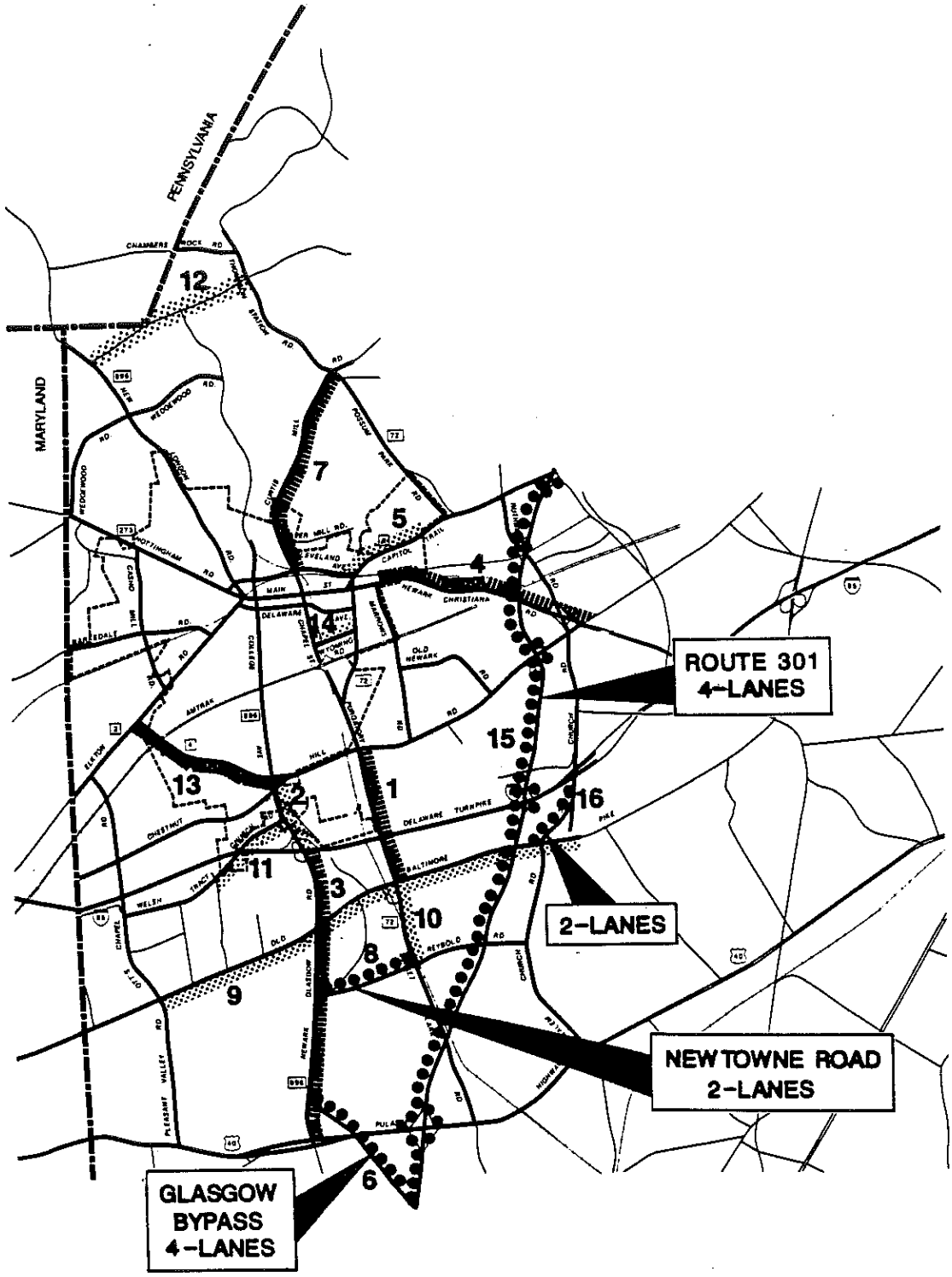
VI. ANALYSIS OF FUTURE CONDITIONS (PHASE 2)

Identification of future deficiencies is based primarily on peak-hour traffic volumes and a segment-level analysis, although intersection evaluations were also made. The year 2010 average daily traffic volumes obtained from the DelDOT model were refined and adjusted to account for factors which are specific to the study area. These volumes were then converted to peak-hour numbers for use in the roadway segment analysis spreadsheet. The DelDOT model and procedures for determining peak-hour volumes and conducting segment and intersection analyses are described below.

A. DelDOT MODEL

The year 2010 traffic volumes evaluated in this study were derived from the volumes output by the E+C 67 traffic model. The term E+C 67 represents the roadway volume network with base assumptions relative to improvement projects anticipated to be in place by the year 2010. Some of the projects are committed; however, there are a number of projects on the list which are currently proposals for testing purposes. These projects are not yet committed. The committed and proposed project locations are presented in Figure VI-1 and also listed in Table VI-1. The projects include upgrading existing roads to provide standard lane widths, shoulders, or medians, widening existing two-lane roads to four lanes, and constructing new bypasses or connector roads.



NOTE: Reference Nos. Shown In Table VI-1

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Year 2010 Base Roadway Network

LEGEND:

- Upgrade
- Widen to 4 Lanes
- New Route

Not to Scale

Fig. VI-1

TABLE VI-1
E+C 53 NETWORK PROJECTS

1.* Route 72 from Old Baltimore Pike to Route 4 - Widen to 4 lanes

2. Route 896 from Old Baltimore Pike to I-95 - Upgrade

3. Route 896 from I-95 to Glasgow - Widen to 4 lanes

4. Route 273 from Marrows Road to Route 273 - Widen to 4 lanes (partial new alignment)

5. Kirkwood Highway from Cleveland Avenue to Possum Park Road - Upgrade

6. Glasgow Bypass from Route 301 to Route 896 - 4 lanes (New Alignment)

7. Curtis Mill Road from Cleveland Avenue to Route 7 - Widen to 4 lanes

8. Newtowne Road from Route 72 to Route 896 - 2 lanes (New Alignment)

9. Old Baltimore Pike from Route 72 to Ott's Chapel Road - Upgrade

10. Route 72 from Old Baltimore Pike to Newtowne Road - Upgrade

11. Welsh Tract Road from Route 896 to Whitaker Road - Upgrade

12. Hopkins Road from Route 896 to Thompson Station Road - Upgrade

13. Christina Parkway (Route 4) from Route 896 to Route 2 - Widen to 4 lanes

14. Wyoming Road from Route 72 to Chapel Street - Upgrade

15. Route 301 - New 4 lane alignment

16. Salem Church Road - Realignment as part of Old Baltimore Pike project

* Reference numbers shown in Figure VI-1.

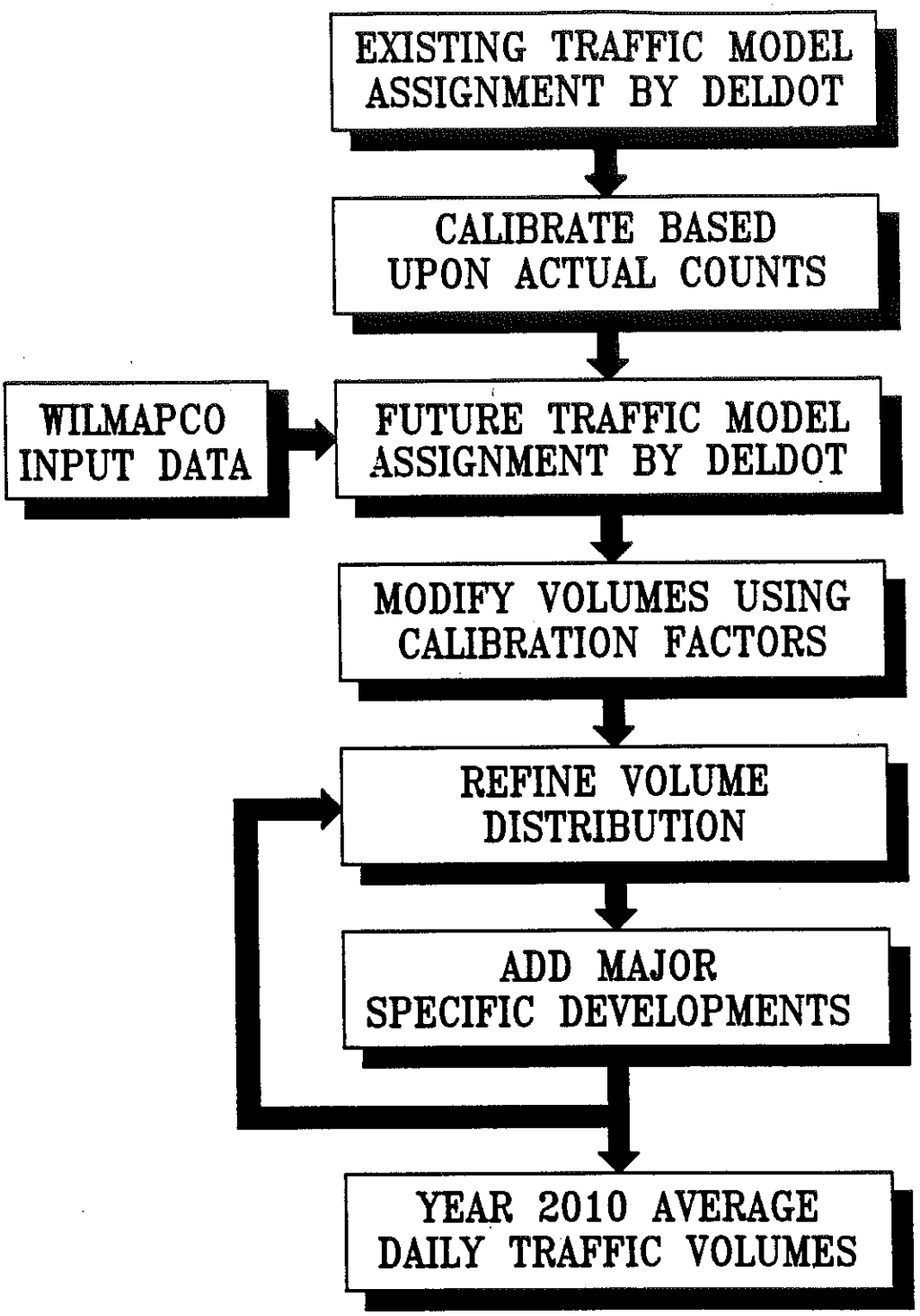
B. TRAFFIC VOLUMES

Figure VI-2 presents the procedures followed to produce the peak-hour segment volumes used in the spreadsheet analysis. The process began with the 1985 model assignment which was calibrated using existing daily traffic volumes and recent intersection turning movement counts. Numerical factors calculated in the calibration process were applied to the year 2010 volumes assigned by the model to produce adjusted volumes. Two additional refinements were then made to these adjusted volumes. First, the volumes within all geographic corridors were evaluated and reassigned among individual roads within each corridor as required to represent balanced trip patterns. Second, traffic generated from the DuPont Tract located in the northern section of the study area was added to the roadway network. The refinement process was repeated until a satisfactory set of daily traffic volumes resulted. The average daily traffic volumes for the year 2010 are presented in Figure VI-3.

Several roadways will experience a significant increase in average daily traffic (more than double), including:

- Christina Parkway,
- Chestnut Hill Road,
- Old Baltimore Pike (between Ott's Chapel Road and Route 896),
- Route 896 (between Route 40 and Old Baltimore Pike),
- Pleasant Valley Road, and
- Route 273 (Between Route 72 and Marrows Road).

There are two factors which, in addition to normal expected growth, have contributed to the significant increase in traffic along these routes. They are the influence of traffic generated by the DuPont Tract and the new Route 301 alignment. It would be



Year 2010 Average Daily Traffic Volume Forecast Procedure

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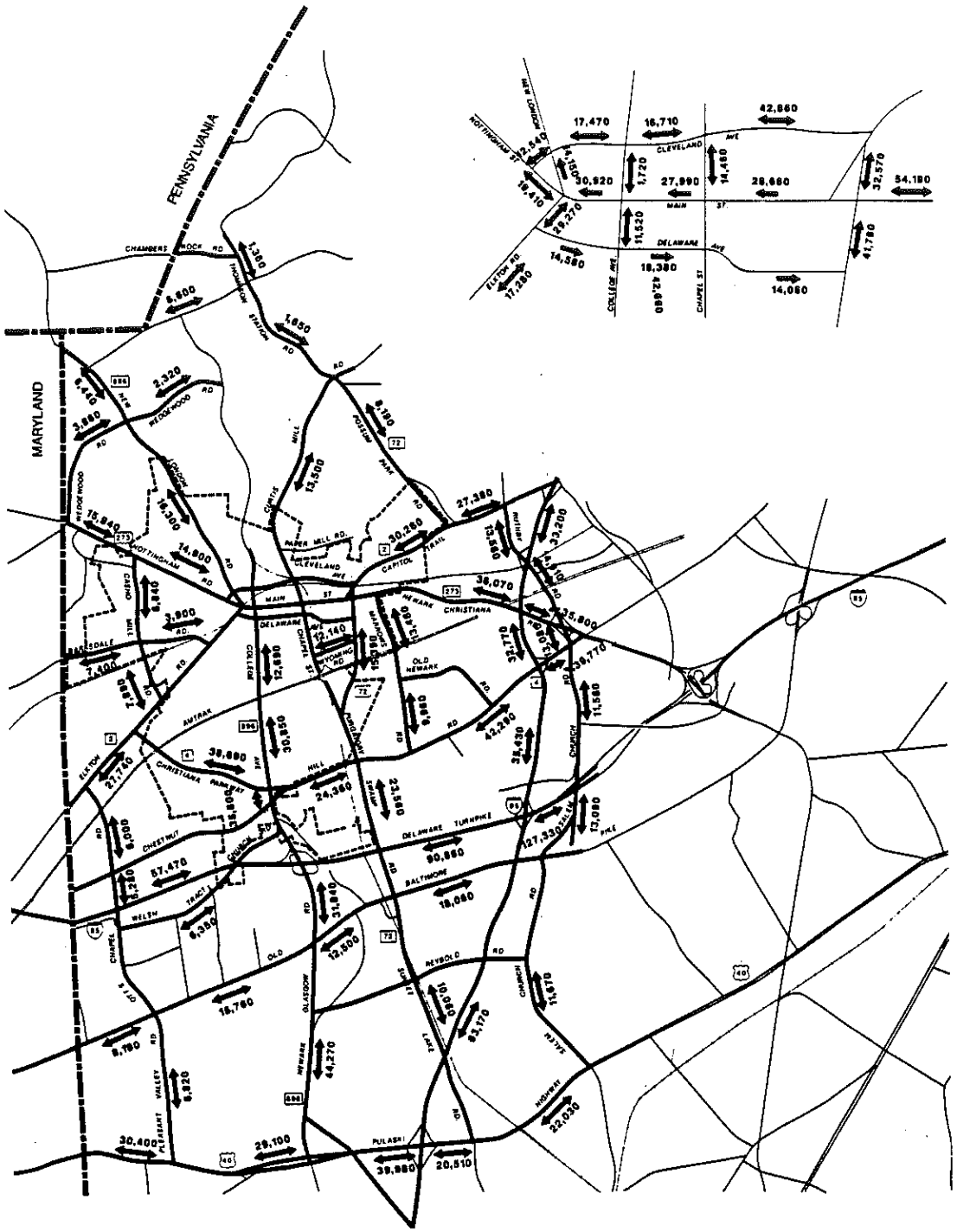
Fig. VI-2



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Year 2010 Base Average Daily Traffic Volumes

Not to Scale

Fig. VI-3

expected that Route 301 would absorb traffic from the local roads; however, it also serves as an attractor. Therefore, roads leading to interchanges with Route 301 will experience a significant increase in traffic volumes. Table VI-2 presents a comparative summary of 2010 versus 1985 volumes along selected links in the study area.

TABLE VI-2
COMPARATIVE SUMMARY OF YEAR 2010 DAILY
TRAFFIC VOLUMES ALONG SELECTED ROADWAYS

Roadway	1985 Volume	2010 Volume	% Increase
Cleveland Avenue (Between Route 72 and Chapel Street)	21,260	42,660	101
Main Street (Between Chapel Street and College Avenue)	23,160	27,990	21
Delaware Avenue (Between College Avenue and Chapel Street)	15,440	19,380	26
Hopkins Road	1,410	6,600	368
Possum Park Road	6,170	8,190	33
Nottingham Road (Between Cleveland Avenue and Casho Mill Road)	11,802	14,900	26
Elkton Road (Between Ott's Chapel Road and Christina Parkway)	15,700	27,740	77
Chestnut Hill Road (Between College Avenue and Chapel Street)	11,270	24,360	116
College Avenue (Between Old Baltimore Pike and I-95)	26,860	31,840	19
Route 72 (Between I-95 and Chestnut Hill Road)	17,330	23,560	36
Pleasant Valley Road (Between Route 40 and Old Baltimore Pike)	4,830	6,820	41
Route 40 (Between Route 896 and Route 301)	15,820	39,980	153

C. SEGMENT ANALYSIS

A computer spreadsheet was created to facilitate the organization and analysis of the individual roadway segments throughout the corridor. These roadway segments include transportation model links which have similar geometric, volume, and capacity characteristics. The analysis results include volume-to-capacity ratios and levels of service.

1. Methodology

Data compiled for the roadway analysis segments defined in Chapter III of this report were input to the spreadsheet. These data included:

- Accident rates,
- Roadway functional classifications,
- Daily and peak-hour traffic volumes, and
- Daily and peak-hour roadway capacities.

Segment volume-to-capacity ratios and levels of service were calculated for the base year 1985 and the future year 2010 based upon the input data. Accident rates were calculated based upon three-year data provided by the Department. Functional classifications and roadway capacities were also provided by the Department. Traffic volumes used in the spreadsheet were taken from the model and calibrated to reflect actual conditions.

2. Results

The volume-to-capacity analysis which results in level of service (LOS) indicates that almost 40 percent of the roadway mileage analyzed in the study area would operate at a deficient level of service (LOS "D" or worse) during the critical peak

hour. Table VI-3 summarizes the overall peak hour levels of service for the year 2010. The percentage of deficient mileage is distributed almost equally among Levels of Service "D", "E", and "F".

TABLE VI-3
YEAR 2010 LEVEL-OF-SERVICE SUMMARY

Level of Service	Mileage	Percent of Total
A	12.3	14.3
B	17.3	20.0
C	23.4	27.0
D	9.3	10.8
E	11.2	12.9
F	12.8	15.0
Total	86.3	100.0

D. INTERSECTION ANALYSIS

Detailed intersection analysis based upon year 2010 link volume projections is inappropriate for the planning level of evaluation being undertaken in this study. Therefore, a general review was made and supplemented by detailed analysis where required. The remainder of this section describes the procedure for analyzing and identifying deficient locations.

1. Methodology

Several intersections were identified as having characteristics which would indicate some level of deficiency. These intersection conditions are:

- currently deficient in mobility, safety, or geometry;
- existing level of service is marginal (LOS "C" or "D"); or
- expected to experience significant traffic increases.

Locations which fit into one or more of these categories were first identified. Evaluation of these intersections was an iterative process since recommendations for new routes could alleviate certain deficiencies or create others. In certain cases, a detailed analysis was required to identify the specific deficiency. In these cases, a critical movement capacity analysis was conducted.

2. Results

There were a number of individual locations which fit into the categories listed above and upon further evaluation were identified as deficiencies in the year 2010. The deficiencies were primarily related to mobility or capacity restraints. Two locations are restrained due to narrow bridges and carry volumes which currently exceed roadway capacity.

There are a number of currently unsignalized intersections which, based upon future traffic projections, may require signalization in order to safely accommodate the traffic volumes expected. Still other locations which are currently signalized may require signal timing or phasing adjustments or minor roadway widenings. These deficiencies will be discussed in greater detail in the next section.

E. IDENTIFICATION OF DEFICIENCIES

The year 2010 deficiencies analysis was conducted for both segments and intersections. The primary emphasis was placed upon the roadway segments since intersection turning movement volumes

are not as accurately projected to twenty-five years in the future. Intersections which performed at a marginal level of service under existing conditions were identified as potential problems in the future.

1. Segment Deficiencies

The spreadsheet method described in the previous section was employed to calculate the peak-hour mobility deficiencies throughout the study area. Figure VI-4 presents the segment deficiencies graphically. Several corridors in the study area are expected to function at Level of Service (LOS) "F" during the year 2010, including sections of Delaware Avenue, Main Street, Cleveland Avenue, and Old Baltimore Pike. In addition, Christina Parkway, and the proposed Route 301 (from Route 40 to I-95) are projected to function at LOS "F" in the year 2010. Sections of several corridors, including Salem Church Road, Route 896, Marrows Road, and Nottingham Road, are projected to function at LOS "E". Sections of Old Baltimore Pike, Elkton Road, Newark Christiana Road, and Chestnut Hill Road are projected to function at LOS "D".

The poor levels of service along the deficient corridors are the result of various conditions which could include poor geometrics, side interference (driveways), or a simple lack of capacity.

The Old Baltimore Pike corridor, for example, currently has a low capacity because of a general lack of shoulders, lateral clearance, and passing zones. In the future, the two-way volume is projected to exceed the capacity of even the upgraded roadway. Most of the two-lane roadways which are projected to function at a poor level of service fall into the same category as Old Baltimore Pike.

VII. PHASE 2 DEFICIENCY EVALUATION

The Phase 2 evaluation concentrated on transportation deficiencies which were based upon projected 2010 traffic volumes. These deficiencies were described in the previous chapter. There also were a number of recommendations made by members of the Citizens Advisory Committee and other concerned parties during the Phase 1 process which were deferred to the Phase 2 analysis. These proposals, which may apply to existing or future conditions, are also addressed herein. Therefore, the Phase 2 alternatives for evaluation were categorized as listed below:

- Phase 2 Long-term Alternatives
- Phase 2 Short-term Alternatives (resulting from long-term options or deferred from Phase 1)

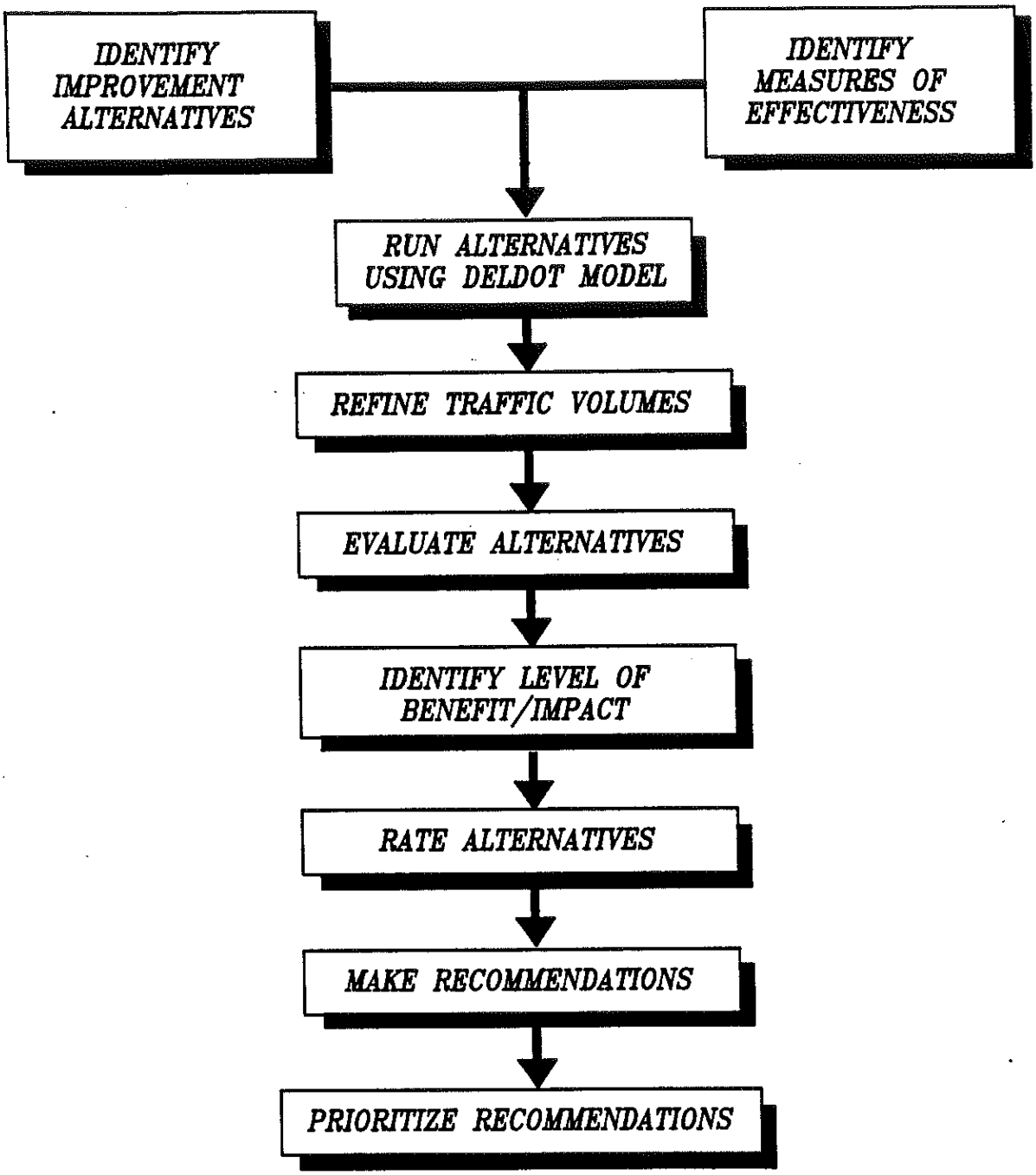
This chapter discusses the evaluation process, alternatives selected for evaluation, measures of effectiveness, and evaluation results.

A. EVALUATION PROCESS

Two distinct processes were used to evaluate the long-term vs. the short-term alternatives. These processes are described below.

1. Phase 2 Long-term Evaluation

The Phase 2 long-term improvement alternatives were subject to an evaluation process which ultimately identified the relative level of benefit and impact for each. This process, presented graphically in Figure VII-1, includes the identification of improvement alternatives and measures of effectiveness, a spreadsheet analysis which calculates the levels of service, and a



Phase 2 Long-Term Alternatives Evaluation Process

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Fig. VII-1

matrix evaluation which ranks the alternatives. The DelDOT model was run for each alternative to obtain the 2010 traffic volumes to be used in the analysis. These volumes were adjusted by the calibration factors defined in Chapter VI (Section B) and input to the spreadsheet to determine the levels of service.

The matrix was created to provide a method for evaluating the individual alternatives and comparing their benefits and impacts with those of the other alternatives. The measures of effectiveness used to evaluate the alternatives were derived from the deficiency criteria described previously in this report. Criteria describing mobility, safety, geometry, environment, and cost were included. The descriptions used in the matrix to define the impacts include:

- "No" benefit/impact;
- "Minimal" benefit/impact;
- "Moderate" benefit/impact; and,
- "Significant" benefit/impact.

Several sub-alternatives were subject to a similar analysis but without full use of the evaluation matrix. Only the main alternatives were evaluated using all of the matrix measures of effectiveness.

2. Phase 2 Short-term Evaluation

The short-term alternatives came from two basic sources: 1) resulting from the Phase 2 deficiency analysis; and, 2) remaining from Phase 1. Each of the alternatives was evaluated qualitatively if not quantitatively on an individual basis without comparison to each other. There are instances in which short-term alternatives are a result of long-term alternatives and these are so noted.

B. LONG-TERM ALTERNATIVES SELECTION

The long-term deficiencies identified in Chapter VI (Section D) were used as the basis for selection of the improvement alternatives. The deficiencies were reviewed and categorized as local or regional to identify an appropriate alternative for mitigation.

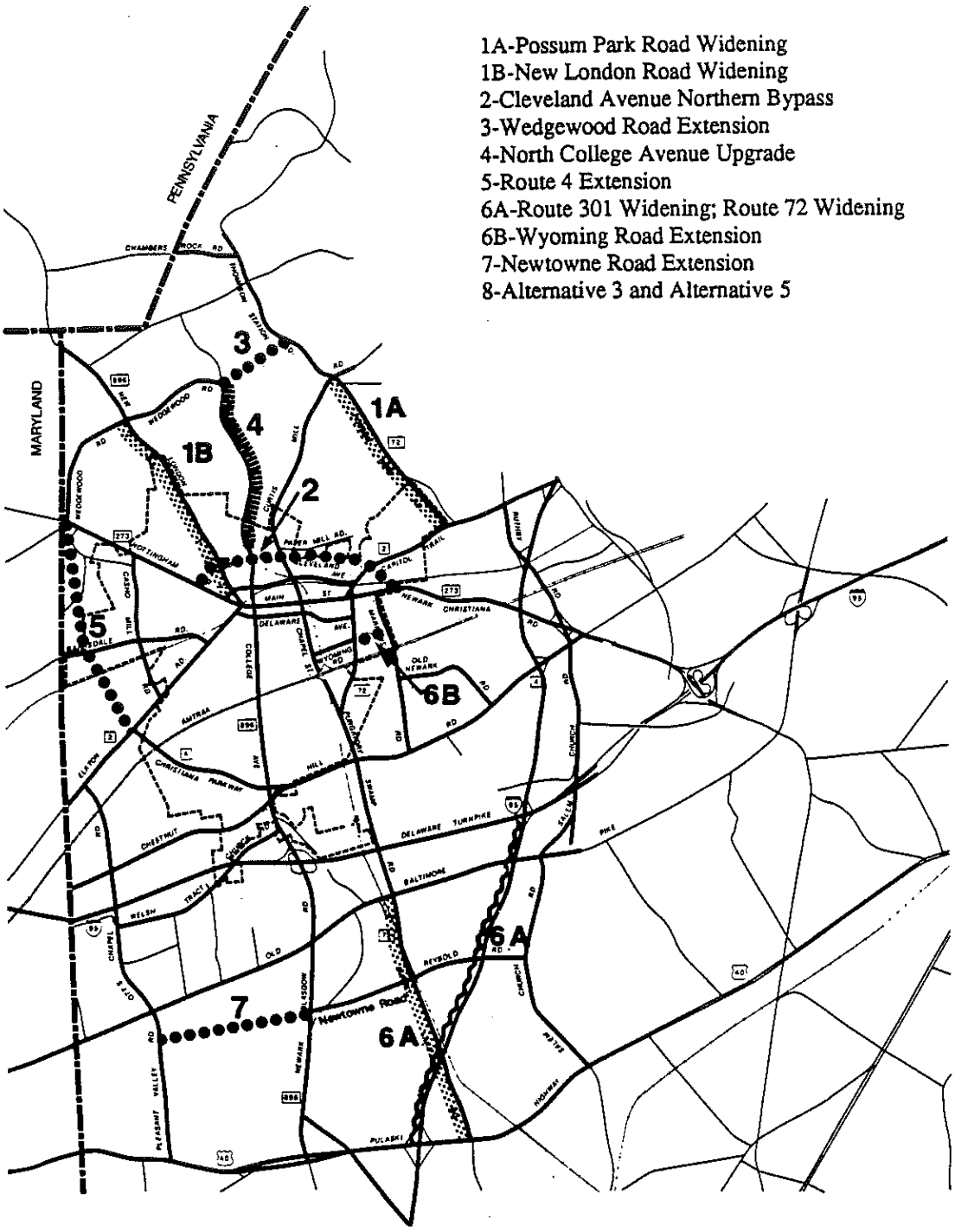
The number of alternatives and variations which could have been tested to mitigate 2010 deficiencies is quite large. At this systems planning level of study, a minor change represented by a variation would not likely alter the results in a measurable fashion. Therefore, the tested alternatives are in many cases representative of others. The major roadway improvement alternatives were tested using the DelDOT transportation planning model. These alternatives are presented below with their variations and the deficiency which they are intended to mitigate. The alternatives are also presented in Figure VII-2.

1. Alternative 1a - Widen Possum Park Road to Four Lanes

The Possum Park Road widening is intended to provide additional capacity and improve the level of service on Possum Park Road only.

2. Alternative 1b - Widen New London Road to Four Lanes

The New London Road widening is intended to solve a similar problem and it was also expected that it might reduce congestion on Nottingham Road.



NOTE: Paths DO NOT Represent Actual Roadway Alignment or Location

Phase 2 Long-Term Alternatives for Model Testing

LEGEND:

- New Route
- Widen to 4 lanes
- Widen to 6 Lanes
- Upgrade 2-Lanes

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Not to Scale

Fig. VII-2

3. Alternative 2 - Cleveland Avenue Northern Bypass from Route 273 at Marrows Road to Nottingham Road

There are alternative alignments for the new route, along with possibilities for partial bypass routes or simply the provision of an additional access to Possum Park Road from the subdivisions in the area between Curtis Mill Road, Possum Park Road, and Cleveland Avenue.

The purpose of the bypass is to divert traffic from the CBD area roadways (Cleveland Avenue, Main Street, and Delaware Avenue).

4. Alternative 3 - Wedgewood Road Extension to Station Road

The alternative to this alignment is the upgrade and/or widening of Hopkins Road located to the north.

The purpose is to provide an east/west route in the northern section of the study area. A secondary function is to provide relief to the north/south routes in the northern section of the study area (Possum Park Road, Curtis Mill Road, New London Road) and to a certain extent Cleveland Avenue, which also traverses east/west.

5. Alternative 4 - North College Avenue Upgrade (Cleveland Avenue to Wedgewood Road)

The intention of this improvement is to provide an additional north/south route to improve access to the northern section of the study area.

6. Alternative 5 - Route 4 Extension (Elkton Road to Route 273)

The purpose of this alternative is to complete the western circumferential route around the CBD area and reduce the volume of through traffic travelling through the CBD (specifically the triangle area of New London Road, Nottingham Road, and Main Street). This alternative is proposed to have an at-grade intersection with Barksdale Road.

7. Alternative 6a - Widen Route 301 to Six Lanes (Route 40 to I-95) - Widen Route 72 to Four lanes (Route 40 to Old Baltimore Pike)

These widenings are intended to serve a two-fold purpose. The first is to accommodate the demand on the two roads; the second is to attract trips which are currently on Route 896 and Salem Church Road.

8. Alternative 6b - Wyoming Road Extension

This alternative can occur either at Delaware Avenue or Wyoming Road. The intention is to provide a direct path to Route 273 and eliminate the jog onto Route 72.

9. Alternative 7 - Newtowne Road Extension (Route 896 to Pleasant Valley Road)

The intention of the alternative is to provide a relief route parallel to Old Baltimore Pike.

10. Alternative 8 - Combination of Alternatives 3 and 5

This alternative was tested to determine the benefit of a continuous "ring-road" around the City of Newark. Variations to this include those mentioned previously relative to Alternatives 3 and 5.

11. Alternative 5 Variations

Several variations to Alternative 5 were developed to determine which could best represent the transportation needs of the area. These sub-alternatives are listed below:

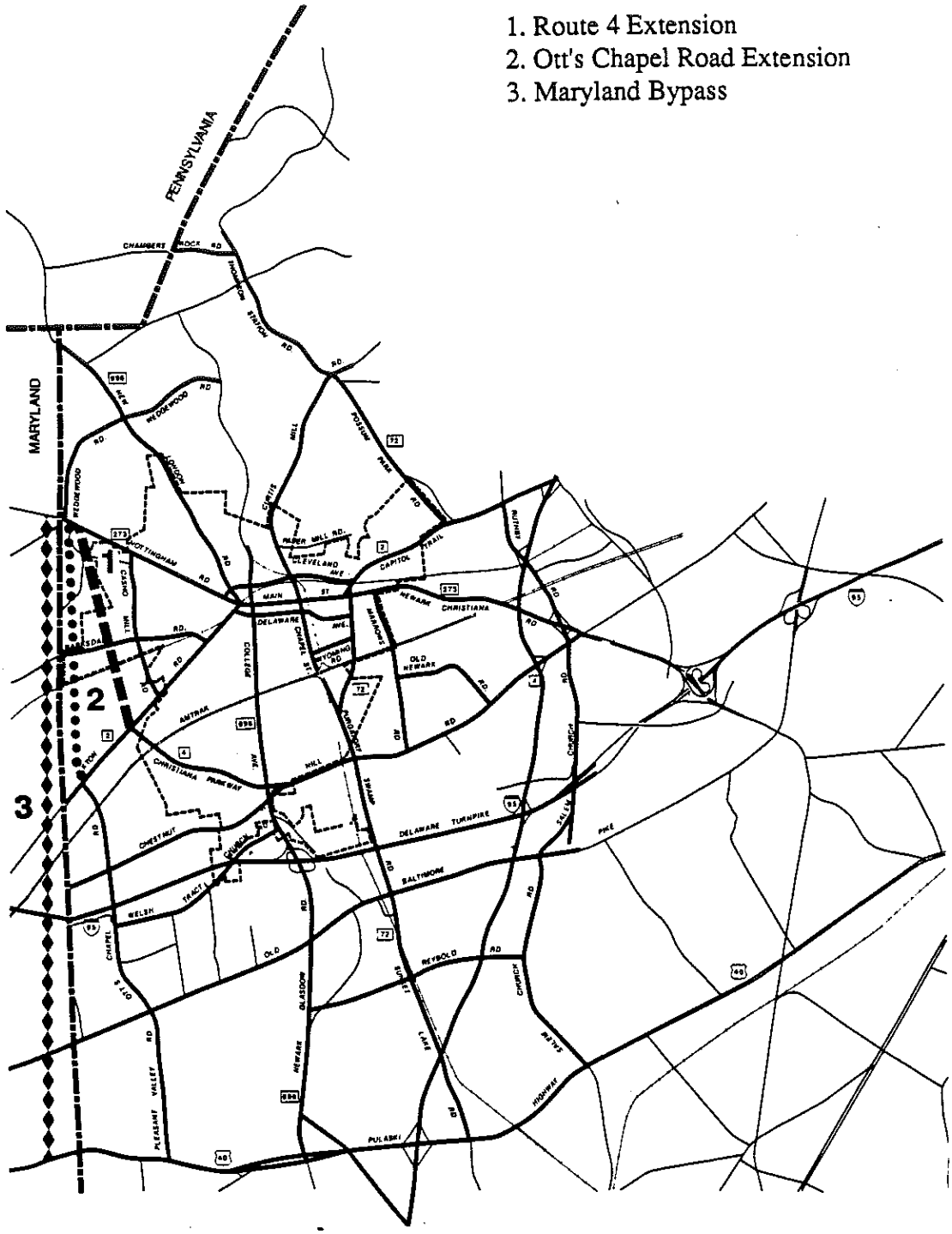
- Route 4 Extension to Nottingham Road (two-lanes with at-grade intersections)
- Ott's Chapel Road Extension to Nottingham Road (two lanes with at-grade intersections)
- Maryland Bypass Road from Route 273 to Route 40 (two lanes with at-grade intersections)

These are graphically presented in Figure VII-3.

C. MEASURES OF EFFECTIVENESS

The rating of the overall benefit and/or impact of a particular alternative is based upon a composite of several measures of effectiveness (MOE). These measures were used in conjunction with the evaluation matrix for the Phase 2 long-term evaluation only. They were derived in part from the deficiency criteria previously established to identify and evaluate the roadway segment deficiencies. Each is listed in Table VII-1 and described below.

The benefits and impacts listed on the following pages were evaluated either quantitatively or qualitatively to determine the overall rating.



NOTE: Paths DO NOT Represent Actual Roadway Alignment OR Location

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Not to Scale

Route 4 Extension Sub-Alternatives

Fig. VII-3

TABLE VII-1
MEASURES OF EFFECTIVENESS

Benefits	Impacts
• Level of Service Improvement - Overall	• Right-of-way Requirements
• Level of Service Improvement - Immediate Area	• Environmental Constraints
• Reduction of Traffic Demand - CBD or Affected Area	• Geometric Constraints
• Geometric/Safety Improvement	• Neighborhood/Community Disruption
	• Cost

1. Benefits

- Level of Service (LOS) (Overall and Immediate Area) was calculated for each analysis segment and tabulated to determine the overall percentage of study area mileage by level of service. These levels were grouped to include LOS A-C and LOS D-F and then compared with the base year to determine the relative improvement. A more subjective technique was used to identify the relative improvement in LOS for the area immediately surrounding the location of the alternative. Limits of the affected area were established and a comparison of levels of service was made between the alternative and the base year 2010 within this area.

- Reduction in Traffic Demand (CBD or Affected Area) was determined based upon a comparison of 2010 base peak hour traffic volumes with 2010 Alternative peak hour traffic volumes for the CBD area and the affected area. The number of volume decreases and their magnitude on the

roadways within the CBD or the affected area, as appropriate, was used to determine the level of benefit.

- Geometric/Safety Improvement was determined based upon the specific alternative definition and its impact on the existing roadway network. The review focused on possible geometric and safety improvements which would result from the alternative. For example, upgrading an existing roadway would likely improve the geometry as well as relieve existing safety hazards. Construction of a new roadway may reduce traffic volumes on adjacent more congested roadways thus also reducing the potential for accidents. The level of improvement is based upon three components: provision of additional roadway capacity, magnitude of actual geometric improvement, and potential reduction in accidents.

The level of benefit for each criteria was tallied to determine the overall benefit summary rating. (see Figure VII-4)

2. Impacts

- Right-of-way required was estimated based upon the type and location of the proposed alternative as well as knowledge of existing right-of-way or proposed acquisition. Because specific route alignments cannot be determined at this systems planning level of study, this measure was not based upon an actual amount of right-of-way required but rather on the likely level of acquisition. For example, new corridors are expected to require significant right-of-way, while widenings are expected to require moderate to minimal right-of-way.

- Environmental Constraints were evaluated based upon the proximity to wetlands and other environmentally sensitive areas.

- Geometric Constraints were measured based upon the location of the corridor, roadway edge constraints, and potential obstacles to construction (such as water-ways and existing residential communities).

- Neighborhood/Community Disruption - Roadway widenings or new corridors could affect neighborhoods immediately adjacent to the location or the community in general. Each alternative was evaluated based upon the location and the actual physical or perceived impact.

- Cost was rated on a relative basis by comparing order-of-magnitude estimates made from unit costs multiplied by roadway mileage.

The level of impact for each criteria was tallied to determine the overall impact rating. (see Figure VII-4)

D. PHASE 2 LONG-TERM ALTERNATIVES EVALUATION

Two levels of long-term alternatives were evaluated. The first was the primary evaluation of the eight original improvement alternatives. A supplementary analysis was conducted to evaluate the variations of Alternative 5 (Route 4 Extension).

1. Primary Evaluation

A matrix was used to evaluate the effectiveness of each of the ten improvement alternatives listed below.

Alternative 1a - Widen Possum Park Road to Four Lanes
Alternative 1b - Widen New London Road to Four Lanes
Alternative 2 - Cleveland Avenue Northern Bypass
Alternative 3 - Wedgewood Road Extension to Station Road
Alternative 4 - North College Avenue Upgrade (Cleveland Avenue to Wedgewood Road)
Alternative 5 - Route 4 Extension to Nottingham Road
Alternative 6a - Route 301 Widening; Route 72 Widening
Alternative 6b - Wyoming Avenue Extension
Alternative 7 - Newtowne Road Extension
Alternative 8 - Wedgewood Road Extension; Route 4 Extension (Alternatives 3 and 5 combined)

The measures of effectiveness described in the previous section were used in the evaluation. The purpose of the matrix is to provide an individual assessment of the alternatives. A final assessment of a composite of improvements was made to determine their combined effect. The evaluation matrix is presented in Figure VII-4. Ratings for measures of effectiveness ranged from "No" "benefit or impact to "Significant" for each particular improvement alternative. These ratings were then tallied to obtain an overall benefit and impact rating using the same descriptors. Finally, an overall project rating was established based upon the composite benefit and impact rating. The overall rating was the primary component leading to the recommendation of a particular alternative. All of the rankings are unweighted, i.e., no attempt was made to give more importance to one measure vs. another. All were considered equally important. A summary of the matrix results is presented in Table VII-2.

ALTERNATIVES

MEASURES OF EFFECTIVENESS	1a	1b	2	3	4	5	6a	6b	7	8
BENEFITS										
LEVEL OF SERVICE IMPROVEMENT										
· OVERALL										
· AFFECTED AREA										
REDUCTION CBD/ AFFECTED AREA TRAFFIC DEMAND										
GEOMETRIC/SAFETY IMPROVEMENT										
BENEFIT SUMMARY										
IMPACTS										
RIGHT-OF-WAY REQUIRED										
ENVIRONMENTAL CONSTRAINTS										
GEOMETRIC CONSTRAINTS										
NEIGHBORHOOD/ COMMUNITY DISRUPTION										
COST										
IMPACT SUMMARY										
OVERALL RATING	Good	Good	Poor	Fair	Fair	Good	Good	Good	Good	Poor

LEGEND:

- "No" Benefit/Impact
- "Minimal" Benefit/Impact
- "Moderate" Benefit/Impact
- "Significant" Benefit/Impact

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Evaluation Summary

Fig. VII-4

TABLE VII-2
SUMMARY OF MATRIX RESULTS

	Number of Alternatives	Percentage
Overall Benefits		
None	0	0
Minimal	3	30
Moderate	7	70
Significant	0	0
Overall Impacts		
None	0	0
Minimal	2	20
Moderate	5	50
Significant	3	30

As shown in the table, 70 percent of the improvement alternatives have "Moderate" benefits, 30 percent have "Minimal" benefits and none have either "No" or "Significant" benefits. There are no alternatives which have "No" impacts but 80 percent have either "Moderate" or "Significant" impacts. Twenty percent of the alternatives have "Minimal" impacts. In summary, most of the alternatives have "Moderate" benefits along with "Moderate" impacts.

The level of service component in the evaluation matrix underwent a separate analysis. Table VII-3 presents the comparison of levels of service by mileage for the alternatives vs. the base condition for 2010. This comparison provided the data used in the evaluation matrix presented previously.

TABLE VII-3
LEVEL OF SERVICE COMPARISON
BY PERCENTAGE OF STUDY AREA MILEAGE

Level Of Service	Alternatives								
	Base	1	2	3	4	5	6	7	8
A-C	61	66	62	61	64	67	69	62	63
D-F	39	34	38	39	36	33	31	38	37
	100	100	100	100	100	100	100	100	100

Level of Service	% Change from Base Alternatives							
	1	2	3	4	5	6	7	8
A-C	8	2	0	5	10	13	2	3
D-F	(13)	(3)	0	(8)	(15)	(21)	(3)	(5)

Note: Level of improvement based on percent decrease in LOS D-F category as shown below:

No Benefit: 0% or negative
Minimal Benefit: 1-7%
Moderate Benefit: 8-14%
Significant Benefit: 15% or more

The paragraphs below describe the details of the evaluation matrix. The individual benefits and impacts for each alternative are discussed as well as other issues pertinent to the evaluation of the individual alternative.

- **Alternative 1a - Widen Possum Park Road to Four Lanes**

Widening Possum Park Road to four lanes provides local benefits such as increasing capacity on Possum Park Road and diverting traffic from other areas. Minimal right-of-way is required since most of the corridor is wide enough to accommodate four lanes and the utility poles are set back. Geometric constraints are also likely to be minimal. The most prominent environmental constraint is the Middle Run bridge crossing near Kirkwood Highway.

The overall desirability rating of the project is "Good", primarily due to the availability of right-of-way and improvement in overall capacity.

- **Alternative 1b - Widen New London Road to Four Lanes**

Widening New London Road to four lanes has local benefits similar to the Possum Park Road widening. However, its proximity to the CBD serves to attract traffic to the downtown area rather than provide relief. In addition, more right-of-way would be required to construct this project. Finally, there are other improvements which better relieve New London Road and the Newark CBD. The overall rating for this alternative is "Good".

- **Alternative 2 - Cleveland Avenue Northern Bypass**

A full bypass of Cleveland Avenue from Route 273 (at Marrows Road) to Nottingham Road with at-grade intersections was tested. As presented in the matrix, this improvement has a "Minimal" benefit with "Significant" impact and, therefore, an overall "Poor" rating.

As a result of the evaluation of this alternative it was determined that an additional access is required from Possum Park Road to the subdivisions to the west. Provision of this access would reduce the number of trips on Cleveland Avenue.

- **Alternative 3 - Wedgewood Road Extension to Station Road**

This alternative has "Minimal" benefit and "Moderate" impacts. Construction of this alternative would require a new crossing of the White Clay Creek. It would not, however, provide much relief to either Hopkins Road or Possum Park Road, which are the expected areas of influence for the improvement. The overall

rating for this alternative is "Fair". It is however recognized that an east/west collector road is needed in this section of the study area and, therefore, a Hopkins Road widening/upgrade alternative was also considered. The Hopkins Road widening/upgrade would have slightly lower impacts but an increased benefit relative to geometry and capacity.

- **Alternative 4 - College Avenue Upgrade (Cleveland Avenue to Wedgewood Road)**

This improvement alternative entails upgrading the existing North College Avenue alignment to a standard width to accommodate through traffic. The benefits realized from this improvement would be "Moderate". Relative to roadway capacity and circulation it would provide an additional north/south route in the northern section of the study area. However, since it intersects with Cleveland Avenue, additional traffic would be attracted to the CBD area. Finally, the impacts expected from implementation of this improvement are significant. Widening the roadway along the edge of the White Clay Creek would require cutting into the slope adjacent to the roadway. The overall rating for this alternative is "Fair".

- **Alternative 5 - Route 4 Extension to Nottingham Road**

This alternative was proposed to provide a circumferential bypass of the City of Newark and relief to the CBD area. It was identified as accomplishing both tasks. It rated "Significant" in the overall level-of-service improvement category. This alternative had two sub-alternatives which will be discussed later as part of the supplementary analysis. The Route 4 alternative evaluated here is a four-lane roadway with at-grade intersections. Both the benefits and impacts measured "Moderate" resulting in an overall rating of "Good".

- **Alternative 6a - Route 301 Widening; Route 72 Widening**

The combination of these widening projects (Route 301 to six lanes and Route 72 to four lanes) successfully draws traffic from Route 896 and also improves the projected level of service on Route 301. Evaluation of this alternative indicates that "Moderate" benefits and impacts would result. The overall level of service rates "Significant" while the remainder of the benefits rate "Moderate". The impacts also were all "Moderate" except the environmental issues which are "Minimal". Finally, sufficient right-of-way is available to widen Route 72. The overall rating for this alternative is "Good".

- **Alternative 6b - Wyoming Avenue Extension**

The Wyoming Avenue alternative also represents a Delaware Avenue Extension. This alternative is identified as having "Moderate" benefits and impacts and diverts sufficient volume from Route 72 in the vicinity of Main Street to alleviate congestion in that local area. In addition, the extension would eliminate the circuitous routing of traffic travelling west to east (from Delaware Avenue or Wyoming Avenue to Route 273). The benefit to CBD volume reduction is "Significant". The overall rating of the alternative is "Good".

- **Alternative 7 - Newtowne Road Extension**

This alternative is identified as having "Moderate" benefits and "Minimal" impacts. The overall improvement to level of service is "Minimal". However, it does serve to reduce traffic on Old Baltimore Pike as well as significantly improve the level of service in the same area. The overall rating for this alternative is "Good".

- Alternative 8 - Wedgewood Road Extension; Route 4 Extension

This combination of Alternatives 3 and 5 which provides a "ring-road" around the CBD on the western side has only "Minimal" benefits but "Significant" impacts. It was demonstrated that this alternative does not have the positive characteristics relative to the "ring-road" concept which were originally anticipated. The overall rating for this alternative is "Poor".

A summary of this evaluation including the overall benefit impact and desirability rating is presented in Table VII-4. Six of the ten alternatives were rated "Good", two were rated "Fair" and two were rated "Poor". These ratings are discussed again in the next section relative to the recommendations.

TABLE VII-4
EVALUATION SUMMARY

Alternative		Rating		
		Benefit	Impact	Overall
1a.	Widen Possum Park Road to 4 lanes	Moderate	Minimal	Good
1b.	Widen New London Road to 4 lanes	Moderate	Moderate	Good
2.	Cleveland Avenue Northern Bypass	Minimal	Significant	Poor
3.	Wedgewood Road Extension	Minimal	Moderate	Fair
4.	N. College Avenue Upgrade	Moderate	Significant	Fair
5.	Route 4 Extension	Moderate	Moderate	Good
6a.	Widen Route 72 to 4 lanes&Route 301 to 6 lanes.	Moderate	Moderate	Good
6b.	Wyoming Road Extension	Moderate	Moderate	Good
7.	Newtowne Road Extension	Moderate	Minimal	Good
8.	Wedgewood Road Extension; Route 4 Extension	Minimal	Significant	Poor

2. Alternative 5 Sub-Alternatives Evaluation

A number of variations to Alternative 5 - Route 4 Extension (discussed under primary evaluation) were identified by the Citizens Advisory Committee. Three representative alternatives were tested on the DelDOT model to identify the alternative to be used in the primary evaluation. A comparison was made of the following three sub-alternatives:

- Route Four Extension to Nottingham Road (two lanes with at-grade intersections);
- Ott's Chapel Road Extension to Nottingham Road (two lanes with at-grade intersections); and
- Maryland Bypass from Route 273 to Route 40 (two lanes with at-grade intersections).

The level of service for the study area roadways was tabulated by percentage of roadway mileage in the study area and is presented in Table VII-5. A comparison of the deficient number of miles (LOS D-F) indicated that the Route 4 Extension had the lowest overall percentage of deficient miles in the study area.

As stated in the Alternatives section of this report, the primary goal of this alternative is to provide a bypass route of the Newark CBD in order to remove the burden of through traffic on the local downtown street system especially the intersection of Main Street/Nottingham Road/New London Road/Elkton Road.

TABLE VII-5
LEVEL OF SERVICE COMPARISON
PERCENTAGE OF STUDY AREA MILEAGE
ALTERNATIVE 5 VARIATIONS

Level of Service	Maryland Bypass	Route 4 Extension	Ott's Chapel Extension
A	19	18	17
B	15	17	16
C	28	29	30
D	12	12	12
E	10	10	10
F	16	14	15
A-C	62	64	63
D-F	38	36	37

The Maryland Bypass alternative served to shift traffic from Nottingham Road to Elkton Road, which could be beneficial. However, the primary goal of this alternative is to relieve traffic from the Newark CBD area, including both Nottingham Road and Elkton Road. This analysis reveals the following:

- It was originally thought that the alternatives could replace one another however, upon evaluation it was determined that they are mutually exclusive and each has its own set of impacts and benefits,

- Neither the Ott's Chapel Road Bypass nor the Maryland bypass provides the level of service or circulation pattern desired to relieve the burden on the downtown roadway network.

- The general travel path which must be served by the existing or the new routes is oriented from the west/northwest (Maryland and Pennsylvania) to the east/south.

east (Route 4, Route I-95) and local Newark destinations).

- Based upon the review of traffic volume paths generated from each alternative it appears that the main benefit of this bypass option is related to traffic along Route 4 with local Newark destinations. This is also the traffic which would use roadways passing through the CBD. Thus the Route 4 extension is the most desirable alternative for evaluation with the primary evaluation.

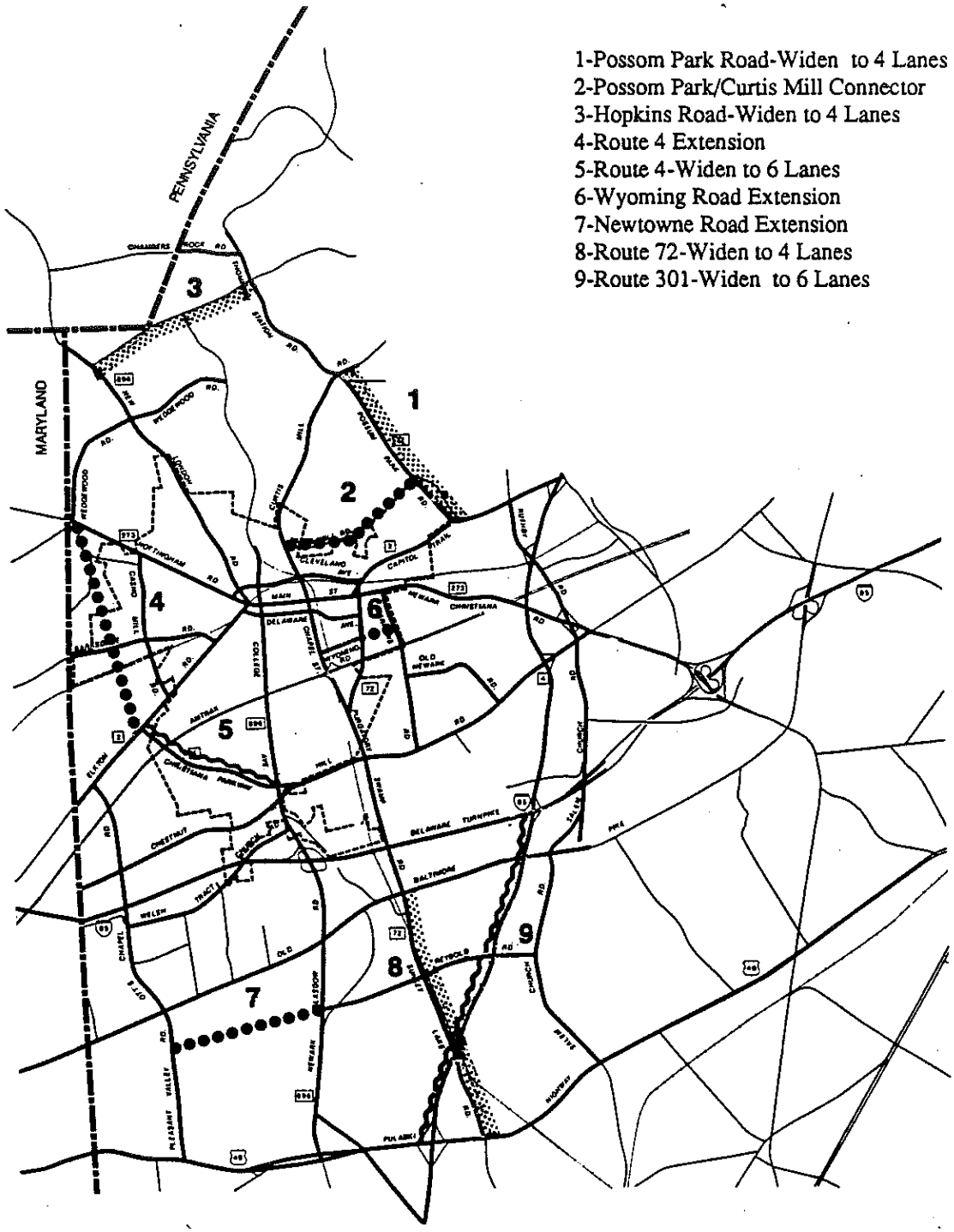
- The Maryland Bypass would likely be a joint project with the State of Maryland if not solely implemented by Maryland.

Based upon this analysis, it was decided that the Route 4 Extension was the most desirable alternative for evaluation with the primary alternatives.

3. Long-Term Composite Alternatives Evaluation

As previously discussed, each of the long-term alternatives was tested individually to determine specific benefits and impacts. Since the intended product of this study is a package of improvements to accommodate traffic growth in 2010, it was necessary to identify the most favorable alternatives which resulted from the individual evaluation as well as other improvement alternatives likely to accommodate future traffic volumes in areas where the initial set of alternatives could not. Figure VII-5 presents the long-term alternatives composite.

The composite evaluation was the second round of analysis conducted to identify the long-term improvement recommendations. Six of the initial eight improvement alternatives were carried



NOTE: Paths DO NOT Represent Actual Roadway Alignment or Location

Year 2010 Composite Alternatives Tested

LEGEND:

- New Route
- Widen to 4 Lanes
- Widen to 6 Lanes

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Fig. VII-5

into the composite evaluation. It should be noted, however, that some of the other initial alternatives were merely altered or adapted to better suit the needs of the area. Table VII-6 lists the composite alternatives.

TABLE VII-6
COMPOSITE ALTERNATIVES

From Initial Eight:

Route 4 Extension
Route 72 Widening
Route 301 - Six lanes
Wyoming Road Extension
Possum Park Road Widening
Newtowne Road Extension

Additional:

Hopkins Road Widening
Christina Parkway Widening
Possum Park Road/Curtis Mill Road Connector

Results of the initial individual evaluation indicated that these nine roadway improvements were the most likely to satisfy the capacity needs of the Newark area and were chosen for the following reasons:

- Route 4 Extension - Overall rating of "Good". Negates the need to widen New London Road as well as make major modifications to the Nottingham Road/Main Street/ New London Road intersection. Further, traffic volumes in the CBD area decreased by about 25 percent to 30 percent.

- Widen Possum Park Road - Overall rating of "Good"; also identified as a need from the Metroform Study.

- Route 72 Widening - Overall rating of "Good".

- Route 301 Widening - Overall rating of "Good".

- Wyoming Road Widening - Overall rating of "Good"

- Newtowne Road Extension - As indicated in the evaluation section, there are local benefits to this improvement with "Minimal" impacts and an overall rating of "Good".

- Hopkins Road Widening - This alternative was included to recognize the potential need for additional east/west capacity in the northern section of the study area, assuming the likely development of the DuPont Parcels.

- Christina Parkway Widening - Evaluation of the Route 4 Extension indicated that traffic volumes on Christina Parkway between Elkton Road and Route 896 would increase substantially. Therefore, this widened alternative was evaluated.

- Possum Park Road/Curtis Mill Road Connector - The Cleveland Avenue northern bypass had an overall rating of "Poor" and did not yield the benefits anticipated. However, it was identified that additional east/west capacity was needed in that section of the study area to facilitate east/west travel which is currently limited to Cleveland Avenue.

The levels of service resulting from this evaluation are presented in Figure VII-6. The review of these levels of service and remaining capacity needs of the area resulted in the identification of the recommended roadway improvements. Two modifications were made to the physical description of the composite alternatives, including:

Yr. 2010 Composite Alternatives Capacity Deficiencies

LEGEND:

- Level of Service D
- Level of Service E
- Level of Service F

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Fig. VII-6

- Newtowne Road should extend to a point beyond Ott's Chapel Road to obtain the maximum benefit, and

- The Possum Park Road/Curtis Mill Road Connector could be truncated to provide access to the residential area from Possum Park Road (currently the only access to this area is Paper Mill Road).

The actual roadway improvements recommended are presented in the next chapter.

E. PHASE 2 SHORT-TERM ALTERNATIVES EVALUATION

In addition to the long-term alternatives listed above, several short-term alternatives were also evaluated. These include alternatives resulting from the Phase 2 long-term analysis or those which were deferred from Phase 1. It should be noted that some of the alternatives which result from the long-term analysis were also mentioned in Phase 1. Their level-of-need may have increased, however, due to the projected additional traffic and/or other improvement alternatives. The short-term improvements are described below.

1. Isolated Locations

Isolated location deficiencies were identified in Chapter VI. In addition, there are some other intersections which may require upgrading as a result of the Phase 2 long-term alternatives discussed in the previous section. Alternative solutions to these deficiencies are as follows:

- **Widen Casho Mill Road Bridge**

This alternative was identified as a possible solution to providing additional capacity between Nottingham Road and Elkton Road. It would relieve an existing bottleneck and also provide access to the mostly residential area. This project would actually increase through-trips in the residential area. At some point in the future it may be desirable to widen this bridge but not as a substitute for a project such as the Route 4 extension.

- **Route 273/Marrows Road**

Improvements at this intersection such as modified channelization and/or signal timing may likely be necessary as traffic volumes on Route 273 increase. In addition, an extension of Wyoming Road to Marrows Road or beyond to Route 273 would create the need for modifications in the immediate area.

- **Possum Park Road/Kirkwood Highway**

The necessity of improvements to this intersection were alluded to in Chapter VI as well as in the Metroform Study conducted previously by VHB for the Department. Improvements are likely to include widening the Middle Run Bridge and the addition of turning lanes at the Possum Park Road approach to the intersection. One of the long-term alternatives is the widening of Possum Park Road, which would include the widening of the bridge.

- **New London Road/Wedgewood Road**

This intersection is currently unsignalized. It is likely, however, that as traffic volumes on New London Road continue to increase, traffic signal warrants will be satisfied and it will become necessary to install a traffic signal.

- New London Road/Hopkins Road

This intersection is also currently unsignalized and would likely satisfy traffic signal warrants in the future, particularly if the DuPont tract in the northern section of the study area is developed.

- Ott's Chapel Road/Chestnut Hill Road

Traffic volumes on Ott's Chapel Road are likely to increase due to growth in the area. This would likely necessitate signalization of this currently unsignalized intersection. In addition, should a sub-alternative of the Route 4 extension be chosen (with a connection to Ott's Chapel Road), improvements to the intersection will be necessary.

- Casho Mill Road/Nottingham Road

As volumes on Nottingham Road continue to increase, it may be desirable to provide additional turning lanes and upgrade the traffic signal system.

Future conditions should be monitored to determine the need and/or the appropriate timing for all of the alternatives listed above. It is also necessary to coordinate these projects with any long-term improvements recommended.

2. Deferred Alternatives

Two alternatives for improvement were mentioned during the early stages of the study, by members of the Advisory Committee including directional changes to Main Street (currently westbound) and Delaware Avenue (currently eastbound) and a new intersection configuration for the Main Street/ Nottingham Road/New London Road intersection.

- **Directional Changes to Main Street and Delaware Avenue**

The traffic volumes on Main Street and Delaware Avenue are in the same range. Therefore, circulation in the CBD area is the major concern. Considering first the intersection of Main Street and Route 72, should a directional change be made, westbound through-traffic on Main Street would be converted generally to left turns to travel west on Delaware Avenue or right turns to travel west on Cleveland Avenue. Considering the volume of traffic which would be entering the intersection from eastbound Main Street, operations at this intersection are likely to be poor. The intersection of Delaware Avenue/Route 72 would also be susceptible to poor operations since it is a four-way intersection. This type of directional change would also necessitate changes at the western end of Main Street at the intersection of Main Street/Nottingham Road/New London Road. Major reconstruction would be required on both ends of the CBD without providing much benefit to travel in and around the CBD.

- **Reconfiguration of Main Street/Nottingham Road/ New London Road**

This intersection currently functions quite well unless a train is passing through the area. As time passes and volumes in the area increase, this intersection may become more congested. However, there are long-term improvements which would reduce the traffic flow through the CBD and maintain volumes at levels which are only slightly higher than existing volumes.

In summary, any of the short-term alternatives listed above are likely to be constructed in conjunction with another project rather than individually. In addition, transportation needs may arise more quickly in some areas than in others as a result of unanticipated growth of development. These situations must be handled on a case-by-case basis.

- **Route 896 Traffic Signal Progression**

This alternative was identified by the CAC. Field data collected did indicate sporadic delays, but not on a consistent basis. Observations made by CAC members indicated that significant queuing does occur along the section of Route 896 between Christina Parkway and I-95. It was further noted that the signals are not in progression for north/south travel. Therefore, investigations should be made to determine if north/south progression is feasible and, if so, the improvement should be implemented in conjunction with the widening that has been funded.

Other long-term alternatives for improvement had been suggested during the course of the study but not analyzed in detail. These are presented in Appendix C.

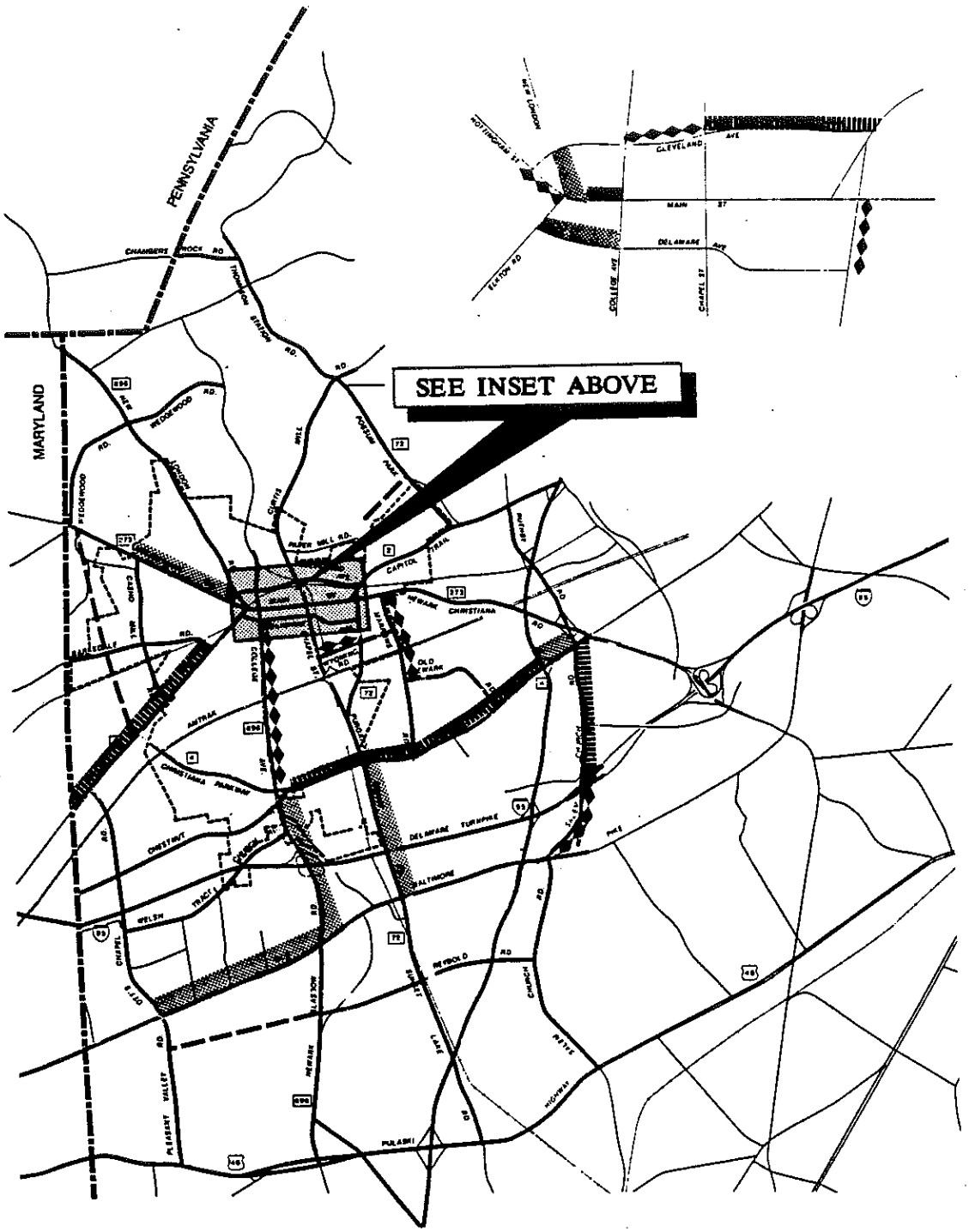
VIII. RECOMMENDED IMPROVEMENT PROGRAM

A. ROADWAY IMPROVEMENTS

This section presents the roadway improvements recommended for implementation prior to the application of priorities. These projects are listed below. Typical sections are presented in Appendix E.

- Route 4 Extension
- Possum Park Road Widening
- Hopkins Road Upgrade/Widening
- Thompson Station Road Upgrade
- Secondary Access from Possum Park Road
- Wyoming Road Extension
- Route 72 Widening
- Newtowne Road Extension
- Route 301 (six lanes)
- Route 4 Widen to Six Lanes
- Curtis Mill Road Widening

Implementation of these improvements would provide an overall improved capacity situation as presented in Table VIII-1. Data presented in the table indicates that after improvements, about 80 percent of the roadway miles studied will function at Level of Service "C" or better compared with about 61 percent in the 2010 base condition. It should be noted that these levels of service do not reflect implementation of TSM improvements or short-term intersection improvements and, therefore, are somewhat understated. Also, no feasible program of recommendations is likely to remove every system deficiency without an inordinately large expenditure for much-increased capacity and resulting property impacts. It seems logical to monitor areawide travel trends and respond to continuing problems as warranted. The segment service levels are presented in Figure VIII-1.



Yr. 2010 Recommended Improvements Capacity Deficiencies

LEGEND:

- Level of Service D
- Level of Service E
- Level of Service F

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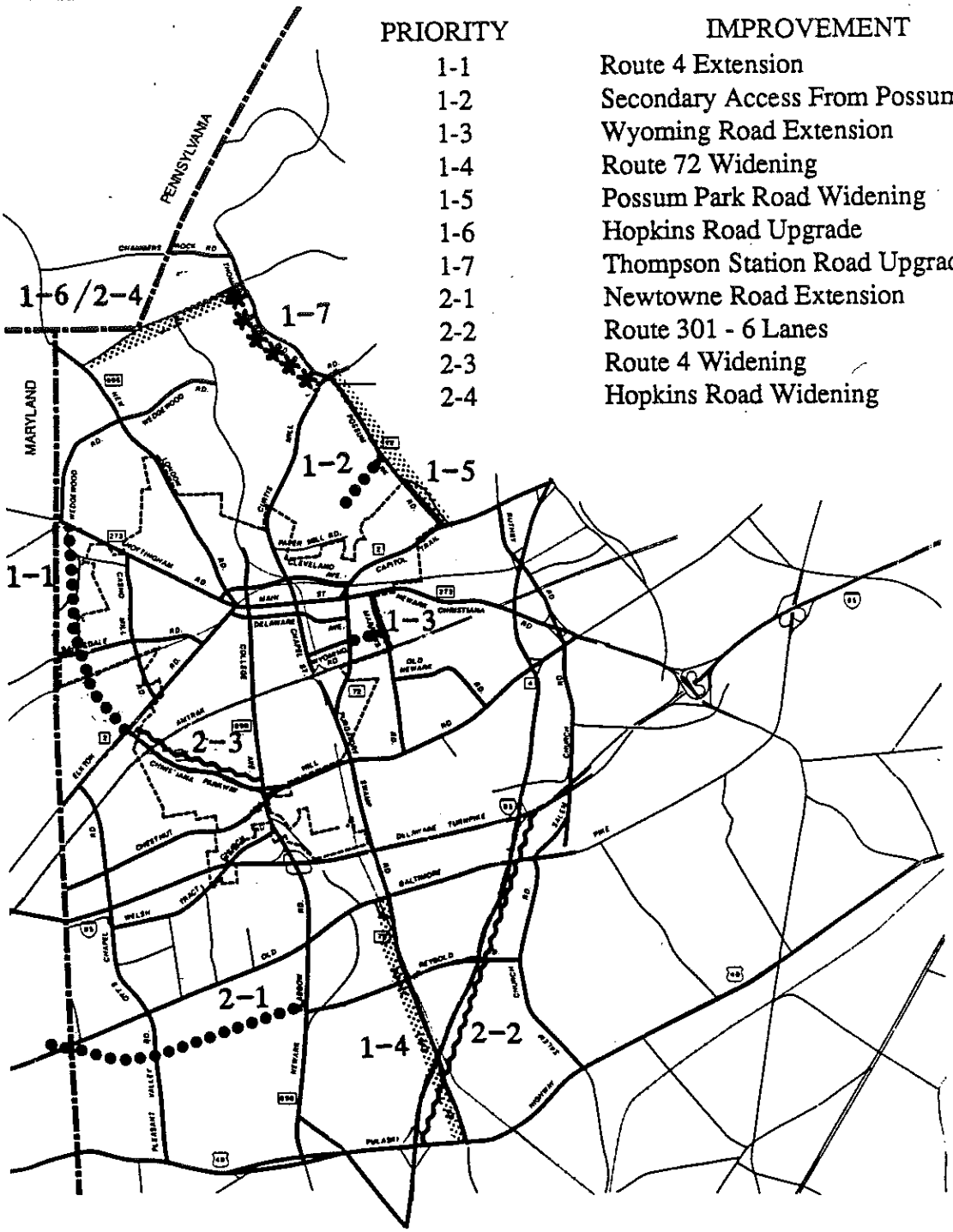
Fig. VIII-1



PRIORITY	IMPROVEMENT
1-1	Route 4 Extension
1-2	Secondary Access From Possum Park Road
1-3	Wyoming Road Extension
1-4	Route 72 Widening
1-5	Possum Park Road Widening
1-6	Hopkins Road Upgrade
1-7	Thompson Station Road Upgrade
2-1	Newtowne Road Extension
2-2	Route 301 - 6 Lanes
2-3	Route 4 Widening
2-4	Hopkins Road Widening

NOTE: Paths DO NOT Represent Actual Roadway Alignment OR Location.

Proposed Improvement Program

LEGEND:
- ●●●● New Route
- ▒▒▒▒ 4-Lane Widen
- ~~~~ 6-Lane Widen
- ✱✱✱ Upgrade

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Fig. VIII-2

TABLE VIII-1
LEVEL OF SERVICE COMPARISON BY MILEAGE
BASE YEAR 2010 VS IMPROVED YEAR 2010

Level of Service	Base Year 2010 Mileage	Base Year 2010 Percent	Improved Year 2010 Mileage	Improved Year 2010 Percent
A	12.3	14.3	22.7	24.5
B	17.3	20.0	15.4	16.6
C	23.4	27.0	36.4	39.3
D	9.3	10.8	5.2	5.6
E	11.2	12.9	5.8	6.3
F	12.8	15.0	7.2	7.7
Total	86.3	100.0	92.7	100.0

B. IMPROVEMENT PRIORITIES

Eleven roadway improvement projects, totaling in excess of $40 million, have been recommended to relieve traffic problems anticipated by 2010. Some of these improvements may be necessary sooner than others, depending upon the rate of growth and the timing of proposed developments in the area. These factors must be taken into consideration when determining the priority of individual projects. In addition, there are a number of other factors which must also be considered. These are listed in Table VIII-2.

TABLE VIII-2
PRIORITIZATION CRITERIA

- Magnitude of the deficiency to be alleviated
- Existing problem or projected problem
- Magnitude of the benefit
- Location of improvement (proximity to impending development)
- Availability of right-of-way
- Engineering feasibility/lead-time required
- Cost
- Coordination with other projects planned by the Department or the City

These criteria were used to develop two priority groups and also to prioritize the improvements within each group. The listing of projects in order of priority is presented in Table VIII-3 and described below. It should be noted that even though projects have been prioritized within the two groups the emphasis should not be placed upon these individual priorities. Rather, the two groups should be considered priority sets. The projects are also shown in Figure VIII-2.

TABLE VIII-3
PHASE 2 LONG-TERM IMPROVEMENTS
PRIORITY LISTING

Priority Group 1

1. Route 4 Extension
2. Secondary Access from Possum Park Road
3. Wyoming Road Extension
4. Route 72 Widening
5. Possum Park Road Widening
6. Hopkins Road Upgrade
7. Thompson Station Road Upgrade

Priority Group 2

1. Newtowne Road Extension
2. Route 301 - Six Lanes
3. Route 4 - Widen to Six Lanes
4. Hopkins Road Widening
5. Curtis Mill Road Widening

1. Priority Group 1

• Route 4 Extension

The Route 4 Extension is proposed as a four-lane connector between Elkton Road and Nottingham Road. This improvement alone would reduce volumes in the CBD by 25 to 30 percent. Implementation of this project would also eliminate the need to widen New London Road. This project has top priority as it will relieve an existing problem and provides great benefit to the CBD.

• Secondary Access From Possum Park Road

This project is a specific example of a more general recommendation to provide alternate access to and interconnection between residential subdivisions. Successful implementation would facilitate the dispersion of traffic to roadways according to desired travel paths and eliminate the unnecessary traffic on

already congested main roads. This project would not necessarily be constructed by the Department. Recommendations will be made to the City, County, and developers by the Department during the subdivision approval process to implement such a roadway network.

- **Wyoming Road Extension**

The Wyoming Road Extension is proposed as a two-lane connection between Route 72 (at Wyoming Road) and Marrows Road. It would provide substantial traffic volume relief at the intersection of Route 273/Route 72. At a minimum, right-of-way should be reserved for this project.

- **Route 72 Widening**

The existing two-lane portion of Route 72 between Route 40 and Old Baltimore Pike is proposed to be widened to four lanes to meet the four-lane section which will soon be under construction. Route 72 from Route 40 to Route 4 would then have comparable capacity.

This project would complement the Route 896 project currently funded but would not eliminate the need for it or the Route 301 project also under consideration. Since the Route 72 widening project will require some right-of-way, acquisition should begin so that development in the area does not preclude the project.

- **Possum Park Road Widening**

The existing two-lane Possum Park Road is proposed to be widened to four lanes. The timing of this improvement is related to the timing and magnitude of the likely development of the DuPont property on the northeast border of the study area. While this improvement is necessary based upon 2010 traffic volumes, it may be required sooner if the development is constructed to its

full potential. Because of this uncertainty, it has been given a lower priority. However, the situation regarding development should be monitored since right-of-way is required for this improvement.

- **Hopkins Road Upgrade**

Hopkins Road traverses the Walter S. Carpenter State Park and is currently a substandard (15 to 18-foot wide) roadway which carries low volumes. However, with development and traffic growth these volumes could increase and thus increase the number of accidents along the corridor. Regardless, the roadway should be upgraded to meet current standards.

- **Thompson Station Road Upgrade**

Thompson Station Road is on the northeast border of the study area and intersects Hopkins Road near the Pennsylvania State Line. Similar to Hopkins Road, this roadway should be upgraded to meet current standards. Development of the Dupont tract will place traffic burdens on this roadway which will ultimately increase the number of accidents on this roadway and reduce the level of safety.

2. Priority Group 2

- **Newtowne Road Extension**

The Newtowne Road Extension would provide a two-lane connection between Route 896 and Pleasant Valley Road. It would also likely cross Pleasant Valley Road and connect with Old Baltimore Pike. This improvement would provide a valuable bypass alternative and relief to Old Baltimore Pike. Its location in Priority

Group 2 results from the fact that the portion of Newtowne Road east of Route 896 is not complete. The priority level could move up if this situation changes.

- **Route 301**

This proposed six-lane freeway would traverse the study area from Route 40 in the south to Kirkwood Highway in the north. Interchanges are proposed at Route 40, I-95, Route 4, Ruthby Road, and Kirkwood Highway. It has been programmed by the Department as part of their long-term plan and, therefore, it has been placed in Priority Group 2. This is not a reflection of the level of priority as much as timing of the project. It should be noted that Route 301 will not replace the need for the widening of Route 896 and Route 72.

- **Route 4 - Widen to Six Lanes**

This proposal would widen the existing section of Route 4 between Route 896 and Elkton Road to six lanes. The long-term need for this improvement is based upon the projections of use for the Route 4 Extension and traffic growth in the immediate area. It is suggested that a decision to provide six lanes on this section be deferred until after construction of the Route 4 Extension to confirm the usage of this corridor and the need for additional capacity.

- **Hopkins Road Widening**

In Priority Group 1 this roadway was proposed for upgrade to meet current standards. The need for additional lanes on Hopkins Road is subject to the development of the DuPont tract and other under-developed parcels in the area. Monitoring will be required to determine the need.

- Curtis Mill Road Widening

During the course of the evaluation process it became unclear as to the actual need for widening both Possum Park Road and Curtis Mill Road (from two lanes to four lanes). Based upon currently approved development proposals and the Group 1 priority improvement to provide access to the triangle area via Possum Park Road, the widening of Curtis Mill Road would likely become a low priority improvement. If, however, the DuPont property is developed and/or the secondary access to Possum Park Road is not completed, this improvement will likely move up to the first priority group. This situation must be monitored in order to react in a timely fashion.

C. ORDER-OF-MAGNITUDE COST ESTIMATES

Costs were estimated for each of the recommendations based upon calculations made for the Department as part of the Sussex County 2005 study. These data were updated to account for inflation (six percent per year) and represent 1988 dollars.

The roadway construction costs assume full depth pavement and two intersections per mile for all roadway types except the Route 301 freeway and Route 4 expressway. The final costs presented in Table VIII-4 include basic engineering design and construction. They do not include bridge construction costs, interchanges, survey, construction engineering, or right-of-way.

The total cost for the 18 miles of roadway improvements is $40,117,000. Close to 40 percent of the total cost is accounted for by the Route 301 improvement.

TABLE VIII
COST ESTIMATES

	Improvement	No. of Lanes	Req'd. R.O.W. Width	Divided/ Undivided (Shoulder/Curb)	Roadway Type	Length (Miles)	Cost per Linear Mile (Thousands)	Total Cost (Thousands)
Priority Group 1								
1-1	Route 4 Extension (Elkton Rd. to Nottingham Rd.)	4	90'	Divided (S)	Expressway*	2.75	$3,300	$9,075
1-2	Secondary Access from Possum Park Road	2	74'	Undivided (S)	Local	0.50	$1,900	$950
1-3	Route 72 - Widen to Four Lanes (Route 40 to Old Baltimore Pike)	4	80'	Undivided (S)	Arterial	1.51	$1,200	$1,812
1-4	Possum Park Road - Widen to Four Lanes	4	86'	Undivided (C)	Arterial	1.86	$1,300	$2,418
1-5	Wyoming Road Extension	2	70'	Undivided (C)	Connector	0.30	$2,000	$600
1-9	Hopkins Road Upgrade (provide standard 14' lanes 8' shoulders)	2	70'	Undivided (S)	Collector	1.76	$700	$1,232
1-10	Thompson Station Road Upgrade (provide standard 14' lanes; 8' shoulders) (Curtis Mill Road to Hopkins Road)	2	70'	Undivided (S)	Collector	1.28	$700	$896
SUB-TOTAL						9.96		$16,983
Priority Group 2								
2-6	Route 4 - Widen to Six Lanes (Route 896 to Elkton Road)	6	200'	Divided (S)	Expressway*	1.43	$1,600	$2,288
2-7	Newtowne Road Extension	2	60'	Undivided (S)	Connector	1.50	$1,900	$2,850
2-8	Route 301 (Six Lanes)	6	200'	Divided (S)	Freeway**	3.45	$4,400	$15,180
2-9	Hopkins Road - Widen to Four Lanes	4	70'	Undivided (C)	Arterial	1.76	$1,600	$2,816
	Subtotal					8.14		$23,134
	Total					18.10		$40,117

* Expressway - Controlled access via interchanges or intersections.
** Freeway - Controlled access via intechanges only.

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D. NON-ROADWAY IMPROVEMENT RECOMMENDATIONS

The main emphasis of this project has been to evaluate and identify roadway improvements. This approach will provide additional roadway capacity and improve the geometry and safety of the roadways; however, it will not ensure the preservation of roadway capacity. The recommendations presented below are designed to preserve capacity by improving driver awareness through clear signing, controlling growth through a unified zoning policy, and reducing peak hour traffic demand through a number of actions.

1. Transportation Management Association (TMA)

A recommendation was made in Phase 1 of this study to start procedures to initiate the TMA; the Phase 2 recommendation is to implement this program. It is the vehicle through which most of the following recommendations can be implemented.

2. Comprehensive Signing Study

A comprehensive signing study should be conducted to include. Newark CBD re-routing of through traffic, truck routing, and University of Delaware routing for parking and various facilities. Much unnecessary travel through the downtown area could be eliminated with the implementation of a good signing program.

3. Demand Reduction Requirements

Major existing employers and new developers should be responsible for reducing peak hour traffic demand for their respective projects through the implementation of demand reduction strategies. Such strategies could include:

- Carpooling or vanpooling, possibly accompanied by preferential parking treatment for them,
- Flexible work hours,
- Charging employees for parking, and,
- Subsidizing transit passes.

4. Parking Management Strategies

Major parking facilities serving all-day (commuter) parking should be located on the periphery of the City with shuttle buses provided to the final destination. This is currently being done by the University of Delaware for certain activities. Short-term parking for retail establishments within the City limits should be maintained and even expanded as required.

5. Public Transit Strategies

Coordination between the public transit operators in the area (DART, City of Newark, and University of Delaware) is encouraged so that routes and services are complementary. The public transit operators should be members of the TMA.

In addition, several recommendations were made as part of the Delaware Transportation Authority - Transit Strategic Development Plan dated March, 1988, prepared by Abrams-Cherwony and Associates in conjunction with Mundle and Associates. These recommendations are presented below.

A three-phase recommendation program was suggested including expansion of existing routes and implementation of new routes in New Castle County. There are two proposed new routes which would

directly impact the Newark study area. These routes would be part of the "Pulse Scheduled System" with a terminal at or near the Christiana Mall. According to the plan, an independent operator may be selected to operate the service. The routes would also be coordinated with existing service to the Mall. The two routes are the Goldy Beacom Pulse, which would serve the northern section of the study area and the Ogletown Pulse which would begin at the Route 896/Route 4 park-and-ride lot. The Goldy Beacom Route would operate on a 30-minute headway schedule during the morning and evening peak hours and 60 minutes during the midday, evening, and Saturday. The Ogletown route would function on 60-minute headways. Both routes are part of Phase II of the implementation program which could begin in five years. Phase III of the plan reduces the headways on Goldy Beacom to 15 minutes during the peak hours and 30 minutes during the midday and Saturday time periods. The headways on the Ogletown route would be reduced to 30 minutes. The addition of these routes would provide a link between the Newark area and the regional transit system.

Finally, the Delaware Ridesharing Administration was established to coordinate vanpooling and carpooling. The extension to Newark of the recently restored commuter rail service between Wilmington and Philadelphia may also prove feasible.

6. Zoning Modifications

Zoning modifications should be implemented which would serve to restrict or reduce development. These modifications might include 1) creation of a separate agricultural zone; 2) requirement of a maximum number of parking spaces for commercial development projects; 3) reduction in the density of development; and 4) downzoning. These recommendations, if implemented, must be carried through and adhered to in the subdivision approval process (at the City and County levels).

7. Curb Cut Limitations

In order to effectively preserve capacity on major roadways, the number of curb cuts should be limited. These include right-turn in/out only as well as full access driveways. The limitations should be related to the roadway classification and zoning of adjacent parcels so that access is not totally eliminated.

8. Monitoring Program

A monitoring program must be established early on (perhaps by the TMA). The purpose of this program would be to supplement monitoring conducted by DelDOT and WILMAPCO (in a macro-scale) with local or micro-scale monitoring. As an example, the TMA monitoring might include the tracking of goals set by specific developers relative to ridesharing or trip generation.

Implementation of these non-roadway improvements as well as some of the Phase 1 TSM-type improvements should serve to reduce peak hour demand, thereby improving the projected 2010 levels of service (after improvements) and possibly even eliminating the need for improvement in certain areas. Again, monitoring of the area's development and traffic growth will determine the extent to which improvements will be necessary toward the end of the study period.

APPENDIX A

VHB

Meeting Notes

Date: October 7, 1987

Place: First Presbyterian Church Building
Newark, Delaware

Attendees:
Attached List

Ref: 1983
Newark Area Transportation Study

Re: Advisory Committee Study
Kickoff Meeting Minutes

The Secretary of Transportation, Kermit Justice, began the public meeting with an overview of the importance for the Department of Transportation to address "access needs" in Delaware in response to the growth in jobs and population which Delaware is experiencing. He mentioned several current projects in the Newark area, including: South Chapel, Christiana Parkway, the Del-273 upgrade, improvements on Kirkwood Highway, and the Ogletown interchange. A pamphlet was distributed by the Department which outlines the overall role "where Del-Dot is" and the programs which are being pursued throughout the state. The Secretary thanked all those including Senator Neal who are contributing toward the identification of area needs as evidenced at this meeting.

A brief introduction of the study was made by Secretary Justice, explaining the combination of the Newark Area Study and the Metroform study in order to coordinate the efforts with the same consultant. Members of the Advisory Committee or their alternates were then introduced. Attendance and input at these meetings was identified as a key to the success of the study. The Secretary then introduced both Larry Klepner as Project Manager for the Department and the study Consultants from Vanasse Hangen Brustlin, Inc. (VHB).

Larry Klepner briefly identified the two-phase study and the objective to sequentially produce short and long-range improvement recommendations. He mentioned that another consultant was evaluating the DART system, and that this study would focus on roadway improvements although encouraging transit where found appropriate. Larry introduced Ray Niedowski for VHB who presented the scope and schedule for the study, followed by responding to many questions from the citizens in attendance.

MAJOR POINTS:

- Ray stressed the importance of the citizen input to the identification of area needs and the development of mitigation programs and an action plan to address transportation improvements;

- In review of the presentation boards, Ray outlined the six study products and the schedule for completion of the various tasks;

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- Truck traffic was identified by several individuals as a major problem which the study should address:

  -- DelDOT agreed to count and classify truck traffic on Route 273 (Nottingham Road) prior to the next meeting;

  -- A two-page summary of the truck issues and recommendations was received from the West Newark Civic Association, particularly addressing the issue in the vicinity of Route 273, West Main Street, and related roadways;

  -- Major issues related to trucks include: the large volumes, night traffic, noise, structural damage to large homes along roadways, toll avoidance, and through traffic from Maryland;

  -- The West Newark Civic Association and other residents voiced their cooperation towards the identification and development of a solution to this persistent and worsening problem;

- Several questions were raised on the approach and objectives of the Origin-Destination survey:

  -- Ray mentioned the type of survey would likely be a mailback since DelDOT has had some recent success with this approach;

  -- The objectives are to obtain routing and user characteristics for all roadways feeding the central Newark area, and to provide regional distribution of trips summaries for input to the State's travel demand modeling process;

  -- Larry said that a larger Newcastle County Origin-Destination study should be done later next Spring specifically addressing traffic at the state and county boundaries;

- The Advisory Committee will receive all draft Technical Memoranda and other intermediate products from the study effort, offering input, comment and direction to the study;

- Advisory Committee meetings will coincide with the schedule for completion of each major product and will be arranged by DelDOT;

- In response to comments regarding development in the area, Larry mentioned the State has no authority to hold land in reserve for new right-of-way;

- Larry also stressed that the study would attempt to work with the adjacent Maryland Counties similar to the Sussex County study last year to represent their projections and impacts on Delaware in the study;

- Regarding the types of recommendations which are likely from the study, Ray discussed VHB's experience in traffic mitigation programs, demand reduction measures, and cost allocation to developers, all as possible options in addition to roadway or signal improvements;

- The study will be in the data collection and assimilation stages for the next six to eight weeks and the next meeting will provide some new data for the Advisory Committee to review.

Date: October 7, 1987
Ref: 1983 Newark Area Transportation Study

ATTENDEES:

Name	Affiliation
Tom McKenney	Newark Business Association
John Brook	University of Delaware
James Neal	Senate
Eugene B. Snell	D.E.S.C.
Bob Rhyner	New Castle Couty Department of Planning
Dick Koch	Civic League of N.C.C.
Roland Roth	Coalition Natural Stream Valleys
Andy McCormick	New Journal
Harry Shipman	Cappa Inc.
David G. Onn	West Newark Civic Association
Peggy and James W. Brown	City of Newark
Arthur W. Fridl	City of Newark
Roy Lopata	Property Owner
Hugh F. Gallagher, Jr.	Property Owner
Alice P. Gallagher	Greater Newark Civic Council
Linda S. Forshey	West Newark Civic Council
Lisa K. Lucas	West Newark Civic Association
Phyllis Townsend	WILMAPCO
James H. Tung	West Newark Civic Association
Ray Becker	WNRK
Larry Peterson	Newark City Council
Rob Phillips	Greater Newark Civic Council
Hal Godwin	West Newark Civic Association
Peggy Tracy	DE. House of Representatives
William Lucas	Civic Association Property
Ada Leigh Soles	DE Chamber
Edwin T. and Katherine Wood	Delaware Department of Transportation
Blake Wilson	Delaware Department of Transportation
Kermit Justice	Vanasse Hangen Brustlin, Inc.
Larry Klepner	Vanasse Hangen Brustlin, Inc.
Charlie Crevo	Vanasse Hangen Brustlin, Inc.
Ray Niedowski	Vanasse Hangen Brustlin, Inc.
Karen Jehanian	
Thomas Bordeaux	

DATE: December 16, 1987

PLACE: Newark City Hall
Newark, Delaware

ATTENDEES: Attached List

REF: 1983
Newark Area
Transportation Study

RE: Advisory Committee
Meeting Two

A meeting was held on December 16, 1987 to both update the group on the status of the study and to present findings from the data collection effort. An agenda was followed within a generally informal setting which allowed for numerous discussions throughout the prepared presentation by VHB. Larry Klepner from the Department began with introductions of the VHB staff, followed by a brief look at the schedule and project status by Ray Niedowski. Several comments were then made by Tom Bordeaux in reference to the first two technical memoranda sent to the group for review. The Committee was encouraged to send comments in response to these reports which are interim documents serving to keep the Department and Committee informed in addition to soliciting input.

Data collection efforts were described by Karen Jehanian using several graphic presentation boards which illustrated summary information on traffic volumes and patterns, average travel speeds, and number of accidents by roadway segment. It was noted that the objective of the data collection work is to combine the various forms of information into an overall analysis which represents the most typical peak hour and daily traffic conditions in the Newark area.

Preliminary results from the recently conducted origin-destination survey were then presented by Tom Bordeaux, who first defined the approach taken to obtain characteristics of trip-makers at nine locations along Newark roadways. The mailback survey card was distributed to all outbound drivers stopped during the red phase of traffic signals for the period 3:00 to 6:00 PM. To

date, nearly 40 percent of the cards taken by drivers at these locations have been returned which affords the study a good sample of typical roadway users at these locations. Mr. Klepner compared this to a similar survey in Sussex County which, although still acceptable had a 20 percent return rate. Mr. Bordeaux showed the overall results for percentage of travel by trip purpose, place of residence, and number of vehicle occupants. He emphasized that additional information will be forthcoming summarizing the survey by station and providing trip distribution patterns.

The final presentation topic included the introduction of example "deficiency criteria" which will be used to identify the problems across the system of roadway segments. It was noted that some combination of both measurable factors (i.e., volume, operating speeds, vehicle delays) and judgmental factors (i.e., roadway continuity, conformance to zoning) will be considered. The next technical memorandum to be submitted to the Committee scheduled for the end of December, will propose the specific criteria to be used in the study assessment of roadway deficiencies.

Following the prepared presentation, an open discussion was held. Substantive comments made during the evening are summarized below:

- Regarding the land development data submitted previously to VHB by the City, City Planning Director Roy Lopata noted that he will be transmitting new updated information received since October.

- John Brook questioned whether the study will be allowing for debate on various alternative improvements. He suggested that any ideas received by VHB be shared with the committee members rather than wait until the next memorandum is prepared. Ray Niedowski noted that Phase 1 of the study will basically outline where the "spot" improvements are needed, and that the Committee would definitely need to interact in identifying and reacting to recommended short-term

improvements, as well as the development of long-term improvements. It was agreed that the Committee will be sent a list of any ideas received to date by source, or any received in the future.

- Level of service analysis will be included in the assessment of segment and intersection conditions based on the turning movement volume and travel delay data collected.

- It was pointed out that traffic is generally greater in the PM peak period than the AM due to more of a mixture of trips for commuting, shopping, personal business, and so forth.

- Seasonal variations of traffic were noted due to the football season, beach traffic, and other factors. Mr. Niedowski pointed out that the raw count data will be factored to average daily volumes based on seasonal factors provided by DEL-DOT.

- The range of alternative improvements to be considered will reflect the community/committee's input and values, and should address both improvements to the roadway system along with travel reduction and other policy measures.

- Traffic count locations were selected based on criteria outlined in Technical Memorandum 2. Although turning movement counts were not done for some intersections such as along Route 896, automatic recorder counts and other data are available. The objective of the data collection effort is to obtain representative data needed to analyze the flow of traffic for the entire system of roadways within a large area; therefore, priorities were assigned to collect the detailed turning movements at key intersections were improvements might be most likely.

- Accident data presented in the meeting represented a summary of accidents by roadway segment and included intersection accidents. The analysis of roadway deficiencies will consider accidents by type and intersection location.

- Discussion regarding the assumed future land use questioned the procedures and techniques which will be employed. Several points were made:

  -- DEL-DOT is responsible for the travel demand modeling which includes the jointly (WILMAPCO, DEL-DOT, Newcastle County) derived population and employment projections for year 2010. These numbers are the basis for estimates of trips by traffic analysis zone which are used in the assignment of future roadway volumes and will form the basis for future deficiency and alternatives evaluation.

  -- It was mentioned that Maryland and Pennsylvania growth will be important to the future year 2010 projections, and that DEL-DOT will need to coordinate with the appropriate state agencies to account for the level of future through trips in the forecasting methods.

- Emphasis was made on the consideration of non-roadway type improvements including the increase in transit usage or other trip reduction or peak hour spreading options.

- The study should address the number of daily rail movements through the area and the resultant conflicts. Larry Klepner said he would obtain rail activity data.

The next meeting will be around the beginning of February to discuss the short-term program recommendations to be documented in Technical Memorandum 4.

ATTENDEES - ADVISORY COMMITTEE MEETING (December 16, 1987)

Harry Shipman	Old Paper Mill Road Civic Association
Dorothy Miller (for Roland Roth)	Coalition of Nat. Stream Valleys
Katherine Wood	95 Nottingham Road
Bob Rhyner	New Castle Count Planning Department
Ron Gardner	Newark City Council
Roy Lopata	Newark City Planning Department
Tom McKenney	Newark Business Association
Eugene B. Snell	DISC
James P. Neal	State Senate
James Tung	WILMAPCO
Eric Mayer	1600 Grenner Lane
Richard R. Koch	1115 Old Baltimore Pike
Art Pridl	Newark City
John Brook	University of Delaware
David Onn	CAPPA, Inc.
Bob Parkes	DEL-DOT
Larry Klepner	DEL-DOT
Ray Niedowski	Vanasse Hangen Brustlin, Inc.
Karen Jehanian	Vanasse Hangen Brustlin, Inc.
Thomas Bordeaux	Vanasse Hangen Brustlin, Inc.

Meeting Notes

Date: April 13, 1988

Attendees:
See Attached List

Place: Newark City Hall
Newark, Delaware

Ref: 1983 - Newark Area Transportation Study

Re: Advisory Committee Meeting Number 3

Larry Klepner, Project Manager for the Department, opened the meeting by welcoming the Advisory Committee and introducing Ray Niedowski and Karen Jehanian from Vanasse Hangen Brustlin, Inc. (VHB).

Ray Niedowski then briefly reviewed the topics discussed at the last meeting and gave an overview of topics for discussion at this meeting. He also discussed the overall project schedule and status indicating that the project was perhaps two or three weeks behind but that this could possibly be made up later in the schedule.

Karen Jehanian then began a review of the handout package which included graphics from Technical Memoranda No. 4 and No. 5. The items discussed included new information on the origin-destination survey results, existing deficiencies (safety and mobility), qualification criteria for short-term improvements, and short-term improvement proposals.

Origin - Destination Survey Results

- The following information was presented by survey station:
  - Summary of survey returns
  - Vehicle occupancy
  - Trip purpose
  - Place of residence
- Regional traffic patterns (based upon DelDOT modelling data) were also presented.
- There were no major comments by the Advisory Committee on this subject.

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Existing Deficiencies

o Safety

-- A question was raised regarding the lack of a reported accident problem on South College Avenue. The road was closed for some time within the 1984-1986 analysis period.
-- A question was also raised as to why there was an accident problem on Route 72 between Route 40 and Old Baltimore Pike since there is no development in that area. Road conditions may be contributing to the accidents reported in this area.

o Mobility

-- A comment was made regarding the lack of an existing mobility problem on Nottingham Road or Casho Mill Road.

Short-Term Improvements

o It was established that while the report (Technical Memorandum No. 4) indicates that priorities have been set, they in fact have not been and will not be until comments are received from the group. A likely method of prioritization will be by grouping projects rather than setting individual project priorities.

o Regarding short-term improvement location #2 (Cleveland Avenue, at Chapel Street), it was suggested that the concept of utilizing the railroad underpass not be deferred to the long-term since the property required is currently for sale. Also, the installation of crosswalks should be examined. This will be included in the design phase of any improvements at this location.

o Regarding location #3 the comment was made that mitigating problems at this location may create problems at Kirkwood Highway/Possum Park Road and Cleveland Avenue/Chapel Street. Long-term solutions may solve any potential problems in this area.

o A comment was made that short-term improvement #6 relative to the installation of pedestrian signals (concurrent) would not be effective and is not realistic. VHB replied that pedestrian safety devices must be part of any improvement program.

o Several comments were made regarding recommendation #14 (Turnpike diversions).
— The committee members suggested that a stronger statement regarding the implementation of suggestions made in the URS Report of 1986 should be made.
— Committee members generally agreed that measures implemented to date by various agencies have not been effective in reducing the amount of traffic (truck and vehicle) diverted from the Turnpike to area roadways.
-- A comment was also made that the long-term solutions may not be fully meaningful without a solution to the Turnpike traffic diversion problem.

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- Discussion relative to the effectiveness of demand-reduction strategies and public transportation also occurred.

General Comments/Questions

- Members would like to receive copies of the Metroform Area Study recommendations. Larry will send a copy to each member.

- A question was raised as to whether environmental factors are considered in formulating solutions. Larry responded that this is a planning study to identify the need and possible solutions to problems. He also said that environmental studies are included in the route location studies which would occur as a project moves forward in the process.

- Two additional comments regarding safety deficiencies were made.

  -- Why was there no indication of a safety problem on Kirkwood Highway between Cleveland Avenue and Possum Park Road. Karen explained that this section had been studied previously by VHB with recommendations submitted to the Department. Therefore, these were not duplicated in this study.
  -- A comment was made that Route 896 at I-95 was reported by DelDOT (in the past) as having a high accident rate but was not indicated as such by VHB. Karen responded that the matter would be looked into.

- Is prioritization of projects required relative to the short-term improvements for the Bond Bill? Larry responded that it was not absolutely necessary.

- A comment was also made relative to costs, including right-of-way which is required for the Bond Bill. Larry responded that the Department would take responsibility for this.

- A question was raised regarding the timing of the next two meetings. Ray indicated that this would be difficult to estimate due to the nature of the tasks to be conducted.

- The issue of out-of-state growth was raised, especially in Cecil County, Maryland. Larry responded that we were in receipt of the Elkton Study and also that the Department through WILMAPCO was as up to date as possible on the development situation in the neighboring states.

- Following a brief discussion of the year 2010 volumes and deficiencies based upon EC-27, the meeting was adjourned.

1983/0488/trn-BI4

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Date: April 13, 1988
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NEWARK TRANSPORTATION STUDY
APRIL 13, 1988

Name	Affiliation/Address
Tom McKenney	Newark Business Association
Gene Snell	DISC
James H. Tung	WILMAPCO
Ed Miller	City of Newark
Ada Leigh Soles	Delaware House of Representatives
Dudley Willis	
Margo Perkins	Chairman, Newark Planning Committee
Marguerite Ashley	Newark Business Association
Carl Luft	City of Newark
Roy Lopata	City of Newark
Bill Widdoes	City of Newark
John Brook	University of Delaware
Steve Amick	Delaware House of Representatives
Bob Parke	DelDOT
Jim Neal	State Senate
Dolly Dall	West Main Street Civic Association
Richard R. Koch	Greater Newark Civic Council
Anita Puglisi	Resident - also Newark Parking Authority
Larry Klepner	DelDOT
Ray Niedowski	Vanasse Hangen Brustlin, Inc.
Karen Jehanian	Vanasse Hangen Brustlin, Inc.

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Meeting Notes

Date:	June 23, 1988	Place:	Newark City Hall Newark, Delaware
Attendees:	See Attached List	Ref:	1983-Newark Area Transportation Study
		Re:	Advisory Committee Meeting Number 4

Larry Klepner, Project Manager for the Department, opened the meeting by welcoming the Attendees and introducing Ray Niedowski and Karen Jehanian from Vanasse Hangen Brustlin, Inc. (VHB).

Ray Niedowski reviewed the agenda for the evening and then discussed the schedule and products to be delivered for Tasks 8, 9, and 10 to be conducted in Phase 2 of the study.

Karen Jehanian then began the technical portion of the presentation with a discussion of the contents of Technical Memorandum No. 5 and finished by presenting the improvement Alternatives to be tested by DelDOT. The attached handout was distributed to the Advisory Committee and used as a guide during the presentation.

Questions were raised regarding the year 2010 volume assumptions, Alternatives for testing and Technical Memorandum No 4. These questions and their responses are summarized below.

Year 2010 Volumes

Bob Rhyner, representing New Castle County Planning Department, indicated that the traffic generated from the DuPont Tract had been incorporated into the model and that VHB had double counted. The consensus was that the Department, VHB and the County would re-examine the issue. In general this would not affect the alternatives to be tested.

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Date: June 23, 1988
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Alternatives for Model Testing

Several comments were made regarding the Alternatives for testing including the suggestion of additional valuable alternatives. These are listed below:

Cleveland Avenue Northern Bypass
- o may want to test partial bypass (feasibility of partial bypass may be greater)
- o may want to extend the full bypass south-west to Elkton Road.

Christina Parkway Extension
- o Possible alignment in Maryland

Newtowne Road
- o extend westward to Old Baltimore Pike
- o provide an interchange at Reybold Road with Route 301.

These proposals will be addressed in the second round of testing as appropriate.

The remainder of the comments were relative to the implementation of the Short Term Recommendations in Technical Memorandum No. 4. Specifically:
- Has funding been appropriated in the upcoming bond bill?
- Are the improvements going to be implemented next year? If not why was the timetable set to coordinate with the bond bill?
- What can the committee do to move the process along?

There were no real answers for these questions, however Steve Amich (Representative of the 25th district) is going to investigate the situation.

1983/0688/trn-BL7

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Date: June 23, 1988
Ref: 1983

GREATER NEWARK MEETING #4

Name	Affiliation
Dwight Holtzen	Cooch's Bridge CA
Gene Snell	Covered Bridge Farms/Disc
James Tung	WILMAPCO
Roland Roth	Coalition Natural Stream Valley's
Arthur W. Fridl	City of Newark
William A. Hogan	City of Newark/Police Department
Bob Rhyner	New Castle County Planning
Roy Lopata	City of Newark
Ada Leigh Soles	House of Representatives 23rd District
Charles S. Townsend	Newark Police Department
Steve Amick	House of Representatives 25th District
Larry Klepner	Delaware Department of Transportation
Ray Niedowski	Vanasse Hangen Brustlin, Inc.
Karen Jehanian	Vanasse Hangen Brustlin, Inc.

1983/0688/trn-BL7

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Meeting Notes

Date: November 15, 1988

Attendees: See Attached

Place: Newark City Council Chamber

Ref: 1983 Newark Area Transportation Study

Re: Advisory Committee Meeting on Proposed Recommendations

The meeting started at 7:35 PM. Larry Klepner introduced the study team and gave and brief overview of the project. Ray Niedowski presented the agenda for the evening, reviewed the study purpose and goals, and summarized the study process for those who might not be familiar with it. Karen Jehanian then presented the details of the Phase 2 process including future deficiencies, improvement alternatives, the evaluation process, the roadway improvement program, proposed priorities, and non-roadway recommendations. The meeting was then opened to general discussion, comments, and questions. the main points discussed are as follows:

Question: Does the Route 4 extension have to be in Delaware, or can it be in Maryland?

Answer: It can be in Maryland. The alignment shown is general and can vary significantly either way.

Question: I see a problem with land takings and other factor that will be required to meet Federal design standards for the extension.

Answer: Details such as this will be discussed at the next step in the implementation process, which is the location study. This study is a systems planning effort, which is more general in nature.

Question: The state line shouldn't be considered a Chinese wall as far as location of new roads is concerned.

Answer: There has been general coordination between Delaware and Maryland but no discussion of specific proposals yet. It was important to present and discuss proposals with the Advisory Committee first.

Question: What is the origin - destination pattern of Route 4 trips? Are they mostly from Maryland?

Answer: There is a fair amount of Maryland based travel with destinations in Newark area, although there is also through traffic and purely local traffic as well.

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Question: Will the Route 4 extension produce any benefit to the local residential area through which it may pass?

Answer: Yes. It will offer a bypass route for trips now being made through the area. Such traffic will be likely to grow in the future, particularly on roads such as Casho Mill Road.

Question: How do you correlate the Route 4 extension as the No. 1 priority with evaluation summary chart showing a "moderate" benefit, "moderate" impact, and "good" overall rating?

Answer: The chart is a summary of a more detailed evaluation matrix showing four benefit levels and five impact levels. It works out when everything is considered, although there is some subjective judgement involved in the process.

Question: Was truck traffic considered in the rating scheme?

Answer: Not specifically, although the overall counts used include trucks. The model is more sensitive to total traffic volume. One of the recommendations is for a comprehensive signing study which would include truck signing.

Question: Why is there no connection proposed between Nottingham Road and New London Road?

Answer: The model indicated no significant capacity problems in this area.

Question: Have I-95 tolls been considered in the process?

Answer: There have been some attempts to solve this problem, including an I-95 study just getting underway.

Question: What is the effect of the Route 4 extension on its feeder roads?

Answer: Not significant enough to cause a deficiency.

Question: Can you clarify the level of service chart for 2010, and how can someone relate to LOS "F".

Answer: A general discussion took place on the meaning of the various service levels and how they relate to existing conditions in Newark.

Comment: The Wedgewood Road area needs further study.

Question: How can you evaluate impacts without looking at a specific route alignment?

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Answer: At this systems planning stage, the evaluation process involves order-of-magnitude estimates, some quantification where possible, qualitative assessments where not possible. Specific routes cannot be pinned down at this stage.

Question: How can your recommendation for a four lane Hopkins Road be correlated with two-lane roads at either end and the park land through which it passes?

Answer: Hopkins Road is not recommended for four lanes, but rather a safety upgrade to an acceptable two-lane standard. If it needs four lanes at some distant time in the future after continued monitoring of development patterns, it can be widened. This dual approach is shown in the priority program.

Question: Can you put an implementation time frame on each recommendation?

Answer: Not specifically, other than Group 1 is likely in the 1990s and Group 2 after 2000. It depends on funding, politics, etc.

Question: Would you consider doing only a portion of the Route 4 extension?

Answer: The preference is to do all of it at one time.

Question: Input should be obtained from Maryland and Pennsylvania on their proposed road improvements and growth scenarios?

Answer: We are doing so, although Maryland does no modelling except in the Baltimore area. WILMAPCO is responsible for the modelling in Cecil County and we are obtaining information from them.

Question: Why are there LOS differences between WILMAPCO and VHB?

Answer: VHB analyses are based on the very latest model runs (as of last week). Recent runs have been made to correct earlier problems. We have also applied calibration factors to model output and made judgments on shifting volumes within certain corridors for more realistic results. Even with these changes, we do not see any real change in the conclusions and recommendations.

Question: Have we met with WILMAPCO on this?

Answer: Not yet, but we will do so now that a long-range plan is emerging. Their input and review is important.

Question: Have we done any sensitivity analysis on the effect of data changes on conclusions?

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November 15, 1988
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Ref:

Answer: Yes, in the sense that our calibrated numbers are different from the raw model data. We have taken a look at the likely effect of changes and concluded that there would be no real change in our recommended program.

Question: I see the biggest failing as the lack of consideration of trucks. This issue has not really been addressed.

Answer: This is a long-range study. Trucks are being considered specifically in the other Interstate study.

Comment: We need an interchange at the Route 301/Newtowne Road junction.

Question: We can see the full evaluation matrix? I can't understand some of your conclusions without it.

Answer: It will be in the final report, but we can make it available in advance to those interested.

Question: I don't understand why funding availability was used as a criterion for evaluation. None of the recommendations are on the books yet.

Answer: Basically, your are right. It really was meant as a reminder that certain big ticket items may not be completely fundable when they come up for consideration and may have to be deferred.

Question: What does calibration mean?

Answer: It means that 1985 model data are compared with actual ground counts and a factor is developed for each road segment where there is a difference. That factor is there applied to future year model data to compensate.

Question: Isn't the model calibrated against existing conditions to start with?

Answer: Yes, but there can still be differences, especially when the model is based on earlier year data. The calibration factors we used are another level of refinement.

Question: Did we say that most study area traffic is through traffic from the northwest?

Answer: About 57 percent of northwest corridor traffic is through traffic.

Question: Why isn't a full circumferential being proposed? Why is Hopkins Road being upgraded rather than Wedgewood?

Answer: The model showed no real capacity problem in this area. The Hopkins Road improvement is really related to safety rather than capacity, at least in the foreseeable future.

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Question: The model results and recommendations for this Wedgewood Road area have low credibility.

Answer: We are using the best data we have in the model.

Question: Have you gone back to review the short-term improvement program? Only about one-half of it was funded in this year's bond bill.

Answer: The full short-term program needs to be implemented. More money will be included in next year's bond bill.

At this point Bob Parke of DelDOT said that he sensed some of the frustration on the part of some in the audience, and that the comments being made were very good ones. He emphasized that this study is not an end point but rather a beginning, and that the Advisory Committee has had an impact on the study. This systems planning phase is an important part of the implementation process. He said he had personally talked to his counterpart in Maryland and, although no specific details were discussed relative to new road locations near the Maryland/Delaware line, he got a positive general reaction. There will be further public meeting on all proposed improvements during the next phase of the implementation process. Even though this study has to come to an end, it will serve as a basis for the location studies to come. State law mandates an ongoing planning process, the result of which is the six-year capitol improvement plan updated every year. There already is some money in the next six-year plan to start doing some as-yet-unspecified improvements.

Senator Neal said that if we are really talking about corridors for new routes rather than specific alignments, we should use a broaden band on our graphics. We agreed to do this. He also said that he would like to see the full evaluation matrix rather than the summary chart in our handout. We will make it available. He also emphasized the importance of consistency between our data and WILMAPCO's, then asked where we go from here. DelDOT said the final step is production of the final report, then ultimately location studies for projects to be included in the six-year plan.

The concluding discussions involved the following:

- no more VHB meetings are planned with the Advisory Committee
- DelDOT will meet with the Committee before finalization of the report and follow-up with VHB as required.
- Advisory Committee members will put any further comments in writing and submit them by the end of November.

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- VHB will get the draft report to the Committee prior to its finalization for their review and comments; this will occur after redrafting the present version based on WILMAPCO input to DelDOT and the Committee's written comments due by November 30.

- Timing for production of the final report is not fixed but will likely not occur until the end of December or even into January; Bob Parke indicated that the timing is not as important as the process.

The meeting adjourned at 10:20 PM.

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NEWARK AREA TRANSPORTATION STUDY

ATTENDANCE LIST

NAME	ORGANIZATION	ADDRESS
Harlan C. Williams	Harlan C. Williams	P.O. 1800 Elkton MD 21921
Robert Baldwin	NCC Dept. of Planning	
W. W. John	Wedgewood	362 Wallace Dr. Newark, 19711
Roland Roth	Coalition for Nat. Stream Valley	807 Delgrove Ave., Newark, 19713
John Paul	North Wedge Civic Assn.	314 Wedgewood Rd. Newark, 19711
Gene Snell	Disc	26 Bridge Brook Ln. Newark, 19711
David G. Onn	CAPPA	Hi, Holly Lane, Newark, DE 19711
K. M. Jester	State Representative	1267 Bethel Church Rd. Mata, 19709
Ada Leigh Soles	State Representative	217 Vassar Dr. Newark, 19711
William Redd	City of Newark	110 Sypherd Newark, 19711
Roy Lopata	City Newark	220 Elkton Rd. Newark, 19711
Maureen Roser	City of Newark	220 Elkton Rd. Newark, 19711
Margo Perkins	Newark Planning	283 Dallom Rd. Newark, 19711
Anita Puglisi	Newark Parking Authority	700 Dallom Rd. Newark, 19711
Dorothy P. Miller	Coalition for Natural Stream Valleys	430 Orchard Rd Newark, DE 19711-5137
Larry Peterson	West Newark Civic Assoc.	243 W. Main 19711

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November 15, 1988
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Ref:

Henry Meier	Wedge Committee	2 Fox Lane Newark, DE 19711
Jane L. Dilley	League of Women Voters	106 Tanglewood Lane
Ray Walker	Wedgewood Rd	351 Wedgewood Rd. Newark, 19711
Petar and Barbara Slijepcevil		325 Wedgewood Rd. Newark, 19711
Sara Money Blaine		322 Wedgewood Rd Newark, 19711
Dwight Holtzen	Coochi Bridge CA	1133 Old Baltimore Pk. 19702
Sally Jo Wright		719 new London Rd. Newark
Melvin D. Wright		717 New London Rd. Newark
John L. Kmetz	Wedge Hills Civic Assn.	14 Fox Lane Newark, DE 19711
David A. Marsden		334 Wedgewood Rd. Newark, DE 19711
Richard C. Hoffman	North Wedge Civic Assn.	346 Wallace Dr. Newark, DE 19711
Minor C. Seward	North Wedge Civic Assn.	341 Wallace Dr. Newark, DE 19711
Shanti Mehta	North Wedge Civic Assn.	365 Wallace Dr. Newark, DE 19711
Roy Dietz	North Wedge Civic Assn.	361 Wallace Dr. Newark, DE 19711
Louis Palko	North Wedge Civic Assn.	358 Wallace Dr. Newark, DE 19711
Doris Palko	North Wedge Civic Assn.	358 Wallace Dr. Newark, DE 19711
John & Mary Dobbins	North Wedge Civic Assn.	353 Wallace Dr. Newark, DE 19711

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Marian E. Porter		375 Wedgewood Road Newark, DE 19711
R. Robert Ruggio	Commonwealth Group	62 Read's Way Corp. Commons New Castle, DE
Terry F. Neimeyer	Kidde Consultants	Suite 103 Commonwealth Bldg. Newark, DE 19702
James H. Tung	WILMAPCO	Suite 101 Stockton Bldg. University office Plaza Newark, DE 19702
Roger Martin	State Senate	Windy Hills
Carl Luft	City of Newark	
Philip Downey	Northwedge, CA	342 Wedgewood Rd.
Jim Parks	Northwedge, CA	333 Wallace Dr. 19711
R. B. Heiart		212 Wedgewood Rd. 19711
David Marsela		334 Wedgewood Rd. 19711
Richard R. Koch		1115 Old Balt. Pike Newark, 19702
Ray Niedowski	VHB	
Karen Jehanian	VHB	
Charles Crevo	VHB	
Bob Parke	DelDOT	
Larry Klepner	DelDOT	
Ted Yurek	DelDOT	

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APPENDIX B

SEGMENT ANALYSIS FOR EXISTING ROADWAY CONDITIONS

NEWARK AREA TRANSPORTATION STUDY
VANASSE HANGEN BRUSTLIN INC. -- BOSTON, MA
FOR
DELAWARE DEPARTMENT OF TRANSPORTATION

ROADWAY DESCRIPTION					ROADWAY INVENTORY													ROADWAY PERFORMANCE							
ROAD NAME	TO	FROM	ANL. SEG.	ROUTE LOG	BEGIN MP	END MP	DISTANCE (miles)	URBAN/ RURAL CLASS	FUNC. CLASS	ROAD TYPE	# DIR LANES	AADT	PEAK HOUR %	PEAK VOL	DAILY CAPACITY	PEAK CAPACITY (2-WAY)	DAILY V/C	PEAK V/C	LOS ADT	LOS PEAK	TOTAL ACC.	ACC. RATE	HSIP AART	SPEED AM	SPEED MIDDAY	SPEED PM
PLEASANT VALLEY RD	Route 40	Old Balt. Pike	1	8	0.00	1.48	1.48	1	6	13	1	3259	11	358	7890	789	0.413	0.454	A	A	12	2.27	3.16	0	0	0
ELKTON RD (EB)	State Line	Barksdale	2	11	0.00	2.18	2.18	1	3	3	2	15987	10	1599	20230	2023	0.790	0.790	B	B	166	4.35 †	1.27	35	37	33
		Delaware Av	3	11	2.18	2.59	0.41	2	3	5	2	17405	8	1392	18900	1890	0.921	0.737	C	B	100	12.80 †	4.95	27	21	27
DELAWARE AV (EB)	Elkton Rd	College Av	4	11	2.59	2.78	0.19	2	3	4	2	16267	8	1301	8980	898	1.811	1.449	F	E	47	13.89 †	5.92	14	11	18
(ONE WAY)		Chapel St	5	11	2.78	3.24	0.46	2	3	4	2	15440	8	1235	9880	988	1.563	1.250	F	D	76	9.77 †	5.92	13	17	11
		Route 72	6	11	3.24	3.77	0.53	2	3	4	3	11563	8	925	12380	1238	0.934	0.747	C	B	91	13.56 †	5.92	13	17	11
ROUTE 72	Delaware Av	Main St	7	11	3.77	3.97	0.20	2	3	6	2	35152	8	2812	18900	1890	1.860	1.488	F	E	29	3.77	5.68	0	0	0
		Cleveland Av	8	11	3.97	4.12	0.15	2	3	6	2	29269	10	2927	20260	2026	1.445	1.445	E	E	15	3.12	5.68	0	0	0
KIRKWOOD HWY	Cleveland Av	Possum Park Rd	9	11	4.12	5.20	1.08	2	3	6	2	31853	10	3185	22400	2240	1.422	1.422	E	E	47	1.25	5.68	0	0	0
		Ruthby Rd	10	11	5.20	5.97	0.77	2	3	5	2	32396	10	3240	26940	2694	1.203	1.203	C	C	0	0.00	4.95	0	0	0
MAIN ST (NB)	Route 72	Chapel St	11	11	10.75	11.34	0.59	2	3	6	3	23161	8	1853	15150	1515	1.529	1.223	F	D	133	12.49 †	5.68	17	13	11
		College Av	12	11	11.34	11.76	0.42	2	3	6	3	24415	8	1953	15150	1515	1.612	1.289	F	D	26	6.48	5.68	17	22	17
		Nottingham Rd	13	11	11.76	11.91	0.15	2	3	6	3	24415	8	1953	15150	1515	1.612	1.289	F	D	7	4.36	5.68	25	21	25
ELKTON RD	Nottingham Rd	Delaware Av	14	11	11.91	11.97	0.06	2	3	6	3	24415	8	1953	15150	1515	1.612	1.289	F	D	35	11.22 †	5.92	17	16	19
CURTIS MILL RD	Main St	Cleveland Av	15	13	0.00	0.25	0.25	2	3	4	1	11393	10	1139	7790	779	1.463	1.463	E	E	69	2.78	2.32	37	43	33
		Possum Park Rd	16	13	0.25	2.38	2.13	1	4	7	1	10652	10	1065	8390	839	1.270	1.270	D	D	21	4.35	5.92	0	0	0
NEWARK-CHRISTIANA RD	Route 72	Marrows Rd	17	18	0.09	0.30	0.21	2	3	4	2	20999	8	1680	18900	1890	1.111	0.889	C	C	154	3.76	5.92	0	0	0
(RT 273)		Chestnut Hill	18	16	0.30	2.36	2.06	2	3	4	2	18176	10	1818	14500	1450	1.254	1.254	D	D	64	11.94 †	5.68	0	0	0
		Ruthby Rd	19	18	2.36	2.50	0.14	2	3	6	2	34954	8	2796	22200	2220	1.575	1.260	F	D	64	11.94 †	5.68	0	0	0
OLD BALTIMORE PIKE	State Line	Ott's Chapel	20	26	0.00	0.79	0.79	1	4	7	1	5870	11	646	7890	789	0.744	0.818	B	C	35	6.89 †	2.32	0	0	0
		Route 896	21	26	0.79	2.49	1.70	1	4	7	1	6225	11	685	7890	789	0.789	0.868	B	C	48	4.14 †	2.32	0	0	0
		Cooch's Bridge	22	26	2.49	2.97	0.48	1	4	7	1	6325	11	696	7350	735	0.861	0.947	C	C	15	4.51	2.32	0	0	0
		Route 72	23	336	0.00	0.38	0.38	1	4	7	1	11583	11	1274	8500	850	1.363	1.499	D	E	42	8.71 †	2.32	0	0	0
		Salem Church	24	336	0.38	2.17	1.79	1	4	7	1	13338	11	1467	11200	1120	1.191	1.310	C	B	77	2.95 †	2.32	0	0	0
US ROUTE 40	State Line	Pleasant Valley	25	32	0.00	0.85	0.85	1	3	3	2	17842	9	1606	29040	2904	0.614	0.553	B	A	17	1.02	1.27	0	0	0
		Route 896	26	32	0.85	2.17	1.32	1	3	3	2	17842	9	1606	30200	3020	0.591	0.532	A	A	68	2.64 †	1.27	0	0	0
		Route 72	27	32	2.17	3.77	1.60	1	3	3	2	15798	9	1422	29040	2904	0.544	0.490	A	A	41	1.48	1.27	0	0	0
		Salem Church	28	32	3.77	5.14	1.37	1	3	3	2	23924	9	2153	29040	2904	0.824	0.741	C	B	29	0.81	1.27	0	0	0
NOTTINGHAM RD	Main St	Cleveland Av	29	41	0.00	0.18	0.18	2	4	10	1	11805	12	1417	11100	1110	1.064	1.276	C	D	8	3.44	5.23	27	30	32
(RT 273)		Casho Mill	30	41	0.18	1.12	0.94	2	4	10	1	11805	12	1417	112300	11230	0.105	0.126	A	A	26	2.14	5.23	27	30	32
		State Line	31	41	1.12	1.97	0.85	2	4	10	1	11960	11	1316	12300	1230	0.972	1.070	C	C	55	4.94	5.23	38	41	34
SALEM CHURCH RD	Route 40	Old Balt. Pike	32	48	2.00	4.29	2.29	1	5	13	1	6399	10	640	6760	676	0.947	0.947	C	C	82	5.11 †	3.16	0	0	0
INTERSTATE 95	State Line	Route 896	33	56	0.00	2.34	2.34	1	1	1	2	41482	9	3733	69560	6956	0.596	0.537	A	A	NA	NA	NA	NA	NA	NA
		Salem Church Rd	34	56	2.34	5.10	2.76	1	1	1	2	67803	8	5424	69560	6956	0.975	0.780	C	B	NA	NA	NA	NA	NA	NA
THOMPSON STATION RD	Curtis Mill	Hopkins Rd	35	53	0.00	1.28	1.28	1	7	13	1	2355	10	236	6760	676	0.348	0.348	A	A	15	4.54	3.16	0	0	0
		Chambers Rock	36	53	1.28	1.56	0.28	1	7	13	1	1435	17	244	6760	676	0.212	0.361	A	A	1	2.27	3.16	0	0	0
HOPKINS RD	New London Rd	Thompson Stat.	37	302	0.00	1.76	1.76	1	7	13	1	1414	25	354	6760	676	0.209	0.523	A	A	48	17.61 †	3.16	0	0	0
CLEVELAND AV	Nottingham Rd	New London Rd	38	309	0.00	0.10	0.10	2	4	10	1	11371	9	1023	7380	738	1.541	1.387	F	D	7	5.62	5.23	8	10	32
		N. College	39	309	0.10	0.32	0.22	2	4	10	1	16745	12	2009	15460	1546	1.083	1.300	C	D	31	7.68 †	5.23	14	17	24

ROADWAY DESCRIPTION								ROADWAY INVENTORY										ROADWAY PERFORMANCE									
ROAD NAME	TO	FROM	ANL. SEG.	ROUTE LOG	BEGIN MP	END MP	DISTANCE (miles)	URBAN/ RURAL CLASS	FUNC. CLASS	ROAD TYPE	# DIR LANES	AADT	PEAK HOUR %	PEAK VOL	DAILY CAPACITY	PEAK CAPACITY (2-WAY)	DAILY V/C	PEAK V/C	LOS ADT	LOS PEAK	TOTAL ACC.	ACC. RATE		HSIP AART	SPEED AM	SPEED MIDDAY	SPEED PM
		Curtis Mill	40	309	0.32	0.73	0.41	2	4	10	1	16745	12	2009	15460	1546	1.083	1.300	C	D	67	8.91	*	5.23	14	21	15
		Route 72	41	309	0.73	1.30	0.57	2	4	10	2	22396	10	2240	15000	1500	1.493	1.493	E	E	160	11.45	*	5.23	22	21	17
PAPER MILL RD	Curtis Mill Rd	End	42	310	0.00	0.69	0.69	2	7	15	1	230	8	18	3700	370	0.062	0.050	A	A	3	17.26		4.41	0	0	0
N. COLLEGE AV	Main St	Cleveland Av	43	311	0.00	0.19	0.19	2	4	10	1	5121	9	461	7380	738	0.694	0.625	B	B	13	12.20		5.23	12	8	5
WEDGEWOOD RD	State Line	Nottingham Rd	44	312	0.00	0.10	0.10	1	6	13	1	407	12	49	3700	370	0.110	0.132	A	A	0	0.00		3.16	0	0	0
		New London Rd	45	312	0.10	1.41	1.31	1	6	13	1	1435	12	172	3700	370	0.388	0.465	A	A	1	0.49		3.16	0	0	0
APPLETON RD	New London Rd	N. College Av	46	312	1.41	2.47	1.06	1	6	13	1	442	9	40	3700	370	0.119	0.108	A	A	2	3.90		3.16	0	0	0
NEW LONDON RD	Main St	Cleveland Av	47	313	0.00	0.20	0.20	2	4	10	2	9561	13	1243	8980	898	1.065	1.384	C	D	24	11.46		5.23	10	6	5
		Wedgewood Rd	48	313	0.20	2.20	2.00	2	4	10	1	10837	10	1084	8200	820	1.322	1.322	D	D	51	2.15		5.23	30	33	26
		State Line	49	313	2.20	3.15	0.95	1	5	13	1	6147	10	615	8700	870	0.707	0.707	B	B	8	1.25		3.16	41	45	44
POSSUM PARK RD	Kirkwood Hwy	Curtis Mill Rd	50	314	0.00	1.86	1.86	1	5	13	1	6497	13	845	7700	770	0.844	1.097	C	C	34	2.57		3.16	0	0	0
CHAMBERS ROCK RD	State Line	Thompson Stat.	51	329	0.00	0.61	0.61	1	7	13	1	827	8	66	7700	770	0.107	0.086	A	A	6	10.86		3.16	0	0	0
SALEM CHURCH RD	Old Balt. Pike	Chapin Rd	52	348	0.00	1.26	1.26	2	4	10	1	10900	9	981	7390	739	1.475	1.327	E	D	46	3.06		5.23	0	0	0
		Chestnut Hill	53	348	1.26	2.00	0.74	2	4	10	1	10900	9	981	7390	739	1.475	1.327	E	D	32	3.62		5.23	0	0	0
OLD NEWARK RD	Marrows Rd	Chestnut Hill	54	350	0.00	1.08	1.08	2	5	15	1	2537	13	330	6680	668	0.380	0.494	A	A	13	4.33		4.41	0	0	0
MARROWS RD	Chestnut Hill	Old Newark	55	351	0.00	0.73	0.73	2	5	15	1	9057	9	815	8390	839	1.079	0.972	C	C	70	9.67	*	4.41	0	0	0
		Route 273	56	351	0.73	1.61	0.88	2	5	15	1	12410	9	1117	8390	839	1.479	1.331	E	D	38	3.18		4.41	0	0	0
RUTHBY RD	Route 273	Route 2	57	352	0.00	1.57	1.57	2	5	15	1	13039	7	913	11000	1100	1.185	0.830	C	C	102	4.55		4.41	0	0	0
ROUTE 72	Route 40	Old Balt. Pike	58	356	3.90	6.41	1.51	1	4	7	1	9956	12	1195	8200	820	1.214	1.457	D	E	79	4.80	*	2.32	39	44	39
		Chestnut Hill	59	356	6.41	7.79	1.38	2	3	4	1	18259	10	1826	12200	1220	1.497	1.497	E	E	101	3.66		5.92	25	30	22
		Delaware	60	356	7.79	9.23	1.44	2	3	4	2	13755	12	1651	11000	1100	1.250	1.501	D	E	25	1.15		5.92	33	36	30
BARKSDALE RD	State Line	Casho Mill Rd	61	360	0.00	0.70	0.70	2	5	15	1	4303	9	387	7050	705	0.610	0.549	B	A	10	3.03		4.41	0	0	0
		Elkton Rd	62	360	0.70	1.47	1.40	2	5	15	1	7512	10	751	7050	705	1.066	1.066	C	C	29	2.52		4.41	0	0	0
CASHO MILL RD	Elkton Rd	Barksdale Rd	63	361	0.00	0.62	0.62	2	5	15	1	4394	9	395	6340	634	0.693	0.624	B	B	48	16.09	*	4.41	0	0	0
		Nottingham Rd	64	361	0.62	1.45	0.83	2	5	15	1	4561	10	456	6340	634	0.719	0.719	B	B	9	2.17		4.41	0	0	0
VALLEY RD	State Line	Church Rd	65	362	0.00	0.65	0.65	2	5	15	1	418	12	50	6680	668	0.063	0.075	A	A	3	10.08		4.41	0	0	0
CHURCH RD	Nottingham Rd	Casho Mill Rd	66	363	0.00	0.82	0.82	2	5	15	1	510	12.7	65	6340	634	0.080	0.102	A	A	4	8.73		4.41	0	0	0
CHESTNUT HILL RD	State Line	Ott's Chapel	67	364	0.00	0.52	0.52	1	5	13	1	1575	16	252	7200	720	0.219	0.350	A	A	1	1.12		3.16	0	0	0
		Route 896	68	364	0.52	2.21	1.69	2	5	15	1	7068	12.9	912	7200	720	0.992	1.266	C	D	31	2.37		4.41	0	0	0
PARK DR	End	Route 896	69	365	0.00	0.24	0.24	2	7	15	1	837	40	335	6000	600	0.140	0.558	A	A	1	4.55		4.41	0	0	0
ROUTE 4	Elkton Rd	Route 896	70	366	0.00	1.43	1.43	1	3	3	2	17112	12	2053	22400	2240	0.764	0.917	B	C	36	1.34		1.27	0	0	0
		Route 72	71	366	1.43	2.31	0.88	2	3	4	2	11265	15	1650	15960	1596	0.706	1.059	B	C	37	3.41		5.92	0	0	0
		Route 273	72	366	2.31	4.68	2.37	2	3	4	2	16194	9.3	1506	15960	1596	1.015	0.944	C	C	204	4.85		5.92	0	0	0
WELSH TRACT RD	Ott's Chapel	Route 896	73	367	0.00	1.91	1.91	1	5	13	1	2094	10	209	7890	789	0.265	0.265	A	A	17	3.88		3.16	0	0	0
REYBOLD RD	Route 72	Salem Church	74	385	0.00	1.12	1.12	1	5	13	1	1981	8	158	7890	789	0.251	0.201	A	A	16	6.59		3.16	0	0	0
NEWARK - GLASGOW RD (RT 896)	Route 40	Old Balt. Pike	75	387	3.22	5.38	2.16	1	3	2	1	17234	9	1551	11800	1180	1.461	1.314	E	D	136	3.34	*	2.45	32	37	30
		Chestnut Hill	76	387	5.38	6.85	1.47	2	3	6	2	26862	9.5	2552	22400	2240	1.199	1.139	C	C	249	5.76		5.68	26	34	25
		Route 4	77	387	6.85	7.04	0.19	2	3	6	2	31010	9	2791	22200	2220	1.397	1.257	D	D	40	6.20		5.68	23	22	27
		Park Pl	78	387	7.04	8.15	1.11	2	3	4	1	23146	9	2083	16680	1668	1.388	1.249	D	D	103	3.66		5.92	25	26	26
		Delaware Av	79	387	8.05	8.65	0.60	2	3	4	1	11177	8	894	7380	738	1.514	1.212	F	D	45	6.13		5.92	18	20	22
		Main St	80	387	8.65	8.75	0.10	2	3	6	1	13613	9	1225	15960	1596	0.853	0.768	C	B	18	12.08		5.68	17	12	9
IRON HILL RD	Old Balt. Pike	End	81	388	0.00	0.50	0.50	1	7	13	1	162	8	13	5080	508	0.032	0.026	A	A	0	0.00		3.16	0	0	0
WHITTAKER RD	Old Balt. Pike	Welsh Tract	82	389	0.00	0.93	0.93	1	7	13	1	189	16	30	5080	508	0.037	0.060	A	A	1	5.20		3.16	0	0	0
IRONSIDE RD	Old Balt. Pike	Welsh Tract	83	390	0.00	0.82	0.82	1	7	13	1	146	8	12	5080	508	0.029	0.023	A	A	1	7.63		3.16	0	0	0
OTT'S CHAPEL RD	Old Balt. Pike	Chestnut Hill	84	397	0.00	1.49	1.49	1	4	7	1	3691	11	406	7500	750	0.492	0.541	A	A	18	2.99		2.32	0	0	0
		Elkton Rd	85	397	1.49	2.37	0.88	2	4	10	1	4889	11	538	25760	2576	0.190	0.209	A	A	6	1.27		5.23	0	0	0

APPENDIX C

OTHER LONG-TERM RECOMMENDATION ALTERNATIVES

Two alternatives for improvement were suggested by members of the Citizens' Advisory Committee (CAC) but not evaluated formally as part of this project. These include:

- Downtown Bypass from Route 273 to I-95, and
- Reybold Road interchange with Route 301.

The Downtown Bypass was dismissed following the analysis of the three sub-alternatives to Alternative 5. (See Page VII-18 of Final Report). The alternative would serve primarily through-traffic from the northwest to I-95 which was not the predominant travel pattern.

The Reybold Road interchange was evaluated by the Department using their computer model. The results indicated that local traffic was diverted from Newtowne Road to Old Baltimore Pike and that through-traffic was diverted from Old Baltimore Pike to Newtowne Road. The overall result was a decline in level-of-service on both roadways. Therefore the project was not pursued further.

Other projects suggested by the advisory committee or presented in previous reports were addressed in the formal evaluation process.