, cancer, neurosurgery, psychiatry, rehabilitation, geriatrics, and women's health. It has also invested in information technology to link and integrate electronic medical records across multiple hospitals and care settings and has invested research monies to seed new fields, such as regenerative medicine and bio-security.

The Carnegie Mellon University is a global research university and is consistently named one of the top-ranked universities in the nation by *U.S. News & World Report*. This University offers 90 majors in a wide diversity of programs, such as medicine, robotics, business, public policy and management, computers, technology, acting, and music, to name a few. It offers bachelor's, master's and doctoral degrees. The Robotics Institute at Carnegie Mellon University conducts basic and applied research in robotics technologies relevant to industrial and societal tasks. In addition, it is the home of the H. John Heinz III, School of Public Policy and Management, the Center for Cognitive Brian Imaging, Mellon College of Science, and the Temper School of Business.

A brief analysis was performed on specific colleges/universities in Butler County and the competitive area for the purpose of identifying scientific and "high-tech" degrees that have been awarded in 2005-2006 (for the purpose of this analysis, these degrees are in subjects related to the following: computers/ web design, architecture/design, engineering, mathematics, science, medicine and robotics.) They include the colleges/universities that have a presence in the Regional Learning Alliance located in Cranberry Township and Carnegie-Mellon University, University of Pittsburgh, Duquesne University, and Point Park University. It is important to note that the colleges/universities located at the Regional Learning Alliance are satellite campus and the information obtained is for all of the degrees awarded by each of these colleges/universities. The counties involved in this analysis include Butler, Allegheny, Beaver and Westmoreland. These colleges and universities offer associates, bachelors, masters and doctoral degrees in scientific and high-tech studies.

According to the Pennsylvania Department of Education's 2005-06 Publication "Degrees and Awards Conferred by Institution, Program, Level of Program, Gender and Race", there were 4,266 scientific and "high-tech" degrees awarded by these colleges and universities in 2005-2006. Below is table that describes the total degrees awarded by type and by county. Colleges and universities in Allegheny County awarded the most degrees in scientific and high-tech subjects with 3982 degrees, followed by Butler County with 195 degrees, Westmoreland County with 47 degrees and Beaver County with 42 degrees. Cranberry Township is located close enough to the colleges/universities in these counties that businesses located in the

Township, or are considering relocating to the Township, can take advantage of this well-educated workforce.

Table 30

Degrees Awarded in Scientific and High-Tech Studies by County for 2005-06					
Counties	Associate's	Bachelor's	Master's	Doctoral	Total by County
Butler	95	74	26	0	195
Allegheny	532	2,015	1,147	291	3,985
Westmoreland	22	25	0	0	47
Beaver	0	42	0	0	42
Total by type	646	2,156	1,173	291	4,269

Butler County also has a vocational-technical school; the Butler County Area Vocational-Technical School. It is affiliated with the seven school districts in Butler County including the Seneca Valley Area School District. This School offers programs for individuals that can enter jobs in technical, skilled, and semi-skilled occupations after high school graduation or after technical school or college training. The programs include computer networking, telecommunications, construction trades and health occupations.

Cranberry Township can take immediate advantage of the highly educated work-force that is graduating from each of these types of educational institutions. Graduates are entering the workforce with degrees in the areas of medicine, technology, sciences, computer and technology, medicine, robotics, and engineering. In addition to the new graduates, this quality and quantity of post-secondary and higher education provides professional development opportunities for employees of current and future employers. If Cranberry Township were to market to and attract the types of companies that are looking for employees with these specific skills sets, it could expand its business and commercial base significantly.

Special Incentive Designations

Special incentive designations are areas in Pennsylvania that receive specific tax relief or other types of incentives to improve the economic competitiveness of the area. Incentives can aid in attracting businesses to an area which will improve economic development. In Pennsylvania, these areas include: Enterprise Zones, Keystone Opportunity Zones, and Keystone Innovation Zones. Pittsburgh is the only comparative area with special incentive designations; However, other state grants and programs are available to businesses for capital improvements or workforce development activities on a case-by-case basis. Businesses moving into Cranberry Township or the surrounding region can work directly with the Development Corporation of Butler County and the Pennsylvania Governor's Action Team on an incentive package customized for individual companies. In addition,

local and state incentive programs, such as Tax Increment Financing (TIF) districts and Local Economic Revitalization Tax Assistance Act (LERTA) districts, may be available at the municipal level to offset specific project costs.

Special Incentive Designations in Pittsburgh include Enterprise **Zones, Keystone** Opportunity Zones, and Keystone Innovation Zones.

Enterprise Zone

The Enterprise Zone Program is administered by the Pennsylvania Department of Community and Economic Development. It provides grants to financially disadvantaged communities for preparing and implementing business development strategies within municipal enterprise zones. Pennsylvania's Enterprise Zone Program has adopted many of the characteristics of the federal Enterprise Zone Program.

The Neighborhood Assistance/Enterprise Zone Tax Credit is a specific incentive program that provides tax credits to businesses investing in or making physical improvements to properties located within designated enterprise zones.

As an area must demonstrate fiscal distress for an Enterprise Zone designation, there are no Enterprise Zones close to Cranberry Township. The City of Pittsburgh has several Enterprise Zones as listed in Table 31.

Keystone Opportunity Zone (KOZ)

Keystone Opportunity Zones (KOZ) are designated commercial, industrial, and residential zones, where most state and local taxes have been eliminated. There are 12 designated zones in Pennsylvania with several sub-zones in each.

Taxes waived in a KOZ-designated site include:

- State corporate net income tax
- State capital stock and foreign franchise tax
- State personal income tax
- State sales and use tax
- Local earned income/net profits tax
- Local business gross receipts, business occupancy, business privilege, and mercantile tax
- Local real property tax
- Local sales and use tax

KOZ sub-zones are located throughout southwestern Pennsylvania; 10 are located in Pittsburgh and its surrounding municipalities. There is one KOZ sub-zone in proximity to Cranberry Township, the Forward Township Business Park.

Keystone Innovation Zone (KIZ)

A Keystone Innovation Zone (KIZ) designation enables areas to receive grants to fund community/university partnerships to generate job growth through technology transfer and entrepreneurship. A KIZ is focused around campuses and property surrounding Pennsylvania's major colleges and universities.

The Pittsburgh region is home to two KIZs, including the Pittsburgh Central KIZ and the Greater Oakland KIZ. Each of these KIZs provides economic strength for southwestern Pennsylvania, including Cranberry Township, by linking workforce with educational assets.

These special incentive designations help attract businesses to the region which and provide an economic base for the area by providing job opportunities for residents. In addition, these companies also bring an influx of skilled laborers to the region which increases the average income for the area. The tax on businesses also keeps the tax burden residents must bear lower.

Taxes

Both residents and business alike consider affordability when choosing a location. Local taxes can increase the cost of living substantially. Cranberry Township's tax infrastructure was compared to one municipality in each competitive area. The municipalities that were used for comparison include: Monroeville, Moon Township; the City of Pittsburgh in Allegheny County; and Peters Township in Washington County. Table 31 includes a summary of select taxes in Cranberry Township and the competitive area municipalities.

Cranberry Township's taxes are relatively consistent with taxes levied in the comparison municipalities. Dollars levied for the emergency and municipal services are lower in Cranberry Township than each of the comparison municipalities. Unlike each of the comparison municipalities, the Township does not levy a mechanical devices tax on coin-operated amusement machines.

Tax Terms

The following tax term definitions are provided for reference help the reader understand the difference between each tax type. Definitions were obtained from the Penn State Local Tax Reform Education Project (http://cax.aers.psu.edu/taxreform).

Amusement Tax

The amusement tax is a tax on the privilege of engaging in an amusement. It is levied on admissions prices to places of amusement, entertainment, and recreation. Amusements can include things such as craft shows, bowling alleys, golf courses, ski facilities, or county fairs. The amusement tax is levied on patrons, even though it is collected from the operators of the amusement.

Earned Income Tax

The earned income tax is levied only on residents' earned income (such as wages, salaries, or other reimbursements for work). Unearned income, such as interest, dividends, pensions, and social security, are exempt from the tax. Unlike the federal or state income taxes, the earned income tax allows no exemptions or standard deductions. A municipality or school district can collect earned income taxes from non-residents who work in the jurisdiction, but do not pay an earned income tax in their "home" jurisdiction.

The maximum levy is 1.00 percent of earned income. If both the municipality and school district levy the earned income tax, both must share the 1.00 percent tax.

Emergency & Municipal Services Tax

Prior to Act 222 of 2004, the Emergency & Municipal Services Tax was called the Occupation Privilege Tax, and is a tax on the privilege of working in the municipality. All persons employed in the jurisdiction levying this tax must pay, regardless of whether they are residents. The maximum annual levy is $52.00.

Mechanical Devices Tax

The mechanical devices tax is a tax on coin-operated amusement machines, such as jukeboxes, pinball machines, video games, and pool tables. The tax rate is set as a percentage of the price to activate the machine.

Real Estate Tax

The real estate tax is a tax on the value of real property, such as land, buildings, and other improvements. The amount of real estate or property tax a taxpayer owes depends on the value of their property and the local tax rate. Property values for tax purposes are determined by an assessment process conducted by the county government. These assessed values may be very different than the actual market value of the properties.

Realty Transfer Tax

The realty transfer tax is a tax on the sale of real estate. The maximum levy is 1.00%of the sales price. If both the municipality and school district levy this tax, both must share the 1.00% tax.

Quality of Life

In addition to accessibility, affordability, and good schools, everyday amenities play a role in determining where a person will live. The Greater Pittsburgh Area earned the title, "Most Livable Community in the Nation" for its strength in housing, health, education, arts, recreation, economics, safety, transportation and climate in the1985 "Places Rated Almanac". The Almanac was a survey of 329 metropolitan areas by Rand McNally. In subsequent editions of the Almanac, the region has continued to rate consistently high. The area has been listed as one of the top ten areas to live in Money Magazine, Fortune Magazine, National Employment Review and Century 21 Real Estate Corporation.

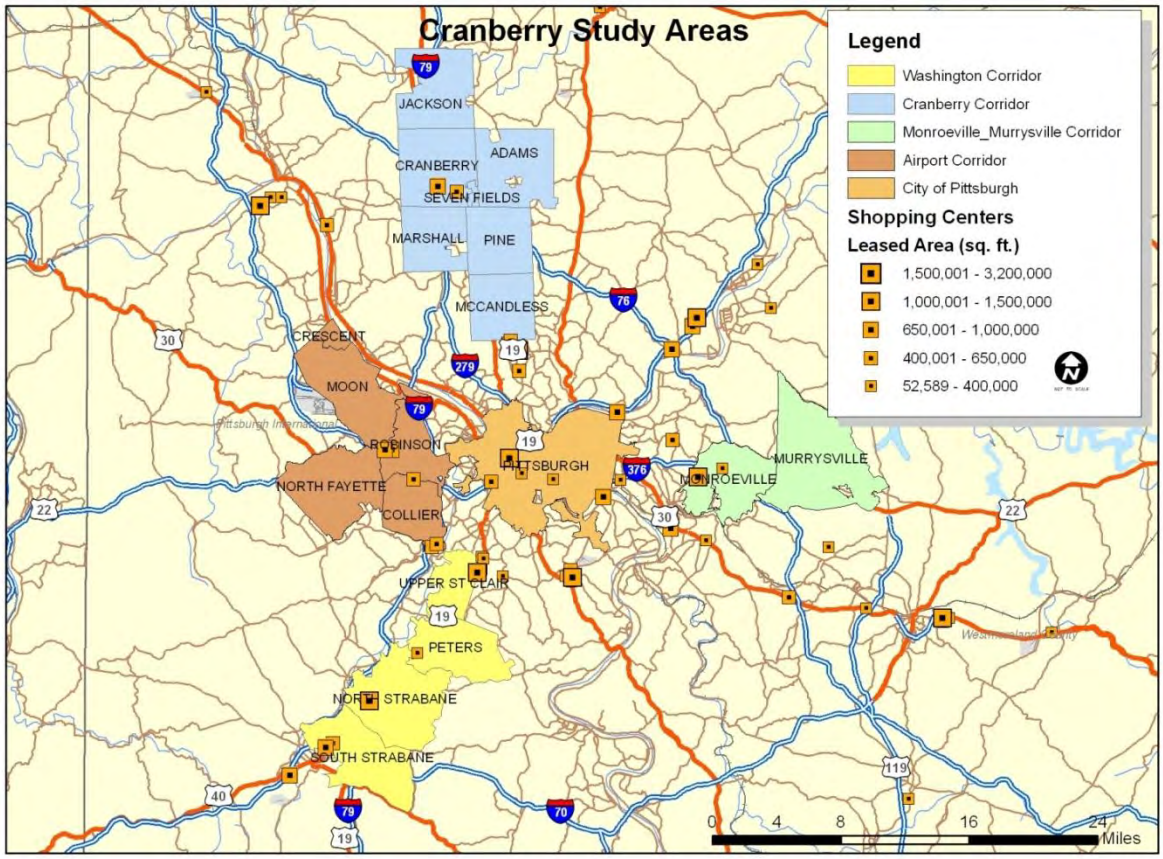
Shopping

Each of the competitive areas has ample shopping opportunities, including major regional malls and shopping centers. Major retail department stores, such as Target, Kohl's, Wal-Mart, Home Depot, and Lowe's are located in each competitive area. Regional shopping areas and malls have department store anchor tenants, such as such as Macy's, JCPenney, Sears, and Nordstrom.

Boutique or "lifestyle center" shopping areas are located throughout the region, and a regional outlet mall is located one-half hour north of Cranberry Township, just over the Mercer County line.

Figure 2 shows major regional shopping areas and their distance from Cranberry Township.

Figure 2


Cranberry Study Areas
Legend
Washington Corridor
Cranberry Corridor
Monroeville_Murrysville Corridor
Airport Corridor
City of Pittsburgh
Shopping Centers
Leased Area (sq. ft.)
1,500,001 - 3,200,000
1,000,001 - 1,500,000
650,001 - 1,000,000
400,001 - 650,000
52,589 - 400,000
JACKSON
CRANBERRY
ADAMS
SEVEN FIELDS
MARSHALL
PINE
MCCANDLESS
CRESCENT
MOON
ROBINSON
NORTH FAYETTE
COLLIER
PITTSBURGH
MURRYSVILLE
MONROEVILLE
UPPER ST CLAIR
PETERS
NORTH STRABANE
SOUTH STRABANE
0 4 8 16 24
Miles

Entertainment and Open Space

Cranberry Township is strategically located to take advantage of an extensive list of cultural, night-life, and recreational amenities in the City of Pittsburgh. It is also located close to some of Pennsylvania's best open space and outdoor destinations.

Within the Township are several local parks which include a water park, nature trails, a skate park, and Graham Park, a 115 acre park that is currently under development. The first phase of Graham Park is scheduled to open in 2008, with full development expected to be completed in eight to ten years.

Downtown Pittsburgh is a 30-minute drive from Cranberry Township. The city's recreational, cultural, sports, and dining amenities are easily accessible to Township residents.

Within 30 miles of the City of Pittsburgh, there are 140+ theaters and 100+ art galleries. The Benedum Center for the Performing Arts in Pittsburgh is one of the most well-known and largest theaters, with 2,880 seats. It is home to the Pittsburgh Ballet, Pittsburgh Dance Council, Pittsburgh Opera, and The Trust Presents Broadway series. Music enthusiasts can find over 110 music venues in proximity to Pittsburgh.

The Pittsburgh Zoo & PPG Aquarium is one of only six major zoo/aquariums in the country. Visitors can see over 72 threatened or endangered species exhibits. Kid's Kingdom opened in 1995 and is an interactive, nationally acclaimed children's zoo within The Pittsburgh Zoo & PPG Aquarium.

Sports fans living in and around Cranberry Township have the opportunity to watch major league teams, such as the Pittsburgh Steelers, Pittsburgh Pirates, and the Pittsburgh Penguins.

Recreational amenities are located throughout Butler County, as well. The Big Butler Fair is held each summer and includes a carnival, petting zoo, concerts, fireworks, exhibits, and food.

Open space and outdoor enthusiasts can find ample opportunities to enjoy the outdoors close to Cranberry Township. Moraine State Park, the third-largest state park in Pennsylvania, is an outdoor recreational amenity for both county residents and visitors. It is located 15 minutes north of Cranberry Township. The Pittsburgh region includes numerous locations for camping, biking, hiking and much more.

One of the most unique and often overlooked nearby amenities is Presque Isle State Park on Lake Erie. Located only one and a half hours north of Cranberry Township in the City of Erie, the park offers a variety of active and passive recreational opportunities.

Residential Options

Cranberry Township provides a variety of residential options for its residents. The Township's housing stock has grown tremendously over the past few decades to match its increase in residents. According to Cranberry Township's website, 13 new housing developments are under construction and five are under review. Based on U.S. Census 2000 data, of the 8,726 housing units in Cranberry Township, 5,644 (65 percent) were constructed between 1980 and 2000.

Table 31

Summary of Special Incentive Designations and Taxes for Competitive Areas and Select Municipalities										
	Cranberry		Monroeville/Murrysville Corridor		Airport Corridor		City of Pittsburgh		N. Washington	
Special Incentive Designations							Enterprise Zone: Pittsburgh - East Liberty, Lawrenceville, North Side KOZ: 10 KOZ sites within the City of Pittsburgh KIZ: Pittsburgh Central KIZ; Greater Oakland KIZ			
Taxes (2007)*	Cranberry Township, Butler County, Seneca Valley S.D.		Murrysville Borough, Westmoreland County, Franklin Regional S.D.		Robinson Township, Allegheny County, Montour S.D.		City of Pittsburgh, Allegheny County, Baldwin-Whitehall S. D.		Peters Township, Washington County, Peters Township S.D.	
	Municipality Tax Amount	School District Tax Amount	Municipality Tax Amount	School District Tax Amount	Municipality Tax Amount	School District Tax Amount	Municipality Tax Amount	School District Tax Amount	Municipality Tax Amount	School District Tax Amount
Amusement (percent)			0	10			5			
Earned Income – Resident (percent)	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5
Emergency & Municipal Services Tax (dollars)	30	0	47	5	52	0	47	5	47	5
Fire Equipment & Firehouses (mills)	2.5	0	0.6							
Mechanical Devices (dollars)			0	60	400	0	485	0	225	0
Occupation (dollars)	0	10								
Common Level Ratio	10.42		5.05		1.15		1.15		7.52	
County Millage Rate	27.5		20.99		4.69		4.69		21.4	
Tax on a $200,000 home	$3,222		$4,430		$4,563		$6,974		$ 3,269	

Sources: Municipal tax data: http://munstatspa.dced.state.pa.us/MunicipalTaxInfo.aspx; Common Level Ratios: http://www.revenue.state.pa.us/revenue/c

Cultural/Civic Assets (Social Capital)

Many towns and cities across America are suffering from a reduction of social capital that threatens civic assets and community health. Participation in civic and non-profit organizations have not kept pace with Cranberry Township population growth due to trends of two career families, long commutes, and more employment re-locations. The trend of a strong alliance of businesses, government and civic/social organizations has weakened over the last decade across America for various reasons, which weakens the spirit of a "Sense of Community" and the long term health of businesses, especially in growing communities like Cranberry.

Improvement of social capital provides many benefits to a community including: personal fulfillment, meeting human needs, enriches culture life, improves health of businesses and industry and makes the community more self-reliant by using less tax money. Towns & Cities with a strong "Sense of Community" are planned and achieved. These communities understand the importance of strong non-profit/civic organizations and encourage residents to engage in these groups as a member or volunteer. The establishment of new bylaws and mission, by the Cranberry Township Board of Supervisors in April 2007, of The Cranberry Township Community Chest is an important part of overall planning to establish long term community health.

Local Government

One of Cranberry Township's greatest strengths lies in the commitment to improving the Township. Cranberry has received numerous accolades over the years ranging from excellence in salt storage to the Governor's Award for Local Government Excellence. The citizens are progressive and demand the best from their local government. In the last 10 years Cranberry Township has been recognized with:

Excellence in Parks and Recreation by the Pennsylvania Recreation & Park Society;

First Place Honors in PennDOT's statewide Road and Bridge Safety Improvements for improvements made to Graham Road;

The Governor's Award for Environmental Excellence for its municipal and solid waste program;

First Runner-Up in PennDOT's statewide Road and Bridge Safety Improvements for improvements made to the Smith-Wisconsin Connector;

Excellence in Storage from the Salt Institute;

The President's Leadership Award from the Pennsylvania State Association of Township Supervisors given to Cranberry's Township Manager;

Award for Excellence in Government Achievement from the Southwestern Pennsylvania Commission;

Governor's Award for Local Government Excellence given to Cranberry for its innovative community initiatives; and

Outstanding Community of the Year from the Pennsylvania Chamber of Business and Industry.

The Township, working with citizens along with a variety of non-profit and civic organizations, provides a number of opportunities and a variety of activities to obtain citizen involvement. The Township calendar includes political meetings such as the Board of Supervisors and Planning Advisory Commission, the Cranberry Area Chamber of Commerce, and also social activities such as: the concert series at the Township Gazebo, night swimming at the North Boundary Park Public Pool, and charity softball events. Cranberry also celebrates several annual events ranging from 5k runs to parades and festivals.

Some of the statistics are impressive in the number of residents involved in other Township activities; Park programs: 11,000+ enrollment, baseball/softball: 2600+enrollment, soccer: 2000+enrollment, youth football 500+enrollment,after school programs 250+enrollment, library circulation: >300,000, pool:.50,000 visitors, golf course:.34,000 rounds.

Businesses & Companies

In a global economy, it is sometimes hard for businesses to connect on a local level and understand the importance of their involvement on the community. International and domestic competition, the importance for increased productivity, and the demands of shareholders for profits have changed the face of businesses and companies. Residents who own local shops, stores, businesses and industries in the community have decreased rapidly in the last 10-15 years, and this has weakened the bond these businesses have with the local government and community. Many companies understand the importance of this bond and work hard to build a solid relationship with the community. They understand that a healthy community creates a quality of life that grows the local economy by encouraging new families to move in and a draw to recruit skilled employees. Successful community growth is a commitment of business, government and the civic/non-profit sector working together.

Health Care

Hospitals

Regional

There are 56 hospitals with over 11,000 beds in the region. Some of the top ranked hospitals in the nation are located within the region. The Prestigious University of Pittsburgh Medical Center is the busiest transplant center in the world, and was ranked fourteenth best overall hospital by *US News & World Report*. It also ranked

Magee-Women's Hospital in Pittsburgh thirteenth in Gynecology, and The Children's Hospital of Pittsburgh eleventh nation wide for Pediatrics. Other hospitals in the region have received accolades for practices in Ear, Nose, and Throat; Digestive Disorders; Urology; Cancer; Neurology and Neurosurgery; Orthopedics; Renal; Cardiovascular; Psychology; and Technology (Pittsburgh Regional Alliance).

Cranberry

Butler Memorial Hospital, located in Butler, has over 200 beds. It was ranked one of the best medium sized hospitals in the nation by *Solucient*. The University of Pittsburgh Medical Center Passavant-Cranberry has 35 beds.

Healthcare Providers

There are over 8,000 doctors and specialists in the region. Even with the large number of healthcare providers there is a shortage of general practitioners and family doctors. Nurses are also in high demand. According to an article in the *Pittsburgh Tribune* from February 2006 there are openings for the following:

Table 32

Medical Field Job Opportunities		
Number of Openings	Occupation	Average Salary
4,111	Registered Nurses	$51,397
1,094	Licensed Practical Nurses	$35,402
494	Clinical laboratory sciences	$32,739 to $43,980
686	Pharmaceutical Technicians and Licensed Pharmacists	$22,110 to $74,152
1,172	Home Health Aide	$18,845 to $22,235.
1,964	Nurse Aides	$18,845 to $22,235.
1,239	Personal Home Care Aides	$18,845 to $22,235.
208	Respiratory Therapist	$41,392.00
393	Medical Imaging	$35,610 to $58,344.

Many colleges in the area offer nursing programs, and the area has been marketing these nursing programs to fill the openings.

Continuing Care

Cranberry Township has two nursing homes and offers one assisted living facility. As of the 2000 Census, approximately 180 people were in nursing homes in Cranberry. Currently Allegheny and Washington Counties have reached the maximum number of beds allowed in the county for nursing homes. Nursing homes in these areas have high occupancy rates. Hospice facilities however, have high vacancy rates.

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Executive Summary

In the Cranberry Vision document, public input told Cranberry where it wanted to go, but the Comprehensive Plan also had to lay out how to get there. In order to achieve the Vision the Township set forth, growth management policies would have to be implemented today to gear growth toward that vision. Cranberry Township officials wanted to ensure that the policies they implement would achieve that Vision, so they modeled three growth scenarios to see which most correctly matched the Vision. Impacts of each of the scenarios are modeled in a separate section of the Comprehensive Plan. If none of the scenarios match the Vision, then a blend of the scenarios will be used to achieve the Vision. Modeling the scenarios still helps the Township have a better understanding of the effects of the policies. This provides information to assist in choosing policies that will better result in the desired effect.

Growth Scenarios

The growth scenarios each incorporated different growth management strategies. Scenario A assumed no change, that growth would follow the same pattern it does today. This was achieved by modeling the build-out of all developable lands in the Township. In Scenario A, the build-out was in accordance with current standard zoning.

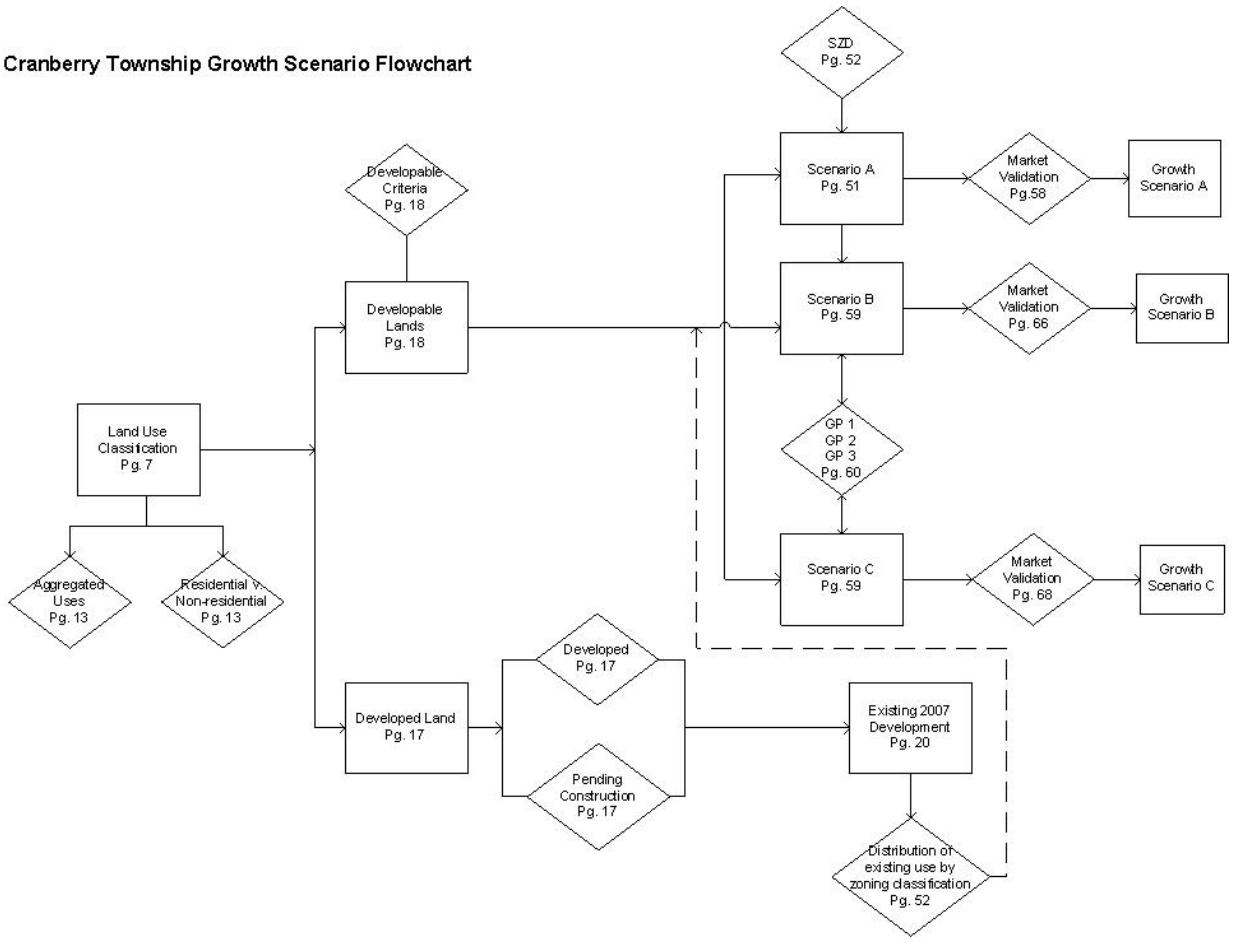
Scenario B also involved the build-out of the developable lands, but it assumed changes to zoning in certain areas known as sub-areas. The changes to the zoning followed patterns, known as Growth Pattern 1, 2, and 3. These patterns differed in their assumptions, but each allowed higher building densities than standard zoning policies. This allowed for more infill development. However, most of Scenario B still developed according to standard zoning policies, with Growth Patterns 1, 2, and 3 being applied only in a few sub-areas.

Scenario C was built out similarly to Scenario B, but the growth patterns were applied to more sub-areas.

The sub-areas selected for application of the growth patterns, rather than standard zoning, were selected because those areas were the most appropriate for infill development to create a denser core and less dense outer ring of development. This concentric ring development is recognized in smart growth principles for creating less traffic congestion and lower infrastructure costs. The Cranberry Vision included the use of smart growth principles.

Growth Scenario Capacity Methodology

The Cranberry Township Growth Scenario Flow Chart shown below explains how these growth scenarios were developed.



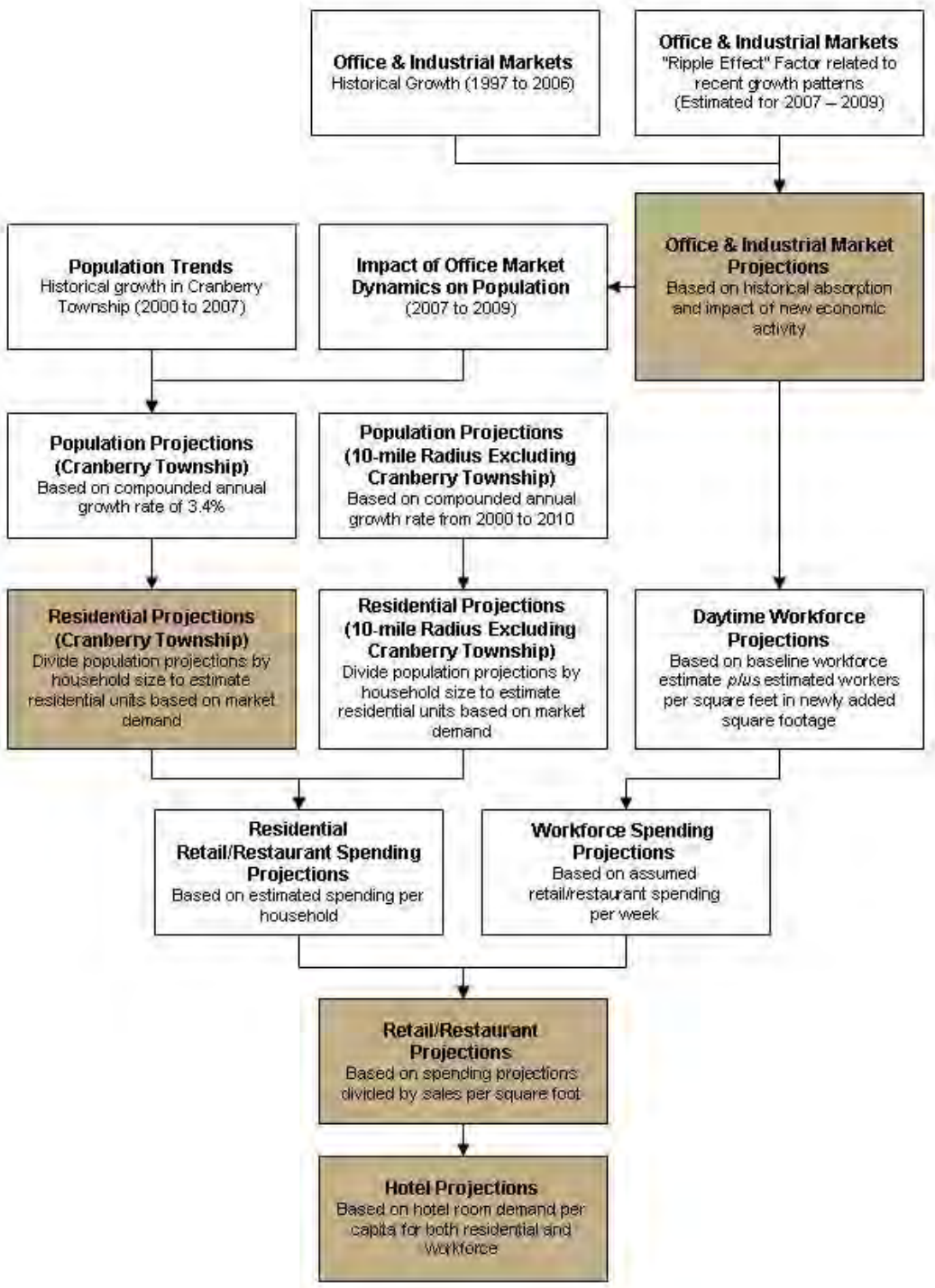
First, current land uses had to be considered. Then the uses were aggregated into uses more suitable for projections (Hotel, Industrial, Office, Restaurant, Retail, and Residential.) Then, because residential and non-residential uses cannot be measured in the same way (non-residential in square feet and residential in units) those uses were split.

Growth can only occur where there is developable land. Land was determined developable by removing developed land and land that already had approval for building from the total. The remaining land was deemed developable. Zoning patterns and development patterns from already developed land were used to develop the growth scenarios. These patterns had to be accounted for because present development today has already begun to affect developments in the future. In the end, additional square footage for each aggregated based on land capacity use was determined for each growth scenario, then the market validation verified whether those additional square footages were possible in each scenario.

Market Validation Methodology

The market validation methodology can be seen in the flow chart below.

Market Validation Methodology Overview



Office and Industrial Market

Market validation for each growth scenario began by estimating the market potential for growth in the office and industrial markets. It was assumed that office and industrial absorption is driven by economic growth, and that office and industrial space will be absorbed in Cranberry at a baseline rate similar to historical absorption rates. Absorption rates were determined utilizing building permit data for the past ten years. The potential "spin off" opportunities from new business development were also considered in the market projections.

Residential Market

It was assumed that the market for residential housing is driven by population growth. It was also assumed that residential market will grow at a similar rate to non-residential uses. Non-residential uses drive the number of workers in the Township, which contribute to resident population growth. Census data and a compounded annual growth rate of 3.4 were used to estimate population growth. To determine the potential demand for residential housing units, population estimates were divided by the average number of persons per household in Cranberry Township.

Restaurant and Retail

Market potential for retail and restaurant growth was determined by examining two drivers:1) growth in the number of households within a 10-mile radius; and 2) growth in the daytime workforce in Cranberry Township. Retail and restaurant spending was estimated for Cranberry Township residents, residents within a 10-mile radius, and for the daytime workforce in Cranberry Township. Current retail and restaurant sales were also estimated and compared to spending to determine the amount of retail spending that is "leaking" from the Township. The amount of "leakage" was divided by the estimated annual sales per square foot to determine the additional number of square feet of retail and restaurant space that could potentially be supported.

Hotel

The demand for additional hotel space is assumed to be driven by both residential and non-residential growth. Assumptions for projecting future hotel growth included that twenty percent of hotel demand is generated by the general population, twenty percent of demand is generated by proximity to major transportation corridors and sixty percent is generated by corporate users. Ratios were calculated for each driver based on current statistics (e.g. hotel rooms per capita, etc.). Resulting ratios were applied to projected growth in residential, office, and industrial growth projections to estimate the square footage of additional hotel space that could be supported.

Results

Table 1 shows the additional square footages, number rooms and housing units that can be added to the existing development to produce build out based on land capacity for each land use and for each scenario. It also shows the amount of additional square footage, number of rooms and units that the market will support in the year 2030.

Table 1

Scenario Totals Comparison							
		Scenario A		Scenario B		Scenario C	
Land Use	2030 Market Potential	Land Capacity	Difference between Market and Capacity	Land Capacity	Difference between Market and Capacity	Land Capacity	Difference between Market and Capacity
Hotel	423	268	155	620	(197.16)	901	(478.23)
Industrial	1,424,358	3,030,322	(1,605,964.28)	2,265,436	(841,078.10)	1,773,364	(349,006.19)
Office	5,155,820	6,429,231	(1,273,410.70)	5,378,568	(222,748.20)	5,204,286	(48,465.57)
Restaurant	478,443	204,021	274,422.32	365,287	113,155.72	520,010	(41,567.41)
Retail	1,863,199	1,818,073	45,125.53	3,016,672	(1,153,473.23)	3,407,138	(1,543,938.80)
Residential units	11,718	3,503	8,215.18	7,648	4,069.76	12,736	(1,018.21)

It can be seen from Table 1 that in Scenario A there is capacity for 268 hotel rooms, but the demand in 2030 will be for 423 rooms. In Scenario A there is not enough capacity under current zoning to meet the market demand for hotel rooms. However in Scenarios B and C the capacity for hotels rooms surpasses the market demand for 2030.

In all three scenarios there is more capacity for industrial and offices uses then there will be a demand for industrial or offices uses in the 2030.

Restaurant capacity is unable to keep up with market demand in both Scenarios A and B. In Scenario C the capacity will be greater than the 2030 demand.

Retail capacity falls slightly short of market demand in Scenario A. In Scenarios B and C the capacity surpasses the demand for retail.

In Scenarios A and B the demand for residential units is greater than the capacity of the land. In Scenario C the capacity is just slightly larger then the demand in 2030.

Future Policies

Table 1 can be used as a guide for changes to zoning policies. Policies changes should strive to bring capacity and market potential closer together. If the capacity falls below market demand then policies should shift to allow for more of that use to better capture the market and eliminate escape. If the market demand is greater than the capacity, then the policies should shift to allow that space to be used for a land use that does fall short of the market demand. If capacity is larger in every land use as it is in Scenario C, then the capacity can be used for future growth when the market does have the potential to capture all of the use.

Introduction and Purpose

Phase III of the Comprehensive Plan identifies different growth scenarios that could represent possible futures for Cranberry. The scenarios differ by calling for varying development patterns and intensities of land uses. The change in development patterns acts like the independent variable, which has an effect on roads, traffic, government services, population, taxes and a myriad of other dependent variables. Each scenario will paint a picture of life in Cranberry based on one alternative development pattern. A preferred growth scenario will be developed by evaluating these alternative futures, and a growth management plan will be developed to establish policies that will be necessary to achieve that future.

Changing development patterns of land use can lead to many possible scenarios. The Township felt it would be most practical to limit the analysis of alternative future scenarios to three. This constraint provides enough variety to understand the large-scale policy implications of substantially differing growth patterns, but narrows the focus enough to make meaningful decisions about future direction. The three scenarios represent a spectrum of viable futures for Cranberry; however, all three scenarios are very realistic possibilities for Cranberry's future.

As part of Phase II, the Township included a market assessment. The market assessment evaluated population trends, market sector absorption rates, current land use densities, spending habits of residents, and spending habits of visitors to Cranberry. The market assessment is the base for projections used in the future growth scenarios. Basing the growth scenarios on the market assessment ensures the projections are realistic and represent possible futures. This process is described further in the sub-section entitled "Market Validation."

Three scenarios are presented and evaluated, but it is not necessary to endorse one scenario. These scenarios represent snapshots of Cranberry at varying levels of build-out intensities based on altering development patterns. The scenarios provide a clearer picture of potential impacts of growth; therefore, the preferred scenario need not be one of the growth scenarios presented. It may be a combination of two or more scenarios or specific elements of each of the growth scenarios.

Growth scenario projections are not typical of comprehensive plans. Most communities are unable to think forward enough to develop projections on which to base their comprehensive plans, but Cranberry has elected to use this innovative approach in order to better understand the effects of policy decisions.

Each growth scenario represents a different policy and then models the impacts of that policy. Analyzing future growth scenarios by measuring their outcomes or impacts on future revenue and services, helps Cranberry produce better policies now that will more accurately guide the Township to Cranberry's Vision.

Cranberry's Vision includes using smart growth principles in order to reduce future impacts on roads, infrastructure, open space, and services.

Smart Growth

Scenario A represents the Township growing according to its current zoning standards. Scenarios B and C represent what the Township could look like if it implements zoning that endorses additional smart growth principles beyond those currently being applied in the Township. The American Planning Association describes these goals further in its Smart Growth Policy Guide[1], as follows:

Efficient Use of Land and Infrastructure

High-density development, infill development, redevelopment, and the adaptive re-use of existing buildings result in efficient utilization of land resources and more compact urban areas. Efficient use of public and private infrastructure starts with creating neighborhoods that maximize the use of existing infrastructure. In areas of new growth, roads, sewers, water lines, schools and other infrastructure should be planned as part of comprehensive growth and investment strategies. Regional cooperation is required for large infrastructure investments to avoid inefficiency and redundancy.

A Greater Mix of Uses and Housing Choices in Neighborhoods and Communities Focused Around Human-Scale, Mixed-Use Centers Accessible by Multiple Transportation Modes

Mixed-use developments include quality housing, varied by type and price, integrated with shopping, schools, community facilities and jobs. Human-scale design, compatible with the existing urban context, and quality construction contribute to successful compact, mixed-use development and also promote privacy, safety, visual coherency, and compatibility among uses and users.

Conservation and Enhancement of Environmental and Cultural Resources

Biodiversity, green infrastructure, and green architecture are integral to smart growth. Smart growth protects the natural processes that sustain life; preserves agricultural land, wildlife habitat, natural landmarks, and cultural resources; integrates biodiversity, ecological systems, and natural open space (green infrastructure) into the fabric of development; encourages innovative storm water management; is less consumptive and more protective of natural resources; maintains or improves air quality; and enhances water quality and quantity for future generations. Energy conservation is a major benefit and result of smart growth, helping to create more sustainable development and allow people to meet current needs without compromising the needs of future generations. Green architecture incorporates environmental

[1] American Planning Association Policy Guide on Smart Growth. 15 April 2002. Available at https://www.planning.org/policyguides/pdf/SmartGrowth.pdf.

protection and reduced natural resource consumption into the design and construction of buildings, also enhancing the comfort and health of the occupants.

Creation or Preservation of a "Sense of Place"

A "sense of place" results when design and development protect and incorporate the distinctive character of a community and the particular place in which it is located. Geography, natural features, climate, culture, historical resources, and ecology each contribute to the distinctive character of a region.

Cranberry Baseline Data

Information for projecting the growth scenarios was drawn from Cranberry Township's data files in September 2007. Most of the files are housed electronically; therefore, data was manipulated using Geographical Information Systems (GIS) and Microsoft Excel to extract the information needed. New records are continually being added to Cranberry's electronic filing system so it can provide the most up-to-date information. It is a dynamic system. The projections and trends reported in this section would be slightly different if present data were used rather than September 2007 data. It is important to understand Cranberry's data files to understand where the information from the growth projections came from and why certain assumptions were made.

Land Use Classification System

Cranberry Township adopted the American Planning Association (APA) Land-Based Classification Standards (LBCS) as its comprehensive land use classification system in September of 2007.

Land-Based Classification Standards provide a consistent model for classifying land uses based on their characteristics. The standards are based on a multi-dimensional land-use classification model. The model extends the notion of classifying land uses by refining traditional categories into multiple dimensions, such as activities, functions, building types, site development character, and ownership constraints. Each dimension has its own set of categories and subcategories. These multiple dimensions allow users to have precise control over land use classifications.

For local planning purposes, LBCS calls for classifying land uses in the following dimensions: Activity, Function, Structure Type, Site Development Character, and Ownership. Cranberry Township used the Activity dimension to classify the land uses. This information was collected in the Township's Geographic Information System (GIS) and will be a useful tool for future planning analysis.

Activity refers to the actual use of land based on its observable characteristics. It describes what actually takes place in physical or observable terms (e.g., farming, shopping, manufacturing, vehicular movement). An office activity, for example, refers only to the physical activity on the premises, which could apply equally to a law firm, a nonprofit institution, a court house, a corporate office, or any other office use. Similarly, residential uses, whether single-family dwellings, multi-family structures, manufactured houses, or any other type of building, would all be classified as residential activity.

As of September 2007, Cranberry had not taken its Land Use Classification system down to the lowest level for every category. Some of the APA Land Uses do not occur in Cranberry, and some occur in such small amounts that no useful information could be gained by further refining the use; however, Cranberry staff could further refine its Land Uses in the future should it

choose to do so, just as Cranberry could reclassify its Land Uses according to a different APA dimension.

Existing Land Use

Table 1 shows a summary of the existing land uses as classified by the Land-Based Classification Standards. There are nine APA Land Use Categories. Then the lands are further classified into APA Land Uses. Appendix B shows a tree diagram that describes the hierarchy of uses. As previously noted more APA Land Uses exist than those shown in Table 1; however, if they are not represented in Table 1, then the uses are not present in Cranberry Township or Cranberry chose not to further define the use. Definitions of all APA Land Uses can be found in Appendix A.

Table 1 reflects that 45% of all of Cranberry's land (measured in acres) is being used for Residential Activities. Six thousand one hundred forty-four (6,144) acres are used for Residential Activities. This is the land use category that accounts for the highest percentage of land in Cranberry Township. Leisure Activities is the next highest, using 2,108 acres or 15% of land. One thousand six hundred ninety-seven (1,697) acres or 12% of the land, is used for "No Human or Unclassifiable Activity." Shopping, Business, or Trade Activities uses 1,130 acres or 8% of land. Industrial, Manufacturing, and Waste-Related Activities uses 409 acres or 3% of land. Social, Institutional, or Infrastructure-Related Activities uses 351 acres and 3% of land. Mass Assembly of People uses 144 acres or 1% of Cranberry's total acreage, and Travel or Movement Activities uses less than 1% of land. Figure 1 Existing Land Use maps out all of the land uses according to LBCS.

Table 2

Cranberry Township Land Use Table							
APA Category Code	**APA Category**	**Category Acreage**	**Percentage**	**APA Land Use Code**	**APA Land Use**	**Land Use Acreage**	**Percentage**
				0	(blank)	297	2%
1000	Residential Activities	6,200	45%	1100	Household Activity	5,626	40%
				1200	Transient Living	36	0%
				1400	Multi-Family Activity	537	4%
2000	Shopping, Business, or Trade Activities	1,130	8%	2110	Goods-Oriented Shopping	352	3%
				2120	Service-Oriented Shopping	89	1%
				2200	Restaurant-Type Activity	55	0%
				2210	Restaurant-Type Activity Drive-Through	9	0%
				2300	Office Activity	611	4%
				2310	Office Activity High Turnover People	2	0%
				2320	Office Activity High Turnover Automobile	12	0%
3000	Industrial, Manufacturing, and Waste-Related Activities	409	3%	3110	Primarily Plant or Factory-Type Activity	37	0%
				3120	Primarily Goods Storage or Handling Activity	369	3%
				3300	Construction Activity	3	0%
4000	Social, Institutional, or Infrastructure-Related Activities	351	3%	4000	Social, Institutional, or Infrastructure	12	0%
				4100	School or Library Activity	239	2%
				4110	Classroom-Type Activity	2	0%
				4210	Fire and Rescue-Related Activity	1	0%
				4230	Emergency or Disaster-Response Activity	3	0%
				4311	Water Storing, Pumping and Piping	15	0%
				4312	Water Purification, Filtration Activity	1	0%
				4321	Sewer Storing, Pumping or Piping	1	0%
				4322	Sewer Treatment and Processing	9	0%
				4332	Power Generation, Storage, or Processing	2	0%
				4340	Telecommunication-Related Activity	1	0%
				4350	Natural Gas or Fuel-Related Activity	7	0%
				4410	Water Storage	4	0%
				4420	Storage of Natural Gas, Fuels	1	0%
				4500	Health Care, Medical, or Treatment Activity	42	0%
				4600	Grave Digging Activity	5	0%
				4700	Military Base Activity	8	0%
5000	Travel or Movement Activities	12	0%	5220	Drive-In, Drive Through, Stop-n-Go Activity	12	0%
6000	Mass Assembly of People	144	1%	6600	Social, Cultural, or Religious Assembly	144	1%
7000	Leisure Activities	2,221	15%	7100	Active Leisure Sport and Related Activity	634	4%
				7200	Passive Leisure Activity	1,588	12%
8000	Natural Resources-Related Activities	1,495	11%	8100	Farming, Tilling, Plowing, or Harvesting	1,453	11%
				8200	Livestock Related Activity	8	0%
				8300	Pasturing & Grazing	33	0%
9000	No Human or Unclassifiable Activity	1,826	13%	9000	No Human Activity	1,826	13%
Total						**13,788**	**100%**

* Acreage does not include right-of-way

Figure 1
Existing Land Use

Land Use Aggregation

For the purpose of the growth projections, it was necessary to aggregate the land uses into broader categories than the nine APA Land Use Categories. Land Use Categories for this project became Residential, Industrial, Hotel, Office, Restaurant, and Retail. The engineering consultants needed the land uses to be aggregated in this way in order to properly measure the impacts of the projected growth scenarios. These land uses were also aggregated based on the similarity of their characteristics; similarity of their impacts, similarity of how they would be treated in zoning, and how they would be treated from a policy perspective at time of plan implementation.

Residential

Once the uses were aggregated into useful categories, they had to be further separated out based on units of measurement. The Residential land use needed to be measured in terms of units. Units included single family homes, apartments, condos, townhouses, mobile homes, duplexes, and multi-family housing. Based upon projections made from the 2000 Census, it is estimated that there are approximately 10,378 residential units in Cranberry Township as of December 2006. The residential units are located on approximately 6,144 acres, which equals an overall density of 1.6 residential units per acre.

Units per acre will be the unit of analysis used for residential activities in the growth scenarios. Units are the appropriate means for measuring residential activities because the amount of services the Township must provide relates to each home and the residents of the home, rather than the size of the home.

Non-Residential

Non-residential activities, or APA uses other than Residential Activities, cannot be measured in units like residential uses. The sizes of buildings used for non-residential activities can vary greatly. The amount of services rendered or revenue generated on non-residential uses does not relate to the unit or the building. It is related to the size or the square footage of a building and the type of use. Square feet and use type was the unit of analysis used for measuring non-residential activities in the growth scenarios.

Hotel was initially measured in square footage, but as the project progressed it became apparent that the number of rooms would be a more appropriate unit of measurement. To convert the square footage to number of rooms, an inventory of all the hotels in Cranberry was conducted. The inventory counted square footage of each hotel and the number of rooms in each hotel. Based on the information from the inventory an average number of square feet per room for Cranberry hotels was determined. The average number of square feet in a hotel room in Cranberry is 1,019 square feet. This number is rather large because it does not just include guest rooms, but also lobbies, hallways etc… Therefore square footage was the unit used to determine the amount of land available for all non-residential activities, and it was used the unit used to measure projections for all non-residential projections, but the hotel square footage was

then converted to room numbers by dividing the square footage by the determined average square footage of 1,019 square feet.

Because these activities cannot be measured in the same way, it was appropriate to break residential and non-residential uses into separate inventories.

Table 3

Non-residential Development Inventory by APA Land Use and Aggregated Use				
APA Broad Category	**APA Specific Number**	**APA Use**	**Aggregated Use**	**Aggregated Square Footage**
5000	5220	Drive-In, Drive Through, Stop-n-Go Activity	Retail	3,061,268
2000	2110	Goods Oriented Shopping		
	2300	Service Oriented Shopping		
	2320	Office Activity	Office	4,463,391
3000	3120	Office Activity High Turnover Automobile		
	3110	Primarily Goods Storage or Handling Activity	Industrial	4,194,451
2000	2200	Storage of Natural Gas, Fuels		
	2210	Primarily Plant or Factory-Type Activity		
	2120	Restaurant Type Activity	Restaurant	288,151
4000	4400	Restaurant-Type Activity Drive-Through		
1000	1200	Transient Living	Hotel	965,783
		Other*	N/A	-
			Total	**12,973,044**
*Other uses included Active Leisure and Sport-Related Activity, Construction Activity, Household Activity, No Human Activity, and Social, Cultural, or Religious Assembly for a total of 189,629 square feet.				

The “Other” category was eliminated in the aggregated uses table because it contained many other uses, each of which consumed very little square footage. These uses individually would have had a negligible effect on Cranberry’s over-all growth patterns; therefore the “Other” category was eliminated when determining Cranberry’s present and future trends.

Existing Zoning

Zoning is the main way to shape future growth, by allowing certain land uses in certain areas or districts. The standard zoning densities were used as the base for each future growth scenario. The existing zoning represents the base of the projections because Cranberry’s present zoning has already begun to affect its future growth. Cranberry Township has 15 zoning classifications. These classifications can be seen in Figure 2, Existing Zoning. Definitions and specific

allowable uses in each zoning district can be found in the Cranberry Township Zoning Ordinance.

Figure 2
Existing Zoning

Developable Lands Inventory

Determining the land uses (Residential, Hotel, Industrial, Office, Restaurant, and Retail) and their associated unit of measurement (units or square feet) determined *what* would be projected in the growth scenarios, but it was still necessary to determine *where* the growth would occur. No redevelopment was assumed in the projections, so growth was constrained to undeveloped land, which for our purposes is referred to as "Developable Lands". In order to determine which lands were developable, it first had to be determined which lands were developed.

Developed Lands

The developed lands inventory contained all the parcels in the Township and their respective lot sizes measured in acres. If the parcel had a building or buildings upon it, the size of the building was recorded in square feet. The Township used 2005 digital aerial photography data to capture building footprints. The Township used building permit data from 2005-2007 to add information to the inventory about buildings that had been built since 2005. The Township field-verified all the non-residential buildings for number of stories and also field verified all the permit data from 2005 and on to ensure accuracy. The 2005 digital aerial photography was digitized and combined with existing building data, including the number of stories, to produce square footage data for each parcel. This building square footage was assigned the same land use classification assigned to the parcel. The inventory is contained in a GIS database and can be seen in Figure 3, Developed Lands.

Pending Construction

Some land may look undeveloped on the ground, but in reality has already begun the construction process. These lands included developments that had secured approval through the formal approval process but had not yet begun construction. The Township counted any developments under this circumstance as developed land rather than developable, with a few caveats.

Any residential plan that had received preliminary approval was excluded from the Developable Lands Inventory. Any non-residential development that had received final land development approval was excluded from the Developable Lands Inventory. This distinction was made between residential and non-residential development based on the experience of the Township. Once preliminarily approved, residential plans have little tendency to change in size or scope, primarily because home buyers move into a plan from the early stages and have a vested interest in the plan being completed with few changes. Non-residential developments do not have the same circumstances and consequently tend to change between preliminary and final approval based on market conditions, absorption rates, and a variety of other factors.

For residential plans, only the number of units that had not yet received building permits was included. For non-residential development, square footage of structures not yet constructed were included by their specific land use.

For the future growth scenarios, these developments were assumed to have been built and are included in the square footage of existing development. The acreage on which these approved uses are located was also removed from the developable lands map inventory. The developments are identified in Figure 4, Pending Construction.

Developable Lands

The developable lands inventory was generated using existing Township data and GIS system. The developable lands inventory included all undeveloped parcels, excluding land zoned for open space or parks.

In addition to undeveloped land, the inventory also included several other categories of properties as developable. All residential land uses on parcels currently zoned commercial were included in the undeveloped lands inventory because it is assumed these parcels will eventually be redeveloped to a higher commercial use as properties around them convert to more intense uses.

Also included were all residential properties that were more than five acres with only a single residential unit. This distinction is made because properties that have development potential (e.g. a 50 acre parcel with one house) are still categorized by their current land use. It was determined that parcels greater than five acres have the potential to be subdivided or assembled for development purposes, and represent a significant amount of underdeveloped land.

Finally, large parcels of non-residentially used lands viewed as underdeveloped were individually included. A primary example of these parcels is the golf driving range on Rowan Road. This property has a current use and under the land classification system is identified as developed; however, the Township believes that the current use is not the ultimate highest and best use, but instead is an interim use. This property, as well as the others included under this category, represents a significant development opportunity for the community. Based on this assumption, Cranberry used the undeveloped and underdeveloped lands inventory to create a developable lands map which can be seen in Figure 5, Developable Lands. Figure 5 determined where the future growth would occur. Table 3, Developable Land by Zoning, shows the percent of each zoning classification that is developable.

Table 4

Developable Land by Zoning			
Zoning	**Total Acreage**	**Developable Acreage**	**Percent Developable**
BPK	190	137	72%
C-1	78	25	32%
C-2	11	3	26%
C-3	260	130	50%
I-L	244	6	3%
MU	93	7	7%
PIC	158	59	37%
PRD	3,357	171	5%
R-1	4,604	2,451	53%
R-2	2,148	617	29%
R-3	188	48	26%
RMU	20	-	0%
SP-1	1,538	458	30%
SU-1	716	202	28%
TLI	170	8	4%
Total	**13,775**	**4,321**	**31%**

Figure 3
Developed Lands

Figure 4
Pending Construction

Figure 5
Developable Lands

Growth Scenarios Methodology

Smart Growth Areas and Sub-Areas

In order to regionalize the projections, recognizing the diversity of development across the Township, and to provide more specific information for the impact assessment phase of the project, the Township was divided into eight Smart Growth Areas (SGAs). These areas are depicted in Figure 6, Smart Growth Areas. The growth that is expected to occur in Cranberry over the next 20 years is expected to occur at higher concentrations in certain areas and not in equal distribution throughout the Township. In order to project higher densities in certain areas but not in others, it was necessary to further break down the SGAs into Sub-Areas. The sub-areas are also depicted in Figure 6, Smart Growth Areas. Figure 6 also shows the amount of developable lands in each sub-area and smart growth area.

Figure 6
Smart Growth Areas

Each Smart Growth Area was made up of sub-areas and remaining lands. While the Smart Growth Areas cover all of Cranberry, it is important to remember that future growth was constrained to developable areas. Therefore, the projections only took place within developable lands within each Smart Growth Area.

The projections were recorded for each Smart Growth Area. Projections for the Smart Growth Areas were calculated by adding projections from the sub-areas and remaining lands that laid within the Smart Growth Area. The Smart Growth Areas were then added together to determine the number of future square feet and units for each use that would be added to Cranberry's existing developments. This means nine projections were created for each growth scenario: eight projections for each Smart Growth Area and one total projection for the scenario as a whole.

Projecting Non-residential Land Uses

For non-residential land uses, the developed lands inventory was used to create an average building density ratio for each of the aggregated non-residential land uses: industrial, hotel, retail, office, and restaurant.

First, representative projects were selected because of their recent construction and because they are representative of how much development current land use regulations are yielding in newer developments. It was assumed future projects would continue to yield development at the same ratios without any major land use policy changes.

It was decided not to use an average of all the building density ratios in a land use because some developments represented older building patterns that current regulations would no longer permit. Some developments also have become non-conforming uses. Basing the projections on an average of selected projects eliminated the potential of generating unrealistic building patterns. A list of the representative projects as identified by parcel ID and aggregated land use can be found in Exhibit B. The average building density ratio for each land use was derived by averaging the building density ratios for selected projects in each of the aggregated uses.

The building density ratio was then calculated by dividing the square footage of the building from the representative project, by the lot size, on which the building is situated. This ratio represents the amount of square feet each non-residential land use built consumes per acre of land (on average) across the Township under existing land use regulations.

The results of averaging the building density ratios for the selected projects can be seen in Table 4. These densities represent the current building density ratios and were the basis for future build-out.

Table 5

Non-Residential Representative Developments	
(in square feet/ acre)	
Retail	6,730
Office	14,723
Industrial	8,141
Hotel	16,274
Restaurant	3,711

Projecting Residential Activities

For residential land uses, current zoning regulations limited the number of units that were allowed per acre. The allowable units per acre was the ratio used for projecting residential growth. The allowable units per acre in each zoning district can be seen in Table 5. The allowable units per acre were then multiplied by the developable acres in the corresponding zoning district in the sub-area of the Smart Growth area to determine the future number of units.

Table 6

Current Residential Zoning Density Factors	
Zoning District	**Units Per Gross Acre**
R-1 Rural Residential District	0.9
R-2 Single Family Residential District	1.4
R-3 Multi-Family Residential District	6.5
SU-1 Special Use District	7.8
RMU Residential Mixed Use	7.0

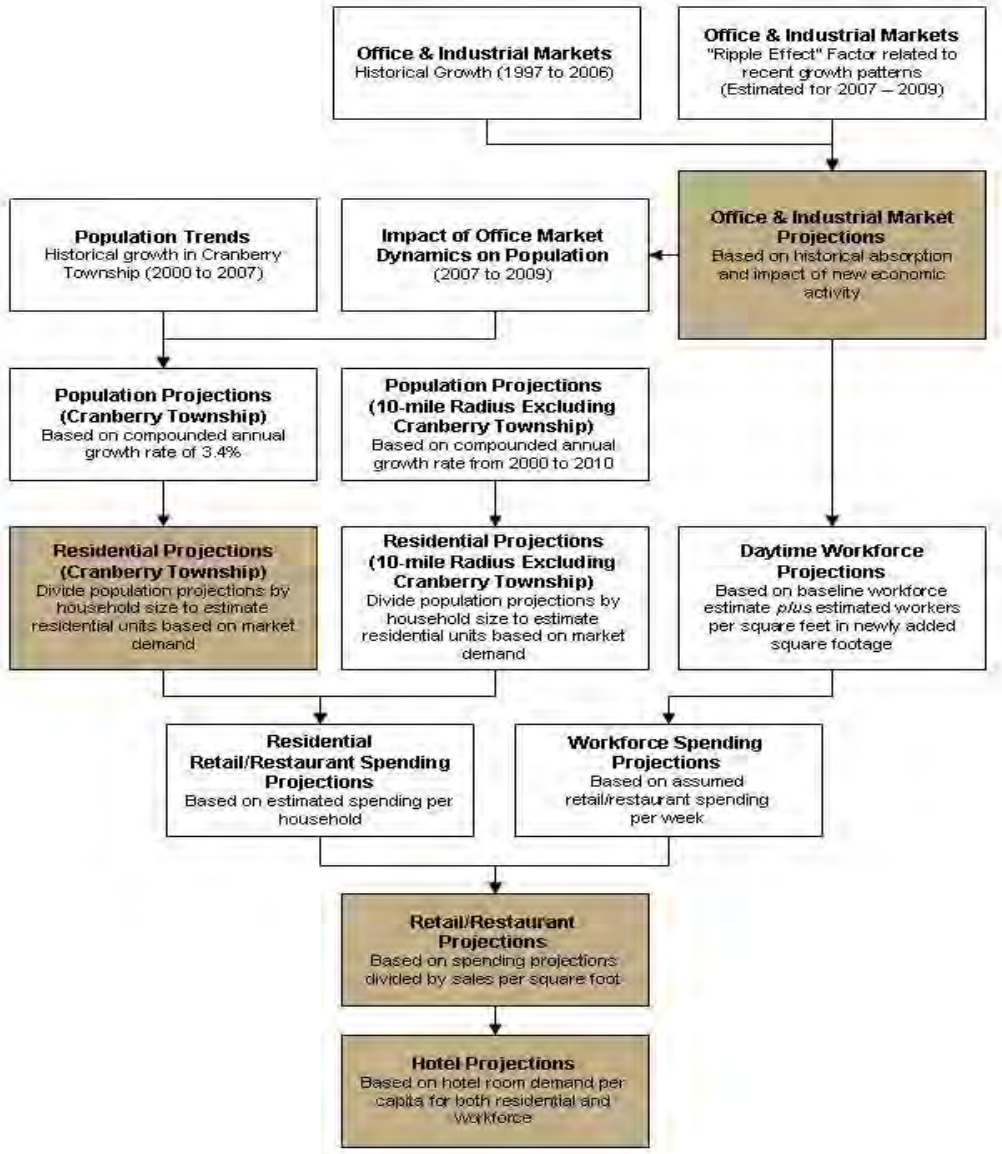
Market Validation Methodology

As land use projections for each growth scenario are calculated, it is important to validate the projections by estimating the market potential for each based on benchmarks identified in the assessment of the current market. The market projections can serve two purposes: (1) to validate the viability, from a market perspective, of each proposed growth scenario; and (2) to estimate the time that it might take to reach build-out for each proposed growth scenario, based on market factors. Projections will be calculated for each of the following growth components:

- Residential
- Office
- Industrial
- Retail
- Restaurant
- Hotel

Figure 7 presents an overview of the methodology and the interdependence of the various components in the market validation methodology:

Figure 7
Market Validation Methodology Overview



The following pages present the key indicators and calculation methodologies used to project future market potential. Market-based projections are also presented. These projections will be compared to the build-out scenario projections for each of the three growth scenarios to measure the market viability of each growth scenario.

Office and Industrial

Market validation for each growth scenario will begin by estimating the market potential for growth in the office and industrial markets. In projecting baseline office and industrial growth potential for each scenario, we assume that (1) office and industrial absorption is driven by economic growth, and that (2) office and industrial space will be absorbed in Cranberry Township at a baseline rate similar to historical absorption patterns. We will use available square footage from permit data from the past ten years, combined with the square footage of currently approved projects that have not yet been built, as the total baseline absorption. The baseline rates for office and industrial absorption will be adjusted to reflect the market potential related to significant new growth in the office market.

Office Market

Between 1997 and 2006, it is estimated that 1,548,272 square feet of office space was added in Cranberry Township. Although estimated square footage for 2007 is not available, we know that at the end of 2007, there was approximately 948,238 square feet of office space approved, but not yet built. Assuming that the approved "pipeline" office space will take around three years to construct, we have assumed that the 948,238 square feet of "pipeline" office space will be absorbed evenly over the next three years, for an estimated absorption of 316,079 square feet per year during 2007, 2008, and 2009.

Historic growth in the office market inherently captures market dynamics within Cranberry Township, as well as the impact of the regional economy on the Township. However, in estimating market potential, we will also consider the potential for the "ripple effects" of some of the recent (2007 and 2009) office and industrial activity in our market potential estimates by estimating the additional square footage required based on potential new indirect jobs in the area as a result of the new economic activity being introduced into the area. We will assume for estimating purposes that 275 square feet of office space is required for each employee, which means that approximately 3,448 jobs will be added in Cranberry Township between 2007 and 2009 associated with the "pipeline" office space. Based on economic impact data calculated using the IMPLAN input/output model, we estimate a "ripple effect" generated from business operational spending of about 592 additional jobs that will require additional office space. If half of those jobs were captured in Cranberry Township, an additional 81,400 square feet of office space could be absorbed between 2007 and 2009, bringing the total estimated annual absorption for those years to 343,213 square feet. Combining the estimates for 2007 to 2009 with actual absorption data for the previous seven years, the average annual absorption for office space since 1997 is 214,826 square feet. The above described calculations are presented in the following table.

Table 7

Estimated Annual Office Absorption				
	Baseline Square Feet Absorbed (From Actual Data)	**"Pipeline" Square Footage**	**Ripple Effect Square Feet Absorbed**	**Total Estimated Square Feet Absorbed**
1997	98,919			98,919
1998	383,006			383,006
1999	211,934			211,934
2000	107,000			107,000
2001	122,079			122,079
2002	301,549			301,549
2004	98,256			98,256
2005	109,625			109,625
2006	115,904			115,904
2007		316,079	27,133	343,213
2008		316,079	27,133	343,213
2009		316,079	27,133.	343,213
Total	1,548,272	948,237	81,399	2,577,911
Total Average Annual Absorption				**214,826**

Projected office absorption is calculated below to represent the projected potential total square feet of office and industrial space from 2007 to 2050. The resulting market potential estimates will provide a comparison to the capacity for office and industrial growth in each scenario.

Table 8

Market-Based Projections for Additional Office Space	
2007	214,826
2008	429,652
2009	644,478
2010	859,303
2011	1,074,129
2012	1,288,955
2013	1,503,781
2014	1,718,607
2015	1,933,433
2016	2,148,258
2017	2,363,084
2018	2,577,910
2019	2,792,736
2020	3,007,562
2021	3,222,388
2022	3,437,213
2023	3,652,039
2024	3,866,865
2025	4,081,691
2026	4,296,517
2027	4,511,343
2028	4,726,168
2029	4,940,994
2030	5,155,820
2031	5,370,646
2032	5,585,472
2033	5,800,298
2034	6,015,123
2035	6,229,949
2036	6,444,775
2037	6,659,601
2038	6,874,427
2039	7,089,253
2040	7,304,078
2041	7,518,904
2042	7,733,730
2043	7,948,556
2044	8,163,382
2045	8,378,208
2046	8,593,033
2047	8,807,859
2048	9,022,685
2049	9,237,511
2050	9,452,337

Industrial Market

Between 1997 and 2006, it is estimated that 688,530 square feet of industrial space was added in Cranberry Township. Estimated square footage for 2007 is not available and there is no "pipeline" industrial space as of the end of 2007.

Like the office market, historic growth in the industrial market inherently captures market dynamics within Cranberry Township, as well as the impact of the regional economy on the Township. However, in estimating market potential, we will also consider the potential for the "ripple effects" of some of the recent (2007 and 2009) economic activity in our market potential estimates by estimating the additional square footage required based on potential new indirect jobs in the area as a result of the new economic activity being introduced into the area. Even though there are is no industrial "pipeline" square footage, there is a potential "ripple effect" from the office "pipeline" on the industrial market. Based on economic impact data calculated using the IMPLAN input/output model, we estimate a "ripple effect" generated from office operational spending of about 473 jobs that will require industrial space. The industrial jobs or "ripple effect" generated from office operational spending are likely from manufacturing sources, and are therefore less likely to be absorbed in Cranberry Township. Assuming that 500 square feet of industrial space is required for each employee, if 10 percent of those jobs were captured in Cranberry Township, an additional 23,650 square feet of industrial space could potentially be absorbed between 2007 and 2009. Combining the estimates for 2007 to 2009 with actual absorption data for the previous seven years, the average annual absorption for industrial space is 59,348 square feet. The above described calculations are presented in the following table.

Table 9

Estimated Annual Industrial Absorption	
1997	447,978
1998	148,000
1999	-
2000	79,465
2001	-
2002	1,190
2004	-
2005	-
2006	11,897
2007	7,883
2008	7,883
2009	7,883
Average Annual Absorption	59,348

Table 10

Market-Based Projections for Additional Industrial Space	
2007	59,348
2008	118,697
2009	178,045
2010	237,393
2011	296,741
2012	356,090
2013	415,438
2014	474,786
2015	534,134
2016	593,483
2017	652,831
2018	712,179
2019	771,527
2020	830,876
2021	890,224
2022	949,572
2023	1,008,920
2024	1,068,269
2025	1,127,617
2026	1,186,965
2027	1,246,313
2028	1,305,662
2029	1,365,010
2030	1,424,358
2031	1,483,706
2032	1,543,055
2033	1,602,403
2034	1,661,751
2035	1,721,099
2036	1,780,448
2037	1,839,796
2038	1,899,144
2039	1,958,492
2040	2,017,841
2041	2,077,189
2042	2,136,537
2043	2,195,885
2044	2,255,234
2045	2,314,582
2046	2,373,930
2047	2,433,278
2048	2,492,627
2049	2,551,975
2050	2,611,323

Residential

In projecting residential growth potential, we will assume that the market for residential housing is driven by population growth. We also assume that the potential exists for the residential market to grow at a similar rate to non-residential uses. According to population data from the U.S. Census Bureau and ESRI, the population in Cranberry Township grew by a compounded annual rate of 4.77 percent between 1990 and 2000, but slowed to a compounded annual rate of 2.69 percent between 2000 and 2007. By comparison, the significant new growth in office square footage in Cranberry Township is expected to increase the 10-year compounded annual growth rate for office space to 3.4 percent. The residential market has likely been more influenced by factors such as accessibility and cost of living than by growth in workforce, evidenced by a low percentage (less than 20 percent) of the Cranberry Township daytime workforce that actually lives in the Township. However, assuming that the potential for population growth mirrors economic growth patterns, we will assume that the market-driven potential population growth rate is 3.4 percent, to reflect activity in the non-residential sectors. The number of housing units required to accommodate that growth will represent the residential market potential. To calculate the number of housing units required, the projected population growth is divided by 2.81, the estimated number of persons per household in Cranberry Township in 2007. The following table presents the estimated market potential for residential units in Cranberry Township.

Table 11

Market-Based Projections for Additional Housing Units				
	Projected Population Calculated at 3.4%	Increase in Population	Estimated Persons/Household	Residential Market Potential
2007	28,445	-		
2008	29,412	967	2.81	344
2009	30,412	1,967	2.81	700
2010	31,446	3,001	2.81	1,068
2011	32,515	4,070	2.81	1,449
2012	33,621	5,176	2.81	1,842
2013	34,764	6,319	2.81	2,249
2014	35,946	7,501	2.81	2,669
2015	37,168	8,723	2.81	3,104
2016	38,432	9,987	2.81	3,554
2017	39,738	11,293	2.81	4,019
2018	41,090	12,645	2.81	4,500
2019	42,487	14,042	2.81	4,997
2020	43,931	15,486	2.81	5,511
2021	45,425	16,980	2.81	6,043
2022	46,969	18,524	2.81	6,592
2023	48,566	20,121	2.81	7,161
2024	50,218	21,773	2.81	7,748
2025	51,925	23,480	2.81	8,356
2026	53,690	25,245	2.81	8,984
2027	55,516	27,071	2.81	9,634
2028	57,403	28,958	2.81	10,305
2029	59,355	30,910	2.81	11,000
2030	61,373	32,928	2.81	11,718
2031	63,460	35,015	2.81	12,461
2032	65,617	37,172	2.81	13,229
2033	67,848	39,403	2.81	14,023
2034	70,155	41,710	2.81	14,844
2035	72,541	44,096	2.81	15,692
2036	75,007	46,562	2.81	16,570
2037	77,557	49,112	2.81	17,478
2038	80,194	51,749	2.81	18,416
2039	82,921	54,476	2.81	19,386
2040	85,740	57,295	2.81	20,390
2041	88,655	60,210	2.81	21,427
2042	91,669	63,224	2.81	22,500
2043	94,786	66,341	2.81	23,609
2044	98,009	69,564	2.81	24,756
2045	101,341	72,896	2.81	25,942
2046	104,787	76,342	2.81	27,168
2047	108,350	79,905	2.81	28,436
2048	112,034	83,589	2.81	29,747
2049	115,843	87,398	2.81	31,102
2050	119,781	91,336	2.81	32,504

Retail & Restaurant

The potential market for retail and restaurant growth is expected to be driven by two factors: (1) growth in the number of households within a 10-mile radius; and (2) growth in the daytime workforce in Cranberry Township. Based on market potential, we performed the following calculations to estimate the market potential for retail and restaurant uses. For purposes of this exercise, all calculations reflect 2007 dollars.

Retail

1. Establish the estimated number of households in Cranberry Township in each growth scenario at 10-year intervals from 2010 to 2050.
2. Using the residential projection methodology presented above, estimate the number of households in the remainder of the 10-mile radius retail market area.
3. Add the estimated number of Cranberry Township households to the estimated households in the remainder of the 10-mile radius to arrive at the total number of households in the 10-mile radius at 10-year intervals.
4. Establish the estimated annual retail spending per household (using ESRI estimates).
5. Multiply the total households in the 10-mile radius at annual intervals by the estimated annual retail spending to arrive at the TOTAL annual retail spending by residents.
6. Establish the number of current workers in Cranberry Township in 2007.
7. Establish industry standards square feet per worker for each non-residential use, using benchmarks from the Urban Land Institute and the APA Planner's Guide.
8. Calculate the estimated number of new workers for each non-residential use by dividing the total new square footage for each use at 10-year intervals.
9. Add the number of current workers to the estimated number of total new workers to arrive at workforce in Cranberry Township at 10-year intervals.
10. Establish assumed annual retail spending per worker in Cranberry Township.
11. Multiply assumed annual retail spending per worker by the estimated workforce at 10-year intervals to arrive at the estimated TOTAL annual retail spending by workforce.
12. Add the total annual retail spending by residents and workforce to arrive at the total retail spending.
13. Estimate current annual retail sales by multiplying existing retail square footage by the estimated annual sales per square foot.
14. Estimate "leakage by subtracting retail sales from retail spending.
15. Estimate amount of leakage captured assuming a 50% captured rate.

16. Divide the estimated retail leakage captured by the retail establishments (from Dollars and Cents of Shopping Centers) to arrive at the total additional retail footage supported by the market.

Restaurant

1. Establish the estimated number of households in Cranberry Township in each growth scenario at 10-year intervals from 2010 to 2050.

2. Using the residential projection methodology presented above, estimate the number of households in the remainder of the 10-mile radius restaurant market area.

3. Add the estimated number of Cranberry Township households to the estimated households in the remainder of the 10-mile radius to arrive at the total number of households in the 10-mile radius at 10-year intervals.

4. Establish the estimated annual restaurant spending per household (using ESRI estimates).

5. Multiply the total households in the 10-mile radius at 10-year intervals by the estimated annual restaurant spending to arrive at the TOTAL annual restaurant spending by residents.

6. Establish the number of current workers in Cranberry Township in 2007.

7. Establish industry standards square feet per worker for each non-residential use, using benchmarks from the Urban Land Institute and the APA Planner's Guide.

8. Calculate the estimated number of new workers for each non-residential use by dividing the total new square footage for each use at annual intervals.

9. Add the number of current workers to the estimated number of total new workers to arrive at workforce in Cranberry Township at annual intervals.

10. Establish assumed annual restaurant spending per worker in Cranberry Township.

11. Multiply assumed annual restaurant spending per worker by the estimated workforce at 10-year intervals to arrive at the estimated TOTAL annual restaurant spending by workforce.

12. Add the total annual restaurant spending by residents and workforce to arrive at the total restaurant spending.

13. Estimate current annual restaurant sales by multiplying existing restaurant square footage by the estimated annual sales per square foot.

14. Estimate "leakage by subtracting restaurant sales from restaurant spending.

15. Estimate amount of leakage captured assuming a 50% captured rate.

16. Divide the estimated restaurant leakage captured by the restaurant establishments (from Dollars and Cents of Shopping Centers) to arrive at the total additional restaurant footage supported by the market.

Table 12

[2]

Market-Based Projections for Residential Spending								
	Projected Additional Households	Total Households in Cranberry Township	Projected Households	Total Households in 10-Mile Radius	Estimated Annual Retail Spending per Household	Estimated Annual Restaurant Spending per Household	Total Retail Spending	Total Restaurant Spending
2008	344	10,398	52,029	62,427	31,600	4,206	$1,972,684,495	$262,566,803
2009	700	10,754	52,402	63,156	31,600	4,206	$1,995,723,563	$265,633,332
2010	1,068	11,122	52,778	63,900	31,600	4,206	$2,019,229,581	$268,762,013
2011	1,449	11,503	53,156	64,659	31,600	4,206	$2,043,216,154	$271,954,657
2012	1,842	11,896	53,538	65,433	31,600	4,206	$2,067,697,337	$275,213,133
2013	2,249	12,303	53,922	66,224	31,600	4,206	$2,092,687,643	$278,539,374
2014	2,669	12,723	54,308	67,032	31,600	4,206	$2,118,202,065	$281,935,376
2015	3,104	13,158	54,698	67,856	31,600	4,206	$2,144,256,087	$285,403,199
2016	3,554	13,608	55,090	68,698	31,600	4,206	$2,170,865,703	$288,944,973
2017	4,019	14,073	55,485	69,558	31,600	4,206	$2,198,047,434	$292,562,896
2018	4,500	14,554	55,883	70,437	31,600	4,206	$2,225,818,347	$296,259,240
2019	4,997	15,051	56,284	71,335	31,600	4,206	$2,254,196,072	$300,036,351
2020	5,511	15,565	56,688	72,253	31,600	4,206	$2,283,198,818	$303,896,653
2021	6,043	16,097	57,095	73,191	31,600	4,206	$2,312,845,400	$307,842,650
2022	6,592	16,646	57,504	74,150	31,600	4,206	$2,343,155,253	$311,876,930

[2] 10,054 Households in Cranberry in 2007; 51,658 households in the remainder of the 10-mile radius around Cranberry in 2007

Market-Based Projections for Residential Spending								
	Projected Additional Households	Total Households in Cranberry Township	Projected Households	Total Households in 10-Mile Radius	Estimated Annual Retail Spending per Household	Estimated Annual Restaurant Spending per Household	Total Retail Spending	Total Restaurant Spending
2023	7,161	17,215	57,917	75,131	31,600	4,206	$2,374,148,455	$316,002,165
2024	7,748	17,802	58,332	76,134	31,600	4,206	$2,405,845,750	$320,221,115
2025	8,356	18,410	58,751	77,160	31,600	4,206	$2,438,268,568	$324,536,633
2026	8,984	19,038	59,172	78,210	31,600	4,206	$2,471,439,052	$328,951,666
2027	9,634	19,688	59,596	79,284	31,600	4,206	$2,505,380,077	$333,469,260
2028	10,305	20,359	60,024	80,383	31,600	4,206	$2,540,115,280	$338,092,559
2029	11,000	21,054	60,454	81,509	31,600	4,206	$2,575,669,081	$342,824,815
2030	11,718	21,772	60,888	82,660	31,600	4,206	$2,612,066,712	$347,669,386
2031	12,461	22,515	61,325	83,840	31,600	4,206	$2,649,334,247	$352,629,742
2032	13,229	23,283	61,765	85,047	31,600	4,206	$2,687,498,625	$357,709,469
2033	14,023	24,077	62,208	86,284	31,600	4,206	$2,726,587,682	$362,912,272
2034	14,844	24,898	62,654	87,552	31,600	4,206	$2,766,630,183	$368,241,979
2035	15,692	25,746	63,103	88,850	31,600	4,206	$2,807,655,851	$373,702,548
2036	16,570	26,624	63,556	90,180	31,600	4,206	$2,849,695,399	$379,298,065
2037	17,478	27,532	64,012	91,544	31,600	4,206	$2,892,780,568	$385,032,755
2038	18,416	28,470	64,471	92,941	31,600	4,206	$2,936,944,155	$390,910,985
2039	19,386	29,440	64,934	94,374	31,600	4,206	$2,982,220,055	$396,937,264
2040	20,390	30,444	65,399	95,843	31,600	4,206	$3,028,643,294	$403,116,256
2041	21,427	31,481	65,869	97,350	31,600	4,206	$3,076,250,069	$409,452,778
2042	22,500	32,554	66,341	98,895	31,600	4,206	$3,125,077,789	$415,951,810
2043	23,609	33,663	66,817	100,480	31,600	4,206	$3,175,165,112	$422,618,496
2044	24,756	34,810	67,296	102,106	31,600	4,206	$3,226,551,993	$429,458,155
2045	25,942	35,996	67,779	103,775	31,600	4,206	$3,279,279,722	$436,476,282
2046	27,168	37,222	68,265	105,487	31,600	4,206	$3,333,390,974	$443,678,558
2047	28,436	38,490	68,755	107,245	31,600	4,206	$3,388,929,853	$451,070,853
2048	29,747	39,801	69,248	109,049	31,600	4,206	$3,445,941,941	$458,659,234

Market-Based Projections for Residential Spending								
	Projected Additional Households	Total Households in Cranberry Township	Projected Households	Total Households in 10-Mile Radius	Estimated Annual Retail Spending per Household	Estimated Annual Restaurant Spending per Household	Total Retail Spending	Total Restaurant Spending
2049	31,102	41,156	69,745	110,901	31,600	4,206	$3,504,474,352	$466,449,972
2050	32,504	42,558	70,245	112,803	31,600	4,206	$3,564,575,775	$474,449,548

Table 13

[3]

Market- Based Projections for Workforce Spending										
	Additional Office SF	Additional Industrial SF	Additional Office Employees (275 s.f./Employee)	Additional Industrial Employees (500 s.f./ Employee)	Total Additional Workforce	Total Workforce (2007 + Additional)	Assumed Annual Retail Spending	Assumed Annual Restaurant Spending	Total Retail Spending	Total Restaurant Spending
2007	214,826	59,348	781	119	900	20,458	780	1820	$15,957,147	$37,233,344
2008	429,652	118,697	1,562	237	1,800	21,358	780	1820	$16,659,055	$38,871,128
2009	644,478	178,045	2,344	356	2,700	22,258	780	1820	$17,360,962	$40,508,912
2010	859,303	237,393	3,125	475	3,600	23,158	780	1820	$18,062,870	$42,146,696
2011	1,074,129	296,741	3,906	593	4,499	24,057	780	1820	$18,764,777	$43,784,480
2012	1,288,955	356,090	4,687	712	5,399	24,957	780	1820	$19,466,685	$45,422,264
2013	1,503,781	415,438	5,468	831	6,299	25,857	780	1820	$20,168,592	$47,060,048
2014	1,718,607	474,786	6,249	950	7,199	26,757	780	1820	$20,870,500	$48,697,832
2015	1,933,433	534,134	7,031	1,068	8,099	27,657	780	1820	$21,572,407	$50,335,616
2016	2,148,258	593,483	7,812	1,187	8,999	28,557	780	1820	$22,274,315	$51,973,401
2017	2,363,084	652,831	8,593	1,306	9,899	29,457	780	1820	$22,976,222	$53,611,185
2018	2,577,910	712,179	9,374	1,424	10,799	30,357	780	1820	$23,678,129	$55,248,969
2019	2,792,736	771,527	10,155	1,543	11,698	31,256	780	1820	$24,380,037	$56,886,753
2020	3,007,562	830,876	10,937	1,662	12,598	32,156	780	1820	$25,081,944	$58,524,537
2021	3,222,388	890,224	11,718	1,780	13,498	33,056	780	1820	$25,783,852	$60,162,321

[3] 2007 Estimate Workforce = 19,558

Market- Based Projections for Workforce Spending										
	Additional Office SF	Additional Industrial SF	Additional Office Employees (275 s.f./Employee)	Additional Industrial Employees (500 s.f./ Employee)	Total Additional Workforce	Total Workforce (2007 + Additional)	Assumed Annual Retail Spending	Assumed Annual Restaurant Spending	Total Retail Spending	Total Restaurant Spending
2022	3,437,213	949,572	12,499	1,899	14,398	33,956	780	1820	$26,485,759	$61,800,105
2023	3,652,039	1,008,920	13,280	2,018	15,298	34,856	780	1820	$27,187,667	$63,437,889
2024	3,866,865	1,068,269	14,061	2,137	16,198	35,756	780	1820	$27,889,574	$65,075,673
2025	4,081,691	1,127,617	14,843	2,255	17,098	36,656	780	1820	$28,591,482	$66,713,457
2026	4,296,517	1,186,965	15,624	2,374	17,998	37,556	780	1820	$29,293,389	$68,351,241
2027	4,511,343	1,246,313	16,405	2,493	18,898	38,456	780	1820	$29,995,296	$69,989,025
2028	4,726,168	1,305,662	17,186	2,611	19,797	39,355	780	1820	$30,697,204	$71,626,809
2029	4,940,994	1,365,010	17,967	2,730	20,697	40,255	780	1820	$31,399,111	$73,264,593
2030	5,155,820	1,424,358	18,748	2,849	21,597	41,155	780	1820	$32,101,019	$74,902,377
2031	5,370,646	1,483,706	19,530	2,967	22,497	42,055	780	1820	$32,802,926	$76,540,161
2032	5,585,472	1,543,055	20,311	3,086	23,397	42,955	780	1820	$33,504,834	$78,177,945
2033	5,800,298	1,602,403	21,092	3,205	24,297	43,855	780	1820	$34,206,741	$79,815,729
2034	6,015,123	1,661,751	21,873	3,324	25,197	44,755	780	1820	$34,908,649	$81,453,514
2035	6,229,949	1,721,099	22,654	3,442	26,097	45,655	780	1820	$35,610,556	$83,091,298
2036	6,444,775	1,780,448	23,436	3,561	26,996	46,554	780	1820	$36,312,464	$84,729,082
2037	6,659,601	1,839,796	24,217	3,680	27,896	47,454	780	1820	$37,014,371	$86,366,866
2038	6,874,427	1,899,144	24,998	3,798	28,796	48,354	780	1820	$37,716,278	$88,004,650
2039	7,089,253	1,958,492	25,779	3,917	29,696	49,254	780	1820	$38,418,186	$89,642,434
2040	7,304,078	2,017,841	26,560	4,036	30,596	50,154	780	1820	$39,120,093	$91,280,218
2041	7,518,904	2,077,189	27,341	4,154	31,496	51,054	780	1820	$39,822,001	$92,918,002
2042	7,733,730	2,136,537	28,123	4,273	32,396	51,954	780	1820	$40,523,908	$94,555,786
2043	7,948,556	2,195,885	28,904	4,392	33,296	52,854	780	1820	$41,225,816	$96,193,570
2044	8,163,382	2,255,234	29,685	4,510	34,195	53,753	780	1820	$41,927,723	$97,831,354

Market- Based Projections for Workforce Spending										
	Additional Office SF	Additional Industrial SF	Additional Office Employees (275 s.f./Employee)	Additional Industrial Employees (500 s.f./ Employee)	Total Additional Workforce	Total Workforce (2007 + Additional)	Assumed Annual Retail Spending	Assumed Annual Restaurant Spending	Total Retail Spending	Total Restaurant Spending
2045	8,378,208	2,314,582	30,466	4,629	35,095	54,653	780	1820	$42,629,631	$99,469,138
2046	8,593,033	2,373,930	31,247	4,748	35,995	55,553	780	1820	$43,331,538	$101,106,922
2047	8,807,859	2,433,278	32,029	4,867	36,895	56,453	780	1820	$44,033,446	$102,744,706
2048	9,022,685	2,492,627	32,810	4,985	37,795	57,353	780	1820	$44,735,353	$104,382,490
2049	9,237,511	2,551,975	33,591	5,104	38,695	58,253	780	1820	$45,437,260	$106,020,274
2050	9,452,337	2,611,323	34,372	5,223	39,595	59,153	780	1820	$46,139,168	$107,658,058

[4]**Table 14**

Market- Based Projections for Additional Retail and Restaurant Space								
	Total Retail Spending	**Total Restaurant Spending**	**Retail Leakage**	**Restaurant Leakage**	**Retail Leakage w/Capture**	**Restaurant Leakage w/capture**	**Additional Retail SF**	**Additional Restaurant SF**
2008	$1,989,343,549	$ 301,437,931	609,934,088	203,638,041	304,967,044	101,819,021	898,534	299,993
2009	$2,013,084,526	$ 306,142,245	633,675,064	208,342,355	316,837,532	104,171,177	933,509	306,923
2010	$2,037,292,451	$ 310,908,709	657,882,989	213,108,819	328,941,495	106,554,410	969,171	313,945
2011	$2,061,980,932	$ 315,739,137	682,571,470	217,939,247	341,285,735	108,969,623	1,005,541	321,061
2012	$2,087,164,022	$ 320,635,397	707,754,560	222,835,507	353,877,280	111,417,754	1,042,640	328,274
2013	$2,112,856,236	$ 325,599,423	733,446,774	227,799,533	366,723,387	113,899,766	1,080,489	335,587
2014	$2,139,072,565	$ 330,633,209	759,663,103	232,833,318	379,831,552	116,416,659	1,119,110	343,002
2015	$2,165,828,494	$ 335,738,816	786,419,032	237,938,926	393,209,516	118,969,463	1,158,526	350,524
2016	$2,193,140,017	$ 340,918,373	813,730,555	243,118,483	406,865,278	121,559,242	1,198,760	358,154
2017	$2,221,023,656	$ 346,174,080	841,614,194	248,374,190	420,807,097	124,187,095	1,239,838	365,896
2018		$ 351,508,208			435,043,508	126,854,159	1,281,783	373,755

[4] Total Current Restaurant Sales =$97,799,890.16; Total Current Retail Sales =$1,379,409,461.60

Market- Based Projections for Additional Retail and Restaurant Space								
	Total Retail Spending	Total Restaurant Spending	Retail Leakage	Restaurant Leakage	Retail Leakage w/Capture	Restaurant Leakage w/capture	Additional Retail SF	Additional Restaurant SF
	$2,249,496,477		870,087,015	253,708,318				
2019	$2,278,576,108	$ 356,923,103	899,166,647	259,123,213	449,583,323	129,561,607	1,324,622	381,732
2020	$2,308,280,762	$ 362,421,190	928,871,301	264,621,299	464,435,650	132,310,650	1,368,382	389,831
2021	$2,338,629,252	$ 368,004,971	959,219,790	270,205,081	479,609,895	135,102,541	1,413,090	398,057
2022	$2,369,641,012	$ 373,677,035	990,231,551	275,877,145	495,115,775	137,938,572	1,458,776	406,413
2023	$2,401,336,122	$ 379,440,054	1,021,926,660	281,640,163	510,963,330	140,820,082	1,505,468	414,903
2024	$2,433,735,324	$ 385,296,788	1,054,325,862	287,496,898	527,162,931	143,748,449	1,553,197	423,531
2025	$2,466,860,050	$ 391,250,090	1,087,450,588	293,450,200	543,725,294	146,725,100	1,601,996	432,301
2026	$2,500,732,441	$ 397,302,907	1,121,322,980	299,503,017	560,661,490	149,751,509	1,651,895	441,218
2027	$2,535,375,374	$ 403,458,285	1,155,965,912	305,658,395	577,982,956	152,829,197	1,702,930	450,286
2028	$2,570,812,484	$ 409,719,368	1,191,403,022	311,919,478	595,701,511	155,959,739	1,755,135	459,509
2029	$2,607,068,192	$ 416,089,408	1,227,658,730	318,289,518	613,829,365	159,144,759	1,808,545	468,893
2030	$2,644,167,731	$ 422,571,763	1,264,758,270	324,771,873	632,379,135	162,385,936	1,863,199	478,443
2031	$2,682,137,173	$ 429,169,903	1,302,727,712	331,370,013	651,363,856	165,685,007	1,919,135	488,163
2032	$2,721,003,458	$ 435,887,414	1,341,593,997	338,087,524	670,796,998	169,043,762	1,976,391	498,059
2033	$2,760,794,423	$ 442,728,001	1,381,384,961	344,928,111	690,692,481	172,464,056	2,035,010	508,136
2034	$2,801,538,831	$ 449,695,493	1,422,129,370	351,895,603	711,064,685	175,947,801	2,095,033	518,401

Market- Based Projections for Additional Retail and Restaurant Space								
	Total Retail Spending	Total Restaurant Spending	Retail Leakage	Restaurant Leakage	Retail Leakage w/Capture	Restaurant Leakage w/capture	Additional Retail SF	Additional Restaurant SF
2035	$2,843,266,407	$ 456,793,845	1,463,856,945	358,993,955	731,928,473	179,496,978	2,156,505	528,858
2036	$2,886,007,863	$ 464,027,146	1,506,598,401	366,227,256	753,299,201	183,113,628	2,219,470	539,514
2037	$2,929,794,939	$ 471,399,621	1,550,385,477	373,599,731	775,192,739	186,799,865	2,283,976	550,375
2038	$2,974,660,434	$ 478,915,634	1,595,250,972	381,115,744	797,625,486	190,557,872	2,350,070	561,447
2039	$3,020,638,241	$ 486,579,698	1,641,228,779	388,779,808	820,614,390	194,389,904	2,417,803	572,737
2040	$3,067,763,387	$ 494,396,474	1,688,353,926	396,596,584	844,176,963	198,298,292	2,487,226	584,253
2041	$3,116,072,070	$ 502,370,780	1,736,662,609	404,570,890	868,331,304	202,285,445	2,558,393	596,000
2042	$3,165,601,697	$ 510,507,595	1,786,192,236	412,707,705	893,096,118	206,353,853	2,631,358	607,987
2043	$3,216,390,928	$ 518,812,066	1,836,981,467	421,012,176	918,490,733	210,506,088	2,706,179	620,221
2044	$3,268,479,716	$ 527,289,509	1,889,070,255	429,489,618	944,535,127	214,744,809	2,782,915	632,710
2045	$3,321,909,353	$ 535,945,420	1,942,499,891	438,145,530	971,249,946	219,072,765	2,861,625	645,461
2046	$3,376,722,512	$ 544,785,480	1,997,313,050	446,985,590	998,656,525	223,492,795	2,942,374	658,484
2047	$3,432,963,298	$ 553,815,559	2,053,553,836	456,015,669	1,026,776,918	228,007,835	3,025,226	671,787
2048	$3,490,677,294	$ 563,041,725	2,111,267,833	465,241,834	1,055,633,916	232,620,917	3,110,249	685,379
2049	$3,549,911,612	$ 572,470,247	2,170,502,150	474,670,356	1,085,251,075	237,335,178	3,197,511	699,268
2050	$3,610,714,943	$ 582,107,606	2,231,305,482	484,307,716	1,115,652,741	242,153,858	3,287,084	713,466

(1) Represents existing 3,846,154 retail S.F. and 218,045 in the “pipeline”
(2) Represents existing 288,151 restaurant S.F. with no restaurants reported in the “pipeline”

Hotel

Like the retail and restaurant sectors, the demand for additional hotel space will also be driven by both residential and non-residential growth, and will therefore change with each growth scenario. In measuring the potential market for hotel space, we must make some assumptions regarding the drvers of market demand. For purposes of these market projections we will assume that:

- 20% of demand is generated by the general population
- 20% of demand is generated by proximity to major transportation corridors
- 60% of demand is generated by corporate users (assumed to be office and industrial users)

Table 15

S.F. of Existing Hotel Related to:	%	S.F.	Per Unit	Unit
Location (Fixed)	20%	102,713	102,713	Fixed
Population (Variable)	20%	102,713	4	Per Capita
Corporate Users (Variable)	60%	308,139	15	Per Capita

The future demand for hotel space will be calculated as follows:

1. Establish number of square feet of hotel space existing (or approved but not built) in 2007.

2. Establish the estimated population of Cranberry Township in 2007.

3. Establish the number of square feet of office and industrial uses in Cranberry Township in 2007 (including the square footage that is approved, but not yet built).

4. Calculate the number of existing square feet of hotel space that can be attributed to the general population, the location of Cranberry Township, and to corporate users.

5. Divide the existing square feet of hotel space attributed to the general population by the estimated 2007 population to arrive at the number of square feet of hotel space demand per capita.

6. Estimate the number of employees in office and industrial uses by dividing the total square feet of each use by industry standards for space requirements per employee (from the Urban Land Institute and APA).

7. Divide the existing square feet of hotel space by the number of employees in office and industrial uses to arrive at the number of square feet of hotel space demand per corporate employee.

8. Multiply the increase in population at 10-year intervals by the per capita demand for household space to project the demand generated by population growth.

9. Multiply the increase in office and industrial employment at 10-year intervals by the estimated demand per corporate employee to project the additional square footage supported by corporate users.

10. The number of square feet of hotel space attributed to the location of Cranberry Township will remain constant.

11. Add the existing number of square feet of hotel space, the additional number of square feet generated by population growth, and the additional number of square feet generated by corporate growth to project the total number of square feet of hotel space that could be supported by the market in each growth scenario.

12. Market potential will be measured at annual intervals using related population, office,and industrial benchmarks.

The following table presents the above calculations:

Table 16

Market-Based Projections for Additional Hotel							
	Population	**Workforce (Corporate Users)**	**Total S.F. Supported Per Capita-Population**	**Total S.F. Supported Per Capita-Workforce (Corporate Users)**	**Total S.F. Supported-Location**	**Total S.F. Supported**	**Additional S.F. Supported**
2007	28,445	20,458	102,713	308,139	102,713	513,565	-
2008	29,412	21,358	106,205	321,693	102,713	530,611	17,046
2009	30,412	22,258	109,816	335,247	102,713	547,776	34,211
2010	31,446	23,158	113,550	348,801	102,713	565,064	51,499
2011	32,515	24,057	117,411	362,355	102,713	582,479	68,914
2012	33,621	24,957	121,403	375,910	102,713	600,025	86,460
2013	34,764	25,857	125,530	389,464	102,713	617,707	104,142
2014	35,946	26,757	129,798	403,018	102,713	635,529	121,964
2015	37,168	27,657	134,211	416,572	102,713	653,496	139,931
2016	38,432	28,557	138,775	430,126	102,713	671,614	158,049
2017	39,738	29,457	143,493	443,680	102,713	689,886	176,321
2018	41,090	30,357	148,372	457,234	102,713	708,319	194,754
2019	42,487	31,256	153,416	470,788	102,713	726,918	213,353
2020	43,931	32,156	158,633	484,343	102,713	745,688	232,123
2021	45,425	33,056	164,026	497,897	102,713	764,636	251,071
2022	46,969	33,956	169,603	511,451	102,713	783,767	270,202
2023	48,566	34,856	175,369	525,005	102,713	803,087	289,522
2024	50,218	35,756	181,332	538,559	102,713	822,604	309,039
2025	51,925	36,656	187,497	552,113	102,713	842,323	328,758
2026	53,690	37,556	193,872	565,667	102,713	862,252	348,687
2027	55,516	38,456	200,464	579,221	102,713	882,398	368,833
2028	57,403	39,355	207,280	592,775	102,713	902,768	389,203
2029	59,355	40,255	214,327	606,330	102,713	923,370	409,805
2030	61,373	41,155	221,614	619,884	102,713	944,211	430,646

Market-Based Projections for Additional Hotel							
	Population	Workforce (Corporate Users)	Total S.F. Supported Per Capita-Population	Total S.F. Supported Per Capita-Workforce (Corporate Users)	Total S.F. Supported-Location	Total S.F. Supported	Additional S.F. Supported
2031	63,460	42,055	229,149	633,438	102,713	965,300	451,735
2032	65,617	42,955	236,940	646,992	102,713	986,645	473,080
2033	67,848	43,855	244,996	660,546	102,713	1,008,255	494,690
2034	70,155	44,755	253,326	674,100	102,713	1,030,139	516,574
2035	72,541	45,655	261,939	687,654	102,713	1,052,307	538,742
2036	75,007	46,554	270,845	701,208	102,713	1,074,767	561,202
2037	77,557	47,454	280,054	714,763	102,713	1,097,529	583,964
2038	80,194	48,354	289,576	728,317	102,713	1,120,605	607,040
2039	82,921	49,254	299,421	741,871	102,713	1,144,005	630,440
2040	85,740	50,154	309,602	755,425	102,713	1,167,739	654,174
2041	88,655	51,054	320,128	768,979	102,713	1,191,820	678,255
2042	91,669	51,954	331,012	782,533	102,713	1,216,259	702,694
2043	94,786	52,854	342,267	796,087	102,713	1,241,067	727,502
2044	98,009	53,753	353,904	809,641	102,713	1,266,258	752,693
2045	101,341	54,653	365,937	823,195	102,713	1,291,845	778,280
2046	104,787	55,553	378,378	836,750	102,713	1,317,841	804,276
2047	108,350	56,453	391,243	850,304	102,713	1,344,260	830,695
2048	112,034	57,353	404,546	863,858	102,713	1,371,116	857,551
2049	115,843	58,253	418,300	877,412	102,713	1,398,425	884,860
2050	119,781	59,153	432,522	890,966	102,713	1,426,201	912,636

Growth Scenario A

Scenario A projects the maximum build-out of the Township using the current land use trends and existing zoning densities allowable in Cranberry's existing land use and zoning ordinances. Scenario A assumes the current growth pattern will not change in the future and all future developments will occur in a similar pattern and at the same ratios that exist within the Township today.

Scenario A assumes that the only way for the Township to grow is within its existing undeveloped lands under the standard zoning density. Therefore, Cranberry's current zoning was applied to build-out Scenario A.

As previously noted, acres are not a specific enough unit of analysis to make useful projections. Residential activities are measured in units, and non-residential activities (Hotel, Industrial, Office, Restaurant, and Retail) are measured in square footage.

Residential Projections

Projecting the number of residential units for Scenario A was relatively straightforward, because residential use was captured within a few zoning districts, (R-1, R-2, and R-3). There was no PRD or RMU that fell within the developable lands. Cranberry's Zoning Ordinance only allows a density of .9 units/acre in the R-1 district. The number of acres in the R-1 district that fell within the developable land was totaled and multiplied by .9 to determine the number of units that the R-1 would produce in the future. This was done for each Smart Growth Area and then totaled to determine the number of additional future units in Scenario A.

The same process was repeated for the R-2 and R-3 districts using their associated allowable densities provided in Table 4.

For example, if there are 10 developable acres in the R-1 district, 13 developable acres in R-2, and six developable acres in R-3 in Smart Growth Area 1, Sub-Area 1A, then the total number of residential units for Sub-area 1A would be 66. Table 7 below explains the process.

Table 17

Example - Smart Growth Area 1, Sub-Area 1A			
Zoning District	**Number of acres in District**	**Ratio**	**Future Residential Units**
R-1	10	0.9	9
R-2	13	1.4	18.2
R-3	6	6.5	39
Total			66

This process was repeated for each sub-area and then totaled to determine a projection for each Smart Growth Area.

The results for Scenario A can be seen in Table 10. A total of 3,292 residential units are produced in Scenario A.

Non-Residential Projections

Projecting non-residential activities was more difficult because non-residential zoning allows more than one land use. In order to project the future number of square feet produced by each use, the zoning had to be broken down into its allowable uses.

Information from the developed lands inventory was used to determine this. The zoning districts were broken down into their land use classification by district to determine the percentage of land used for each land use in that zoning district. The results of this exercise can be seen in Table 8, Percentage of Land Uses in Each Zoning District. This information provides the makeup of each zoning district.

Table 18

Percentage of Developed Non-residential Land Uses in Each Non-residential Zoning District, 2007				
Zoning	**Total Acreage**	**Land Use**	**Land Use Acreage**	**Percent**
BPK	6	Industrial	6	100.0%
C-1	31	Office	7	22%
		Restaurant	2	5%
		Retail	22	73%
C-2	8	Office	1	17%
		Retail	6	84%
C-3	126	Industrial	6	5%
		Office	4	3%
		Restaurant	15	12%
		Retail	101	81%
I-L	97	Industrial	28	29%
		Retail	69	71%
MU	8	Industrial	3	40%

Percentage of Developed Non-residential Land Uses in Each Non-residential Zoning District, 2007				
Zoning	**Total Acreage**	**Land Use**	**Land Use Acreage**	**Percent**
		Office	2	25%
		Retail	3	35%
PIC	61	Industrial	22	36%
		Office	34	56%
		Restaurant	2	4%
		Retail	3	4%
SP-1	671	Industrial	179	27%
		Office	433	65%
		Restaurant	12	2%
		Retail	26	4%
		Hotel	20	3%
SU-1	596	Industrial	61	10%
		Office	247	41%
		Restaurant	34	6%
		Retail	237	40%
TLI	84	Office	19	23%
		Retail	5	6%
		Industrial	60	71%

To project the future build-out in Scenario A for non-residential uses, the ratios for each land use were applied using the percentage breakdowns of the land uses in the developable land in each zoning district and each sub-area in each Smart Growth Area.

For example:

If there are 33 developable acres in Smart Growth Area 1, Sub-Area 1B. Say, 30 of the developable acres are in the PIC district. Three are in the C-2 zoning district. The PIC is made up of 36% industrial use, 56% office use, 4% restaurant and 4% retail. The C-3 is made up of 17% office and 87% retail. (This number equals greater than 100% due to rounding.) (See Table

Percentage of Developed Non-residential Land Uses in Each Non-residential Zoning District, 2007)

The percentage of the land use is multiplied by the number of developable acres in the zoning district to determine the actual number of acres each land use will consume in that zoning district. For the PIC, 10.8 acres will be used for industrial uses, 16.8 acres will be used for office, 1.2 acres will be used for restaurant, and 1.2 acres will be used for retail. For the C-2, .51 acres will be used for office and 2.49 acres will be used for retail.

The acreages are multiplied by the ratios from the Non-Residential Representative Ratio Table. For industrial lands, 10.8 acres are multiplied by the ratio of 8,141 for that land use to determine that 87,923 square feet will be added in the future from the PIC zoning district in Sub-area 1B in Smart Growth Area One. For office use, 16.8 was multiplied by the ratio of 14,723, creating 247,346 future square feet. For restaurant use, 1.2 acres is multiplied by 3,711, creating 4,453 future square feet. For retail, 1.2 is multiplied by 6,730, to create 8,076 future square feet. Table 8 below explains the example for Smart Growth Area 1, Sub-area 1B.

Table 19

Smart Growth Area 1, Sub-Area 1B Example						
Zoning District	**Number of acres in District**	**Land use**	**Percent of acres in zoning district**	**Number of Acres**	**Ratio**	**Future Square Feet**
PIC	30 acres	Industrial	36%	10.8	8,141	87,923
		Office	56%	16.8	14,723	247,346
		Restaurant	4%	1.2	3,711	4,453
		Retail	4%	1.2	6,730	8,076
C-2	3 acres	Office	17%*	0.51	14,723	7,509
		Retail	87%*	2.49	6,730	16,757
Totals	33	Industrial		10.8		87,923
		Office		17.3		254,708
		Restaurant		1.2		4,453
		Retail		3.7		24,833

* This equals greater than 100% due to rounding.

This process was repeated for each zoning district in each sub-area in each Smart Growth Area. The future square feet for each land use from each sub-area were then added together to get a total number of future square feet in each of the eight Smart Growth Areas. The results for Scenario A can be seen in Figure 7, Growth Scenario A, and are summarized in Table 9.

Table 20

Scenario A (Additional Square Feet , Rooms, and Units)									
Land Use	**SGA 1**	**SGA 2**	**SGA 3**	**SGA 4**	**SGA 5**	**SGA 6**	**SGA 7**	**SGA 8**	**Total**
Hotel rooms	-	4	-	15	70	78	65	35	**268**
Industrial	342,799	31,581	-	68,033	451,213	356,751	296,071	1,483,874	**3,030,322**
Office	500,071	47,042	-	332,789	1,916,055	1,553,642	1,303,588	776,044	**6,429,231**
Restaurant	9,926	1,735	-	4,388	99,081	12,047	11,110	65,734	**204,021**
Retail	50,781	2,097	-	62,927	855,810	43,690	37,225	765,543	**1,818,073**
Residential units	908	282	898	375	147	540	63	287	**3,503**

* Numbers may not add up to the exact total due to rounding

Results

In Scenario A, 268 hotel rooms are added to the Township. This is the size of one large hotel. Three million square feet of Industrial use is added. Approximately 6.4 million square feet of office is added. About 200,000 square feet of Restaurants are added, about 1.8 million square feet of Retail is added, and 3,500 residential units.

Figure 8
Growth Scenario A

Market Validation

In Scenario A, the capacity based on land use is supported by the market as achievable using the year 2050 as the target date. However, office and industrial uses will likely not be achieved before 2030. The land allocated for hotel, retail, restaurant and residential uses are not consistent with market demand. It should be noted that in this scenario, if an 8% vacancy rate were applied to non-residential uses to account for aging facilities, the demand for retail, restaurant, and hotel space would be decreased slightly.

Table 21

Scenario A Validation							
Land Use	**Total Capacity**	**Potential 2010**	**Potential 2020**	**Potential 2030**	**Potential 2040**	**Potential 2050**	**Year Potential Achieved**
Hotel	268	51	228	427	642	896	2023
Industrial	3,030,322	237,393	830,876	1,424,358	2,017,841	2,611,323	2058
Office	6,429,231	859,303	3,007,562	5,155,820	7,304,078	9,452,337	2037
Restaurant	204,021	313,945	389,831	478,443	584,253	713,466	2008
Retail	1,818,073	969,171	1,368,382	1,863,199	2,487,226	3,287,084	2030
Residential units	3,503	1,068	5,511	11,718	20,390	32,504	2016

Growth Scenarios B and C

Scenarios B and C are designed to represent a more intensive and alternative development pattern for the use of land. The use of the developable land was altered by reallocating land uses in certain sub-areas. Growth Scenario Development Assumptions in Table 10 shows all the sub-areas and Smart Growth Areas for each scenario and the zoning assumptions made for each sub-area. Figure 5 also shows where the Smart Growth Areas and sub-areas are located.

Table 22

Growth Scenario Development Assumptions		
Smart Growth Areas	**Scenario B**	**Scenario C**
Sub Area 1A	*SZD	GP - 1
Sub Area 1B	GP -2	GP – 2
Sub Area 1C	GP – 1	GP – 1
Sub Area 1D	GP – 2	GP – 1
All Remaining Areas	SZD	SZD
SGA # 2		
Sub Area 2A	SZD	GP - 1
All Remaining Areas	SZD	SZD
SGA #3		
Sub Area 3A	GP - 1	GP - 2
Sub Area 3B	SZD	GP - 1
Sub Area 3C	SZD	GP - 1
All Remaining Areas	SZD	SZD
SGA # 4		
Sub Area 4A	GP - 1	GP - 1
All Remaining Areas	SZD	SZD
SGA # 5		
Sub Area 5A	GP - 3	GP - 3
All Remaining Areas	SZD	SZD
SGA # 6		
Sub Area 6A	GP - 1	GP - 2
Sub Area 6B	SZD	GP - 1
All Remaining Area	SZD	SZD
SGA # 7		
Sub Area 7A	SZD	GP - 1
All Remaining Area	SZD	SZD
SGA # 8		
Sub Area 8A	Actual Simon	Actual Simon
Sub Area 8B	GP - 2	GP - 2
Sub Area 8C	GP - 1	GP - 2
Sub Area 8D	GP - 1	GP - 2
All Remaining Areas	SZD	SZD
*SZD= Standard Zoning Density		

Standard zoning densities were applied for all sub-areas in Scenario A. The growth projection for Scenarios B and C used a combination of standard zoning densities in some sub-areas and

zoning assumptions referred to as GP-1, GP-2, and G-3 in other sub-areas. The assumptions for GP-1, GP-2, and GP-3 can be seen in the Definitions of Growth Area Densities Table 11.

Table 23

Definition of Growth Area Densities			
	GP - 1	**GP - 2**	**GP - 3**
Required Open Space	30%	15%	10%
Residential Acreage % (net of open space)	95%	75%	25%
Gross Units Per Acre	5.5	10.0	15.0
Residential Allocation			
Single Family Homes	50%	25%	0%
Townhouses	25%	45%	30%
Multi-family Apartments.	25%	30%	70%
Commercial Acreage % (net of open space)	5%	25%	75%
Non Residential Allocations			
Office	20%	20%	20%
Retail	60%	32%	35%
Restaurant	10%	24%	21%
Hotel	0%	12%	11%
Civic/Institutional	10%	12%	13%
Sq, Ft Factors (Scenario #2 & 3)	N/A	X2	X2

Developing the Growth Patterns

The assumptions for Growth Patterns 1, 2, and 3 (GP-1, GP-2 and GP-3), as indicated in the chart above, are based on the ideas of Smart Growth. The assumptions particularly center on the Smart Growth goals of efficient land use and infrastructure, a greater mix of uses and housing choices, preservation of environmental resources, and creation of a sense of place.

The sub-areas that use GP-1, 2, or 3, as their zoning assumptions were selected by Township staff and their consultants. The areas were selected because they have the most potential to develop according to these growth patterns, and the most to benefit from the zoning change. They also represent undeveloped properties where changes in land use policies are most desirable from a market perspective.

The differences in the Growth Patterns do not represent more intensive uses in each of the differing patterns. In other words, all the growth patterns allow the same types of uses, and the difference between the Growth Patterns lies in the allocation of the uses, not necessarily the

intensity of use. There is an increasing amount of land dedicated to non-residential uses as the growth patterns progress from GP-1 to GP-3. All of the uses in the GPs are more intense than in standard zoning.

The densities for the non-residential uses in GP-2 and GP-3 are further intensified by doubling the building density ratios. These intensified building density ratios can be seen in Table 12. The purpose for intensifying the ratio was based on an understanding that as a matter of policy, smart growth patterns typically have multiple story non-residential uses in a more compact arrangement than do typical suburban-style developments. Because the ratios were originally derived from existing development in Cranberry, it is appropriate to intensify the yield currently being produced by Cranberry's current development pattern.

Table 24

Scenarios B & C Representative Developments (in square feet/ acre)	
Retail	13,460
Office	29,446
Industrial	16,282
Hotel	32,546
Restaurant	7,422

Calculating Projections in Scenarios B and C

Sub-areas that employed standard zoning did not change from Scenario A. Sub-areas that used Growth Pattern 1, 2, or 3 were calculated by taking the total amount of developable land in the sub-area and applying the respective percentages found in the Definition of Growth Area Densities Table to divide them into uses rather than using standard zoning.

For example, if there are 71 developable acres in Scenario B, Smart Growth Area 1, Sub-area 1B that uses zoning assumption of Growth Pattern 1.

Of those 71 acres 95% are used for residential uses. This means close to 68 acres of the developable land will be used for residential purposes. Of those 68 acres, approximately 5.5 residential units will be built on each acre resulting in approximately 370 residential units built in Sub-area 1B. Of the 374 units, 50% will be single family homes, yielding 185 units. 25% of those 374 units will be townhouses, yielding 92.5 units, and multi-family housing will yield another 92.5 units at 25%. Of the remaining 3.5 non-residential acres, 30% must be reserved for open space. (NOTE: The 5.5 residential units on each acre already accounts for the required open space in the residential uses.)

This leaves 3.25 acres of developable areas for the non-residential uses. In Growth Pattern 1, hotel land use is not allowed. Therefore, no land will be projected for that use.

20%, or.65 acres will be used for office. In GP-1, the building density ratios remain the same as the densities used for standard zoning; therefore, .5 acre multiplied by the office building density ratio of 14,723 sq/acre yields 9,570 square feet.

60% or 1.95 acres will be used for retail, yielding 13,124 square feet. 10% or .325 acre will be used for civic institutional uses and restaurant uses, resulting in .33 acre used for civic/institutional uses and 1,026 square feet for restaurants. (A building density ratio was not calculated for civic/institutional uses because so little land is used for that use; however, the Township did feel it was important to reserve land for that use.)

The Scenario B example for SGA1, Sub-area 1B in Table 13 demonstrates this example. The same process was repeated for GP 2 and 3 but the appropriate percentages were applied.

Finally, all square feet for each land use from each Sub-area was added together to get a total for the Smart Growth Area. The results for Scenario B can be seen in Figure 10, Growth Scenario B, and are summarized in Table 14. The results for Scenario C can be seen in Figure 11, Growth Scenario C, and in Table 15.

Table 25

Example for Scenario B - SGA 1, Sub-area 1B									
Acres in Sub-Area	**Growth Pattern 1**	**Number of Acres**	**Open Space**	**Net Acres**	**Ratio**	**Number Units**	**Allocations**	**Percentage of Allocation**	**Number of Future Units or Sq.Ft. for Allocations**
71	95% residential	67.45	N/A	67.45	5.5 units/acre	370 total residential units	Single Family Housing	50%	185
							Townhouses	25%	92.5
							Multi-family	25%	92.5
	5% Non-residential	3.55	0.3	3.25	14,723 sq.ft./acre	N/A	Office	20%	9,570
					6,730 sq.ft./acre	N/A	Retail	60%	13,124
					3,711 sq.ft./acre	N/A	Restaurant	10%	1,206
					16,274 sq.ft./acre	N/A	Hotel	0%	-
					N/A	N/A	Civic/Institutional	10%	0.33 acre

Table 26

Scenario B (Additional Square Feet and Units)									
Land Use	**SGA 1**	**SGA 2**	**SGA 3**	**SGA 4**	**SGA 5**	**SGA 6**	**SGA 7**	**SGA 8**	**Total**
Hotel rooms	121	4	-	16	253.70	78	65	83	**620**
Industrial	26,052	31,580	-	72,825	531,139	356,751	296,071	951,018	**2,265,436**
Office	226,330	47,042	4,808	363,357	1,501,641	1,569,861	1,303,588	361,941	**5,378,568**
Restaurant	59,572	1,735	606	5,772	184,822	14,090	11,110	87,581	**365,287**
Retail	194,711	2,097	6,592	76,810	912,994	65,925	37,225	1,720,319	**3,016,672**
Residential units	2,461	187	1,077	735	316.93	1,154	63	1,654	**7,648**

Table 27

Scenario C (Additional Square Feet and Units)									
Land Use	**SGA 1**	**SGA 2**	**SGA 3**	**SGA 4**	**SGA 5**	**SGA 6**	**SGA 7**	**SGA 8**	**Total**
Hotel rooms	60	4	38	92	253	170	65	217.89	**901**
Industrial	26,052	31,581	-	72,825	203,792	192,026	296,071	951,018	**1,773,364**
Office	169,970	56,808	100,485	471,427	1,504,025	1,040,939	1,308,238	552,394	**5,204,286**
Restaurant	36,044	2,965	22,960	40,163	190,981	67,014	11,696	148,188	**520,010**
Retail	177,022	15,485	100,402	149,620	894,272	178,104	43,599	1,848,634	**3,407,138**
Residential units	3,589	705	2,949	949	374	1,903	236	2031	**12,736**

Results

In Scenario B, approximately 600 hotel rooms are added. That is roughly 3 hotels. About 2 million square feet of industrial use is added. Five point three million (5.3) square feet of office space is added. Restaurant space is increased by about 365,000 square feet. An additional 3 million square feet of retail space is added, and over 7,600 residential units is added to Cranberry.

Scenario C results in an additional 900 hotel rooms. This is about 4 hotels. Close to 2 million square feet of industrial space, 5.2 million square feet of office space, an additional 520,000 square feet of restaurant space, 3.4 million square feet of retail, and over 12,000 residential units.

Figure 9
Growth Scenario B

Market Validation

In Scenario B, the capacity based on land use is supported by the market as achievable using the year 2050 as the target date. However, only restaurant and residential are likely to be built out prior to 2030.

Table 28

Scenario B Validation							
Land Use	**Total Capacity**	**Potential 2010**	**Potential 2020**	**Potential 2030**	**Potential 2040**	**Potential 2050**	**Year Potential Achieved**
Hotel rooms	620	51	51	228	427	642	2040
Industrial	2,265,436	237,393	830,876	1,424,358	2,017,841	2,611,323	2045
Office	5,378,568	313,945	389,831	478,443	584,253	713,466	2032
Restaurant	365,287	969,171	1,368,382	1,863,199	2,487,226	3,287,084	2017
Retail	3,016,672	1,938,342	2,736,764	3,726,398	4,974,452	6,574,168	2047
Residential units	7,648	1,068	5,511	11,718	20,390	32,504	2025

Figure 10
Growth Scenario C

Market Validation

In Scenario C, the capacity based on land use is supported by the market as achievable using the year 2050 as the target date. However, it is not likely that any of the uses will be built out prior to 2030.

Table 29

Scenario C Validation							
Land Use	**Total Capacity**	**Potential 2010**	**Potential 2020**	**Potential 2030**	**Potential 2040**	**Potential 2050**	**Year Potential Achieved**
Hotel	901	51	51	228	427	642	2051
Industrial	1,773,364	237,393	830,876	1,424,358	2,017,841	2,611,323	2036
Office	5,204,286	313,945	389,831	478,443	584,253	713,466	2031
Restaurant	520,010	969,171	1,368,382	1,863,199	2,487,226	3,287,084	2035
Retail	3,407,138	1,938,342	2,736,764	3,726,398	4,974,452	6,574,168	2052
Residential units	12,736	1,068	5,511	11,718	20,390	32,504	2032

Comparison

A comparison between the capacities of all three scenarios can be seen in Table 30.

Table 30

Scenario Totals Comparison			
Land Use	**Scenario A**	**Scenario B**	**Scenario C**
Hotel	268	620	901
Industrial	3,030,322	2,265,436	1,773,364
Office	6,429,231	5,378,568	5,204,286
Restaurant	204,021	365,287	520,010
Retail	1,818,073	3,016,672	3,407,138
Residential units	3,503	7,648	12,736

Analysis

Hotel

Hotel space increased with each scenario. This means Scenario A has the lowest amount of hotel square footage and Scenario C has the highest.

Based on available land capacity, Scenario A can support 268 additional rooms. Using market projections however the market can actually support 423 additional rooms by the year 2030. Land availability based on current zoning patterns restricts the possible market for hotel space. The 268 rooms are expected to be built out by the year 2023 based on projected market conditions.

Scenario B allows for 620 rooms; however the market can only support 423 additional rooms by the year 2030. Therefore in Scenario B the market restricts hotel growth. The 620 rooms are expected to be built by the year 2040 based on projected market conditions.

Scenario C provides for 901 additional hotel rooms, but the again the market will only support 423 rooms in the year 2030. Hotel space in Scenario C is expected to reach build out based on land capacity in the year 2051.

Industrial

Industrial space lessens with each scenario, however the capacity for industrial growth is greater than the market demand in each scenario. Based on land capacity Scenario A has capacity for over 3 million additional square feet of industry. The market in 2030 however restricts this number to 1.4 million additional square feet. According to projected market conditions 3 million square feet of industrial space will be built out in the year 2058.

Scenario B has land capacity for 2.3 million square feet of industry. The market however can support 1.4 million additional square feet in the year 2030. 2.3 million square feet of industrial space will be built out by 2045.

Scenario C has capacity for 1.8 million additional square feet. The market again can support 1.4 million additional square feet by the year 2030. Industrial land capacity in Scenario C is projected to be built out in the year 2036.

Office

Office space grows the most in Scenario A and the least in Scenario C. The market in 2030 can not support the amount of office space the land capacity allows in any of the scenarios. The market can only support 5.2 million additional square feet of office space at that time. Scenario A has capacity for 6.4 million additional square feet which is projected to be built out by the year 2037. Scenarios B allows for 5.4 million additional square feet, projected to be built out in the

year 2032 and Scenario C allows for 5.2 million additional square feet which will be built out in the year 2031.

Restaurant

Like hotel space, restaurant space also increases with each scenario. In Scenario A an additional 202,000 square feet will be added, but the market anticipates that this capacity will be build out in the coming year, 2008. Scenario B allows for 365,000 additional square feet which is anticipated to be built out in 2017. Scenario C will allow 520,000 square feet o be built which is anticipated to be built out in 2035. In Scenarios A and B capacity can not keep up with demand. In Scenario C the capacity is slightly higher than the demand.

Retail

Retail space grows the most in Scenario C and the least in Scenario A. Retail growth falls in the middle in Scenario B. Cranberry can support 1.8 million additional square feet by 2030.

From a land capacity perspective, 1.8 million additional square feet of retail space can be supported in Scenario A which is expected to be built out in the year 2030. Scenario B can support 3 million additional square feet, which is anticipated to be built out by 2047. And Scenario C can support 3.4 million additional square feet which will be built by 2052.

Residential

Scenario C produces by far the most residential units from a land capacity perspective with Scenario A producing the least number of units, and Scenario B falling in the middle. In Scenario A 3,500 additional units are produced, but the market demands 11,718 units in the year 2030. The 3,500 units are expected to be built by the year 2016. In Scenario B, 7,600 units are produced, which are anticipated to be built out by the year 2025. Scenario B also falls short of the market demand. In Scenario C there is capacity for 12,700 units, but the market in 2030 will not support that much growth, so the market restricts the number to 11,719 units. The 12,700 units are anticipated to be built out by the year 2032.

Comparison

Table 30 shows the numbers that are likely to be produced in each scenario taking into consideration the market validation. Essentially two sets of numbers were produced for each scenario. The numbers related to land capacity and the market numbers. As it can be seen from the analysis section, the numbers restrict each other. At times the capacity is greater than the demand, and at other times the market demand is greater than the land capacity. Table 30 reflects the restricted numbers. These numbers represent the number of additional square feet or units that will be added to the Township in the year 2030. The grey cells reflect market restricted numbers meaning the demand is not as great as the land capacity. The white cells reflect capacity restricted numbers, meaning the demand is greater than the capacity.

Table 31

Scenario Totals Comparison			
Land Use	**Scenario A**	**Scenario B**	**Scenario C**
Hotel	268	423	423
Industrial	1,424,358	1,424,358	1,424,358
Office	5,155,820	5,155,820	5,155,820
Restaurant	202,672	365,287	478,443
Retail	1,802,665	1,863,199	1,863,199
Residential units	3,503	7,648	11,718

*Grey cells refer to market restricted numbers.

Conclusion

Cranberry is about 30% developable. The way that 30% develops produces different outcomes for the future of Cranberry. Table 31 shows the square footage of existing non-residential land uses today and the number of residential units today, and compares it to the totals of those uses at build-out under each growth scenario in the year 2030.

Table 32

2030 Build Out				
Land Use	**Existing Square Footages and Units**	**Total with Scenario A**	**Total with Scenario B**	**Total with Scenario C**
Hotel	948	1,215	1,370	1,370
Industrial	4,194,451	5,618,809	5,618,809	5,618,809
Office	4,463,391	9,619,211	9,619,211	9,619,211
Restaurant	288,151	490,823	653,438	766,594
Retail	3,061,268	4,863,933	4,924,467	4,924,467
Residential units	10,378	13,881	18,026	22,096

Each scenario produces relatively the same amount of non-residential development; the big difference exists in the number of residential units produced. Scenario C which applies the highest densities allows for more non-residential development than Scenario A or B, but creates substantially more residential units. Scenario A, which applied standard zoning allows for the least amount of development to occur, both residentially and non-residentially. Scenario B supports more growth than Scenario A, but less than Scenario C.

The Smart Growth principles applied in the Growth Patterns (GP-1, GP-2, and GP-3) allow more growth to occur in the same amount of land. If Cranberry changes its zoning to be more aligned with the growth patterns used in Scenario C it can potentially support more development. While Scenario C conserves more land it may produce more problems, such as congestion. The impacts of each scenario will help determine which scenario should be the preferred scenario for Cranberry's future.

Exhibit A

Activity Dimensions and sub-classifications

- 1000 Residential activities
  - 1100 Household activities
  - 1200 Transient living
  - 1300 Institutional living
- 2000 Shopping, business, or trade activities
  - 2100 Shopping
    - 2110 Goods-oriented shopping
    - 2120 Service-oriented shopping
  - 2200 Restaurant-type activity
    - 2210 Restaurant-type activity with drive-through
  - 2300 Office activities
    - 2310 Office activities with high turnover of people
    - 2320 Office activities with high turnover of automobiles
- 3000 Industrial, manufacturing, and waste-related activities
  - 3100 Plant, factory, or heavy goods storage or handling activities
    - 3110 Primarily plant or factory-type activities
    - 3120 Primarily goods storage or handling activities
  - 3200 Solid waste management activities
    - 3210 Solid waste collection and storage
    - 3220 Landfilling or dumping
    - 3230 Waste processing or recycling
  - 3300 Construction activities (grading, digging, etc.)
- 4000 Social, institutional, or infrastructure-related activities
  - 4100 School or library activities
    - 4110 Classroom-type activities
    - 4120 Training or instructional activities outside classrooms
    - 4130 Other instructional activities including those that occur in libraries
  - 4200 Emergency response or public-safety-related activities
    - 4210 Fire and rescue-related activities
    - 4220 Police, security, and protection-related activities
    - 4230 Emergency or disaster-response-related activities
  - 4300 Activities associated with utilities (water, sewer, power, etc.)

- 4310 Water-supply-related activities
  - 4311 Water storing, pumping, or piping
  - 4312 Water purification and filtration activities
  - 4313 Irrigation water storage and distribution activities
  - 4314 Flood control, dams, and other large irrigation activities
- 4320 Sewer-related control, monitor, or distribution activities
  - 4321 Sewage storing, pumping, or piping
  - 4322 Sewer treatment and processing
- 4330 Power generation, control, monitor, or distribution activities
  - 4331 Power transmission lines or control activities
  - 4332 Power generation, storage, or processing activities
- 4340 Telecommunications-related control, monitor, or distribution activities
- 4350 Natural gas or fuels-related control, monitor, or distribution activities

- 4400 Mass storage, inactive
  - 4410 Water storage
  - 4420 Storage of natural gas, fuels, etc.
  - 4430 Storage of chemical, nuclear, or other materials
- 4500 Health care, medical, or treatment activities
- 4600 Interment, cremation, or grave digging activities

- 4700 Military base activities
  - 4710 Ordnance storage
  - 4720 Range and test activities

- 5000 Travel or movement activities
- 5100 Pedestrian movement

- 5200 Vehicular movement
  - 5210 Vehicular parking, storage, etc.
  - 5220 Drive-in, drive through, stop-n-go, etc.

- 5400 Trains or other rail movement
  - 5410 Rail maintenance, storage, or related activities

- 5500 Sailing, boating, and other port, marine and water-based activities
  - 5510 Boat mooring, docking, or servicing
  - 5520 Port, ship-building, and related activities
- 5600 Aircraft takeoff, landing, taxiing, and parking
- 5700 Spacecraft launching and related activities

- 6000 Mass assembly of people
- 6100 Passenger assembly
- 6200 Spectator sports assembly
- 6300 Movies, concerts, or entertainment shows

- 6400 Gatherings at fairs and exhibitions
- 6500 Mass training, drills, etc.
- 6600 Social, cultural, or religious assembly
- 6700 Gatherings at galleries, museums, aquariums, zoological parks, etc.
- 6800 Historical or cultural celebrations, parades, reenactments, etc.

7000 Leisure activities

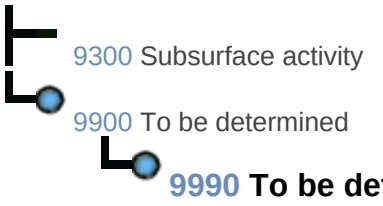
- 7100 Active leisure sports and related activities
  - 7110 Running, jogging, bicycling, aerobics, exercising, etc.
  - 7120 Equestrian sporting activities
  - 7130 Hockey, ice skating, etc.
  - 7140 Skiing, snowboarding, etc.
  - 7150 Automobile and motorbike racing
  - 7160 Golf
  - 7180 Tennis
  - 7190 Track and field, team sports (baseball, basketball, etc.), or other sports
- 7200 Passive leisure activity
  - 7210 Camping
  - 7220 Gambling
  - 7230 Hunting
  - 7240 Promenading and other activities in parks
  - 7250 Shooting
  - 7260 Trapping
- 7300 Flying or air-related sports
- 7400 Water sports and related leisure activities
  - 7410 Boating, sailing, etc.
  - 7420 Canoeing, kayaking, etc.
  - 7430 Swimming, diving, etc.
  - 7440 Fishing, angling, etc.
  - 7450 Scuba diving, snorkeling, etc.
  - 7460 Water-skiing

8000 Natural resources-related activities

- 8100 Farming, tilling, plowing, harvesting, or related activities
- 8200 Livestock related activities
- 8300 Pasturing, grazing, etc.
- 8400 Logging
- 8500 Quarrying or stone cutting
- 8600 Mining including surface and subsurface strip mining
- 8700 Drilling, dredging, etc.

9000 No human activity or unclassifiable activity

- 9100 Not applicable to this dimension
- 9200 Unclassifiable activity



The definitions provided by APA for each function are listed below.[5]

”1000 Residential activities” includes activities that occur in all types of residential uses, structures, ownership characteristics, or the character of the development.

“1100 Household activities” includes those activities normally associated with single-family, multifamily, town homes, manufactured homes, etc.

“1200 Transient living” includes activities associated with hotels, motels, tourist homes, bed and breakfasts, etc. Note that the distinction between various residential activities is independent of the definition of a family.

“1300 Institutional living” includes residential living activity associated with dormitories, group homes, barracks, retirement homes, etc. These activities may occur in any number of structural types (single-family homes, multi-family homes, manufactured homes, etc.), but the activity characteristics of such living are not the same as the other subcategories under residential activities. Also note that the distinction between various residential activities is independent of the definition of a family.

“2000 Shopping, business, or trade activities” captures all uses that are business related. Use it as a catch-all category for all retail, office, commercial, and industrial activities when the subcategories are either too specific or otherwise unknown (as in comprehensive plan designations).

“2100 Shopping” includes all retail shops and stores. If the shop sells both goods and services, or if it is not clear which of the two more detailed categories to assign, then use this one. Increasingly, distinguishing between a store (that sells goods) and shop (that sells service) will become difficult and for many planning-related applications even irrelevant. Even economic applications that employed such distinctions are reconsidering because of the difficulty in distinguishing between goods and services. However, for those planning applications that require this distinction, or for existing land-use data sets that already employ such distinctions, apply the subcategories. Otherwise, for routine land-use data classification, apply the Shopping category only.

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[5] American Planning Association. Land Based Classification System. 18 August 2003. Available at http://www.planning.org/lbcs/standards/view.htm?Dimension=Activity&Level=4&Keyword=&style=tree&submit1=View+Results.

“2110 Goods-oriented shopping” Activities in stores that trade retail goods. The distinction is in the physical attributes of activities associated with goods (buying, selling, repairing, etc.) and not the type of goods.

“2120 Service-oriented shopping” Those shops that primarily sell services on site. The distinction is in the physical attributes of activities associated with services, such as hairdressing. Business services, such as accounting, legal services, advertising, etc., belong in the office category.

“2200 Restaurant activity” includes Eating, dining, and such activities associated with restaurants and other establishments that serve food, drink, and related products to be consumed on or off premises.

“2210 Restaurant-type activity with drive-through” Eating, dining, and such activities associated with restaurants and other establishments that serve food, drink, and related products that may have seating but has drive-through facilities. Such activities, although commonly associated with fast-food restaurants, may also occur at restaurants and food establishments that do not serve fast food.

“2300 Office activities” includes typical office uses should be categorized here including those that are primarily office-use in character. This category is a catch-all designation for all office-type uses.

“2310 Office activities with high turnover of people” Especially those that have counters for customer service, or waiting areas for customers or visitors. Use this category to indicate an activity characterized by a steady stream of people when such activity is part of normal operations of the office use.

“2320 Office activities with high turnover of automobiles” Typically associated with drive-through windows at banks, department of motor vehicles, and other businesses. Traditionally, these activities were associated with banks, post offices, and financial institutions, but they may also occur at other kinds of establishments.

“3000 Industrial, manufacturing, and waste related activities” includes all manufacturing, assembly, warehouse, and waste management activities. Use this as a catch-all category for anything not specified in subcategories below.

“3100 Plant, factory, or heavy goods storage or handling activities “includes all industrial activities. Use this as a catch-all category for anything not specified in subcategories below.

“3110 Primarily plant or factory-type activities” Assembly plants, manufacturing facilities, industrial machinery, etc.

“3120 Primarily goods storage or handling activities” Characterized by loading and unloading goods at warehouses, large storage structures, movement of goods, shipping, and trucking. This category also includes self-storage activities.

“3200 Solid waste management activities” includes storing, collecting, dumping, waste processing, and other related operations.

“3210 Solid waste collection and storage” Solid waste activities at source or intermediate locations, such as recycling centers. Use this category for large sites that have their own recycling areas where solid waste is separated or pretreated. Solid waste includes demolition waste, street sweepings, sewage sludge, industrial solids and sludges, agricultural manure, and crop wastes. The term garbage refers to food waste portion of solid waste and refuse or trash refer to mixed solid wastes. This category also includes activities associated with recycling (or refuse reclamation) and other related operations with landfilling.

“3220 Landfilling or dumping” Activities that typically occur at landfills and resource recovery facilities. Also useful to mark those areas not necessarily identified as landfills, but used as dumps. The term sanitary landfill is sometimes used to differentiate public landfills from others.

“3230 Waste processing or recycling” Activities normally associated with incinerators, recycling facilities, resource recovery facilities, etc.

“3300 Construction activities” during the construction stage of a development, especially if it is a large-scale one and is a multiyear project, the characteristics of the use is quite different from what it may eventually become. When local plans need to track such activities, use this category. Once completed, the activity code should reflect its actual use

“4000 Social, institutional, or infrastructure-related activities” includes all institutional activities. This broad category may also be used for land-use designations in comprehensive and general plans.

“4100 School or library activities mainly those activities” associated with educational, instructional, or teaching activities. Administrative functions, especially those where school board or administrative offices are located, should be assigned office categories. Likewise, sports, school-bus parking, or maintenance activities should be assigned appropriate categories. But if the data being classified is generalizing over large areas, then use this category.

“4110 Classroom-type activities” Those that occur in school buildings, lecture rooms, etc. This category may include other related activities only if the data is being generalized and the predominant activities are classroom-type instructions

“4120 Training or instructional activities outside classrooms” Driving, flying, or other instructional activities that occur outside a typical school building.

“4130 Other instructional activities including those that occur in libraries” Includes all other instructional activities here

“4200 Emergency response or public-safety-related activities” Broad category to group all fire, police, rescue, EMS, and other public safety activities. Use this category for joint or co-located facilities if the application needs a single activity code.

“4210 Fire and rescue-related activities” The classic example is a fire station with fire trucks in standard bays with associated training, resting, office, and equipment storing activities on the site. Use this category for sites that do not necessarily look like a fire station, but serve the same purpose (e.g., on-site fire and rescue stations for large-scale developments).

“4220 Police, security, and protection-related activities” Policing and police-related activities that typically occur in a police station. It also includes community policing centers located in neighborhoods, which may occupy store-front locations.

“4230 Emergency or disaster-response-related activities” Many look like a typical office building but are distinct in the operations in them. Often they have the 911 emergency center, disaster coordination facilities, and essential communication facilities for disaster recovery and response. Note that this category is not for coding schools and other community facilities used in disaster recovery operations.

“4300 Mass storage, inactive” activities associated with large storage areas for water, fuels, waste, and other products where such storage is not associated with utilities. These facilities may be associated with a private or public establishment to serve functions not associated with utilities.

“4310 Water-supply-related activities” Category for water supply-related, including irrigation-related activities. Use this category for any activity associated with water supply.

“4311 Water storing, pumping, or piping” Activities primarily associated with linear features, such as pipelines, water channels, etc., located in easements and point features, such as air vents, pumping stations, piping junctions, etc., that may or may not be located in easements.

“4312 Water purification and filtration activities” Associated with large-scale plants, many of which appear industrial in character. This category should also include all the related activities associated with a water purification and filtration facility, such as water storage, water pumping, etc.

“4313 Irrigation water storage and distribution activities” This category includes activities associated with urban and rural water distribution systems. Although not as common as the water purification plants, these activities are commonly associated with wells and reservoirs for water supply.

“4314 Flood control, dams, and other large irrigation activities” Associated with dams, reservoirs, and other large-scale storage and distribution of water. Primarily industrial in character, many such sites also host other activities, such as sightseeing, power generation, leisure activities, environmental monitoring, etc.

“4320 Sewer-related control, monitor, or distribution activities” This activity is characterized by sewer-related activities, such as pumping, piping, storing, treating, filtering, etc., whether urban or rural, private or public. Use this category for any activity associated with sewers.

“4321 Sewage storing, pumping, or piping” Activities primarily associated with linear features, such as pipelines, channels, etc., located in easements and point features, such as air vents, pumping stations, piping junctions, etc., that may or may not be in easements.

“4322 Sewer treatment and processing” Associated with sewer treatment plants, many of which appear industrial in character. This category also includes related activities associated with a sewer treatment and processing facility, such as storage, pumping, etc.

“4330 Power generation, control, monitor, or distribution activities” This activity is characterized by electrical power generation, control facilities, distribution centers, etc. Use this category for any activity associated with power supply and distribution.

“4331 Power transmission lines or control activities” Activities primarily associated with linear features, such as transmission lines, conduits, etc., located in easements and point features, such as air vents, pumping stations, piping junctions, etc., that may or may not be in easements.

“4332 Power generation, storage, or processing activities” Activities primarily associated with switching centers, transformer locations, and other power-related facilities that serve as storage or transit points in the distribution system.

“4340 Telecommunications-related control, monitor, or distribution activities” Activities associated with telecommunications encompass communication tower facilities, antennae locations, repeater stations, and distribution centers.

“4350 Natural gas or fuels-related control, monitor, or distribution activities” Activities associated with natural gas encompass production facilities, distribution lines, and control and monitor stations.

“4400 Mass storage, inactive” Activities associated with large storage areas for water, fuels, waste, and other products where such storage is not associated with utilities. These facilities may be associated with a private or public establishment to serve functions not associated with utilities.

4410 Water storage” Not related to utilities, but may be related to an industrial or commercial

“4420 Storage of natural gas, fuels, etc.” Not related to utilities, but may be related to an industrial or commercial enterprise. This may include tanks, tank farms, open storage, etc., above or below ground.

“4430 Storage of chemical, nuclear, or other materials” Not related to utilities, but may be related to an industrial or commercial enterprise. This may include tanks, tank farms, open storage, etc., above or below ground.

“4500 Health care, medical, or treatment activities” Activities in this category encompass those associated with clinics, hospitals, and other facilities that treat, house, or care for patients.

“4600 Interment, cremation, or grave digging activities” this category encompasses activities associated with cemeteries, cremation facilities, funeral homes, and the like.

“4700 Military base activities” Military bases are typically complex collection of activities that include a wide range of activities associated with military training, living and recreational facilities for military personnel, storage and maintenance facilities, and other related facilities.

“4710 Ordnance storage” Activities primarily associated with storing and moving of military ordnance.

“4720 Range and test activities” These activities encompass large areas for range and test activities of arms, ammunitions, war games, and related military activities. Although such activities are part of a military base, identifying this special category is useful for planning around bases for land-use compatibility.

“5000 Travel or movement activities” This category encompasses activities associated with all modes of transportation. It includes rights-of-way and such linear features associated with transportation.

“5100 Pedestrian movement” Use this category for classifying pedestrian-only roads and open mall areas in road rights-of-way. Although comprehensive plans may not depend on such distinctions, many site plans and urban designs use them for circulation components of their plans.

“5200 Vehicular movement” This is a catch-all category for all forms of automobile movement on roads, parking areas, drive-through facilities, etc. Use the subcategories to further distinguish them.

“5210 Vehicular parking, storage, etc.” Activities associated with parking or storing of automobiles.

“5220 Drive-in, drive through, stop-n-go, etc.” Activities associated with serving customers in their automobiles from a fixed location, such as a drive-through window. Assign this code to those uses that have drive-through window facilities. This also includes activities associated with car washes and such where the customers drive through specialized facilities.

“5400 Trains or other rail movement” Includes activities associated with movement of rails and other vehicles on railroads. It includes activities associated with rail maintenance, storage, and rights-of-way for railroads.

“5410 Rail maintenance, storage, or related activities” Use this category for identifying rail maintenance and storage activities, which are industrial in character, from rail movement and railroad rights-of-way. This category also includes railroad switching activities.

“5500 Sailing, boating, and other port, marine and water-based activities” This category includes activities associated with water and marine based travel, movement, and their related activities. Use the subcategories to distinguish areas of marine movement from marine storage activities.

“5510 Boat mooring, docking, or servicing” Use this subcategory for activities associated with docks and marinas where boats and ships are anchored, moored, or serviced.

“5520 Port, ship-building, and related activities” These activities include a complex collection of shipping, storing, repairing and other similar activities that are industrial in nature. Passenger terminals are not included in this category.

“5600 Aircraft takeoff, landing, taxiing, and parking” These activities encompass all aspects of air travel and transportation that occur at ground facilities, such as airports, hangars, and similar facilities. Passenger terminals are not included in this category.

“5700 Spacecraft launching and related activities” These activities include space vehicle control, storage, movement, and viewing areas. Although they appear similar to air transportation facilities, spacecraft related activities entail several other activities.

“6000 Mass assembly of people” This is a catch-all category for activities associated with mass assembly of people for either transportation, spectator sports, entertainment, or other social and institutional reasons. Use the subcategories to further classify the type of mass assembly.

“6100 Passenger assembly” This category is for activities primarily associated with bus, train, and airport terminals.

“6200 Spectator sports assembly” Spectator sports assembly may occur in stadiums, open grounds, or other venues occasionally used for such purposes. Identifying such activities may be required for public safety related applications.

“6300 Movies, concerts, or entertainment shows” Besides performance viewing, this category also includes related activities associated with such performances: food and souvenir vending, purchasing tickets, and related activities. This category also includes mass assembly at theaters and planetariums.

“6400 Gatherings at fairs and exhibitions” Mass assembly of people at fairs and exhibitions includes activities associated with food and souvenir vending, purchasing tickets, and related activities. This category also includes activities associated with entertainment shows, park rides, etc., at fairs.

“6500 Mass training, drills, etc.” Includes activities in parade grounds and drill fields associated with institutions.

“6600 Social, cultural, or religious assembly” Use this category for mass assembly of people for social (eg., city hall), cultural (eg., parades), or religious (eg. churches) purposes. It also includes large outdoor ceremonies for religious, cultural, or other purposes. Although such activities may occur infrequently and may not involve any functional or structural characteristics (for example a spontaneous gathering that occurs on an annual basis on a hilltop), identifying where mass assembling of people occurs is essential for many planning applications. Use this category to capture such use information. Often this may mean assigning a mass assembly category to areas that already have other activity categories assigned. Apply this category when other more specific mass assembly categories are inappropriate.

“6700 Gatherings at galleries, museums, aquariums, zoological parks, etc.” Public assembly gatherings at galleries, museums, aquariums, zoological parks, and similar exhibition services

are characterized by a steady stream of people as opposed to mass congregation of viewers at movie theaters and such. Although the distinction may not be significant, certain public assembly activities require this information separate from other kinds of gatherings in planning for public safety.

“6800 Historical or cultural celebrations, parades, reenactments, etc.” These are usually annual gatherings, parades, and cultural celebrations that may involve shows, amusement park-like assembly of people, and selling food, drink and souvenirs.

“7000 Leisure activities” This is a catch-all category for classifying all forms of leisure activities. It includes the customary active and passive kinds of leisure activities although such distinctions are difficult to define. Although LBCS provides active and passive subcategories, for new data classification purposes either apply this category (for top level coding) or identify the precise nature of activities (which are at the third-level coding).

“7100 Active leisure sports and related activities” This category refers to an arbitrary second-level coding to accommodate existing data classified as either active or passive leisure activities. Although the distinction between active and passive are difficult to separate, use this category only if more precise lower-level categories are combined in existing data. For new data classification purposes either apply this category (for top level coding) or identify the precise nature of activities (which are at the third-level coding).

“7110 Running, jogging, bicycling, aerobics, exercising, etc.” Although these activities are normally associated with bike paths, jogging trails, sidewalks, and such facilities, they also include the kinds that happen on athletic tracks and playgrounds. Exercising and aerobic activities include those that take place in health clubs and gymnasiums besides outdoor facilities.

“7120 Equestrian sporting activities” This category is for all equestrian-related leisure activities including riding, mounting, horsemanship, and equestrian games, such as polo, hurdles, dressage training and show jumping. The related categories include those incidental to maintaining stables, feeding, caring, and housing horses.

“7130 Hockey, ice skating, etc.” This is a broad category to include activities normally associated with ice rinks and skating on ice. Hockey and other sports on ice are also included in this category

“7140 Skiing, snowboarding, etc.” This is a broad category that includes leisure sport activities on snow: skiing, luge, bobsled, toboggan.

“7150 Automobile and motorbike racing” This is a broad category to include the myriad forms of vehicular sports including automobile racing, dirt racing, motorcycle racing, and other cross-country type events.

“7160 Golf” Includes other leisure activities, such as pall-mall, tipcart, croquet, golf, curling, and pall one besides golf.

“7180 Tennis” Because of its unique site development characteristic, traditionally lawn tennis (as opposed to table tennis) has been classified distinct from other sporting activities. It also includes related sports, such as racquet ball.

“7190 Track and field, team sports (baseball, basketball, etc.), or other sports” This includes activities associated with playing baseball, basketball, and other related games.

“7200 Passive leisure activity” This category refers to an arbitrary second-level coding to accommodate existing data classified as either active or passive leisure activities. Although the distinction between active and passive are difficult to separate, use this category only if more precise lower-level categories are combined in existing data. For new data classification purposes either apply this category (for top level coding) or identify the precise nature of activities (which are at the third-level coding).

“7210 Camping” Camping is a broad category that includes parts of activities associated with of shelter, recreation, and other related activities, such as hunting, fishing, sailing, etc. The designation applies to only those camping areas and camp grounds where camps are allowed.

“7220 Gambling” Casinos normally host gambling, wagering, and those establishments that serve the gaming aspects of leisure activities. However, many other types of establishments also provide slot machines, and other gambling and gaming facilities (shopping centers in Las Vegas, for instance).

“7230 Hunting” Hunting activities include live and also clay pigeon and skeet shooting.

“7240 Promenading and other activities in parks” This is a catch-all category for all other areas of parks and recreational areas that do not qualify under any of the other more specific categories.

“7250 Shooting.”

“7260 Trapping.”

“7300 Flying or air-related sports.”

“7400 Water sports and related leisure activities.”

“7410 Boating, sailing, etc.”

“7420 Canoeing, kayaking, etc.”

“7430 Swimming, diving, etc.” Includes activities associated with lifeguard services and other related activities

“7440 Fishing, angling, etc.”

“7450 Scuba diving, snorkeling, etc.”

“7460 Water-skiing”

“8000 Natural resources-related activities”

“8100 Farming, tilling, plowing, harvesting, or related activities” Agricultural activities, such as farming, plowing, tilling, cropping, seeding, cultivating, and harvesting for the production of food and fiber products. Also includes sod production, nurseries, orchards, and Christmas tree plantations. This category excludes forest logging and timber-harvesting operations.

“8200 Livestock related activities” Activities associated with feeding and raising of livestock in pens and confined structures.

“8300 Pasturing, grazing, etc.” Activities normally associated with feeding and grazing in open ranges.

“8400 Logging” Activities normally associated with forestry.

*8500 Quarrying or stone cutting” Includes activities normally associated with borrow pits.

“8600 Mining including surface and subsurface strip mining” Includes crushing, screening, washing, and flotation activities. Beneficiating is another common term used to describe such activities.

“8700 Drilling, dredging, etc.” Includes activities normally associated with on and off-shore drilling for oil and natural gas operations, dredging for beach control, expanding waterways, and cleaning of canals or channels.

“9000 No human activity or unclassifiable activity” May also be used as a placeholder for areas of no habitation (desert areas, for example).

“9100 Not applicable to this dimension” Use this code as a permanent code for those records that will never be classified in this dimension. It is normal for land-use databases to have records that may never be classified and be left blank instead. But LBCS recommends that all records have a code because some computer applications may not be able handle blank entries (null values in database terminology).

“9200 Unclassifiable activity” Use this category as a temporary placeholder for activities that cannot be grouped anywhere until the classification scheme is updated. Check the LBCS web site to see how others have dealt with such unique activities before revising the classification scheme.

“9300 Subsurface activity” Use this category for activities that occur below the surface that are of no interest to the applications that will use this data set and assigning one of the unknown categories may be inappropriate.

“9900 To be determined” Use this code as a placeholder until an appropriate code can be assigned. It is normal for land-use databases to have records that may never be classified and

left blank instead. But LBCS recommends that all records have a code because some computer applications may not be able handle blank entries (null values in database terminology). This code could also be used as the default value for data-entry work. The subcategories serve the same purpose for other coding levels.

Exhibit B

Retail Representative Projects				
Parcel ID	**Project Name/Address**	**Building Square Footage**	**Lot Acreage**	**Square Feet Built Per Acre**
130.4F44.19E 130.4F44.19R 130.4F44.19G 130.4F44.19H 130.4F44.19J 130.4F44.19L 130.4F44.19M 130.4F44.19N 130.4F44.19P 130.4F44.19 130.4F44.19A 130.4F44.19F 130.4F44.24 130.4F44.19D	Cranberry Commons	553,412	82.23	6,760
130.4F108.25B 130.4F108.25B1	Streets of Cranberry	94,691	14	6,733
Representative Ratio				6,732

Office Representative Projects				
Parcel ID	**Project Name**	**Building Square Footage**	**Lot Acreage**	**Ratio**
130.4F44.36D	Bldg. 700 Cranberry Woods	130,242	12.000	10,853.49
130.4F44.36FA	Bldg. 500 Cranberry Woods	148,547	11.000	13,504.29
130.4F44.36E	Bldg. 800 Cranberry Woods	163,799	10.625	15,416.33
130.4F108.13R	200 W. Kensinger Dr.	54,254	6.730	8,061.55
130.4F108.13S	210 W. Kensinger Dr.	48,717	5.870	8,299.40
130.4F110.14BA5	144 Emeryville Dr.	48,419	3.077	15,735.91
130.4F110.14E1A	760 Commonwealth Dr.	265,391	8.500	31,222.50
Representative Ratio				14,723

Restaurant Representative Projects				
Parcel ID	**Project Name**	**Building Square Footage**	**Lot Acreage**	**Ratio**
130.4F44.19BAA	Red Robin	6,342.080	1.820	3,484.66
130.4F44.19BD	Smokey Bones	8,176.781	1.860	4,396.12
130.4F44.19BE	Chick-fil-A	4,676.789	1.390	3,364.60
130.4F44.19BC	Olive Garden	9,351.779	2.000	4,675.89
130.4F44.19B	On The Border	5625.085	2.130	2,640.89
Representative Ratio				3,711

Industrial Representative Projects				
Parcel ID	**Project Name**	**Building Square Footage**	**Lot Acreage**	**Ratio**
130.4F110.14C20	51 Pennwood Place (Multi Tenant Warehouse)	439631.50	39.800	11,046.02
130.4F110.14E4	900 Commonwealth Dr.	19995.92	3.820	5,234.53
Representative Ratio				8,141

Hotel Representative Projects				
Parcel ID	**Project Name**	**Building Square Footage**	**Lot Acreage**	**Ratio**
130.4F108.20B4	Graham School Rd.	59,500.0000	6.8900	8,635.70
130.S14.F3A	Residence Inn	96,759.3895	5.8490	16,542.89
130.4F110.14BA1	Red Roof Inn	47,937.6728	3.4620	13,846.81
130.4F110.14BA6	Ameri-Suites	144,995.5284	3.6290	39,954.68
130.4F110.19	Fairfield Inn	39,417.1986	1.8600	21,192.04
130.4F110.27B1A	Holiday Inn Express	26,521.3228	1.6000	16,575.83
130.4F110.5A1	Hampton Inn	18,193.5286	2.3920	7,605.99
130.4F108.20B4	Graham School Rd.	40,120.0001	6.8900	5,822.93
Representative Ratio				16,274

The Cranberry Plan

Citizen Advisory Panel Meeting Summaries

Tuesday, December 11, 2007 CAP Meeting

"Spread the Word"

- What's the status of a retail location in the Township for Cabella's or Dick's?
  - Twp. has not received applications from either Cabella's or Dicks.
- CAP will be able to access a 'road responsibility' map, on the CAP Cybrary site
  - This will identify road ownership; Color-coded to indicate federal, state, local roads
- Reporting concerns, questions
  - all non-emergency calls go to Customer Service, so Twp. can respond and track issues/questions.
- Some have said Cranberry Twp. is a 'bedroom' community – based on aerial, field verifications, GPS surveys, the township square footage is actually: 14 Million non-resident square feet; 4 Million industrial; 5.5Million office; and 4Million retail
- FYI: Plans for Park Place were approved and this project is moving forward.

FYI – To gain additional resident input for The Cranberry Plan – we plan to conduct a Citizens Survey, under the auspices of the National Citizen Research Center..

Next meeting: Tues., January 8 – The presentation topic will be Traffic. Team is generating summaries and planning to devote first half of meeting to presentation/discussion.

Tuesday, January 8, 2008 CAP Meeting

"Spread the Word"

- Response to questions:
    - Graham Park Update – Site development phase ($6.4 million); Aerial view shown; Future phases – Building (restroom); Amenities – dugouts, fences, concessions/pw (2008), scoreboards, bleachers, etc. (August 2008)
    - Freedom Road – Overview of Projects funded or spearheaded by the Township; Highlights of ROW's and improvements;
        - Suggested that Transportation Task Force strategize to find a way to build support for improvements to Freedom Road corridor
    - Cranberry Heights Drive Traffic Calming Plan
        - Construction will begin later in 2008
        - Worked with Heights Drive Extension Committee;
        - Revamping website and will be able to view the map online.
    - Anticipated Traffic with Westinghouse – PowerPoint model shown.
        - CAP member is concerned about major back-ups from turning lane into Cranberry Woods; CAP member asked about a southern access road into Cranberry Woods – No.

Traffic Presentation

- Cranberry Township has the highest roadway standards.
- Cranberry was the first to implement an impact fee (Trip Generation Analysis).
- Traffic studies are conducted on all new construction.
- Township Public Safety Review
- Traffic Improvements
- Connectivity – Heights Drive and Ehrman/Garvin Road – to begin in 2008; Dutilh Road Corridor – In planning stages (Hartner Drive and Short Street); Minor widening will be done – restrained by topography and ROW issues.
- Rt. 228 Corridor Planning – Future connection from Simon Mall; North Catholic is deciding on location near Rt. 228 Corridor; St. Killians; Cranberry Woods Drive
- Funding – Resurfacing: state liquid fuels; capital improvements; state funding eroded; township roads and traffic - ownership, turnpike crossing, road standards.

Traffic Signal Operation Presentation

- A Signal operations and traffic system presentation was given by Duane McKee.

Cranberry Township Roads and Traffic: A Primer

- *Getting to, through, and around Cranberry easily has been a key priority of the Township for decades. The Township government has played a leadership role in Cranberry's traffic management effort. That effort has a number of moving parts:*
- **Ownership.** Although all roads in Cranberry are linked together, they are owned and maintained by different entities. PennDOT is responsible for the Turnpike, I-79, Rts. 19 and 228 and other key arterial roads. Most residential streets, as well as many of the collector roads that serve them, were built by private developers and transferred to the Township when their developments were completed. A number of smaller roads, including many that serve commercial sites and apartment complexes, are privately owned and maintained.
- **Turnpike crossings.** The crossings at Rochester, Freedom, and Powell roads are all owned by the Turnpike Commission, an independent agency with close ties to PennDOT.
- **Road standards.** Cranberry requires high engineering standards for any roadways it agrees to accept from developers and maintain as public streets. Standards include lane widths, drainage, sight lines, grades, construction materials, and more. Cranberry's roads are designed for a 50-100 year lifespan before major reconstruction is needed.
- **Maintenance.** Cranberry currently sweeps, plows, salts, mills and resurfaces 107 miles of local roadway. Winter road clearing is financed out of general tax revenues paid by Township residents. Resurfacing has historically been funded out of the state's tax on gasoline, its so-called Liquid Fuels funds, which PennDOT distributes according to a formula. Over time, however, that formula has fallen to about half the actual cost of road maintenance.
- **Local connections.** Cranberry's vision for its local road network involves creating a grid of collector roads that roughly parallel Rts. 19 and 228 and which will allow local traffic to travel in the Township without having to use either highway. Examples include Wisconsin Road extension, Heights Drive extension, Executive/Thompson Park Dr., and Thorn Hill extension.
- **Partnerships.** Cranberry works closely with PennDOT, private developers, and other interested organizations in coordinating improvements to the Township's traffic network. These partnerships typically involve planning, engineering, acquisition, and construction financing.
- **Land use.** Zoning and planned uses for undeveloped and redeveloping properties have a tremendous impact on the local transportation system. Cranberry strives to align improvements to its traffic management system with future traffic levels contemplated in its land use ordinances.
- **Impact fees.** Fees paid by developers to offset the increased traffic generated by their projects have raised about $13 million for road improvements throughout Cranberry. The use of these funds is determined by analyses of trip generation, emergency vehicle access, highway access methods, intersection control, and connectivity.
- **Intergovernmental coordination.** Much of Cranberry's traffic either begins or ends outside its municipal boundaries. Accordingly, the Township has established relationships with neighboring communities, counties and PennDOT districts for roadway planning, traffic signal timing, traffic light maintenance, and traffic information.
- **Pedestrian access.** Creating sidewalks to increase the opportunities for walking and bicycle transportation in Cranberry has been part of the Township's new construction approval process for several years. Other initiatives include building crosswalks, adding pedestrian crossing signal lights, and promoting footpath connections between separate developments.
- **Advanced technology.** Most of Cranberry's 33 traffic signals are regulated by a master control system, connected by fiber optic cable, and pre-emptable by emergency vehicles. Six others outside of Cranberry are operated by the Township through intermunicipal agreements.

Survey

- Members were encouraged to participate by logging onto the Forum. Hard copies were also made available.

Questions

- How can we raise local awareness of public safety issues?
    - Suggestions: A township-wide e-mail list connected with the Amber Alert system; Reverse 911 system.
- Is the Township considering a Rt. 79 access point north of Rt. 228?
- Rochester Road improvements?
- Will SVSD build an elementary school going on their Ehrman Road property?
    - What is the school district's long-range plan to manage growth?
- What is the status of Bellevue Park?

Tuesday, February 26, 2008 CAP Meeting

MAPS were posted in the Municipal Center and CAP members were encouraged to review each map and write comments, questions or suggestions for revision on the maps -

- Gas/Sewer Maps
    - Lines
- Add flood areas to National Resources
- Analyze steep slopes w/developable lands
- Underground
    - Strip Mines
    - Utility/Gas Resources
- Add more description to Scenario Maps
- Link Zoning Map to Ordinances
- Soil Types need key
- Add "Motion" over time
- Traffic flow/counts
- Further define green space
- Summary of why businesses locate here
- Zoning changes over time

Questions and Answers

- How long to complete Rt. 19 study?
    - Projections on implementation
    - Also – additional I-79 exit
- Zoning districts that allow alternative energy?
- Reverse 911 system?
- Impacts of strike on Parks and Recreation?
- CAP names on CP website
    - Email if permission
        - Option in Friday e-mail
- Public Health? Who does what?
- How does Cranberry Township rank statewide re: rate of growth
- What is the impact of the three growth scenarios on Township finances?

Tuesday, March 11, 2008 CAP Meeting

The March 11 meeting departed from the typical agenda. There were three primary focuses and CAP members were invited to join the group of their choice. (Technology; the Arts; Trails & Greenways)

Technology Business Roundtable -

Attraction Factors to Cranberry Township – Technology Businesses:

- Access to Quality Infrastructure
- The ability to expand with an abundance of Land
- Mixed use Developments – Young Technology workers are attracted to areas where a car is not required to shop, the ability to visit entertainment areas, get to work, etc.
- Cranberry Township has a high Quality of life
- The low taxes make Cranberry Township an attractive place to start a business because it makes economic sense to locate to Cranberry.
- A stable Political Climate makes Cranberry Township an attractive place to start a business
- Office space for start up companies

Technology Challenges to Cranberry Township

- Rt. 228 congestion
- It is a challenge to attract young people (30 or younger) because of a minimal amount of evening entertainment venues
- Difficult recruiting young professionals from Universities in Pittsburgh who are leaving the area for high paying Technology positions
- The Image of Pittsburgh is a challenge because it does not entice professionals to relocate (Rust Belt)
- Cranberry Township is not a diverse community and this dissuades members of different races of relocating to the area

Comments and Observations

- Is it better to have diversity regarding types of Technology Businesses or similar technology businesses in one area – There are advantages to both
- Diversity – Not reliant on one sector

- Similar – Can use similar support services and keep employees in the same area for an extended period of time.

- Different states are known for being economically friendly towards Technology Businesses and other states are known for being impediments toward Technology growth

- Measures need to be taken to change the image of Pennsylvania with Technology Companies

- Many tax incentives are given to large businesses in the State of Pennsylvania, while aggregate taxes are not conducive to small businesses in the Technology field

Recommendations

- Start a Cranberry Technology Council that raises money for Technology Companies and advise the Board of Supervisors on Technology related issues

- Meet w/ Pittsburgh Technology Council which is funded through membership dues

- Start technical education early

- Shadowing – High School

- Science & Math competitions

- Pitt Life Science

- Simplify Government to make it easy for Technology Companies to develop

- Strive to achieve a balance of large & small businesses so that the Township has established businesses as well as businesses on the rise

- Provide Incubators for start up Technology Companies that cannot afford to handle overhead costs

- Provide Quality of Life Improvements geared towards young professionals
    - Parks
    - Night Life
    - Bike Trails
    - Running

Arts Discussion Group

Summary: Recommend that the **Culture & Diversity Task Force** develop a written action plan to seek endorsement from Supervisors to proceed with joining Butler Arts Council; investigate re-forming Cranberry Arts Council; seek grant money and to indicate community interest in arts groups locating in the community. (note: the arts is one part of this group's charge)

****

The Butler Arts Council is re-organizing and is most interested in having Cranberry as a member. Their 18 member organizations have much to offer – to residents who would like to participate in an art/performing arts group or for those seeking entertainment. They believe that travel to Butler is easier or, as easy as travelling into Pittsburgh. They believe that they have not done enough to reach the Cranberry audience and would look to us for ideas and assistance in that regard.

The Arts Council expressed interest in bringing events/activities to the township.

Discussion continued - Re-vitalizing the Cranberry Area Council for the Arts as well as joining the Butler Arts Council, which has non-profit status.

New ideas suggested, related to the arts included:

- Design and install a "Tiks" kiosk for the municipal center
- Add Butler events advertising to Ch 50 or Twp display
- Create a quiet reflection garden in Graham Park where small performances/readings might also take place
- Design a walking maze for the park
- Hold additional musical events (shows) in the Amphitheatre
- "HeeHaw" talent events for kids and seniors
- Develop a quick, 10 question survey to conduct among Township residents to determine the types of artistic activities that residents would support (such as art films, speaker series)
- Seek grants to underwrite start-up costs
- Seek corporate sponsorships to support series events

Public Art –

Mix art with public plantings

Not seeking amateur art or donations without purpose and place

Create a public art commission to develop a plan and to invite or retain professional artists to create pieces, related to an overall theme or to keep art within certain parameters

Trails & Greenways

1. Harmony (rail/trail) Both a trail and historic adventure
2. Washington Trail
3. Multi-use trails
4. How to you want to use trails?
5. Topography considerations
6. Create or locate a publication about the trail system(s)
7. Function – consider function first: connections that will be used
8. Connect development of trails with sidewalks to each other and "practical places"
9. Parks as destinations
10. Utilize common open space
11. Destinations
    a. Connect Parks
    b. Target connecting destinations rather than focusing on trail-types
12. Connection to RIDC
13. Add TRACO trails to maps
14. Divide maps into quads –
15. Adopt-A-Trail
16. Handicap access
17. HOA legal issues
    a. Liability and maintenance
18. Sidewalks are a top priority
    a. Twp connections
19. Use alternative Transportation / Recreation / Exercise
20. Level trail
    Senior use; also Cache boxes
21. Connections between neighborhoods and Twp
22. Less vehicle use = less wear on roads
23. Sell naming rights to trails
24. Exercise areas / stops on trail
25. Bike lane loop on existing roads
    a. Park and Ride (BK)
    b. East on Mars; North on Franklin
    c. West on North Boundary to Glen Eden
    d. South on Powell; East on Freedom
26. Marshall Rd. – through
    a. Simon
        1. Bike trail
27. Perimeter trail at golf course

Tuesday, April 8 CAP Meeting

Chris Labash, Public Image consultant presented an overview of his study and findings.

All CAP members were invited to respond to four questions. A list of responses follows:

1. What are you proud of in Cranberry?
2. What are our community's greatest assets?
3. What makes Cranberry different from other communities?
4. What would make you feel disappointed if we did not have it?

What are you proud of in Cranberry?

- The vibrant, dynamic community that we have built!
- Parks, library and police & fire protection
- Everything – snow removal, police/ambulance/fire, accessibility to stores. Cranberry puts money back into the community – allows you to see where money goes.
- Traffic management has been continually improved.
- Sense of community services
- Safety
- Growth
- Parks & Recreation/management of growth/dedication to residents. Great place to raise a family.
- The progress Cranberry is making.
- Forward thinking. Planning while providing top level services without the higher taxes of other communities.
- Willingness to thoughtfully grow. Engagement
- Image of living in Cranberry is still good.
- Recreational amenities
- Well run government/children's activities/government that considers strategic planning – important.
- Community amenities
- Landscape designs
- Planned development along major roadways
- Parks & Recreation facilities/people/this planning & communication process
- Leads the way in progress & innovative development/high community standards/good shopping & dining
- Low taxes compared to services received
- Parks/Recreation facilities/youth organizations/Cranberry CUP
- Economic growth
- High caliber housing
- Police Department/willingness of residents to take up a cause
- True feeling of "home" in all phases and aspects
- My home, my town, schools, Township, people
- Municipal building/Cranberry government building – all under one roof. Makes up for not actually having a town.
- The current CAP process

- Good planning and management
- Reliability of infrastructures – police, fire, water & sewage
- That the Township is moving forward in a very _____ manner w/the growth and seems to be handling it so well.
- Effort to keep what we have and grow towards what we don't.

What are our community's greatest assets?

- Wide open spaces/parks/convenience
- Specifically our parks and proactive/forward thinking supervisors and manager – In general, it's the total package: low taxes, convenient to 79, turnpike, etc. /lots of choices for shopping and eating out.
- Parks/open spaces/recreation/good restaurants/shopping/friendly people
- A forward looking governing body
- Location/convenience/reasonable cost of living/taxes/property values/parks & recreation facilities & activities
- Township leadership/Parks & Recreation
- Family oriented community
- Sense of community between residents, sports, Township/meet together, work together, smile together
- Location/taxes/safety/young community – willing to accept change
- Location – highway access/Affordable low taxes – county & local/Well managed – growth/recreation and community services
- Low taxes/rural community, but close proximity to major interstate highways & Pittsburgh
- Connects to two major interstates/quick access into Cranberry via the se interstates and quick access out of Cranberry to Pittsburgh, for example.
- The pride in the looks and what is built also who builds/the parks/the shopping/restaurants/interstate easy to get to.
- The vibrant community that has been built without burdensome taxes
- Access to transportation/Township management conscious of the need for future planning and community awareness
- Availability of a wide range of services/travel connectivity
- Concern about sustainable value and future oriented growth
- Community leaders working toward common goals to make our lives better by living here.
- Strong leadership/planning development rather than just letting it happen
- Median income/location/well-run government/strategic thinking/hopefully – open mindedness
- Website with information/community involvement/parks for the community – ran by Cranberry Township, not by county/always working to make it better
- Neighborhoods/location, location, location/diverse shopping/parks & recreation
- Retail and restaurants/newer homes and communities/parks and recreation/young, family friendly
- Housing value
- Accessibility to major transportation corridors
- Location/cheaper taxes/access to major highways/access to Pittsburgh
- Parks and Recreation/proactive Township governance and staff/low taxes/ease to north/south (I-79) corridor growth

- Parks/public safety/municipal center with library/the officials and employees
- Parks and Recreation/access to highway transportation/good shopping
- Parks/YMCA/athletic association (baseball, football, soccer)/green space – trees/wooded areas/access to 79/76
- Parks & Recreation facilities and their benefits to the citizens/The way the Township has been careful with developments
- Park facilities/wealth of businesses/the planning process/location (79 & turnpike)

What makes Cranberry different from other communities?

- Planning – focus on thoughtful/level of community input sought and given/concern to gather stakeholder input
- Initiative to plan, see ahead and improve/This place is vibrant, than other Pittsburgh neighborhoods
- The total package, line item by line item, while other communities may have one or two things that are better, we have a lot of things that are good/great.
- Cranberry Township works tremendously hard to provide extraordinary services to their residents in all facets (sewer/water/recreation/public safety, etc.) and care what the residents think
- Sustainable growth plan
- As a young community, forward planning is effective and excellent
- Cranberry has resources available to their residents/availability of stores/Township run parks (not county parks)
- Educated public & management sophisticated/desirable – good housing & attractive commercial properties/environmentally responsible or soon to be
- We work together – team work/We work with surrounding counties/keep everyone informed
- There is no town.
- The current balance of commercial and residential usage
- Good planning & management
- Well thought out growth & development plan
- The extensive community facilities/the planning being done/the very heavy traffic we have to deal with daily
- The exceptionally fast growth that the community is experiencing and has to deal with
- Growth/planning
- Youth and activity
- Low taxes/planning efforts/travel convenience – commuting to other towns
- Integration of green space and sidewalks/parks/YMCA
- Large variety of people/open space
- Progressive
- Mostly good young community
- Planning – constant improvement of this planning for Butler – more impact
- Growth oriented – with concern for image
- Rural feel, yet close to amenities/Dynamic, vibrant community with ample recreation opportunities
- Newer/fast growing

- Its youth & mobility – most of us came from somewhere else and that makes for a friendly community that is relatively open to change
- Progressive thinkers in government
- Better planning/growing/big future
- Median income/opportunity to think strategically about growth/well-run government/citizen participation
- _____ with a sense of community

What would make you feel disappointed if we did not have it?

- Appreciation and welcoming culture for a vibrant and diverse population
- Government leaders that think alike are necessity
- Open door policy at Township for all residents and questions
- Sense of community
- A good library
- New mall (Simon)/more restaurants/continual improvements to traffic/parks and rec.
- Parks & Rec. department/rolling hills that still consist of farmland – scenery
- The dog park, once it opens
- The parks/the pool/the golf course/the careful planning/the municipal building and facilities
- Green spaces
- Wild life – animals/trees – open space
- Wild life – trees, flower, parks
- Low taxes/open spaces
- The golf course – everyone I talk to says great things about it/also the water park – I know many people who joined who don't live in the Township.
- Parks/activity programs
- Parks and recreation services and amenities – They are great for the family atmosphere in Cranberry!
- More recreation activities – winter/outdoors
- Controlled development/parks/green space – trees/need more sidewalks
- Parks/library
- Safe walking and biking paths that lead someplace great, like to an ice cream shop
- Parks and recreation
- Recreation
- Parks & low taxes
- North Boundary Park
- Completed sidewalks, bike paths, other "greenways"
- Well-run government/trees/parks/smooth roads/birds-wildlife/activities
- Traffic under control/restricted use green spaces
- Parks/pools/activities for kids/program guide
- Country living atmosphere/green spaces
- An identifiable town center to give Cranberry an identity of an actual town

<u>Top Summary</u>:

<u>Proud</u>

- Well-run government/takes strategic planning seriously
- Feeling of home
- Reliability of infrastructure - Police, fire, library, Parks & Recreation

Different

- Good management and forward planning
- Fast growth
- Educated public

Disappointed Without

- Parks
- Recreation
- Activities
- Golf course
- Greenways
- Open space

Greatest Assets

- Location
- Low taxes
- Well managed growth

THE CRANBERRY PLAN

Citizen Advisory Panel

Intergovernmental Panel Discussion

Tuesday, May 6, 2008

Responding to the Citizen Advisory Panel's questions and ongoing interest in areas of mutual cooperation, representatives from all levels of government were invited to participate in a panel discussion. CAP members submitted questions, in advance and all participants had the opportunity to respond. Then, audience members posed questions to the panel. Over 55 CAP members and invited representatives from neighboring communities attended.

Moderator: Susan Hockenberry, Local Government Academy

Members of the Panel:

Dale Pinkerton, Chairman, Butler County Board of Commissioners – Applauded the CAP for being involved in their local community and stated that the community's primary role is promoting unity, sharing expertise, pooling resources and working together for mutual best interests of the county.

Dick Hadley, Chairman, Cranberry Township Board of Supervisors – Very pleased to welcome this group of panelists; and appreciate their willingness to share their viewpoints as well as respond to questions from the Citizen Advisory Panel.

Doug Smith, Southwestern Pennsylvania Commission - Covers 10 county regional planning agencies, southwestern corner of PA, 7,200 square miles, three PennDot districts. Believe that a big part their purpose is to enhance and support intergovernmental cooperation. Recognized as a Metropolitan Planning organization and they work closely with PennDot; also operate a Congestion Management Program.

Dr. Don Tylinski, Superintendent of Schools, Seneca Valley School District – This meeting is important to the entire SV community, and Cranberry Township, in particular. The Twp is very progressive and aggressive in representing the needs of its residents and also seeking cooperative relationships with the school district and community neighbors.

Jeff Smith, President, Harmony Borough Council, and President, Butler County Council of

Government – Explained the COG's role and what it stands for, e.g., work with each other in terms of grants and shared equipment; consists of 23 municipalities. Referred to as the "circulatory system" – seeking/assisting with grants, purchasing.

Diane Sheets, Community Development Corporation of Butler County – The CDC is a private, non-profit agency, directed by Board of Directors, funded by part of the county. Three roles: Site development, state financing, and regardless of size, what businesses must do to be successful. The CDC helps put grants into place in Cranberry Township. Out of state , or out of country companies tend to be those that the government stands behind. Cranberry Township is successful with working all companies, and an example of that success is the Westinghouse project.

Dean Berkebile, President, and Seneca Valley Board of School Directors – Has experience operating a business in Cranberry Township, and has received a great deal of support from the police department. Looking forward to further cooperation. Rapid growth is very challenging to any school district – it causes us to focus on 'bricks & mortar' yet our main priority will always be the educational program.

Bryan Hollihan, Aide to Pennsylvania State Senator Jane Clare Orie – Senator Orie has a strong voice at the state level; and we can continue to be a powerful voice, especially in our long-range efforts. Senator Orie has worked to prioritize those efforts and has been an on-going supporter for the township's Graham Park.

Mike Butler, Aide to United States Representative Jason Altmire – Mike made a point to say that very few communities have their act together like Cranberry Township, and that we wouldn't be successful if we didn't have strong intergovernmental cooperation. We rely on these relationships. CAP is a good indicator of community strength.

Question #1. What are the areas you see as priorities for intergovernmental cooperation and action? And, what examples of cooperation can you point to?

(Jeff Smith) – Biggest priority that a lot of municipalities have. We're all faced with financial issues, causing more of a problem every year. The COG has done a grant writing process. Multiple

municipalities score higher, e.g., the parks project – the COG wrote a letter of support for a grant application in hopes that Cranberry Township receives funding.

(Dick Hadley) – Cranberry Township is growing as a community, becoming a regional hub. It is important for us to look at what goes on beyond our borders. The Board of Supervisors has formed an intergovernmental group with other Boards of Supervisors – we ask ourselves "How are they going to develop?" "What do they see?" Example – Rt. 228 planned out; wasn't a connector for 79 and the Turnpike. The Township said "no" for the entire region, but we all worked together, and the project was built for 60 million dollars. The traffic numbers south of the turnpike connector on Rt. 19 was 50,900 cars per day; today the number has decreased to 29,100 cars per day – a difference of 21,800 cars (42% less traffic today). This is a remarkable success story of all intergovernmental relations.

Question # 2. How can Cranberry Township best maximize receiving state grants that are available to other municipalities?

(Susan Hockenberry) – Mike and Bryan, Given the competitiveness for state investment. How productive is the Freedom Road project? How do we maximize our federal dollars? How do you make the most money of what you're getting, municipalities working together? (e.g. maximizing resources)

(Bryan Hollihan) – We look at the economic problems that a lot of communities are experiencing. Those challenges are easier to overcome with intergovernmental cooperation efforts.

Question # 3. What capacities (resources, strategies, people …) do you have to achieve intergovernmental cooperative initiatives with others?

(Jeff Smith) – Used COG as an example – the essence of intergovernmental cooperation. The COG provides a forum for municipalities to meet and share equipment.

(Mike Butler) – We can host meetings; provide an open forum to exchange ideas; and facilitate dialogue.

(Susan Hockenberry) – Diane, you're the face of intergovernmental efforts with businesses.

(Diane Sheets) We bring value, added to a knowledge-base, a lot of regional relationships. We provide a non-political voice in discussions of what Cranberry Township wants to achieve. All government entities try to achieve to some experience that may not be there. We're seeing changes in policy.

(Dr. Tylinski) – The Seneca Valley School District had meetings with Cranberry Township, and workforce development is a big issue. We need to develop a workforce that is conducive, along with the many other companies in our community. Immediate opportunities for increased cooperation - Transportation; Communication – (e.g. expanded township use of Channel 50 TV station).

Question # 4. How can resources be shared, at a cost benefit, rather than replicated across groups?

(Dale Pinkerton) – Bring the entire county together as one unified voice. Your voices would never be heard in Harrisburg or Washington, D.C. if you don't get everyone talking. You will get more state and federal funds.

(Diane Sheets) – A unified voice is really important. As you work to make Cranberry Township successful, you have to support the rest of the county. Represent everyone's interest in your township or county. Take a shared responsibility in your planning.

Question # 5. From your perspective, what mutual cooperative efforts will be necessary, to improve the Freedom Road corridor. What will this project look like when finished?

(Dick Hadley) – We try to take pieces one at a time. We had the opportunity to work with PennDOT and talk about how growth and how land use planning works. We will develop a partnership with PennDOT and with neighbors across the Rt. 228 Corridor and into Beaver County. Ultimately, a solution for Freedom Rd. will come from cooperation with PennDot, local residents, neighboring communities – all of the stakeholders.

(Doug Smith) - Mutual cooperative efforts… What are they? Traditionally, transportation issues take a 'Cookie cutter approach' to fixing/building roads – so changing to a different approach – takes time to work; need increased recognition; have to do land use and land use planning transfunding and working together. The construction industry costs are rising. There is not enough money to maintain existing roads. It's a huge challenge. The more that municipalities can pull together, the better.

Question # 6. Will re-zoning be necessary to achieve improvements to the Freedom Road corridor?

(Dick Hadley) – More than likely at some point, throughout this process. The original Crow's Run project was designed to be a limited access highway, which doesn't make sense at all when you need to find other ways to move traffic. We hope to work with PennDot to see the need for a context sensitive roadway project and appreciate the opportunities and move beyond the transportation manual.

(Doug Smith) – Congestion Management Program. People are looking for other ways of getting around. There is a demand out there for other options of transportation.

Question # 7. Transportation issues are of paramount concern for township residents – mass transportation, both in and around the Township, as well as to/from Pittsburgh are virtually non-existent. What are you doing, or can you do, to help our community begin to fill this void?

(Don Tylinski) – Growth is not always the school district's friend – look back at funding. Growth is not a financial friend of school districts. On an operating basis, it gets harder to run a business. Our school district covers 100 square miles. Are there additional things the school district can do to meet the transportation void?

(Diane Sheets) – Mass transit, unfortunately, is set up as county boundaries, rather than needs-based on commerce corridors. Jobs may go unfilled because of gas prices. When you take a look at other metro areas and how they manage their transportation, we don't have a clue. That's a huge opportunity for intergovernmental cooperation.

Question # 8. How can we collectively help Seneca Valley School District to heal from, and move beyond a tumultuous year?

(Dean Berkebile) – You can help SVSD by focusing on many positives, such as acknowledging our educational success. We have had increased success and our test scores are increasing significantly.

(Don Tylinski) –If we can save one child, through programs such as drug testing – then it is well worth the effort. We are doing the job; of course, we will always have room to improve. In the Pittsburgh Business Times, next week, the headline will read "SV Jumps", based on scores from the PSSA tests.

Three years ago we were ranked 38th. We've jumped 20 notches, and we're now 18th! Now that's extreme success. We are very proud of that. The curriculum and technology is helping.

(Susan Hockenberry) – A good way to heal is to celebrate success.

Question # 9. Cranberry Township and the surrounding communities are both vibrant and growing. Together, we can help attract and retain businesses to the county and the state. Yet the state roads are inadequate to sustain this growth. Act 44 does not focus funding where it is most likely to help the state as a whole. How can the state respond to our immediate needs?

(Diane Sheets) – That's one big obstacle – changing the political agenda; projects like Rt. 228, Freedom Road – a 4 to 5 years long. You could be in the middle of a project, and bridges are taking priority over capacity – funding streams. I spoke with many elected officials and their comment is, "It might not be as bad as last year, but may not have anything until mid July." Most of our money is on reimbursements, and the pay is 60 to 90 days.

(Doug Smith) – Our region is 10 counties. Discussions are at the regional table, and the needs are so great. They may look at Cranberry Township and say "Go to the end of the line – you had your turn."

(Susan Hockenberry) – How does the state prioritize projects?

(Doug Smith) – Prioritization process – a big black box. A lot come with a long list of projects. It's ugly! Bridges – criterias; Roadways…. That requires a lot of coordination. We're going into that black box.

- It provides a level of accountability
- Helps reassure folks that their project is being handled like everyone else's.
- Helps faster cooperation

Panelists now responded to questions from the audience:

Q – How were panelists chosen? Why was Daryl Metcalfe not present? Marlene Lott, assistant to Rep. Metcalfe responded that – Rep. Metcalfe was in Harrisburg; and he speaks for himself.

Q – Who do you consider to be your main customer on a regular basis?

(Dick Hadley) You – the residents of Cranberry Township. The public is our major customer.

(Dale Pinkerton) –The people of Butler County.

(Diane Sheets) Business, consultants

(Doug Smith) Ultimately, the public but on a daily basis, it's local government leaders; and at a regional level – state officials.

Q – Is the Rt. 228 Corridor and Freedom Road referred to as a Cranberry Township problem, or do you think it's an intergovernmental problem? What can we do to get Act 44 as an exception?

(Mike Butler) – It ties into a larger initiative, improving our infrastructure. Have a harder time competing with business.

(Dick Hadley) – One thing we have done is reach out to our neighbors. Talk about a great opportunity that right in our region. Hats off to Bruce Mazzoni, one of the Township Supervisors, who knocked on the door of every business to involve them and let them know what is going to happen in Cranberry Township.

(Diane Sheets) – If everyone told their elected officials exactly what was needed by their community a lot of folks would join you. If everyone had the same statement – or "elevator speech", then legislators would listen to you. This isn't in lieu of much-needed bridge repairs around the state, it's in addition. A key piece to long range future growth is re-development.

(Susan Hockenberry) – What could be in place where high quality meets the needs of the future?

(Dick Hadley) - We need to speak with 'one voice' about our region and our communities. We are working with our neighbors because traffic flow is not a localized issue.

Q – Would it make sense to combine government?

(Mike Butler) School districts? Local governments? This would be a major undertaking.

Q – Growth somehow ends up being counter-productive for the school district – because of the intense focus on infrastructure. How do you now balance going from a rural school district to a large-scale district?

(Dr. Tylinski) We are constantly working with the state and demographers to project our growth. Actually, right now, we are a plateau – which gives us a 'breather'. We have made good educational progress. We have focused on buildings but we never forget the main focus is on programs and kids.

Q – Is it better to attract new business or 'bail out' existing businesses that may be struggling?

(Diane Sheets) It's better, every time, to protect existing businesses. It's also vital to attract new business.

Q – How can intergovernmental cooperation give voice to our transportation needs? Would government pay attention to a professional business plan?

(Doug Smith) This is a complex question. The business plan is the long range transportation plan, which sets our projects and priorities. It boils down to what you are willing to pay. We do coordinate a transit operations meeting each month. (Their website is www.spcregion.org)

Q – the concept of eminent domain, related to the Freedom Rd. corridor is a hot topic. 30 addresses are seeking commercial zoning status.

(Mike Butler) We are working on the connector project and seeking a way to find funding that, at this point, is not there. We share your feelings of uncertainty.

Comment – to Dr. Tylinski & Mr. Berkebile – "Thanks for all you've done and continue to do for our children – it's been a challenging school year.

Citizens Advisory Panel

Task Force Presentation Meeting Notes

June 10, 2008

Economic Development & Redevelopment

- Business contact with Cranberry Township
    - Communicate i.e. redevelopment opportunities
- High gas prices – impact?

Sewer, Water and Environmental Stewardship

- Will future sewer/water be driven by development?
- Helping current developments retrofit to be green?
- Township projects should be "green"!
- Recycling of compact fluorescent bulbs?
- Yard waste recycled as mulch/compost

Public Image

- Involve school district?
- Cranberry Cup brings community together
- Identify school district with signs on major roadways
- Present to real estate market – portray image
- Need gathering place (civic space)
- How to get the image out there

Parks and Recreation

- Residents from other communities are using Cranberry's Parks
- Involve HOA's in trail production
- Need recreation facilities/opportunities that are multi-age

Culture and Diversity

- Restaurant/grocery stores – ethnic
- Access to Pittsburgh is positive asset

Transportation

- Green vehicle access to HOV
- Extension of HOV north
- Not just volume –type-of-traffic
- No jake brake ordinance

Citizens Advisory Panel

Tuesday, September 9, 2008

AGENDA

- **Impact Assessment Document**
- **Preferred Growth Scenario**
- **Future Land Use Mapping**
- **Congestion Management Rating System presentation, Doug Smith, SPC Region Director**

Presentation focus: explanation of Scenarios A, B, C and estimated population projections for each

Discussed potential of Scenario B as preferred scenario, and reasons why

Doug Smith presented an overview of the Congestion Management System and explained that the CAP

would represent the first opportunity given to 'ordinary citizens' to use the system. All CAP members will receive individual log-in/passwords.

CAP members asked questions regarding the detailed analyses performed on each scenario and agreed that the infrastructure requirements between A and B were not nearly as significant as what would be required between B and C.

The Future Land Use map and Preferred Growth Scenario will be posted to the CAP website.

Citizen Advisory Panel Meeting Notes

Tues., October 14, 2008

- Doug Smith, from SPC, gave an update and a Congestion Management Process recap.
    - A tool created to help the planning process and to get input from the communities.

    - No plans now to make an action plan out of it.
    - Is still available if anyone still wants to use it.
    - Cranberry Township will continue to use SPC as our resource for congestion management.
- Strategies were prioritized using laptop computers for the top 15 strategies – dedicating resources to for the next few years.
- Chris Labash gave an update on the branding of Cranberry Township.
    - "Cranberry Township – Built around you."
- Duane gave a brief explanation of the street signs and showed the CAP members the updated signs, asking CAP member opinion's on three signs.
- Property maintenance
    - Enforce property code
- Annual report card
    - Incorporate into operations.

Rt. 228 Questions / Rumors

1. What is the history of the project?
2. If nothing were to be done – what would the impact be on traffic?
3. Has Simon given a 'drop-dead' date?
4. Will the state of the economy possibly help us – in that Simon may decide to put this project on hold, rather than pull-out?
5. Will Westinghouse have an entrance or exit other than from Rt. 228?
6. What are PennDot and Governor and legislator's positions (get them on record)
7. Direct quotes for legislature?
8. Did Westinghouse offer money toward the project?
9. Estimate ROI (return on investment) for road improvements and project (quantify # of jobs; economic impact) Also – impact on neighboring communities.
10. Rumor – that state money that's been promised isn't really available
11. What is the current funding formula?
12. If PennDot doesn't have the funds for Plan A and doesn't like Plan B – what's their next best idea?
13. Where is the Governor?
14. Funding from Adams and Seven Fields or Butler County?
15. Is there an option for southern access point? Was that nixed by Marshall Twp?
16. Who maintains the road in the future (state plows, etc.)
17. What can the average citizen do to lobby for the project?
18. If we develop it – it will attract more traffic…
19. If we do nothing, what will happen?
20. What's being developed off 228 beyond Franklin Rd.?
21. What is Simon's contribution to the community?

22. Are there any invisible/visible opponents to the Simon/road project?
23. What is the "bare minimum" that PennDot would approve?
24. What is the state's position on transportation (Act 44) issues?
25. Is Adams Twp not seeing the positive benefits? How can these be communicated to them? There's a huge benefit.
26. Can the needed improvements for Rt. 228 be separated from the Simon project? (vs. regular, routine improvements)

END

The Cranberry Plan Community Stakeholder Meetings

Seneca Valley School District, Thursday, January 17, 2008

Butler County Tourism & Convention Bureau, Board Meeting, Thursday, February 21, 2008

Cranberry Area Chamber of Commerce Executive Board, Tuesday, February 12, 2008

Municipal Neighbors Roundtable, Tuesday, February 26, 2008

Cranberry Township Volunteer Fire Department, Tuesday, March 18, 2008

Cranberry Historical Society, Tuesday, March 25, 2008

Community Utility Providers, Thursday, April 10, 2008

Local Realtors, with Chamber of Commerce, Thursday, April 24, 2008

Cranberry Senior Club, Friday, May 2, 2008

To be scheduled: Sherwood Oaks Retirement Community; local Religious Leaders; Cranberry EMS

Upcoming: Cranberry Plan, Public Meeting, Thursday, July 31, 2008

In addition to a year-long community involvement effort with 75 members of the **Citizens Advisory Panel,** meetings with individual stakeholder groups expanded our opportunities to share details of the comprehensive planning efforts and provided open forums for questions, suggestions and open dialogue.

Without exception, participants expressed a sincere interest in the future of Cranberry Township. Participants were eager to understand the planning process and to offer suggestions or resources, based on their group's frame of reference.

The **Seneca Valley School District** is about to embark on a strategic plan and welcomed involvement and support from the Township. Market assessment and mapping data from the Township will be especially useful to them.

Butler County Travel & Tourism members are anxious to learn more about the planned growth scenarios and future retail/commercial development. They board believes they can assist with grant-seeking efforts.

The **Cranberry Area Chamber of Commerce** is moving quickly to accomplish its strategic plan. In addition to the meeting with realtors (advertised as the first in a series of "Community Connections" meetings, to be co-hosted by the Chamber and the Township) another collaborative outcome of our meetings is a major update of information materials provided to new businesses in the community.

Municipal Neighbors enjoyed the chance to exchange information and brainstorm ways to collaborate in the future. There was unanimous support for establishing quarterly meetings.

Cranberry Twp. Volunteer Fire Department members are on the cutting edge of fire prevention efforts in the region. The department has its own strategic plan, which is both detailed and far-reaching. The group is preparing itself to meet the future needs of the business/residential community and is prepared to cooperate in every with the planning initiative.

The **Cranberry Historical Society** expressed ideas for celebrating and preserving the rich history of the community. This is an active group – with interested volunteers and a commitment to support the future of the Township.

Community Utility Providers were pleased to be considered as partners in the planning process. Since most provide 'service on demand' – they were interested in growth projections.

Local Realtors, with Chamber of Commerce Often the first point-of-contact for future residents or business owners, realtors are anxious to have access to the last-best information concerning development. They suggested several ways they could be more involved in sharing Township information.

The Cranberry Plan Community Stakeholders

Seneca Valley School District
Cranberry Township Municipal Center
Thursday, January 17, 2008

John Trant, chief strategic planning officer for the Township, led a brief discussion related to the Cranberry Plan; the vision, planning process and goals for the Plan. He provided an information packet, including the Vision, a brochure description The Cranberry Plan and current statistics concerning the Township and growth.

Attendees: Dr. Don Tylinski, Superintendent of Schools; Kevin Prady, Director of Transportation; Jerry Andree, Township Manager; Bruce Mazzoni, Township Supervisor; Judi Boren, Cranberry Plan staff; and John Trant.

The group discussion centered on issues of mutual importance, such as state reimbursements; growth and quality of life issues (community livability)

- Supervisor Bruce Mazzoni briefly explained how The Cranberry Plan and the Cranberry Township Community Chest are connected and offered to present to the Board of School Directors. This was scheduled for Tuesday, March 4, 2008.
- The School District is about to begin working on a new Strategic Plan. Jerry Andree and Don Tylinski agreed to share information, maps and market assessment data
- The group discussed the potential formation of an Economic Council, and how this could benefit both the Township and School District.
- Kevin Prady noted that the perception of "heavy traffic all the time" is a difficult perception to change. The possibility of the new Simon Properties development could significantly add to this perception.
- Kevin Prady and Tim Book, GIS Supervisor, reviewed maps and how the township could support the school district with current information.
- Further discussion centered around future construction on Freedom Rd., Powell Rd. and Rt. 228 and how this will affect bus routing and timing. An unresolved question remains as to how to address and resolve those issues.
- Additionally, the School District is interested in Township and PennDot plans for Myoma Rd.

- The meeting concluded with a brief discussion about greater use by the Township of cable channel 50.

The Cranberry Plan Community Stakeholders

Butler County Tourism & Convention Bureau
Thursday, February 21, 2008

Travel & Tourism Executive Board Meeting, Cranberry Highlands Golf Course

John Trant, chief strategic planning officer for the Township presented a powerpoint presentation and overview of the Cranberry Plan, and provided Tourism Board members with a packet of information related to the Vision and The Cranberry Plan. He also shared a draft copy of the Market Assessment Executive Summary

Discussion was limited, due to the group's agenda for that evening; yet everyone was interested in continuing the dialogue. A follow-up meeting is set for Thursday, May 15 at 9:00 am in the Travel & Convention Bureau office in Zelienople.

Questions

On behalf of the group, Jack Cohen, Travel & Convention Bureau director, asked, "How can we help? One area where we see a need is for expanded opportunities for visual, performing and creative arts."

John Trant said he would return with projected growth scenarios, and seek feedback

The group also asked about plans for managing traffic flow and traffic control through Cranberry Township – particularly on weekends when as many as 44,000 Recreational Vehicles come through the community

Several members asked for more information concerning a possible new Cranberry Town Center and preserving the Meeder Farm/ new Municipal Center.

Jack Cohen volunteered to help research grants to help with this project.

The Cranberry Plan Community Stakeholders

Cranberry Area Chamber of Commerce Executive Board
Tuesday, February 12, 2008
Cranberry Public Library Meeting Room

Attendees: Chamber Board of Directors: Susan Balla, Chairman; Keith Colanna, Chair-Elect; Mike Hall, Secretary; Chamber Directors: Cletus Scalo, Kim Reuss, Gary Basilone, and Kari Geyer, Operations Director; Judi Boren, Cranberry Plan staff; and John Trant. Also: Niki Campbell, GSP image/public affairs consultant

Chamber Board Chairman, Susan Balla introduced John Trant, chief strategic planning officer for the Township, who shared a powerpoint presentation and information overview of the Vision, planning process and goals for The Cranberry Plan.

Additionally, Mr. Trant distributed copies of the brochure "Doing Business in Cranberry Township" and asked for feedback on improving the usefulness of the brochure. Cindy Marzock and Judi Boren will meet with a small group of Chamber members to review the brochure and Susan Balla will organize this meeting.

Susan Balla explained that the Chamber is in the midst of significant growth and change. The Board plans to update the Chamber image with key messages designed to attract new members. They plan to offer media training for business owners; and begin applying for grants.

Ms. Balla asked that their new consultants from GSP meet with Peter Longini, Township director of communications.

Members of the Chamber Board of Directors were very interested in the Cranberry Plan as well as the master plan for new Municipal Town Center.

The group is extremely anxious to gain additional space for Chamber offices as they expand both staff and programming. They pressed for a specific answer regarding Township plans for the space formerly occupied by the Township Police Department.

Notes from Follow-up meeting, February 15, 2008 Susan Balla, Kari Geyer, Judi Boren

- Pre-planning was completed for the first of a periodic series of meetings (Cranberry Connections) to be co-hosted by the Chamber and the Township focused on topics of mutual interest.
- The Chamber will invite current realtor members and reach out to other real estate agents and agencies.

- The meeting will be on **Thursday, April 24 from 10:00 am to noon** in Council Chambers
- The Chamber will handle the invitations, RSVPs and opening remarks.
- The Keynote presenter will be John Trant, sharing the Cranberry Plan; highlights from the Market Assessment and other homeowner information.
- Jerry Andree, Township Manager, will be invited to attend
- The Chamber will try to solicit advance questions from realtors that can be addressed at meeting

The Cranberry Plan Community Stakeholders

Municipal Neighbor Roundtable
Cranberry Township Council Chambers
Tuesday, February 26, 2008

John Trant, chief strategic planning officer for the Township, welcomed representatives of neighboring communities to the meeting and presented an overview of the vision, planning process and goals for the Cranberry Plan.

Attendees

Gary Peaco, Adams Twp.
Don Pepe, Andrew Spencer, Zelienople
Andrew Dash, Bill Campbell, Marshall Township.
Gary Koehler, Scott Anderson, Township of Pine
Barry Fowler, New Sewickley Township
Jeff Smith, Harmony Borough
Scot Fodi, Middlesex
Representing Cranberry: Jerry Andree, John Trant, Eric Kaunert, Duane McKee, Tim Book, Judi Boren
Unable to attend: Tom Smith, Seven Fields Boro; Sam Skorich, Richard Crown, Jackson Twp.

Next meeting – invite Mars, and possibly Forward, Lancaster, Evans City
Everyone agreed that quarterly communication meetings would be beneficial to all. This would help everyone recognize and learn about the regional impact of things like the Westinghouse move.

Middlesex cautioned that joint conversations must benefit both the large and small municipalities so that everyone benefits

New Sewickley, Pine Township and Richland Township Supervisors would support Rt. 228 improvements

Jerry Andree - **The purpose of the meeting** is to open a continuing dialogue about mutual issues and concerns; to share resources and communicate, as appropriate, with one voice.

John Trant - Cranberry shared maps from their GIS system and asked that neighboring communities share their GIS data - related to roads, sewers, water, etc.

Cranberry also requested a copy of each municipality's most recent comprehensive plan

Barry Fowler - New Sewickley Twp feels it is in a position similar to Cranberry – 20 years ago – on the verge of growth. Barry suggested that a contact be made with Rick Packer, Beaver Co. Planning Commission, for map data

- Note – Butler County communities are not relying on Butler County mapping data for baseline information

Scott Anderson – Pine Township is updating their traffic study, impact fees, trail plan, bikeways and sidewalk plans

Don Pepe – Zelienople is dealing w/ their Main St. truck-traffic issues; Town is at the nexis of major routes; not even sure that adding the missing I-79 ramps will help; also many streets have a brick-base and it is very difficult to fully repair/replace these streets

Very challenging for a small town to even get on the state's 'radar' for road projects

Zelienople plans to update their comprehensive plan soon and hopes to do that in cooperation with Harmony

A large development of 260 acres is coming up for a first review and the significance of this development will impact all Zelienople public services

Gary Peaco – Adams Township parks plan is nearly complete. The last comprehensive plan was 1994, so they hope to begin anew next year

Scot Fodi – Middlesex completed their comprehensive plan in 2004 using HRG and EPD as consultants

The group to brainstorm local/mutual assets:

- Major transportation routes
- Sewer & water
- Parks & Recreation
- Historic Harmony
- Hereford Manor (actually Beaver Co)
- Zelienople and Butler Airports
- Great golf courses
- UPMC medical facilities (note – Cranberry will become an emergency center for Childrens' North)
- Good school districts
- Strand Theatre
- Many places to worship (St. Kilian's is the largest parish)
- Waterways – Brush Creek, Connoquenessing Creek, Glade Run, North Park Lake, Breakneck Creek
- Harmony is building a canoe launch

Additional suggestions – School/Community Council concept

Scot Fodi -Mars S.D. and Middlesex & Adams are meeting quarterly to discuss mutual issues, and it's very successful. Gary Koehler (Pine) added that for many years, Pine, Richland and Pine-Richland also had a Community Council and accomplished many worthy joint projects. The dialogue continues.

Challenges

- Transportation network and infrastructure in general
    - Single modal (car)
    - Aging bridges
    - Rt. 228, and Freedom Rd., going into Beaver County
- Not speaking in one voice for our region
- Allegheny Co. pushes more to re-develop than develop – which is our greatest need
- County lines separate COGs
- Public Safety
- We are in different PennDot districts and DEP regions
- Housing – many alternatives
    - Harmony & Zelienople have full service small town atmosphere
    - When other areas are built-out, Zelienople & Harmony will be cultural & historic attractions (more so than they already are)
- Everyone wants to be 'sustainable' and it's a difficult concept to define
    - Also sometimes viewed negatively
    - Cranberry sometimes characterized as the poster child for 'sprawl'
    - Pine prefers to call it controlled quality growth
    - Middlesex supervisors are very interested in attracting new business to add to their base

The Cranberry Plan Community Stakeholders

Cranberry Township Volunteer Fire Department
Haine School Fire Station
Tuesday, March 18, 2008

John Trant, chief strategic planning officer for the Township, presented an overview of The Cranberry Plan, the Vision, goals and objectives. Mr. Trant thanked the 60 members for their dedication and outstanding service. The Cranberry Twp. VFC has an excellent ISO rating.

CTVFC members offered comments and suggestions:

- When new businesses begin discussions about locating in Cranberry Twp, do they appear to be uncomfortable with having a volunteer fire department? The VFC did have discussions with Westinghouse. (At this time, this has not been an issue with prospective businesses)
- The CTVFC plans continuously to keep pace with community growth and the demands.
- An ongoing challenge will be to have the necessary manpower to respond to all calls for assistance, particularly daytime calls.
- Funding, for operations and capital expenditures, is an ongoing concern for the CTVFC
- CTVFC has a formal five year strategic plan and is in the process of developing a new Strategic Plan. Copies of both will be sent to John Trant.
- As the community continues to grow (residential, office, retail) CTVFC and the Township must cooperatively to provide resources to keep pace with growing demands for service. This will include planning for additional locations; space for equipment; and meeting space.
    - Ongoing need to maintain adequate water supply and pressure
- CTVFC members are looking forward to the completion of their training facility.
- Height requirements – 8 story buildings will stretch the capabilities of the CTVFC equipment.
    - Higher structures require different equipment and different training for firefighters.
- Rt. 19 and other state roads/intersections do not meet CTVFC specifications for accessibility.
    - Mid-street plantings pose mobility challenges for equipment.

- The Township Codes Department does a good job with informing residential and business developers of requirements; VFC suggested the Codes Administrators become even more assertive.
    - CTVFC suggests that the Township mandate standards and implement zoning changes that exceed the basic BOCA code for fire suppression systems.
    - There are often issues with building renovations/alternations to original plans.
    - BOCA. for example. requires 1 hydrant for a 200,000 sq. ft. building, but the Cranberry Township Fire Dept would prefer to have 2 or 4 hydrants
        - Would the Township Supervisors approve an amendment, establishing Cranberry Twp requirements that exceed BOCA, in accordance with recommendations from the Cranberry Township Volunteer Fire Co. Chief.
        - Suggest that the Township promote the use of the Knox Box plan which is not required of smaller businesses but would be beneficial to both the VFC and business owners.
        - Require better labeling of standpipes (ex. Standpipes at the rear of the shopping strip by the cinemas are not labeled)
        - Make more stringent requirements on fire walls between store fronts (ex. Play It Again Sports fire was more destructive because the in-between walls had been altered)
- Traffic is an issue for fire equipment – when responding to calls
    - N/S and E/W corridors
    - Approx ½ of the calls to the fire department are responding to traffic accidents
        - In the future, structure calls may increase (more buildings, older homes…)
- Auto alarms are a major annoyance – fire department must respond to all calls
    - A number of businesses are frequent offenders – causing volunteers and equipment to go out on false alarms (this puts volunteers and general public in danger; unnecessary wear/tear on equipment and distracts response from actual calls) Ex. Butler Auto Auction; Tai Pai; Hyatt Regency (formerly AmeriSuites); Cold Storage…)
        - Increase charges to repeat-offenders –so they get their system repaired.
        - Other related problems – new sprinkler systems set up alarms repeatedly
        - New owners (such as Michaels/Bed Bath Beyond --formerly K-Mart) do not have information or access to company or key (fire management system?)

- Posting of all addresses is critical (Ex. One street address for an office building with multiple 'suites')
    - Individual addresses within a strip mall are not posted
- How might the Cranberry community change governmentally as it grows?
    - Currently Cranberry Twp is a 2nd class Twp and could remain as such unless there is a movement from the voting public to become a 'city'

The Cranberry Plan Community Stakeholders

Cranberry Township Historical Society Executive Board
Tuesday, March 25, 2008

John Trant, chief strategic planning officer, welcomed members of the Historical Society to the meeting and presented an overview of the vision, planning process and goals for the Cranberry Plan. At the conclusion of his presentation, Board members were invited to ask questions about the plan, the process or any issues in general, related to the township or the community.

Present: Roy Wagner, Helen Dewald, Jane Pelly, Peggy Grinager, Joey Hamilton, Dick Cherry, Rich and Beverly Magill. Twp Staff: Judi Boren, Eric Kaunert, John Trant.

The group examined a large map of Cranberry Township – historical markers and several points of interest are already on the map. The Society will review the map and make suggestions for additions and return within two weeks – the township will then update the map.

John asked for a 1-2 page summary of the Township's history, to include in the Cranberry Plan. The group provided their book, "The History of Cranberry Township".

Questions/ Concerns

- Does the Twp react to, or recruit development? (Supervisors do not seek development but respond appropriately when it comes. Development can be shaped through pro-active zoning, codes enforcement..but we do not control the use of property – if the developer's plans meet zoning requirement or permissible uses. Ex. We do not control the number of banks, pharmacies…)
- Infrastructure and coordination with the state and other agencies – Rochester Rd underpass (PennDot is patching daily; road is scheduled for re-surfacing this spring)
- Concerns about sewer/water tap-ins – when new lines are laid for newer developments – it isn't always easy or feasible for existing neighbors to tap-in (ex: Shadow Creek/Plains Church Rds)
- Storm water retention – Do we have a comprehensive storm water drainage plan? Complaint - Plains Church/Franklin Ridge resident experiences drainage problems and run-off. (Yes, we do more than many communities. After the major renovation in Fernway, there were no complaints after the recent rain)
- FYI – the Powell Farm was purchased/approved as an agricultural preservation area – the county has closed on that property. It could be a 'learning farm' – pending available funds.

Suggestions

- Brush Creek hiking/biking Trail – (Mike Diehl is actively seeking funding for this project)
- Can we establish an Historic Preservation Review process? To help Supervisors determine areas or landmarks to be preserved; so there is no adverse historic impact created by the Cranberry Plan
- Sustainability – how much retail development do we need? One of the worst symptoms of blight is too much development. The Planning Commission should consider what is 'enough'.
    - John Trant – We can set general parameters for use in general; We cannot say "no' to banks, pharmacies. We work actively with current business owners (ie: WalMart) to assist them with successful expansion or re-development to avoid having a hole in our community (vacated spaces.

- Walking Trails – is the Twp working with the Meeder Family about preserving their barn and house? (yes, there are discussions)

The Cranberry Plan Community Stakeholders

Utility Service Providers
Thursday, April 10, 2008

Attendees: Consolidated Communications; Dominion Peoples; Dominion Transmission; Armstrong; Waste Management; (Township staff) Jerry Andree, John Trant, Duane McKee, Judi Boren

John Trant, chief strategic planning officer for the Township, thanked the representatives for attending and presented an overview of The Cranberry Plan and described the process that will lead to the adoption and implementation of the plan by fall, 2008.

What additional information can the Township provide? In addition, what questions do you have; or what information can you provide to the Township?

The utilities would appreciate receiving information concerning changes in ordinances, the permit process or anticipated changed in utility design.

** Representatives would also appreciate receiving an email, with Planning Advisory Commission minutes attached as a PDF, – thus allowing them to be current with development.

** Sharing of GIS maps: Utilities would be able to provide the Township with maps of their lines, under a confidentiality agreement.

Questions –

- What are the plans for Rt. 228? And, will the project require moving the pole line (Project is moving forward and yes, probably the pole line will be moved)
- What is the status of Park Place? (Grading now; pulling permits for summer start)
    - Note: This will be a learning experience for all of the utilities, as the area for lines will be somewhat tight. (John Trant notes that in the future, more developments will be like Park Place and Bellevue Estates)
- Dominion Transmission expressed concerns when home/business owners are unaware that their lines run beneath their property – and construct a pool, shed, etc. This does not appear on their Deed.
    - Can language be put into developer's agreements to clarify this?
- Did your market study reveal residential requests for additional services or products? (Good question, but we did not ask it – we could however. Jerry Andree commented that utility service is very good and therefore residents have the products and services they need)

- Suggested that if the Township can forecast additional development – sometimes the utilities must run lines to a far point to serve a development…when there is no active development in between.
- What are the plans for the Lindner property north of the Dog Park? This follows a Dominion Peoples line. (The Township envisions using the property it owns for recreational purposes)
- Will the proposed I-79 ramp go over the (?) office on Old Mars Rd. (Most likely, yes)
- Are there plans for additional entrance/exit from Westinghouse site? (Yes, there will be a new access road and roundabout)
- What is the development north of Ogleview? (Cranberry Promenade – but work hasn't begun)

The Cranberry Plan Community Stakeholders

Local Real Estate Agents
Thursday, April 24, 2008

This was the first outreach session held with the Cranberry Area Chamber of Commerce. The goal was to open a new avenue for communication with local real estate agents, who are frequently the first point-of-contact for new residents or businesses. Thirty-seven agents attended.

Following welcoming comments from Kari Geyer, on behalf of the Chamber, John Trant, chief strategic planning officers, shared an overview of The Cranberry Plan as well as highlights of the Township maps (areas open for development; re-development; new developments; zoning; parks and bike trails.)

Questions/Answers from the group –

John asked the agents, **"What is the most frequently-asked question from prospective residents? "** The answer is 'traffic'. John suggested that agents explain the north/south and east/west collector roads which help motorists avoid congested intersections at peak times. For example, the Township worked successfully with Cranberry Heights residents and the Deener family, to provide a Powell Road / Cranberry Heights connector to Rt. 19. This project will begin in 2009. Another example of a collector road is near Mystic Ridge (Erhmann and Garvin). Work on that project will begin later this year.

Will these maps be available online? Our GIS system is very sophisticated and, as the maps are finalized, many will be available on the website. Currently, Property Finder may be very useful to agents.

How can we keep us with current developments? On the Twp. website, visit Community Development – to view lists of ongoing commercial and residential developments.

Could there be an information section on the website where agents could actually log-in to view/print current information that they can share with clients?

What is the status of Freedom Road improvements? The Twp. is working with the state and PennDot, as this is a state roadway.

Are there any plans to zone the south side of Freedom Road as commercial? We are working on an overall plan for the Freedom Road corridor.

What is the status of the Simon property? The outcome of this project is closely tied to the Rt. 228 improvement project. We are seeking a collaborative agreement between PennDot, Simon and the Township. If the project moves forward, work would not begin until 2011-2012.

Where will Cracker Barrel be located? It will be at the northern end of the site of the former Oak Leaf Motel.

What are the projects along Powell Road? These are work site accesses to Graham Park and Park Place.

What is happening on the Baldingers site, along Rt. 19? This is actually in Jackson Twp. Buncher bought that property. Baldingers is moving into Zelienople.

Where will North Catholic locate? They are looking at two sites in Cranberry and one in Adams Twp., but no decision has been made.

Is there any potential for a new grocery store farther out on Rt. 19? (Vic Conrad shared that he has spoken to many people living in the area of the Butler Auto Auction who would love to see another grocery store out that way – it would relieve traffic in the center of Cranberry.) John Trant added that as there is more demand in the northern sector, construction of a grocery store could be an attractive option to a developer.

What's the status of the Dog Park? The fencing is up; road work is to begin soon. This will be a large, double area for large and small dogs.

Does the school district have plans for a new elementary school in Cranberry Twp.? The district owns property on Erhmann Rd., but they are just beginning their strategic plan update – so they have no immediate plans for that property.

Comment: Some prospective residents have questions about the large size of the Seneca Valley S.D. and some of the challenges they've faced recently.

What was the population of Cranberry Twp. five years ago, as compared with today? Today: 28,000. Five years ago: 23,000.

Does UPMC have plans to expand their capacity? They are adding a Children's' North ER. One agent suggested that the nursing facility might relocate to provide additional medical office/hospital expansion space.

Township Employee Meeting Documents

Employee Communications Meeting
Wednesday, December 19, 2007 / Administration

John Trant, Chief Strategic Planning Officer, welcomed employees to the meeting and presented an overview of the vision, planning process and goals for the Cranberry Plan.
At the conclusion of his presentation, administrative employees were invited to ask questions about the plan, the process or any issues in general, related to township administration or the community.

General Suggestions

- The Township should clearly communicate, with businesses early in the application process about the mercantile tax
- Could the new website have a section devoted to Living, Working, Opening a Business in Cranberry Township
    - Section on "Opening a business" would include all details/forms required of new businesses
    - Section on "Living" and "Working" – with specific information concerning all taxes, contacts, due-dates and forms
- Consider ways to communicate with employees about benefits and assure employees they are valued (bridging the gap between union and management)
- There is a continuing problem w/ noise and kids running in Town Square - this is a safety hazard
- Can we post 'rules' for use of open space in the Municipal Center?
- Post directional signs in Municipal Center (people cannot locate various offices, etc)

Parks and Recreation – top need is for more programming space and storage
Customer Service

- Frequent questions – make the "Trash Collection" program easier to find on the website
- Customer Service fields many requests to view sewer/water payments on-line AND make payments (Parks/Recreation reports that their online registration & payment system works well)
- Clearly label the 'information racks' at the entryway (Travel/Tourism; State Representatives; Township…) The type of information on each rack is confusing and the area has a cluttered appearance

Employee Communications Meeting
Thursday, December 20, 2007 / Administration

John Trant, Chief Strategic Planning Officer, welcomed employees to the meeting and presented an overview of the vision, planning process and goals for the Cranberry Plan.
At the conclusion of his presentation, administrative employees were invited to ask questions about the plan, the process or any issues in general, related to township administration or the community.

General Suggestions

- Cranberry is a township of the 2nd class – why is that? Seems 'first-class'! Who chooses the structure?
    - Township can remain 2nd class without any disadvantage. Status changes only by a public vote
    - Mixed use (form-based code) is helping – bringing a mix of residential, business, retail makes a more sustainable community
- Some people/families are moving away because it's too "hectic" – what is being done to manage this?
    - Cranberry is working to manage growth – example: Marshall chose to fight growth and ultimately lost some ability to control the growth
    - Our recently completed market assessment will be very useful
- Are there incentives to build 'green'?
    - Yes – stemming from form-based codes
      Also, Sustainable Pittsburgh will form a team to assess Cranberry's physical structures, etc.
- When the Township is 'built-out' – and there are no more development fees – what will we do then?
    - CAP is already discussing the possibility of a Redevelopment Authority

Parks and Recreation

- Hoping to expand program offerings; appeal to different ages and interests – teens, young adults, adults/seniors
    - Are there plans to expand the P/R areas? (yes)
    - Average age is 34, making Cranberry the youngest community demographic in the state
        - Younger adults (20s) don't want to live here – what is lacking?
- Observation – when all the young families mature and children move on will people stay? For example, could parks/fields be over-built?

Comments Should we send township info to Seven Fields?

- Cranberry has a much larger staff than other neighboring communities
    - We provide a higher level of response and service to residents
        - Do residents ask about that?

Employee Communications Meeting

Friday, December 21, 2007 / Administration

John Trant, Chief Strategic Planning Officer, welcomed administrative employees to the meeting and presented an overview of the vision, planning process and goals for the Cranberry Plan.

At the conclusion of his presentation, employees were invited to ask questions about the plan, the process or any issues in general, related to township administration or the community.

General Comments

- Many concerns related to traffic; red lights on Freedom Rd., sewer/water rates (based on out-of-state experiences); trash collection
- Rec'd. suggestions regarding composting (could township collect and mulch and then make available to residents, at no charge?)
- Employees appreciate knowing about new developments – friends, neighbors, callers expect that when they work for the township, they are knowledgeable
- Many concerns about Vogel and trash collection (bins not fully emptied; trash spills onto street; rude drivers; drivers are too picky about whether lids are down; residents do not like tags
    - Would like more options for recycling electronics; and special item pickups
- Would love to have a "main street" such as in Zelienople

Employee Communications Meeting
Thursday, January 3, 2008 / Sewer & Water; Golf Course

John Trant, Chief Strategic Planning Officer, welcomed employees to the meeting and presented an overview of the vision, planning process and goals for the Cranberry Plan.
At the conclusion of his presentation, employees from sewer & water and the golf course were invited to ask questions about the plan, the process or any issues in general, related to township administration or the community.

General Comments

- Are residents generally aware of the plan?
- Are businesses involved?
- Will the plan be implemented in phases?
- Are you looking at the impact of stores like the Super Wal-Mart vs. the viability of other retail stores? (more concerning about accommodating use)
- Is the Township. considering expanding the golf course – another 9 or 18 holes?
- Suggestion – construct a 'maze' in one of the parks – fun for families
- How will you know that projections under each scenario are accurate?
- Does the plan consider the cost to the Township for sewer treatment plant needs under each scenario?
- If the state makes changes to Water Quality regulations – is that addressed in the scenarios or model? (Chester Engineering is looking at this)

Employee Communications Meeting
Tuesday, January 8, 2008 / Administration

John Trant, Chief Strategic Planning Officer, welcomed employees to the meeting and presented an overview of the vision, planning process and goals for the Cranberry Plan.
At the conclusion of his presentation, administrative employees were invited to ask questions about the plan, the process or any issues in general, related to township administration or the community.

Questions / Comments

- Why are we building out? Why not stop and upscale (street lights, etc)
    - What will a built-out Cranberry look like? Homes/retail/green space?
- Transportation – Turnpike bridges; traffic flow; main roads – major concerns
- What about public safety? What the expansion plans for Fire, EMS?
- What are the plans for future Township staffing and space?
    - Meeder property and possible new Town Center
- Green space; solid waste
- To what extent is Butler County involved w/ Township development or planning?
- What is the level of inter-governmental cooperation?
- What is the general answer to question – It's so expensive to build in Cranberry Township
    - It IS expensive – property is very expensive but the Township will not back off impact fees..
    - There is a tipping point before developers say 'no' and then $$ come down
- Is there truth to a rumor about Seneca building on Erhman Road?
    - The school district has no plans for that property, at this time.
- With potential SV expansion; construction of St. Killian's and possibly N. Catholic (which probably won't be in Township) – what are the plans to expand sewer & water?
    - How to keep up w/ line replacement (i.e.) Fernway, moving on to Sun Valley)
- Is the Township government structure part of the larger plan?
    - Matching system to scenario; could potentially become a city
- Is there potential for a re-development authority? – so that when we are built-out, we don't become a Monroeville (with a big hole in the 'donut')

John Trant, Chief Strategic Planning Officer, welcomed employees to the meeting and presented an overview of the vision, planning process and goals for the Cranberry Plan.
At the conclusion of his presentation, public works employees were invited to ask questions about the plan, the process or any issues in general, related to township administration or the community.
(15) Sewer/Water Field Operations, Traffic Control, PW Office staff.

Concerns

- SW Field Ops need new equipment; feel their needs are not full recognized and this will be increasingly important as the Township examines 'build-out' scenarios

- Major concern — sidewalks and trees. SW doesn't see new plans anymore and often find later that lines are under sidewalks or worse, under the street

Questions

- How soon will the scenario build-out data become available and will each fully explore the SW needs?

- What is the impact on Township needs, now and in the future, by the growth plans of surrounding communities? (intergovernmental cooperation is a strand)

- With agreements between Township and Evans City and Jackson residents to provide water – and we already know Kenny Ross is expanding…what is the impact on our own water needs?

- What will the new Simon Mall be like? (combination of in/outdoor, mixed retail. Trend is away from indoor malls. No application rec'd. as of yet. This is why form-based codes is a good approach

- We will need almost two different populations – those who live but do not work in the Township and those who come here to work but cannot afford to live here. How will the retail/restaurants meet their staffing needs? (low/minimum wage jobs)

- Any truth to the rumors that the unused I-79 rest areas could become ramps?

- Where do the collected impact fees go? (to support infrastructure; East and West funds)

- Is there any data regarding the length of time that people live in Cranberry? Before moving ?

- What about the future of mass transit in Cranberry (the Port Authority woes; uncertain nature of Butler transit)

- Is S.V. contemplating building a new school on Ehrman Rd.? (no immediate plans and they did consider selling a piece of the property; there is no water)

- Westinghouse – growing larger before the first buildings are even built? Opting to hold at 4 floors but also make seek option to buy additional property and could build up to 1 M square feet of office space.

- There will be NO hazardous materials or projects in the Westinghouse facilities

Employee Communications Meeting
Wednesday, January 9, 2008 / AM Public Works

John Trant, Chief Strategic Planning Officer, welcomed employees to the meeting and presented an overview of the vision, planning process and goals for the Cranberry Plan.
At the conclusion of his presentation, public works employees were invited to ask questions about the plan, the process or any issues in general, related to township administration or the community.

Concerns

- Need for buffers between developments
- As Township grows – will the need for additional public works staff be addressed?
- How is the Plan addressing intergovernmental cooperation?
- Plowing, sweeping - concerns about traffic and parking
- Does the P.A.C. take maintenance into consideration?
- Concerns about affordable housing; density; low income populations?
- Street trees interfere with visibility of stop signs?
- Concerns about Freedom Road and Rochester Road Turnpike bridges
- Sidewalk interferes with sewer line maintenance

Questions

- What are the plans for expanding the Public Works facility?
    - Current facility filled up quickly
- Standards for road construction? Inspections; installing to PPIC
- Are there plans for a signal on Rt. 19 near the public works facility?
- Why so many pharmacies and banks?
- What is the status of the Simon Mall?
- Haines School Rd- good construction detail – sidewalk against concrete curb
- Graham School Rd – improvements?
- Where will North Catholic locate?
- Ideas to move away from sprawl/traffic perceptions
- I-79 ramps at rest areas – are these planned?
- Are we promoting living/working in the Township?

- Traco shift changes create traffic problems on Unionville Rd.
- What is the plan for the local road system near the proposed Simon Mall?
- What are the Township doing to promote green/ L.E.E.D. development?
- Traffic islands on Rt. 228 are a maintenance problem.

Police Department Communications Meeting
Friday, January 11, 2008

John Trant, Chief Strategic Planning Officer, welcomed employees to the meeting and presented an overview of the vision, planning process and goals for the Cranberry Plan.
At the conclusion of his presentation, Police Department employees were invited to ask questions about the plan, the process or any issues in general, related to township administration or the community.

Questions / Comments

- Will the Police Dept staffing keep pace with Township growth – to maintain a high level of service?
    - It takes at least one year to properly train a new Officer; sometimes, new hires are not a good fit, so the hiring process takes time
    - Once a preferred scenario is chosen, how will the Police Dept grow?
    - PD needs to have increased infrastructure in place before a growth-spurt
- What is the level of involvement and cooperation between Cranberry and neighboring communities?
- Comment – South Hills COG does a nice job of joint purchasing and has a good hiring process
    - Township is helping to re-vitalize the North Hills COG; also, the BOS recently created an Intergovernmental Cooperation Board
- How can the Plan provide greater opportunities to live & work in the Township?
- Traffic is a #1 issue. Some people will not cross over the Rt. 19 – Rt. 228 intersection.
- What are the population projections under each scenario?
- New Simon Mall will create a new dynamic for public safety – what is the cause for the $ shortfall on the project?
- There are 'two populations' in Cranberry – all those who are in the daytime to work, shop, eat etc. and those who come home from working elsewhere, to sleep
- Status of public transportation? To/from Pittsburgh; those who would come here to work from other others?
- What will be the definition of "affordable" housing in Cranberry Township?
- What is the number of liquor licenses allocated for the Township?
    - This definitely has an impact on the Police Dept and public safety
    - People may drive out here to avoid the Allegheny Co drink-tax

- What are the re-development plans (residential and retail)?
    - To maintain a high-quality public image
    - Some areas/neighborhoods are showing deterioration
    - Can Township be more assertive and enforce Codes Violations?

Police Department Communications Meeting
Monday, January 28, 2008

John Trant, Chief Strategic Planning Officer, welcomed employees to the meeting and presented an overview of the vision, planning process and goals for the Cranberry Plan.
At the conclusion of his presentation, Police Department employees were invited to ask questions about the plan, the process or any issues in general, related to township administration or the community.

Questions / Comments

- How do you see growth for the Police Department?
    - When we map out our growth, we will also develop a plan for public safety needs (police, fire…)

- We've heard rumors that the Township will be moving across Rochester Rd to the Meeder property.
    - Township needs, as well as the needs of the Library and our tenants is outgrowing the current bldg. We considered another 2nd floor but that is cost-prohibitive. We anticipate using the space that was the Police Dept to expand Parks & Recreation for the short-term. We would like to build a new "Town Center" across Rochester on the Meeder site – the family is open to that.

- The # 1 complaint we hear is about traffic – everyday. Other concerns are failing to stop at stop signs; speeding.
    - Another issue is the congestion that occurs at Haine School due to parents dropping of and picking their children.

- We've heard about the possibility of a new, large mall?
    - A Simon Mall – looking to locate off Rt. 228 – there would be significant improvements to Rt. 228 and new ramps to I-79. There's a $10M shortfall right now in funding the road improvements.

Police Department Communications Meeting
Thursday, March 6, 2008

John Trant, Chief Strategic Planning Officer, welcomed employees to the meeting and presented an overview of the vision, planning process and goals for the Cranberry Plan.

At the conclusion of his presentation, Police Department employees were invited to ask questions about the plan, the process or any issues in general, related to township administration or the community.

Issues important to the Police Dept. - to address in the Cranberry Plan

- Traffic issues – congestion, particularly on Freedom, Rochester, Rt. 228, Peters & Franklin Rds.
- Problem area – red light on Rt. 228/ I-79 westbound – the light sits too far back and motorists do not see it – there could be a bad accident someday
- On street parking is a problem – Police receive calls from the road crew – what will the street parking situation be in new developments?
- If the Simon development moves forward – will there be a Police sub-station at the mall; could there be Police-only parking spots, next to handicapped spots (as they have at Robinson and Monroeville Malls)
- Issues related to Police Dept. staffing as the Township grows
- Will there be any security issues related to the Westinghouse development (threat assessment)

General questions that the Police receive

- Development updates – when new projects will get underway (Simon, property behind the Creamery
- Updates on status of
    - Condition of future replacement of the bridge on Freedom Rd.
    - Deplorable road condition of tunnel on Rochester Rd.
    - Will the district construct a new school on the Ehrman Rd property?
    - When and where will North Catholic build their new High School?
    - Status of proposed Town Center on Rochester Rd., across from Municipal Bldg.

Police Department Communications Meeting
Thursday, March 26, 2008 / Police

John Trant, Chief Strategic Planning Officer, welcomed employees to the meeting and presented an overview of the vision, planning process and goals for the Cranberry Plan.
At the conclusion of his presentation, Police officers were invited to ask questions about the plan, the process or any issues in general, related to town or the community.

Questions/ Concerns

- Question from long-time, local business owner about impact fees – how are these determined and collected? Isn't this a deterrent to small business who wants to either locate or re-locate?
- Traffic/road concerns: Freedom Rd., Rochester Rd. tunnel under Turnpike

- Rt. 228 /Rt. 19 intersection – is the light for left turns long enough to permit to empty out the lanes? There are many who push the yellow/red light at that intersection
- Traffic increases due to Bellevue and Park Place developments; also access to Graham Park
- Rt. 19 property across from Auto Auction – we hear this may be developed w/ townhomes. What is the zoning? How could this be a desirable location – between Rt. 19 and I-79?
- Status of the Simon development ?– (future uncertain; would not go vertical until 2012-13)
- Where will North Catholic build? Cranberry or Adams (currently the site is Adams is more likely)
- Property at Rochester & Graham School Rd. what is the status?– (the owner has approval to construct a small motel but nothing is happening)
- Status of access to Freeport Rd. on Marshall Township. side of Cranberry Woods? (Marshall will not allow that thru-way access)
- FYI – Fresh Air Camp sold 4-50 acres next to the Westinghouse site

Public Input Summary – The Cranberry Plan

Community Stakeholder Meetings

Meeting	Date	No. of Participants	Location	Top Issue
Seneca Valley School District	17-Jan-08	4	Municipal Center	Market Assessment and GIS Mapping
Butler County Tourism & Convention Bureau	21-Feb-08	?	Cranberry Highlands Golf Course	planned growth scenarios and future retail/commercial development
Cranberry Area Chamber of Commerce Executive Board	12-Feb-08	8	Cranberry Public Library Meeting Room	Space for the Chamber of Commerce expantion/comparing the chamber comp plan with the Township Comp Plan
Municipal Neighbors Roundtable	26-Feb-08	7	Council Chambers	Establishing Quarterly Meetings
Cranberry Township Volunteer Fire Department	18-Mar-08	60	Haine School Fire Station	Coordinating The Cranberry Plan with the VFD Strategic Plan
Cranberry Historical Society	25-Mar-08	8	Room 203	Preserving Cranberry's Historical Sites
Community Utility Providers	10-Apr-08	5	Municipal Center	Growth Projections
Senior Listening Post	11-Apr-08	?	Municipal Center	Transportation
Local Real Estate Agents	24-Apr-08	37	Council Chambers	Keeping up with current developments - Communication
Cranberry Senior Citizens	2-May-08	13	Senior Center	Transportation
Community Church Leaders	15-May-08	7	Room 203	Formation of a Township/Church Council
Cranberry Twp. Committees, Commissions & Boards	19-May-08	45	Cranberry Highlands Golf Course	General Planning Initiatives
Sherwood Oaks Retirement Community	6-Jun-08	65	Sherwood Oaks	Transportation

Employee Meetings

Meeting	Date	No. of Participants	Location	Top Issue
Parks and Recreation & Customer Service	19-Dec-07	?	Council Chambers	Improve Internal and External Communication

Parks and Recreation	20-Dec-07	?	Council Chambers	Expanding Programs to different ages and interests
Administration	21-Dec-07	?	Council Chambers	Traffic
Sewer & Water; Golf Course	3-Jan-08	?	Council Chambers	Communication of the Plan to Residents/Businesses
Administration	8-Jan-08	?	Council Chambers	Facilitation of Development
Public Works	8-Jan-08	15	Council Chambers	sidewalks and trees
Public Works	9-Jan-08	?	Council Chambers	General Maintenance of the Township
Police Department	26-Mar-08	?	Council Chambers	Traffic/Transportation Issues
Police Department	11-Jan-08	?	Council Chambers	Traffic/Police Staffing
Police Department	28-Jan-08	?	Council Chambers	Traffic/Police Staffing
Police Department	6-Mar-08	?	Council Chambers	Traffic

Steering Committee Meetings

Meeting	Date	No. of Participants	Location	Top Issue
Steering Commitee Meeting #1	12-Sep-07	6	Room 203	Summary of the Comprehensive Planning Process
Steering Commitee Meeting #2	10-Oct-07	4	Room 203	Market Assessment/Sustainability
Steering Commitee Meeting #3	12-Dec-07	4	Room 203	Market Assessment/Growth Scenario Methodology
Steering Commitee Meeting #4	9-Jan-08	5	Room 202	Sustainability Principles/Growth Scenarios
Steering Commitee Meeting #5	20-Feb-08	3	Room 202	Traffic Presentation
Steering Commitee Meeting #6	12-Mar-08	3	Room 202	Sustainability Assessment Scope/Impact Assessment Methodology
Steering Commitee Meeting #7	5-May-08	5	Room 202	Preferred Scenario Methodology/Traffic Presentation
Steering Commitee Meeting #8	2-Jun-08	6	Room 202	Survey/Municipal Service Impact Assessment/Sewer and Water Presentation
Steering Commitee Meeting #9	14-Jul-08	4	Room 202	Township Financials by Land Use (Revenue and Expenditures)

Steering Commitee Meeting #10	4-Aug-08		Room 202	
Steering Commitee Meeting #11	2-Sep-08		Room 202	
Steering Commitee Meeting #12	6-Oct-08		Room 202	
Steering Commitee Meeting #13	3-Nov-08		Room 202	

Citizen Advisory Panel Meetings

Meeting	Date	No. of Participants	Location	Top Issue
Citizen Advisory Panel Meeting #1	14-Nov-07	85	Cranberry Highlands Golf Course	CAP Kickoff and General Comments
Citizen Advisory Panel Meeting #2	11-Dec-07	64	Senior/Teen Center	Sustainability Presentation/1st Task Force Meetings
Citizen Advisory Panel Meeting #3	8-Jan-08	49	Council Chambers	Traffic Presentation
Citizen Advisory Panel Meeting #4	26-Feb-08	47	Council Chambers	GIS Mapping/Market Assessment
Citizen Advisory Panel Meeting #5	11-Mar-08	37	Cranberry Highlands Golf Course	Technology/Pedestrian Mobility/Cultural Diversity
Citizen Advisory Panel Meeting #6	8-Apr-08	32	Council Chambers	Public Image
Citizen Advisory Panel Meeting #7	6-May-08	37	Council Chambers	Intergovernmental Cooperation
Citizen Advisory Panel Meeting #8	10-Jun-08	31	Council Chambers	Individual Task Force Presentations
Public Meeting	31-Jul-08		Municipal Center	
Citizen Advisory Panel Meeting #9	4-Aug-08		Council Chambers	
Citizen Advisory Panel Meeting #10	9-Sep-08		Council Chambers	
Citizen Advisory Panel Meeting #11	14-Oct-08		Council Chambers	
Citizen Advisory Panel Meeting #12	11-Nov-08		Cranberry Highlands Golf Course	

Task Force Meetings

Economic Development and Redevelopment Task Force

Meeting	Date	No. of Participants	Location	Top Issue
Meeting #2	11-Dec-07	13	Senior/Teen Center	Economic Development and Redevelopment Authority
Meeting #3	8-Jan-08	13	Council Chambers	Developing in Cranberry Township
Meeting #4	26-Feb-08	10	Council Chambers	Redevelopment & the School District

Meeting #5	11-Mar-08	7	Cranberry Highlands Golf Course	Pedestrian Mobility, Cultural Diversity, and Technology Businesses
Meeting #6	8-Apr-08	7	Council Chambers	Chamber of Commerce
Meeting #8	10-Jun-08	5	Council Chambers	Task Force Presentation
Sewer, Water, and Environmental Stewardship Task Force				
Meeting	**Date**	**No. of Participants**	**Location**	**Top Issue**
Meeting #2	11-Dec-07	10	Senior/Teen Center	Infrastructure and Sustainability
Meeting #3	8-Jan-08	8	Council Chambers	Infrastructure - Strengths and Weaknesses
Meeting #4	26-Feb-08	7	Council Chambers	Conservation, Open Space and Trails
Meeting #5	11-Mar-08	8	Cranberry Highlands Golf Course	Pedestrian Mobility, Cultural Diversity, and Technology Businesses
Meeting #6	8-Apr-08	4	Council Chambers	Sustainability Assessment
Meeting #8	10-Jun-08	6	Council Chambers	Task Force Presentation
Culture and Diversity Task Force				
Meeting	**Date**	**No. of Participants**	**Location**	**Top Issue**
Meeting #2	11-Dec-07	8	Senior/Teen Center	Culture and Diversity Strengths and Weaknesses
Meeting #3	8-Jan-08	4	Council Chambers	Culture and Diversity Programs to meet the needs of a growing population
Meeting #4	26-Feb-08	7	Council Chambers	Amplifying Current Cultural and Recreational Offerings
Meeting #5	11-Mar-08	3	Cranberry Highlands Golf Course	Pedestrian Mobility, Cultural Diversity, and Technology Businesses
Meeting #6	8-Apr-08	5	Council Chambers	Culture and the Arts
Meeting #8	10-Jun-08	4	Council Chambers	Task Force Presentation
Public Image Task Force				
Meeting	**Date**	**No. of Participants**	**Location**	**Top Issue**
Meeting #2	11-Dec-07	8	Senior/Teen Center	Current Public Image
Meeting #3	8-Jan-08	5	Council Chambers	What the future Public Image will be

Meeting #4	26-Feb-08	4	Council Chambers	Chris Labash/Market Assessment/School District
Meeting #5	11-Mar-08	1	Cranberry Highlands Golf Course	Pedestrian Mobility, Cultural Diversity, and Technology Businesses
Meeting #6	8-Apr-08	2	Council Chambers	Cranberry Photos/Walkability/Destinations
Meeting #8	10-Jun-08	3	Council Chambers	Task Force Presentation

Transportation Task Force

Meeting	Date	No. of Participants	Location	Top Issue
Meeting #2	11-Dec-07	15	Senior/Teen Center	Mass Transit/Pedestrian Mobility/Road Improvements
Meeting #3	8-Jan-08	10	Council Chambers	Turnpike Bridges/Freedom Road
Meeting #4	26-Feb-08	12	Council Chambers	Freedom Road Corridor
Meeting #5	11-Mar-08	13	Cranberry Highlands Golf Course	Pedestrian Mobility, Cultural Diversity, and Technology Businesses
Meeting #6	8-Apr-08	7	Council Chambers	Top Ten Transportation Priorities
Meeting #8	10-Jun-08	9	Council Chambers	Task Force Presentation

Parks and Recreation Task Force

Meeting	Date	No. of Participants	Location	Top Issue
Meeting #2	11-Dec-07	10	Senior/Teen Center	Assessment of current Parks and Recreational Offerings
Meeting #3	8-Jan-08	9	Council Chambers	Ideas for new Parks and Recreational Offerings
Meeting #4	26-Feb-08	7	Council Chambers	-
Meeting #5	11-Mar-08	5	Cranberry Highlands Golf Course	Pedestrian Mobility, Cultural Diversity, and Technology Businesses
Meeting #6	8-Apr-08	7	Council Chambers	Economic Benefits of Parks/Recreational Needs - 2nd Skate park & Frisbee Golf
Meeting #8	10-Jun-08	4	Council Chambers	Task Force Presentation

The Cranberry Plan Steering Committee
Meeting Agenda # 1
Wednesday, September 12, 2007 - 5:30 PM

1. Why Plan?
2. Cranberry Plan Process
3. Schedule
    - Confirm Steering Committee dates/times
    - Milestones
4. Role of Steering Committee
5. Project Team/Role of Consultants
6. Citizen Advisory Panel
7. Communications
8. Form Based Code

http://sharepoint.twp.cranberry.pa.us/sites/Strategy/CompPlan/Steering Committee/The Cranberry Plan Steering Committee Agenda 9-12-07.docx

The Cranberry Plan Steering Committee
Meeting # 2
Wednesday, October 10, 2007 5:30 p.m. – 7:30 p.m.

This meeting was opened by John K. Trant, Jr., Chief Strategic Planning Officer for Cranberry Township. Eric Kaunert, Community Planner for Cranberry Township, was also present.

Steering Committee Members Present:

Chad Brinkley
Jim Collela
Dick Hadley
Bruce Mazzoni

Consultants Present:

Debbie Tollett
Troy Truax
Court Gould
Matt Mehalik

The meeting was called to order at 5:40 p.m. at which time Mr. Trant went over the agenda for the Steering Committee Meeting Number 2. After the Agenda was reviewed, Mr. Trant then briefly discussed the materials in the Members' Cranberry Plan Binders, specifically The Cranberry Plan Process. Mr. Trant outlined The Cranberry Plan Process, explaining each of the 5 Phases and the main elements of each of those phases.

The following is a summary of the remainder of the meeting:

1. Market Assessment (Delta Development: Troy Truax and Debbie Tollett)

A. Ms. Tollett explained the following topics to the committee:

1. Demographics
2. Workforce/Commuter Patterns
3. Growth Trends in Competitive Areas
4. Economic Profile of the Township and the larger Economic Region
5. Using Regional Assets and Strengths to create new business opportunities
6. Impact of new or planned businesses
7. Township's Greatest Weaknesses/Challenges to economic growth
8. What level of Business Development can the Township support and what types of businesses should be targeted

B. At this point, the Steering Committee questioned the inclusion of the Monroeville/Murrysville Region in the study area. The discussion led to the retaining of the Monroeville/Murrysville Region, but also the request by the Committee to look at the possibility of including SouthPointe (Canonsburg, PA), South Side (Pittsburgh, PA), and the Route 30 Corridor in the study analysis.

C. Upon the completion of the discussion regarding the study area, Ms. Tollett then summarized the Executive Summary of Findings:

1. Population and Growth Rate – Cranberry is younger and growing faster than the competitive corridors in the study area
2. Diversity Index – Cranberry is less diverse than the comparative corridors in the study area
3. Housing Statistics – Cranberry is a leader in home sales, owner occupied housing, and four bedroom homes.
4. Economy – Cranberry's Economy is heavily reliant on wholesale and retail trade sectors.
5. Westinghouse
    - The addition of Westinghouse will help diversify Cranberry's economy
    - Westinghouse's provision of a free commuter line may delay the relocation of employees to Cranberry
    - The addition of Westinghouse jobs will strengthen Cranberry's competitive advantage for the professional and technical services sector

D. At this point the Steering Committee raised concerns regarding the abundance of Westinghouse material and the overemphasis of the Westinghouse impact on Cranberry Township's current economy. The Market Analysis is a snapshot of 2007 and the impact of Westinghouse will not be felt until 2009 and later. The scenario modeling that projects the 25 year build-out will include the impacts of Westinghouse and satellite industries.

E. After the discussion on the Executive Summary of Findings concluded, Ms. Tollett then moved to the explanation of the Key Planning Opportunities, the Commercial Real Estate Market, Regional Competition, and Industrial and Commercial Office Supply.

F. At this point a question was posed by the Steering Committee in regards to the Retail Market Study. Ms. Tollett explained the chart regarding retail briefly, and then stated that she will create a narrative to explain the Retail Chart and its calculations, to be included in the next draft of the document.

G. After the Retail Market Analysis discussion, the Steering Committee requested that the Township conduct an analysis regarding the Mechanical Device Tax on Page 64 of the Market Analysis Draft, as well as coordinate the transfer of Cranberry Township Community Chest information to Delta Development, to be included in the section concerning Non-Profit Corporations.

2. Sustainability (Sustainable Pittsburgh: Court Gould and Matt Mehalik)

A. Mission - Sustainable Pittsburgh, a 501(c)(3) nonprofit, affects decision-making in the Pittsburgh Region to integrate economic prosperity, social equity, and environmental quality bringing sustainable solutions to communities and businesses.

B. Vision - Through the policy and practice of sustainable development, Southwestern Pennsylvania has a strong economy in which all people are can live to their potential, are engaged, and prosper within the means of a clean and healthy environment.

C. Commitment to Equity - "Sustainable development integrates Economy, Environment, and Equity (3 E's). Acknowledging the persistence of institutional discrimination and resulting disparities gap in basic liberties within Southwestern Pennsylvania, Sustainable Pittsburgh recognizes Equity as an overarching imperative. Social equity for an increasingly diverse citizenry is central to our mission of broadening regional decision making for sustainable development."

D. Core Values

1. Sustainable Development - a better way (integrating 3Es)
2. Integrity in approach
3. Trusted advisor (non-partisan & fact based)
4. Compassion for Southwestern PA - diverse people, resources, region
5. Systemic change at scale - for the region
6. Collaborative in partnerships and public engagement

E. Overarching Strategies

1. Policy Advocacy. Engage partners in developing sustainable development policy recommendations and build coalitions to organize for positive change (Smart Growth, Targeted Investments, Integrated Infrastructure, Equitable Development). Gain rapport with key decision-making bodies and partner at the decision-making table.

2. Sustainable Development Practice. Assist communities and businesses to implement sustainable development practices with an eye toward demonstrating bottom-line benefits/wins and linking to SP's policy agenda.

3. Civic Engagement. Demystify regional planning and investment processes and build capacity for diverse civic leaders to gain a seat at decision-making tables for local and regional planning and visioning.

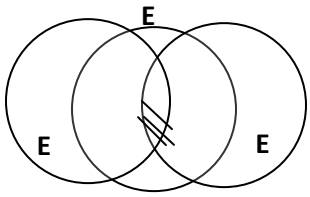
4. Educate. Continue to innovate a wide range of means to reach civic leaders regarding sustainable development best practice and policy opportunities while growing SP's network of partners and community leaders.

F. Commitment to Equity

1. Sustainable Pittsburgh integrates Economy, Environment, and Social Equity. Acknowledging the persistence of discrimination and resulting disparities gap in basic liberties within Southwestern Pennsylvania, Sustainable Pittsburgh recognizes equity as an overarching imperative. Social equity for quality of life and an increasingly diverse citizenry is central to the mission of broadening regional decision-making for sustainable development.

G. After discussing Sustainable Pittsburgh, Mr. Gould then discussed the concept of sustainability, beginning with the three E's of sustainability:

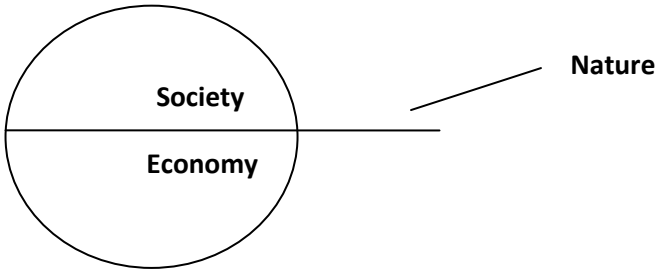
1. Environment
2. Equity
3. Economy



4. The above illustration represents the three (3) E's of sustainability and how a problem can be solved sustainably by identifying a solution that hits all three of the E's, which is represented in the diagram by the hatched area.

5. An example of this is the City of Chattanooga who instituted an electric bus system. The buses were developed in Chattanooga (Economy), they were free to ride (Equity), and they were environmentally efficient(Environment).

H. Mr. Gould then created another diagram emphasizing the importance of the balance with nature:



I. Economics

1. Do not be too reliable on one (1) source of income
2. Save money through efficient land use
3. Foster local businesses
4. Do not lower prices for things that can harm us
5. Do not tax the things that help us, such as productivity

J. Mr. Gould then spoke about the importance of educating and empowering citizens with the sustainability concept and recited the United Nations definition of sustainability:

> "Sustainability requires meeting the human needs of the present without compromising the ability of future generations to meet their own needs."

K. Upon the completion of Mr. Gould's explanation of sustainability Mr. Gold then turned the meeting over to Mr. Mehalik where he explained the concept of LEED:

L. LEED = Leadership in Energy and Environmental Design

How LEED can assist the Township:

1. Utility tracking to keep costs down
2. Affordable Housing
3. Chattanooga Bus Example

M. 7 major factors:

1. Stewardship – Ecological/Ethics surrounding basic necessities
2. Respect for Limits – Prevent waste and pollution
3. Interdependence – Culture, nature, 3 E's, finance, and capacity
4. Economic Restructuring – Expand employment opportunities, efficiencies, conservation, and a connectivity between environment and economy
5. Fair Distribution – Narrow the disparity between groups and tax systems
6. Long Term Views – Intergovernmental
7. Nature as a Teacher

N. After the discussion was complete regarding LEED and Sustainability, Mr. Trant then led a brainstorming session with the Steering Committee to identify important sustainability topics to be addressed by the Cranberry Plan. The following was captured:

A. Transportation

a. Public Transportation System
b. Link to the City of Pittsburgh

B. Recreation
C. Infrastructure
D. Impact on the Future
E. Education of the Citizenry
F. Incentivize "Green" Aspects of Development
G. Fast Pace of Growth = Pressure on Resources
H. Workforce Housing
I. Traffic
J. Taxation and Finance
K. Smart Growth
    a. Site Impacts
    b. Redevelopment
L. Form Based Code
    a. Recommend Green Materials
    b. Incentivize Green

O. After the brainstorming session Mr. Gould then outlined how Sustainable Pittsburgh would assist the Township:

1. **Sustainability Principles**- Sustainable Pittsburgh will complete research on Cranberry Township and develop draft Cranberry Sustainability principles. These may include any of the seven (7) major factors of sustainability. The Steering Committee will review the principles and collect feedback from the Citizen Advisory Panel. The principles will guide future decision-making and policy development.

2. **Sustainability Assessment** – Sustainable Pittsburgh will also complete an analysis on the internal processes of Cranberry Township, as well as the Township's physical plant, and make recommendations on how to enhance sustainability.

3. Growth Management Scenarios (John Trant)

A. The Growth Management Analysis begins with modeling of future development scenarios. The Growth Management Analysis will be conducted by creating three (3) growth scenarios differentiated by varying growth patterns and intensities as a result of policy and zoning changes. These scenarios will effectively map out development in the Township, identifying how different growth patterns will impact Township administration, infrastructure, and services.

B. Growth Scenario A will establish the status quo or baseline scenario projecting out the Township's current growth patterns with no changes to policy or zoning. Growth Scenarios B and C will project out the Township's growth patterns with differing land use patterns incrementally higher intensities based upon policy and zoning changes. All three scenarios will be instrumental in choosing the most appropriate growth path based upon capacity and sustainability and capability.

C. The Growth Scenario Impact Assessment will inform the development of a preferred growth scenario by the Steering Committee. Once this preferred growth scenario is selected, recommendation will be developed to implement the Growth Management Plan over the next 25 years.

D. The Market Assessment is the process that establishes the baseline for all of the growth scenarios. This Assessment provides a snapshot of the current market of Cranberry Township and what the current market can accommodate as far as retail, office, residential units, etc. Each scenario projection will include all elements identified in the baseline Market Assessment in order to compare current statistical information with future projections.

4. Citizen Advisory Panel (John Trant)

A. At this time Mr. Trant invited the Steering Committee Members to the November 14th Citizen Advisory Panel Kickoff Meeting.

5. Scope of Work and Schedule (John Trant)

A. Mr. Trant discussed the Master Scope of Work tasks for the Cranberry Plan and the parties that are responsible for completing those tasks.

6. Base Mapping (John Trant)

A. Mr. Trant explained the GIS Mapping that was displayed on walls of the conference room. The maps were created to illustrate a snapshot of Cranberry Township demonstrating different elements of development, land use, developable areas, zoning, parks, transportation and the growth scenarios.

7. Action Items for the December 12, 2007 Steering Committee Meeting

1. Obtain CTCC information from Bruce Mazzoni and send the information to Delta Development to include in the Market Assessment.
2. Provide the Steering Committee with a revised Market Assessment document.
3. Provide the Steering Committee with more information on the Growth Scenarios prior to the next meeting.
4. Distribute draft Cranberry Sustainability Principles for review.

The meeting was adjourned at 8:45 p.m.

The Cranberry Plan Steering Committee
Meeting # 3
Wednesday, December 12, 2007 5:30 p.m. – 7:30 p.m.

This meeting was opened by John K. Trant, Jr., Chief Strategic Planning Officer for Cranberry Township. Eric Kaunert, Community Planner for Cranberry Township, was also present.

Steering Committee Members Present:
Chad Brinkley
Jim Collela
Dick Hadley
Bruce Mazzoni
Consultants Present:
Troy Truax
Erin Geneste

The meeting was called to order at 5:30 p.m. at which time Mr. Trant went over the agenda for the Steering Committee Meeting Number 3. After the Agenda was reviewed, Mr. Trant then briefly discussed the materials in the Members' Cranberry Plan Binders, specifically The Cranberry Plan Process. The following is a summary of the remainder of the meeting:

Market Assessment Summary

- Demographic Characteristics
- Living and Working in Cranberry
- Regional Comparable Areas to Cranberry
- Growth Trends
- Economic Profile of Cranberry Township and the Cranberry Township Region
- Local and Regional Strengths that can be used to create business opportunities
- Impacts of new businesses
- Weaknesses and Challenges of Economic Growth
- Level of business development the Township can support

Methodology
Baseline Data
Step 1 – Existing Land Use Inventory
Step 2 – Developable Lands/Pending Construction
Step 3 – Developed Lands
Growth Scenarios

Scenario A – Projected Buildout with current Growth Patterns
Scenario B – Projected Buildout with a mix of Current/Increase of density Growth Patterns
Scenario C – Projected Buildout with some current growth patterns and highly dense development

Action Items

1. Create a Developable Lands Map with Smart Growth Area Lines
2. Create an Open Space Map
3. Establish how the Sub Growth Area Lines were determined and include this in the methodology
4. Establish how the Redevelopment Area Lines were determined
5. Obtain the Ratio's for Table 9, Page 17 that calculated the Projected Square Feet
6. Quantify the Sub-Areas in A, B, and C
7. Insert the Acreages on the Growth Scenario Maps
8. Document if Parking Spaces and Trails were included in the methodology
9. Take a Smart Growth Area and explain how each result was reached

The Cranberry Plan Steering Committee
Meeting #4
Wednesday, January 9, 2008 5:30 p.m. – 7:30 p.m.

This meeting was opened by John K. Trant, Jr., Chief Strategic Planning Officer for Cranberry Township. Eric Kaunert, Community Planner for Cranberry Township, was also present.

Steering Committee Members Present:
Chad Brinkley
Jim Collela
Dick Hadley
Bruce Mazzoni
John Morgan
Consultants Present:
Troy Truax
Erin Geneste

The meeting was called to order at 5:40 p.m. at which time Mr. Trant went over the agenda for the Steering Committee Meeting Number 4. After the Agenda was reviewed, Mr. Trant then briefly discussed the materials in the Members' Cranberry Plan Binders, specifically The Cranberry Plan Process. The following is a summary of the remainder of the meeting:

CAP Recap

Transportation – The Transportation Task Force discussed road connectivity as well as engaging Daryl Metcalfe for discussion.
Parks and Recreation – This task force discussed park options as well as using Parks and Recreation as way to increase Real Estate values.
Culture and Diversity – The Culture and Diversity discussed how the Township is currently not diverse and how Westinghouse could be used to increase diversity.
Public Image – This task force discussed making Cranberry Township a "Place" with known boundaries. This included identifiable entrances and exits.
Sewer and Water – The Sewer and Water task force talked about green spaces and parks.
Economic Development – The Economic Development task force discussed the establishment of an Economic Development Authority to promote development as well creating alternative traffic links to Pittsburgh.

Final Sustainability Principles

Be distinctive. Cranberry's Township's character is fundamental to its long-term success. That character grows out of a combination of its own unique qualities and the distinctive ways it manages the process of building a sense of community, which is an issue common to all communities. Identifying the distinct qualities of the Township's character and diverse citizenry, and leveraging them in the formulation of policies, programs, projects and promotions, will be a bedrock principle of Cranberry's public management.

Be prosperous. A successful community is one in which every resident has the motivation as well as the opportunity to advance his or her own life and career. Success also occurs when the community benefits that accrue from prosperity are available to all. As a matter of policy, that means working to remove obstacles so that anyone in the community can fully participate in the Township's rising fortunes.

Be healthy. An economy that builds upon and contributes to a healthy environment is the foundation for continuing economic prosperity in Cranberry Township. That means working to attract knowledge-based industries and fostering a diversity of business enterprises that advance sustainable production and consumption, reduce waste, use renewable resources and contribute to preservation of scenic assets, ecosystems, clean air and water.

Be engaged. Citizens who are actively engaged in their own governance and civic life lead happier, more constructive lives than those whose involvement in their community is passive. Civic engagement also drives transparent, accountable, and effective governance. Cranberry will strive to create opportunities for individual residents, as well as organized groups to participate meaningfully in advancing shared goals and simultaneously implementing social, economic, and environmental improvements throughout their Township.

Be committed. Cranberry is determined to have a long-term vision and be to agile in tracking and responding to emerging trends and signals, in order to make smart decisions for today and tomorrow. Accordingly, Township officials and administrators will provide steady leadership, educate residents on

implementing these sustainability principles, encourage innovation, develop and report on progress measures, and demonstrate sound business practices to address important concerns.

Schedule Update

January – Sewer, Water, Traffic, and other services will receive population estimates to insert in their models.

February – Background, Information, and Research Chapter will be completed and reviewed by the Steering Committee.

Methodology Discussion

Executive Summary

In the Cranberry Vision document public input told Cranberry where it wanted to go, but the comprehensive plan also had to layout how to get there. In order to achieve the Vision the township set forth, growth management policies would have to be implemented today to gear growth toward that vision. Cranberry Township wanted to ensure that the policies they implement would achieve that Vision, so they modeled three growth scenarios to see which most correctly matched the Vision. Impacts of the each of the scenarios will be modeled in a separate section of the Comprehensive Plan. If none of the scenarios match the vision, then a blend of the scenarios will be used to achieve the Vision. Modeling the scenarios still helps the Township have a better understanding of the effects of the policies. This provides information to assist in choosing policies that will better result in the desired effect.

The growth scenarios each incorporated different growth management strategies. Scenario A assumed no change, that growth would follow the same pattern it does today. This was achieved by modeling the build out of all developable lands in the Township. In Scenario A the build out was in accordance with current standard zoning.

Scenario B also involved the built out of the developable lands, but it assumed changes to zoning in certain areas known as sub-areas. The changes to the zoning followed patterns, these patterns were known as Growth Pattern 1, 2, and 3. These patterns differed in their assumptions but each allowed higher building densities than standard zoning policies. This allowed for more infill development. Most of Scenario B still developed according to standard zoning policies, growth patterns 1, 2, and 3 were applied only in a few a sub-areas.

Scenario C was built out the similarly to Scenario B was built out, but the growth patterns were applied to more sub-areas.

The sub-areas selected for application of the growth patterns rather than standard zoning were selected because those areas were the most appropriate for infill development that would create the more dense core and less dense outer ring of development. This concentric ring development is recognized in smart growth principles for creating less traffic congestion and lower infrastructure costs. The Cranberry Vision included the use of smart growth principles.

The Cranberry Township Growth Scenario Flow Chart diagram shown below explains how these growth scenarios were developed.
First current land uses had to be considered. Then the uses were aggregated into uses more suitable for projections (Hotel, Industrial, Office, Restaurant, Retail, and Residential. Then because residential and non-residential uses can not be measured in the same way (non-residential in square feet and residential in units) those uses were split.

Growth can only occur where there is developable land, so what was developable was determined by removing developed land and land that had approval to built from the total.
Patterns from zoning and the developed land were used to develop the growth scenarios because present development today has already begun to affect developments in the future. In the end each aggregated use was projected to maximum build out in the developable land under each growth scenario then the market validation verified whether those maximum builds out where possible in each scenario.

The results of the maximum build out for each scenario can be seen below can be seen in the table

Maximum Build Outs				
Land Use	**Existing Square Footages and Units**	**Total with Scenario A**	**Total with Scenario B**	**Total with Scenario C**
Hotel	965,783	1,241,783	1,479,317	1,825,397
Industrial	4,194,451	6,338,672	5,363,842	5,196,804
Office	4,463,391	10,427,772	10,105,253	10,068,295
Restaurant	288,151	433,356	564,892	853,746
Retail	3,061,268	6,428,420	5,673,845	6,022,436
Residential units	10,378	13,670	18,506	23,649
Total non-residential square feet	12,973,044	24,870,001	23,187,148	23,966,678

below.

Action Items for Next Meeting

1. Change charts in the GIS Mapping to reflect the new Methodology Numbers
2. Associate Rooms with Hotels rather than Square Footage
3. Page 4 – Show Page Numbers with chart headings (Flow Chart)
4. Show Concentric Circles on the Mapping

The Cranberry Plan Steering Committee
Meeting # 5
Wednesday, February 20, 2008 5:30 p.m. – 7:30 p.m.

This meeting was opened by John K. Trant, Jr., Chief Strategic Planning Officer for Cranberry Township. Eric Kaunert, Community Planner for Cranberry Township, was also present.

Steering Committee Members Present:

Chad Brinkley
Dick Hadley
Bruce Mazzoni

The meeting was called to order at 5:40 p.m. at which time Mr. Trant went over the agenda for the Steering Committee Meeting Number 5.
The following is a summary of the remainder of the meeting:

Schedule

An updated copy of the Master Schedule was given to the Steering Committee. In addition to the Master Schedule two (2) other schedules were created and provided to the Steering Committee – The Detailed Master Schedule and the Task Force Schedule.

The Detailed Master Schedule includes an in depth description of all scheduled activities at CAP and Steering Committee Meetings as well as all major consultant deadlines. The Task Force Schedule indicates all general meeting topics as well as individual task force topics.

Sustainability Principles

The Final Steering Committee Principles were distributed to the committee. These principles will be incorporated into a resolution which will be presented to the Board of Supervisors for adoption.

January 8, 2008 CAP Recap

"Spread the Word"

- Response to questions:
  - Graham Park Update – Site development phase (6.4 million); Arial view shown; Future phases – Building (restroom); Amenities – dugouts, fences, concessions/pw (2008), scoreboards, bleachers, etc. (August 2008)
  - Freedom Road – Projects that were funded or spearheaded by the Township were shown; Highlights of ROW's and improvements were show; Suggested that Transportation Task Force strategize to find a way to build support.
  - Heights Drive Traffic Calming Plan – Construction will begin later in 2008; Worked with Heights Drive Extension Committee; Revamping website and will be able to view the map online.
  - Anticipated Traffic with Westinghouse – PowerPoint model shown. CAP member is concerned about major back-ups from turning lane into Cranberry Woods; CAP member asked about a southern access road into Cranberry Woods – No.

Traffic Presentation

- Township has highest roadway standards.
- Township is the first to implement an impact fee (Trip Generation Analysis).
- Traffic studies done on all new construction.
- Township Public Safety Review
- Traffic Improvements
- Connectivity – Heights Drive and Ehrman/Garvin Road – to begin in 2008; Dutilh Road Corridor – In planning stages (Hartner Drive and Short Street); Minor widening will be done – restrained by topography and ROW issues.
- Rt. 228 Corridor Planning – Future connection from Simon Mall; North Catholic is deciding on location near Rt. 228 Corridor; St. Killians; Cranberry Woods Drive
- Funding – Resurfacing: state liquid fuels; capital improvements; state funding eroded; township roads and traffic - ownership, turnpike crossing, road standards.

Traffic Signal Operation Presentation

- Signal operations and traffic system presentation was given by Duane McKee.

Survey

- Members were encouraged to participate by logging onto the Forum. Hard copies were also made available.

Questions

- How can we raise local awareness of public safety issues?
    - Suggestions: A township-wide e-mail list connected with the Amber Alert system; Reverse 911 system.
- Is the Township considering a Rt. 79 access point north of Rt. 228?
- Rochester Road improvements?
- Is an elementary school going to be built on Ehrman Road?
- Is there a long-range plan with the school system?
- What is the status of Belle Vue Park?

Next CAP Meeting: Tuesday, February 5th. The topic will be Economic Development and Redevelopment. The Market Assessment will be presented.

<u>Growth Scenarios</u>

An Executive Summary of the Growth Scenario was presented to the Steering Committee and a discussion ensued regarding the findings as well as its presentation to the CAP. Below are the following recommendations to Staff regarding the Growth Scenarios:

- Remove parcel lines on the Growth Scenarios Maps
- Give a detailed explanation of Formed Based Code (FBC) and Traditional Neighborhood Development (TND)
- Present photos of TND Developments that are located within and outside of the region
- Present photos of our TND Developments including Bellevue and Park Place
- Introduce the three (3) Growth Scenarios and work backwards to explain how they were developed

Intergovernmental Cooperation

On Tuesday, February 26, 2008 Cranberry Township will meet with representatives from the following municipalities to discuss The Cranberry Plan:

Pine Township, New Sewickley Township, Harmony Borough, Zelienople Borough, Middlesex Township, Adams Township, Jackson Township Marshall Township, and Seven Fields Borough.

The Cranberry Plan Chapters 1, 2, and 3

The first draft of chapters 1, 2, and 3 were distributed to the Steering Committee and the following was highlighted. Chapter 3 was not discussed because it had been the discussion of the previous two (2) meetings:

Page 5 - Introduction – gives the reader an introduction to Cranberry Township - Role of the Plan – Based upon Sustainability, a development strategy based upon build out

Page 9 – Study Area

Page 10 - Community Visioning – Outlines the Visioning process of 2005 (Meetings and Processes) and all of the community concerns and desires for the Township as well as Life in Cranberry, 2030.

Chapter Two – Background Information and Research

Page 13 - Existing Plans and Reports – Includes a brief explanation of all plans and studies completed since the last Cranberry Township Comprehensive Plan.

Current Socioeconomic/Demographics/Labor Force Statistics

Page 17 - Population Growth – We grew 14% from 2000 to 2006 (23,000 to 28,000)

Page 19 - Regional County Growth – Only Butler County and Washington posted growth rates 2000 – 2006 (<1%)

Page 20 – Cranberry Employment – TRACO, Verizon, and UPMC are biggest employers – Westinghouse will be

Page 21 - Median Family Income - $90,411 (6th in Study Area) on page 29

Page 22 - Housing – Comparable Home Value in the upper echelon communities – Median yearly appreciation 3.48%

Page 24 - Education – Comparable SAT Test scores (500 –Math, Verbal, Writing) with the exception of Marshall Township, Mt. Lebanon, Upper St. Clair, and Peters Township (550+)
Page 26 - Sewer and Water – Brush Creek treats up to 4.5 million gallons of water and sewage a day servicing New Sewickley, Marshall, Pine, and Cranberry Township.
Page 27 - Regional Trends – Analysis is of the Pittsburgh MSA

Economics– Education and Health industry is 1.5 times the national average, which is second only to Trade, Transportation, and Utilities. While manufacturing has lagged behind the national average and lost 21.4% of its employment. Since March of 2001 the MSA has lost 1.5% of its jobs

Migration – Between 2000 and 2006, 70,520 people moved from Allegheny County to another Pittsburgh MSA County, while 49,151 people moved into Allegheny County

Page – 30 - TRWIB Project
Page 31 - Transportation – 170 miles of Roadway, 107 miles of local roadway with a 50 to 100 year lifespan
Page 33 - Market Assessment
Page 42 – Open Space and Natural Resources (See Map)
Page 45 - Township Staffing – 116 Full Time and 30 Part Time Employees – Each Department has a description of what they do.
Page 48 - Intergovernmental Cooperation Projects

Mapping
The current versions of The Cranberry Plan Mapping were displayed and discussed.

The Cranberry Plan Steering Committee
Meeting # 6
Wednesday, March 12, 2008 5:30 p.m. – 7:30 p.m.

This meeting was opened by John K. Trant, Jr., Chief Strategic Planning Officer for Cranberry Township. Eric Kaunert, Community Planner for Cranberry Township, was also present.

Steering Committee Members Present:

Chad Brinkley
Dick Hadley
Bruce Mazzoni

The meeting was called to order at 5:40 p.m. at which time Mr. Trant went over the agenda for the Steering Committee Meeting Number 6.
The following is a summary of the remainder of the meeting:
Sustainability Assessment Scope

The Final Steering Committee Principles were distributed to the committee in final form. These principles will be incorporated into a resolution which will be presented to the Board of Supervisors for adoption.

The Sustainability Assessment Scope was distributed to the committee and the schedule was discussed. A brief summary of the Sustainability Scope is provided below:

- **Energy Conservation & Co2**
  (Municipal Center, Public Works Facility, Sewage Treatment Plant, Golf Course)
- **Waste/recycling and Environmentally Preferable Procurement**
  (Municipal Center, Public Works Facility, Sewage Treatment Plant, Golf Course).
- **Parking congestion at the Municipal Center**
  (congestion, scheduling adjustments, alternative transportation)
- **Renewable energy options and cost/benefit assessment.**
- **Fiscal Health**
- **Stormwater**
- **Planning and Zoning**
- **The Cranberry Plan**
- **Green Golf Course**

<u>February 26, 2008 CAP Recap</u>
Sewer, Water, and Environmental Stewardship

- Preserve and protect more wetland and open space areas as well as make these areas more usable and accessible
- Develop an official Trail and Open Space Map
- Involve the School District in the CAP Process

Transportation and Mobility

Freedom Road

- Pedestrian/Bike Mobility
  - Ease of Access
  - Crosswalks
  - Bike Lanes
  - Sidewalks on Freedom Road over the Turnpike (protected)
- Off Road Improvements

- Street Trees
- Landscaping (Median and Off Road)
- Street Lights
- Curb/Gutter rather than asphalt curb
- Bus Stops and Park and Ride

Economic Development

- Partner with the Butler or Allegheny County Redevelopment Authority
- Market Assessment
  - Multi-Family Housing – Identify a model community to gauge housing mix
    - Locate close to Malls for service sector employees
- School Discussion
  - High Paying jobs will translate into better schools

Culture & Diversity and Parks & Recreation

- Culture and Diversity
  - Cultural Discount Program with Township Resident ID Card
  - Re-Inventing the Cranberry Area Council for the Arts
- Parks and Recreation
  - Adult Recreation Programming
  - Tow Rope for sled riding at N. Boundary Park/New Skate Park
  - Multi-Use Building for Rental
  - Selling Naming Rights to the Tennis Courts

Next CAP Meeting: Tuesday, April 8th. The topic will be Public Image.

Impact Assessment Methodology

The Impact Assessment Methodology summary was distributed to the Steering Committee. This document describes the process of projecting Township revenues and expenses from the 2007 Budget and projects out revenues and expenses to the year 2050.

Revenues were broken down into a ratio or multiplier by calculating the 2007 Budget line items for each revenue source and each land use. This multiplier or ratio was then used to project out to Township build out and beyond.

A similar set of calculations was conducted for expenses. Each expense related to Township Department or miscellaneous line item was identified, and then broke down to a per unit ratio or multiplier. This multiplier was then used to project out to build out and beyond.

Schedule

The updated Master Schedule was discussed by the Steering Committee and minor adjustments were identified:
April - Chapters 1, 2, and 3 will be discussed at next Steering Committee Meeting
May – Transportation, Municipal Services, Preferred Scenario, and the April CAP Review.
June – Sewer and Water Assessment, Preferred Scenario, Future Land Use, and May CAP Review.
July – Future Land Use Plan, Impact Assessment Summaries, and June CAP Review.

The Cranberry Plan Steering Committee
Meeting # 7
Monday, May 5, 2008 5:30 p.m. – 7:00 p.m.

This meeting was opened by John K. Trant, Jr., Chief Strategic Planning Officer for Cranberry Township. Eric Kaunert, Community Planner for Cranberry Township, was also present.

Steering Committee Members Present:
Chad Brinkley
Dick Hadley
John Morgan
Jim Collela
Bill Thompson

Traffic Consultants Present:
Darren Meyer
Keith Johnson
Jeff Strejcek

The meeting was called to order at 5:40 p.m. at which time Mr. Trant went over the agenda for the Steering Committee Meeting Number 7.

The following is a summary of the remainder of the meeting:

Schedule Update

Upcoming CAP Meetings:
Tuesday, June 10, 2008 CAP Presentation to the Steering Committee
Thursday, July 31, 2008 Public Meeting
Upcoming Steering Committee Meetings:
Monday, June 2, 2008
Monday, July 7, 2008

March and April CAP Re-CAP

March CAP

Business Technology Roundtable – Business professionals from Westinghouse, MSA, and other technology companies met with members of the CAP to discuss how to attract and retain technology companies.

Culture and Diversity Task Force – Non-profit professionals met with CAP members to identify ways to make the Township more diverse and create more cultural offerings to our residents.

Pedestrian Mobility – CAP members discussed trails, bikeways, and sidewalks as well as marked up our GIS maps to identify logical connections to parks, pedestrian destinations, sidewalks, and trails.

April

Culture and Diversity – Review of Culture and Diversity Deliverables

Economic Development – The Cranberry Township Chamber of Commerce met with the Economic Development Task Force and updated them on the Chamber's new procedures, achievements, and members.

Sewer and Water – The Sustainability Assessment was reviewed and recommendations were made to Sustainable Pittsburgh.

Transportation – Freedom Road was discussed and priorities were established by the task force regarding improvements.

Parks and Recreation – The Parks and Recreation Task Force made a list of the top ten sidewalks, bikeways, and trails. This list was then distributed to the task force where each segment was prioritized.

Preferred Scenario Methodology

A Decision Making Matrix was created to assist the committee in choosing the preferred growth scenario. This matrix includes the major aspects of the plan including transportation, municipal services, sewer and water, finance, parks and recreation, and municipal services. These planning aspects will be rated in several different categories including: cost, feasibility, sustainability, public input, staff/consultant recommendation, and impacts. The ratings will be based on a 1 to 3 point rating system (3 being the best and one being the worst). Total scores will be given for each scenario based on the aggregate scoring. The total score will not specifically determine the chosen scenario, but will play a large role in determining the scenario that best fits the growth path of
Cranberry Township based on the values and desires of the Steering Committee.

The Steering Committee asked that the following additions/subtractions be made to the Preferred Growth Scenario Decision – Making Matrix:

- Include a Market Forces Rating Category
- Remove the Cost Rating Category in the first round of the matrix
- Give the Matrix to the CAP and have them fill it out and compare their scores to the scores of the Steering Committee
- Possibly eliminate a scenario in the first round of the matrix

- Can Township Staff provide a one to two page summary of each Scenario when the matrix will be filled out?
- Can Township Staff break down costs and impacts on a per unit (edu, per house, per trip) basis
- Can Township Staff put together a summary of public input?

Traffic Model Update (URS)

Two (2) different spreadsheets were distributed to the Steering Committee regarding the Traffic Model:

1. The first spreadsheet illustrated the average daily trips based on land use and established variables:

Land Use Type	Independent Variable	Average Daily Trip Rate
Residential	Dwelling Units	10
Hotels	Rooms	9
Industrial (Industrial Park)	1000 SqFt GFA	7
Office Buildings (General)	1000 SqFt GFA	11
Restaurants (Sit-down)	1000 SqFt GFA	127
Retail (Shopping Center)	1000 SqFt GFA	45

2. The second spreadsheet identified number and percentage increase based on Scenarios A, B, and C from 2007.

		Percentage Change from 2007		
Route	**Location**	**Scenario A**	**Scenario B**	**Scenario C**
Rte 19	North of North Boundary Rd	81%	106%	109%
Rte 19	South of North Boundary Rd	105%	116%	145%
Rte 19	South of Rochester Rd	62%	65%	107%
Rte 19	South of Turnpike Connector	124%	126%	126%
SR 228	East of I-79	134%	207%	231%
Rochester Rd	East of Haines School Rd	46%	59%	87%
Freedom Rd	West of Rte 19	44%	79%	94%
Franklin Rd	North of SR 228	107%	130%	166%
Rowan Rd	East of Rte 19	58%	74%	84%
Powell Rd	North of Rochester Rd	219%	232%	300%

Traffic Impact Assessment (HRG)

This segment of the meeting discussed what types of roadway improvements are necessary to sustain the level of growth illustrated in Scenarios A, B, and C. The improvements required in these areas call for additional traveling lanes, turning lanes, signalization, and road realignments at each roadway location based upon differing scenarios. Accompanying each improvement is a cost estimate that accounts for construction costs for the roadway improvements, which does not include ROW cost, utility transfers, and inflation.

The Cranberry Plan Steering Committee
Meeting # 8
Monday, June 2, 2008 5:30 p.m. – 7:30 p.m.

This meeting was opened by John K. Trant, Jr., Chief Strategic Planning Officer for Cranberry Township. Eric Kaunert, Community Planner for Cranberry Township, was also present.

Steering Committee Members Present:

- Chad Brinkley
- Dick Hadley
- John Morgan
- Jim Collela
- Bill Thompson
- Bruce Mazzoni

Consultants Present:

- Debbie Crass
- John Masalanik

The meeting was called to order at 5:30 p.m. at which time Mr. Trant went over the agenda for the Steering Committee Meeting Number 8.

The following is a summary of the remainder of the meeting:

Schedule Update

Upcoming CAP Meetings:

- Tuesday, June 10, 2008 CAP Presentation to the Steering Committee
- Thursday, July 31, 2008 Public Meeting

Upcoming Steering Committee Meetings:

- Monday, July 14, 2008
- August 4, 2008

Survey Summary

- Random Mailer Survey
- 3,000 sent out
- 1,510 Returned 50.4%
- For the most part we had a very good response

Quality of Life

- 64% good
- 25% Excellent
- 10% Fair
- 1% Poor

Three (3) biggest challenges

- Traffic Congestion – 47%
- Too much growth – 25%
- Drugs – 25%

Safety Ratings were very high – 84% or respondents feel they are somewhat or very safe

Community Participation

- Used public library – 79%
- Visited a park – 86%
- Read Cranberry Today – 94%

Public Trust

- Receive good value for the taxes they pay 71 out of 100
- Pleased with the overall direction of the Township 68 out of 100

Quality of Services

- Good – 65%
- Excellent – 21%
- Fair – 13%
- Poor – 1%

Comparison Ranking

Top 5

- Access to Affordable Quality Food – 9th out of 63
- Amount of Public Parking – 8th out of 115
- Appearance of Recreation Facilities – 6th out of 117
- Economic Development – 4th out of 169
- Health Services – 10th out of 109

Bottom 5

- Place to retire – 169th out of 211
- Cultural Activities – 139th out of 168
- Bike Travel – 166th out of 166
- Walking – 165th out of 166
- Car Travel – 151th out of 166

<u>Intergovernmental Meeting</u>

On Tuesday, May 6, 2008 Cranberry Township held an intergovernmental cooperation meeting inviting political figures from all levels of government to attend and discuss issues facing Cranberry Township and the region. This meeting was held in Council Chambers during a regularly scheduled CAP meeting.

The meeting allowed CAP members to ask questions to the political figures as well as provided a platform for members of the panel to speak on related issues. The following members served on the panel:

- Dale Pinkerton, Chairman, Butler County Board of Commissioners
- Dick Hadley, Chairman, Cranberry Township Board of Supervisors
- Doug Smith, Southwestern Pennsylvania Commission
- Dr. Don Tylinski, Superintendent of Schools, Seneca Valley School District
- Jeff Smith, President, Harmony Borough Council, and President, Butler County Council of Government
- Diane Sheets, Community Development Corporation of Butler County
- Dean Berkebile, President, and Seneca Valley Board of School Directors
- Bryan Hollihan, Aide to Pennsylvania State Senator Jane Clare Orie
- Mike Butler, Aide to United States Representative Jason Altmire

Minutes from that meeting are available on the SharePoint website.

Municipal Service Impact Assessment

Below is a brief summary of the observations and scenario comparisons discussed:

Impact Observations and Scenario Comparisons

Revenue Observations

− Residential land uses in 2007 made up 67 percent of the total real estate tax revenue in the Township. Office and retail uses were the next largest generators of real estate tax revenue, making up about 10 percent of the revenue for each use.

− Restaurants generated the largest amount of real estate taxes per square foot, generating 12 cents per square foot. Retail uses generated 08 cents per square foot, office uses generated 06 cents per square foot, and industrial and hotels generated 03 cents per square foot.

− Residential units generated an average of $174.90 of real estate tax revenue per unit.

− Earned income tax accounted for 65.5 percent of the Act 511 revenues for an average of $167.41 per capita. Business privilege/mercantile accounted for 23.7 percent of the revenue and the local services tax accounted for 10.8 percent.

− Residential uses generated 66 percent of the total taxes levied (real estate, transfer, Act 511) in the Township, leading to the assumption that residential properties are carrying a larger tax burden than non-residential uses. However, the cost of providing services to residential uses and non-residential uses must also be considered.

Expenditure Observations

− Police services make up 30 percent of the Township's total annual budget expenditures. This is the largest single expenditure in the Township budget. Of the police budget, a full 80 percent of expenditures is related to salary and benefits. This is by far the highest ratio of personnel costs to other operating costs of any of the departments and service delivery areas.

− The second highest expenditure in the annual budget is for Public Works (highways, streets, winter maintenance, traffic control, fleet maintenance, and administration) at 15 percent of the budget, excluding the sewer and water funds.

− Debt service currently makes up 9 percent of the operating budget and will be nudged higher with the decision by the Township to issue additional debt in summer of 2008.

Scenario Comparisons and Observations

− For purposes of this comparison, total build-out was driven by market projections. In a market-driven environment, the build-outs occur closer to the years that have been identified in the market study previously completed than to the forced target year of 2030, which may extend the period of time when expenditures outpace revenues.

− In all three growth scenarios, general fund expenditures outpace revenues after 2021: In Scenario A, it is 2022; in Scenarios B and C, it is 2027. In Scenario A, revenues rise again in 2024 to exceed expenses, but dip below expenses again after three years. This is primarily due to changes in debt service that are not offset by increase in other expenses as seen in Scenarios B and C.

− The actual reserves that are available for capital expenditures and/or additional debt service to finance capital projects begin to drop after 2016 as inflation associated with expenses begins to “catch up” with real estate tax revenue.

− While general fund reserves that are available for capital expenditures increase by around 20 percent from Scenario A to Scenario B, there is only a 5 percent increase from Scenario B to Scenario C. Driven by population increase, sewer and water reserves that are available for capital expenditures increase by around 45 percent from Scenario A to Scenario B, with a 25 percent increase from Scenario B to Scenario C.

− In all three scenarios, the projected general fund net revenue begins to slow between 2016 and 2020. The largest sources of revenue for the Township, real estate tax and earned income tax, are directly tied to the addition of housing units. While real estate tax plateaus with residential build-out in each scenario, charges for services and earned income tax continue to grow with inflation. Charges for services revenues outpace real estate tax revenue between 2017 and 2019 in all three scenarios.

− For water, sewer and other population and fee-driven services, residential population and commercial build-out are the primary drivers and are therefore treated the same in all three scenarios.

− Because most of the Township budget is personnel costs, increased staffing costs will eventually outpace the revenue that is generated by increases to residential and commercial development. This is due to the fact that, while public-sector salary and benefits exceed CPI increases, assessments are frozen at 1967 values and therefore do not reflect the natural market value increases of property in the Township, thereby limiting the revenue that is generated.

− In scenarios A and B, the expenditures begin to outpace the revenues soon after the full residential build-out occurs. Additional build-out for commercial, retail, and industrial do not have a significant impact in terms of providing additional revenue or increasing the demand for municipal services.

Land Use Mix Observations

− Residential growth is the primary driver of the retail market, and office growth is the primary driver of the hotel market. While the current land use ratios are not representative of a "balanced" mix of land uses, it is evident that the growth in related land uses is not consistent across the three growth scenarios. For instance, growth in Scenario A is directed toward office uses, but hotel use doesn't increase accordingly. Residential growth is greatest in Scenario C, but retail use doesn't increase accordingly. The following table shows the current ratio of selected related land uses, compared to the ratio of additional square feet (or units) for each growth scenario.

Staffing Observations

− The total FTE staffing requirement at full build-out for Scenario A is 202, and is 245 and 286 for Scenarios B and C, respectively. Cranberry Township currently employs 153 FTE staff members.
− Scenario C provides some benefit for the Township by creating some economies of scale for staffing requirements, as seen in Figures 12, 13, and 14 on page 28. For example, by year 2030, the number of police officers required to support the estimated calls for service generated by the increased population is:
Base 28 1.3 officers/1,000
Scenario A 41 1.1 officers/1,000
Scenario B 49 1.0 officers/1,000
Scenario C 57 .93 officers /1,000
− Scenario C also provides lower staffing costs in the public works department because the miles per acre (.0085) is less for TND development than for traditional development (.0138) as contemplated in Scenarios A and B.

Sewer and Water Impact Assessment

The Cranberry Township engineering department prepared the cost estimates presented Table 1 for providing the improvements identified as being required to accommodate development associated with the three alternative development scenarios being considered in the Cranberry Township Comprehensive Plan. These cost estimates were developed using descriptions and estimated quantities of various identified water and sewerage system improvements provided by Chester Engineers. The development of the improvement sets is documented in the following two previously provided technical memoranda: Identified Sewerage Facilities Improvements Required to Accommodate Comprehensive

Plan Growth Scenarios, April 4, 2008 and Identified Water Distribution System Facilities Improvements Required to Accommodate Comprehensive Plan Growth Scenarios, May 13, 2008.

Table 1
Estimated Costs of Water and Sewerage System Improvements

Development Scenario	Sewer System Improvements	Water System Improvements	Total System Improvements	Estimated Number of Additional Equivalent Dwelling Units	
				Sewer System	Water System
	Estimated Design and Construction Costs				
Scenario A	$15,500,000	$23,800,000	$39,300,000	9,156	10,760
Scenario B	$24,700,000	$26,200,000	$50,900,000	13,769	16,287
Scenario C	$37,700,000	$33,900,000	$71,600,000	18,277	21,690
	Estimated Cost per Additional Equivalent Dwelling Unit				
Scenario A	$1,693	$2,212	$3,905		
Scenario B	$1,794	$1,609	$3,403		
Scenario C	$2,063	$1,563	$3,626		

The costs presented in Table 1 are based upon estimates of the cost of construction (in current dollars) plus a 7-percent allowance for associated engineering costs. The cost estimates for sewerage facilities include costs associated with the following improvements to the sewerage system:

- Increasing the capacity of the existing interceptor sewers,
- Expanding the capacity of wastewater pump stations, and
- Expanding the capacity of the wastewater treatment plant.

The sewerage system estimates do not include costs associated with the construction of local collection sewer facilities within the new development areas. This conforms to the current practice in which associated sewage collection facilities are paid for by the land developers.

Similarly, the costs for water distribution system improvements are limited to the costs associated with the following:

- Installing water mains as necessary to improve flow delivery capacities,
- Installing water transmission mains necessary to reach anticipated development areas that are not in proximity to existing mains (including potential extensions of service into Jackson Township),
- Constructing a new and expanding the existing water pumping stations, and
- Constructing additional distribution system water storage facilities.

The water system estimates do not include costs associated with the construction of local water distribution mains and appurtenances within new development areas. This also conforms to the current practice in which local distribution facilities are paid for by the land developers.

Ultimately, the Township may be successful in reducing the costs presented in Table 1 by recouping portions of the costs from developers; however, such cost reductions to the Township cannot be estimated with confidence at this time.

Table 1 also contains estimates of the increase in the number of equivalent dwelling units (EDUs) that are associated with each of the alternative development scenarios. Equivalent dwelling units (EDUs) are units of measure that standardize all land use types (housing, retail, office, etc.) to the level of demand created by one single-family housing unit. For example, in the case of water, one EDU is equivalent to the amount of water (gallons per day) provided to the average Cranberry Township residential customer. A small business designed to use three times as much water as an average residential customer would have a demand of three EDUs in terms of a water demand; a large commercial complex that requires 50 times as much water each day would have a demand of 50 EDUs.

The numbers of EDUs presented in Table 1 are not the same for water and sewerage. The reason for this is that the sewer system improvements include allowances for EDUs associated customer growth in the portions of Marshall Township and Sewickley Township that are currently tributary to the Cranberry system while the water system improvements include allowances for EDUs associated with future customers associated with the potential expansion of Cranberry service area into southern Jackson Township. The numbers of EDUs associated with these customers outside of Cranberry Township for are not the same for water and sewerage.

Figure 1 presents a graph of the cost and equivalent dwelling units data presented in Table 1. Figure 2 presents the ratio of cost of the identified water and sewerage system infrastructure improvements to the additional number of EDUs to be served for each development scenario. Note that the lowest combined water and sewerage system improvements unit cost ($/EDU) is associated with Development Scenario B – the mid-range growth scenario. This implies that Development Scenario B is the most efficient scenario from the standpoint of the cost of providing the required associated water and sewerage infrastructure.

Steering Committee Questions and Comments

When does our contract expire with Westview Water Authority?
Answer: Our contract with Westivew Water Authority expires in 2017.
What is our EDU (Estimated Dwelling Unit) Cost?
Answer: Sewer$1,784.00 per EDU
Water$1,197.00 per EDU
What are the Developer and Township costs for sewer and water?
Answer: We will work with Chester Engineers to obtain this answer.
In order to be sustainable the Steering Committee Proposed the four (4) following options:

1. Raise Taxes
2. Lower Services
3. Increase Density
4. Redevelop Properties

The Cranberry Plan Steering Committee
Meeting # 9
Monday, July 14, 2008 5:30 p.m. – 7:00 p.m.

This meeting was opened by John K. Trant, Jr., Chief Strategic Planning Officer for Cranberry Township. Eric Kaunert, Community Planner for Cranberry Township, was also present.

Steering Committee Members Present:

- Chad Brinkley
- Dick Hadley
- Jim Collela
- Bill Thompson
- Bruce Mazzoni

The meeting was called to order at 5:30 p.m. at which time Mr. Trant went over the agenda for the Steering Committee Meeting Number 9.

The following is a summary of the remainder of the meeting:

Schedule Update

Upcoming Meetings:

- Thursday, July 31, 2008 (Public Meeting)
- Tuesday, August 12, 2008 (CAP Meeting)

Upcoming Steering Committee Meetings:

- Monday, August 4, 2008
- Monday, September 2, 2008

June CAP Re-CAP

At the June 10, 2008 CAP Meeting representatives from individual task forces presented their findings to the Steering Committee. The following is brief summary of what each task force presented:

- **Economic Development:** Start an Economic Development Authority
- **Public Image:** Focus on Community and Connectivity
- **Sewer, Water, Environmental:** Pursue Green projects and an aggressive infrastructure plan
- **Parks and Recreation:** Provide a wide range of recreation opportunities for all ages
- **Culture and Diversity:** Partner with regional organizations and adopt a diversity statement

- **Transportation & Mobility:** Priority Projects: Rochester Road/Turnpike Bridge, Freedom Road/Turnpike Bridge, Route 228 Corridor Improvements, and Possible new I-76 Ramps

Growth Scenario Review

Maps of Growth Scenarios A, B, and C were distributed to the Steering Committee. Each map included a table that identified the land use distribution at the comprehensive plan initiation date as well as the projected build out land use distribution. A summary of those tables is listed below:

Cranberry Township Existing Land Use Distribution(2007)		
Land Use	**Total Square Feet**	**Total Acres**
Hotel	473,445	32.6
Industrial	4,260,433	368.9
Office	5,653,338	747.4
Restaurant	288,151	64.2
Retail	3,846,154	475.9
Total Non-Residential	14,521,520	1,689.10
Residential	10,054 Units	6,460

Scenario A Build Out			
Scenario A Build out Totals		**Scenario A % Increase**	
Hotel Rooms	1,214 Rooms (1,237,066 SF)	Hotel	21.91%
Industrial Square Feet	7,290,755	Industrial	42.47%
Office Square Feet	12,082,568	Office	63.06%
Restaurant Square Feet	492,171	Restaurant	41.45%
Retail Square Feet	5,664,227	Retail	45.95%
Total Non-residential SF	**26,766,787**	**Non-residential**	**206.32%**
Population	**38,095(13,557 Res. Units)**	**Population**	**23.45%**

Scenario B Build Out			
Scenario B Build out Totals		**Scenario B % Increase**	
Hotel Rooms	1,567 Rooms (1,596,773 SF)	Hotel	39.50%
Industrial Square Feet	6,525,869	Industrial	35.73%
Office Square Feet	11,031,906	Office	59.54%
Restaurant Square Feet	653,438	Restaurant	55.90%
Retail Square Feet	6,862,826	Retail	55.39%
Total Non-residential SF	**26,670,812**	**Non-residential**	**205.58%**
Population	**50,011 (17,798 Res. Units)**	**Population**	**41.69%**

Scenario C Build Out			
Scenario C Build out Totals		**Scenario C % Increase**	
Hotel Rooms	1,865 Rooms (1,900,435 SF)	Hotel	49.17%
Industrial Square Feet	6,213,766	Industrial	32.50%
Office Square Feet	11,177,681	Office	60.07%
Restaurant Square Feet	795,135	Restaurant	63.76%

Retail Square Feet	7,262,554	Retail	57.85%
Total Non-residential SF	**27,349,571**	**Non-residential**	**210.81%**
Population	**64,293 (22,880 Res. Units)**	**Population**	**54.64%**

Scenario Impacts Executive Summary

The final draft of the Scenario Impacts Executive Summary was distributed to the Steering Committee. The fiscal impact measures the differences in estimated monetary outlay required by Cranberry Township in response to the changes in land use and levels of build-out associated with each growth scenario. The impact analysis is not intended to be a predictor of actual budgetary numbers, but instead an evaluation of the differences of alternative growth scenarios on municipal operations. By establishing assumptions about operational levels of services, it is possible to evaluate the differences in staffing levels necessary to support the growth scenarios. Staffing projections coupled with projected increases in expenditures provide a basis for evaluating overall financial needs relative to each growth scenario. This document is located in the Steering Committee Meeting #9 July 14, 2008 meeting workspace or upon request.

Scenario Summaries

The Scenario Impacts Executive Summary was the final piece of information regarding Scenarios A, B, and C. To summarize all of the comprehensive plan material the Township created the "Scenario Summaries" document, which highlights all projections in a four (4) page document. The Scenario Summary document includes highlights on the budget projections, land use projections, transportation projections, staffing and municipal facility projections, and infrastructure projections. This document was distributed to the Steering Committee and will be used as a quick scenario guide while selecting the preferred growth scenario. The Scenario Summaries document is located in the Steering Committee Meeting #9 July 14, 2008 meeting workspace or upon request.

Impact Assessment Worksheet

The Impact Assessment Worksheet is a decision matrix document which will assist the Steering Committee in selecting the preferred growth scenario. The worksheet places the major categories of the plan (ex. Transportation, parks and recreation, social equity, etc.) in rows. Running perpendicular to the rows, in columns, are the major forces affecting the plan (Ex. Market Forces, Sustainability, Staff/Consultant Input, Public Input, and Feasibility).

The Steering Committee was given the Impact Assessment Worksheet and asked by Staff to complete the worksheet while referencing the Scenario Summaries document. Upon completion, we will average the Steering Committee responses and calculate them with the CAP responses in order to obtain an indication of the preferred scenario. The Impact Assessment Worksheet document is located in the Steering Committee Meeting #9 July 14, 2008 meeting workspace or upon request.

Action Items

- Perform a Cost/Benefit Analysis of the following land uses:
  - Retail
  - Restaurant

- Office
- Industrial
- Hotel
- Residential

- Survey Municipal Parks, Library, and other municipal functions to determine use and satisfaction.
- Assist the Steering Committee in identifying a method to select the preferred growth scenario. The following are possible methods:
  - Base decision on the biggest cost – Roads
  - Base decision on when a new sewage plant is needed
  - Take the results from the Cost/Benefit Analysis and make the decision based off of those results.

The Cranberry Plan Steering Committee
Meeting # 10
Monday, July 14, 2008 5:30 p.m. – 7:00 p.m.

This meeting was opened by John K. Trant, Jr., Chief Strategic Planning Officer for Cranberry Township. Eric Kaunert, Community Planner for Cranberry Township, was also present.

Steering Committee Members Present:

- Chad Brinkley
- Dick Hadley
- Jim Collela
- Bruce Mazzoni

Consultants Present:

- Mat Mehalik

The meeting was called to order at 5:30 p.m. at which time Mr. Trant went over the agenda for the Steering Committee Meeting Number 10.

The following is a summary of the remainder of the meeting:

Schedule Update

Upcoming Meetings:

- Tuesday, August 12, 2008 (CAP Meeting)
- Tuesday, September 9, 2008 (CAP Meeting)

Upcoming Steering Committee Meetings:

- Monday, September 2, 2008
- Monday, October 6, 2008

July 31st Public Meeting ReCAP

Call to Order - Chairman Hadley

Chairman Hadley called the meeting to order at 6:30 p.m. in the Council Chambers of the Cranberry Township Municipal Center, 2525 Rochester Road, Cranberry Township, PA, and led the salute to the flag.

Cranberry Plan Update Presentation

- **Introduction to the Cranberry Plan – Dick Hadley**
  Mr. Hadley welcomed everyone to the Cranberry Plan Update presentation and noted that all of the food and drinks that were available before the meeting were donated, and Mr. Hadley thanked the local businesses for their support. Mr. Hadley also thanked Nick Marzock for singing and playing the guitar during the open house from 3:00 to 6:00 pm before the meeting, where staff and CAP members provided an opportunity for residents to obtain additional information about this planning process. Mr. Hadley thanked the Cranberry Plan and CAP volunteers, nearly eighty people, for their time and efforts in this endeavor, noting the last Comprehensive Plan was done in 1995, and all of the goals of that plan have been achieved. From 1995 to today, Cranberry Township continues to grow and we need to take a long-term approach as we become a mature community, and we want the community to tell us what we need in the future.

- **Cranberry Plan Community Update – John Trant, Jr.**
  Mr. Hadley introduced John Trant, Jr., noting that John and his staff do a great job in coordinating the CAP, and each committee will make a presentation this evening, and then we will have a question and answer session.
  John reviewed the Citizen Survey which can be found on the Cranberry Plan website and the Cranberry Township website.

- **Economic Development & Redevelopment, CAP Member Susan Balla**
  Mr. Skorupan introduced Susan Balla from Gateway Bank who is the Chairman of the Board of the Cranberry Area Chamber of Commerce who discussed Economic Development and Redevelopment, noting we need to work with Seneca Valley School District; endeavor to have public transportation available which would bring qualified workers to the area; simplify the development process in Cranberry Township; and partnership with schools and universities.

- **Culture and Diversity, CAP Member Jan Stevens**
  Mr. Mazzoni introduced Jan Stevens, member of the Cranberry Library Board and local realtor. Ms. Stevens noted we need to promote a social climate that accepts diversity and suggested the Board of Supervisors adopt a diversity statement and publish it on the Township website.
  Ms. Stevens read a sample statement entitled “Cranberry Township Values People.”
- **Transportation and Mobility, CAP Member Susan Rusnak**
  Mr. Root introduced Susan Rusnak who discussed pedestrian friendly streets with bike lanes, and sidewalks connecting throughout plans and parks, as well as public transportation.

- **Public Image, CAP Member Bob Gillenberger**
  Mr. Mazzoni introduced Bob Gillenberger who discussed our Public Image, noting this is a great place for families and community involvement.

- **Sewer, Water and Environmental Stewardship, CAP Member Randy Elder**
  Mr. Root introduced Randy Elder who discussed how the growth of the Township affects our sewer and water situation, noting we will need a third connection and possible additional storage facilities. We are also considering providing water to our neighboring municipalities. Mr. Elder also suggested requiring new development to landscape with native plantings, ensuring the future of the landscaping.

- **Parks and Recreation, CAP Member David Kovach**
  Mr. Hadley introduced Dave Kovach, Cranberry Township Police Sergeant and Community Relations Officer. Sgt. Kovach noted the importance to people of the quality of life amenities, which accounts for the number of young families moving into Cranberry Township. The Township needs additional facilities and to look at acquiring land in the future for recreational activities. Interconnectivity is also important to the community.

  Mr. Hadley announced the Pittsburgh Ballet will perform at the Community Park Amphitheater on August 22nd at 7:00 p.m.

  Mr. Hadley thanked everyone and commented that the Board is pleased with the dedication of the Township staff, and there is no process as in depth and comprehensive as the process that is taking place here right now.

Sustainability Assessment

The Sustainability Assessment was a collaborative process where Cranberry Township opened its doors and records to a thorough review of both the many ways in which the Township is already implementing sustainable solutions and for analysis of opportunities to go further. Sustainable Pittsburgh managed an assessment team to study and build Cranberry's internal capacity for applied sustainability. The multi-disciplinary team was afforded opportunity and access to a wide range of municipal facilities, personnel, and data. Upon a review of the Cranberry Township's operations, a report was generated outlying the Township's current sustainable processes, as well as recommendations for new sustainability initiatives. Those recommendations were broken down into three (3) different types: Tier 1 – the low hanging fruit, which requires low risk and will offer low rewards, Tier 2 – which requires incremental risk to in respect to Tier 1, but offers long term and higher rewards, and Tier 3 – which requires great risk, but also offers large rewards.

Upon reception of the Sustainability Assessment Report, all participating consultants were invited to speak about their discipline and their most important sustainability recommendation. Below is a listing of each discipline and their most important recommendation:

Human Resources – Communication from the Township to its employees, as well as increased Sustainability education.

Finance – Communication between the Township and residents about what the Township is doing financially. Also, an evaluation of the Township's free services was recommended to determine which services can be converted to fee services generate revenue.

Energy Conservation – The most important recommendation for this discipline was to appoint an energy manager to quantify energy consumption and oversee initiatives of energy conservation. Also, the overall lighting of the Township was seen as the area in most need of attention in respect to energy conservation.

Alternative Energy – The procurement of Green Power.

Green Purchasing – Enacting an EPP Policy.

Recycling – Making recycling easy for residents and employees as well as recycling education.

Stormwater – Utilizing rain barrels.

Policy Ordinances and Affordable Housing – Create an overall vision for the Township.

Certifications – Obtain the LEED ISO 1400

Golf Course – Communicate to the residents what sustainability initiatives we are carrying out at the Golf Course.

Future Land Use Discussion

- Zone for more cluster development in the core and more PRD's or TND -1's in the outlying areas
- Plan for more Redevelopment Areas
- Plan for Mass Transit, specifically a Bus "Loop" System

Action Items

Continue the search for a Sister City for Cranberry Township, specifically communities with a population of 50,000 or 60,000.

The Cranberry Plan Steering Committee
Meeting # 11
Tuesday, September 2, 2008 5:30 p.m. – 7:00 p.m.

This meeting was opened by John K. Trant, Jr., Chief Strategic Planning Officer for Cranberry Township. Eric Kaunert, Community Planner for Cranberry Township, was also present.

Steering Committee Members Present:

- Chad Brinkley
- Dick Hadley
- Jim Collela
- Bruce Mazzoni
- Susan Beck

CAP ReCAP

1. **Results of the Cranberry Township Sustainability Assessment**
   a. Matt Mehalik provided an overview of the Sustainability Assessment
   b. Explained Tier 1, 2, and 3 recommendations
   c. Answered Sustainability questions from the CAP

2. **Benefits of Mixed-Use/Traditional Neighborhood Developments**
   a. John Trant gave a PowerPoint presentation on the benefits of TND's
   b. The CAP was very receptive to TND style development and the benefits it brings to Cranberry Township

3. **Future Land Use Exercise**
   a. The CAP was given maps of the Township and asked to "map out" the future land use of the Township

4. **Congestion Management/Southwestern Pennsylvania Commission Toolbox**
   a. **A video was shown describing the Congestion Management System for SPC**
   b. **At the next CAP Meeting the CAP will make recommendations to the SPC through the Congestion Management System**

5. **Did you know? (Rt. 228 Project)**
   a. A brief summary of the Route 228 Project was given by John Trant

Preferred Growth Scenario/Future Land Use Map

Staff and the Steering Committee Reviewed Scenario B, the Preferred Growth Scenario Map, and the

Future Land Use Map. All suggestions made by the Steering Committee are reflected in the "Actions Items" section of this document.

Action Plan

Goal 1
By 2030, Cranberry Township will improve connectivity and mobility and become a community with a grid network of interconnected streets, sidewalks, trails, and buildings; and will connect and expand the local pedestrian and street network to access key north/south and east/west transportation corridors.

Goal 2:
By 2030, Cranberry Township will become a community with a variety of transportation options for residents, employers, workers, and visitors.

Goal 3:
By 2030, Cranberry Township will be a community that works with state and federal officials to provide enhanced mobility through adequate infrastructure and congestion management.

Goal 4:
By 2030, Cranberry Township will become a community of increased housing options that include a variety of housing types (single-family homes, apartments, townhouses, and condominiums) to service different lifestyles and income levels, located within the same neighborhoods.

Goal 5:
By 2030, Cranberry Township will continue to be a community with strong neighborhoods with well-maintained housing stock and programs targeted to maintaining real estate values.

Goal 6:
By 2030, Cranberry Township will become a community with a mix of land uses that maintains a diverse tax base and supports a high quality of life. Mixed-use development will permit residences, offices, shops, and services to locate together for the efficient use of space and reduced traffic congestion. Special attention will be given to enhancing architectural aesthetics, pedestrian access, and public transportation.

Goal 7:
By 2030, Cranberry Township will become a community which has a sustainable diverse economy that can weather national economic fluctuations. Cranberry will be a regional employment center and a hub for regional economic development.

Goal 8:
By 2030 Cranberry Township will be a community with visual identity that makes a clear statement when entering the Township. It will project a sense of place through quality architecture and design of buildings, public spaces and streetscapes.

Goal 9:
Through 2030, Cranberry Township will continue to be a community that meets the ongoing communications needs of the community by providing a consistent, multi-faceted, current, and progressive message.

Goal 10:
By 2030, Cranberry Township will become a community with indoor and outdoor recreational opportunities and broader offerings including structured and unstructured activities, to meet the evolving needs of a diverse community.

Goal 11:
By 2030, Cranberry Township will become a community with a network of linked open spaces accessible to the public, which creates passive recreational opportunities.

Goal 12:
By 2030, Cranberry Township will become a community with preserved environmentally sensitive areas, including but not limited to steep and slide-prone slopes, floodplains, wetlands, and stream corridors. These features will be proactively incorporated into the review and design of new development.

Goal 13:
Through 2030, Cranberry Township will continue to be a community that meets infrastructure and facility needs and maintains high quality service to an evolving, diverse community.

Goal 14:
Through 2030, Cranberry Township will continue to be a community that is actively engaged, and that advocates and encourages regional approaches and solutions to local government challenges and opportunities.

Goal 15:
Through 2030, Cranberry Township will continue to have a governance structure that is dynamic, proactive, fiscally sound, responsible and responsive, professional, and a high-quality service provider.

(More Goals will be added in the 2nd Draft)

Mission Statement
Through effective civic leadership and efficient public services, Cranberry Township sustains an environment that cultivates innovation and excellence by engaging residents, businesses, government agencies, and nonprofit organizations to ensure a community of choice that is healthy, welcoming, and connected.

Action Items

- Add Fernway to the Redevelopment Map
- Add the Seneca Valley property in the northernmost part of the Township to the Preferred Growth Scenario Map (Adjust Calculations)
- Add the Driving Range (Viola Property) to the Preferred Growth Scenario map (Adjust Calculations)
- Add North Boundary Road to the Streetscape Enhancement street list on the Future Land Use Map
- Change the northern portion of industrial section (purple) off of Marshall Road to office on the Future Land Use Map
- Make sure that the Redevelopment Map is congruent with the Future Land Use Map
- Use the Mission Statement internally to direct Township Staff but do not use the mission statement externally for a marketing slogan.

The Cranberry Plan Steering Committee
Meeting # 12
Tuesday, October 7, 2008 5:30 p.m. – 7:00 p.m.

This meeting was opened by John K. Trant, Jr., Chief Strategic Planning Officer for Cranberry Township. Eric Kaunert, Community Planner for Cranberry Township, was also present.

Steering Committee Members Present:

- Chad Brinkley
- Dick Hadley
- Jim Collela
- Bruce Mazzoni
- Sharon Beck
- William Thompson

Schedule

- Next CAP Meeting – Tuesday, October 14, 2008
- Public Meeting – Thursday, October 30, 2008
- Final Steering Committee Meeting – Monday, November 3, 2008
- Final CAP Meeting – Tuesday, November 11, 2008 (Cranberry Highlands Golf Course)
- December 29, 2008 – PAC review
- January 5, 2009 – PAC recommendation to BOS
- January 29, 2009 – BOS review
- February 5, 2009 – BOS adoption

Future Land Use Map
The Steering Committee reviewed the Future Land Use Map and recommended the following:

- Revisit the eastern end of the Route 228 having the future land use classification of "High/Medium Density Residential
- Check the infrastructure projections for TND Smart Growth Sub Area 1C

Strategies for Action
The Steering Committee had the following comments in regards to the Strategies for Action Document:

- Include a strategy that discusses a Bus Loop around Cranberry Township
- Include a strategy that discusses garnering support for regional transportation projects
- Include a strategy that discusses the Route 19 Study
- Include a strategy that provides ethnic housing
- Include a strategy for mobile home parks
- Include a strategy that discusses Cranberry Point
- Include a strategy that addresses Community Day and possibly adding more community-wide events
- Include a strategy that deals with shared services
- Include a strategy that deals with the Historical Society
- Include a strategy the preserves the Meeder House and Barn in the Cranberry Town Center
- Include a strategy that calls for an annual meeting with the Planning Advisory Commission, Zoning Hearing Board, and Board of Supervisors

Branding Presentation
Peter Longini and Chris Labash gave a presentation regarding the Cranberry Township branding process. The new tagline for the Township will be, "Cranberry Township, Built Around You."

Action Items

- Revisit the eastern end of Route 228 having the future land use classification of "High/Medium Density Residential
- Check the infrastructure projections for TND Smart Growth Sub Area 1C
- Revise the Strategies for Action Document as per the Steering Committee Meeting Comments
- Continue work on the Sister City search and document
- Send the remaining meeting dates associated with The Cranberry Plan
- Identify how many mobile homes are in Cranberry Township

END


the CRANBERRY PLAN
2003
2030
Shaping the Future
WWW.CRANBERRYPLAN.ORG

SMART TRANSPORTATION GUIDEBOOK

Planning and Designing Highways and Streets that Support Sustainable and Livable Communities

New Jersey Department of Transportation

Pennsylvania Department of Transportation

MARCH 2008

March 2008

The Pennsylvania and New Jersey Departments of Transportation have partnered in the development of the Smart Transportation Guidebook — a roadmap to a successful future!

The goal of the Guidebook is to integrate the planning and design of streets and highways in a manner that fosters development of sustainable and livable communities. The Guidebook has equal applicability to rural, suburban and urban areas.

Transportation needs will always outweigh available resources. Smart transportation means incorporating financial constraints, community needs and aspirations, land use, and environmental constraints during project development. The result will be an effective use of resources and a lasting community asset.

Deep appreciation is extended to the design and planning personnel from both the New Jersey and Pennsylvania Departments of Transportation who participated in the preparation of this Guidebook. Their creativity was critical to the success of this effort.

Thanks also go to the Federal Highway Administration Division Offices from both New Jersey and Pennsylvania for their contributions and review of the guidebook. And special appreciation goes to the Delaware Valley Regional Planning Commission for administering the work of the consultant production team.

The principles and concepts in the Smart Transportation Guidebook are offered for use and thoughtful deliberation in all communities throughout Pennsylvania and New Jersey.

Sincerely,

Allen D. Biehler
PennDOT Secretary

Kris Kolluri
NJDOT Commissioner

TABLE OF CONTENTS

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HOW TO USE THIS BOOK

The* Smart Transportation Guidebook *provides guidance on planning and designing non-limited access roadways in New Jersey and Pennsylvania, from local streets through multi-lane state highways.

Turn to the following chapters for information:

What is "Smart Transportation"?

For an understanding of this new approach to planning and designing roadways, see the key principles of Smart Transportation in **Chapter 1: Introduction**.

Project planning on state roadways.

For assistance in project planning on NJDOT and PennDOT roadways, see **Chapter 2: Smart Transportation Tools and Techniques.** County and local governments should also review this chapter for ideas on how to create the best projects on their roadways. To understand the role of the local government in NJDOT and PennDOT projects, see **Chapter 3: A Local Commitment.**

Planning and designing the roadway.

For all roadway projects, proceed using the following steps:

- Identify the land use context; see **Chapter 4: Land Use Context**. Choose the land use context that best describes the study area. If there are plans for the study area, choose the land use context based on those plans.
- Identify the transportation context; see **Chapter 5: Transportation Context**. Choose the roadway type that best describes the role of the roadway in the community. Also evaluate the surrounding roadway network; in Smart Transportation, the relationship of the road to the larger network should always be understood.
- Choose design values for the roadway, appropriate to land use context and roadway type. See **Chapter 6: Designing the Roadway**.

Guidance on roadway and roadside design.

What factors should be considered in planning and designing the roadway? See Chapters 7 through 9:

- For guidance on the appropriate design of roadway elements – travel lanes, on-street parking, shoulders, bicycle facilities, medians, and intersections – see **Chapter 7: Roadway Guidelines**.
- For guidance on the appropriate design of roadside elements – pedestrian facilities, transit facilities, landscaping and streetscaping – see **Chapter 8: Roadside Guidelines**.
- For guidance on general systems issues – access management, traffic calming, operations and maintenance, and emergency response – see **Chapter 9: Road System Issues**.

1.0 Introduction

The New Jersey Department of Transportation (NJDOT) and the Pennsylvania Department of Transportation (PennDOT) have commissioned the preparation of the *Smart Transportation Guidebook*. Its focus is to guide the development of non-limited access roads as context sensitive roadways, with the goal of creating transportation facilities that work well for all users, are affordable, and support smart growth community planning goals.

1.1 WHY IS SMART TRANSPORTATION IMPORTANT? WHY THIS BOOK?

NJDOT and PennDOT cannot always solve congestion by building more, wider and faster state roadways. There will never be enough financial resources to supply the endless demand for capacity. Further, both states realize that the "wider and faster" approach to road construction cannot ultimately solve the problem. Sprawling land uses are creating congestion faster than roadway capacity can be increased. Figure 1.1 illustrates this never-ending cycle of transportation and land use changes.

Smart Transportation proposes to manage capacity by better integrating land use and transportation planning. The desire to go "through" a place must be balanced with the desire to go "to" a place. Roadways have many purposes, including providing local and regional mobility, offering access to homes and businesses, and supporting economic growth.

The Guidebook intends to help agencies, local governments, developers and others plan and design roadways that fit within the existing and planned context of the community through which they pass.

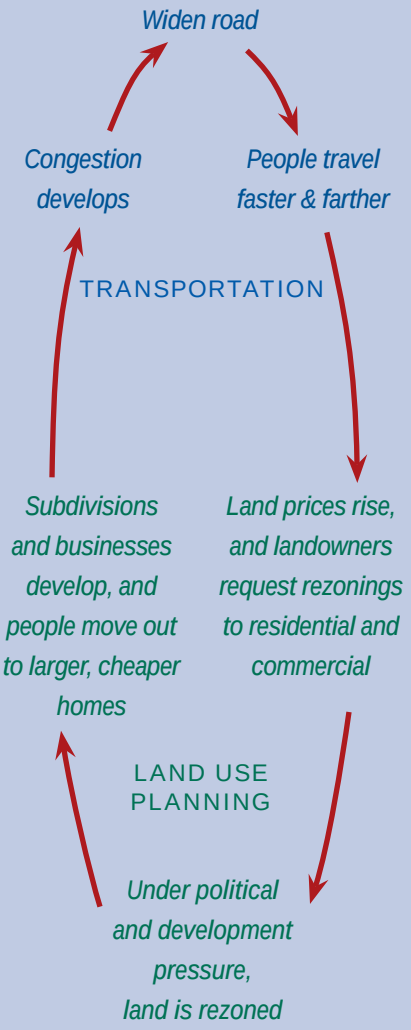


Figure 1.1 Transportation and Land Use Cycle

1.2 WHAT IS SMART TRANSPORTATION?

Smart Transportation recommends a new approach to roadway planning and design, in which transportation investments are tailored to the specific needs of each project. The different contexts - financial, community, land use, transportation, and environmental - determine the design of the solution. The best transportation solution arises from a process in which a

multi-disciplinary team, considering a wide range of solutions, works closely with the community. Inclusive of context-sensitive solutions (CSS), Smart Transportation also encompasses network connectivity, and access and corridor management. It will help both states and communities adapt to the new financial context of constrained resources.

Smart Transportation **can be summarized in the following principles:**

1. Tailor solutions to the context.

Roadways should respect the character of the community, and its current and planned land uses. The design of a roadway should change as it transitions from rural to suburban to urban areas. Changes in roadway widths, the presence or absence of parking lanes, and other factors provide clues to motorists on how fast to drive when they pass from one land use type to another. If appropriately designed, vehicular speeds should fit local context. The concept of desired operating speed, described later in the Guidebook, is key to the context sensitive roadway.

Community context is much more than the physical appearance of buildings and street. At the local level, the context includes the role of the roadway in supporting active community life.

The transportation context of the roadway is essential. Use of the Guidebook is not meant to result in a cookie-cutter roadway template, in which the same Main Street or commercial corridor design appears in every town. The design of every roadway must respond to its unique circumstances. The states will continue to value the mobility offered by high-speed roadways that serve motorists drawn from a larger region or heavy freight traffic. Conversely, other state roadways serve mostly local traffic and can be designed to be more sensitive to the local context.

The presence of environmental resources must always be reflected in the development of alternatives.

Finally, the financial context must be considered. In both states, transportation funding is in short supply, and is far exceeded by needs. By permitting a narrower roadway, a Smart Transportation approach can save money on some projects. In other cases, streetscaping needs and other components may increase costs. But in all cases, designing a road to fit its context is the smart thing to do.

2. Tailor the approach.

Projects vary in need, type, complexity and range of solutions. Therefore, the approach should be tailored to that specific project. This tailored approach should be developed with the team members and project stakeholders early in the process. PennDOT's guidance on Linking Planning and NEPA (National Environmental Policy Act) describes this in more detail.

3. Plan all projects in collaboration with the community.

All state transportation projects are planned through on-going partnerships with local communities. Indeed, this Guidebook invites a wide-ranging discussion between the state, local officials, and citizens on the appropriate role of state roadways within the community. As part of this collaboration, both parties have responsibilities.

NJDOT or PennDOT will review proposed roadway projects to ensure that they maintain vital regional or statewide mobility goals. If the design is not consistent with community plans, the DOT may recommend revising the roadway design, or work with the community on alternative strategies to better accommodate regional trips.

For its part, the local government is responsible for sound land use planning. It should help create a well-connected street network that will better accommodate local trips, thus removing these trips from major roadways. Linking developments along arterials will also serve to moderate traffic growth on these roads. The local government should also encourage mixed use districts that cut down on the number of vehicular trips.

In summary, the collaboration between state and community involves the integration of land use planning with transportation planning, and a focus on the overall transportation network rather than a single roadway. These concepts should be incorporated into all corridor plans for NJDOT and PennDOT.

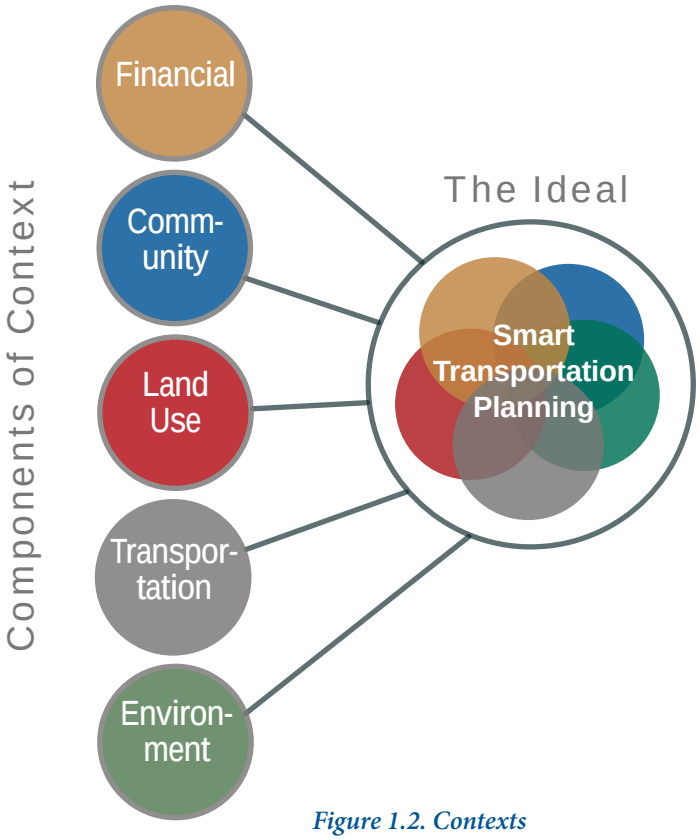


Figure 1.2. Contexts

4. Plan for alternative transportation modes.

The needs of pedestrians, bicyclists and transit users must be considered in designing all roadway projects. Sidewalk networks should be well connected with opportunities for regular, safe street crossings. On collector and arterial roadways, bike lanes or wide curb lanes can encourage people to bike rather than drive for short and moderate distance trips. If a roadway is designed to discourage vehicular speeding, it can be comfortably used by pedestrians and bicyclists alike. Transit friendly design should support a high level of transit activity. By encouraging alternative transportation, communities can break the pattern of sprawling suburbs with rapidly multiplying vehicular trips and congestion.

It should be acknowledged that there are potential trade-offs between vehicular mobility and pedestrian, bicycle and transit mobility. A balance should be sought in attaining these goals on all projects.

5. Use sound professional judgment.

Although this book provides guidance on the range of dimensions for roadway elements, all recommendations should be filtered through the best judgment of the project team after considering the specific circumstances of each project. There is no one-size-fits-all approach to good decision-making. The smart solution on some projects may be to seek design exceptions or waivers to allow for true context-based design.

Community involvement at work

"We shape our buildings, and afterwards our buildings shape us."

Winston Churchill, 28 October 1943 to the House of Commons (meeting in the House of Lords).

6. Scale the solution to the size of the problem.

Find the best transportation solution that fits within the context, is affordable, is supported by the communities, and can be implemented in a reasonable time frame. Examine lower scale alternatives like network additions or transportation system management before developing alternatives such as new or widened roadways. If safety and not congestion is the problem, consider focused solutions that can improve safety without increasing capacity. Safety must be considered on all roadway projects.

1.3 BACKGROUND OF SMART TRANSPORTATION

Smart Transportation is informed by two important concepts that have taken root in transportation and land use planning: Context Sensitive Solutions (CSS) and Smart Growth.

As defined by the Federal Highway Administration (FHWA), CSS is "a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist."

Smart Growth has been defined many different ways but generally emphasizes environmental preservation, compact development patterns, alternative transportation, and social equity.

The ideas behind Smart Growth and CSS have permeated the operating philosophies of both NJDOT and PennDOT. PennDOT has developed 10 Smart Transportation themes:

1. Money counts
2. Understand the context; plan and design within the context
3. Choose projects with high value/price ratio
4. Enhance the local network
5. Look beyond level-of-service
6. Safety first and maybe safety only
7. Accommodate all modes
8. Leverage and preserve existing investments
9. Build towns not sprawl
10. Develop local governments as strong land use partners

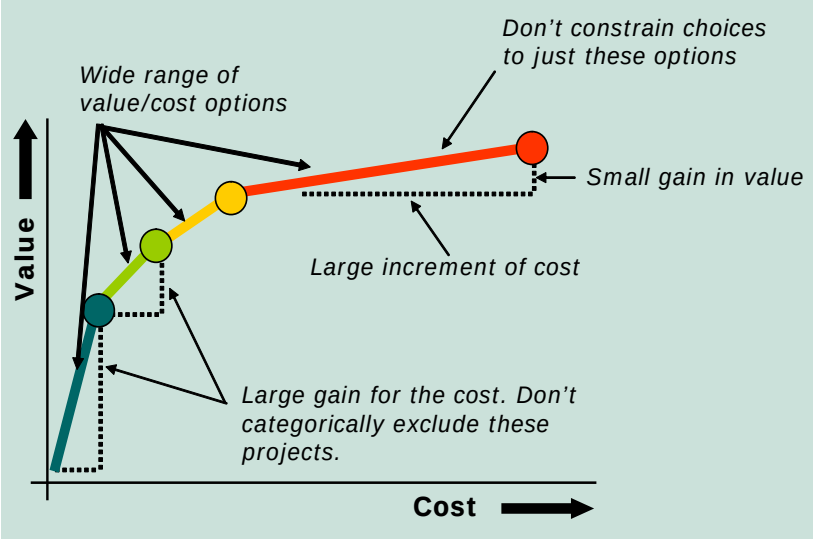


Figure 1.3. As shown here, it is important to look beyond choices of high cost and to develop solutions that have large gain in value for the cost.

The History of CSS

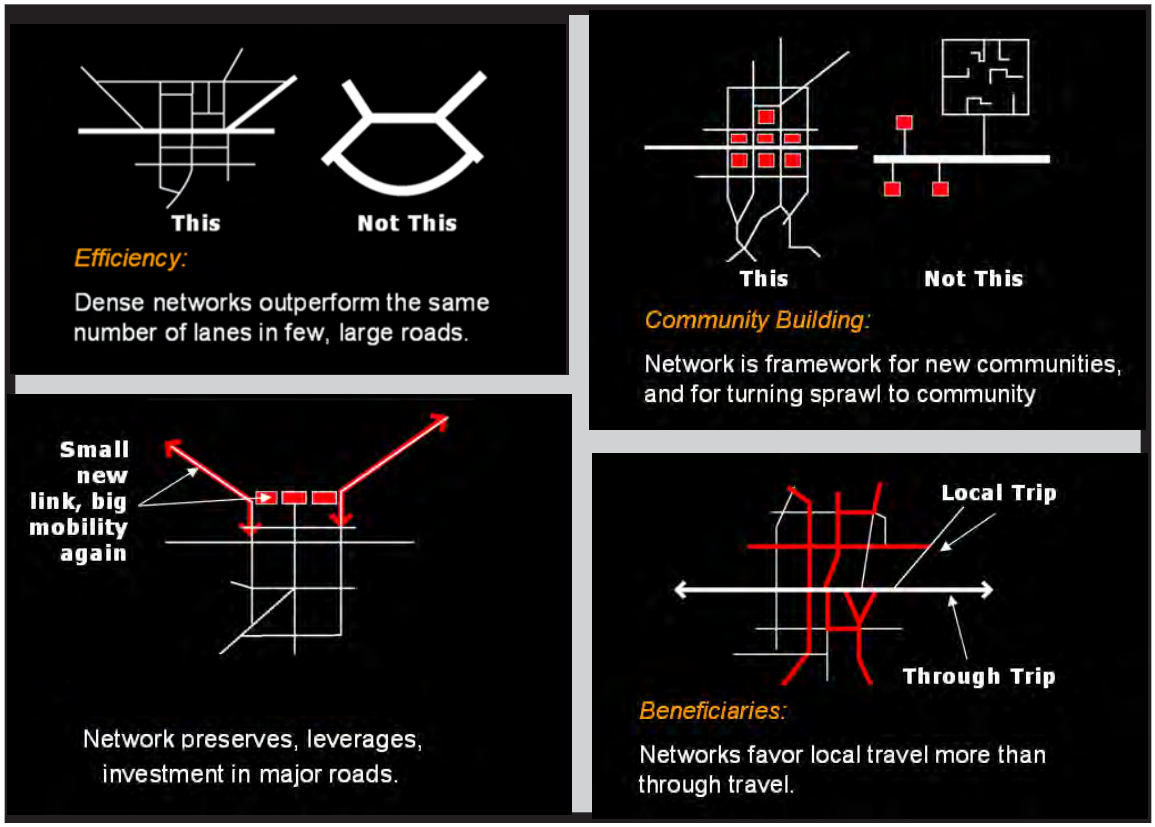
As this timeline shows, the idea that roadways should be planned for place is revolutionary, but not new:

1991 **Intermodal Surface Transportation Efficiency** Act, a landmark transportation funding bill, emphasizes the importance of sensitivity to community resources in all transportation projects.

1995 National Highway System Designation Act states that roadway designs may consider impacts of transportation projects on both the built and natural environment.

1998 "Thinking Beyond the Pavement" conference sponsored by the Maryland State Highway Administration in conjunction with the FHWA and AASHTO coins the term "context sensitive **design." Following the conference, five pilot states** – Connecticut, Kentucky, Maryland, Minnesota, and Utah – are asked by FHWA to implement CSD principles and report on their experience.

Figure 1.4 Benefits of Network



NJDOT's definition of context sensitive design says that "CSD maximizes the integration of the roadway into the surrounding environment/community, while providing for the road user's needs in a manner which is fiscally feasible."

The NJDOT proactive design policy includes the following statements supportive of smart transportation:

- Our designs should result in motorists driving freeways like freeways, arterials like arterials, collectors like collectors, and local streets like local streets;
- Designers may include elements that encourage drivers to slow down to speeds appropriate to local conditions; yes, this includes traffic calming (below 35 MPH).

1.4 FLEXIBLE DESIGN STANDARDS

The preparation of the *Smart Transportation Guidebook* has benefited from the promotion of flexible standards by the federal government and experiences in other states.

Like most states, the design manuals for both New Jersey and Pennsylvania are heavily drawn from the AASHTO Green Book (officially, American Association of State Highway and Transportation Officials, *A Policy on Geometric Design of Highways and Streets*, Fourth Edition, 2001). It is important to note that the Green Book is not a design manual, but rather a series of recommended design values for roadways, and that not all its criteria is based on safety. FHWA has adopted the Green Book

2004 Transportation Research Board publishes Context-Sensitive Design Around the Country, providing examples of CSD implementation throughout the United States.

2006 Institute of Transportation Engineers (ITE), partnering with the Congress of New Urbanism (CNU), and in conjunction with the FHWA and EPA, issues a proposed "Recommended Practice": Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities (2006). Some of the practices from that text are referenced in this guidebook.

for all roadways on the National Highway System (NHS). Both the FHWA (*Flexibility in Highway Design,* 1997) and AASHTO (*A Guide for Achieving Flexibility in Highway Design,* 2004) recommend flexibility in application of the Green Book design values, particularly when considering impacts on the community. Even greater flexibility is possible for non-NHS roadways; on these roads, states can set their own standards.

Despite this, standards in most state design manuals hew closely to AASHTO values, and sometimes surpass them. This is the case in both states. It is now recommended that both states take advantage of the flexibility offered in FHWA and AASHTO guidance. Application of flexible design will allow for greater improvements to the overall network by maximizing limited funding.

The use of seven different "land use contexts" as an organizing framework is key to providing flexibility for the designer. Smart Transportation recognizes the major differences between urban and suburban land use areas, and the different expectations of motorists in these areas. By tailoring design values to both land use context and transportation context, and tying both context types to the desired operating speed, the Guidebook promotes driving behavior consistent with roadway design.

Smart Transportation has benefited from the opportunity to learn from successful experiences in other states, where flexible design has been implemented and safety maintained.[1] For example, Vermont revised its State Standards in 1996 to reduce lane widths from the previous standards. The roadway design speed is permitted to be equal or less than the posted speed. There has been no apparent reduction in safety on Vermont roads from application of the new standards.[2]

PRINCIPLES OF SMART TRANSPORTATION

1. Tailor solutions to the context.
2. Tailor the approach.
3. Plan all projects in collaboration with the community.
4. Plan for alternative transportation modes.
5. Use sound professional judgment.
6. Scale the solution to the size of the problem.

1.5 PURPOSE OF GUIDEBOOK

This book provides guidelines for improving the roadway system in accordance with Smart Transportation principles. It can be used in the planning and design of non-limited access roadways of all classifications, from principal arterial highways owned by the state government to local roadways. At the state level, it will serve as a link between context sensitive philosophy and the DOT design manuals as well as the AASHTO Green Book. All county and local governments in both states, and their private sector partners, are encouraged to use this Guidebook.

1.6 PROJECT SPONSORS AND USE OF THIS GUIDEBOOK

DVRPC is the metropolitan planning organization (MPO) for the Philadelphia-Camden-Trenton metropolitan area, including Burlington, Camden, Gloucester and Mercer Counties in New Jersey, and Bucks, Chester, Delaware, Montgomery and Philadelphia counties in Pennsylvania. Although overseen by the DVRPC, the potential application of the Guidebook extends beyond the region, since NJDOT and PennDOT are key partners and other parts of New Jersey and Pennsylvania have similar land use and roadway characteristics.

Both NJDOT and PennDOT require use of context sensitive practices in all projects. Now for the first time, the two states are working together to establish common design guidelines, and to link land use context to roadway values for every roadway type in the region.

This Guidebook has potential application for a wide range of users in New Jersey and Pennsylvania:

- MPOs and RPOs (Rural Planning Organization) in the two states – serve as guidelines for integrated land use and transportation studies.
- NJDOT and PennDOT – serve as guidelines for applying the NJDOT and PennDOT design manuals in a context sensitive manner.
- Municipalities and Counties – serve as guidelines for land use and roadway development projects.
- Developers – provide tools to realize "smart growth" goals for developments.
- Residents of New Jersey and Pennsylvania – guide community development and better understand their role in the transportation project development process.

SMART TRANSPORTATION Tools and Techniques

2.0

This chapter describes tools and techniques that can be employed by PennDOT and NJDOT to develop transportation solutions that are context-sensitive and affordable, and that receive support from the community and resource agencies. These tools are not intended to replace the project development processes of NJDOT or PennDOT, but rather should be applied to existing processes in order to achieve smarter solutions. They are consistent with state and federal regulations, such as the National Environmental Policy Act (NEPA) and the federal transportation legislation referred to as SAFETEA-LU. Counties and municipalities can also benefit from the application of these tools.

2.1 WHY USE THESE TOOLS?

Project delays and escalating costs are discouraging to everyone involved. Planning and designing solutions that are not affordable and cannot be implemented do not solve problems. Projects that are built but do not meet the expectations of the community, the transportation agency or the general public are also frustrating.

The application of these tools will permit a better understanding of the problem, key issues, and potential solutions; agency and community opinion; and schedule and budget early in the process. In this manner, projects listed on the TIP can be implemented with more certainty, and completed within the estimated timeframe and budget.

Use of these tools will also help enable the following outcomes:

- Allocate financial resources to projects that address local, regional and statewide priorities.
- Achieve consistent expectations between project proponents and communities, and entities that evaluate and fund projects.
- Achieve the optimum accommodation for all modes.
- Ensure context sensitivity in the planning and design of projects.
- Decrease the amount of re-work in the preliminary engineering and final design phases of a project.

Early Project Budget Planning

Project planning is a complex undertaking, which involves identifying the transportation problems to be solved and finding the best alternative to solving the problems. Unfortunately, all too often, a project is defined, public commitments are made and then the news is delivered that the project is unaffordable.

In Smart Transportation, project planners and designers consider the potential project cost and funding resources at the earliest possible time. A cost estimate must be included when a project is introduced and continue to be updated as the project becomes better defined through the development process. As the project advances to decision points on whether it should move onto a TIP or into final design, the cost estimate must be up-to-date to enable decision makers to determine the project's future. A concerted effort must be made to fit a given project at the beginning of the pipeline into the window of available funding at the end. Projects that grow to exceed the available funding envelope must be evaluated to bring the scope in line with the established project budget, or be at risk of cancellation.

These Smart Transportation tools are applied in conventional transportation planning, but differ significantly by broadening many of the already-familiar steps. The tools are:

A. Understand the problem and the context before programming a solution for it.
B. Utilize a multi-disciplinary team.
C. Develop a project-specific communication plan.
D. Establish the full spectrum of project needs and quality of life objectives.
E. Focus on alternatives that are affordable and cost effective.
F. Define wide-ranging measures of success.
G. Consider a full set of alternatives.
H. Compare and test alternatives.

2.2 TOOLS AND TECHNIQUES

Both NJDOT and PennDOT implement a wide range of projects, from simple maintenance and roadway resurfacing projects to the construction of new highways. The tools and techniques described in this chapter can be applied at different levels, depending on the complexity and needs of each project.

NJDOT has organized each of their projects into four different "pipelines". Projects in pipelines 1 and 2 are more complex and will therefore require the greatest effort in planning and preliminary engineering to determine the best "fit" solution. On the other end of the spectrum, projects in pipeline 4 are much simpler and are often implemented through maintenance activities which require little preliminary engineering but will still benefit from early planning and coordination.

PennDOT has three categories of projects – minor, moderately complex and major. Although all of these projects include some level of problem identification and planning activities, the moderately complex and major projects will require the greatest effort in planning and preliminary engineering to determine the best solution.

For the purpose of this chapter, the terms "simple, moderate and complex" will be used to describe the general type of project. "Simple" projects will include PennDOT minor projects and NJDOT pipeline 4 projects. "Moderate" projects will include PennDOT moderately complex projects and NJDOT pipeline 3 projects. "Complex" projects will refer to PennDOT major projects and NJDOT pipeline 1 and 2 projects.

Tool A – Understand the problem and the context before programming a solution for it.

The purpose of the investment must be defined by project stakeholders from the beginning. Sufficient information must be gathered to understand the problem and its context, issues and opportunities, potential solutions and estimated costs, and draft implementation schedule.

What is the transportation problem? How much money is available for this problem? Is the problem related to safety, capacity, or roadway or bridge condition? Is the project intended to provide access for a specific economic development opportunity? Is it consistent with regional and state priorities? What is the role of the roadway within the study area?

To understand the problem and determine the project needs and objectives, the following activities should be conducted:

1. Review data that identified the need for the project. For some projects, this may simply be the output of the preservation and maintenance program. For more involved problems, such as safety or capacity, this should include crash data, projected traffic volumes, and future traffic generators in and around the study area.

2. Understand the existing and future context of the problem. This includes the financial context (order-of-magnitude costs, benefits and regional funding priorities), transportation context (function and use of the roadway), land use and community context (type of area that is served by the roadway), and environmental context. Evaluate regional and state priorities; if the problem is inconsistent with these priorities, it will likely not be funded. See Chapters 4 and 5 for information on determining the context.

3. Understand the project needs and objectives from the perspectives of the project sponsor, project team, local governments, potential users, and other interested parties. Establishing this understanding at the

beginning of the project will help to manage expectations. This activity will require more coordination for moderate and complex projects. For simple projects, the minimum activity involves coordination with municipal representatives and utilities on the anticipated schedule and potential impacts to their property, community or operations. Utilities should be notified even for routine resurfacing and rehabilitation projects to coordinate needed work.

Table 2.1 identifies techniques that can be used to achieve a solid understanding of the project, listed from least to greater effort. Routine maintenance and system preservation projects should use techniques that require the least effort. The full range of techniques could be used on more complex projects.

It can take many years for a transportation project to be implemented; it is important that the needs and objectives identified at the onset of the project are still valid and able to be addressed by the alternatives at the project's end. If a project has been in the development process for a few years, a review of the project, cost estimate, and its consistency with current priorities should be completed at major decision points in the process. NJDOT and PennDOT both employ go/no go decision points in their development processes.

Application

The following questions can be asked to determine if this tool was used effectively:

- Is there a clear understanding of the problem?
- How often, and for how long, does the problem occur?
- Has recent data been mapped and analyzed for a safety problem?
- Have the project team and stakeholders agreed to or adopted the project needs and objectives?
- What are the current and future transportation, environmental, land use and financial contexts of this problem?
- What alternatives should be developed?
- What are the order-of-magnitude costs for the potential alternatives? Are they consistent with state and regional priorities?
- What is the implementation schedule for the alternatives? Is the construction schedule understood by all potentially impacted parties?
- What is the agency and community opinion of this problem and potential solutions? What issues or concerns do municipal representatives have?
- Do the local municipalities, utilities, or private land owners have projects scheduled that may be facilitated or harmed by the project?

Table 2.1 Techniques to Understand Problems, Issues, and Opportunities - In Order from Most Simple to Most Complex

	Mapping	Collecting & Analyzing Data	Gathering Input from Municipalities and other Stakeholders
SIMPLE	Aerial Map of Existing Roadway or Bridge with 100' buffer on either side (Scale: 1" = 200')	Data from asset or performance management systems (pavement, bridge inspection, road safety audit, etc.)	Telephone calls to municipal representatives and utilities
		Crash history	Meeting with municipal representatives, on site
		Roadway Function – vehicle types, pedestrian activity, bicycle activity, trip characteristics, trip types, etc.	Small group discussion, conducted on site
	Regional Transportation Map	Major natural and environmental systems	One-on-one stakeholder interviews; conducted on site
		Existing context, land use and activity centers (trip generators)	Series of focus group meetings throughout the project area
COMPLEX		Anticipated future context, land use and activity centers	Meeting with regional elected officials

Tool B – Utilize a Multi-Disciplinary Team

The project team should encompass the skill sets and perspectives needed to address diverse viewpoints. A multi-disciplinary team contributes to a broader evaluation of data and measures of success, ensuring that the community's vision is well represented. The collaborative participation of all members of the team will permit a broad range of alternatives to be considered. Through local partnerships, network improvements and alternatives not located within the right-of-way can be implemented more easily.

Table 2.2 illustrates the relationship between specific problems or issues, the knowledge or skills needed to address these issues, and the internal and external team members that can provide that knowledge or skill. This table is merely an illustration of this idea and is not a complete list of issues or skills needed.

Solutions might target a single mode of transportation, or address the range of road users including pedestrians, bicyclists, transit operators, automobile drivers, and truckers. The issues and opportunities identified should inform the makeup of the team.

Table 2.2 Example Characteristics of Multi-Disciplinary Teams

Potential Problem or Issue	Specific Knowledge or Skills Needed	Potential Internal Team Member with Knowledge/Skills	Potential External Team Member with Knowledge/Skills
Drainage	Hydraulics	Drainage Engineer	DEP
Parklands	Section 4(f) Process	Environmental Specialist	County or Municipal Planner
Community Opposition	Communication & Conflict Resolution	Project Manager, Public Relations Representative	Municipal Manager, Community Groups, Elected Officials
Staged or Complex Construction	Construction Methods	Representative of Construction Unit	Construction Contractors
Soils with High Sinkhole Potential	Geotechnical/Hydrology	Geotechnical Engineer	DEP
Historic Bridge Structure	Structural Engineer Historic Resources	Bridge Unit, Environmental Unit	DEP, PHMC/SHPO
Pedestrian Fatalities	Safety, Pedestrian	Traffic & Safety Unit, Bike/ Pedestrian Coordination	Municipal Planner/Engineer
Speeding/Aggressive Driving	Safety, Roadway Design Traffic Calming	Traffic & Safety Group, Project Engineer, Traffic Calming Specialist	Municipal Planner/Engineer, Local Law Enforcement

Table 2.3 Example of Project-Specific Communications Matrix

	Communication Techniques				
Intended Audience/ Users of Facility	**Website**	**Visuals**	**Special Topic Meetings**	**General Meetings, Workshops, & Public Hearings**	**Radio/Press/ Newsletters**
General Public	X	X		X	X
Traveling Public	X	X		X	X
Resource Agencies	X	X	X	X	X
Elected Officials	X	X	X	X	X
Special Populations	X	X	X	X	X
Sounding Board	X	X	X	X	X

Complex projects often require input from many perspectives, including transportation planners, community leaders, citizens, environmental specialists, landscape architects, resource agencies, public works officials, design engineers, and agency executives. For complex problems, the roles and responsibilities should be defined at the beginning of the process. On federal and state-funded projects, the ultimate decision-makers will be the Federal Highway Administration and NJDOT or PennDOT.

Application

The following questions can be asked to determine if this tool was used effectively:

- What are the specific issues related to this project?
- Do team members have the specific knowledge and skills to address the project issues?
- Does the composition of the team reflect the complexity of the project?

Tool C – Develop a Project-Specific Communication Plan

A critical element of any project is gathering input from all interested parties, including resource agencies, project stakeholders, municipalities, users of the roadway, property owners, and citizens. Current transportation legislation requires that agencies and the public be provided an opportunity to comment on the purpose and need and potential alternatives as early as practicable in the decision-making process.

A Communications Plan should be developed for most projects. (The needed communication strategy should be determined during the scoping phase of the project.) The plan should consider all substantive issues likely to arise in the development and evaluation of alternatives. It can be a simple matrix that outlines the intended audiences and tools or techniques that will be used to reach these audiences. An example of this approach is shown in Table 2.3.

The communications plan should be developed with representatives of the intended audience, as they often know what tools and techniques have worked well in the past. During the course of the project, the effectiveness of the plan should be evaluated by the project team on a regular basis, and the plan and tools/techniques changed if necessary.

In general, the number of stakeholders and the level of agency and community coordination will grow with the increase in complexity and the number of sensitive issues that are associated with the project. Both PennDOT (Public Involvement Handbook) and NJDOT provide guidance on public involvement.

Table 2.4 lists the tools available to engage the public and agencies, ranging from tools that are applicable for simple projects to those that would be applied on more complex projects. Simple visualization tools, in particular, can be very effective in communicating ideas and gathering input on intended project outcomes.

Table 2.4 –
Example Techniques for Community Engagement

- Phone calls
- Letters
- Meetings
- Newspaper advertisement/article
- Public meeting(s)
- Press releases
- Posters of upcoming events
- Project newsletters
- Advertisements
- Interactive project website
- Stakeholder interviews
- Visualization tools
- Open houses
- Public hearing(s)
- Neighborhood meetings
- Surveys
- Walking audits
- Design workshops/ charrettes
- Citizens Advisory Committee
- Field offices
- Steering committee
- Formalized partnerships or inter-local agreements
- Conflict resolution

Application

The following questions can be asked to determine if this tool was used effectively:

- Does the communication plan include techniques that will appeal to all intended audiences?
- Have the techniques proven effective in gathering input and fostering project understanding? If not, how should the communications plan be modified to better achieve this?
- Has the project team opened a dialog with the stakeholders, potentially interested parties, community leaders and elected officials?
- Is there a summary of issues and opportunities that can be easily understood by the project stakeholders and the general public?
- Is there project support from the community/ stakeholders? If not, how will outstanding issues be addressed?
- What municipal representatives and stakeholders should be included in the next phase of project development?

Tool D – Establish the Full Spectrum of Project Needs and Objectives

The statement of purpose and need should include the objectives that the proposed project is intended to achieve. Consistent with SAFETEA-LU, objectives may include:

- Achieving a transportation objective identified in the statewide or metropolitan transportation plan;
- Supporting land use, economic development, or growth objectives in applicable federal, state, local or tribal plans; and
- Serving national security, or other national objectives as established in federal laws, plans or policies.

Project needs and objectives should be developed in collaboration with the study team and stakeholders. Following are some common examples of project objectives:

1. Structural integrity. For many projects, the primary objective is to provide safe and structurally-sound roads and bridges. Does this require full reconstruction, rehabilitation, or preventative maintenance? The character and design of the structure, and treatment of pedestrians and bicyclists, may also be important objectives for the community.

2. Safety. Crash data should be reviewed to determine if safety problems exist. Safety must be addressed for all users, including pedestrians and bicyclists. Is safety increased through the raising of design speed (crashworthiness) or through the reverse method of matching desired operating speeds with the context (context sensitive design)? The solution must be commensurate with the documented problems.

3. Traffic service. This is a common measure on projects, but it is possible to refine the goal to a greater degree than typically seen. For example, do traffic service goals apply to service for all users? For daily local travel to destinations or for distant weekend ones? Is there a concern with traffic service all day, a peak hour, or something in between? Is mobility (the ability to get from origin to destination, possibly by a variety of routes), really the traffic issue, rather than speed or delay? Is parking part of the traffic service?

4. Non-motorized user service. Do the goals of "pedestrian-friendly," "bicycle-friendly," or "transit oriented" apply? If these are important goals in the study area, consideration could be given to the use of formal level of service measures for pedestrian, bicycle and transit service.

5. Community character. As a starting checklist, identify the character types defined in Chapters 4 of this guidebook. Variations on these basic context types within the study area could be identified, such as "Main Street" or "neighborhood business center."

6. Economic development. The role of economic development can be analyzed in numerous ways. Will the facility result in opening up more area to development? Is the project located in a growth area identified by the MPO, RPO and/or municipalities? Will it serve to attract "big-box" retail or regional distribution uses? Will it strengthen a "Main Street," or otherwise compete with sprawl? Will it add to the visitor appeal of a scenic or historical asset?

All objectives should be developed with, and accepted by, the project team and stakeholders. For simple projects, documenting agreement may involve a phone call, email and/or letter with the municipal representative. For complex projects, these goals must be vetted with the project team and stakeholders, and documented ***before*** project alternatives are developed.

Application

The following questions can be asked to determine if this tool was used effectively:

- Are the project needs and objectives understood by the project team and stakeholders?
- Were agencies and the public involved in the development of project needs and objectives?

Tool E - Focus on Alternatives that are Affordable and Cost-Effective

No matter how good a solution is, if it is not affordable, it will not solve the problem. Financial resources are very limited in both New Jersey and Pennsylvania. Construction costs have increased significantly (30-40% over the last few years) and federal and state funds are not keeping pace with demand. Wise investment in transportation infrastructure requires sensitivity to available funding.

Virtually all projects offer a range of options with different costs, corresponding to different levels of value. However, the importance of understanding alternatives based on the value to price ratio is often overlooked. Current guidance is fairly silent on this subject, and does not direct projects toward the most effective value to price yield. Frequently, one objective is given as an absolute mandate, which must be met at all costs. The concepts of "return on investment" and "right sizing" recognize the growing importance of evaluating the value to price ratio on proposed alternatives. Performance measures such as cost per existing trip, cost per new trip, and cost per time savings for a representative trip may be used to better understand the return on a proposed investment.

Both NJDOT and PennDOT have capital investment committees that review cost estimates for all major projects and determine if the project should move forward. Acting as "gatekeepers," these committees are tasked at key decision points with evaluating the proposed investment in relation to potential benefits and federal, state and regional priorities. To ensure fiscal responsibility, the total estimated project costs should be determined for all alternatives at several steps within the project development process.

An evaluation of project costs and benefits can help define reasonable alternatives; the best alternative will often be one that achieves the greatest balance. For example, if Alternative A meets 100% of the defined project needs and objectives, while Alternative B meets 80% of these same needs and objectives, but costs 50% of Alternative A, then Alternative B may be a better investment than Alternative A. If Alternative A meets 100% of the project needs and objectives but is not a regional or state priority and cannot be funded for the foreseeable future, then it is not a good choice for solving the problem.

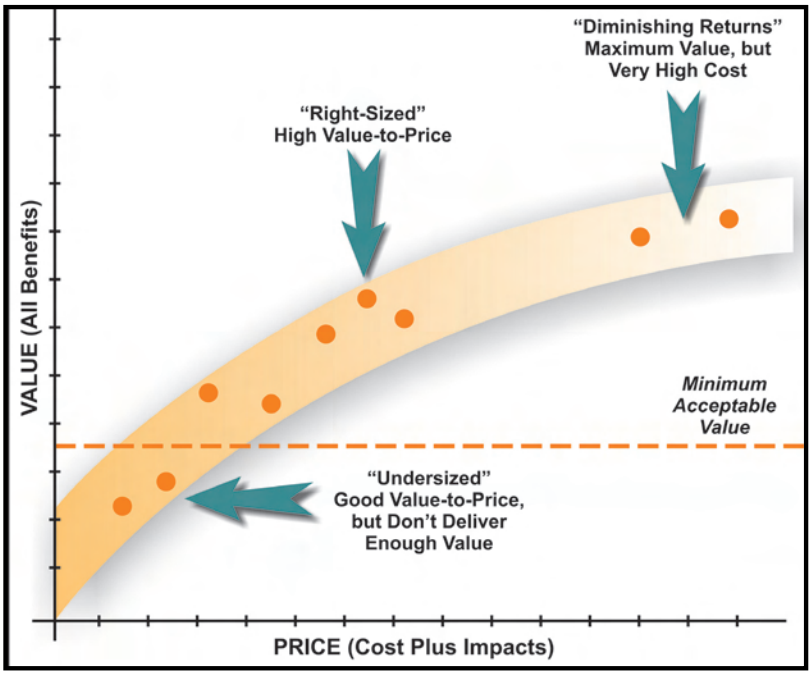


Figure 2.1 Value to Price Curve

Application

The following questions can be asked to determine if this tool was used effectively:

- Is the total estimated cost of each alternative known before programming the project on a TIP? Is the cost known before a recommended alternative for final design is selected?
- Are each of the alternatives affordable given the current financial situation and state/regional priorities?
- What are the cost/benefits of the alternatives?

Tool F – Define Wide-Ranging Measures of Success

Setting measures of success is not unique to context-sensitive design; most road design projects measure the success of alternatives in meeting project needs and objectives. In Smart Transportation, it is recommended that measures represent the full spectrum of project needs and objectives, such as transportation for all modes, safety, economic development, community character, and land use (see Tool D: Establish Full Spectrum of Project Needs and Objectives). Wide-ranging measures are used to assess alternatives against these needs and objectives.

Although broad in outlook, measures of success (MOSs) can be simple to calculate, calculable from readily available data (for simple projects) and readily reproducible. It is completely acceptable for MOSs to be redundant, measuring different aspects of the same qualities. For example, the "volume to capacity ratio" and "queue length" computations as defined in the Highway Capacity Manual are both measures of effectiveness about a single quality (traffic service) but each is useful in its own way.

Measures of success should be directly related to the accepted project needs and objectives. For objectives relating to vehicular traffic service, measures should be chosen from the standard, widely used measures (for example, "level of service", "seconds of delay"). For objectives that capture community character, measures should be developed based on the specific concerns of the community. Chosen measures should be transparent and easily conveyed to all stakeholders.

Including measures of success that address community goals as well as traffic performance is critical to reaching a smart transportation solution. For example, traditional traffic-only measures, while accurate for their single goal (moving traffic) are usually devoid of context. Thus, an evaluation measure calling for "attaining peak hour traffic level of Service C" would gauge success only by that measure. The fact that the roadway may be located within a "Main Street" environment or a heritage neighborhood is not considered. Using this single measure, any alternative that attains the level is considered satisfactory, and any alternative that does not is often eliminated as "failing". Because projects have wide-ranging needs and objectives, no single measure of success should be used to determine the preferred solution for a problem.

Measures of success that address the full set of needs and objectives should be simple and yield a great deal of understanding with a minimum of computation. For example, the measure of pedestrian mobility (a critical element where the context is a "Main Street") is furnished by information as simple as the number of signalized crossings, the presence of pedestrian signal indications, the width of pavement to be crossed or the posted speed. All of this information is readily available from project inventories, photographs, GIS files or field visits.

The absence of a wide range of evaluation measures in transportation planning is generally not due to the difficulty of computing such measures. Rather, it is because they were not identified as issues earlier in the process. Even if only a few measures are finally selected for project evaluation, consideration of a wide range of measures at the beginning of a project can help identify important community values that may otherwise be overlooked.

Table 2.5 provides examples of measures and how they can be calculated. All measures of success should be tailored to the specific project. Some characteristics of effective measures include:

- Simple compilation, from readily available data (rather than complex computation using extensive new data – particularly for simple projects).
- Transparent, using a method understandable to the non-technical public.
- Reproducible results (rather than yielding different answers to different analysts, for same conditions).
- Objective (not judgmental).
- Yields degrees of success (not just "pass/fail").

Application

The following questions can be asked to determine if this tool was used effectively:

- Have the alternatives been compared using a wide-ranging list of measures of success?
- Do all needs and objectives have corresponding measures of success?

Table 2.5 Examples of Smart Transportation Measures of Success

Measure of Success	Units	Potential Source
TRAFFIC		
Peak Hour LOS (intersection) **Non-Peak Hour LOS (intersection)**	• Level of Service • Seconds of delay • Queue lengths • Daily Profile	HCS intersection – or SIDRA roundabout runs, existing and design year
Screen line capacity (at *X* segments throughout the corridor)	Peak hour/peak direction vehicles	HCM source flows on planned lane count
Volume/Capacity (at *X* segments throughout the corridor)	Peak hour volume/capacity ratio	• HCM source flows on planned lane count • Traffic Study
Corridor travel times between selected origins and destinations	Minutes	Simulation such as Synchro, VISSIM
Reduction in existing VMT	VMT	Simulation such as Synchro, VISSIM
Desired travel speeds in Area X, Area Y	MPH expected based on roadway design and characteristics	NJDOT/PennDOT Design Manual/ AASHTO Green Book
SAFETY		
Reduction in number of driveways	Number of driveways	Field Count
Reduction in unprotected left turns	Peak hour vehicles	Signalized intersection analysis and existing turning movements
Potential safety improvements at documented high-crash locations	Potential for increasing safety	Crash data and safety audit
Median that meets certain criteria	Linear feet (lf)	Map take-off
Shoulders that meet certain criteria	Linear feet (lf)	Map take-off
ALTERNATIVE MODES		
Sidewalk	lf of new sidewalk	Map take-off or GIS
Restored sidewalk	lf of replaced sidewalk	Map take-off or GIS
Safe pedestrian crossings	Number of well-marked crosswalks,and/or speed and volume of crossing traffic	Map take-off or GIS
Bicycle access	lf of bike lanes, paved shoulders, or wide curb lanes	Map take-off or GIS
Public transportation	Bus stops with safe pedestrian crossings	Map take-off or GIS
Ease of crossing for farm equipment in rural areas	• Crossings • Desired speed based on road design	Map take-off or GIS NJDOT/ PennDOT Design Manual/ AASHTO Green Book

Measure of Success	Units	Potential Source
COMMUNITY CHARACTER		
Rural road-front in purchased farm land, conservation easement	lf, Acres	Map take-off or GIS
Town streetscape	lf	Left turn lane placement and existing turning movements
Historic resources	• Number of NRHP-Eligible Buildings Impacted/Displaced • Number of NRHP-Eligible Districts Impacted	Map take-off or GIS
Businesses	Number Impacted/Displaced	Map take-off or GIS
Residences	Number Impacted/Displaced	Map take-off or GIS
Community facilities	Number Impacted/Displaced	Map take-off or GIS
Land use/growth management	Consistency with local and regional plans and policies	Comprehensive Plans or similar documents
Open space/parklands	Number Impacted/Displaced	Map take-off or GIS
ENVIRONMENTAL		
Wetlands	• Number Impacted • Acreages Impacted • Quality	Map take-off or GIS
Stream crossings	• Number of New Crossings • Acreage of New Crossings	Map take-off or GIS
Floodplains	Acreages Impacted	Map take-off or GIS
COSTS		
Total project costs	Dollars in Year of Expenditure	Estimated
Cost per new trip	Dollars per trip	Estimated cost, new capacity added
Cost per new VMT	Cents per mile	Estimated cost, new VMT capacity added
Cost per user	Dollars per user	Estimated cost, new users

Tool G – Consider a Full Set of Alternatives

A critical element of Smart Transportation is a structured search through a wide range of alternatives at an early stage in the process. Consistent with NEPA, this range will always include a no-build alternative, and, depending on the complexity of the project, could include one or many build alternatives. These alternatives should address the project needs and objectives identified earlier in the process.

The following pages provide some examples of potential solutions for common transportation problems. These are not listed in any particular order. However, consistent with Smart Transportation principles, the first alternatives to be developed should be low cost and low impact. High-cost, high-impact alternatives should be developed only if the low build alternatives do not address enough of the needs and objectives.

After full consideration of project context and objectives, a solution that requires a design exception may be the best project alternative. In these cases, the evaluation process and rationale for incorporating a design exception into the alternative must be well documented, in accordance with NJDOT or PennDOT procedures. The review process for design exceptions should determine the appropriateness of the alternative.

As discussed in greater detail in Tool E, an analysis of the "value to price" ratio should be conducted for all potential alternatives. This technique, and other techniques for exploring alternatives, are listed in Table 2.6.

Application

The following questions can be asked to determine if this tool was used effectively:

- Was a full range of alternatives developed? Were low cost, low impact alternatives considered?
- Do the alternatives address the needs and objectives that were agreed upon by the stakeholders and project team?

Table 2.6 Checklist for Exploring Alternatives

Strive For	Avoid
Multi-Party Input – DOT, engineering consultant, specialists (historic, environmental), stakeholder representatives.	Project Staff Only Input – Inside project team, generalists where specialists are needed.
Collaborative – Participants sift through wide range of alternatives, with no exclusions. Alternatives are discussed in structured dialogue sessions.	Prescriptive – Range of alternatives is prescreened and limited. Some alternatives are dismissed early as "fatally flawed."
Iterative – Alternatives are considered again, with the same process as described above, as further understanding and evaluation is gained.	One Time – Alternatives are "closed down" after an early "final screening."
Aware of Value/Price -- Some understanding of value/price relationship at early stage and throughout.	Focusing only on High Price Solutions – Little understanding of value/price during alternatives stage.
Expansive – Process seeks alternatives that yield multiple quality-of-life benefits.	Constrained – Alternatives are limited to narrow range that addresses only one issue or concern.

There is a wide range of solutions that can address mainline congestion, from increasing efficiency to managing demand. One choice that some areas have made is to evaluate the level of service that can reasonably be accommodated for all modes.

RANGE OF SOLUTIONS FOR MAINLINE CONGESTION

INCREASE EFFICIENCY (ON-ROUTE)

- Signal Coordination
- Manage Access
- Change Intersection (See Intersection Congestion)
- Time Based Changes (Reversible Lanes, Off-Peak On-Street Parking, etc.)
- Corridor-wide ITS
- One Way/Two Way Corridor Conversion

USE ALTERNATIVE MODES

- Bicycling
- Walking
- Transit Use

EVALUATE LEVEL OF SERVICE STANDARDS

INCREASE CAPACITY (ON-ROUTE)

- Add Lanes
- Reconfigure

USE ALTERNATIVE ROUTES (OFF-ROUTE)

- Build New Route
- Re-Direct Traffic to Existing Routes
- Augment Existing Network

MANAGE DEMAND (ON & OFF-ROUTE)

- TDM (Telecommuting, Employee Transit Passes, Employee Shuttles, etc.)
- Land Use Policies

The following provides some ideas for solutions related to roadway resurfacing.

RANGE OF SOLUTIONS FOR RESURFACING

RESURFACE TO CURRENT CONFIGURATION

EVALUATE THE NEED FOR MILLING TO IMPROVE ACCESS & DRAINAGE

RESTRIPE

- Add bicycle lanes
- Modify number of lanes
- Modify lane widths
- Modify on-street parking
- Allow for streetscape opportunities

There are a wide range of solutions that can address congestion at intersections. The focus is often limited to solutions at the specific location, but a number of solutions may be found by using or enhancing the surrounding network.

RANGE OF SOLUTIONS FOR INTERSECTION CONGESTION

RECONFIGURE (AT LOCATION)

- Change Lane Configuration
- Grade Separate
- Roundabout

CHANGE OPERATIONS (AT LOCATION)

- Reconfigure Signal
- Restrict Turns

DEVELOP NETWORK (AT A DIFFERENT LOCATION)

EVALUATE LOS STANDARDS (AROUND LOCATION)

IMPLEMENT MEASURES (AROUND LOCATION)

The following provides some ideas for solutions related to deficient bridges.

RANGE OF SOLUTIONS FOR BRIDGE DEFICIENCY

REHABILITATE

- Focus only on structural integrity (may require design exceptions)
- Upgrade to current geometric standards
- Introduce Roadway Elements
- Restore historic character of structure
- Use for another function- i.e. vehicular to pedestrian bridge

REBUILD

- In- place
- At another location

REMOVE

Safety problems can be very difficult to diagnose and to solve. This table outlines a range of solutions for increasing intersection safety.

RANGE OF SOLUTIONS FOR INTERSECTION SAFETY

MODIFY INTERSECTION CONTROL

- 2-Way Stop
- 4-Way Stop
- Signal
- Roundabout
- Grade Separation

SIGNAL TIMING

- Extend Yellow Phase
- Extend All Red
- Modify Cycle Length
- Consider Activated vs. Pretimed
- Protected Instead of Permissive Left Turn

MODIFY GEOMETRY

- Relocate Signal Mast Arms
- Add Turn Lanes
- Modify Alignment
- Increase/Decrease Curb Radius
- Evaluate Proximity of Curb Cuts to Signal
- Restrict/Modify Turning Movements
- Review Bicycle Striping

IMPROVE ROAD SURFACE

ENHANCE SIGHT LINES (ROADSIDE ELEMENTS)

- Vertical Curve
- Horizontal Curve
- Relocate Landscaping

EVALUATE INTERSECTION CONTROL MEASURE

- Relocate Signage
- Move Stop Bar Location

INCREASE ENFORCEMENT

- Camera
- Police

IMPROVE PEDESTRIAN/ADA ELEMENTS

- Ramps
- Pedestrian Crossing Signals
- Pedestrian Refuge
- Review Location of Bus Stops
- Review Markings

PROVIDE OR UPGRADE ILLUMINATION

Tool H – Compare and Test Alternatives

The purpose of this tool is to assess the full range of alternatives using the broad range of measures of success. The measures are "balanced" against one another to determine the best solution to meet project needs and objectives. The assessment process not only computes measures of success but also portrays the tradeoffs between measures, such as a reduced traffic level of service balanced against a corresponding increase in civic value associated with on-street parking.

The following steps are recommended in using this tool:

Summarize the assessment – Collapse the assessment to simple and appealing summary products, such as charts, tables, matrices and spreadsheets. Illustrations (photographs, sketches or even somewhat abstract computer graphics) should be used for those measures best described graphically.

Understand important tradeoffs – Illustrate the balance ("tradeoff") between important competing measures. One criterion should offset another, such as pairing vehicular traffic service and pedestrian level of service. Successful Smart Transportation understands these tradeoffs and achieves a balance of values that can gain community consensus.

Most important measures needing to be balanced are usually "apples and oranges," impossible to collapse to a single common measure. Although disparate measures cannot be directly compared in common terms, simply computing and comparing them represents an improvement under Smart Transportation. The "apples and oranges" dilemma is not a fault of the process, but more likely an indicator that a meaningful set of evaluation measures has been included.

Avoid weighting and scoring schemes – These are likely to be cumbersome and contentious. At this nearly final stage in the Smart Transportation planning process, participants' energy is far better directed toward arriving at a solution that addresses the wide range of project needs and objectives, rather than in creating numerical weighting schemes for disparate measures of success that do not lend themselves to such treatment.

Collaborate, not vote, on a recommended solution – Avoid putting the decision on a recommended solution to a vote, regardless of how representative the study group is of broad community viewpoints. Rather, informed consent or negotiated recommendation should be reached through a collaborative process. At this point a "third party" facilitator, skilled in consensus building, may be a valuable input.

Application

A successful outcome of this tool can be tested by asking the following questions:

- Have the agreed upon measures of success been used to compare and test the range of alternatives?
- Are the results summarized in a manner that is easily understood by a non-technical audience?
- Are the analyses repeatable by others?

2.3 TESTING THESE TOOLS AND TECHNIQUES

Use of the tools outlined in this document does not guarantee a context sensitive solution, but it greatly improves its likelihood because:

1. Smart Transportation brings a wide range of viewpoints into the process, assuring a thorough look at alternatives and success criteria.
2. The process reduces or eliminates adversarial counterplanning, by including issues at the very beginning that may be important to stakeholders and project opponents alike. The same energy which can serve to obstruct non-inclusive projects is channeled in a positive direction on Smart Transportation projects.
3. The analytical steps of the recommended process – broadened goals, structured search through alternatives and wide-ranging evaluation – serves as a systematic checklist for all stakeholders and decision-makers. It is also a transparent process that everyone can follow and in which everyone can participate.

A Local Commitment

On projects with NJDOT or PennDOT, the community partners with the state and has an essential role in planning state roadway projects. The community's input is needed on a number of tasks:

Planning the Community Vision

On some projects, the vision of the community for land uses adjacent to the roadway will be well established. However, the state will also become involved in projects where a new or reconfigured roadway may spur the community to create a new vision. In such cases, community discussions that include visioning workshops or charrettes should be held to foster a new plan. Local representatives should agree upon the land use plan for the study area, and clearly communicate that vision to the DOT. This must take place early in the study in order to determine the future land use context.

Committing to Improvement of the Roadway Network

Development of a network that effectively ties together all roadway classes – arterial, collector and local - is a key Smart Transportation strategy. The presence of a roadway network gives the state and community more flexibility if they coordinate on converting a state roadway into a Main Street, or any other traditional commercial street. Further, since neither state has the financial resources to eliminate congestion on all state highways, improving the network will give community residents more options on future trips.

The community should:

- Achieve greater connectivity by updating its official map and circulation plan to show desired links; and
- Consider regulations that require greater connectivity in future developments.

3.0

Smart Transportation should help in the development of smart growth communities. Following are the 10 principles of Smart Growth from the US EPA:

- *Create range of housing opportunities and choices*
- *Create walkable neighborhoods*
- *Encourage community and stakeholder collaboration*
- *Foster distinctive, attractive places with a strong sense of place*
- *Make development decisions predictable, fair and cost effective*
- *Mix land uses*
- *Preserve open space, farmland, natural beauty and critical environmental areas*
- *Provide a variety of transportation choices*
- *Strengthen and direct development towards existing communities*
- *Take advantage of compact building design*

The community can regulate:

- Block size, by setting a maximum block length of 300 to 600 ft.;
- Connectivity, by requiring developers to meet the connectivity ratios given in Section 5.2.2; and,
- Pedestrian/bicycle connections, by requiring these connections (even in developments with cul-de-sacs) every 300 to 600 ft.

Revising Comprehensive Plans and Ordinances

The community should:

- Encourage mixed use development, which reduces the number of trips on public streets, and gives community residents the opportunity to make walking trips;
- Control the rapid increase in traffic associated with large single-use developments;
- Change zoning as needed to ensure projects are built at good locations with the appropriate density. If a town is planning a Main Street, it should revise both its comprehensive plan and zoning ordinance to encourage center-based development.
- Prepare access management plans or ordinances to encourage or require shared driveways, cross access drives or frontage roads to reduce both turns and traffic on the public road.

Encouraging Alternative Transportation Modes

The community should:

- Require installation of sidewalks in developments as appropriate (see suggested guidelines in 8.1.1);
- Install sidewalks on "missing links," using federal, state and local funds;
- Develop a bike network plan, and install bike lanes, shoulders, or wide curb lanes on selected roadways according to plan and as opportunity permits;
- Encourage walking and biking through public education programs, such as "Safe Routes to School" and "Bicycle Rodeos" at schools.

CONNECTIVITY CODES

A growing number of municipalities are adopting "connectivity codes" as part of subdivsion and land development ordinances, requiring well-connected networks in new developments. Following are excerpts from two municipalities:

Beaverton, Oregon, *Development Code Chapter 60*

"In new residential, commercial, and mixed-use development, local street connections shall be spaced at intervals of no more than 530 feet as measured from near side right-of-way line, except where impractical due to physical or topographic constraints…Local street connections at intervals of no more than 330 feet shall be considered in areas planned for the highest density mixed-use development."

Cary, North Carolina, *Land Development Ordinance*

"Any residential development shall be required to achieve a connectivity index of 1.2 or greater unless the Planning Director determines that this requirement is impractical due to topography and/or natural features. In the event that this requirement is waived, a six-foot pedestrian trail shall be provided to link any cul-de-sacs within a residential development…"

Note: The measure of connectivity is the number of street links divided by the number of nodes.

Source: APA, *Planning for Street Connectivity*, Planning Advisory Service Report 515.

Land Use Context

4.0

Land use context and roadway type comprise the organizing framework for the selection of appropriate roadway design values. A context area is a land area comprising a unique combination of different land uses, architectural types, urban form, building density, roadways, and topography and other natural features. The existing and planned land use context should be defined on every project. The roadway design should be compatible with the existing land use context, or a planned land use context that reflects the community vision.

4.1 WHY CONTEXT MATTERS

Understanding the land use context provides guidance on who will need to use the road and how. This understanding influences the geometric design of the roadway and the types of amenities required in the right-of-way.

For this document, the design elements are organized into three general categories:

Desired Operating Speed: This is the speed at which it is intended that vehicles travel. The roadway context should play a large role in determining the desired operating speed. For example, pedestrian travel and the presence of civic uses and retail close to the street all suggest the need to use the lower range of the desired operating speed.

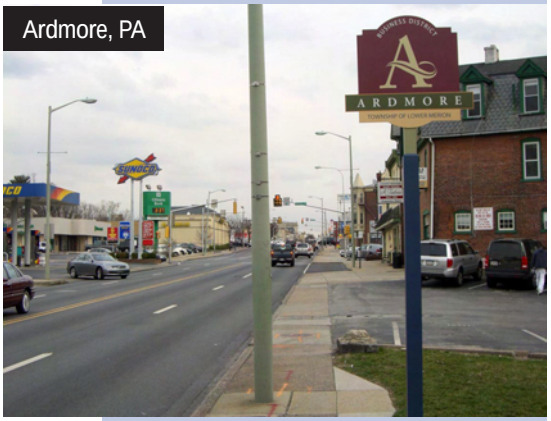
Roadway: The design team should select roadway elements and geometry with a clear understanding of surrounding land uses. For example, in urban areas the design team should always seek to provide parking lanes. Travel lanes are often narrower than in suburban areas, particularly if this enables the installation of bike lanes.

Roadside: The roadside primarily serves the pedestrian and the transit rider and provides a transition between public and private space. The design of the roadside elements should support the land use context. Civic uses such as schools and parks, and high density neighborhoods which generate higher pedestrian activity may require wider sidewalks.

A Tale of Two Contexts

Route 30, classified as a principal arterial, has a cross-section of four 10 ft. travel lanes in both Ardmore, PA, and Wayne, PA, as shown below. The speed limit on both roads is 25 mph. In a workshop for this guidebook, DVRPC stakeholders agreed that the Wayne town center is friendlier for pedestrians, identifying Route 30 in Wayne as "an example of an arterial roadway that has evolved to a village feeling." The difference? In Wayne, the presence of on-street parking and the traditional town center context (with zero building setbacks) results in more watchful motorists and creates a defined space for pedestrians. With sporadic on-street parking and with the greater prominence of parking lots, Ardmore is an example of a suburban center.

Ardmore, PA



Wayne, PA

4.2 DEFINING LAND USE CONTEXT

Seven context areas are described in the following section, from the least to the most developed: Rural, Suburban Neighborhood, Suburban Corridor, Suburban Center, Town/Village Neighborhood, Town Center, and Urban Core.

The context areas are illustrated in Figure 4.2. This drawing does not arrange the areas in order of intensity, but is an illustrative example of how these areas might fall across the land.

"Quantifiable characteristics," summarized in figure 4.3, are provided for each context. They are similar to what community planners refer to as "bulk standards," normally used to prescribe the desired appearance of land uses within a zoning district. Each land use context should be identified based upon this information.

In practice, land uses do not always fit neatly into the defined context areas, or the boundaries between context areas may be fluid. The planner or designer should use their best judgment in selecting the context that most closely matches the existing and proposed land uses.

It is recommended that contexts be broadly defined, avoiding segments less than 600 ft. in length. This is largely an issue of practicality. There is a limit on the number of different roadway cross-sections that can be implemented to respond to land use context within a small area.

1. Rural

This context area consists of a few houses and structures dotting a farm or forest landscape. The areas are predominantly natural wetlands, woodlands, meadow or cultivated land. Small markets, gas stations, diners, farm supplies, convenience grocers, etc. are often seen at the intersections of arterial or collector roads. Areas with a few commercial or civic uses and a number of homes close to the roadway can be placed into the sub-context type of "rural hamlet." Once the population of the settled area exceeds 250, it should be classified into the town/village context.

Examples include areas of Burlington and Gloucester Counties to the east, and Tioga and Jefferson Counties to the west.

2. Suburban Neighborhood

Predominantly low-density residential communities, many built since WWII. House lots are typically arranged along a curvilinear internal system of streets with limited connections to regional road network or surrounding streets. Lot sizes are usually two acres to one-quarter acre, but in older suburbs, it is common to find one-eighth acre lots. Garden apartments are also included in this type. Neighborhoods can include community facilities such as schools, churches, recreational facilities, and some stores and offices. When suburban houses line an arterial roadway but have their primary access to frontage roads or rear access roads, it is possible to classify this area as a "suburban corridor."

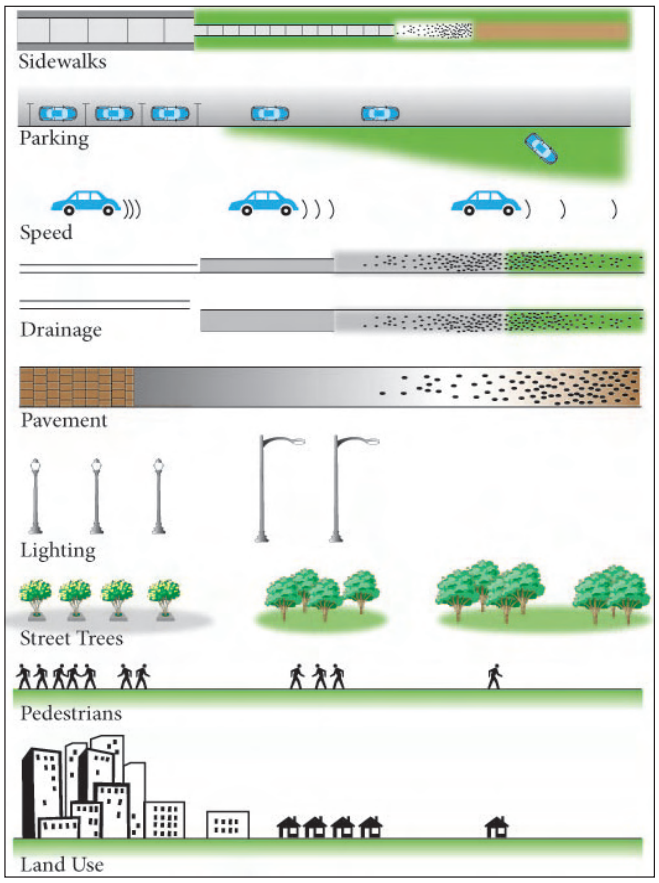


Figure 4.1 From Urban to Rural. As intensity and mix of uses along a roadway increase, there is a greater need to accommodate and prioritize other modes of travel, including bicyclists, pedestrians, and transit riders.

Figure 4.2 The Seven Land Use Contexts

3. Suburban Corridor

This area is characterized by big box stores, commercial strip centers, restaurants, auto dealerships, office parks, and gas stations. These uses are sometimes interspersed with natural areas and occasional clusters of homes. Buildings are usually set back from the roadway behind surface parking. Office buildings are usually set back a bit more than adjacent retail frontage to establish garden separation from ground windows.

These areas are found along many arterial roadways, such as Route 38 in Cherry Hill and Route 611 north of Philadelphia.

4. Suburban Center

Often a mixed-use, cohesive collection of land uses that may include residential, office, retail, and restaurant uses where commercial uses serve surrounding neighborhoods. These areas are typically designed to be accessible by car, and may include large parking areas and garages.

They are less accommodating to pedestrians than town centers, and opportunities to cross the primary roadway can be limited. On-street parking may or may not be provided.

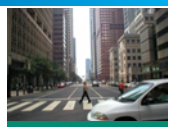
Examples include Lancaster Avenue in Ardmore, PA, and Montgomery Avenue in Bryn Mawr, PA.

5. Town/Village Neighborhood

Predominantly residential neighborhoods, sometimes mixed with retail, restaurants and offices. In urban places, residential buildings tend to be close to the street. Rowhouses fronting the sidewalk, and houses back 30 feet behind a front lawn are both common types. Small retail establisments sometimes occupy principal corners. Block sizes are regular and often small in comparison to suburban neighborhood blocks. Even where streets are narrow, on-street parking is common and typically well used. The large majority of neighborhoods have sidewalks.

Existing examples include Fairview in Camden and Society Hill in Philadelphia.

Figure 4.3 Defining Contexts

	RURAL	SUBURBAN			URBAN		
							
	Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town Center	Urban Core
Density Units	1 DU/20 ac	1 DU/ac - 8DU/ac	2 - 30 DU/ac	3 - 20 DU/ac	4 - 30 DU/ac	8 - 50 DU/ac	16 - 75 DU/ac
Building Coverage	NA	< 20%	20% - 35%	35% - 45%	35% - 50%	50% - 70%	70% - 100%
Lot Size/Area	20 acres	5,000 - 80,000 sf	20,000 - 200,000 sf	25,000 - 100,000 sf	2,000 - 12,000 sf	2,000 - 20,000 sf	25,000 - 100,000 sf
Lot Frontage	NA	50 to 200 feet	100 to 500 feet	100 to 300 feet	18 to 50 feet	25 to 200 feet	100 to 300 feet
Block Dimensions	NA	400 wide x varies	200 wide x varies	300 wide by varies	200 by 400 ft	200 by 400 ft	200 by 400 ft
Max. Height	1 to 3 stories	1.5 to 3 stories	retail -1 story; office 3-5 stories	2 to 5 stories	2 to 5 stories	1 to 3 stories	3 to 60 stories
Min./Max. Setback	Varies	20 to 80 feet	20 to 80 ft	20 to 80 ft	10 to 20 ft	0 to 20 ft	0 to 20 ft

6. Town/Village Center

A mixed use, high density area with buildings adjacent to the sidewalk, typically two to four stories tall with commercial operations on the ground floor and offices or residences above. Parallel parking usually occupies both sides of the street with parking lots behind the buildings. Important public buildings, such as the town hall or library, are provided special prominence.

Places like Haddon Avenue in Collingswood and State and Main Streets in Doylestown are classic "Main street" town centers.

7. Urban Core

Downtown areas consisting of blocks of higher density, mixed use buildings. Buildings vary in height from 3 to 60+ stories with most buildings dating from an era when elevators were new technology - so five to twelve stories were the standard.

Examples are Trenton's Downtown and Center City Philadelphia.

4.3 PLANNING FUTURE CONTEXT AREAS

The planned land use context along the corridor is assessed by consulting the following plans and documents:

- Municipal comprehensive plan (referred to as master plan in New Jersey)
- Multi-municipal or regional comprehensive plan (applicable in Pennsylvania)
- Zoning ordinance
- Redevelopment plan (if applicable)
- State Plan designation (applicable in New Jersey)

As part of the collaboration between state and community, the study team consults with local stakeholders on the vision for their community. If no vision exists, a workshop or charrette can be held to help crystallize the community vision.

5.0 Transportation Context

Routes 1 and 27 in Central New Jersey (below) are both classified as principal arterials in traditional functional classification, but they have very different roles within the roadway network. This chapter proposes a new roadway typology to better capture the role of roadways in a community.

The transportation context consists of the role that the roadway plays, or is anticipated to play within the local community and the larger region. It also refers to the supporting street network, and the interaction of the roadway with that network.

5.1 ROADWAY TYPE

A new roadway typology is proposed for the Guidebook in order to design roadways that better reflect their role in the community and the larger transportation network.

Currently, every roadway owned by NJDOT or PennDOT, or by county governments in New Jersey, is assigned a functional classification consistent with the AASHTO Green Book:

- Principal Arterial
- Minor Arterial
- Collector (subdivided into major collector and minor collector within rural areas)
- Local

A problem with the existing functional classification system is that an entire highway is sometimes placed into a certain class based on select characteristics – such as the overall highway length, or traffic volumes – although its level of access and mobility are not consistent with other roadways in that class. For example, many state highways are classified as principal arterials even if they are far more vital to community access than to regional mobility. This creates a dilemma for highway designers: the application of design standards for that class may encourage higher operating speeds than are appropriate for segments serving community access.

To address this issue, a roadway typology is proposed which better captures the role of the roadway within the community. It focuses more narrowly on the characteristics of access, mobility and speed. If a segment of an arterial roadway has a relatively low speed, is important to community access, and has a lower average trip length, it should not be designed like a high order arterial. Further, under this approach, roadways


Route 1


Route 27

are segmented to a greater degree than traditional functional classification. If one segment of a roadway has low average trip lengths and has consistently lower speeds, its design should be different than another section which carries long trips.

The roadway typology is presented in Table 5.1 and illustrated in Figure 5.1. It should be emphasized that this should be used only as a planning and design "overlay" for individual projects, and does not replace the traditional functional classification system used in both states. The roadway classes shown in Table 5.1 correspond to the classifications of arterial, collector and local as described in the 2001 AASHTO Green Book. Their design values should likewise correspond to the design guidelines provided in the Green Book.

Different state highways have different community roles, and the Guidebook recommends that this should be reflected in the design. Some state highways, such as NJ Route 1, will be considered as a Regional Arterial because of their importance to regional mobility. On the other hand, Route 27, which is classified as a principal arterial by NJDOT, actually operates more like a community arterial or a community collector. Parallel to Route 1 and the New Jersey Turnpike, this highway has a low average trip length. Maintaining regional mobility becomes a smaller concern on Route 27 and similar state roadways.

Whatever the road classification, traffic mobility and safety are important goals on state highways, and must be considered on all roadway projects. These goals will continue to receive significant attention on roads with acute safety or congestion problems. Mobility and safety goals are balanced with local development goals on projects.

PennDOT owns many roads in Pennsylvania, from arterials down through local roads. NJDOT controls a much smaller share of the road network, and virtually all of its roadways are arterials. Because of the relatively high volumes found on many NJDOT roadways, the maintenance of mobility on regional arterials remains a strong emphasis.

5.1.1 Main Street

Although not one of the Smart Transportation roadway categories, the concept of Main Street has an important place in Smart Transportation. Anchoring the center of a town, village or city, the Main Street is characterized by:

- Wide sidewalks and regular pedestrian activity;
- Mostly commercial and civic uses, with residential uses primarily found on the upper level of buildings;
- High building density;
- Buildings oriented to the street, with little or no building setbacks;
- Street furniture and public art;
- Heavy use of on-street parking;
- Speeds of 30 mph or less;
- Preferably no more than two travel lanes, although three to four lanes are seen on occasion.

Table 5.1 Roadway Categories

Roadway Class	Roadway Type	Desired Operating Speed (mph)	Average Trip Length (mi)	Volume	Intersection Spacing (ft)	Comments
Arterial	Regional	30-55	15-35	10,000-40,000	660-1,320	Roadways in this category would be considered "Principal Arterial" in traditional functional classification.
Arterial	Community	25-55	7-25	5,000-25,000	300-1,320	Often classified as "Minor Arterial" in traditional classification but may include road segments classified as "Principal Arterial."
Collector	Community	25-55	5-10	5,000-15,000	300-660	Often similar in appearance to a community arterial. Typically classified as "Major Collector."
Collector	Neighborhood	25-35	<7	<6,000	300-660	Similar in appearance to local roadways. Typically classified as "Minor Collector."
Local	Local	20-30	<5	<3,000	200-660	

Route 27, Kingston

Route 27, Princeton

The Main Street would typically belong to the Community Arterial road type, or to the Collector road type. This is the case on Route 27 in New Jersey; this roadway hosts two Main Street segments between New Brunswick and Trenton, in the towns of Princeton and Kingston. As defined here, a municipality can have more than one Main Street.

Main Streets are desirable in Smart Transportation because they support more sustainable communities, and because of their potential to increase walking, biking and transit use, as well as vehicular trip chaining.

For information on planning Main Streets, see Section 6.2.1.

5.2 ROADWAY NETWORK

Network design establishes critical parameters for roadway design—type of roadway, its general purpose (i.e., what type of traffic it is to handle) and number of lanes necessary to achieve the purpose. By increasing the options of motorists to travel from one point to another, a well-connected regional network permits greater flexibility in designing individual roadways. Improving roadway connectivity can serve regional mobility equally well as widening major roadways, and a well-connected network always serves the needs of pedestrians and bicyclists better than simply widening arterial roadways.

Because network connectivity is so important in Smart Transportation Solutions, it appears as a recurring theme in this guidebook. Network types, basic principles, and evaluating and creating a network are discussed in this section and in Chapter 3, "A Local Commitment."

5.2.1 Network types

The traditional urban grid has short blocks, straight streets, and a crosshatched pattern (Figure 5.2). The typical contemporary suburban street network has large blocks, curving streets, and a branching pattern (Figure 5.3). The two networks differ in three respects: (1) block size, (2) degree of curvature, and (3) degree of interconnectivity.

Both network designs have advantages and disadvantages. Traditional grids disperse traffic rather than concentrating it at a handful of intersections. They offer more direct routes and hence generate fewer vehicle miles of travel (VMT) than do contemporary networks. By offering many different routes to a destination, they better meet the needs of local motorists. They encourage walking and biking with their direct routing and their options for travel. Grids are also more transit-friendly; transit ridership is greatest between tracts that have relatively direct transit connections.[3]

Contemporary networks do have some advantages, such as the ability to lessen traffic on local residential streets. With their curves and dead ends, contemporary networks can go around or stop short of valuable natural areas.

Traditional grids best fulfill Smart Transportation goals, and are recommended for application in most areas.

5.2.2 Evaluation of the network

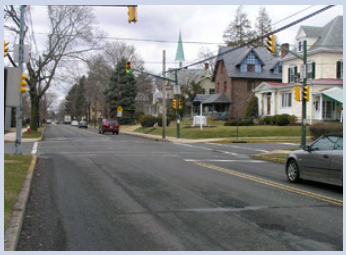
All roadway networks should be evaluated using the measures on internal connectivity, external connectivity, and route directness.

RURAL — to

Rural Places	Suburban Neighborhood	Suburban Corridor	Suburban Center
			
			
			
			
			

Figure 5.1 Roads in Context

URBAN →

Town/Village Neighborhood	Town Center	Urban Core	
			REGIONAL — Regional Arterial
			Community Arterial
			Community Collector
			Neighborhood Collector
			LOCAL — Local Road/ Street

to

The photos enclosed in a yellow box indicate the Town Center and Core City streets that also operate as a local or regional Main Street.

Internal Connectivity. *Use either of the following two measures:*

- **Beta Index** — This is equal to the number of street links divided by the number of nodes or link ends. A higher ratio indicates higher street connectivity. When applied to the developments shown in Figures 5.2 and 5.3, Apalachicola is rated 1.69, and Haile Plantation is rated 1.19. Traditional developments generally rate above 1.4. [4]
- **Intersections per square mile** — Strict grid systems have about 25 intersections per square mile, while conventional branching systems have about one-third to one-half that many. [5]

External Connectivity

- All neighborhoods in the community should be connected to the larger street system at least every ¼ mile.

Route Directness

- This measures the distance a pedestrian would walk between two points compared to the straight line (or radial) distance between the same two points. The closer the ratio is to 1.0, the more direct the route; route directness values of 1.2-1.5 describe reasonably connected walkable networks.[6]

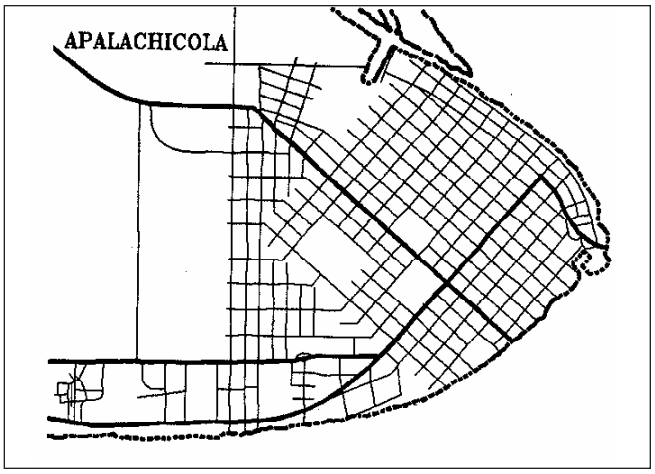


Figure 5.2. Traditional Urban Grid

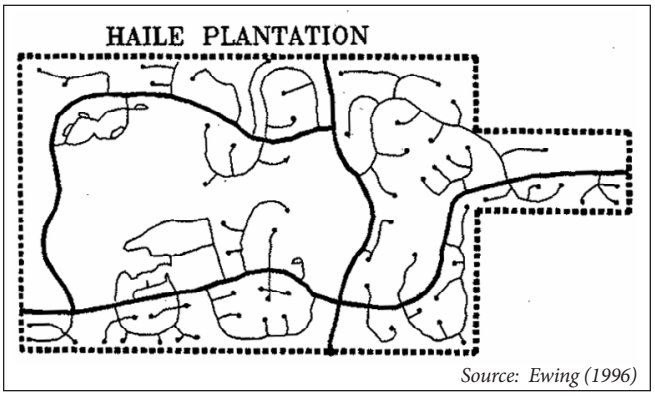


Figure 5.3. Contemporary Branching Network

5.3 CREATING EFFICIENT NETWORKS

In Smart Transportation, network evaluation becomes a critical task anytime existing or projected traffic congestion is identified as a potential issue on projects. The role of the network differs somewhat for projects in built-out areas versus newly developing areas.

5.3.1 Existing and Built-out Areas

In a built-out area, can the network be improved such that local traffic can use local streets to a greater degree? It should be determined how much traffic can be removed from regional roadways if the local and collector system is made to work more effectively. The network should be evaluated using measures of internal connectivity, external connectivity, and pedestrian route directness, described in Section 5.2.2.

If improving the network will not address the problem or is not an option, the two primary choices are to widen the roadway or to build a parallel roadway.

Roadway widening

The planner should first determine if segment improvements, access management, or intersection changes will address the problem, and then consider mainline widening. Widening should be done only if the resulting roadway is compatible with the land use context. Planners should identify the existing roadway role, its consistency with the community vision, and whether an alternative roadway type would better support the community.

Parallel roadway

If a parallel roadway is necessary, the planner should consider development of a regional or community arterial. It should be consistent with an area network plan, and be tied in where possible to the existing road system. This would improve the effectiveness of this road link.

5.3.2 Creating a Road Framework for New Development

A newly developing area offers the opportunity to implement a highly connected street system with less reliance on multi-lane arterials. Following are guidelines to be used in laying out a context sensitive roadway network capable of providing safe, multimodal choices for all trips. Initial planning should identify higher order roads needed for ultimate build-out; local roads and neighborhood collectors should then be included, depending upon specific developments proposed.

Network Configuration – Areawide

- Arterial roadways should be continuous and networked in generally rectilinear form with spacing of ½ to 1 mile in suburban contexts and ¼ to ½ mile in urban contexts. Closer spacing may be needed depending on activity levels and through movements.
- Collectors may be spaced at 1/8 mile intervals, if needed.
- Urban cores and town centers should be connected by community arterials and community collectors. These roadways should have the area's highest level transit service.
- Collectors should link neighborhood centers with adjacent neighborhood centers and town centers. All such connectors should be able to accommodate transit service.
- Major roadways that are to serve as major truck routes or primary through traffic routes should avoid the centers of urban areas or neighborhoods wherever possible. Community arterials and community collectors may be designated local truck routes to reach clusters of commercial uses in centers or cores.
- Sketch planning demand estimation or travel forecasting models should be used to estimate the density/spacing and capacity needs for major roadways beyond the minimum spacing described above.

Spacing

- Irrespective of thoroughfare spacing, pedestrian facilities should be well networked. In suburban contexts, block sizes of no more than 600 feet on a side with a maximum area of 7 acres will provide a reasonable level of connectivity.[7] In urban contexts, block sizes of 300 to 400 feet with a maximum area of 3-4 acres are ideal.
- Where streets cannot be connected, provide bike and pedestrian connections at cul-de-sac heads or midblock locations as a second-best solution to accessibility needs. Recommended maximum spacing is 330 ft.
- Bicycle-compatible roadways should comprise a bicycle network of parallel routes with effective spacing of ½ mile.

5.3.3 Network principles

All new networks should be evaluated using the measures on connectivity in Section 5.2.

Route 63, a principal arterial highway, runs through Harleysville, PA (top) and Lansdale, PA (bottom). Harleysville lies six miles northwest of Lansdale, with I-476 passing between the two municipalities. Motorists on Route 63 in Harleysville have an average trip length of 30 miles, much longer than the 10 mile average trip length of motorists found on Route 63 in Lansdale. Motorists commuting from the north prefer to take I-476 into Philadelphia, and avoid driving through Lansdale. Further, Route 63 in Lansdale serves as that borough's main street. The highway thus serves a different role in these two municipalities.

5.4 SIGNAL SPACING

Recommended signal spacing corresponds to the optimal spacing of arterial, collector and local streets (Table 5.2), although signals should be installed only where warranted.

Signal spacing of 300 ft. on arterials and collectors can be an important strategy in complementing traditional grid networks where low traffic speeds and high pedestrian activity are desired. On roadways in traditional urban contexts where regular cross traffic flows can be accommodated by stop-controlled intersections, signal spacing of 500 to 660 ft. on arterials and collectors may be sought.

On lower order suburban roadways, spacing of 660 ft. (1/8 mile) permits safe pedestrian crossings at the upper boundary of desirable block lengths. Signal spacing of 1320 ft. (1/4 mile) begins to permit the speed progression sought by NJDOT or PennDOT on those corridors where traffic flow is a priority.

The spacing of traffic signals has a major influence on roadway operating speeds and capacity. Studies have found that a four lane divided arterial roadway with signal spacing of 2640 ft. carries the same amount of traffic as a six lane arterial with signals spaced at 1320 ft.[8] Neither situation is optimal for pedestrians. On the one hand, narrower roadways are more amenable to pedestrian crossings. On the other hand, wider signal spacing reduces the opportunities for pedestrians to cross roadways at controlled locations. Further, motorists who desire to turn left onto an undivided major roadway may be tempted to access it at a Stop-controlled crossing, rather than traveling farther out of their way to access the roadway at a signal. On higher-order roadways where major pedestrian generators straddle the corridor, the best choice is sometimes smaller signal spacing and acceptance of a lower progression speed.

Table 5.2. Recommended Signal Spacing

	Urban Contexts	Suburban Contexts	Rural Contexts
Regional Arterial	660 to 1320 ft.	1320 to 1540 ft.	1980 ft.
Community Arterial	300 ft. to 1100 ft.	1320 ft.	1540 ft.
Community Collector	300 to 660 ft.	660 to 1320 ft.	1540 ft.

6.0 Designing the Roadway

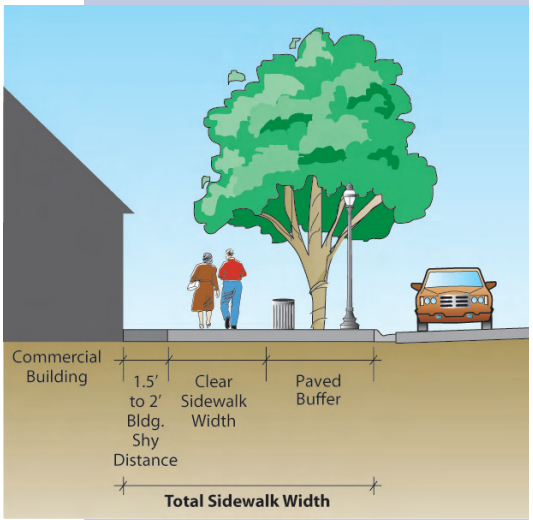
6.1 SELECTING DESIGN VALUES

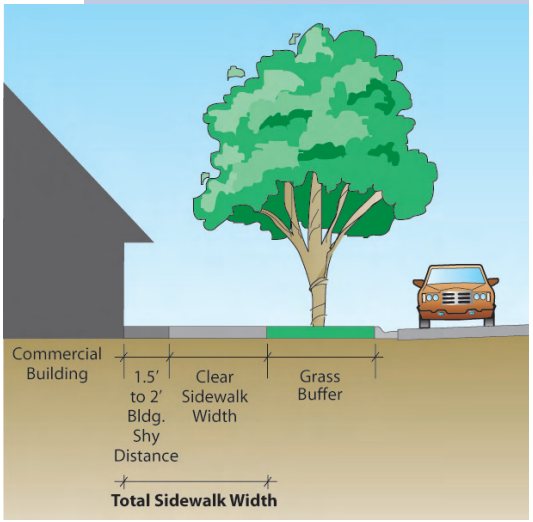
Once the desired land use context and roadway types are established, the roadway design should begin to be assembled. This section contains the Matrix of recommended design values, cross-referenced by land use context and design element.

6.1.1 Roadway

- **Lane Width** — The width depends on roadway type, context area, bus and freight activity, and whether bicycle activity is to be accommodated in the absence of a bike lane. Dimensions for wide curb lanes, an option for accommodating bicyclists, are shown in the Matrix along with standard lane widths. See Section 7.1.
- **Parking Lane** — On-street parking is desirable on most urban and many suburban roadways where desired operating speeds are 35 mph or lower. Parking should be provided on both sides of streets in traditional business districts, and on at least one side of residential areas. See Section 7.2.
- **Shoulder Width** — Shoulders should be considered for rural and suburban contexts. In urban areas, paved shoulders should be employed only as part of retrofits, to narrow existing wide travel lanes and accommodate bicyclists if bike lanes are not optimal. See Section 7.3.
- **Bike Lane** — Bike lanes may be a desirable addition on all but local and high-speed roads. The decision to install bike lanes should stem from a comprehensive bike plan. See Section 7.4.
- **Median** — Medians can improve access control along arterial and collector roadways and provide refuge for pedestrians at crossings. See Section 7.5.
- **Travel Lanes** — The number of travel lanes is selected based on the balance of providing capacity versus enhancing the roadside. This is determined as part of the broader planning effort.

Figure 6.1 Total Sidewalk Width





6.1.2 Roadside

- **Clear Sidewalk Width** — The width of the sidewalk available for walking. This is the most essential component of the roadside. See Section 8.1 for more details on this element.
- **Buffer** — In suburban areas, this refers to the planted strip between the curb and sidewalk; in urban contexts, this refers to the part of the sidewalk adjacent to the curb that accommodates street furniture and opening car doors. See Section 8.3, Landscape Design, and Section 8.4, Street Furniture for more details.
- **Shy Distance** — The area along sidewalks closest to buildings, fences, plantings and other structures generally avoided by pedestrians. This is only applicable in urban contexts, where a zero building setback is common.
- **Total Sidewalk Width** — The total width of the sidewalk on one side of the street. In urban contexts, it is derived by adding together clear sidewalk width, buffer, and shy distance. In suburban contexts, the buffer is composed of a planted area, and there is typically an ample building setback (and thus no "shy distance" dimension). The total sidewalk width thus repeats the dimension for the clear sidewalk width.

6.1.3 Speed

See Section 6.4 for the discussion on planning the desired operating speed.

6.1.4. Priority of elements

The Matrix lists all elements that would normally comprise the cross-section of a roadway. No roadway should have all of these elements. For example, when a roadway is provided with a bike lane, it would not have a shoulder, and vice-versa. A suburban roadway with a shoulder would not have a parking lane. Table 6.1 summarizes the desirability of key cross-section elements on each roadway type.

Table 6.1 Cross-Section Elements

	Paved Shoulder	Parking Lane	Bike Lane	Median (physical or two-way left turn lane)	Sidewalk*
Regional Arterial	Recommended for rural, suburban corridor, suburban neighborhood contexts	Evaluate for urban contexts	Evaluate for suburban center and urban contexts	Recommended for multi-lane roads; evaluate on other roads	Recommended for urban contexts; recommended for suburban contexts as appropriate
Community Arterial	Recommended for rural, suburban corridor, suburban neighborhood contexts	Recommended for urban contexts; evaluate for suburban center, suburban neighborhood contexts	Evaluate for suburban and urban contexts	Recommended for multi-lane roads; evaluate on other roads	Recommended for urban contexts; recommended for suburban contexts as appropriate
Community Collector	Recommended for rural and suburban corridor contexts; evaluate for suburban neighborhood	Recommended for urban, suburban center contexts; evaluate for suburban neighborhood	Evaluate for suburban and urban contexts	Recommended for multi-lane roads	Recommended for urban contexts; recommended for suburban contexts as appropriate
Neighborhood Collector	Recommended for rural, suburban corridor contexts	Recommended for urban, suburban center, suburban neighborhood contexts	Evaluate for suburban and urban contexts	Consider primarily for aesthetic enhancement	Recommended for urban contexts; recommended for suburban contexts as appropriate
Local	Evaluate for rural contexts	Recommended for urban, suburban center, suburban neighborhood contexts	Typically not needed	Consider for aesthetic enhancement only	Recommended for urban contexts; recommended for suburban contexts as appropriate

**Sidewalks are recommended as part of State and Federally funded roadway projects in suburban contexts unless one or more of the following conditions is met:*

- *pedestrians are prohibited by law from using the roadway*
- *the cost of installing sidewalks would be excessively disproportionate to the need or probable use.*
- *sparsity of population or other factors indicate an absence of need.*

Table 6.2 Matrix of Design Values

Regional Arterial		Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town/Village Center	Urban Core
Roadway	Lane Width[1]	11' to 12'	11' to 12' (14' to 15' outside lane if no shoulder or bike lane)	11' to 12' (14' to 15' outside lane if no shoulder or bike lane)	11' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)
	Paved Shoulder Width[2]	8' to 10'	8' to 10'	8' to 12'	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)
	Parking Lane[3]	NA	NA	NA	8' parallel	8' parallel; see 7.2 for angled	8' parallel; see 7.2 for angled	8' parallel
	Bike Lane	NA	5' to 6' (if no shoulder)	6' (if no shoulder)	5' to 6'	5' to 6'	5' to 6'	5' to 6'
	Median	4' to 6'	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only
	Curb Return	30' to 50'	25' to 35'	30' to 50'	25' to 50'	15' to 40'	15' to 40'	15' to 40'
	Travel Lanes	2 to 6	2 to 6	4 to 6	4 to 6	2 to 4	2 to 4	2 to 6
Roadside	Clear Sidewalk Width	NA	5'	5' to 6'	5' to 6'	6' to 8'	6' to 10'	6' to 12'
	Buffer[4]	NA	6'+	6' to 10'	4' to 6'	4' to 6'	4' to 6'	4' to 6'
	Shy Distance	NA	NA	NA	0' to 2'	0' to 2'	2'	2'
	Total Sidewalk Width	NA	5'	5' to 6'	9' to 14'	10' to 16'	12' to 18'	12' to 20'
Speed	Desired Operating Speed	45-55	35-40	35-55	30-35	30-35	30-35	30-35

1 12' preferred for regular transit routes, and heavy truck volumes > 5%, particularly for speeds of 35 mph or greater.
2 Shoulders should only be installed in urban contexts as a retrofit of wide travel lanes to accommodate bicyclists.
3 Buffer is assumed to be planted area (grass, shrubs and/or trees) for suburban neighborhood and corridor contexts; street furniture/car door zone for other land use contexts. Min. of 6' for transit zones.
4 Curb return radius should be as small as possible. Number of lanes, on street parking, bike lanes, and shoulders should be utilized to determine effective radius.

Community Arterial		Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town/Village Center	Urban Core
Roadway	Lane Width[1]	11' to 12'	10' to 12' (14' outside lane if no shoulder or bike lane)	11' to 12' (14' to 15' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)
	Paved Shoulder Width[2]	8' to 10'	4' to 8' if no parking	8' to 10'	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)
	Parking Lane[3]	NA	7' to 8' parallel	NA	8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled
	Bike Lane	NA	5' to 6' (if no shoulder)	5' to 6' (if no shoulder)	5' to 6'	5' to 6'	5' to 6'	5' to 6'
	Median	4' to 6'	12 to 18; for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians only
	Curb Return	25' to 50'	25' to 35'	25' to 50'	20' to 40'	15' to 30'	15' to 35'	15' to 40'
	Travel Lanes	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4
Roadside	Clear Sidewalk Width	NA	5'	5' to 6'	6'	6' to 8'	6' to 10'	8' to 14'
	Buffer[4]	NA	6'+	5' to 10'	4' to 6'	4' to 6'	4' to 6'	4' to 6'
	Shy Distance	NA	NA	NA	0' to 2'	0' to 2'	2'	2'
	Total Sidewalk Width	NA	5'	5' to 6'	10' to 14'	10' to 16'	12' to 18'	14' to 22'
Speed	Desired Operating Speed	35-55	30-35	35-50	30	25-30	25-30	25-30

1 12' preferred for reguar transit routes, and heavy truck volumes > 5%, particularly for speeds of 35 mph or greater.
2 Shoulders should be installed in urban contexts only as part of a retrofit of wide travel lanes, to accommodate bicyclists.
3 7' parking lanes on this roadway type to be considered in appropriate conditions.
4 Buffer is assumed to be planted area (grass, shrubs and/or trees) for suburban neighborhood and corridor contexts; street furniture/car door zone for other land use contexts. Min. of 6' for transit zones.

Sources for values in matrix: AASHTO Green Book (2001), and ITE "Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities" (2006).

Community Collector		Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town/Village Center	Urban Core
Roadway	Lane Width[1]	11' to 12'	10' to 12'	11' to 12'	10' to 11' with bike lanes; w/o bike lanes or shoulder, 14' for bike routes	10' to 11' with bike lanes; w/o bike lanes or shoulder, 14' for bike routes	10' to 11' with bike lanes; w/o bike lanes or shoulder, 14' for bike routes	10' to 11' with bike lanes; w/o bike lanes or shoulder, 14' for bike routes
	Paved Shoulder Width[2]	4' to 8'	4' to 8' if no parking or bike lane	8' to 10'	4' to 6' (if no parking or bike lane)	4' (if no parking or bike lane)	4' (if no parking or bike lane)	4' (if no parking or bike lane)
	Parking Lane	NA	7'	NA	7' to 8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled
	Bike Lane	NA	5'	5' to 6'	5' to 6'	5' to 6'	5' to 6'	5' to 6'
	Median	NA	12 to 16 for LT; 6' for pedestrians only	12 to 16 for LT; 6' for pedestrians only	12 to 16 for LT; 6' for pedestrians only	12 to 16 for LT; 6' for pedestrians only	12 to 16 for LT; 6' for pedestrians only	12 to 16 for LT; 6' for pedestrians only
	Curb Return	20' to 40'	15' to 35'	20' to 40'	20' to 35'	10' to 25'	10' to 25'	10' to 30'
	Travel Lanes	2	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4
Roadside	Clear Sidewalk Width	NA	4' to 5'	5' to 6'	6' to 8'	5' to 6'	6' to 8'	6' to 10'
	Buffer[3]	NA	5'+	5' to 10'	4' to 5'	4' to 5'	4' to 5'	4' to 6'
	Shy Distance	NA	NA	NA	0' to 2'	0' to 2'	2'	2'
	Total Sidewalk Width	NA	4' to 5'	5' to 6'	10' to 15'	9' to 13'	12' to 15'	12' to 18'
Speed	Desired Operating Speed	35-55	25-30	30-35	25-30	25-30	25-30	25-30

1 11' to 12' preferred for heavy truck volumes > 5% and regular transit routes.
2 Shoulders should be installed in urban contexts only as part of a retrofit of wide travel lanes, to accommodate bicyclists.
3 Buffer is assumed to be planted area (grass, shrubs and/or trees) for suburban neighborhood and corridor contexts.

Neighborhood Collector		Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town/Village Center	Urban Core
Roadway	Lane Width[1]	10' to 11'	10' to 11'	NA	NA	9' to 11' with bike lanes; w/o bike lanes or shoulder, 12' to 14' for bike routes	9' to 11' with bike lanes; w/o bike lanes or shoulder, 12' to 14' for bike routes	9' to 11' with bike lanes; w/o bike lanes or shoulder, 12' to 14' for bike routes
	Paved Shoulder Width[2]	4' to 8'	4' to 8' if no parking or bike lane	NA	NA	NA	NA	NA
	Parking Lane	NA	7' parallel	NA	NA	7' to 8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled
	Bike Lane	NA	5'	NA	NA	5'	5'	5'
	Median	NA	8' to 10' landscaping; 6' - 8' for peds	NA	NA	8' to 10' landscaping; 6' - 8' for peds	8' to 10' landscaping; 6' - 8' for peds	8' to 10' landscaping; 6' - 8' for peds
	Curb Return	15' to 35'	15' to 35'	NA	NA	10' to 25'	10' to 25'	10' to 25'
	Travel Lanes	2	2	NA	NA	2	2	2
Roadside	Clear Sidewalk Width	NA	4' to 5'	NA	NA	5' to 6'	6'	6' to 8'
	Buffer[3]	NA	4'+	NA	NA	3' to 5'	3' to 5'	4' to 6'
	Shy Distance	NA	NA	NA	NA	0' to 2'	2'	2'
	Total Sidewalk Width	NA	4' to 5'	NA	NA	8' to 13'	11' to 13'	12' to 16'
Speed	Desired Operating Speed	20 to 35	25-30	NA	NA	25-30	25-30	25-30

1 11' to 12' preferred for heavy truck volumes > 5% and regular transit routes.
2 Shoulders should be installed in urban contexts only as part of a retrofit of wide travel lanes, to accommodate bicyclists.
3 Buffer is assumed to be planted area (grass, shrubs and/or trees) for suburban neighborhood and corridor contexts.

	Local Road	Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town/Village Center	Urban Core
Roadway	Lane Width [1]	9' to 11'	See roadway width	NA	NA	See roadway width	9' to 11'	9' to 11' with bike lanes; w/o bike lanes or shoulder, 12' to 14' for bike routes
	Roadway Width [2]	See lane and shoulder width	Wide: 34' to 36' Medium: 30' Narrow: 26' Skinny: 20'	NA	NA	Wide: 34' to 36' Medium: 30' Narrow: 26' Skinny: 20'	See lane and parking width	See lane and parking width
	Paved Shoulder Width	2' to 8'	NA	NA	NA	NA	NA	NA
	Parking Lane	NA	See roadway width	NA	NA	See roadway width	7' to 8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled
	Bike Lane	NA	NA	NA	NA	NA	NA	NA
	Median	NA	NA	NA	NA	NA	NA	NA
	Curb Return	10' to 25'	10' to 25'	NA	NA	5' to 25'	5' to 25'	5' to 25'
	Travel Lanes	2	2	NA	NA	2	2	2
Roadside	Clear Sidewalk Width	NA	4' to 5'	NA	NA	5'	5' to 6'	6' to 8'
	Buffer [3]	NA	4'+	NA	NA	3' to 5'	3' to 5'	3' to 5'
	Shy Distance	NA	NA	NA	NA	0' to 2'	2'	2'
	Total Sidewalk Width	NA	4' to 5'	NA	NA	8' to 12'	10' to 13'	11' to 15'
Speed	Desired Operating Speed	20 to 30	20 to 25	NA	NA	20 to 25	20 to 25	20 to 25

1 11' to 12' recommended for industrial districts.

2 Index to residential streets:
Wide: High-density neighborhoods, two-way, parking both sides
Medium: Can be used in all neighborhoods-two-way, parking both sides
Narrow: Low-density and medium density - two-way, parking both sides; all neighborhoods - one-way street, parking both sides, or two-way, parking one side
Skinny: All neighborhoods - one-way, parking one side; two-way, no parking

Low-density - less than or equal to 4 dwelling units/acre.
Medium-density - >4, and less than or equal to 8 units/acre.
High-density - >8 units/acre.

3 Buffer is assumed to be planted area (grass, shrubs and/or trees) for suburban neighborhood and corridor contexts; street furniture/car door zone for other land use contexts.

Route 73 in Burlington County is the prototypical regional arterial in a suburban setting, with divided median and wide shoulders.

Torresdale Avenue in Philadelphia, which functions as a community collector in an urban area, has 11 ft. travel lanes, 5 ft. bike lanes, 8 ft. parking lanes, and 6 ft. sidewalks.

6.2 SPECIAL ROADWAY TYPES

6.2.1 Main Street

As noted in Section 5.1.2, a "Main Street" is an overlay of the Community Arterial, or Community Collector road type. The design of a Main Street is taken from the elements of those road types within the Town Center or Urban Core contexts. Major characteristics are:

- Lane Width: 10 to 12 ft., with 14 ft. considered to create wide curb lanes on a bike route if no bike lane is provided.
- Parking Lane: 7 to 8 ft. parallel, or 13 to 19 ft. for angled parking.
- Clear Sidewalk Width: 6 to 14 ft, although widths rarely exceed 10 ft.
- Buffer: 4 to 6 ft.
- Building Shy Distance: 2 ft.
- Desired Operating Speed: 25 mph is optimal speed, but 30 mph is acceptable.

Creating a Main Street on a state roadway that has focused on serving through traffic may require a variety of strategies, such as:

- Installing signals at increased frequency on a smaller block structure;
- Narrowing a multi-lane roadway in order to widen sidewalks or install on-street parking or bike lanes, and to facilitate easier pedestrian road crossings.

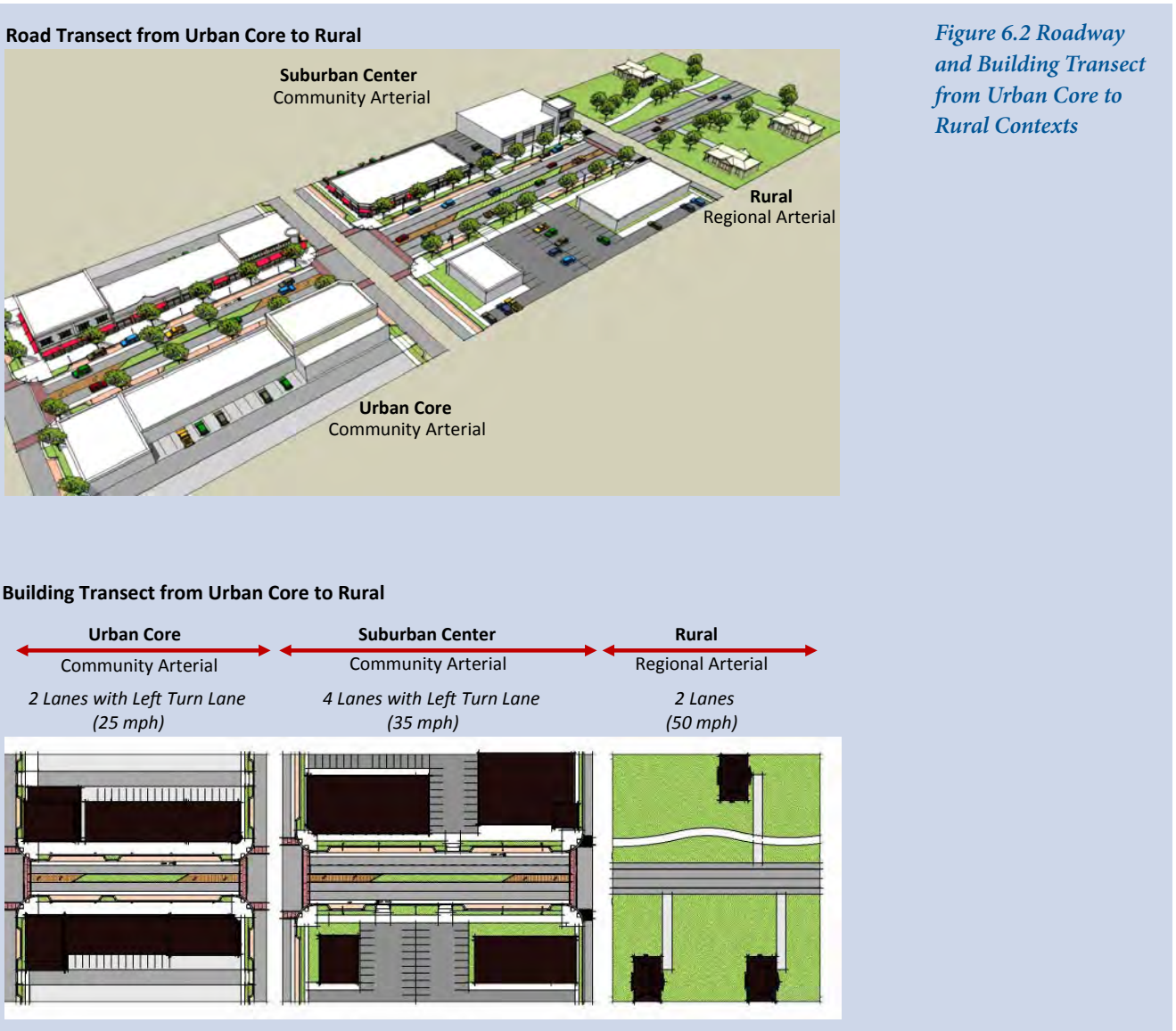


Figure 6.2 Roadway and Building Transect from Urban Core to Rural Contexts

Main Streets should be encouraged as part of efforts to create sustainable town centers. However, the decision to create a new Main Street should be more carefully evaluated on regional arterial roadways, particularly those with four or more lanes. Roadways on which heavy trucks account for more than 5% of traffic volumes, and on which the average trip length is greater than 15 miles, should be scrutinized. More flexibility is possible on Community Arterial roadways, and even more so on Community Collector roads.

If creation of a Main Street will lengthen delays on the state roadway, or make it difficult to implement strategies to reduce existing high levels of congestion, the following questions should be explored:

- What strategies will be implemented by the community to encourage walking, biking, and transit in the community?
- What smart growth strategies will be advanced by creation of the Main Street?
- What is the impact on traffic delays if capacity is reduced on the study corridor? If the reduction greatly increases delays, the study team and community should be prepared to address alternatives:
  - Can the existing system of arterial and collector roadways accommodate an increase in volumes if capacity is reduced on the study corridor, and motorists shift to alternative routes?
  - Can the supporting roadway network be improved to accommodate diverted traffic?
  - Can lower-order roadways in the network be modified? If the network can better accommodate local trips and local traffic has less need to travel on the state roadway, there will be more flexibility for converting the state roadway into a Main Street.

An important question is the acceptability of increased delays under roadway reconfiguration. The "Level of Service" at intersections is normally a chief performance measure used to evaluate roadway projects. Nationwide, the FHWA has long sought at least a Level of Service 'D' for intersections in urban areas (not more than an average delay of 55 seconds per vehicle). However, it is increasingly difficult to achieve these Levels of Service at the heavily congested intersections found in the two states. Many intersections today operate at Levels of Service 'E' or 'F', and on a growing number of projects, it is considered a success to achieve a 'good F' (V/C ratio of 1.5 to 1.0).

As described above, the DOTs will always have an interest in keeping delays on major arterials at a reasonable level. However, if the state roadway is not critical to regional movements, both state and community should consider whether a Level of Service 'E' or 'F' at intersections is acceptable. The project would involve a trade-off between vehicular levels of service, and "local service." That is, the community could encourage walking and make a business district a greater destination, by accepting slower traffic on the roadway.

6.2.2 Industrial Street

An industrial area may be located in an urban, suburban, or rural context. Streets in these areas may provide access to manufacturing or warehouse/distribution uses. The primary design consideration of these streets is the large trucks that service such uses. Travel lanes on these streets should be 12 ft., along with curb and gutter or open drainage. On-street parking on local industrial streets is normally needed on only one side, if at all.

6.2.3 Rural Crossroads

As discussed in section 4.2.1, a "rural hamlet" is a subtype of the rural context, consisting of a limited number of commercial and civic uses, as well as single-family homes. It is typically located at the crossroads of arterial or collector roads. Travel lane widths for roads through rural hamlets are often consistent with lane widths outside the hamlets or sometimes narrowed by 1 ft. Shoulders are often narrowed from their full width at these locations. Sidewalks are occasionally present, but on-street parking is atypical. The desired operating speed may be stepped down 10 mph, but no more than 20 mph, from the prevailing speed on the roadway outside the hamlet.

6.3 RETROFITTING

The design values presented in Table 6.2 are intended to be compatible with the needs of 3R (resurfacing, rehabilitation and restoration) and reconstruction projects in addition to new construction projects. In general, context-sensitive design philosophy views retrofit projects as an opportunity to improve conditions for walking and biking. Travel lanes wider than needed present the opportunity to narrow travel lanes and install bike lanes. If travel lanes are below Design Manual standards, and the road has shoulders, these should be preserved to better accommodate bicyclists if existing lane widths do not translate into a high crash rate for associated crash types, such as sideswipes. On ambitious reconstruction projects, a wider cartway than necessary permits the moving of curbs to provide wider sidewalks and create a better environment for pedestrians.

6.4 DESIRED OPERATING SPEED

"Desired operating speed" is one of the most important concepts in this guidebook. The desired operating speed is the speed of traffic that, in the expert judgment of the highway designer and community planner, best reflects the function of the roadway and the surrounding land use context. Identification of this speed allows the designer to select the design speed and appropriate roadway and roadside features. It must be approved by the DOT for all roadways.

The desired operating speed is the speed at which we would like vehicles to travel. It is operationally defined here as the desired speed of the 85th percentile vehicle.[9] It is equivalent to "environmental reference speed" in European design practice, which is the "speed used in designing roadways in such a way that it is difficult to drive above this speed."[10]

The concept of desired operating speed is best explained by its relationship to three other concepts of speed: operating speed, posted speed, and design speed.

- Operating speed is the speed at which a typical vehicle operates, commonly measured as the 85th percentile speed of all vehicles.[11]
- Posted speed is the legal speed limit on a roadway. It is often set without any means of self enforcement, and drivers tend to travel at what they perceive as a safe speed regardless of the posted speed. Fewer than a third of drivers go the speed limit on urban and suburban arterials.[12]
- Design speed (as defined in the AASHTO Green Book) is the speed used to determine various geometric design features, including horizontal curvature, gradient, superelevation, stopping sight distance, and, for rural highways only, lane width.

Historically, New Jersey has required the design speed to be 5 mph above posted speed for existing roadways, and 10 mph for new roads; Pennsylvania typically requires a 5 mph difference for both new and existing roads. Many design features also include a "safety margin." If the design speed of a curve is 35 mph, drivers can safely navigate the curve above this speed; however, they will not feel quite as comfortable doing it.

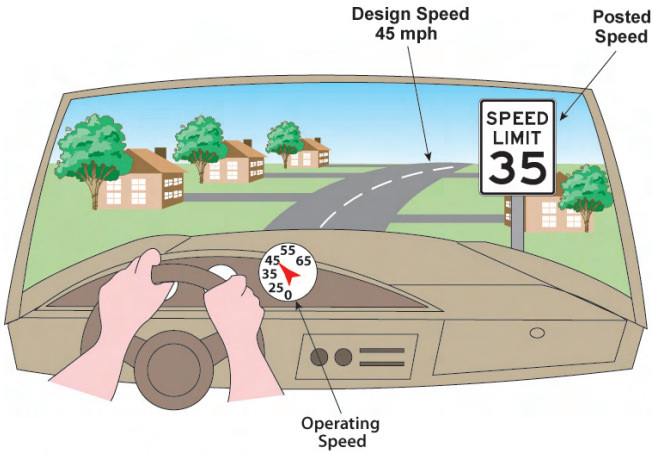
The greatest drawback to the existing design speed approach is that drivers usually drive as fast as they believe the road can safely accommodate. Existing policy may thus encourage operating speeds higher than the posted speed limit and/or selected design speed in an area.

In the interest of highway safety, it is desirable to have a stronger relationship between the posted speed limit, design speed, and operating speed.[13] Therefore, this guidebook recommends that the desired operating speed for most roadway types be the same as the design speed, and also the same as the posted speed. For all roadways posted at 45 mph or above, the design speed should be set 5 mph over the desired operating speed.

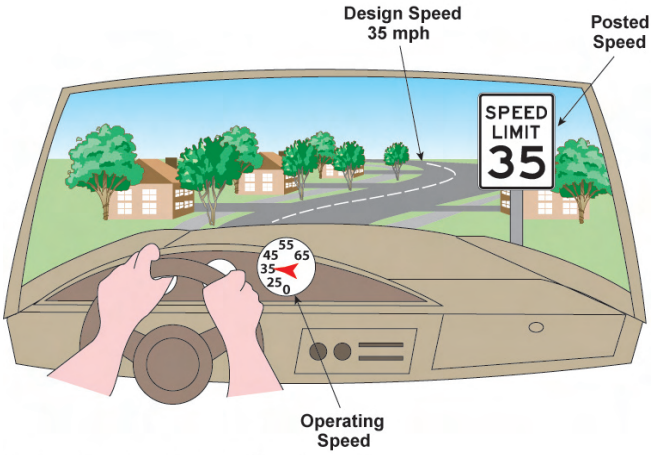
The desired operating speed of all roadway types is indicated in Table 6.2. For the highest order roadway – regional arterial – the desired operating speed ranges from 30 to 60 mph. The desired operating speed drops to 20 to 30 mph on local roads, the lowest order roadway. Viewed by context, the desired operating speed may be as high as 60 mph in rural contexts, 50 mph in suburban contexts, and 35 mph in urban contexts. The speed may be as low as 20 mph in all contexts.

Under this policy, all of the controlling design elements directly related to design speed – horizontal curvature, gradient, superelevation, and stopping sight distance – would be set equal to, and therefore reinforce, the desired operating speed. Roadway features not directly related to design speed, such as lane and shoulder width, and the presence or absence or a parking lane, should also support the desired operating speed. Roadside design features, such as the building setback or use of street trees, should likewise support the desired speed.

Figure 6.3 Desired Operating Speed



Conventional Design



Using Desired Operating Speed

On roadway segments with vertical or horizontal curvature, the selected design speed will have a role in controlling speeds. However, on many roadways in urban and suburban areas, vertical and horizontal curvatures are minor, and other design elements must be used to control speeds.

Marshalling all contributing roadway and roadside factors to encourage motorists to travel at the desired operating speed will require the best judgment of the highway designer. Design elements should be used in a consistent manner, in accordance with guidance from the AASHTO Green Book. Following is a discussion of design features that have been found to affect operating speeds: [14]

- ***Horizontal and Vertical Curvature*** — A tight curve radius has a greater impact on operating speed than any cross-section or roadside element. Vertical curvature also impacts operating speeds.
- ***Sight Distance*** — As sight distance decreases, so does operating speeds. One study found that when street trees and shrubbery restrict sight distance, this has a greater impact on speeds than density of adjacent land use.[15] Adequate sight distance should always be provided, per AASHTO guidelines.
- ***Street Trees*** — Street trees in planting strips appear to have a traffic calming benefit by causing the motorist to believe the space is tighter and more restrictive. [16]
- ***Lane Widths*** — Narrower lane widths are associated with lower speeds. One study of suburban arterials found that, once posted speeds are discounted, lane width is the only significant variable for operating speeds on straight sections. [17] A relationship between lane widths and speeds was also identified in a study of urban collector roadways in central Pennsylvania.[18] It should be acknowledged that other studies have found no relationship between lane width and speeds.
- ***Shoulder Widths*** — This has received less study than other design features, and the relationship between shoulder widths and speeds is still inconclusive. [19]
- ***Total Roadway Widths*** — Narrower roadway widths are associated with lower operating speeds. [20,21]
- ***Clear Zone*** — Narrower clear zones are associated with lower speeds. [22]
- ***Access Density*** — Higher density of access points is associated with lower operating speeds.[23,24] Along roadways with uncontrolled access, drivers must be vigilant to interaction with driveways, intersections, median areas, and parking.
- ***Signal Density*** — Higher signal density is associated with lower operating speeds.[25] In their recommendations for signal progression, particularly on roadways with closely spaced signals, engineers have great influence on the speed of prevailing traffic.
- ***Median*** — Roadways without medians have lower speeds than roadways with medians.[26] Speeds appear to be higher on roadways with two-way left turn lanes than roadways with physical medians.
- ***On-Street Parking*** — On-street parking leads to lower speeds, due to side friction between moving and passing vehicles. One study found that on otherwise similar roadways, speeds were 7.5 mph lower on roadways with parked cars.[27]
- ***Curbs*** — Speeds appear to be lower on streets with curbs than streets without curbs,[28] although one study found no relationship between speeds and the presence of curbs.[29]

- ***Pedestrian Activity*** — Speeds are lower on roadways with higher pedestrian activity.[30]
- ***Roadside Development*** — Speeds are lower in residential areas than commercial areas.[31] Building setback also matters. As part of an effort to quantify "Main Streetness" for *Flexible Design of New Jersey's Main Streets,* building setback from the street was determined as one of the five key variables in whether people perceive a roadway to be a "Main Street."[32]
- ***Physical Traffic Calming Measures*** — The ability of traffic calming measures to lower vehicular speeds has been well documented.[33] Nationwide, speed humps and mini circles are the most popular measures on lower-order roadways. On higher order roadways, less intrusive measures, such as curb extensions or roundabouts should be considered.
- ***Superelevation*** — Low or no superelevation reduces speeds;[34] this recommendation is targeted to low speed streets.
- ***Curb Return Radii*** — Smaller radii, and the modification of high-speed channelized right turns, can reduce the speed of turning vehicles.[35]
- ***Horizontal Offset Between Inside Travel Lane and Median Curbs*** — A smaller offset can reduce speeds.[36]

6.4.1 Transitions

Design consistency promotes safe roadways. Transitions from one speed zone to another should be introduced in a manner that gives motorists adequate time to prepare for, and react to, changes in roadway design. It is undesirable to surprise motorists with design features inconsistent with motorist expectation. Designers should thus avoid reducing design speed by more than 10 mph on design features in adjacent segments.[37] For example, when a series of curves on a roadway section are built using a design speed of 45 mph, a curve designed for 25 mph should not be introduced into the middle of the section as a traffic calming measure. Speed limit reductions should occur on tangent sections, removed from intersections.

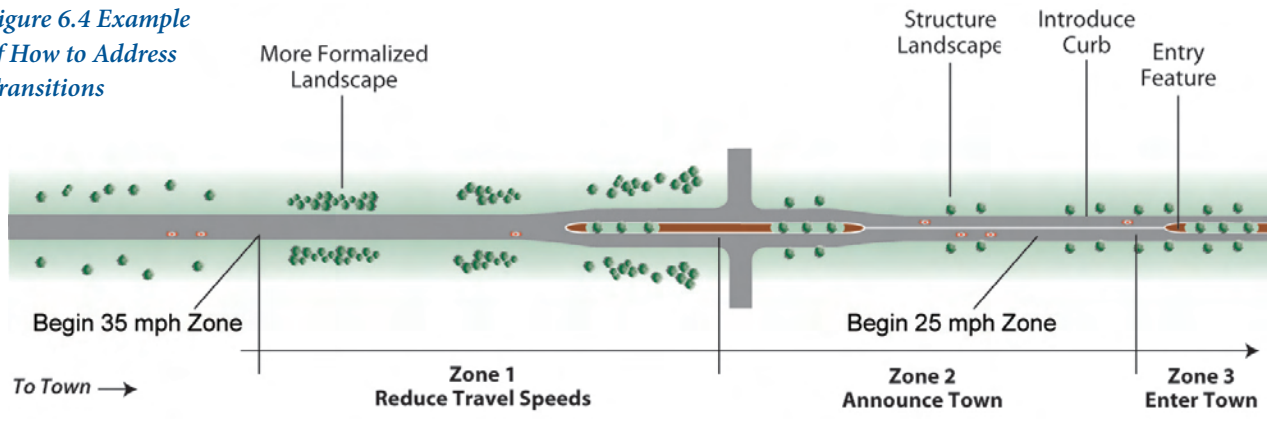
The same principle holds for transitions from a 55 mph speed zone on the outskirts of a town, to 25 mph in a town: speed limits would ideally be stepped down in 10 mph segments. Exceptions can be made in appropriate situations. For example, when a traffic signal or roundabout falls between two different context areas, a reduction of 20 mph could be considered.

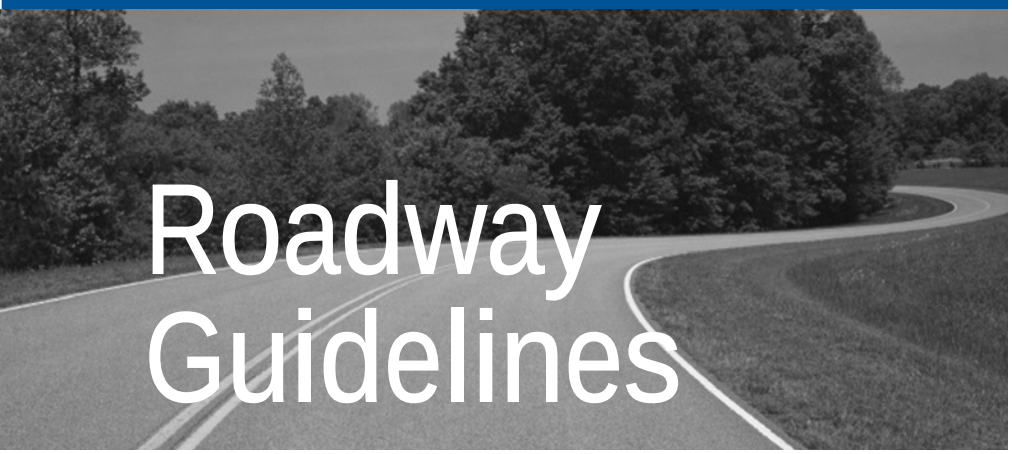
In all cases, the designer needs to introduce transition measures that will safely lower the speed of vehicles entering the project area by sending a clear message to the driver that there is a change in context. Changes in building height and setback, the width and number of travel lanes, and the shoulder treatment are all means of providing visual cues.

Transition measures could include:

- Changing an 8 ft. shoulder on the outskirts of a town to an 8 ft. parking lane, and/or introducing a bike lane.
- Narrowing the lane width. For example, lanes that were 12 ft. in the rural area could be narrowed to 10 ft. within the town.
- Introducing curvature, such as roundabouts at the entrance to the populated area. This is a very common technique in England, and in increasing use here in this country.
- Installing "gateway" treatment, with landscaping and signage, and the use of physical measures such as medians, curb extensions, and decorative pavement.

Figure 6.4 Example of How to Address Transitions





7.0 Roadway Guidelines

7.1 TRAVEL LANES

The designer is encouraged to make full use of the normal range of travel lane widths – from 9 to 12 ft. – depending upon context and project goals. The designer should select the lane width that best complements the desired operating speed of the roadway. The optimal lane width depends on at least five factors:

- **Roadway type.** Widths of 11 to 12 ft. should be used for regional arterials in rural and suburban areas, although widths may be reduced to 10 ft. in urban contexts. The fullest range of lane widths – 10 to 12 ft. – are regularly used for the community arterial, since this roadway type has the greatest need for flexibility. On collector roadways, lanes of 10 to 11 ft. are recommended for urban areas and suburban centers in order to encourage driver behavior that is compatible with the context, although widths of up to 12 ft. are possible on suburban corridors. Widths of 9 to 11 ft. are recommended for local roads in urban and suburban centers.
- **Desired operating speeds**. Lane widths of at least 11 ft. are recommended when posted speeds are 35 mph or higher. Widths of 10 to 11 ft. are often used for roadways posted less than 35 mph, and are recommended for speed control purposes.
- **Context area.** Narrower lane widths are commonly used in urban areas, especially traditional commercial districts or neighborhoods.
- **Truck and bus volumes.** Lane widths of 12 ft. are recommended for arterials with posted speeds of 35 mph or higher and that have heavy truck volumes in excess of 5 percent, and/or bus service headways of more than twice per hour. Widths of 11 to 12 ft. are recommended for other roadways with significant heavy truck volumes, or in industrial districts.
- **Bicycle facility.** If bike lanes or paved shoulders of at least 4 ft. are provided, travel lanes can be striped as narrow as 10 ft. on community arterials and lower speed roadways. In the absence of bike lanes, an outside lane width up to 14 ft. should be considered where the roadway is part of a planned bike network, although a width of 12 ft. is adequate for low speed roadways with modest volumes.

Yorkship Village in Camden, NJ. The 18 ft. roadway, on-street parking, and horizontal curves ensure that vehicles will travel slowly through this traditional planned development.

The AASHTO Green Book states the advantages of using narrower lane widths on roadways posted at 45 mph or less: "More lanes can be provided in areas with restricted rights of way; allow shorter pedestrian crossing times because of reduced crossing distances; and are more economical to construct."[38] Further, studies have suggested that wide travel lanes can encourage higher travel speeds. In short, narrower travel lanes are better for pedestrians.

Studies have increasingly validated the ability to safely use lanes narrower than 12 ft. lanes on roadways. As noted in a paper on suburban and urban arterials at the 2007 TRB conference, "There is no indication that the use of 10- or 11-ft. lanes rather than 12-ft. lanes for arterial midblock segments leads to increases in accident frequency."[39] A similar conclusion was reached for lane widths at intersections.

Lane widths are not prescribed for local roads in the town/ village neighborhood and suburban neighborhood contexts. Historically, streets have been calmed in these neighborhoods through the use of shared lanes. Narrow roadway dimensions result in yield movement, a traffic calming condition where motorists must occasionally pull over and wait for an approaching car to pass before proceeding. In these context areas, Table 6.2 offers four different "street modules," ranging from 20 to 36 ft. The appropriate street module depends upon the housing density in the neighborhood, the presence of parking, and whether the roadway is one-way or two-way.

Local street design is intended to make the motorist vigilant for the presence of other motorists, pedestrians and bicyclists, and hamper the ability to speed. Many new suburbs have local streets designed for on-street parking that is never used because of low residential densities and ample driveways. Wide, empty streets can lead to higher speeds, and should be avoided.

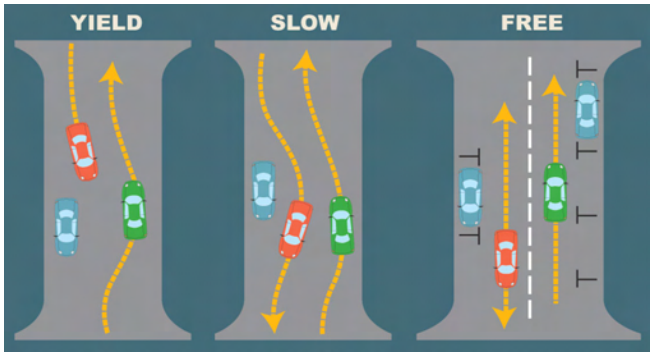


Figure 7.1 Local Street Design. "Yield" and "slow" conditions are traditional ways of calming traffic on local streets.

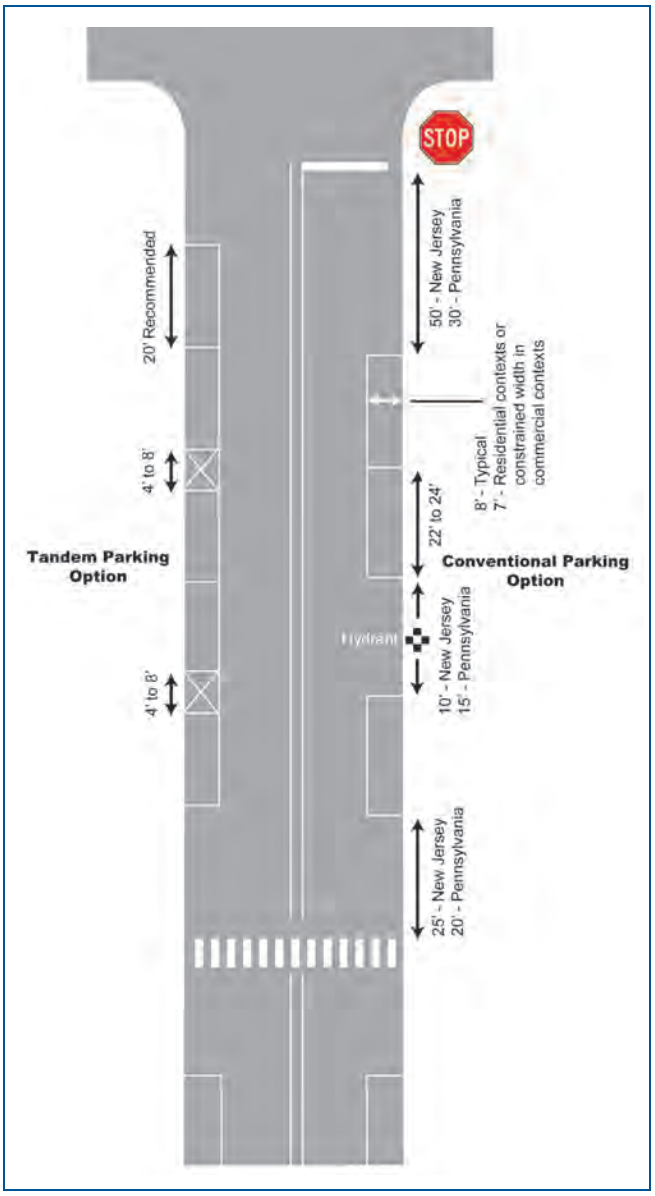
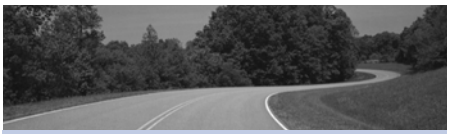


Figure 7.2 On Street Parking Dimensions.

7.2 ON-STREET PARKING

On-street parking is an important part of the urban fabric. Parking lanes benefit pedestrians, since they serve as a buffer from traffic, and can reduce the speed of passing vehicles by creating side friction. Further, on-street parking acts as a visual cue that tells motorists they are in a more urbanized, lower-speed area. On-street parking should be considered in all contexts except the rural and suburban corridor context areas, and on all roadway types. On-street parking is preferred over the use of a shoulder in urban areas.



7.2.1 Parking Types

Parallel Parking

A parallel parking space is typically 8 feet wide and 22 to 24 feet in length. Parking lanes wider than 8 feet are generally not recommended; they increase pedestrian street crossing distance, and reduce the right-of-way available for bike lanes and sidewalks and buffers. However, widths greater than 8 feet are possible when incorporated into innovative bike lane treatments.

Parking spaces of 7 ft. may be acceptable on commercial streets with lower traffic volumes and parking turnover. Widths of 7 ft. should be assumed on all residential streets. At least 1.5 feet should be kept clear between the edge of the curb and any objects such as telephone poles, benches, and trees, in order to allow space for opening and closing of car doors.

"Tandem" parallel parking spaces are recommended for higher-order and congested roadways. Rather than stripe each parking space at 22 to 24 feet in length, parking spaces are typically striped at 20 feet in length with a marked out box of 4 to 8 ft. in length in between two spaces. Under this configuration, the time required for parking a vehicle is cut significantly.

Angled Parking

Angled parking should be considered on wide streets in commercial areas with lower volumes and speeds. Angled parking can provide up to 50 to 75 percent more spaces than parallel parking. Parking spaces are typically 8.5 ft. wide, with the depth (measured perpendicular to the street), and minimum width of adjacent lane dependent on the stall angle, as indicated in Table 7.1.

Angled parking should be considered on wide streets in commercial areas with lower volumes and speeds.

Table 7.1 Angled Parking Dimensions

Angle	Stall Length	Minimum Width of Adjacent Lane
45°	17 ft., 8 in.	12 ft., 8 in.
50°	18 ft., 3 in.	13 ft., 3 in.
55°	18 ft., 8 in.	13 ft., 8 in.
60°	19 ft., 0 in.	14 ft., 6 in.
65°	19 ft., 2 in.	15 ft., 5 in.
70°	19 ft., 3 in.	16 ft., 6 in.
90°	18 ft., 0 in.	24 ft., 0 in.

Source: ITE, *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities,* ***2006.***

Back-in angle parking in Pottstown, PA.

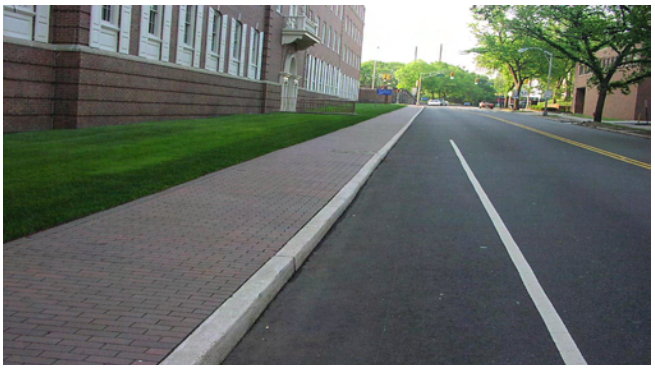
Angled parking can be head-in or back-in:

- **Head-in angled parking.** Standard "head-in" angled parking requires motorists to back out into the travel lane when leaving the parking space, often with limited visibility. For this reason, traffic speeds should be less than 30 mph when angle parking is used.
- **Back-in angled parking.** Some communities have found back-in, drive-out angle parking an attractive alternative to head-in angle parking. This design removes the sight-distance issues associated with standard angle parking, directs passengers to the sidewalk rather than the street and is the preferred configuration of diagonal parking on roadways with bicycle lanes or a higher number of bicyclists. This technique is being championed in some projects within the two states, such as High Street in Pottstown, PA.

7.3 SHOULDERS

The shoulder is the portion of the roadway contiguous with the traveled way that accommodates stopped vehicles, emergency use, and bicyclists. Consistent with the AASHTO Green Book, this Guidebook recommends the use of shoulders as being more critical on higher speed roadways in urban and suburban contexts. On these roadways, shoulders are desirable for avoiding crashes and stopping due to mechanical difficulties.

Shoulders are generally not recommended in urban and suburban center contexts, where on-street parking and/or bike lanes are more desirable. On medium to lower speed roadways where vehicles cannot completely pull off the road, the presence of stopped vehicles can slow traffic



Rutgers University in New Brunswick, NJ striped a shoulder on George Street through its central campus as the most expedient way to create a facility for bicyclists.

down, but they rarely pose a hazard for passing motorists. However, shoulders can perform a useful role in retrofitting existing urban and suburban center roadways with wide travel lanes, minimal demand for on-street parking, and where bike lanes are not practicable. In these situations, a shoulder of 4 to 6 ft. in width narrows the travel lane for motorists, and provides a dedicated area for bicyclists. As noted in the Green Book, a narrow shoulder is also useful in emergency situations; if a vehicle pulls over such that it occupies no more than 4 ft. of the traveled way, the remaining travel way width can be used by passing vehicles.

Recommendations for shoulders are provided in the Matrix; the dimensions refer to paved surfaces only. Paved shoulders are more advantageous for bicycle travel and should be encouraged. Shoulders in urban and suburban areas are generally curbed, with a closed drainage system.

Shoulder widths recommended in Table 6.2 range from 2 ft. to 12 ft. The 12 ft. shoulder is only recommended for the regional arterial on suburban corridors. Shoulders of 8 to 10 ft. in width are recommended for the higher speed roadways: arterial roadways in rural and suburban corridor contexts, and the community collector in the suburban corridor context. Shoulders of 4 to 10 ft. are recommended for higher order roadways in suburban neighborhoods.

Lower width shoulders are recommended in other contexts. In urban areas, shoulders of 4 to 6 ft. are recommended for use only to retrofit existing wide travel lanes and enhance bicycle travel. No shoulders are recommended for neighborhood collector roadways in urban contexts, or for local roads in general, with the exception of rural areas.

7.4 BICYCLE FACILITIES

Encouraging alternative transportation modes is a key principle of smart growth development. All reconstruction or restriping projects for arterial and collector roadways should routinely consider the best means of accommodating bicyclists.

7.4.1 Facility Types

There are three principal types of bike facilities:

1) **Shared roadway** – Most bicycle trips take place on roadways in which bicyclists share the travel lane with motorists, or ride on the shoulder. There are no markings on the roadway to indicate the presence of bicyclists, but signs may be erected to indicate that the roadway is part of a bike route. The compatibility of the roadway for bicyclists depends upon many factors, including the width of the travel lane and shoulder (if present), roadway operating speed, traffic volumes, mix of heavy vehicles, and parking. This category can be divided into two sub-categories: wide curb lanes and paved shoulders. Both of these sub-categories are explained in greater detail later in this section.
2) **Bike lane** – A striped lane and markings on the roadway, accompanied by signing, designate an area for preferential or exclusive use by bicyclists. Bike lanes accommodate one-way travel only, and lie on both sides of the roadway.
3) **Shared use path** – These paths lie outside the roadway. The term bicycle path is rarely used for these facilities since they are shared by many other non-motorist modes, such as pedestrians and roller-skaters. They may be seen along abandoned rail lines, greenways, and within parks, and they are highly valued for their recreational opportunities. However, they are much less functional for everyday transportation than the first two categories discussed. They access relatively few land uses within their community. When installed parallel to roadways, shared use paths experience a higher rate of motorist-bicyclist conflicts and crashes than on-road facilities.[40] A major problem is that motorists turning at intersections or driveways may be taken by surprise by bicyclists who suddenly enter the roadway, opposite the flow of normal traffic. This issue is particularly acute on roadways with a high number of driveways and/or high traffic volumes at driveways, and where sight distance is less than ideal.

Due to the limitations of shared use paths, states and local governments should emphasize bike lanes and compatible shared roadways to accommodate bicycle use. Of these two facilities, bike lanes have some advantages. Surveys have shown that bicyclists prefer bike lanes to wide curb lanes.[41] Fewer bicyclists ride on sidewalks on streets with bike lanes than on streets with wide curb lanes.[42] Bicyclists ride father from the curb edge, improving sight distance and the ability to respond to vehicles entering the roadway from streets and driveways. Through defining areas for both users, erratic maneuvers by motorists are reduced. However, both facilities reduce encroachment by motor vehicles into adjacent lanes.

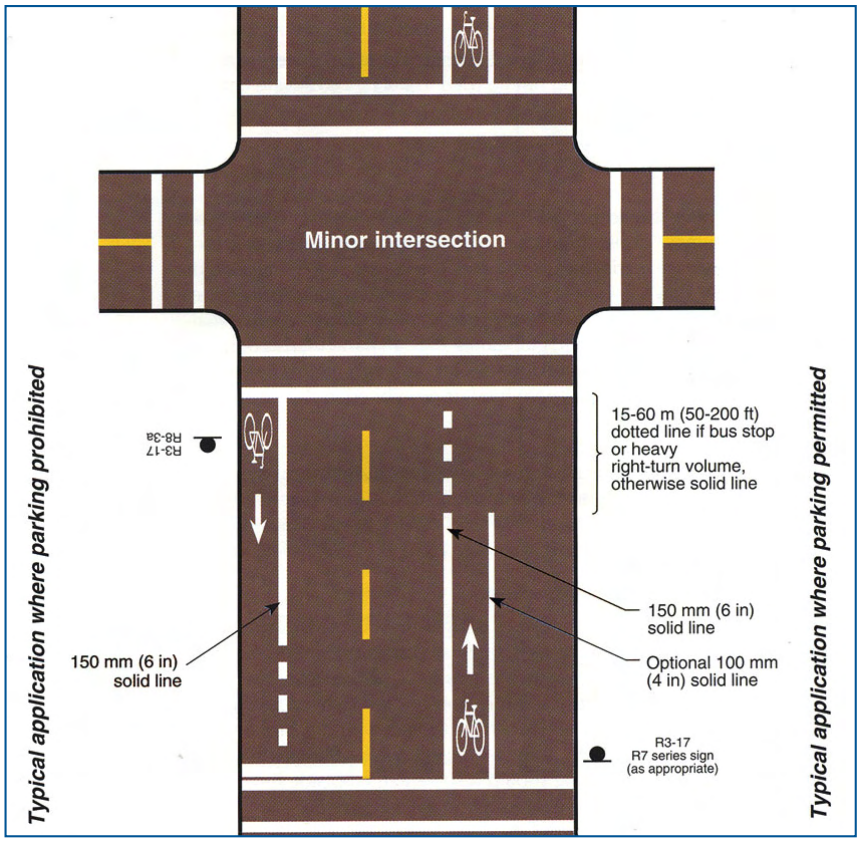
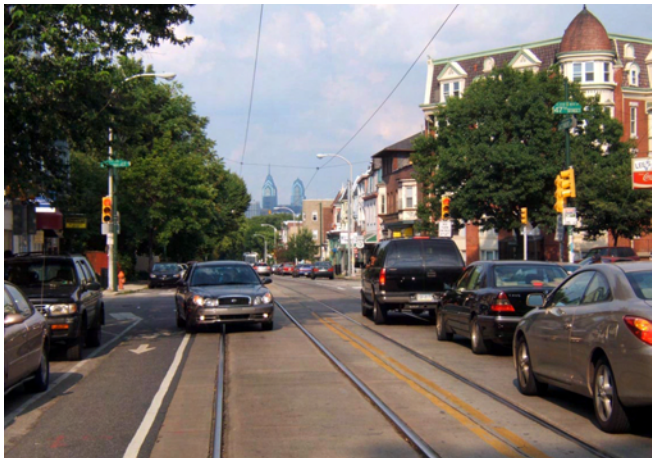


Figure 7.3 Typical bike lane striping. (AASHTO Guide for the Development of Bicycle Facilities.)



Baltimore Avenue, a principal arterial in Philadelphia, was striped with 10 ft. travel lanes to enable the installation of bike lanes. The effective curb radius of this intersection is significantly increased by the presence of the bike lane – as well as the parking lane – enabling motorists from the side street to easily turn right into the 10 ft. lane.

The 5 foot bike lane and 10 foot travel lane comprise a common cross-section in urban areas.

Bicyclist education is highly recommended for supplementing all facility types. Well-designed bike facilities cannot substitute for good judgment on the part of the cyclist. Even on roads with bike lanes, cyclists are still obliged to follow all prevailing rules of the road.

The AASHTO *Guide for the Development of Bicycle Facilities* is the most authoritative national guide for designing bicycle facilities. Both states also have their own bicycle plans: NJDOT, *Bicycle Compatible Roadways and Bikeways*, April 1996; and PennDOT, *Statewide Bicycle & Pedestrian Master Plan: Bicycle Guidelines*, April 1996.

7.4.2 Bike Lanes

Bike lanes are the ideal facility for accommodating basic bicyclists. By designating a space only for bicyclists, they give bicyclists a measure of comfort that motorists will not move into their path. They serve to advise motorists of the possible presence of bicyclists. The presence of bike lanes encourage bicyclists to separate themselves from parked cars more than they otherwise might, reducing the possibility of being "doored."[43]

A bike lane width of 5 ft. is recommended by AASHTO *Guide for the Development of Bicycle Facilities*, and is the most widely accepted standard. Widths of 6 ft. are recommended with the presence of considerable truck traffic, and under most circumstances when roadway speeds exceed 40 mph. Widths greater than 6 ft. are generally not used, to discourage motorists from using the bike lane as a parking lane or turning lane.

Some municipalities across the country have striped 4 ft. bike lanes, typically to reduce the width of 14 ft. travel lanes and reduce vehicular speeds. This practice is similar to striping shoulders on wide travel lanes in urban environments, described in section 7.3. This use should be permitted in constrained rights-of-way, particularly as part of an effort to narrow wide travel lanes.

The 5 ft. of width for standard bike lanes should be provided outside the joint if the roadway between the gutter pan and pavement is not smooth. Some municipalities have elected to pave asphalt up to the curb for this reason.

Bike lanes should not be installed between parking lanes and curb lanes. The presence of parking would obstruct the visibility by bicyclists and motorists at the approaches to intersections. Further, bicyclists desiring to turn left would be starting from the right curb, not an ideal position.

Bike lane markings should not extend through an intersection or through a pedestrian crosswalk. The AASHTO *Guide for the Development of Bicycle Facilities* should be consulted for striping options on bike lanes through intersections. It is problematic to continue

In addition to improving sight distance of and by pedestrians, a curb extension provides room for a bike rack in a constrained urban area.

bike lanes adjacent to the curb in intersections with dedicated right-turn lanes. In this scenario, through bicyclists would have to contend with motorists turning into their path within the intersection. It is instead recommended to dash or to completely interrupt the bike lane in advance of the intersection. This marking pattern serves to notify bicyclists that they must weave with motorized traffic at a safe opportunity and position themselves between through and right-turning motorists at the intersection approach.

Bike lanes are usually not needed on local streets, due to the lower traffic volumes and speeds.

7.4.3 Shared Roadway

Shared roadways can be subdivided into two categories: paved shoulders and compatible curb lanes.

Paved shoulder

The practical effect of paved shoulders is little different than that of bike lanes, and should also be considered for accommodating bicyclists.[44] The minimum width of 4 ft. recommended for shoulders coincides with the minimum width recommended for bike-compatible facilities. The same qualities that make wide shoulders desirable on higher-speed, higher-order facilities also pertain to bicycle travel.

Wide Curb Lane

Given the relatively narrow rights-of-way for many roadways in the two states, wide curb lanes are often the most practical bicycle facility. These have less potential for encouraging bicycle use than bike lanes and paved shoulders, but are often preferred by experienced bicyclists. These bicyclists may find that bike lanes limit their options for various maneuvers. Bike lanes also may collect more debris than wide curb lanes, since they are not "swept" by the movement of passing traffic.

The recommended width for a wide curb lane on most streets is 14 ft. A width of 15 ft. is recommended for roadways with steep grades, and for roadways with speeds above 40 mph. On lower-speed, lower trafficked urban roadways without parking, a curb lane of 12 ft. suffices.

Bicyclists appreciate any extra width provided to them on higher-order roadways, whether the curb lane width meets the recommended standard or not. If space is available in restriping a multi-lane roadway, the outside lanes should be wider than the inside lanes.

7.4.4 Facility Selection

Guidance on selecting a bicycle facility should be provided by a bike network plan that identifies the most important bicycle generators in the community, and provides recommendations on how to best accommodate bicyclists between those destinations. Bicycle generators include schools, parks, major shopping areas, employment centers, transit stations, and large residential developments.

A bike network plan should identify roadways for bike lanes, compatible shoulders or shared lanes, and shared use paths. In many cases, the selected roadways will be arterial and collector roadways. Bicyclists prefer to travel on these roadways for the same reason that motorists do: they provide the most direct route to key destinations. A representative bike network plan is shown for West Windsor Township in Mercer County, NJ (Figure 7.4).

7.4.5 Road Diets and Other Treatments

Sometimes bike lanes can be installed as the valued by-product of a "road diet" treatment, in which a four-lane roadway is converted into two through lanes with a two-way left-turn lane and two bike lanes. These have many beneficial effects:[45, 46]

- create a designated facility for bicyclists;
- reduce crossing distance in which pedestrians are exposed to vehicular traffic;
- provide a refuge for crossing pedestrians if physical medians are created;
- can reduce incidence of left turn crashes for motorists;
- can reduce vehicular speeds by 1 to 5 mph on roadways where speeding is common.

On a roadway in Portland, Oregon, where travel lanes were variously reduced in width or number to permit the installation of bike lanes, motorists traveling at faster than 31 mph decreased from 58% of all motorists to 51%.[47]

Many jurisdictions have approved the use of 10 ft. lanes in order to install bike lanes. The presence of bike lanes addresses at least two operational issues that designers might perceive with the use of 10 ft. lanes:

- Increase separation from parked vehicles, or from curbs if no parking lane is present;
- Bike lanes are incorporated into the effective turning radius for vehicles, facilitating turns for larger vehicles.

The City of Philadelphia has been a national leader in creating bike lanes, striping a total of 150 miles since 1996. A common cross-section has been 44 ft. wide roadways with 7 ft. parking lanes, 5 ft. bike lanes and

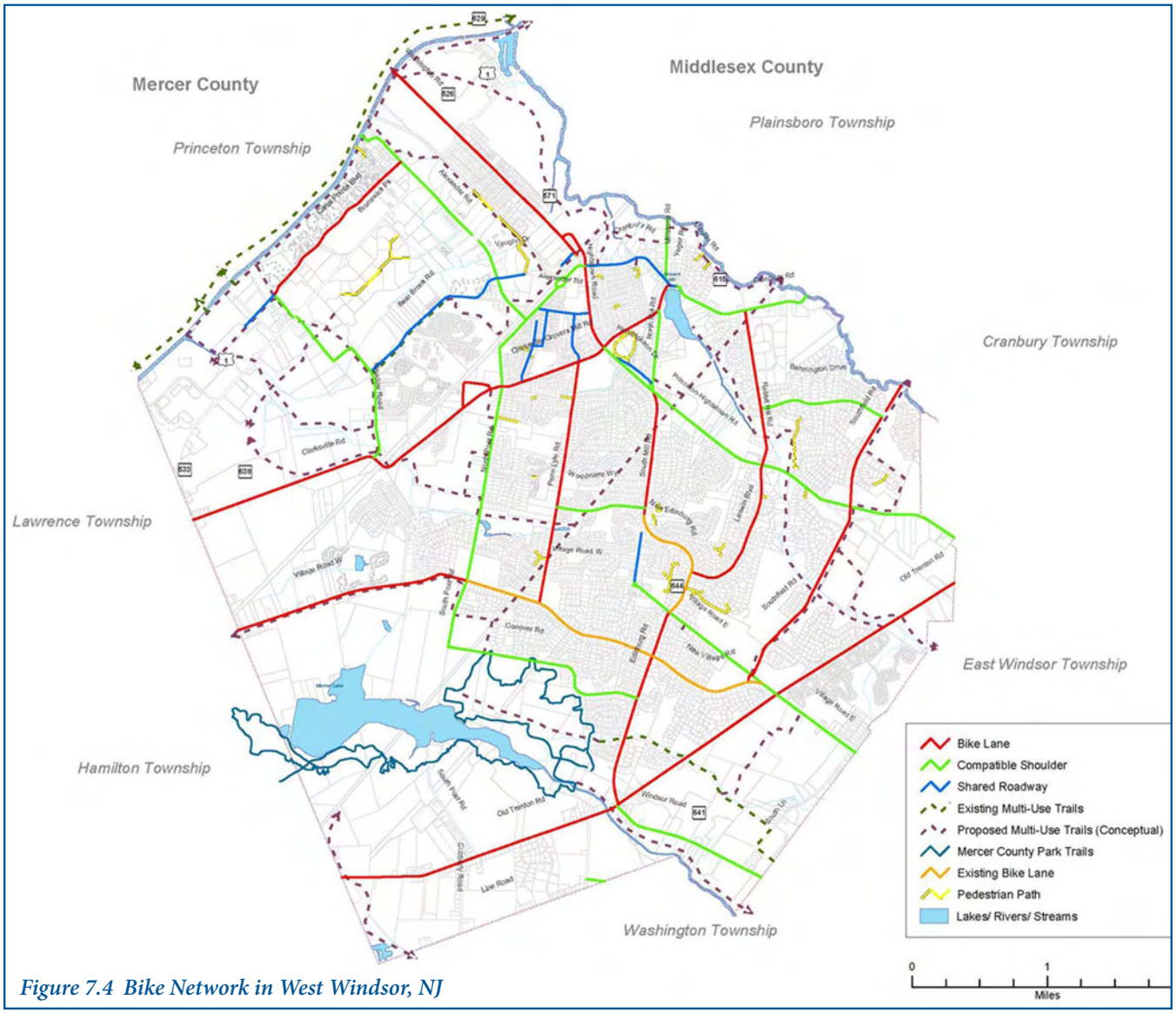
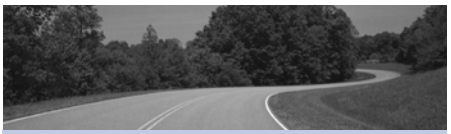


Figure 7.4 Bike Network in West Windsor, NJ



10 ft. travel lanes. To encourage traffic calming on some wider roadways, medians of 4 ft. to 6 ft. were striped in order to narrow travel lanes to 10 ft. The City elected not to stripe 11 to 12 ft. lanes even though that would have been an option.[48]

On many existing roadways – particularly urban commercial and mixed-use districts - bike lanes can be installed only if parking lanes are removed. Because on-street parking is perceived as vital to the activity of these areas, and serves to slow down traffic on these streets, communities will rarely elect this option.

In the absence of a bike network plan, the sponsoring agency must assess the feasibility of different bike facilities, and consider community goals for the project. On main streets or roadways on which traffic calming is needed, the installation of bike lanes or wide curb lanes may be a lower priority. The presence of bike compatible roadways on parallel roads may also help determine the need to install bike facilities on the project roadway.

7.5 MEDIANS

The primary function of a center median is to separate opposing traffic flows. Other purposes include serving as a refuge for pedestrians crossing the street, storing or restricting left-turn vehicles, managing access, and providing an attractive landscaping or streetscaping treatment.

Landscaped medians provide an aesthetic enhancement for business districts, and facilitate pedestrian crossings.

The TRB *Access Management Manual* groups medians into three categories:

- **Nontraversable** – Examples include Jersey barriers, raised with curbing, flush grass or guiderails. Jersey barriers are common in the two states, particularly in New Jersey, where their narrow width (24 in. wide by 32 in. tall) have made them the median of choice in retrofitting arterial roadways with restricted ROW. Raised medians with curbs are useful for facilitating pedestrian crossings. Although grass medians are classified as non-traversable, they are sometimes crossed by wayward vehicles, and have been the site of several fatal crashes on New Jersey highways in recent years. NJDOT has begun installing guiderails in grass medians on stretches of limited access roadways to reduce the possibility of cross-over crashes.
- **Traversable** – Painted medians that do not discourage vehicles from entering or crossing. This type of median is discouraged since left turns are made from the left or passing lane, and trailing vehicles make lane changes to avoid the left turning vehicles.

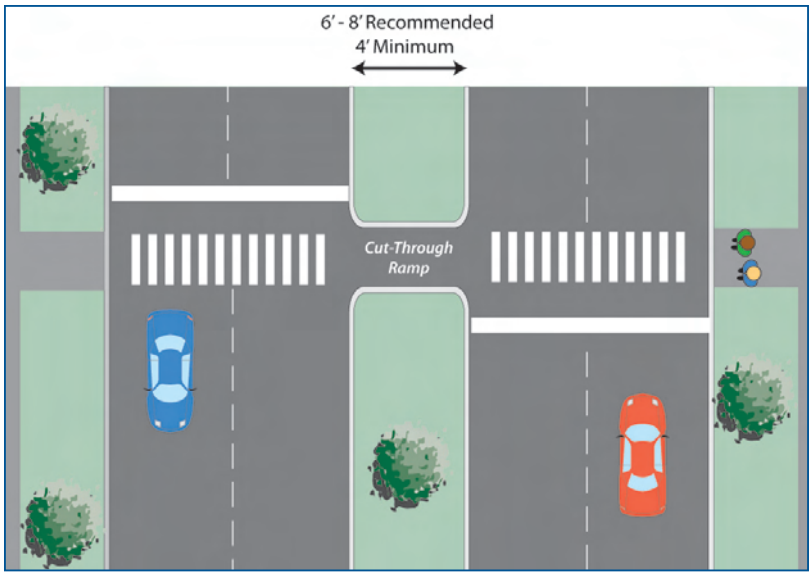


Figure 7.5 Raised medians should accommodate regular pedestrian activity.

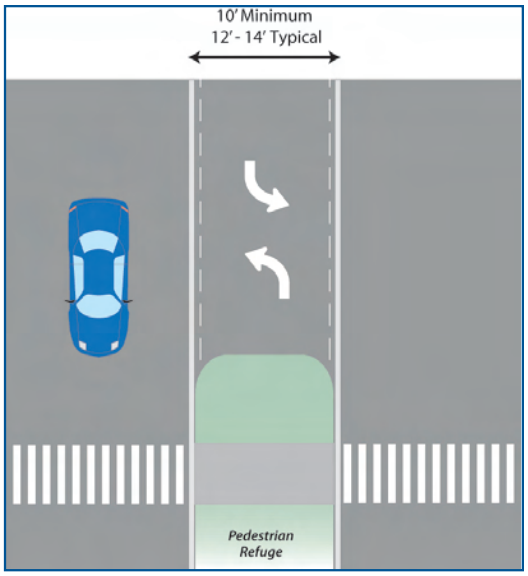


Figure 7.6 Two-way left turn lane with median.

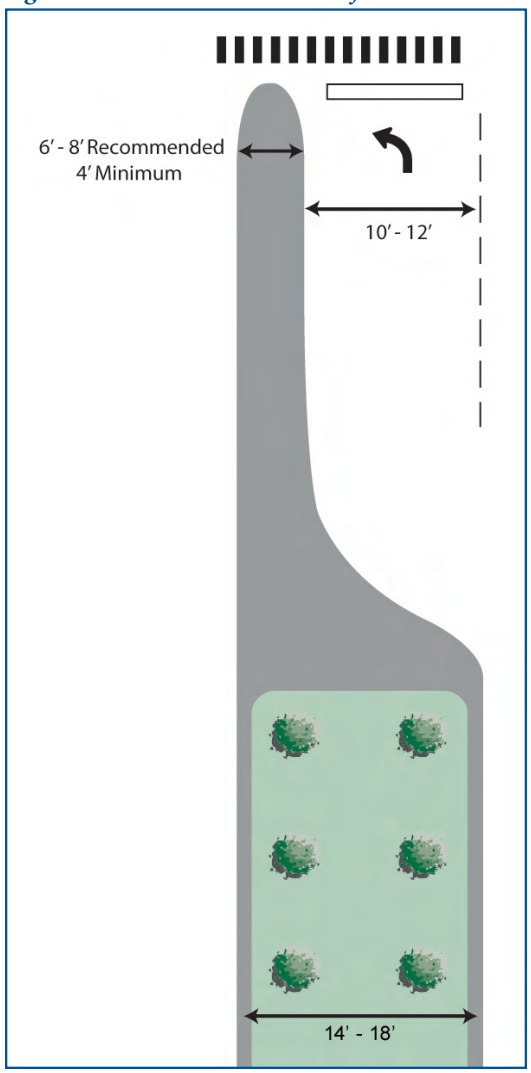
- **Continuous Two-Way Left Turn Lane** (TWLTL) – Striped to permit left turns in either direction. These can be stamped pavement or pavers to create the perception of reduced lane widths and slow vehicles entering the TWLTLs.

The nontraversable median is the preferred median type. Due at least in part to its efficiency in reducing conflicting maneuvers at driveways, it has the lowest crash rate. In one study, roads with nontraversable medians were found to experience 5.6 crashes per million vehicle miles, versus 6.9 for TWLTLs and 9.0 for undivided roadways.[49]

Among nontraversable medians, the raised median with curbing is preferred due to its ability to encourage safe pedestrian crossings on higher order roadways. One study found a pedestrian crash rate of 19.11 per 100 million miles on arterials in CBDs with raised medians, versus 41.11 for TWLTL and 87.31 for undivided roadways. In suburban areas, the rate was 6.31 per 100 million miles for raised median, versus 12.89 for TWLTL and 13.91 for undivided roadways.[50] The advantage in pedestrian safety for raised medians has been found in other studies.[51] However, the installation of physical islands within the TWLTL at locations of regular pedestrian crossings can serve to make this median type pedestrian friendly.

Furthering another context sensitive design goal, raised medians can enhance the appearance of a corridor, by hosting trees or other vegetation as part of a boulevard treatment (see guidelines for planting medians in Landscape Design, Section 8.3.) An attractive brick or textured concrete surface is another option.

Figure 7.7 Raised median with left turn lane.



Raised medians are desirable to aid pedestrian crossings on roadways over 60 ft. in width. It should be noted, however, that on higher speed roadways of restricted widths, the Jersey barrier is often preferred to the raised median with curbing. A Jersey barrier has greater ability to separate opposing traffic and prevent head-on collisions than a narrow raised median (less than 10 ft.). On certain high speed and high volume highway segments, NJDOT seeks to discourage all midblock pedestrian crossings due to concern about pedestrian safety, and deploys a Jersey barrier in these cases. Each site should be analyzed on a case-by-case basis to determine how to safely accommodate pedestrians.

The use of TWLTLs is appropriate in certain situations. Although their crash rate is higher than nontraversable medians, their crash rate is 35% lower than undivided roadways.[52] They are suggested for consideration on roadways with volumes from 10,000 to 24,000 vpd.[53,54] Other parameters include highways with extensive commercial development, driveway density of more than 45 per mile, high left turn volumes and / or high rate of rear-end or angle crashes from left turns.[55] Concerns that TWLTLs increase head-on collisions are unfounded; indeed, studies show similar head-on crash rates for raised median and TWLTLs, and both have much lower head-on crash rates than undivided roadways.[56]

Recommended widths of medians are provided in the Matrix. Medians installed to serve as pedestrian refuges should ideally be 8 ft. in width, with 6 ft. the recommended minimum (measurements of physical medians are from face-of-curb to face-of-curb). Median widths of 12 to 18 ft. can accommodate left turn bays. Medians of 60 ft. in width or more should only be used for regular traffic operations in rural areas, or to provide landscaping treatments and/or parks in suburban and urban contexts. TWLTLs are typically 12 to 14 ft. in width, although 10 ft. widths are common in many urban areas.

If a proposed median will prevent access to a commercial driveway, a project can incorporate median breaks, U-turn jughandles, flush textured pavement medians, or TWLTLs.

7.6 INTERSECTIONS

Balancing the needs of motorists, pedestrians and bicyclists can become even more difficult at intersections than at mid-block locations. Following are features desired by each user group:

Features desired by pedestrians:

- Well-defined facilities, with sidewalks on all corners, crosswalks in good condition, and pedestrian signal indications that are easily visible from every corner of intersections.
- Short crossing distance. This can be accomplished by:
  - Controlling the number and width of travel lanes.
  - Using the smallest curb radius practicable.
  - Controlling the degree of skew, and thus disproportionately long crossing legs.
  - Installing curb extensions ("bulb outs").
- Adequate time to cross intersection.
- Presence of median islands at major intersections, to provide a refuge if pedestrians are not able to cross the intersection within their signal phase.
- Management of conflicts with vehicles. Turning vehicles present the greatest conflicts. These can be addressed through a wide range of treatments, from use of regulatory signs ("Turning Traffic Must Yield to Pedestrians", R10-15) to leading or exclusive pedestrian intervals or protected left turn phases at signalized intersections.
- Features to accommodate disabled pedestrians.
- Good sight distance.

Features desired by motorists:

- Minimal traffic delays.
- Ability to complete turns without encroaching into lanes of opposing or adjacent traffic, and without leaving roadway (especially larger trucks).
- Predictability of conflicting traffic flows, through the use of protected (green arrow) phases and exclusive travel lanes.
- Well delineated facilities. At large, complex intersections, the use of median islands with accompanying signage, and dashed lane markings help keep motorists in the appropriate lanes when turning.

- Responsive signal operation with minimal "wasted" signal green time, usually accomplished through vehicular detection on minor streets.
- Avoidance of extreme angles.
- Good sight distance.

Features desired by bicyclists:

- Adequate width travel lanes to accommodate bicyclists.
- Signals capable of detecting bicycles, or operating on pretimed phases. In short, the ability to navigate through an intersection without the need to dismount the bicycle.
- Low vehicular speeds.
- Good sight distance/visibility of signals and conflicting vehicles.
- Predictability of conflicting traffic flows, through the use of protected (green arrow) phases and exclusive travel lanes.

The needs of these different groups must be balanced on every roadway. For example, the addition of turn or through lanes can be the most effective means of resolving serious traffic congestion on a roadway, but they can also make intersections more difficult for pedestrians to navigate. In these cases, the roadway designer should identify improvements to assist pedestrian mobility, whether through the addition of pedestrian refuges or signalization, striping and signing strategies.

7.6.1 Curb Radii

In a context where only motor vehicles are important, the radius of corners at an intersection would be large enough to comfortably and safely accommodate the design vehicle without encroachment into adjacent or opposing lanes. However, large turning radii increase the length of crosswalks and hence the exposure of pedestrians to vehicles. (See Figure 7.8.) They permit vehicles to take turns faster, which is also detrimental to pedestrian safety. Therefore, all curb radii must balance vehicular needs with pedestrian needs.

To avoid over-sized curb radii, determining the appropriate design vehicle is important. ITE *Context Sensitive Solutions in Designing Major Urban Thoroughfares* recommends that curb return radii "be designed to accommodate the largest vehicle type that will frequently turn the corner. This principle assumes that the occasional large vehicle can encroach into the opposing travel lane." Designers should use available tools such as turning templates or AutoTURN to determine the best curb radii for the specific context and conditions.

Conversely, designers should avoid making curb radii too small if larger vehicles are regularly present. In this case, large vehicles will frequently travel over the curb into the pedestrian realm, jeopardizing safety and degrading the curb. It is this conflict that engineers must address in designing curb return radii that are sensitive to their context.

The designer should keep in mind that the effective turning radius may be much larger than the curb radius once parking and bicycle lanes are taken into account as illustrated in Figure 7.9.

There are five types of design vehicles usually taken into consideration by roadway designers:

- passenger vehicle
- SU (single unit truck)

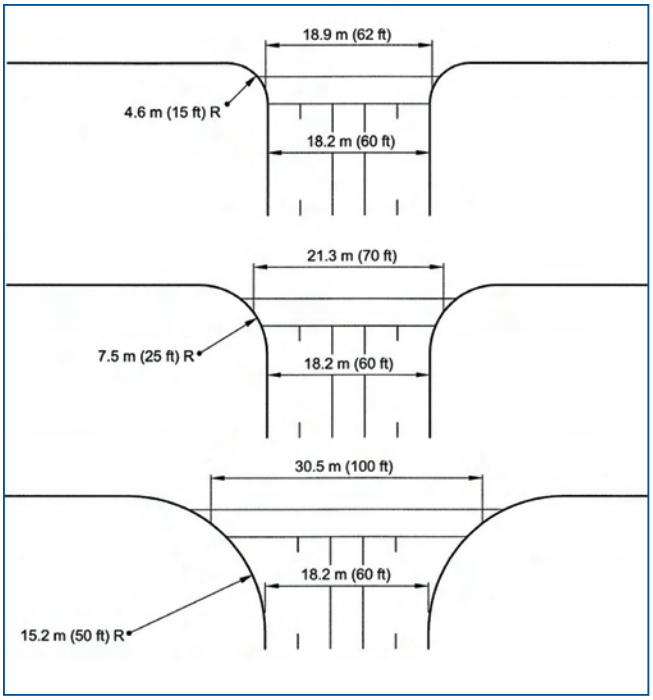


Figure 7.8 Curb radii at driveways and intersections must be selected with care in urban areas, balancing the impacts on truck circulation and pedestrian crossing distances. Example shown: While keeping the mainline constant at 60 ft., a change in radius from 15 ft. to 50 ft. will increase the crossing distance from 62 ft. to 100 ft. The time required for pedestrians to cross increases from 16 to 25 seconds. *Source: FHWA, 2004.*

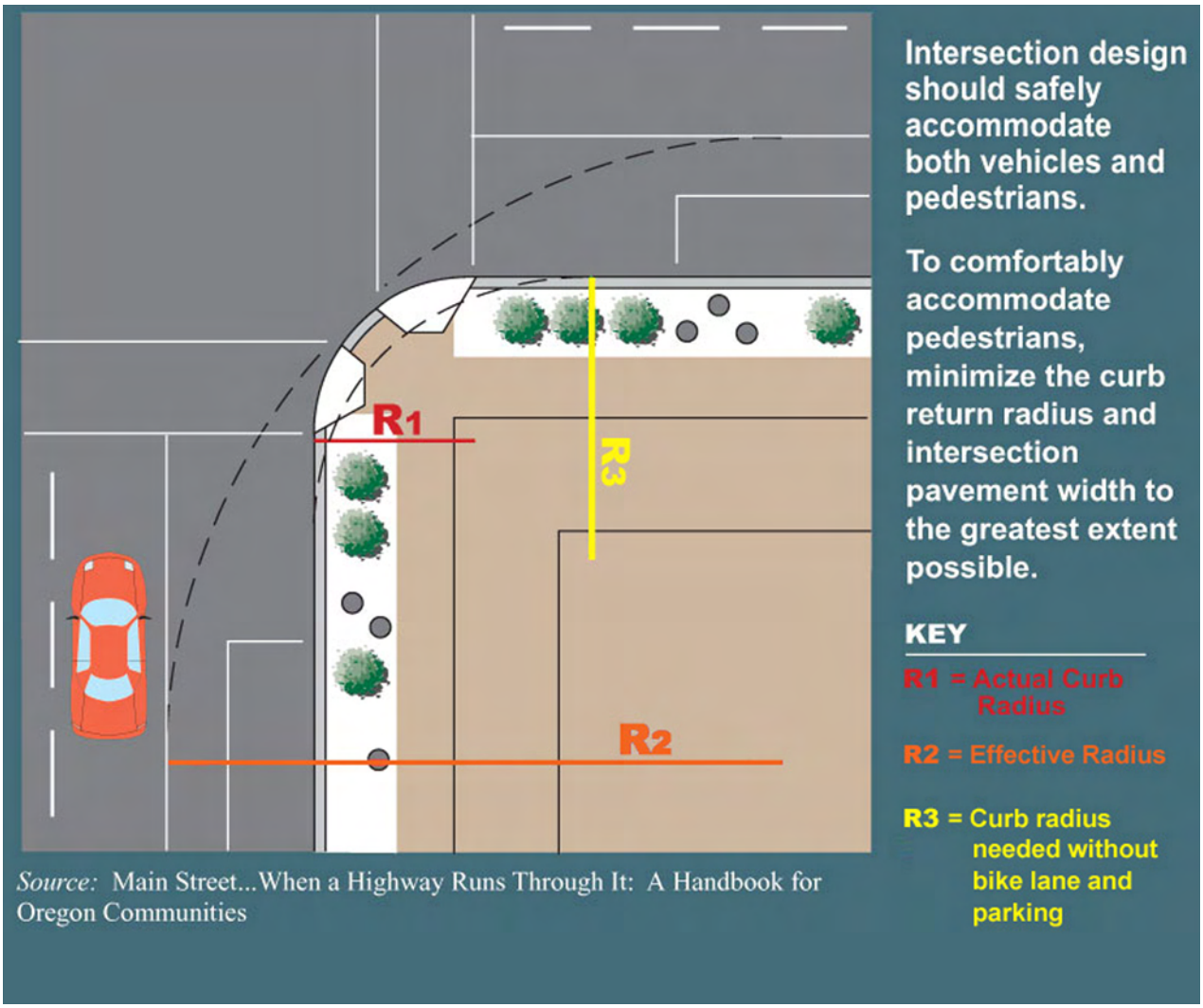


Figure 7.9 Effective Curb Radius

- Bus
- WB-40 (trailer truck with 40 ft. wheelbase)
- WB-50 (trailer truck with 50 ft. wheelbase)

In the urban core and town center contexts, where pedestrian activity is often intense, the smallest possible curb radii should be used. As indicated in the AASHTO Green Book, a curb return radius of 10 to 15 feet is used at most urban intersections, partly to minimize pedestrian crossing distances. This range is recommended here for use on most local streets, as well as collector and arterial roadways in urban areas with moderate volumes and a large percentage of passenger vehicles. Passenger vehicles can navigate curbs of this radius with little encroachment into other lanes. The relative infrequency of single unit trucks, school buses and possibly transit buses would not usually warrant construction of a larger curb radius. Curb radii of 15 to 25 ft. are recommended for these roadway types where encroachment is unacceptable.

A curb radius of 25 to 30 ft. will accommodate most turns on community collector roadways, and community arterials, particularly roads with less than 5% traffic in buses and heavy trucks. A curb radius of 25 ft. and a parking lane will permit a single-unit truck to turn without encroachment.

Radii of 35 to 40 ft. are adequate at most intersections on arterial streets where a WB-50 truck is the design vehicle. A radius of 50 ft. or larger may be considered for intersections on arterials if congestion and the percentage of larger vehicles are significant, and if there is little pedestrian activity.

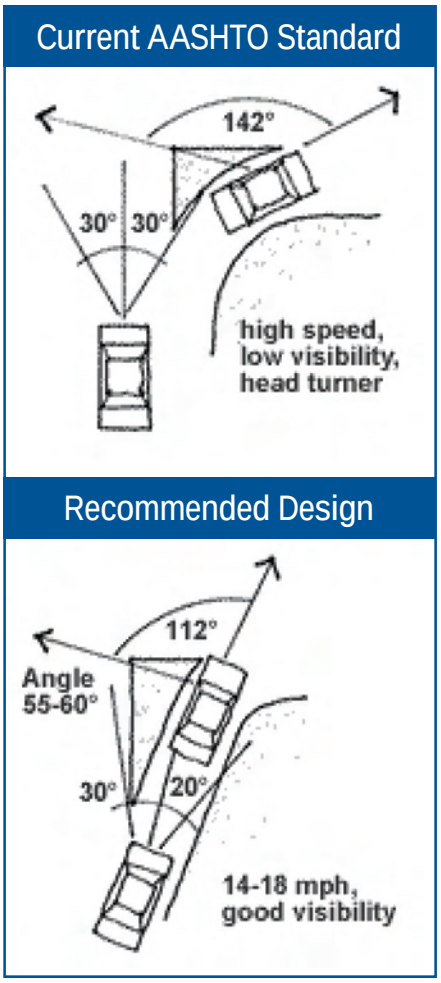


Figure 7.10. The design of channelization islands for slip lanes at intersections can be made more pedestrian friendly by changing entry angles and corner radii. Sources: Walkinginfo.org (graphic); Dan Burden (photo).

If large radii are not practicable on multi-lane roadways, it should be noted that large vehicles may encroach entirely into adjacent same-direction travel lanes. The stop line for opposed traffic can be recessed farther from the intersection if necessary. For a curb radius exceeding 50 ft., ITE *Context Sensitive Solutions in Designing Major Urban Thoroughfares* recommends investigating tapered or compound curve radii or the installation of a channelized right-turn lane with a pedestrian refuge island.

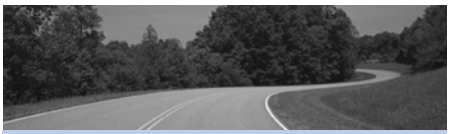
7.6.2 Signal Coordination

Traffic signal coordination reduces delay and unnecessary stops at traffic signals. Because it does so without roadway widening, it can be a useful strategy in improving traffic flow along a roadway without lengthening pedestrian crossings. Optimizing signal timing plans can result in a reduction in travel time ranging from 10 percent to 20 percent.

7.6.3 Islands

Three primary types of islands exist in roadway design: channelizing islands to direct traffic into appropriate paths, divisional islands to divide opposing or same direction traffic, and refuge islands for pedestrians. Islands can improve vehicular safety at an intersection by directing traffic and pedestrian safety by providing a safe refuge at a long intersection crossing. However, high-speed channelized right turn lanes or slips are inappropriate in urban contexts because they create conflicts with pedestrians. Principles for channelized right turns in an urban context are provided in ITE, *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities,* 2006:

- Avoid using channelized right-turn lanes where pedestrian activity is significant.
- Channelized right turn lanes should be reserved for right-turning volume thresholds of 200-300 per hour.
- When an urban channelized right-turn lane is justified, design it for low speeds (5 to 10 mph) and high-pedestrian visibility.
- It is desirable to have pedestrians crossing fully under signal control, rather than excluding the channelized right turn lane from pedestrian signalization.
- Provide a low-angle right turn, to reduce speeds and improve sight distances.



- Provide accessible islands, raised, and big enough for pedestrians to wait at least 4 ft. from the face of curb in all directions, and accommodate accessible features, such as curb ramps. A painted island is not satisfactory for pedestrians.
- If warranted, provide signing to remind drivers of their legal obligation to yield to pedestrians

7.6.4 Curb Extensions

Curb extensions (or bulb-outs) extend the line of the curb into the traveled way, reducing the width of the street. They are often used in urban core, village/town center and suburban center contexts to improve visibility of and by pedestrians, and also reduce the length of pedestrian crossings. They are installed at both intersections and mid-block locations. A common width is 6 ft., or slightly less than the width of a parallel parking lane. Their use should be restricted to streets with on-street parking. They should not be installed within a striped bike lane. They are favored by emergency service departments in many municipalities, since their presence prevents vehicles from parking too close to an intersection, or in front of a water hydrant if so positioned.

Examples of Curb Extensions

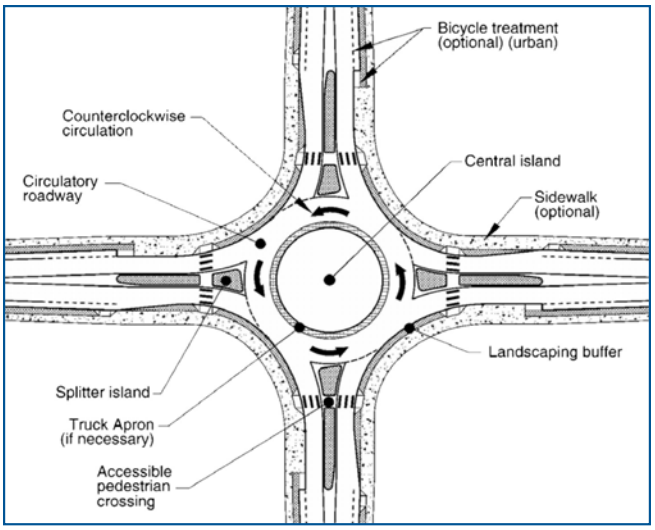


Figure 7.11. Roundabout design.

7.6.5 Modern Roundabouts

The modern roundabout, a channelized intersection with one-way traffic flow around a central island, can be used as an alternative to signalized intersections. They are increasingly accepted in the United States, and have been successfully implemented in other countries for decades. Modern roundabouts help to maintain traffic flow, while improving safety through reducing vehicular speeds and the number of vehicle conflict points (eight versus 32 at traditional 4-way intersections). A before and after study sponsored by the Insurance Institute for Highway Safety found that roundabouts produced a 39% decrease in overall crashes and a 76% decrease in injury crashes.[57]

There are six categories of roundabouts, increasing in diameter from 45 to 200 feet with corresponding increases in vehicle capacity and entry speed. Four categories are intended for urban areas, and two categories for rural areas. The characteristics of each are shown in Figure 7.2.

Roundabouts can lower vehicular delays at an intersection. However, for many communities, the deciding factors in using a roundabout are the aesthetics of a landscaped center island and the traffic calming effect provided by the horizontal deflection. Roundabouts are ideal when installed on the edge of an urban center, as all vehicles entering this area must slow down.

The ability of roundabouts to reduce vehicular crashes is well documented, but less research has been done on their effect on pedestrian and bicycle crashes. However, by reducing and simplifying interactions between pedestrians and vehicles, and reducing speeds, roundabouts have the potential to improve pedestrian safety. Steps must be taken to accommodate blind pedestrians, since they normally navigate four-legged intersections by the sound of the prevailing traffic movement, which is difficult to decipher at roundabouts. Bicycles should be directed into the flow of traffic with no bike lane markings due to the complexity of interactions with vehicles.

For more information on roundabouts, consult the FHWA publication *Roundabouts: An Informational Guide* (2000) and PennDOT Publication 414, *Guide to Roundabouts (2007).*

Table 7.2 Selected design characteristics of roundabout categories

Design Element	Mini roundabout	Urban Compact	Urban Single-Lane	Urban Double-Lane	Rural Single-Lane	Rural Double-Lane
Maximum entry design speed	15 mph	15 mph	20 mph	25 mph	25 mph	30 mph
Typical inscribed circle diameter	45 - 80 ft	80 - 100 ft	100 - 130 ft	150 - 180 ft	115 - 130 ft	180 - 200 ft
Typical daily service volume on 4-leg	10,000 veh/day	15,000 veh/day	20,000 veh/day	**	20,000 veh/day	**

Source: FHWA publication *Roundabouts: An Informational Guide (2000)* *** Special procedures required for calculation***

8.0 Roadside Guidelines

8.1 PEDESTRIAN FACILITIES

Walkability is a critical gauge of a healthy community. Whether in an urban core or a suburban area, pedestrian activity is best accommodated by a connected network of sidewalks, complementary land uses, attractive streetscaping, regular controlled pedestrian crossings, and lower speeds of passing traffic. The most difficult environment for pedestrians is found along higher order roadways in suburban areas, where gaps occur in the sidewalk network, vehicles pass by at high speeds, and the opportunity for safe pedestrian crossings is much less frequent. However, good design can make a major difference in how comfortable and safe these roadways are for pedestrians.

8.1.1 Sidewalks

Sidewalks are desirable to support both mobility and safety. Their presence has been shown to reduce the risk of pedestrian crashes in residential areas; a 1987 FHWA study found that locations with no sidewalks were more than twice as likely to have pedestrian/motor vehicle crashes as sites where sidewalks existed.[58] The safety benefit was particularly pronounced in residential and mixed residential areas. Approximately 15% of pedestrian accidents in suburban and rural areas occur when a pedestrian is struck while walking along a roadway.[59]

The 13 ft. clear sidewalk width on this downtown street permits groups of people to comfortably walk side by side.

A basic strategy for improving pedestrian conditions is to provide sidewalks along all roadways with developed land uses. The vast majority of municipalities in New Jersey and Pennsylvania have sidewalks missing in at least some developed land use areas, in part a product of the post-World War II planning philosophy that emphasized vehicular mobility in suburbia. Unfortunately, even today municipalities in both states continue to approve retail centers and other land uses on suburban roadways with no sidewalks. Along many suburban corridors, pedestrians stitch together trips by walking through parking lots, grass lots, and in the roadway. Other people elect to forego trips by walking or by transit. However, momentum has gathered for requiring sidewalks in all roadway projects, federal, state and local. In 2000, FHWA announced that bicycling and walking facilities will be incorporated into all transportation projects unless "exceptional circumstances" exist.

Missing sidewalk links are one of the biggest impediments to pedestrian mobility, particularly in suburban areas in the two states. Pedestrians in these areas must regularly walk in the street.

In response, the states have been planning, and should continue to plan, for sidewalks in a greater share of roadway projects. At the state level, sidewalks should be considered very early in the planning process to ensure adequate funding is programmed. The final decision to incorporate sidewalks into projects may ultimately be based on program-wide fiscal considerations of the DOT.

The provision of sidewalks has usually been a local responsibility, falling under the municipality's authority to approve new land uses and supporting infrastructure. In the two states, there is only one law mandating the installation of sidewalks in conjunction with land development: the New Jersey *Residential Site Improvement Standards* (RSIS), N.J.A.C. Title 5, Chapter 21. This law applies only to residential developments. It states that sidewalk widths shall be 4 feet, with greater widths near pedestrian generators and employment centers. No state law applies to the installation of sidewalks in commercial developments in New Jersey, or commercial or residential areas in Pennsylvania.

Therefore, the most fundamental action that can be taken by any municipality to improve pedestrian facilities is to amend its land development ordinance to require the installation of sidewalks for new and redeveloped land uses. ITE's *Design and Safety of Pedestrian Facilities* recommends that sidewalks be provided:

- in commercial and industrial areas, along both sides of all roadways;
- in residential areas, along arterials and collectors, and local streets with 1 unit or more per acre;
- in residential area with less than 1 unit per acre, sidewalks may be provided along one side of the roadway.

The ITE text further recommends use of a sidewalk and curb and gutter for any local street within two blocks of a school site.

Some municipalities may wish to retain a rural atmosphere for certain areas, and exclude these areas from this requirement. AASHTO's *Guide for the Planning, Design and Operation of Pedestrian Facilities* suggests that in low-density areas, sidewalks be installed whenever the roadway changes from open swales to curb-and-gutter. The *Guide* also says that sidewalks may not be needed on some local roadways with traffic volumes less than 400 per day.

In suburban areas, developers have routinely requested waivers from sidewalk requirements, typically on the grounds that any anticipated pedestrian activity would be minimal. With few exceptions, this should not justify a waiver, given piecemeal suburban development patterns and the constant potential for redevelopment with more intensive uses.

8.1.2 Sidewalk and Buffer Widths

The Matrix provides recommended dimensions for "clear sidewalk widths," or the section of sidewalk unencumbered by street furniture and not immediately next to buildings. (The concept of clear sidewalk width is the same as "effective walkway width" discussed in the NJDOT *Pedestrian Compatible Planning and Design Guidelines*.)

This 9 foot buffer provides good separation for pedestrians from motorists. Wide buffers are especially desirable on roadways posted at 35 mph or higher.

Clear sidewalk widths of 8 to 10 feet are recommended for major roadways in town center and urban core contexts. Recommended clear sidewalk widths of 5 to 8 feet predominate in most context types. Including the street furniture area and building shy distance, total recommended widths extend from 10 to 18 ft. in most urban contexts. This represents an ideal goal; in physically constrained areas – or most existing neighborhoods in the two states – sponsoring agencies should aspire to provide the widths referenced in clear sidewalk widths.

Although developed primarily to ensure accessible routes for buildings and facilities, the *Americans with Disabilities Act Accessibility Guidelines* (ADAAG) have been pressed into service as the controlling authority for public sidewalks. ADAAG mandates an accessible route width of at least 3 ft., and a width of 5 ft. at regular intervals as passing spaces. In order to specifically address public walkways, the Access Board has released the draft *Public Rights-of-Way Accessibility Guidelines* (November 2005). These require a 4 foot wide pedestrian access route, located within a sidewalk, shoulder, shared street or street crossing. Periodic passing spaces of 5 ft. in width are also required.

Because of the requirement for periodic passing spaces of 5 ft. in width, local governments are increasingly specifying 5 ft. as the recommended minimum for sidewalks, and that standard is recommended here. In significantly constrained areas, a sidewalk width of 4 ft. may be considered. If a buffer is not provided, sidewalk widths of 6 ft. in residential areas, and 8 ft. in commercial areas is recommended.

The presence of buffers, comprised of landscaping in suburban areas, and street furniture in urban areas, is important to the comfort level and perceived safety of pedestrians. The widest buffers – at 6 to over 8 ft. – are recommended on suburban corridors since vehicular speeds are highest in these areas. Wide setbacks are not essential for pedestrian comfort in urban areas, particularly when on-street parking is available and well used, and speeds are moderate. However, wide buffers can be beneficial in this environment in providing room for street furniture and landscaping.

Along low to moderate-speed roadways in residential areas, buffers can be of minimal width. These should be at least 4 ft. to accommodate street trees. Three feet is the minimum width if a grass or planted strip is desired; any buffer less than this should be paved.

8.1.3 Medians

On multi-lane roadways, medians can be among the most desirable features for pedestrians. At signalized intersections in which the pedestrian crossing phase is the bare minimum required by the *Manual on Uniform Traffic Control Devices*, and pedestrians are unable to complete the crossing of the entire intersection, a median will permit them to safely wait until the next pedestrian crossing phase.

Along suburban corridors at unsignalized locations, medians play an even more vital role. Because of the distance separating signalized intersections in these areas, pedestrians are reluctant to cross roadways only at these locations, and many pedestrians will conduct mid-block crossings. The hazard of these crossings can be mitigated by the installation of physical medians. Further, medians reduce the time required for pedestrians to cross; delays are up to 10 times longer for pedestrians crossing undivided multilane roadways than roadways with medians.[60] Medians should always be considered when the cartway width exceeds 60 ft.

Median islands intended to serve as pedestrian refuges should be at least 6 ft. feet wide from curb to curb, although 8 ft. is preferable. In constrained conditions, median widths of 4 ft. feet curb-to-curb are acceptable. All islands should have curb ramps or cut-through ramps at street level to accommodate pedestrians in wheelchairs.

Yield to pedestrian signs mounted on the centerline of two-lane roadways have proven effective in increasing the yielding rate of motorists, and are highly recommended for urban areas.

Advanced yield markings are recommended in conjunction with uncontrolled pedestrian crossings on multi-lane roadways to reduce the possibility of multiple threat crashes.

8.1.4 Crosswalks

Crosswalks should be present on all legs at signalized intersections, unless hazardous conditions make one or two legs unsuitable for installation. Crosswalks may also be installed on the controlled legs of unsignalized intersections. The ability to install them on uncontrolled legs of unsignalized intersections depends on the same kinds of factors that are used to determine if crosswalks should be installed at midblock locations.

AASHTO *Guide for the Planning, Design and Operation of Pedestrian Facilities* recommends midblock crosswalks under the following circumstances:

- Already substantial number of midblock crossings
- Due to existing and planned pedestrian generators, pedestrians are highly unlikely to cross the street at the next intersection
- Spacing between adjacent intersections exceeds 660 feet
- Adequate sight distance is available.

Midblock crosswalks should typically not be installed within 300 feet of signalized intersections. However, on low-speed two-lane roadways in urban contexts, particularly with very high levels of pedestrian activity, mid-block crosswalks may be considered within 200 feet of signalized intersections.

Whether or not to install a midblock crosswalk can be among the most contentious pedestrian planning issues. There is a widespread perception that simply installing crosswalks will make crossings at unsignalized locations safer; studies are definitive that this is not the case. The most extensive study on this topic yet conducted (FHWA, *Safety Effects of Marked vs Unmarked Crosswalks at Uncontrolled Locations*, November 2000) concludes that there is no difference in safety between marked and unmarked midblock crosswalks on two-lane roads, and that marked midblock crossings on multi-lane roadways are actually less safe than unmarked midblock crossings. The greatest difference in crash types at the two crosswalk types on multi-lane roadways is the role of "multiple threat" crashes. In this crash type, a vehicle yields to a pedestrian in the crosswalk on a multi-lane roadway. The yielding vehicle obscures the view of another motorist heading in the same direction. The pedestrian steps in front of the oncoming vehicle, and is struck.

The report concludes that crosswalks, by themselves, should not be installed at uncontrolled crossing locations on two-lane roadways with ADTs (average daily traffic) above 12,000, and multi-lane roadways with ADTs above 9,000. More substantial engineering treatments need to be considered, including raised medians, pedestrian signals, and signs and markings.

Table 8.1 summarizes of the effectiveness of the most common crosswalk treatments, based on TCRP Report 112/NCHRP Report 562, *Improving Pedestrian Safety at Unsignalized Crossings* (2006). This report provides a comprehensive review of previous studies and evaluates several measures in the field.

As indicated, half signals are especially effective, but have seen little application in this country, and some professionals are concerned that the use of red beacons places these measures somewhere in between a warning light and traffic control light. In-street pedestrian crossing signs are very effective, but their application is restricted to two-lane roadways. A wide variety of warning lights have been tested, with in-pavement lights showing greater

Physical islands have been demonstrated to increase the safety of pedestrian crossings. Northampton, Massachusetts supplements the island with signs advising pedestrians to pay attention to oncoming vehicles before crossing.

A variety of blinking pedestrian crossing signs have shown promise in increasing the yielding rate of motorists.

yield compliance than overhead lights. Raised medians by themselves have modest effect on yielding compliance, but are highly recommended on multi-lane roadways for their ability to facilitate safer crossings.

The safest pedestrian crossings – particularly for multi-lane, higher speed roadways – often combine several different treatments. The appropriate crosswalk treatment depends principally upon roadway operating speeds and number of travel lanes. Following are recommendations for the installation of midblock crosswalks (or crosswalks at unsignalized intersections) on different roadway types:

Regional Arterial. Installation of midblock crosswalks on regional arterials should involve the most intensive treatments. These should only be used on roadways of 40 mph or less, since motorists have increasing difficulty stopping at speeds of 40 mph or more.[61] A raised median is highly recommended to accompany mid-block crossings on multi-lane roadways. Advanced yield markings, warning lights and high-visibility markings are also desirable.

Community Arterial. On multi-lane roadways, a raised median and advanced yield markings are desirable. Accompanying lights are recommended for two-lane roadways of 35 mph or above, as well as multi-lane roadways. All crosswalks installed should be high visibility. Curb extensions are recommended on any street with on-street parking.

Main Street. "Yield to Pedestrian" signs mounted on the roadway centerline are highly recommended for this roadway sub-type, along with high-visibility markings. Curb extensions are less critical, but are recommended for streets with on-street parking. They will provide better visibility of and by pedestrians, and should not reduce the number of on-street parking spaces, since parking within 25 feet of the crosswalk would be prohibited in any case.

Community Collector. On multi-lane roadways, a raised median and advanced yield markings are desirable. Accompanying lights are recommended for two-lane roadways of 35 mph or above, as well as multi-lane roadways. All crosswalks installed should be high visibility. Curb extensions are recommended on any street with on-street parking.

Neighborhood Collector. Crosswalks should be accompanied by pedestrian warning signs or "Yield to Pedestrian" signs mounted on the roadway centerline. Crosswalks may be high visibility depending on traffic volumes and speeds. Curb extensions to accompany on-street parking is also recommended.

Local Road. Crosswalks should be accompanied by pedestrian warning signs.

TCRP Report 112/ NCHRP Report 562 provides "Guidelines for Pedestrian Crossing Treatments." This report recommends installing traffic control devices only when peak hour pedestrian volume exceeds 14 per hour on roadways posted above 35 mph, or 20 per hour on roadways posted 35 mph or lower. However, these thresholds can be difficult to meet in suburban areas. If the installation of pedestrian facilities would lead to increased pedestrian volumes, and if controlled pedestrian crossings are more than 600 ft. away, consideration should be given to installing new controlled crossings.

Table 8.1 Effectiveness of Crosswalk Treatments

Treatment	Description	Results
Raised median	Physical median, preferably 6 to 8 ft. wide.	Pedestrian crash rates on multi-lane roadways are 2 to 4 times lower than on roadways without raised medians.
Advanced yield markings and signs	White triangles distributed evenly across roadway 20 to 50 ft. in advance of crosswalk, accompanied by "Yield Here to Pedestrians" sign.	Reduced vehicle-pedestrian conflicts on multi-lane roadways by 67% to 87%.
Overhead flashing beacon	Flashing amber lights installed in conjunction with, or integral within other warning signs. A wide variety of applications has been tested.	Resulted in yielding compliance of 30% to 76%; original field studies for TCRP 112 indicated 49% yielding compliance when pushbutton activated, 67% with passive activation.
Overhead lighted sign	Constantly lit sign with appropriate legend such as "Crosswalk."	Resulted in yielding compliance of 40% to 52%.
In-pavement lights	Lights are installed in pavement similar to lights on airport runways, with lights protruding above pavement up to .5 inches.	Resulted in yielding compliance of 50% to 90%.
In-street "Yield to Pedestrian" sign	Signs are typically placed on flexible orange stanchions, mounted on roadway centerline. Studies have been limited to two-lane roadways.	Resulted in yielding compliance of 82% to 91%. This measure has achieved widespread use in both New Jersey and Pennsylvania.
Half signal	Solid or flashing red beacons are shown to major street, with stop control on minor street.	Original field studies for TCRP 112 indicate yielding compliance up to 98%.

Source: ***TCRP Report 112/NCHRP Report 562, Improving Pedestrian Safety at Unsignalized Crossings.***

8.2 PUBLIC TRANSPORTATION

Transit facilities are an important component of the context-sensitive roadway. This Guidebook recommends increased use of public transportation through facilities that expedite travel, and afford a more comfortable environment for pedestrians.

The focus of this Guidebook is on providing facilities for transit vehicles that utilize surface roadways, as well as riders who walk to and from bus stops. Local governments in the two states have final authority over where to locate bus stops, but it is highly recommended that they coordinate closely with the transit operators in their area, and seek their views on bus stop design early in the process. It should also be noted that all bus stops should be designed to comply with the Americans with Disabilities Act (ADA).

8.2.1 Vehicle Types

Table 8.2 provides design characteristics for three bus types often seen in urban areas. The most common type for local service is the conventional 40 ft. bus; conventional buses can also be manufactured in lengths of 30 to 35 ft. Articulated buses have a joint in the middle which enables them to maneuver comfortably on city streets; they are normally used only in high demand situations, such as major urban areas and college campuses. Intercity buses are typically operated on longer routes with express portions and intercity service with limited stops. Small buses (25 ft. in length) are not discussed in this Guidebook since they are not commonly used in fixed route service, and can be accommodated by stops designed for conventional buses.

Vehicle width does not include both the right and left side mirrors, each of which can add another 12 inches to the vehicle width.

8.2.2 Bus Stops

Following are recommendations for the identification, placement and physical features of bus stops:

Identification – A sign at each bus stop should indicate the agency's name and logo; bus route and destination; schedule; and the agency's telephone number and website. Parking prohibitions should be identified by another sign (i.e., MUCTD R7-107) or pavement markings.

Bus Types

Placement - Bus stops are placed at the nearside or farside of an intersection, or at midblock locations. Below are basic factors that should be considered in bus stop placement:

- At intersections, a consistent pattern of stops (e.g., all nearside or all farside) enables transit patrons to readily comprehend where they need to board a bus.
- At intersections where more than one bus route operates, and in particular where buses operate on cross streets, consideration should be given to the ability to conveniently transfer to other bus routes.
- Stops should be located close to major passenger generators.
- Curb space should be provided to accommodate the desired number of buses, and passenger waiting areas.

Bus stops at intersections are preferred because they provide the best pedestrian accessibility from both sides of the street as well as the cross streets. They also provide for the most convenient transfers to intersecting bus routes.

In limited instances, a midblock bus stop will be suggested by the presence of major generators. Compared to conditions at proximate intersections, midblock bus stops lessen sight distance problems for pedestrians and motorists, produce fewer pedestrian conflicts, and reduces pedestrian congestion at passenger waiting areas.

A major concern with midblock bus stops is that they increase the walking distance for pedestrians who must cross at intersections, and, in so doing, can encourage people to cross the street midblock (i.e., "jaywalk"). This is problematic on high-speed roadways.

At intersections, farside bus stops are typically preferred to nearside stops, especially in urban centers or other areas with high pedestrian volumes. One study found that about 2% of pedestrian crashes in urban areas, and 3% of crashes in rural areas, are related to bus stops. A common pattern is when the pedestrian steps into the street from in front of a stopped bus. This pattern is associated with nearside stops more than farside stops.

Other considerations related to bus stops at intersections include:

- Where it is not desirable to stop the bus in a travel lane and a turn-out is warranted, a farside stop (or even a midblock stop) is preferred.

Table 8.2

	Conventional	
	30 ft.	40 ft.
Length (ft.)	30	40
Width (in.)	102	102
Height (in.)	120	120
Centerline turning radius (ft.)	31	40
Inside turning radius (ft.)	13	25
Seating capacity	23	40

	Articulated
Length (ft.)	60
Width (in.)	102
Height (in.)	131
Centerline turning radius (ft.)	38
Inside turning radius (ft.)	21
Seating capacity	65

	Intercity
Length (ft.)	46
Width (in.)	102
Height (in.)	138
Centerline turning radius (ft.)	47
Inside turning radius (ft.)	30
Seating capacity	50

- If a route requires a left turn, the bus stop should be placed on the farside after the left turn is completed. If this is not possible, a midblock bus stop is preferred, but must be located far enough from the intersection so that the bus can still maneuver into the proper left turn lane.
- If a route requires a right turn, or if there is a high volume of right turns at an intersection, the bus stop should be located at the farside location.
- If too many buses would utilize a farside stop and there is not enough room to extend the bus stop, a nearside location should be used instead.
- When an intersection is complex and has several dedicated turn lanes, farside bus stops are preferred because they are removed from the location where complex traffic movements are performed.
- At simple signalized intersections, nearside stops permit riders to discharge when they are stopped at red lights.

Geometrics – The bus stop area in which parking is prohibited must be long enough to permit buses to maneuver to and from the curb, and to accommodate the safe movement of pedestrians from the curb to the bus. The amount of distance required for a bus stop depends on four factors: (1) the type of bus stop; (2) the length of buses using the stop; (3) the number of buses using the stop; and (4) the posted speed limit of the roadway.

The dimensions in Figure 8.1 are consistent with NJ Transit Guidelines, and apply when buses are operating in the lane adjacent to the curb lane. If parking is prohibited and the bus operates in the curb lane, the bus stop length could be reduced to the length of one bus.

Curb space may be limited in some urban business districts, due to high demand for on-street parking. However, the municipality should not designate bus stops of inadequate length, since the bus will be unable to "dock" at the curb. In this situation, the driver will either "nose in" the vehicle or stop in the street, forcing passengers to step into the street, and not permitting the deployment of the wheelchair lift/ramp for disabled riders.

If space is highly constrained, the municipality may wish to forego mid-block bus stops, since they require the greatest length. The municipality may also consider the use of "bus bulbs." A bus bulb is a section of the sidewalk that extends from the curb of a parking lane to the edge of the through lane. Buses stop in the traffic lane instead of weaving into and out of the bus stop that is located in the parking lane. The bus bulb need only extend the length of the bus, and thereby saves parking spaces. However, because traffic behind is held up during passenger loading, the bus bulb is not preferred for heavily congested roadways.

8.2.3 Turn-Outs

A turn-out is desirable for roadways where the posted speed limit is higher than 40 miles per hour, at stops with a high number of passenger boardings and dwell times. These features allow buses to pull out of the flow of traffic to board and alight passengers, thus not impeding the free flow of vehicular traffic. Figure 8.1 shows the recommended dimensions.

When nearside bus stops have a turn-out, the "exit taper" length can be removed (and 50 ft. deducted from dimensions shown in Figure 8.1) since it is assumed that the bus will utilize the intersection area to merge with traffic. Similarly, if farside bus stops have a turn-out, then the "entrance taper" length can be removed. If multiple buses will use the bus stop, then the "Total Bus Stop Length" can be increased by the length of the additional buses with an allowance of ten feet for separation between buses.

8.2.4 Bus Stop Characteristics

Other desirable characteristics of a bus stop include:

- Front and rear door clearances should be 5 feet wide and 8 to 10 feet deep.
- All-weather, slip resistant surface in bus stop area.
- Slopes are not to exceed two percent in boarding area.
- Vertical clearances of 84 inches.
- No obstructions in boarding/alighting areas, and room for pedestrians to wait without entering the roadway and without impeding other pedestrian movements.
- Compliance with ADA standards, including ability to accommodate bus wheelchair lifts and/or ramps.
- Bus riders must be readily visible to satisfy traffic safety and security issues, with adequate lighting from adjacent parcels and street lights.

Spacing – Bus stop spacing represents a trade-off between providing a high number of stops (thus increasing service coverage and maximizing ridership) while still allowing the transit service to operate at reasonable speeds and trip times. Following is typical bus stop spacing for the seven context areas described in this report:

Table 8.3 Bus Stop Spacing

Context	Stops per Mile	Typical Spacing (ft)
Urban Core, Town Center	10 to 12	450
Town/Village Neighborhood, Suburban Center	5 to 10	750
Suburban Corridor, Suburban Neighborhood	4 to 6	1,000
Rural	As needed	As needed

8.2.5 Bus Stop Amenities

Passenger Waiting Shelters – Following are minimum design specifications for shelters:

- Three walls (a rear and two sides with a minimum covered area of 48 square feet. For areas with space limitations, other types of shelters (e.g., umbrella or half-wall or canopies) may be used.
- Interior seating.
- A minimum front clearance of four feet (five feet desirable) from the shelter to the edge of the curb.
- Minimum sidewalk around shelter (i.e., sides and rear) of three feet (five feet desirable).
- Display panel for route and schedule information, if not provided on information kiosk.

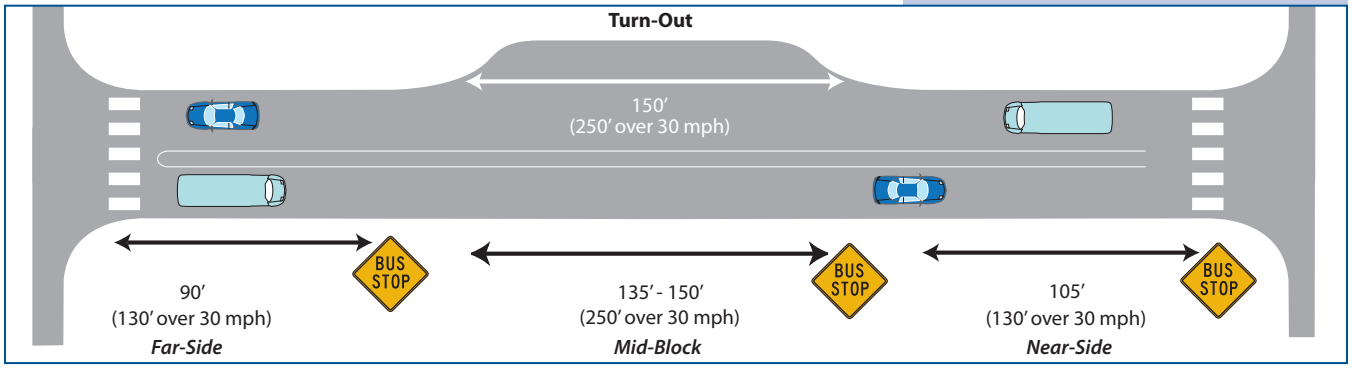
This bus shelter impedes pedestrian movement on the sidewalk.

Seating - Bus stop seating increases patron comfort and reduces perceived waiting time. A bench should be at least six feet wide and placed four feet from the curb. If a four ft. space is not available from the curb, the bench may be installed with its back facing the street.

Information Kiosks/Boxes – These display schedules, maps and other information.

Other Customer Features – Trash receptacles, bicycle storage racks, public telephones, lighting and landscaping.

Figure 8.1 Bus stop dimensions vary depending upon their position on a block. If two or more buses regularly load at the same time, the bus stop length would be increased by each bus length and an allowance of ten feet separation between buses.



Specialized treatments to better accomodate buses, such as "bus shoulder" and "transit signal priority" may be considered in high activity transit corridors. For more information about such treatments, see: NCHRP Project 20-7 Task 135 report, "Geometric Design Guide for Transit Facilities on Highways and Streets—Phase I Interim Guide," prepared for AASHTO Standing Committee on Highways, July 2002.

8.3 LANDSCAPE DESIGN

More than a valued aesthetic enhancement, landscaping helps integrate a roadway into the surrounding environment. Street trees provide shade and physical definition to roadways. Landscape features buffer pedestrians from passing vehicular traffic, making them feel more comfortable. They provide an important stormwater management function by reducing runoff, and improving water quality by filtering runoff before it enters the collection system or nearby streams. Following are principles to follow in installing street trees and other plants.

8.3.1 Street Trees

Street trees are the most critical landscaping element. Historic problems with street trees (e.g., buckling sidewalks, interfering with utility poles) can be addressed by careful species selection and utility placement (on the inside of the sidewalk).

The best location for street trees depends upon area context and roadway. For curbed roadways in urban contexts or developed suburban contexts, trees should be planted next to the street. At maturity, the trunks of these trees should be at least 18 inches from the face of the curb. This distance will permit car doors to open, and is recognized by the AASHTO Green Book as an "operational offset." In suburban contexts, trees can be planted inside and adjacent to the sidewalk if sufficient right-of-way is unavailable.

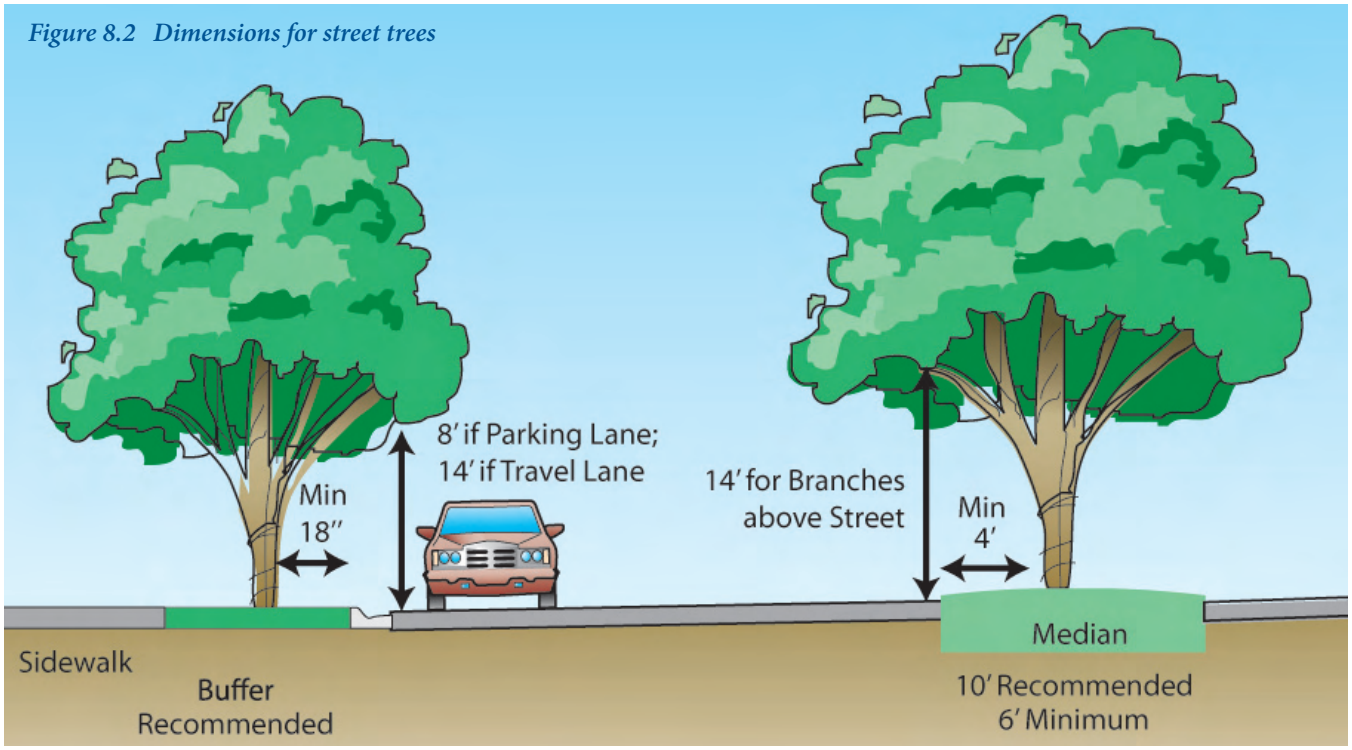
Along roadways with speeds over 45 mph, that are uncurbed or have mountable curbs in rural and suburban context areas, trees with a mature diameter of four inches or more should not be planted within the clear zone. If the street right-of-way is not appropriate for trees, municipalities should request developers to plant trees close to the front lot line.

A tree planting strip of 5 ft. in width is preferred, but 4 ft. strips are common. In constrained areas, a tree pit of 3 ft. may be used for small caliper trees.

Trees must often compete for space with utilities. In urban contexts, if overhead lines are present along the roadway, there are two options: the community should select trees that grow to a maximum height of 25 to 35 ft. at maturity, or trees with a fine branch system that can be trimmed to grow on either side of the lines.

A clear sight line should be maintained along all intersections and curb cuts, and trees should be kept trimmed around all signs and signals. Trees should provide a clear-

Figure 8.2 Dimensions for street trees



ance of 7 ft. above sidewalks, and 8 feet above parking lanes. A clearance of 14 ft. is required on PennDOT roadways if the curb lane is used for moving vehicles. Along New Jersey state roadways, vegetation that has potential to obstruct sight distance should not be planted in the clear zone.

Tree spacing typically varies from 30 ft. to 50 ft., although a minimum of 15 ft. spacing is possible with some tree species. A dramatic effect can be achieved by planting trees in close proximity. On downtown retail streets, the spacing should be at the most between 30 ft. and 40 ft. in order to create the shading and comfort that is welcome along a shopping sidewalk. Spacing can be wider in residential neighborhoods; since larger species are possible here, shade and visual interest along the street can still be maintained.

Tree species in commercial areas are chosen based on owner concerns about blocking views to retail signage and store window displays. Trees that branch up over the first floor signs, and that have an open leafed habit are desirable in these areas.

Trees in Medians

- The recommended raised median width for tree planting is 10 ft. on street segments with infrequent driveways and intersections and 14 ft. to 16 ft. on street segments with frequent driveways and intersections. The minimum median width to accommodate trees is 6 ft. with the approval of a municipal forester or arborist.
- Trees are not recommended for medians when roadway operating speed exceeds 45 mph.

A six foot wide planting strip permits more elaborate landscaping treatments.

- Trees planted within the median serve to reduce the perceived width of the street, and may have the effect of calming traffic.
- Trees in the median should have an upright profile and be high branching. Branches that extend beyond the curb into the street should be pruned 14 ft. above the pavement. Trees can be planted within 50 ft. from the ends of medians only if a high tree canopy is maintained, providing adequate sight distance.

8.3.2 Other Landscaping

Small-scale landscape planting includes shrubs, flowers, ground covers, and smaller ornamental trees. Following are guidelines for small scale plantings:

- Plant species can be used to differentiate between arterial and local streets or various context areas. Use unique plant palettes to characterize and create an identity for each design situation.
- Commercial areas typically receive landscape treatments that are low maintenance and drought tolerant. However, funding of a vigorous maintenance schedule, such as by a business improvement district, will permit more diverse and attractive landscaping treatments.
- Small-scale landscape spacing ranges from 6 in. on center for groundcover, to 6 to 8 ft. on center for large shrubs, to 15 ft. on center for ornamental trees.
- Developers should avoid installing shrubs in the public right-of-way, in the path of pedestrians. If no sidewalk is present, a clear path must still be maintained for pedestrians to walk along the frontage of all developed properties.

8.3.3 Buffering

A well landscaped buffer creates a visual barrier between traffic and pedestrians, providing comfort for the latter. Following are recommendations for the buffer area:

- Low plantings should be spaced densely enough to provide massing, plant drifts and visual interest.
- To heighten decorative effects in high-profile urban and suburban areas alike, plant a minimum 50 percent of a buffer area with vegetation other than lawn.

8.4 STREET FURNITURE

Street furniture refers collectively to sidewalk amenities that accommodate pedestrians, transit users and bicyclists. Types of street furniture include benches, trash receptacles, newspaper racks, bike racks, bollards, kiosks, transit shelters, and street lights. Following are guidelines for selection and arrangement of street furniture.

- The most important aspects of selecting street furniture are to ensure that the colors, materials, and styles make up a family of unified furnishings, and reflect the character of the context area and surrounding architecture.
- Street furniture should be placed where it can accommodate the greatest number of people, and where activity nodes are most desired. Certain furnishings such as trash receptacles and newspaper racks are often clustered near intersections where pedestrians are waiting to cross. Benches should be placed according to design intent. For example, when located at a transit stop, they should face the street for functionality, and when intended for rest and people-watching, they can be placed so that the pedestrian is encouraged to feel a sense of privacy while still connecting with the public square. Benches can be placed near popular restaurants to accommodate people waiting to be seated.
- Public trash receptacles are placed in the buffer zone.
- Bike racks should be located in the buffer zone with a 3 foot minimum clearance between bicycles parked at racks and other street furniture.
- All newspaper racks should be located in the buffer zone, but open toward the pedestrian throughway.
- Chairs, tables, planters and displays are typically located close to buildings. Communities can consider permitting these in the pedestrian throughway as long as desirable widths for pedestrians are maintained.

It should be noted that on all state projects, the cost of installing and maintaining street furniture is borne by the community.

Public art helps to enliven public spaces, as seen in this photograph of children posing with a sculpture of a dolphin on a downtown street.

8.4.1 Lighting

Lighting for the sidewalk and shopfront area is most effectively provided by pedestrian-scale streetlights (12 to 16 ft. in height) placed inside the curb. Spaced about 60 ft. apart on ornamental poles, they can also provide roadway lighting for streets less than 45 ft. wide. Wider streets will require additional illumination to meet IESNA (Illuminating Engineering Society of North America) standards. A lighting fixture with good color rendition makes for a safer, more welcoming nighttime environment – an important quality for successful commercial districts.

Preferred pedestrian lighting is mercury vapor, metal halide or incandescent. Low-pressure sodium lights are undesirable because they create distortion.

9.0 Road System Issues

9.1 ACCESS MANAGEMENT

Access management is the "systematic control of the location, spacing, design and operation of driveways, median openings, interchanges and street connections to a roadway (TRB *Access Management Manual*, 2003)." Benefits include:

- **Safety.** The implementation of good access management practices on a corridor can reduce vehicle crashes by 50 percent or more.[62]
- **Mobility.** Spacing traffic signals at appropriate distances permits signals to be coordinated for optimized operation. Optimal signal spacing can reduce the need to increase a roadway's capacity by widening intersections and corridors.
- **Reduction of conflicts with non-motorized modes.** Controlling the number and width of driveways reduces areas of exposure for pedestrians and bicyclists along a roadway.
- **Aesthetics.** By providing raised medians and reducing the width of driveways, more room can be used for landscaped beds or decorative hardscape surfaces.

Access management is appropriate for all roadway types, but the techniques employed depend upon roadway functional classification and context area.

- **Roadway function.** The highest level of access management applies to high-speed regional and community arterial roadways.
- **Land use context.** Greater access control is appropriate for higher order roadways in suburban areas, where operating speeds are highest. Conversely, a higher concentration of driveways is normally found in urban contexts. However, the number of driveways should be moderated on main streets, to reduce conflicts between motorists and pedestrians or bicyclists.

9.1.1 Access Management in New Jersey and Pennsylvania

New Jersey

The State Highway Access Management Code (N.J.A.C. Title 16, Chapter 47) provides for the comprehensive regulation of access on New Jersey state roadways. The Code regulates the spacing between unsignalized access points and between traffic signals, as well as the type of access.

Controlling the number and width of driveways along a roadway improves vehicular safety and mobility, and reduces the areas of exposure for pedestrians and bicyclists.

The Access Management Code also offers the ability to prepare an access management plan for an entire stretch of state highway. The participants in creating a plan are the host municipality; the county, if a county roadway intersects the highway segment; and NJDOT.

Because NJDOT has complete authority over the design of driveways on state highways, New Jersey municipalities have little ability to influence access on these roadways. However, through the subdivision and site plan approval process, municipalities can encourage developers of properties on state highways to investigate the use of frontage roads, cross access drives, and shared driveways. An incentive (such as a reduction in the number of parking spaces) could be offered to those developers that use the desired access management techniques. It should be noted that municipalities can approve regulations governing access on county and municipal roadways.

Pennsylvania

Pennsylvania Access Management regulations are provided in the Pennsylvania Code, Title 67, Chapter 441 – *Access to and Occupancy of Highways by Driveways and Local Roads*. Chapter 441 specifies the permissible number of driveways and location of driveways for a lot. The regulations do not have spacing standards, as found in New Jersey.

Pennsylvania permits municipalities to implement access management regulations for state highways. As authorized by Chapter 441, these regulations can be more stringent than PennDOT's, provided they result in safer conditions. A number of Pennsylvania municipalities have enacted provisions regulating access on state roadways. West Fallowfield Township in Chester County adopted a highway corridor overlay district for PA Routes 10 and 41 in 1997, which limited the number of access points for developing properties, and applied design standards to new access points. In 2002, Smithfield Township and Middle Smithfield Township in Monroe County enacted access management overlay districts for US Route 209. These ordinances required owners to investigate gaining access from a joint driveway or cross access driveway if prescribed spacing standards could not be met, and encouraged joint access points through the incentive of reducing the required lot frontage and number of parking spaces by 15 percent.

9.1.2 Access Management Techniques

A variety of tools can be used to achieve access management objectives, with the most common discussed below.

Median Treatments

Both two-way left-turn lanes (TWLTLs) and nontraversable medians offer significant advantages over undivided roadways in terms of both safety and mobility. Raised medians are generally preferable to TWLTLs, but the latter are successfully used on commercial corridors with moderate traffic volumes and speeds, and high numbers of driveways. See Medians, Section 7.5.

Shared Driveways

A shared driveway (also referred to as a joint access drive) provides access to two or more properties. Municipalities can implement ordinances encouraging landowners to investigate the feasibility of shared driveways as part of the site development review process.

Cross-access drive

Cross-access drives provide interparcel circulation between two or more lots, and are highly recommended for commercial corridors (see Figure 9.1). Customers that would otherwise re-enter an arterial street to drive to an adjacent property are able to now drive (or walk) via internal connections between properties. An easement is often used to facilitate creation of the cross-access drive.

Channelization

Channelization involves the use of physical islands or pavement markings to direct traffic movements into definite paths of travel to facilitate safe and orderly movements of both vehicles and pedestrians. Common examples are changing a driveway from unrestricted access to right turn in, right turn out only.

Frontage Roads

This is an access drive that parallels a major public road between the right-of-way of the major roadway and the front building setback. It provides access to private properties while separating them from the principal roadway (TRB *Access Management Manual*, 2003).

9.2 TRAFFIC CALMING

ITE defines traffic calming as "the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users." This definition is consistent with the concept of "desired operating speed," discussed earlier in the document. Physical design, complementary road striping, and other strategies are key to slowing motorists to speeds that are appropriate to their contexts, thereby reducing the number and severity of collisions, and increasing the safety and comfort of pedestrians and bicyclists.

9.2.1 Traffic Calming Practice

Although traffic calming was initially implemented mostly on local roads, many cities in the U.S. are now calming collector streets and arterials as well.[63] The road diet – or removing and/or narrowing travel lanes – is one of the most common traffic calming practices for arterial and collector roads. In 2005 Ocean City, New Jersey narrowed West Avenue, an arterial, from four lanes to three lanes and added bike lanes and a wide median. Installed for a trial period on six blocks, residential response was so positive that the City extended the road diet treatment to two miles. The 85th percentile speed was reduced by 1 mph, with the number of high speed "outliers" – those traveling at more than 10 mph over the speed limit – dropping from 12% to 4% of motorists.[64]

The popularity of road diets can be explained by their ability to lower speeds, improve safety, and add room for non-motorized users. A study for the Iowa Department of Transportation of 15 road diets documented a reduction in crash rate of 19%, while a study of road diets in the Seattle area found an average crash reduction of 29%.[65] A review of 14 road diet treatments across the country indicate that eight resulted in speed reductions ranging from 1 to 5 mph, although no notable decreases were seen in six of the treatments. Road diets are particularly effective in calming aggressive motorists, since they are required to queue up in a single lane, often behind more patient motorists.

Cities are also increasingly willing to install traffic calming measures such as speed tables, curb extensions, and center islands on higher order roadways. For example, the City of Beaverton, OR, implemented speed tables, raised intersections, curb extensions(also called bulbouts), and center islands on a collector roadway lined with residential uses and schools, lowering the 85th percentile speeds from 40 to 34 mph.

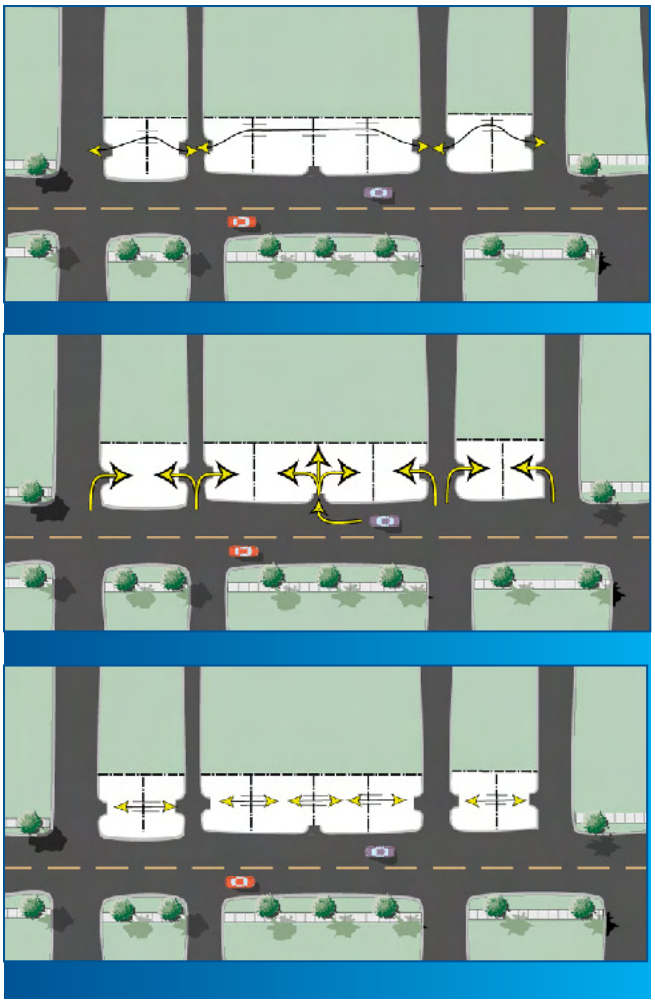


Figure 9.1 The linkage of driveways and parking lots along a corridor permits safer traffic conditions, and benefits pedestrians and bicyclists.

Many highway calming projects do not literally "calm the highway" but, instead, replace the highway with main streets, boulevards and parkways, with traffic calming measures built into their cross-sections. These measures, known as "cross-section measures," include a reduction in lane widths, textures, medians, edge treatments (e.g. removing shoulders and adding curb and gutter) street trees, curb extensions, wider sidewalks, and on-street parking.

9.2.2 Traffic Calming Policy

The acceptance of traffic calming, on all roadway classifications, is increasingly seen. AASHTO endorsed the extension of traffic calming to higher order roadways: "Traffic calming techniques may apply on arterials, collectors, or local streets. Traffic calming aimed at reducing speeds is primarily used in lower speed urban areas and in speed transition areas such as near the urbanized limits of small towns."[66]

At the city and county levels, hundreds of traffic calming programs have existed for some time. At the state level, PennDOT issued Pennsylvania's *Traffic Calming Handbook* in January 2001, and other states have issued manuals and/or have exploited the flexibility already inherent in their guidelines.

9.2.3 Traffic Calming and Context Sensitive Design

Traffic calming and Context-Sensitive Design (CSD) are synonymous as they pertain to the design of most roadways. The ITE international subcommittee that defined traffic calming in 1996 provided a broad list of contextual considerations for design such as location, street type, land use, public transit needs, aesthetics, community preferences, budget, desired speeds and other goals for the street. These are all CSD issues.

For example, as Route 29 goes through Lambertville, New Jersey, its new context-sensitive road diet will include roundabouts, going from four to two lanes, adding on-street parking, adding street trees, and other traffic calming measures.

9.2.4 Lessons from Europe

Although a relatively new idea in the United States, calming on higher order roadways has been accepted in Europe for over thirty years. Following are examples of European traffic calming principles, and the lessons they hold for the US:

- Choose appropriate design speeds. Because functional classification schemes in Europe strike a balance between speed and other goals such as bicycle/pedestrian friendliness, speeds tend to be lower than in the

US Highway 50 in Virginia is a good example of a comprehensive traffic calming project that is aimed at producing appropriate speeds in urban and transition areas alike. The 50 mph highway passes through several small towns. The Virginia DOT, at the request of the local communities, shelved their plans to build highway bypasses around the small towns along with widening the highway to four lanes. Instead, the State is implementing a traffic calming project, leaving the highway at two lanes and narrowing an already built four-lane section back to two lanes. Highway 50 will also be changed to suit its various contexts; it will be a rural highway between the towns, a main street in the towns, and go through transition areas at the edges of the towns. The design speeds range from 50 mph in the rural areas to 25 mph in the towns. Splitter island proposed for Route 50 in Virginia (Courtesy of Lardner/Klein Landscape Architects, P.C.)

U.S. Common speeds are 50 km/h or 31 mph on traffic calmed urban arterials and 40-50 km/h (25-31 mph) on highways as they pass through towns and villages. The main lesson here for U.S. applications is to derive the desired design speed from the context, not the functional classification.

- Choose measures and spacing of features appropriate to design speed and classification. In Denmark, only entranceways, and lateral shifts are permitted at design speeds of 60 km/h (37 mph) or more. At 50 km/h (31 mph), other measures such as narrowings and raised areas are also common. At 40 km/h (25 mph) or less, a much larger menu of measures are used. The lesson here is that cross-section measures are more suitable for arterials and community collector streets, while on neighborhood collector and local streets, periodic measures are also suitable.
- Reallocate right-of-way in favor of non-automobile modes. Europeans have long restriped multilane roads to a single lane in each direction, similar to the US practice of "road diets."
- Provide ample warning on approaches to calmed areas. In Europe, entranceways such as islands and roundabouts are used to mark the transition from highway speeds to town speeds in aesthetically pleasing ways. Islands are used to enhance the effectiveness of entranceways, and roundabouts are even more effective in reducing speeds due to their horizontal displacement.
- Emphasize street edge treatments. Europeans strive to create street environments inviting to pedestrians, slowing the speeds of motorists in the process, through the qualities of human scale, visual enclosure, and complexity. Street trees, requiring buildings to be built to the back of sidewalk, and street furniture contribute to these qualities.
- Facilitate pedestrian crossings. Small corner radii and curb extensions shorten crossing distances for pedestrians and reduce motorists' turning speeds. Curb extensions at the corners and at mid-block crossings provide safe vantage points for pedestrians to see and be seen.

9.2.5 Traffic Calming and Health and Safety

Before-and-after studies, in the US and abroad, of streets which have been traffic calmed, show large reductions in the number and severity of collisions. Typically, a 50% drop in the number of collisions occurs along with an 80 to 90% reduction in deaths and injuries. Further, traffic calmed streets encourage walking and cycling, and helps "self-enforce" speeds, reducing the burden on local police.

European communities have long championed the combined use of traffic calming measures on higher order roadways. This roadway in a Paris suburb uses a raised intersection along with median islands and roadway narrowing to slow motorists.

Although slow speeds have health and safety benefits, the needs of emergency responders should be taken into consideration. Emergency responders, particularly the fire department, are sensitive to "response time." However, if streets are designed for high speeds for the fire department, other motorists can speed as well. Consequently, a balance needs to be achieved between the competing interests of public safety.

Traffic calming measures are therefore divided into two categories: those appropriate for "framework" streets and those appropriate for both framework streets and "non-framework" streets.

- Framework streets include community collector streets and arterial streets – that serve as regular emergency

vehicle routes. Traffic calming measures appropriate for framework streets include only "cross-section measures" because response times are generally unaffected by cross-section changes.

It is important to have a network of framework streets so that emergency responders can get to calls without encountering too many periodic measures. In certain circumstances, periodic measures can be used for framework streets, adjacent to heavy pedestrian generators such as schools, civic institutions, or along a main street.

- Non-framework streets include local streets and neighborhood collector roads which are rarely used by emergency vehicles. Both cross-section and periodic measures can be used on these streets. However, even on non-framework streets, the number of periodic measures should be limited, with no more than 8 to 12 measures between two framework streets. This will help keep emergency response times reasonable and increase public acceptability.

9.2.6 Application

Following are guidelines for the application of traffic calming measures on different roadway classifications:

Table 9.1. Traffic Calming Measures Appropriate to Roadway Classifications

Classification			Regional Arterial	Community Arterial	Community Collector	Neighborhood Collector	Local Street
Design speed range (mph)			30 to 45	25 to 45	25 to 30	25 to 30	20 to 25
Traffic calmed category			Framework Street		Non-Framework Street		
Transition zone to traffic calmed segment							
Gateway (landscaping, archway, signs, etc.)							
Cross Section Measures	Reduction in number of lanes						
	Reduction in width of lanes						
	Long median						
	Short median/refuge						
	Bulbouts[1]						
	Curb and gutter						
	Pedestrian-scale lighting						
	Street trees						
	Buildings at back of sidewalk						
	Lateral shifts						
	Bike lanes						
	On-street parking	Parallel					
		Back-in- angle					
		Front-in-angle					
		90°					
Periodic Measures	Horizontal Measures	Roundabouts					
		Mini-traffic circles					
		Chicanes					
		Short medians					
	Narrowings	Pinch points					
	Vertical Measures	Raised intersections					
		Raised crosswalks					
		Flat-top speed humps					
		Speed cushions					
		Speed humps					

Key: Appropriate; Not Appropriate; Appropriate in Special Circumstances

1 Bulbouts should be used on regional arterials only in urban or suburban center contexts, with speeds of 35 mph or below. On arterials they should be no greater than 6 ft. in width.

9.3 OPERATIONS AND MAINTENANCE

Local maintenance capabilities are important to consider with designs that incorporate landscaping. A community that supports a maintenance-heavy design, such as a planted median, will generally need to provide the maintenance itself, since NJDOT and PennDOT may not be able to do so. Community and neighborhood associations may be enlisted to provide maintenance on such features. Alternatively, the cost of maintenance may lead a community to support alternative measures, such as installation of a hardscape median, or low-maintenance plants such as natural grasses.

Issues regarding maintenance of roadways differ between the two states.

New Jersey

State highways account for a relatively small percentage of roadways in the state. Offering greater flexibility in the design on state-owned roadways may become more feasible in some cases if the roadway is de-designated as a state highway and shifted to county or municipal ownership. This option relieves the state of maintenance responsibility and liability and gives localities control of the roadway design. The tradeoff is that the municipality will have to assume responsibility for maintenance of the roadway.

The report *Flexible Design of New Jersey's Main Streets* notes that a lack of money at the local level for reconstruction and maintenance is a leading hindrance to de-designation.[67] This burden may be partially alleviated through state or federal grants, through cost sharing arrangements, or through road swaps. The report contains a number of case studies offering potential funding solutions, and recommends in particular 1) removing segments that no longer function as state or county routes from their respective systems, and 2) maintenance agreements between state and local governments that will permit more design flexibility.

Pennsylvania

PennDOT owns a greater percentage of higher order roadways than NJDOT, but PennDOT's curb-to-curb maintenance policy typically requires local control and maintenance of curbing and sidewalks. This includes sidewalks, landscaping, street furniture, gateway signage, and roadside lighting not required by PennDOT. Municipalities should understand the implications of additional maintenance on their end before undertaking the project.

9.3.1 Maintenance Operations

Snow Removal

Many communities require homeowners and businesses to clear the sidewalks fronting their property within a reasonable time after a snowfall. Despite this, public agencies must often become involved in clearing snow from sidewalks along major commercial roadways. For public works agencies, the best strategy would entail first clearing the snow from the road, and following up with the use of snow blowers and hand shovels as needed to clear pedestrian facilities. Unfortunately, even when sidewalks and roadways are cleared, a substantial wall of snow is often left adjacent to the curb, presenting obstacles to pedestrians and making pathways impassable for persons in wheelchairs. Priority should thus be given to clearing curb ramps at all intersections. Bike lanes should also be cleared; snow should not be stored there until it melts.

The buffer/ street furniture zone widths recommended in the Matrix should provide sufficient area to store snow in the immediate aftermath of a snowfall.

When snow removal is not possible, departments should consider taking measures to improve pedestrians' foot traction, such as hard-packing the snow, or using de-icing compounds.

Raised crosswalk

9.4 EMERGENCY VEHICLES

Narrower lane widths, physical medians, smaller curb-return radii and traffic calming measures all have potential to increase the response time for emergency service vehicles. Even when the potential increase in incident response time is minor, the concerns of emergency service personnel should be considered. In some cases, it will be possible to build support for smart transportation solutions if emergency services understand that the improvements will result in slowing traffic to speeds appropriate to the context, resulting in fewer and less severe crashes. However, this will not always suffice to address the concerns of emergency service respondents, and the actual impact on emergency service operations will need to be evaluated in such cases.

9.4.1 Major Issues

All of the following issues should be considered in addressing emergency vehicle needs:

Response routes. Alternate response routes should be designated. A high level of connectivity for roadway networks will give more options to emergency service providers.

Classification of the roadway. The higher the classification, the more likely it is that the roadway is used as a primary response route for an emergency service company (i.e. framework streets).

Land use context. The land use context should also be an important consideration. For example, long ladder trucks need to be accommodated in downtowns with multi-story buildings. But in residential neighborhoods of one- and two-story homes, shorter or smaller fire trucks may be the appropriate design vehicle.

Design vehicle. The appropriate design vehicle should be established through coordination with the local fire company. In some areas, fire codes have additional accessibility requirements, such as minimum clear widths designed for space to deploy ladders to reach high buildings and portable ponds for water. If fire companies are located on a neighborhood collector and local streets, designers should consider the emergency vehicles housed at these companies when designing curb radii for intersections used frequently by the fire company.

Modification of design. Street designers need to reconcile emergency service objectives on public streets with a myriad of regular public safety and design objectives. The street designer can better accommodate multiple objectives if he or she is given, and employs, design flexibility.

The proposed installation of a raised median on a wide roadway is a common example of a context sensitive design that may be viewed differently by local planners and by emergency service companies. Planners may regard the median as an opportunity to provide safer crossings for pedestrians, and to slow down speeding traffic by narrowing the travel lane. Emergency service companies may see the median as hindering their ability to travel on the roadway centerline to avoid long queues of traffic when responding to an incident.

There are various means of addressing the concerns of emergency services in such a situation. Adjusting the width of the lane, or installing median islands with a flush hardscape surface are possible options. Medians could be installed with mountable curbs about 200 to 300 feet back from an intersection approach that frequently experiences queuing traffic, permitting emergency vehicles to cross the median to bypass blocked lanes.[68] Mountable medians can be super-reinforced with grasscrete pavers, soil reinforcement or concrete with added rebar.

Curb extensions could be provided with mountable (or flush with pavement) curbs, featuring bollards to protect the pedestrian area. It should also be assumed that emergency vehicles can encroach into opposing travel lanes to some degree.

9.4.2 Context Sensitive Streets and the Fire Code

An obstacle to the construction of context sensitive streets has been the adoption of the National Fire Code (NFC) in its entirety by municipalities. The NFC recommends a 20 ft. clear path on all streets. While this width is virtually always achievable on arterial and collector streets, on local streets this provision contradicts the AASHTO Green Book, ITE *Neighborhood Street Design Guidelines*, and other planning and engineering best practices. If literally applied, it would consign to obsolescence one of the most popular local street types, the 24 to 26 ft. local street with parking on both sides. There is no indication that traditionally narrow local streets have contributed to deaths or injuries from impeding emergency responses. Particularly since narrow streets enhance safety and community life by reducing the incidence of speeding,

the language on 20 ft. clear paths on local streets should not be adopted by municipalities. Instead, municipalities should rely on guidance from AASHTO or ITE.

However, a 20 ft. clear provision is acceptable for private roads and for private driveways into gated subdivisions. Often, the design standards for private streets are less than those for public streets. Furthermore, there are usually fewer redundant routes for emergency responders to use into private developments should the main driveway or private street get blocked.

9.4.3 Traditional Neighborhood Developments

Concerns about emergency response are often raised with traditional neighborhood developments, since they often feature narrow public street widths, alleys, and minimal curb radii.

As the first step in addressing these concerns, two points are in favor of traditional neighborhood developments:

- Most of the emergency responses in a typical community are to incidents such as car crashes, not to house fires. With their traffic calming effects of their roadway design, TND's are intended to reduce the frequency and severity of vehicular crashes.
- The high degree of connectivity found in TND's offer emergency service companies multiple routes to the site.

Where the above arguments do not suffice, TND's have managed to preserve the smaller geometries of streets above the classification of alleys by using the following strategies:

- demonstrating to local emergency personnel the navigability of the smaller road widths and radii using cone tests and a computer program called AutoTURN;
- putting local fire personnel in touch with firefighters in communities which already have TND's; and,
- installing flush curb returns at corners to accommodate fire trucks.

TND's have managed to preserve the small geometries of alleys through the following strategies;

- explaining that alleys are not intended to be a primary means of fighting a fire (and therefore should not be designed for the largest ladder truck); and,
- demonstrating how the alley benefits first responders by creating a new secondary means of attacking a house fire with smaller equipment.

Many of these concerns could be addressed if urbanizing communities encourage their fire departments to purchase smaller, more navigable equipment designed for the tighter spaces of smart growth communities and require installation of sprinkler systems in appropriate buildings.

Emergency Vehicles Major Issues

Response Routes

Classification of the Roadway

Land Use Context

Design Vehicle

Modification of Design

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