

4. ALTERNATIVES ANALYSIS

I. INTRODUCTION

Two alternative land use scenarios were considered in the development of the Strategic Plan. The first scenario was based on the “building out” of the County under existing municipal zoning ordinances. The existing zoning for the 22 municipalities is summarized on **Figure 12** (see next page).

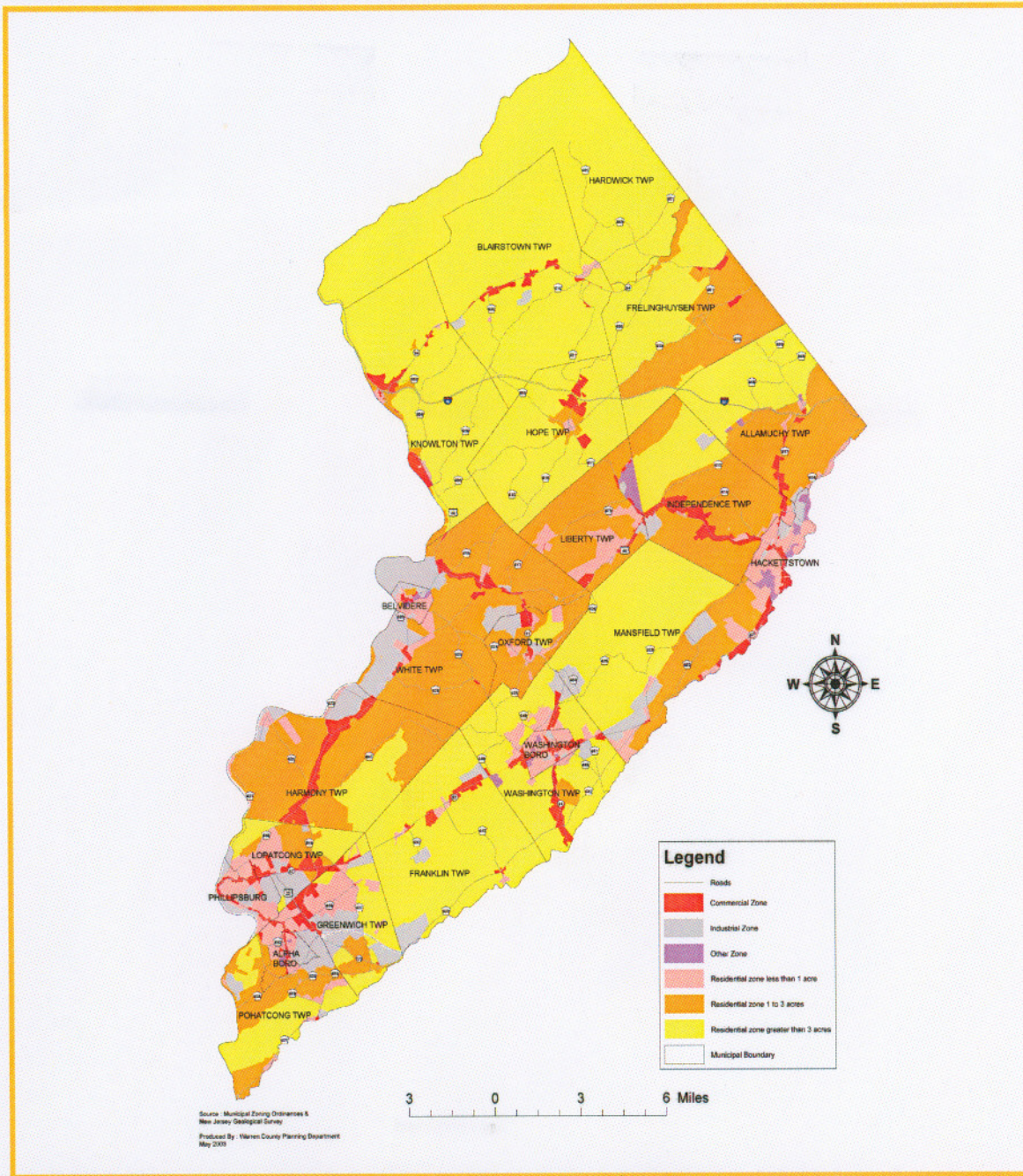
A. Existing Zoning Scenario

For the purpose of describing the buildouts, Warren County was divided into three geographic regions. The following section of the report describes the future buildout predictions by region, under the existing zoning regulations.

- North (Knowlton, Blairstown, Hardwick, Hope, Frelinghuysen) - The northern section of the County has a large amount of buildable land, which is zoned for large-lot residential development (3+ acres/dwelling unit). There is some buildable commercially zoned land along NJ Route 94 in Blairstown, as well as in Columbia in Knowlton.
- Central (Allamuchy, Hackettstown, Independence, Liberty, Mansfield, Oxford, Washington Township, Washington Borough, White, Belvidere) - The central section has more diversity in the zoning of the buildable land than the northern portion, which affects the transportation system. Moderate residential densities, large buildable areas zoned for industrial uses (in White near Belvidere especially), and commercial/industrial zones along the US Route 46 and NJ Routes 31 and 57 corridors are characteristic of the area. In the historic centers of Belvidere, Hackettstown, and Washington Borough, growth is constrained by the scarcity of buildable land.
- South (Harmony, Franklin, Lopatcong, Phillipsburg, Alpha, Greenwich, Pohatcong) - The southern section of the County has the least amount of land that is environmentally constrained or protected. It has a significant amount of buildable land zoned for nonresidential uses, especially along the CR 519 corridor in the towns of Harmony, Greenwich and Lopatcong. Similar to the historic centers in the central section, growth in Phillipsburg and Alpha is relatively modest due to the lack of buildable land.

Countywide buildout under existing zoning would add approximately 17 million square feet of retail space, 66 million square feet of industrial space, 22 million square feet of office space, and more than 45 thousand additional housing units.

Figure 12
Existing Zoning



Source: Municipal Zoning Ordinances & New Jersey Geological Survey
Produced By: Warren County Planning Department
May 2008



B. Alternative Centers-based Scenario

An alternative land use scenario was developed which focused, in part, on managing non-residential land uses which are disproportionately responsible for the deterioration in the operating conditions of the transportation system in the buildout scenario. The scenario included the consolidation of non-residential uses into designated centers as described below, thereby reducing the amount of strip commercial and industrial development. The scenario included a series of "centers" identified by the Warren County Planning Department based, in part, on centers proposed in the General Development Plan (see discussion below). The centers were also based on the preliminary goals for the Strategic Plan.

This alternative scenario assumed that much of the commercially and industrially zoned buildable land outside these centers would be rezoned for residential use. The scenario further assumed that the prevailing residential densities in the vicinity should be used. Areas of "strip" non-residential zoning along corridors such as U.S. Route 46, NJ Route 94, and CR 519 were eliminated or consolidated into the centers. Residential zoning densities were assumed to remain intact within the proposed centers.

The alternative is similar to the recommendations of the 1979 General Development Plan. The General Development Plan recommended four levels of development activity, including town centers, village centers, village clusters and rural residential areas. The town centers included the Hackettstown-Allamuchy, Washington-Washington Township and Phillipsburg Area Town Centers. Village Centers were recommended in Blairstown, Oxford, Hope, Columbia and Belvidere. Village Clusters included historic areas along major transportation routes and included many of the local centers listed as well as others. The balance of the county was recommended for rural style residential development in the Rural Residential areas.

II. LAND USE AND TRANSPORTATION MODEL

A key step in the development of the Strategic Plan involved the creation of a land use and transportation model to test the impacts of land use decisions on the roadway network. The model was used to assess the potential impacts of alternative land use scenarios for the future of Warren County.

The model was developed as an enhancement of the Warren County Transportation System Model. The updated model will give the County and other levels of government a useful tool for maintaining the balance between the transportation system and land use. For example, the effects of a particular proposed development can be tested system wide, allowing a realistic assessment of the full impacts on the transportation network.

A. Performance Measures

Several measures of performance were used with the model to assess the operations of the transportation system in Warren County. The key indicator of operations in the model was the volume-to-capacity (V/C) ratio on the individual parts of the roadway network. Service capacity is the maximum number of vehicles that can pass through a given road cross-section at an acceptable level of service. As the V/C ratio approaches 1.0 (volume approaches capacity) travel speeds decrease, travel times become longer and less reliable, and the performance of the transportation network decreases.

Total trips in the transportation network are a function of the interaction between the various land uses within and proximate to the County. Forecasts were developed for buildout under the existing zoning and for a centers-based alternative land use scenario. The buildout was unique in that it showed the cumulative impact of the individual land use decisions for the 22 municipalities in Warren County. For the buildout forecasts, background growth was accounted for, as well as the growth potential of buildable land in Warren County.

Vehicle-miles traveled (VMT) is another performance measure used with the transportation system model. This is the sum of the number of miles traveled by all vehicles using the transportation system during the PM peak hour, which is the scope of the model. Therefore, VMT is reported as a system-wide aggregate measure of the performance of the transportation system.

Vehicle-hours traveled (VHT) is a performance measure that represents the sum of the number of hours traveled by all vehicles using the transportation system during the period of analysis. The combination of VHT and VMT are important in air quality analyses of the transportation system.

From the above primary performance measures, additional indicators of the operations of the transportation system were calculated. These include average trip length, average trip duration, and average speed. These performance measures are reported system-wide. It should be noted that in the case of trips that have either an origin or destination (or both) outside the study area network, the statistics are reported only for that portion of the trip within the study area.

B. Existing Traffic Conditions

Table 15 below shows the Scenario Performance Measures for the 2002 existing conditions of the Warren County Transportation System. The V/C ratios for existing conditions indicate nearly all of the study area's roadways are operating at acceptable levels of service. There are a number of roadway segments with V/C ratios that suggest they are locations of concern, such as portions of I-78 (V/C = 1.31), I-80 (1.07), NJ Route 57 (1.89), NJ Route 31 (1.39), and CR 517 (1.80). Ratios greater than 1.0 indicate the roadway is operating at Level of Service (LOS) "F", with attendant queuing, driver frustration, and traffic diverting to residential streets. In all, 3 percent of the study area's roadway network was found to be operating with a V/C ratio greater than or equal to 1.0 in the 2002 base conditions. These roadways are shown on **Figure 13** (see next page).

TABLE 15: SCENARIO PERFORMANCE MEASURES

Scenario	Number of Trips	VMT	VHT	Average Trip Length (Miles)	Average Trip Duration (Minutes)	Average Speed (Miles per Hour)
Existing Conditions	48,144	468,364	12,445	9.7	15.5	37.6
Existing Zoning	212,178	2,661,095	269,504	12.5	76.2	9.8
Centers-based	145,808	1,729,231	73,660	11.9	30.3	23.5

Figure 13

V/C Ratios Over 1.0 Existing Conditions



Volume / Capacity

- 0 - 0.75
- 0.75 - 1.1
- 1.1 - 2.0
- 2.0 +



Note:
V/C ratios exceeding 1.0 represent failing conditions.

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C. Buildout Traffic Forecasts

The buildout forecasts for both scenarios (Existing Zoning and Centers-based) were performed using a Geographic Information Systems (GIS). Using data from the New Jersey Department of Environmental Protection (NJDEP), parts of the County that were already developed and parts that were environmentally constrained from development (steep slopes, floodplains, local/state/federal lands, wetlands, and protected farmland) were subtracted from the buildout analysis. The remaining land, that which is not already developed and is not environmentally constrained, was overlain with the existing municipal zoning regulations. The acreage was multiplied by a factor of 0.85 to account for streets, rights-of-way, odd-shaped parcels, and any other uses of the land that would prevent density from reaching the theoretical maximum.

Existing Zoning Alternative – In this scenario, VMT increases nearly 470%, while the average trip duration increases nearly 400% to 76.2 minutes. Trip length increases approximately 30% as drivers seek alternate paths that avoid the most heavily congested roadway segments. System wide average travel speed drops below 10 miles per hour.

The traffic generated and impacts on the V/C ratios at buildout under Existing Zoning are summarized in **Table 15** above and described below by region. In addition, the impact to volume to capacity ratios on the roadway network is shown on **Figure 14** (see next page).

- North - Because there is a relatively low amount of buildable land zoned for non-residential uses, and the residential zoning tends to be low density, the trip generation in this part of the County is relatively low. Thus, the roadway network in this part of the County fares the best in terms of impacts on V/C ratios. However, sections of Route 94, CR 519, CR 517 and CR 612 operate with high V/C ratios.
- Central - Trip generation in this section is higher than in the northern section. In particular, there are large tracts of buildable land that are zoned industrial in White that are significant trip generators. The areas of highest trip growth tend to occur outside the historic centers of Washington Borough, Hackettstown, and Belvidere. In Hackettstown, however, the northern portion of the Town has the highest potential for trip generation. In Mansfield, there is a large amount of trip generation in the southern portion of the town where there is a zone of buildable industrial land. The majority roads in this part of the County operate at V/C greater than 1.0. Roadways such as U.S. Route 46 and NJ Routes 31 and 57 operate at V/C ratios well in excess of 2.0.

Figure 14

V/C Ratios Over 1.0 Future Conditions for Existing Zoning



Volume / Capacity

- 0 - 0.75
- 0.75 - 1.1
- 1.1 - 2.0
- 2.0 +



Note:
V/C ratios exceeding 1.0 represent failing conditions.



- South - Greenwich, especially north of I-78 and west of CR 637, has a large level of trip generation under the buildout, mostly due to the availability of buildable commercially zoned land. Large areas in Harmony that are zoned for moderate density residential use also exhibit significant trip generation. Trip generation is also strong in Lopatcong, especially the southern and eastern portions. This area of Warren County experiences serious congestion under Existing Zoning. The V/C ratio on segments of CR 519 is greater than 3.0 on certain segments, and I-78, NJ Route 173, and U.S. Route 22 and Truck U.S. Route 22 all operate at V/C ratios much greater than 1.0.

Centers Based Scenario - The alternative land use scenario improves the performance of the local, county, and state roadways. Countywide, trip generation is reduced by 41.3% in this scenario versus Existing Zoning. The ratio of non-residential trips generated to residential trips is 1.43, as compared to 3.48 under Existing Zoning.

Many of the County's principal roadways continue to operate at V/C ratios greater than 1.0 under the alternative land use scenario (see **Figure 15** on next page). However, for many roadways the V/C ratios are considerably lower in the alternative land use scenario than the Existing Zoning.

In the case of the two Interstate facilities, I-78 and I-80, the traffic levels are affected more significantly by regional background growth trends than the scenarios. For example, on I-78 westbound east of Alpha, the V/C ratio for the Existing Zoning is 1.7, and for the alternative land use scenario it is 1.6.

Average trip length is reduced from 12.5 to 11.9 miles (under the buildout scenario), reflecting the reduction in diversion from preferred trip routings. Average travel speed more than doubles to 23.5 miles per hour, and average trip duration falls to 30.3 from 76.2, a reduction of 60.2%. See **Table 14** for the transportation system's performance measures under the alternative land use scenario.

- North - Since this part of the County was the least affected by the reduction and transfer of non-residential land uses, the improvements in the performance of the transportation system are relatively modest. Typical improvements in the V/C ratio on individual roadway segments are NJ Route 94 (1.3 to 0.8), CR 519 (0.8 to 0.7), and I-80 (1.1 to 1.0). Significant trip generation reductions are found in northwest Blairstown, northern Frelinghuysen, and Hope. Frelinghuysen sees an increase in trip generation in Johnsonburg due to the transfer of nonresidential development to this center.
- Central - White, in the areas to the north and south of Belvidere, sees some of the largest reductions in trip generation, as large buildable areas currently zoned for industrial use is rezoned to moderate density residential. Trip generation is also significantly reduced in southern areas of Mansfield and northeastern Washington Township. Trip generation is not reduced as much in Hackettstown and northern Mansfield.

Figure 15

V/C Ratios Over 1.0 Future Conditions for Alternative Scenario



Volume / Capacity

- 0 - 0.75
- 0.75 - 1.1
- 1.1 - 2.0
- 2.0 +



Note:
V/C ratios exceeding 1.0 represent failing conditions.



The scenario resulted in significant reductions in the V/C ratio on many components of the transportation network in this section. However, since there is still a relatively large amount of development slated to take place in this section, many segments are still operating with V/C greater than 1.0. In particular, some roadways for which this is true are segments of Route 57 (from over 3.2 to under 2.0), CR 519 (1.9 to 1.1), CR 517 (2.9 to 2.3), NJ Route 31 (3.0 to 1.5), and U.S. Route 46 (3.2 to 2.1).

- South - Trip generation is particularly reduced in areas of western Harmony and northern Franklin. Greenwich also would generate significantly fewer trips than under the buildout scenario, as would Lopatcong. Phillipsburg and Alpha would not see much in the way of trip reductions. The V/C ratios for many roadways, while still substantially greater than 1.0, are lower under this scenario. Characteristic changes in V/C ratios for roadway segments along main corridors are: CR 632 (2.6 to 1.9), CR 519 (2.6 to 1.3), I-78 (1.7 to 1.6) and U.S. Route 22 (2.5 to 1.9).

III. PUBLIC OPINION SURVEY RESULTS

A. Introduction

The survey was conducted as part of the Warren County Strategic Growth Plan by the Warren County Planning Department. It was distributed in the summer of 2003 to 5,627 households. The mailing list was based on a random selection of 10 percent of the registered voters in each municipality in Warren County. There were 749 survey forms returned for a response rate of 13.3 percent.

The questions pertained to attitudes towards development trends in the county, potential goals of the strategic plan and alternative development concepts for the future. In addition, the questions requested key demographic information regarding the respondents. The Planning Department and its consultants are using the results to help formulate the recommendations of the Strategic Growth Plan. A copy of the survey, the overall results and the results by municipality are provided in Appendix 3.

B. Results

The following are the results for each survey question. The tables include the actual number of responses to each question as well as the number of missing responses. The tables include the "percent" of responses and the "valid percent" of responses. The "percent" reflects the portion of all responses including those missing answers. The "valid percent" reflects only the portion of those that actually answered the question. The discussion below each table refers only to the valid percent.

1) Are you satisfied with development trends in your municipality?

Nearly two-thirds (64%) are not satisfied with development trends in their own municipality. Many felt that there was too much development and it was occurring too fast. Sprawl outside of existing centers was another major concern. In addition, the loss of farmland and rural character were frequently listed as major reasons for this dissatisfaction.

Municipalities in which over 50 percent of the respondents were satisfied with development trends in their community included Franklin (52 percent), Hardwick (58 percent), Hope (65 percent) and Knowlton (67 percent).

Among the municipalities in which respondents were not satisfied with development trends in their municipality, strongest responses were in Alpha (88 percent), Greenwich (84 percent) and Washington Township (82 percent).

2) Are you satisfied with development trends in neighboring municipalities?

Over three quarters of the respondents are not satisfied with development trends in their neighboring communities. The most frequent municipality cited as an example of this issues was Greenwich. Other frequently mentioned municipalities include Lopatcong, Mansfield and Blairstown. The Stewartville area in Greenwich Township was also cited as an area of concern.

Among the municipalities in which respondents were not satisfied with development trends in their neighboring municipality, strongest responses were in Alpha (88 percent), Belvidere (93 percent), Franklin (86 percent), Greenwich (88 percent), Harmony (97 percent), Hope 87 percent), Lopatcong (85 percent) Oxford (89 percent), Phillipsburg (88 percent), Pohatcong (90 percent) and Washington Township (80 percent).

The remaining municipalities (except Blairstown) all exceeded 50 percent dissatisfaction with development trends in neighboring municipalities. Blairstown was the only municipality in which over 50 percent of the respondents were satisfied with development trends in neighboring municipalities.

3) Over the next 20 years, what areas of the county should be developed? List three specific areas or sites you think are appropriate for development and the type of development that should occur in these areas or sites.

The most frequently mentioned municipalities that respondents felt should be developed were existing activity centers including

Phillipsburg (135 responses), Hackettstown, Washington Borough, Belvidere and Blairstown. The most commonly mentioned sites were in Phillipsburg, including the Ingersoll Rand property, the Laneco Mall and the Delaware River waterfront.

4) Should there be areas or types of places in the county that should be off-limits to development?

Nearly 90 percent of the respondents feel that some areas in the county should be off-limits to development. The types of areas are discussed in Question 5 below.

5) If yes for Question 4 please list up to three of these areas or types of places you would like to see left undeveloped.

Farmland was the most frequently identified type of place that should remain undeveloped. Other key areas for preservation included waterways, mountainsides and ridgelines, historic sites and rural roads.

6) As part of the planning process, a set of 11 draft goals have been developed by the committee for this effort. From the list below, please rank the goals in order of importance using 1 to 11 with 1 being the most important and 11 being the least important. (Use each number only once).

TABLE 16: GOAL STATEMENT RANKING

Average Ranking	Goal Statement
2.3	Preserve and enhance rural character as well as agricultural, natural, environmental, historic and open space resources and provide incentives to achieve this goal.
3.3	Protect and enhance water quality and quantity.
6.2	Encourage population growth in existing centers and provide financial incentives to local government, school districts and developers to achieve this goal.
6.5	Encourage desirable development that provides local employment opportunities in centers.
6.6	Maintain and improve the existing transportation system to provide safe and efficient mobility and access.
6.6	Encourage state legislation to provide localities more control over growth
6.8	Provide safe and efficient alternative modes of transportation to reduce auto dependence.
6.9	Improve existing public infrastructure such as sewer and water to support existing centers
7.1	Promote inter-municipal, county and state cooperation.
7.3	Ensure that the benefits and cost of plan implementation are shared equitably among all residents, landowners and businesses in Warren County.
7.6	Increase educational and cultural opportunities.

In this question, the lower the ranking score, the more important the goal. Thus, the most important goal was to “preserve and enhance rural character as well as agricultural, natural, environmental, historic and open space resources and provide incentives to achieve this

goal.” The second most important goal was to “protect and enhance water quality and quantity.” These two goals were far more highly ranked on average than the other nine goals.

The other nine goals were actually below the mid-point ranking of 5.5. This does not mean they are unimportant to the respondents. It simply highlights the significance of the first two ranked goals.

The concept of encouraging population growth in centers (which is discussed further in Question I) was the third most important goal.

7) Overall, how do you feel about the above listed Draft Goals for the Strategic Plan?

The majority (69 percent) of respondents support or strongly support the draft goals for the Strategic Growth Plan. Approximately 24 percent strongly support and 45 percent support the goals. Importantly, only 6 percent oppose or strongly oppose the goals.

8) Do you have an additional goal that you would like to suggest for our consideration? Or any that should be deleted? Please describe.

Many of the comments pertained to the restriction or prevention of new development, preservation of farmland, and the reduction of property taxes.

9) Would you prefer to see future growth take place under the “Existing Growth Scenario” or the “Centers Scenario”?

The majority (75 percent) supported the centers scenario compared existing zoning scenario. The centers scenario was described as “each municipality may have at least one designated center for growth.” It should be noted however that no potential centers were identified or shown in the survey.

This question only reflects the attitude that center style of development should be encouraged in the county. This style encourages a mix of various types of housing, retail, offices and other land uses in close proximity to one another in designated centers. Areas outside of the centers would remain rural in character with less growth.

Respondents in a majority of the municipalities preferred the Centers Scenario. The only exceptions were Alpha and Hope. However, the number of respondents in these two communities was relatively low.

10) Do you currently work in Warren County?

Approximately one-third (33 percent) of the respondents work in Warren County, whereas slightly more (approximately 42 percent work

outside the county). Importantly, one fifth (20 percent) of the respondents were retirees.

11) How do you get to work?

The majority (95 percent) of the respondents travel by car to work. Interestingly, more people walk to work than use transit.

12) If working, how long is your commute, door to door?

Nearly 5 percent of the respondents work from home. While slightly more than a quarter (27%) of the working respondents have relatively brief commutes (less than 15 minutes), there is an even distribution of working respondents among the time categories of 15-30 (18%), 30-45 (16%), 45-60 (16%) and more than 60 minutes (17%).

13) Are more transportation choices needed?

Over 60 percent of the respondents believe more transportation choices are needed. Additional information is provided in Question 14 below. A majority of the respondents in several municipality answer yes. Respondents in several rural municipalities did not respond yes in over 50 percent of the replies. These municipalities include Blairstown (49 percent), Franklin (48 percent), Frelinghuysen (44 percent), Harmony (38 percent), Hope (37 percent), Oxford (47 percent), and White (49 percent).

14) If yes, what is needed?

The majority of respondents stated more transportation choices are needed. Of these respondents, the majority (approximately 89 percent) stated that services other than roads are needed. About one-third states more bus service is needed, while another one-third supports new train services. In addition, bicycling and pedestrian improvements were supported more than new roads.

15) What municipality (town, township, or borough) do you live in?

As shown in **Table 17** (see next page), surveys were distributed to 10 percent of the registered voters in each municipality. The average response rate was 13.3 percent. Alpha, Hope, Knowlton, Mansfield, and Phillipsburg each had less than 10 percent response rates in terms of distributed surveys. Allamuchy, Belvidere, Frelinghuysen, Greenwich and Harmony had response rates higher than 17 percent. These communities may be over-represented in the survey as a result.

16) How long have you lived in Warren County?

The largest number of respondents (30 percent) were in the “more than 30 years” category. However, no category had an inordinate number of respondents that would skew the survey responses.

17) How many acres of land do you own in Warren County?

The largest number of respondents were in the 0.25 to 0.5 acres, 0.5 to 1.0 acres and 1 to 3 acres categories. Approximately 75 percent of the households in Warren County own property and 25% rent. The number of respondents that rent or do not own land is only 10%. Thus, it may be possible that the survey over represents the opinions of homeowners as opposed to renters in Warren County.

TABLE 17: SURVEY DISTRIBUTION AND RESPONSES

Municipality	Surveys Distributed	Percent of Distribution	Number of Responses	Percent of Responses
Warren County	5,627	100	714	100
Allamuchy	244	4.3	43	17.6
Alpha	125	2.2	8	6.4
Belvidere	152	2.7	30	19.7
Blairstown	359	6.4	47	13.1
Franklin	163	2.9	23	14.1
Frelinghuysen	132	2.3	25	18.9
Greenwich	291	5.2	54	18.6
Hackettstown	463	8.2	51	11.0
Hardwick	91	1.6	12	13.2
Harmony	162	2.9	34	21.0
Hope	116	2.1	8	6.9
Independence	309	5.5	43	13.9
Knowlton	173	3.1	13	7.5
Liberty	160	2.8	23	14.4
Lopatcong	396	7.0	56	14.1
Mansfield	378	6.7	35	9.3
Oxford	132	2.3	19	14.4
Phillipsburg	640	11.4	48	7.5
Pohatcong	193	3.4	22	11.4
Washington Borough	299	5.3	24	8.0
Washington Township	355	6.3	43	12.1
White	294	5.2	46	15.6

18) Please indicate your age:

Half of the respondents were in the 40 to 59 age category. Since the survey was distributed to only those over age of 18, there can be no valid comparison made to the average age of residents in the county. Few respondents were under the age of 20. However, the survey was addressed to registered voters who must be 18 years of age. Thus, only a small portion of this population would actually have received the survey directly.

19) What is your annual income?

The largest category of respondents earn between \$50,001 and \$75,000 in annual income. The median household income in the County is \$56,000.

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