PENNSYLVANIA ACT 209
TRANSPORTATION IMPACT FEE STUDY

CUMBERLAND TOWNSHIP

ROADWAY SUFFICIENCY ANALYSIS

AND

TRANSPORTATION CAPITAL IMPROVEMENT PLAN

Prepared for:
Cumberland Township,
Adams County

June 2006

McMAHON ASSOCIATES, INC.
TRANSPORTATION ENGINEERS & PLANNERS
RESPONSIVE
TRANSPORTATION
SOLUTIONS

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INTRODUCTION

Overview

This *Roadway Sufficiency Analysis* and *Transportation Capital Improvements Plan* have been prepared in accordance with the requirements set forth in Pennsylvania Act 209 on behalf of Cumberland Township, Adams County, Pennsylvania. Pennsylvania Act 209 was signed into law effective December 19, 1990. It amends the Pennsylvania Municipalities Code (Act 247 of 1968, as amended) to permit municipalities to assess transportation impact fees on new development within their boundaries, provided that they have adopted a municipal transportation impact fee ordinance in accordance with the procedures set forth in the Act.

Impact fees under Act 209, with only one exception, contained in Act 68 amendments to the Municipalities Planning Code (2000), may only be used for those costs incurred for improvements designated in the adopted transportation capital improvements plan of the municipality that are attributable to new development. The impact fees cannot be used for municipal, non-transportation-related capital improvements; for the repair, maintenance, or operation of existing or new municipal transportation capital improvements; or for the upgrade or replacement of existing municipal transportation capital improvements due to operational or safety deficiencies not related to new development. The Act specifically and only applies to off-site transportation capital improvements attributable to new development; it neither applies to, nor restricts, the procedures or powers of the municipality to require on-site transportation improvements to remedy impacts of new development, nor is it intended to replace the municipality's ordinance requirements for submission of traffic impact studies.

All appendices supporting the *Roadway Sufficiency Analysis* referred to in this report are contained in a separate bound document entitled *Pennsylvania Act 209 Transportation Impact Fee Study Technical Appendices*, Cumberland Township, Adams County, dated June 2006.

Process

The process that Cumberland Township has undertaken includes the completion of the necessary milestones pursuant to the Act 209 legislation, as follows:

1. Appointment of a Transportation Advisory Committee and designation of the geographic area(s) of the municipality that will be subject to the transportation impact fee ordinance. Meeting minutes of the Transportation Advisory Committee are included in **Appendix A**.

2. Development and adoption of land use assumptions within the Township and the designated geographic area(s), called Transportation Service Areas (TSA's), which together with existing development are the subject of a roadway sufficiency analysis and development of a transportation capital improvements plan.

3. Completion and approval of a roadway sufficiency analysis for each Transportation Service Area, identifying traffic deficiencies and needed improvements attributable to existing traffic, future traffic not originating from the service area (i.e., pass-through traffic), and future traffic

originating from new development within the service area(s) for a preferred level(s) of service in terms of desired traffic operations during the designated peak hour of study.

4. Development and adoption of a transportation capital improvement plan, including costs, implementation priorities, and funding sources, specifically and separately addressing improvements required to remedy:
   a. current traffic deficiencies resulting from **existing** traffic volumes and capacity limitations;
   b. traffic deficiencies attributable to future **pass-through** traffic after existing deficiencies have been remedied; and
   c. traffic deficiencies attributable to expected **new development** within the service area(s) after pass-through traffic and existing deficiencies have been remedied.
5. Adoption of a Transportation Impact Fee Ordinance based on the total cost of identified transportation improvements attributable to new development within each Transportation Service Area, to be assessed on a "per trip" basis.

Act 209 requires a minimum future planning horizon of five years. A 10-year planning horizon from the year of base data collection has been selected for the purpose of this analysis, and the future year 2015 is considered the design year. However, this document should not be considered a static, "one-time" effort, as the Act 209 legislation has provisions for periodic updates of the roadway sufficiency analysis, capital improvement plan, and impact fees, as changes in the land use assumptions, transportation improvement needs, or funding conditions occur.

As the law allows for the periodic update of the Impact Fee charges, it is recommended that the Transportation Advisory Committee continue to meet periodically and make recommendations to the Board of Supervisors, as necessary, to update the Capital Improvements Plan (CIP) or impact fee charges based on the following:

1. New subsequent development that has occurred in the Township.
2. Capital improvements, listed in the CIP, which have been constructed.
3. Unavoidable delays in construction of the improvements listed in the CIP that are outside the control or responsibility of the Township.
4. Significant changes in the land use assumptions.
5. Significant changes in the estimated costs of the improvements listed in the CIP.
6. Significant changes in the projected revenue from all sources listed, needed for the construction of the improvements listed in the CIP.

Land Use Assumptions

As required by Act 209, the Cumberland Township Transportation Advisory Committee approved the Cumberland Township *Land Use Assumptions Report* (dated January 2006), which was prepared and completed by Local Government Management Services, LLC and David C. Babbitt & Associates, LLC, at a public hearing on February 1, 2006. Subsequently, the Board of Supervisors adopted the *Land Use Assumptions Report* by resolution, as required by Act 209, on February 14, 2006. A copy of the *Land Use Assumptions Report,* and the resolution drafted by the Township to accept it, are provided in **Appendix B**.

The *Land Use Assumptions Report* identifies the anticipated long-term development build-out potential within Cumberland Township, as well as the projected Act 209 design year 2015 build-out on an area-by-area basis, and provides graphics illustrating the potential locations of these parcels. The projected Act 209 design year 2015 build-out for this period within the entire Township, which is the basis of this analysis, is summarized below in **Table 1**.

Table 1. Land Use Assumptions Report 2015 Build-Out Summary

Land Use Classification	2015 Build-Out Projection
Residential	1,116 dwelling units
Non-Residential	725,000 square feet

EXISTING TRANSPORTATION NETWORK

This *Existing Transportation Network* section includes a designation of the roadways and intersections selected to be evaluated as part of this *Roadway Sufficiency Analysis*, as well as an inventory of physical and operational characteristics of the existing Township transportation system required for the completion of the *Roadway Sufficiency Analysis*. This section also delineates the Transportation Service Areas required by the Act 209 legislation.

Roadway Characteristics

The Cumberland Township roadway system, as illustrated in **Figure 1**, consists primarily of two-lane, undivided roadways. Major regional access to the Township is provided via U.S. Route 15, U.S. Route 30 (Chambersburg Road), PA Route 116 (Fairfield Road), and PA Route 34 (Biglerville Road). The roadway network shown in Figure 1, including both roadway segments and intersections, constitutes the transportation roadway network analyzed pursuant to Act 209. The operating characteristics of each of the major study roadways are summarized in **Table 2.**

Table 2. Existing Transportation Network Summary

Roadway	Roadway Classification [1]	Roadway Ownership [2]	Posted Speed Limit (mph)
Chambersburg Road	Arterial	State (S.R. 0030)	40 to 45
Fairfield Road	Arterial	State (S.R. 0116)	40
Biglerville Road	Arterial	State (S.R. 0034)	40
Mummasburg Road	Arterial	State (S.R. 3017)	45
Emmitsburg Road	Arterial	State (S.R. 3001)	40 to 45
US Route 15 Ramps	Arterial	State (S.R. 8002)	Not posted
Taneytown Road	Collector	State (S.R. 0134)	25 to 55
Knoxlyn Road	Arterial	State (S.R. 3013)	40
Millerstown Road	Collector	State (S.R. 3005)	40
Pumping Station Road	Collector	State (S.R. 3005)	40
Herrs Ridge Road	Collector	Township	35
Boyd's School Road	Collector	Township	35
Belmont Road	Collector	Township	35
Old Mill Road	Feeder	Township	25
Park Avenue	Feeder	Township	25
Willoughby Road	Feeder	Township	35
Blackhorse Tavern Road	Collector	Township	40
Red Rock Road	Feeder	Township	35
Ridge Road	Feeder	Township	35
Barlow-Greenmount Road	Feeder	Township	40
Cunningham Road	Feeder	Township	40
Solomon Road	Feeder	Township	35

[1] Based on PennDOT ITMS information for state roads.
[2] See Figure 1 for ownership limits and numerical state roadway designations (i.e., S.R. 0030).

Of the major roadways listed in Table 2, the following roadway segments were specifically designated for evaluation as part of this Act 209 Study:

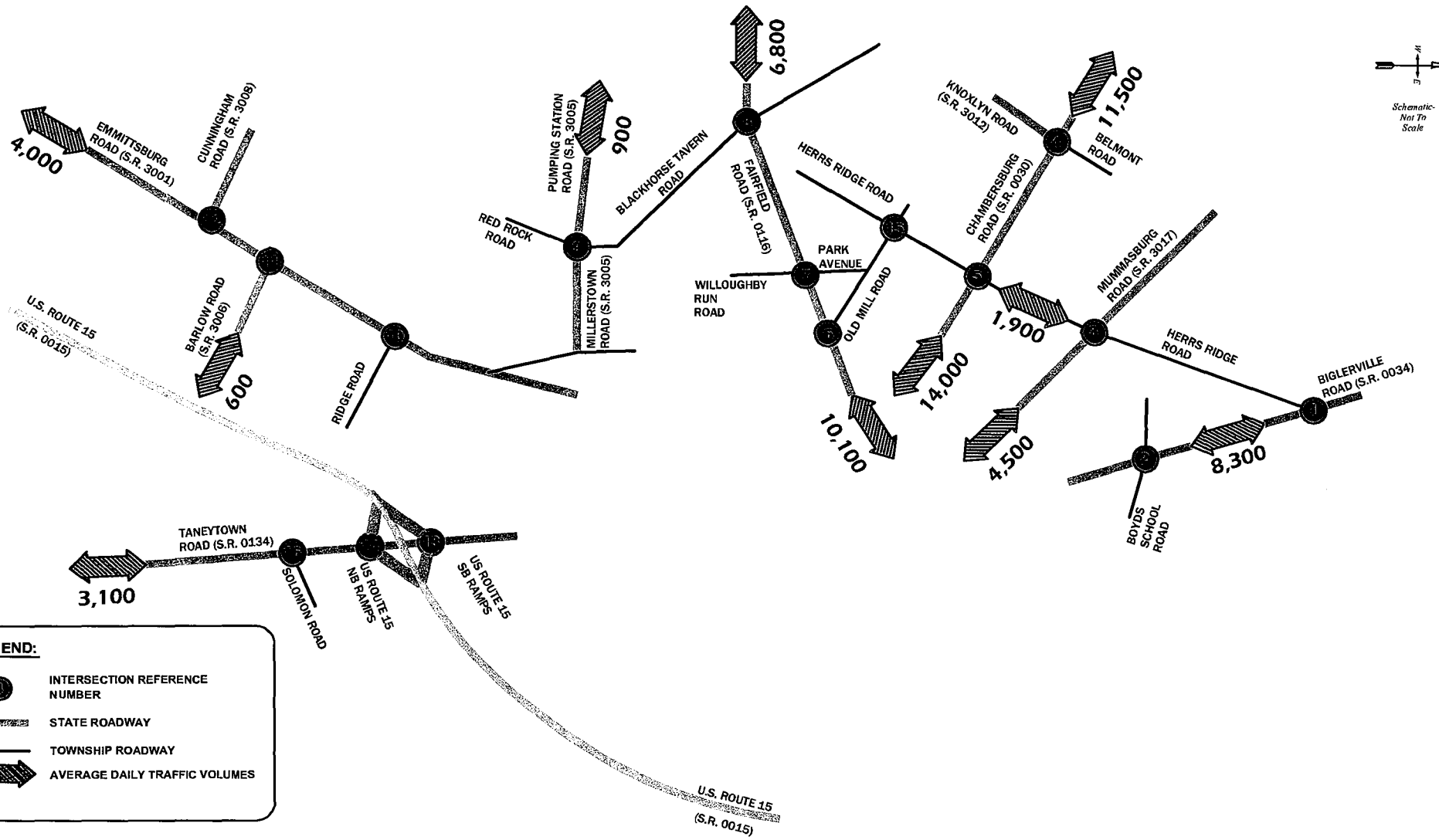

FIGURE 1
Study Intersections and Roadways with Daily Traffic Volumes

CUMBERLAND TOWNSHIP ACT 209 STUDY

CUMBERLAND TOWNSHIP, ADAMS COUNTY, PA

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- Biglerville Road, north of Boyds School Road and south of Herrs Ridge Road
- Emmitsburg Road, north of Barlow-Greenmount Road to south of Ridge Road
- Chambersburg Road, west of Herrs Ridge Road to east of Belmont Road

Several other Township roadways also comprise the transportation roadway network of the Township; however, these roadways are generally classified as local access roadways which provide access to the major arterials and collector roadways, but have limited regional mobility through the Township.

In addition to the study roadway segments, 16 study intersections have been selected by the Township to be evaluated and included in the *Roadway Sufficiency Analysis* and *Capital Improvements Plan*, and include the following, as indicated in both **Table 3** and Figure 1.

Table 3. Study Intersections

Intersection Reference No.	Intersection	2005 Traffic Control
1.	Herrs Ridge Road/Biglerville Road	Stop Sign
2.	Boyd School Road/Biglerville Road	Stop Sign
3.	Herrs Ridge Road/Mummasburg Road	Stop Sign
4.	Belmont Road/Knoxlyn Road/Chambersburg Road	Stop Sign
5.	Herrs Ridge Road/Chambersburg Road	Traffic Signal
6.	Old Mill Road/Fairfield Road	Stop Sign
7.	Park Avenue/Willoughby Run Road/Fairfield Road	Stop Sign
8.	Bream Hill Road/Blackhorse Tavern Road/Fairfield Road	Stop Sign
9.	Red Rock/Blackhorse Tavern Rd. /Pumping Station/Millerstown Rd.	Stop Sign
10.	Ridge Road/Emmitsburg Road	Stop Sign
11.	Barlow-Greenmount Road/Emmitsburg Road	Stop Sign
12.	Cunningham Road/Emmitsburg Road	Stop Sign
13.	Taneytown Road/US 15 Southbound Ramps	Stop Sign
14.	Taneytown Road/US 15 Northbound Ramps	Stop Sign
15.	Herrs Ridge Road/Old Mill Road	Stop Sign
16.	Taneytown Road/Solomon Road	Stop Sign

Existing Traffic Volumes

Traffic operating conditions are influenced by the relationships between traffic volumes and the service capacities of the roadways or intersections. In order to evaluate existing conditions on area roadways, Manual Turning Movement (MTM) counts were conducted at each of the 16 study intersections during the weekday afternoon peak period (4:00 PM to 6:00 PM) on typical weekdays in April and May 2005. These traffic counts commenced on April 19, 2005, and this data was considered the baseline for the Act 209 Study for determining the vacancy and occupancy levels of each property (existing traffic versus future traffic) at the time of the study. These traffic counts were tabulated by fifteen-minute periods to establish the four highest consecutive 15-minute periods which constitute the weekday afternoon peak hour, and serve as the basis for this analysis. **Figure 2** illustrates the 2005 existing weekday afternoon peak hour traffic volumes at the study area intersections. The actual MTM counts are provided in **Appendix C.**

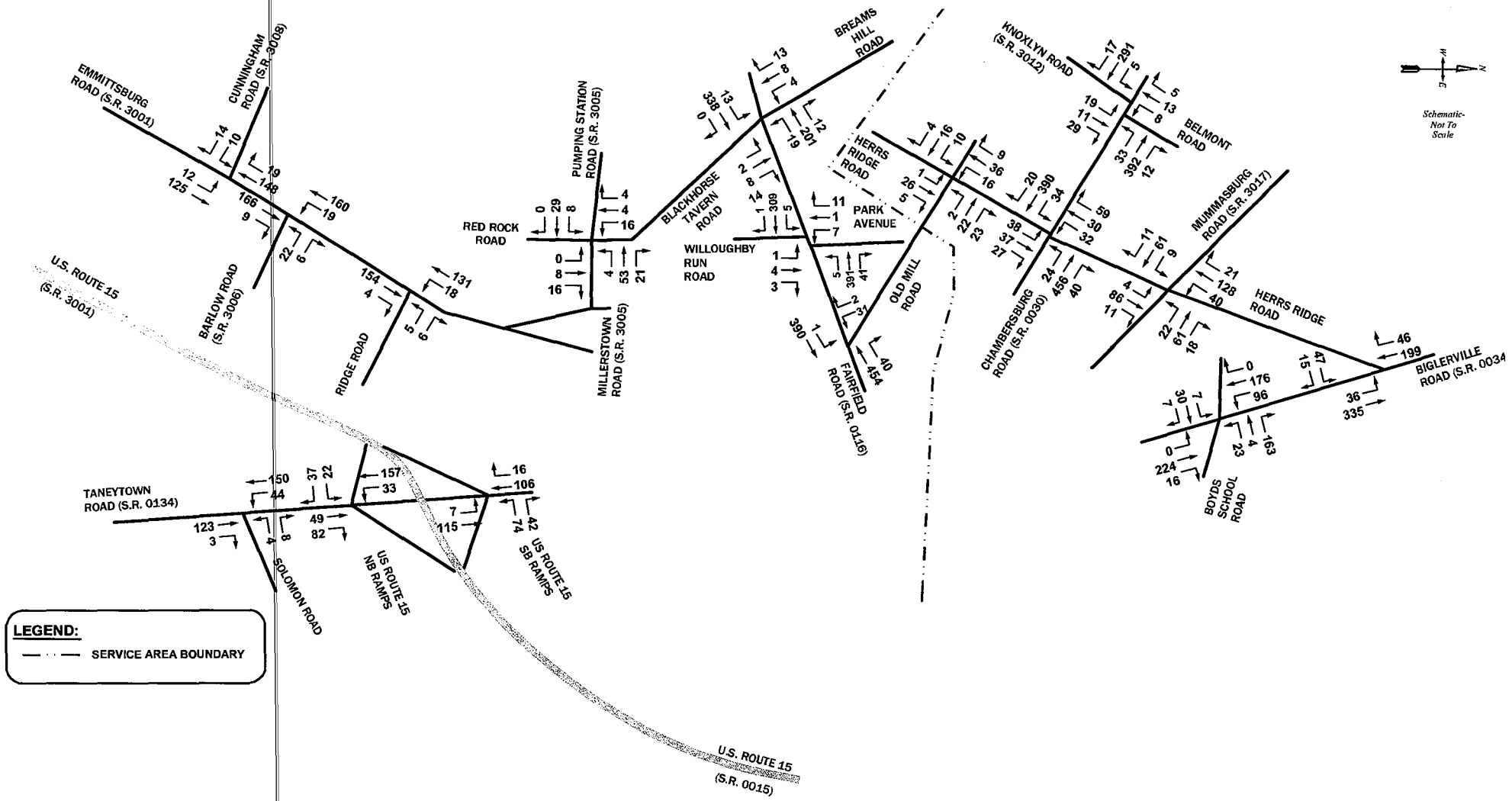

FIGURE 2

2005 Existing Weekday Afternoon Peak Hour Traffic Volumes

CUMBERLAND TOWNSHIP ACT 209 STUDY

CUMBERLAND TOWNSHIP, ADAMS COUNTY, PA

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Additionally, 24-hour Automatic Traffic Recorder (ATR) counts were conducted at 11 roadway segment locations during April 2005 over the course of a one-week period to determine the traffic volumes typically entering and exiting the Township along the major study roadways, as well as to establish current traffic patterns along the area roadways. The average daily traffic volumes are summarized in Figure 1, and the ATR count data is provided in **Appendix D**. The ATR counts were conducted at the following locations:

- Biglerville Road, south of Meadow Drive
- Mummasburg Road, north of Buford Avenue
- Herrs Ridge Road, north of Chambersburg Road
- Chambersburg Road, west of Knoxlyn Road
- Chambersburg Road, east of Reynolds Avenue
- Fairfield Road, west of Blackhorse Tavern Road
- Fairfield Road, east of Hills Drive
- Millerstown Road, east of Waterworks Road
- Emmitsburg Road, south of Marsh Creek Road
- Barlow-Greenmont Road, west of Chapel Ridge Road
- Taneytown Road, south of Barlow-Greenmount Road
- Business Route 15, south of Marsh Creek Road

Transportation Service Areas

Act 209 requires the establishment of specific study boundaries, or transportation service areas, for evaluation and application of transportation impact fees. By law, each transportation service area is required to be completely contiguous, and is limited to a maximum size of seven square miles. Moreover, traffic impact fees for each transportation service area are applicable only to development located within that respective service area, and therefore, development traffic from one service area is considered pass-through traffic within the other service area(s). Further explanation of pass-through and development traffic will be provided in subsequent sections.

As shown in **Figure 3**, the Transportation Advisory Committee has established two transportation service areas within Cumberland Township, in accordance with the requirements of Act 209. The transportation service areas measure less than the maximum seven square miles in area required by the Act 209 legislation.

Transportation Service Area North

As illustrated in Figure 3, Transportation Service Area North (TSA-North) generally consists of the area of the Township north of Fairfield Road, not including the Fairfield Road study area intersections. The six study intersections located within the approximate seven square mile service area are defined in **Table 4.**

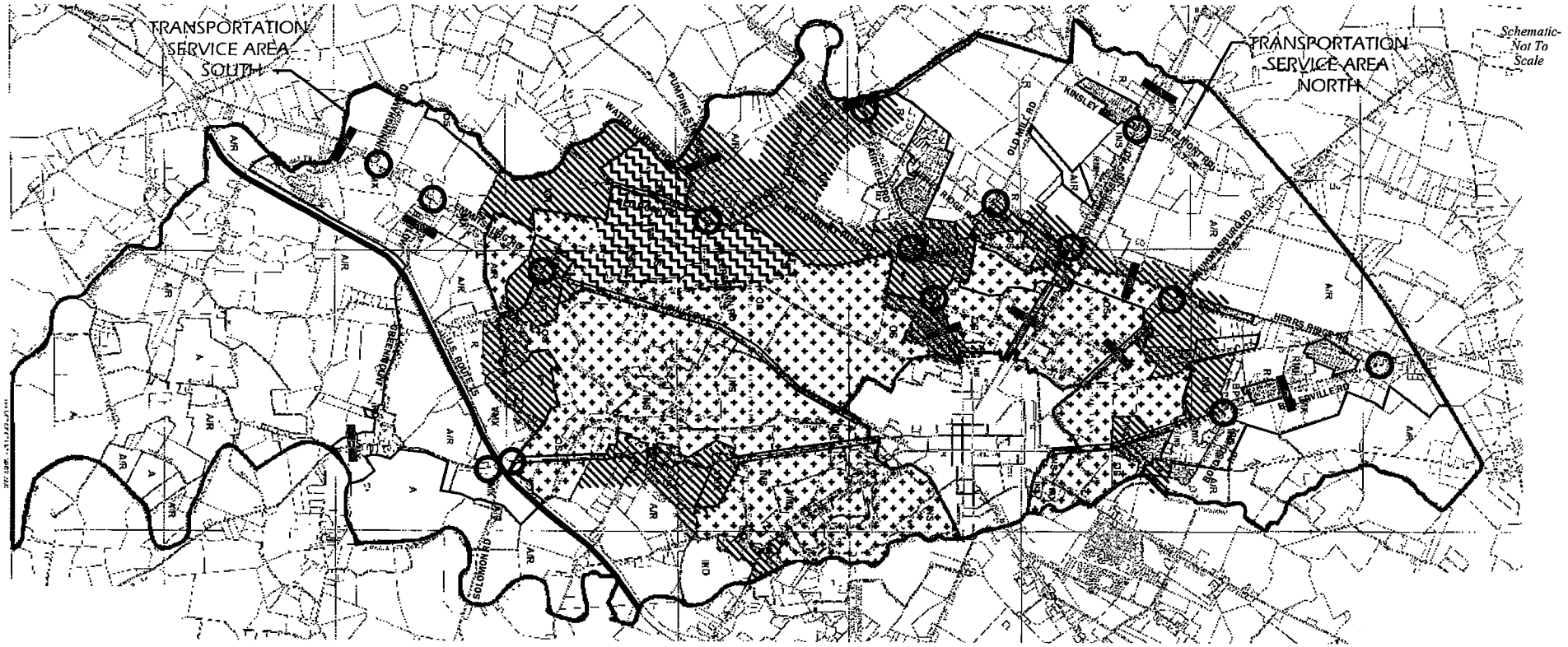

FIGURE 3

Transportation Service Areas

CUMBERLAND TOWNSHIP ACT 209 STUDY

CUMBERLAND TOWNSHIP, ADAMS COUNTY, PA

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Table 4. Transportation Service Area North Study Intersections

Reference No.	Intersection
1	Herrs Ridge Road/Biglerville Road
2	Boyd School Road/Biglerville Road
3	Herrs Ridge Road/Mummasburg Road
4	Belmont Road/Knoxlyn Road/Chambersburg Road
5	Herrs Ridge Road/Chambersburg Road
15	Herrs Ridge Road/Old Mill Road

Transportation Service Area South

As illustrated in Figure 3, Transportation Service Area South (TSA-South) generally consists of the area of the Township south of Fairfield Road, including the study intersections along Fairfield Road. The ten study intersections located within the approximate seven square mile service area are defined in **Table 5**.

Table 5. Transportation Service Area South Study Intersections

Reference No.	Intersection
6	Old Mill Road/Fairfield Road
7	Park Avenue/Willoughby Run Road/Fairfield Road
8	Bream Hill Road/Blackhorse Tavern Road/Fairfield Road
9	Red Rock/Blackhorse Tavern Rd. /Pumping Station/Millerstown Rd.
10	Ridge Road/Emmitsburg Road
11	Barlow-Greenmount Road/Emmitsburg Road
12	Cunningham Road/Emmitsburg Road
13	Taneytown Road/US 15 Southbound Ramps
14	Taneytown Road/US 15 Northbound Ramps
16	Taneytown Road/Solomon Road

EXISTING TRANSPORTATION CONDITIONS

The evaluation of the existing transportation network is based on the physical (i.e., traffic control, intersection geometry, lane usage, etc.) and operational (i.e., traffic volumes, signal timing/phasing) characteristics of the study intersections and roadways during the peak operational period. The Transportation Advisory Committee has selected the weekday afternoon peak hour as the basis of this *Roadway Sufficiency Analysis.*

Analysis Methodology

The traffic volumes in Figure 2 were subjected to detailed capacity/level-of-service analysis in accordance with the standard techniques contained in the ***Highway Capacity Manual***[1]. These standard capacity/level-of-service analysis techniques, which calculate total control delay, are more thoroughly described in **Appendix E** for both signalized and unsignalized intersections and two-lane rural roadway segments, as well as the correlation between average total control delay and the respective levels of service for each intersection and roadway type. Level of service (LOS) is the criterion utilized to evaluate the study intersections and roadways in accordance with standard traffic engineering practice and the Act 209 legislation.

Preferred Levels of Service

Consistent with the Act 209 legislation, the Transportation Advisory Committee has adopted preferred level-of-service criteria for the various intersections and roadways studied. The preferred level of service is considered the operational design standard by which each study intersection and roadway must operate under existing conditions, future pass-through conditions, and future development conditions in this *Roadway Sufficiency Analysis.* Deficient (worsened) operations that do not satisfy the preferred levels of service at the study intersections and roadways must be improved for each condition.

According to Act 209, the preferred level of service may be waived by the municipality at individual intersections or roadway segments based upon the difficulty in implementing various improvements (i.e., geometric design limitations, topographic limitations, or unavailable/unobtainable necessary right-of-way). Similarly, for unsignalized intersections where the preferred level-of-service criterion is not satisfied, most often only signalization can mitigate the traffic deficiency; however, where traffic volumes do not meet traffic signal warrant criteria, as required by PennDOT, these intersections cannot be improved through signalization. Therefore, the required signalization improvement must be waived or deferred until traffic volumes warrant signalization. As shown in **Table 6**, the Transportation Advisory Committee has adopted specific preferred level-of-service criteria for the purposes of this *Roadway Sufficiency Analysis.*

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(1) *Transportation Research Board, Special Report 209, Highway Capacity Manual, published by the Transportation Research Board, Washington, DC, 2000.*

Table 6. Preferred Level-of-Service Criteria

Intersection/Roadway Type	TSA-North	TSA-South
Signalized	**LOS D** all movements **LOS D** overall	**LOS C** all movements **LOS C** overall
Unsignalized	**LOS D** critical movements	**LOS C** critical movements
Roadway Segments	**LOS D** overall	**LOS C** overall

For signalized intersections, the preferred levels of service above apply to individual movements, as well as overall intersection operations. Conversely, for unsignalized intersections, the preferred levels of service apply only to the critical turning or through movements at the intersections. For roadway segments, the preferred level of service applies to each direction of travel.

Existing Levels of Service

The year 2005 existing weekday afternoon peak hour traffic volumes presented in Figure 2 were subjected to the detailed capacity/level-of-service analysis methodology previously described. The results of the analysis are illustrated in **Figure 4**, and the detailed capacity/level-of-service analysis worksheets are contained in **Appendix F**.

As shown in Figure 4, of the 16 study intersections, all presently operate at acceptable levels of service during the weekday afternoon peak hour.

The roadway segment level-of-service analysis indicates that each of the studied roadway segments satisfies the preferred level-of-service criteria, as shown in **Table 7**.

Table 7. Existing Roadway Segment Levels of Service

Roadway	Segment	TSA	LOS
Biglerville Road (S.R. 0034)	North Boyds School Road to Herrs Ridge Road	North	B
Emmitsburg Road (S.R. 3001)	North of Barlow-Greenmount Road (S.R. 3006) to Ridge Road	South	A
Chambersburg Road (S.R. 0030)	West of Herrs Ridge Road to east of Belmont Road	North	C

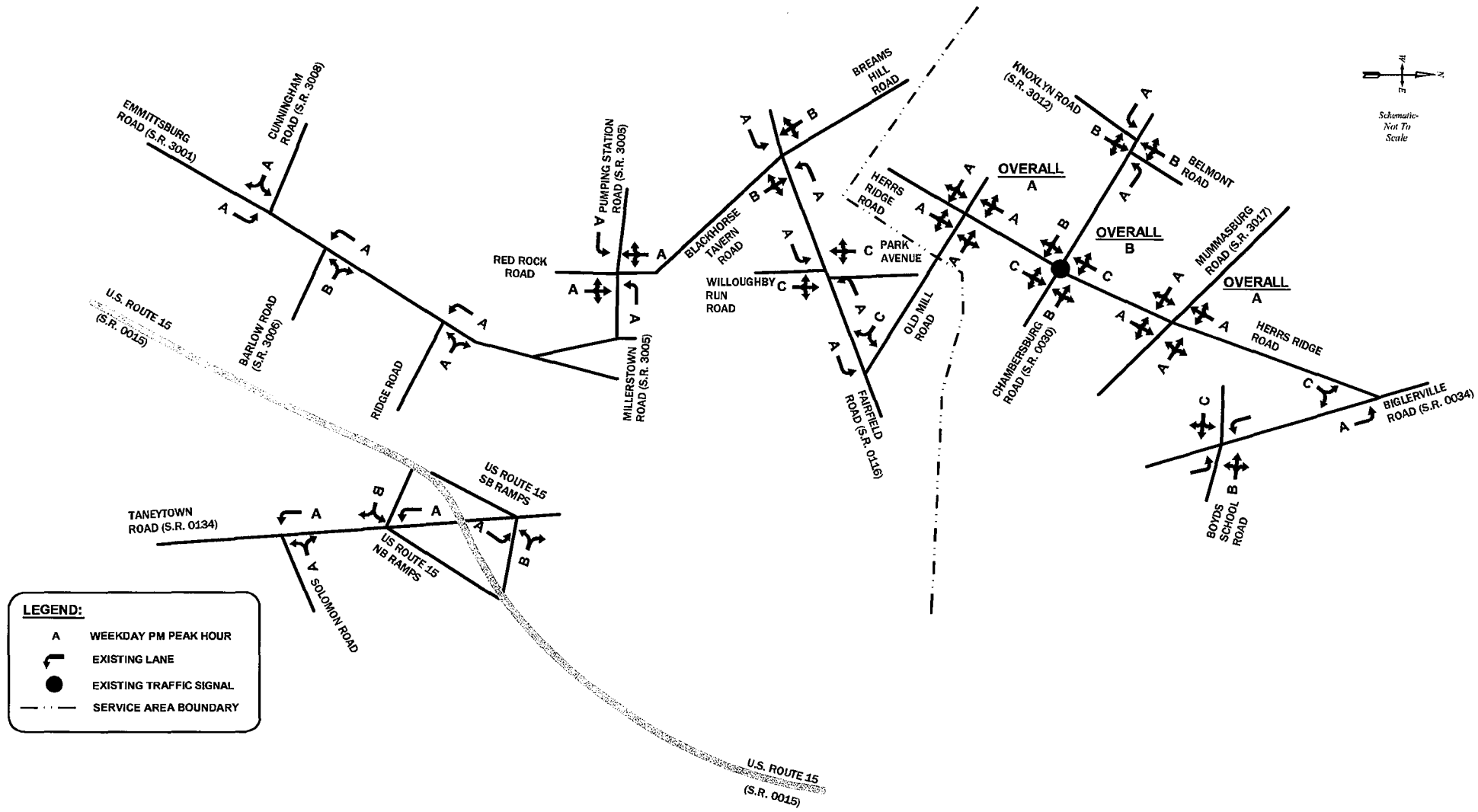

FIGURE 4
2005 Existing Weekday Afternoon Levels of Service
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CUMBERLAND TOWNSHIP, ADAMS COUNTY, PA

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FUTURE TRAFFIC CONDITIONS

Act 209 requires a minimum five-year future time horizon for the development of the *Transportation Capital Improvements Plan* and *Transportation Impact Fee Ordinance*. A 10-year time frame was selected by consensus of the Transportation Advisory Committee for the Cumberland Township Act 209 traffic analysis, which is consistent with the Act 209 design year development projections contained in the *Land Use Assumptions Report*, and produces a forecast year of 2015, the 10-years after the traffic count/data collection period.

Future Traffic Components

Total future traffic volume forecasts for 2015 include three components: existing traffic, pass-through traffic, and development traffic. The first component, **existing traffic,** was described in the previous section. The second component of future traffic projections is **pass-through traffic**, which is subdivided into the following two elements:

- The first element reflects future increases in regional traffic, which are both generated by, and destined to, locations external to the designated transportation service areas, but pass through the designated service areas along the study roadways. This first element of pass-through traffic includes traffic generated by specific known future developments located within the adjacent municipalities.

- The second element of pass-through traffic includes future development traffic generated from one designated transportation service area within the Township that passes through the other designated transportation service area within the Township. For example, while traffic generated from TSA-North is considered "development" traffic in TSA-North, this same traffic is considered "pass-through" traffic when it traverses TSA-South.

Development traffic that is generated by new development within each respective/designated transportation service area constitutes the third and final component of future 2015 traffic volumes. This section first addresses trip generation for each service area, based upon the development projections contained in the *Land Use Assumptions Report* and current development activity in the Township, as well as the trip distribution assumptions utilized in the analysis. Future pass-through traffic conditions are next described for each service area, incorporating existing traffic volumes in the service area, plus regional traffic growth (external to the Township) and development traffic generated from one service area which passes through the other service area. Finally, future 2015 development traffic conditions are defined for each service area, incorporating existing traffic volumes, future pass-through traffic volumes, and future development traffic volumes.

Trip Generation

From the *Land Use Assumptions Report*, vehicular trip generation was estimated for the 2015 weekday afternoon peak hour utilizing the Institute of Transportation Engineers publication, ***Trip***

Generation, 7th Edition. The resulting 2015 weekday afternoon peak hour trip generation is summarized in **Tables 8 and 9** for TSA-North and TSA-South, respectively.

Table 8. Vehicular "New" Trip Generation
Transportation Service Area North

Development Type	Section [1]	ITE Code	Size	Weekday Afternoon New Trips [2] In	Out	Total
Residential	1	210	121 units	80	47	127
Residential	2	210	40 units	30	17	47
Residential	3	210	60 units	43	25	68
Commercial	4	820	250,000 s.f.	363	393	756
Residential	4	220	271 units	19	10	29
Office	4	710	50,000 s.f.	19	93	112
Residential	5	210	10 units	8	5	13
Residential	6	210	40 units	30	17	47
Residential	7	210	10 units	8	5	13
Residential	8	210	30 units	23	13	36
Residential	9	210	10 units	8	5	13
Residential	10	220	20 units	19	10	29
Residential	11	220	40 units	26	14	40
Residential	11	210	10 units	8	5	13
Commercial	11	820	25,000 s.f.	30	32	62
Office	11	710	25,000 s.f.	11	56	67
Total New Trip Generation for TSA-North				**725**	**747**	**1,472**

[1] The locations of specific developments are identified and illustrated in the *Land Use Assumptions Report*.
[2] Net of "pass-by" or "diverted-link" trips.

Table 9. Vehicular "New" Trip Generation
Transportation Service Area South

Development Type	Section [1]	ITE Code	Size	Weekday Afternoon New Trips [2] In	Out	Total
Residential	1	210	30 units	23	13	36
Commercial	1	912	5,000 s.f.	60	61	121
Office	1	710	5,000 s.f.	3	17	20
Residential	2	210	120 units	79	47	126
Commercial	2	820	20,000 s.f.	23	26	49
Office	2	710	20,000 s.f.	10	47	57
Residential	3	210	20 units	16	9	25
Residential	4	210	60 units	43	25	68
Residential	5	210	40 units	30	17	47
Residential	6	210	30 units	23	13	36
Residential	7	210	60 units	43	25	68
Commercial	7	912	5,000 s.f.	60	61	121
Office	7	710	5,000 s.f.	3	17	20
Residential	8	220	80 units	40	22	62
Commercial	8	820	75,000 s.f.	164	178	342
Office	8	710	75,000 s.f.	25	125	150
Residential	9	220	80 units	40	22	62
Commercial	9	820	75,000 s.f.	164	178	342
Office	9	710	75,000 s.f.	25	125	150
Residential	10	210	20 units	16	9	25
Residential	11	210	40 units	30	17	47
Residential	12	210	10 units	8	5	13
Residential	13	210	20 units	16	9	25
Residential	14	210	20 units	16	9	25
Residential	14	220	50 units	29	16	45
Commercial	14	832	10,000 s.f.	37	25	62
Office	14	710	5,000 s.f.	3	17	20
Residential	15	210	25 units	20	11	31
Total New Trip Generation for TSA-South				**636**	**785**	**1,421**

[1] The locations of specific developments are identified and illustrated in the *Land Use Assumptions Report.*
[2] Net of "pass-by" or "diverted-link" trips.

Accordingly, **Service Area North** is estimated to experience an increase in total weekday afternoon peak hour trip generation of **1,472 new trips** over the next ten years, and **Service Area South** is estimated to experience an increase of **1,421 new trips** over the same period.

Trip Distribution

Vehicular traffic volumes generated by new development over the next ten years were generally distributed to the area roadway network based on existing travel patterns determined from the ADT volumes (Figure 1) entering and exiting the Township, as well as the locations of specific future development parcels with respect to the study roadway network and other major traffic generators and destinations. The resultant overall directions of approach and departure are indicated in **Table 10**.

Table 10. Directions of Approach and Departure

Roadway	External Location (to/from)	Arrival/Departure
Biglerville Road	south of Boyds School Road	14 %
Mummasburg Road	south of Herrs Ridge Road	7 %
Chambersburg Road	west of Knoxlyn Road	18 %
Chambersburg Road	east of Herrs Ridge Road	22 %
Fairfield Road	west of Blackhorse Tavern Road	11 %
Fairfield Road	east of Old Mill Road	16 %
Pumping Station Road	west of Blackhorse Tavern Road	1 %
Emmitsburg Road	south of Cunningham Road	6 %
Taneytown Road	south of Solomon Road	5 %

2015 Future Pass-Through Traffic

Traffic generated by new development was assigned to the Township roadways and intersections based on the previously described trip distribution assumptions. Additionally, an annual traffic growth rate of 2.4 percent per year was applied to existing weekday afternoon peak hour traffic volumes, to reflect regional traffic growth in accordance with information provided by the Adams County Office of Planning and Development for the Land Use Assumptions Report.

In addition to regional traffic growth, traffic associated with a number of developments located within surrounding municipalities (or outside the Service Areas studied but within Cumberland Township) was distributed through the township roadway network, and is included in the future traffic projections. These developments represent specific known/proposed developments identified by staff of the surrounding municipalities and the Adams County Planning Commission at the time of this study during the Land Use Assumptions preparation. Each was determined to potentially have a significant influence on the study roadways and intersections. The trip generation for these specific developments has been calculated, and is included in **Appendix G,** and the estimated portion of those development trips that will traverse Cumberland Township was distributed within the Township. In total, these known developments identified in the municipalities adjacent to Cumberland Township (or outside the Service Areas studied but within Cumberland Township) are expected to include 2,669 dwelling units, a golf course as part of a residential community, and new National Park Service Visitor center.

The 2015 future weekday afternoon peak hour pass-through traffic volumes are illustrated in **Figure 5**. Once again, these traffic volumes reflect the assignment of regional traffic growth (i.e., annual regional traffic growth trends and known developments located within surrounding municipalities) and development traffic from one transportation service area which will pass through the other transportation service area to existing traffic volumes.

2015 Future Development Traffic

As explained previously, traffic generated by new development internal to each designated transportation service area constitutes the third and final component of future 2015 traffic. The 2011 future development traffic volumes were determined based on assignment of development traffic within each

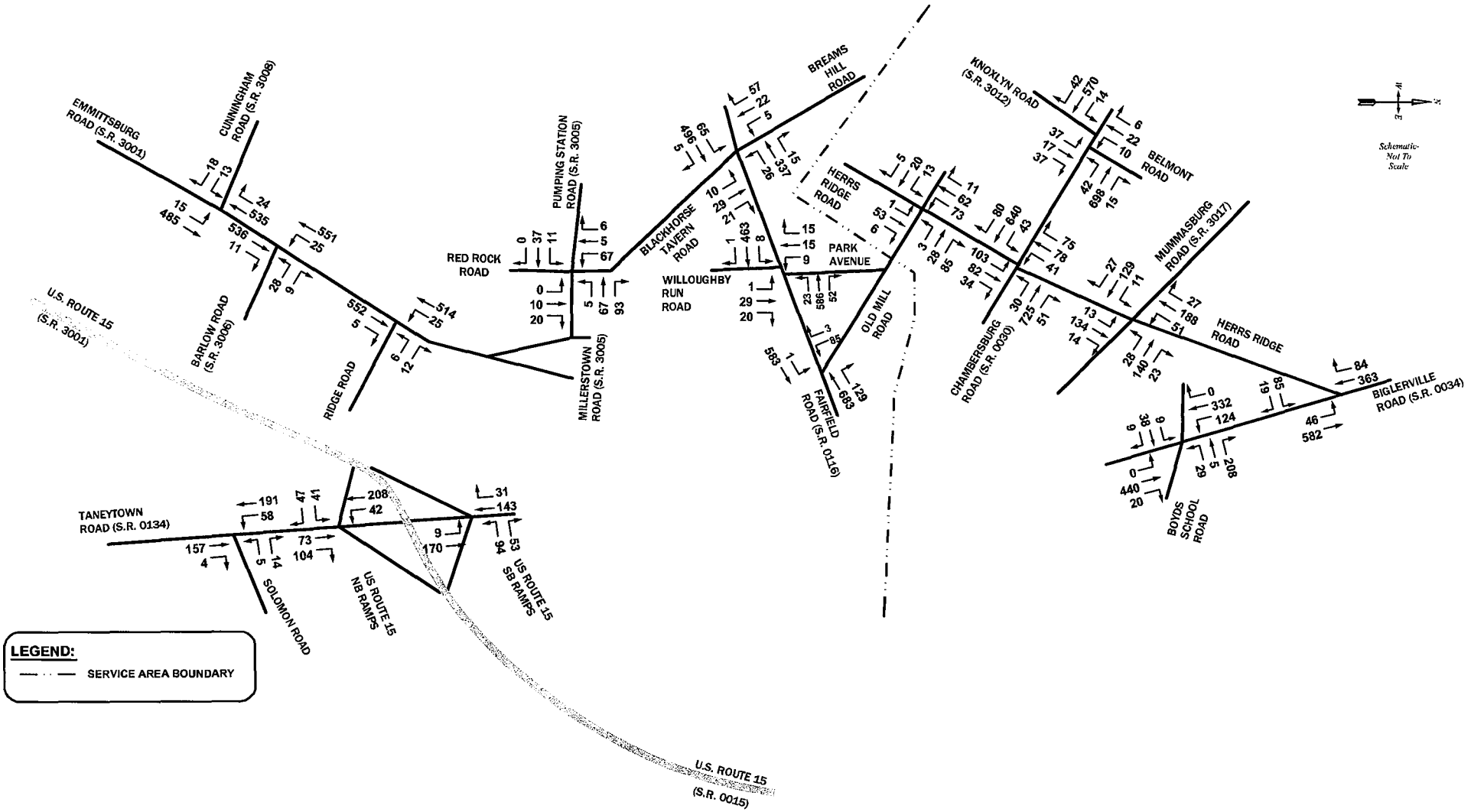

FIGURE 5

2015 Future Pass-Through Weekday Afternoon Peak Hour Traffic Volumes

CUMBERLAND TOWNSHIP ACT 209 STUDY

CUMBERLAND TOWNSHIP, ADAMS COUNTY, PA

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respective transportation service area to the study roadway network, and the addition of these volumes to 2015 future pass-through traffic volumes.

Total 2015 volumes, reflecting both future pass-through traffic and future development traffic volumes, are summarized in **Figure 6**.

2015 Future Pass-Through Traffic Levels of Service

The future 2011 pass-through traffic volumes illustrated in Figure 5 were subjected to the previously described capacity/level-of-service analysis procedures to determine 2015 pass-through levels of service. The detailed analyses are provided in **Appendix H**. As required by Act 209, the future conditions analysis was completed for future 2015 pass-through volumes for each study intersection and roadway in order to determine the incremental traffic impacts and required mitigation of future pass-through traffic as compared to existing traffic impacts and required existing traffic mitigation.

Figure 7 summarizes the results of the 2015 future pass-through traffic capacity/level-of-service analyses for the study intersections. Traffic operating conditions at the following five study intersections will not satisfy the preferred level-of-service criteria under 2015 future pass-through conditions.

- Fairfield Road and Old Mill Road
- Biglerville Road and Herrs Ridge Road
- Biglerville Road and Boyds School Road
- Chambersburg Road and Herrs Ridge Road
- Chambersburg Road and Knoxlyn Road

The roadway segment analysis indicates that each of the study roadways will continue to satisfy the preferred level-of-service criteria. The results of the 2015 future pass-through roadway segment analysis are shown in **Table 11** for each of the studied roadway segments.

Table 11. 2015 Future Pass-Through Roadway Segment Levels of Service

Roadway	Segment	TSA	LOS
Biglerville Road (S.R. 0034)	North Boyds School Road to Herrs Ridge Road	North	C
Emmitsburg Road (S.R. 3001)	North of Barlow-Greenmount Road (S.R. 3006) to Ridge Road	South	C
Chambersburg Road (S.R. 0030)	west of Herrs Ridge Road to east of Belmont Road	North	D

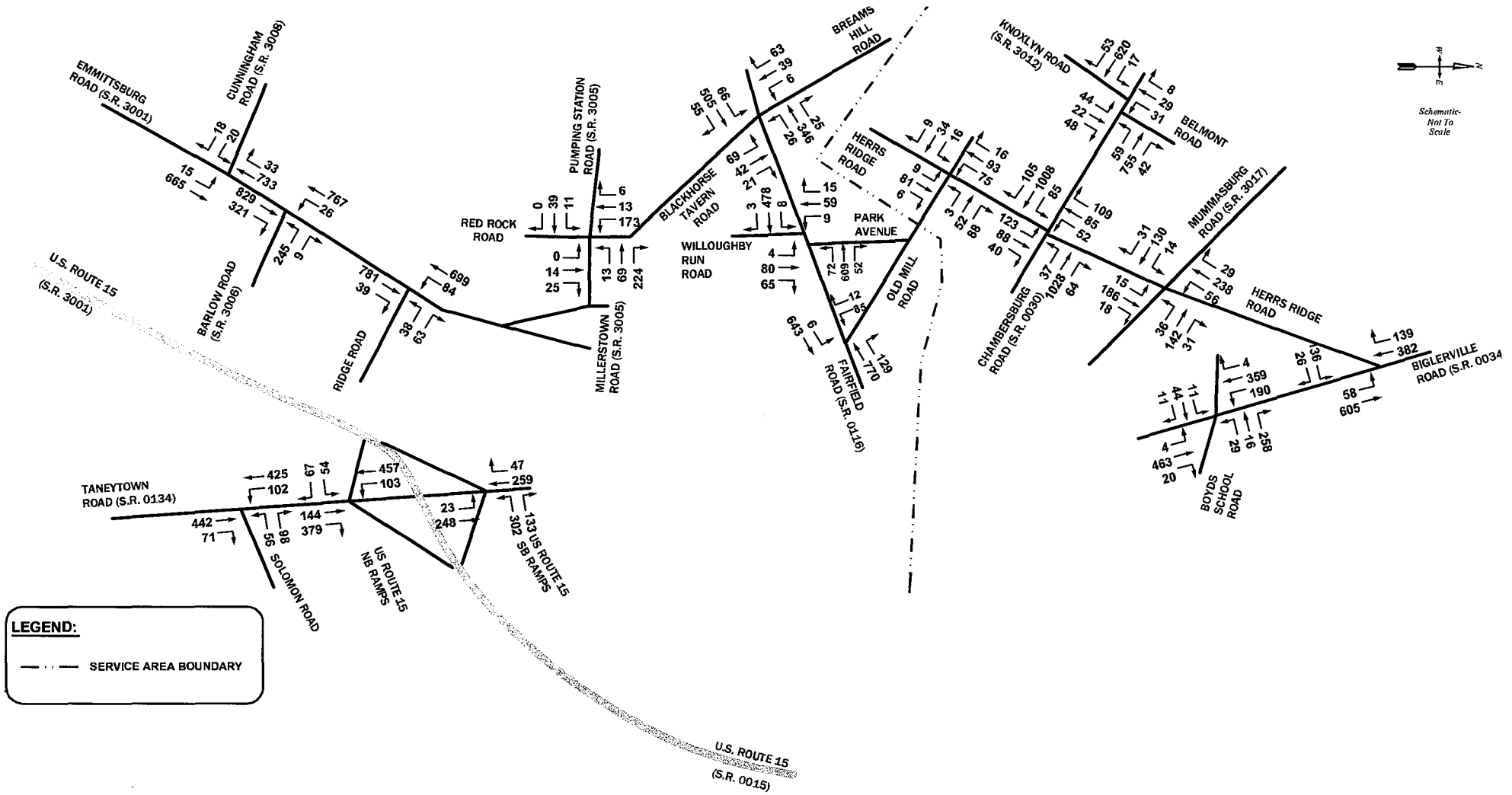

FIGURE 6

2015 Future Development Weekday Afternoon Peak Hour Traffic Volumes

CUMBERLAND TOWNSHIP ACT 209 STUDY

CUMBERLAND TOWNSHIP, ADAMS COUNTY, PA

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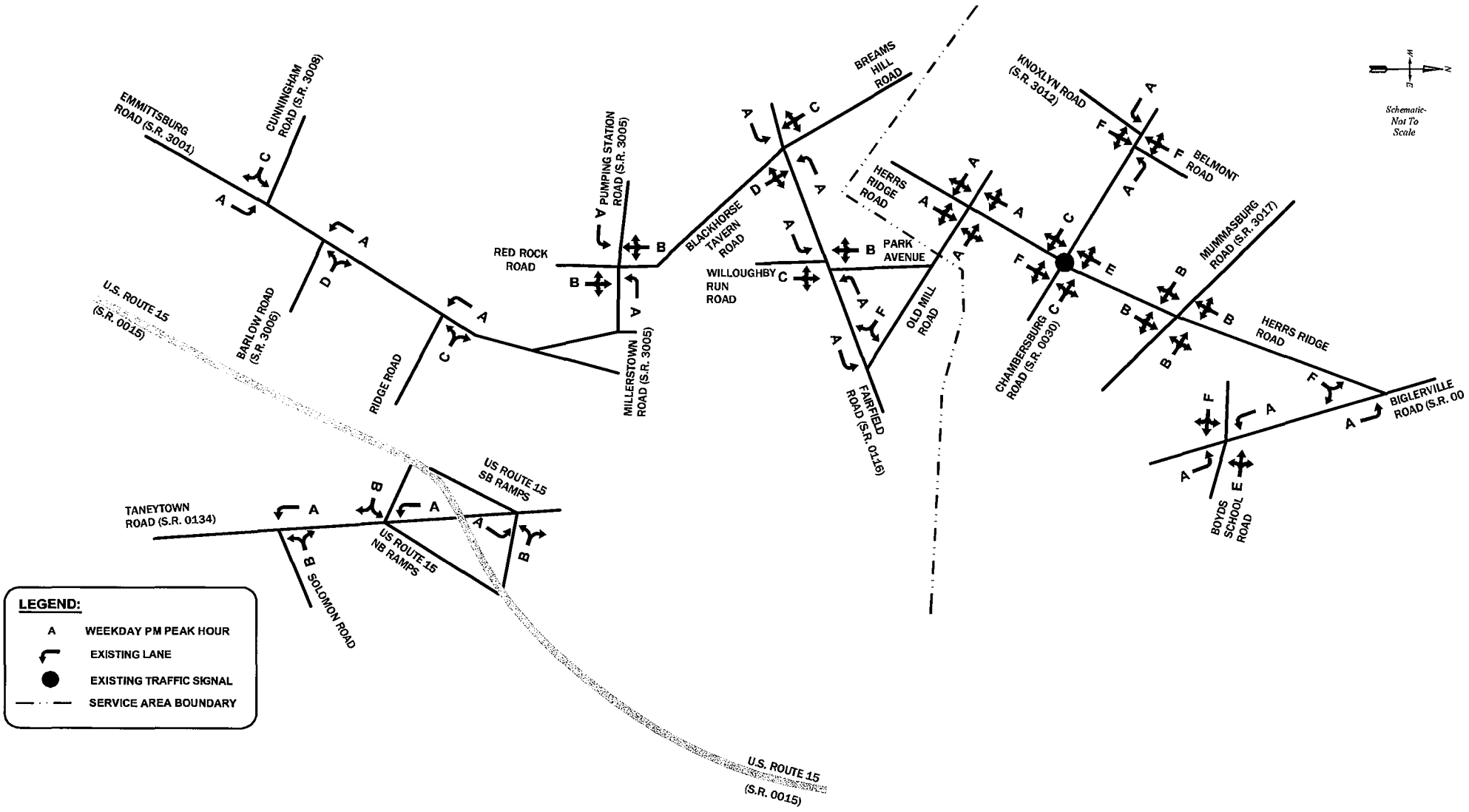

FIGURE 7
2015 Future Pass-Through Weekday Afternoon Levels of Service Without Improvements

CUMBERLAND TOWNSHIP ACT 209 STUDY

CUMBERLAND TOWNSHIP, ADAMS COUNTY, PA

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2015 Future Pass-Through Improvement Program

The additional improvements required to accommodate pass-through traffic are illustrated in **Figure 8.** These improvements, required as a result of future pass-through traffic to achieve the preferred level-of-service criteria, are also summarized in more detail in **Table 12** for each study intersection, respectively. Improvements will be required at five study intersections, four located in TSA-North and one located in TSA-South, in order to achieve the preferred levels of service under present traffic conditions. The future pass-through traffic Capital Improvement Program for both transportation service areas includes traffic signal installations and optimization, as well as geometric widening improvements.

Table 12. Future Pass-through Intersection Improvements

Intersection	Improvement	TSA
Biglerville Road (S.R. 0034)/Herrs Ridge Road	Install Traffic Signal	North
Biglerville Road (S.R. 0034)/Boyds School Road	Install Traffic Signal	North
Chambersburg Road (S.R. 0030)/Herrs Ridge Road	Install Traffic Signal and northbound left-turn lane on Herrs Ridge Road	North
Chambersburg Road (S.R. 0030)/Knoxlyn Road (S.R. 3012)	Install Traffic Signal	North
Fairfield Road (S.R. 0116)/Old Mill Road	Install Traffic Signal	South

2015 Future Development Traffic Levels of Service

The future development traffic volumes presented in Figure 6 were subject to the previously described capacity/level-of-service analysis procedures to determine future 2015 development levels of services and the detailed analyses are provided in **Appendix I.** The 2015 future development LOS conditions are illustrated in **Figure 9**, and indicate that the following seven study intersections will not satisfy the preferred level-of-service criteria, and will require further improvements beyond the previously identified future pass-through improvements.

- Chambersburg Road and Herrs Ridge Road
- Fairfield Road and Park Avenue
- Fairfield Road and Blackhorse Tavern Road/Breams Hill Road
- Emmitsburg Road and Ridge Road
- Emmitsburg Road and Barlow-Greenmount Road
- Taneytown Road and US Route 15 Southbound ramps
- Taneytown Road and US Route 15 Northbound off-ramp/Solomon Road

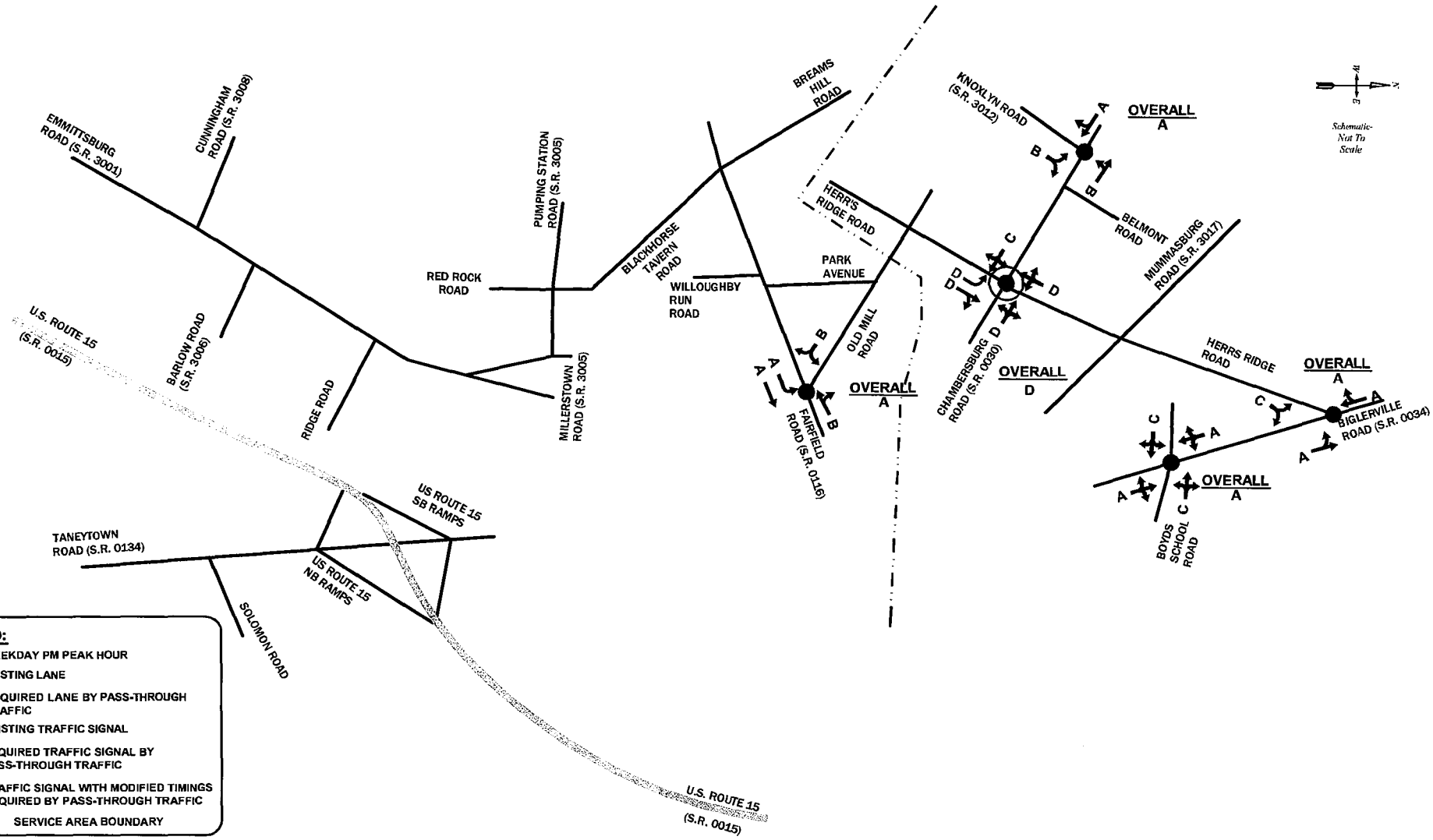

FIGURE 8

2015 Future Pass-Through Weekday Afternoon Levels of Service With Improvements

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CUMBERLAND TOWNSHIP, ADAMS COUNTY, PA

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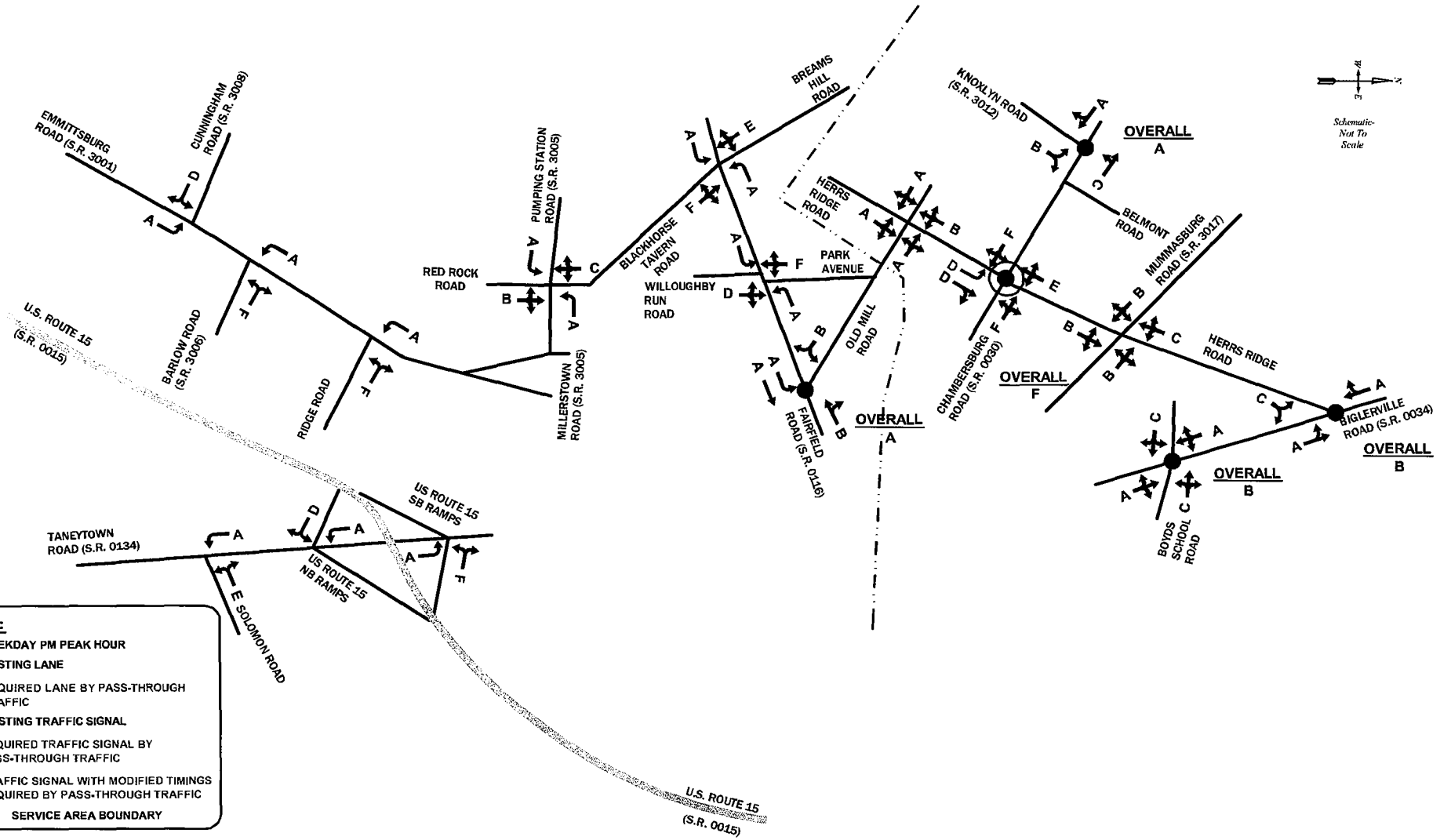

FIGURE 9

2015 Future Development Weekday Afternoon Levels of Service Without Improvements

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The roadway segment analysis indicates that two of the study roadways will not satisfy the preferred level-of-service criteria: (1) Chambersburg Road, between Herrs Ridge Road and Belmont Road, and (2) Emmitsburg Road, between Ridge Road and Barlow-Greenmount Road. To remedy the level of service deficiencies, both Chambersburg Road and Emmitsburg Road are recommended to be widened to a three-lane cross-section plus shoulders, having one travel lane in each direction and a continuous two-way left-turn lane in the center. The results of the 2015 future development roadway segment analysis without improvements are shown in **Table 13** for each of the studied roadway segments.

Table 13. 2015 Future Development Roadway Segment Levels of Service without Improvements

Roadway	Segment	TSA	LOS
Biglerville Road (S.R. 0034)	North Boyds School Road to Herrs Ridge Road	North	D
Emmitsburg Road (S.R. 3001)	North of Barlow-Greenmount Road (S.R. 3006) to Ridge Road	South	D
Chambersburg Road (S.R. 0030)	west of Herrs Ridge Road to east of Belmont Road	North	E

2015 Future Development Improvement Program

The improvements necessary to achieve the preferred level-of-service criteria under 2015 development traffic conditions at the study intersections and roadways are summarized in **Table 14**, and are also illustrated in **Figure 10**. In summary, improvements will be required at seven study intersections and on two roadway segments to accommodate development-generated traffic within the transportation service areas and maintain the established preferred levels of service.

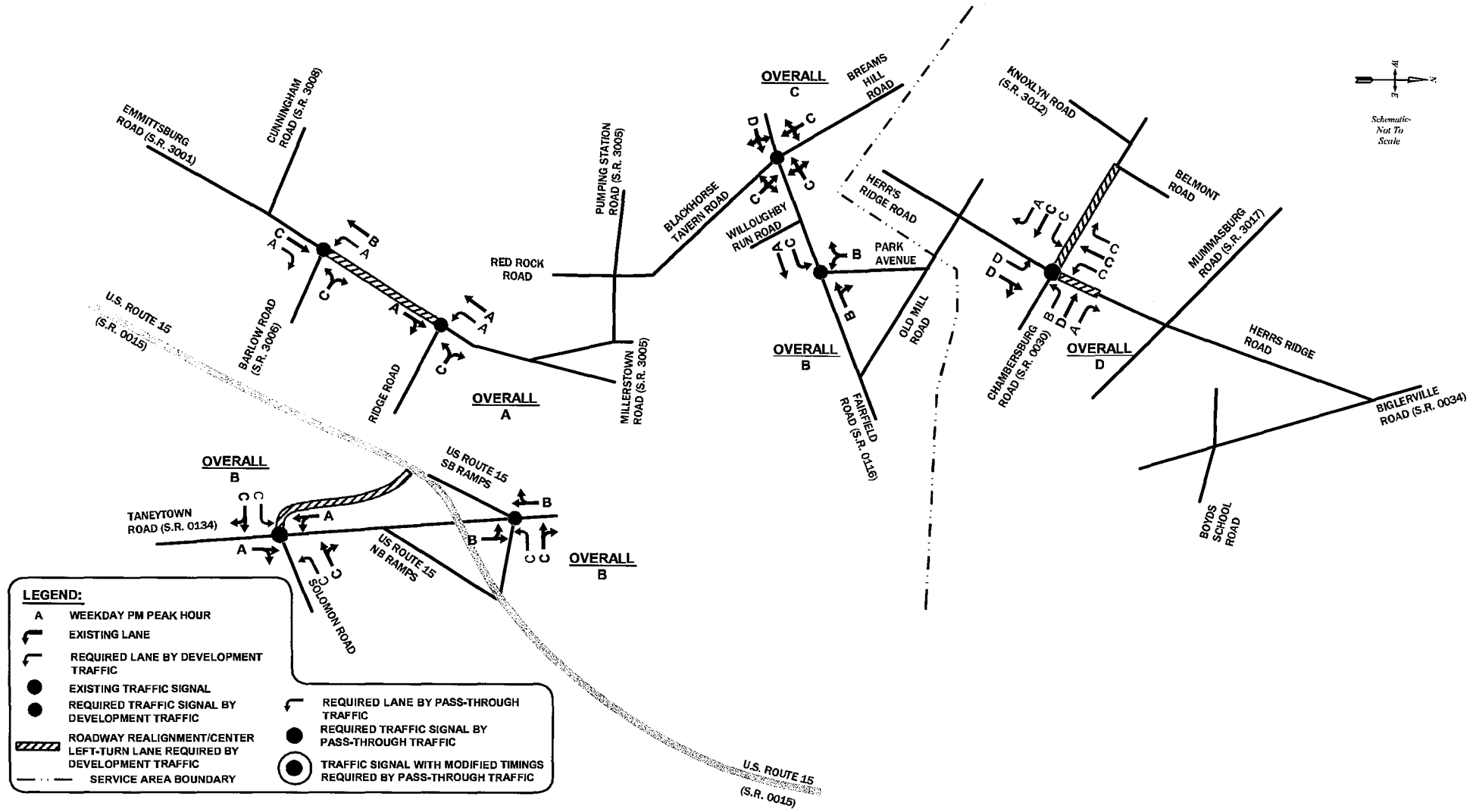

FIGURE 10

2015 Future Development Weekday Afternoon Levels of Service With Improvements

CUMBERLAND TOWNSHIP ACT 209 STUDY

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Table 14. Future Development Intersection/Roadway Improvements

Intersection/Roadway	Improvement	TSA
Chambersburg Road (S.R. 0030)/Herrs Ridge Road	Install left and right-turn lanes on the southbound approach of Herrs Ridge Road, as well as the eastbound and westbound approach of Chambersburg Road (S.R. 0030)	North
Chambersburg Road (S.R. 0030)	Install center left-turn lane from Herrs Ridge Road to Belmont Road	North
Fairfield Road (S.R. 0116)/Park Avenue	Install Traffic Signal and signal ahead signage, as required per sight requirements	South
Fairfield Road (S.R. 0116)/Blackhorse Tavern Road/Breams Hill Road	Install Traffic Signal	South
Emmitsburg Road (S.R. 3001)/Ridge Road	Install Traffic Signal	South
Emmitsburg Road (S.R. 3001)/Barlow-Greenmount Road (S.R. 3006)	Install Traffic Signal, southbound left-turn lane, and northbound right-turn lane	South
Emmitsburg Road (S.R. 3001)	Install center left-turn lane from Ridge Road to Barlow-Greenmount Road	South
Taneytown Road (S.R. 0134)/US Route 15 Southbound Ramps	Install Traffic Signal and westbound left-turn lane on US Route 15 Southbound off-ramp	South
Taneytown Road (S.R. 0134)/US Route 15 Northbound off-ramp/Solomon Road	Install Traffic Signal, realign US Route 15 Northbound off-ramp, install westbound left-turn lane on Solomon Road and eastbound left-turn lane on US Route 15 Northbound off-ramp	South

Other Transportation Improvements

The Township should continue to consider additional transportation capital improvement projects beyond those identified in the *Cumberland Township Roadway Sufficiency Analysis* and *Transportation Capital Improvements Plan* in order to meet its future transportation needs. Moreover, the *Roadway*

Sufficiency Analysis should facilitate the transportation recommendations or vision contained in the *Cumberland Township Comprehensive Plan,* and should provide a resource or reference for any future updates of the *Comprehensive Plan*, but should not be considered as a replacement for the *Comprehensive Plan.*

Cumberland Township may also wish to consider several transportation improvement projects beyond those identified in this *Roadway Sufficiency Analysis*, as well as the resulting *Transportation Capital Improvements Plan.* These projects may include, but not be limited to, improvements at non-study intersections, upgrades of roadways along new development frontages, as well as the following:

- Access Management Plan for Biglerville Road (S.R. 0034), Fairfield Road (S.R. 0116), Emmitsburg Road (S.R. 3001) and Chambersburg Road (S.R. 0030) – It is recommended that the Township consider implementing access management plans for these roadways, to limit the number of intersections (particularly additional signalized intersections and left-turn unsignalized movements) accessed by new development. Moreover, it may be desirable to also include consolidation of certain existing accesses in a future access management treatment, as appropriate, as well as establish "floating easements" between developed and undeveloped properties for frontage road connections.

- Signal Interconnection – Closed-Loop system design is recommended for consideration in the future on the major corridors leading to and from Gettysburg, with the possibility of the Borough of Gettysburg also connecting into the closed loop system as well. The new signals to be installed as necessary when signal warrants are satisfied, as identified in the Roadway Sufficiency Analysis and for specific development access points along the major corridors, should be designed as closed-loop system ready.

- Signal Specifications – The Township should consider having signal specifications prepared for installation of all future signals in order to achieve conformity and the ability to interconnect communication, be available for all contractors and others to utilize for design and construction purposes, and to achieve an identity of signals within the municipality.

TRANSPORTATION CAPITAL IMPROVEMENTS PLAN

This section summarizes Cumberland Township's *Transportation Capital Improvements Plan,* resulting from the *Roadway Sufficiency Analysis.* In accordance with Act 209, the following public notification requirements were met:

1. Public Notice of a public hearing on the *Transportation Capital Improvements Plan* was published two successive weeks, between seven and thirty days from the date of the hearing, in the _____.
2. The *Transportation Capital Improvements Plan* was available for public inspection at the Township building at least ten working days prior to the hearing.
3. The public hearing was held on the *Transportation Capital Improvements Plan* to receive comments on June 27, 2006.

Following the public hearing, the *Transportation Capital Improvements Plan* was adopted by the Township Board of Supervisors by resolution, along with the Roadway Sufficiency Analysis, on June 27, 2006.

The *Transportation Capital Improvements Plan* consists of two sections, which are described below, and includes the ***2015 Future Pass-Through Transportation Capital Improvements Program*** and the ***2015 Future Development Transportation Capital Improvements Program***. There were no transportation capital improvements triggered by existing conditions analyses (2005).

2015 Future Pass-Through Transportation Capital Improvements Program

The 2015 Future Pass-Through Transportation Capital Improvements Program is summarized in **Table 15,** and details the improvements necessary to achieve the preferred levels of service under future 2015 pass-through conditions. Table 15 also provides cost allocations for the improvements, indicating the portions of the total cost for which the Township and PennDOT should be responsible. **The total cost of the Future Pass-through Transportation Capital Improvements Program is approximately $888,000, with $736,000 for TSA-North and $152,000 for TSA-South.** The anticipated completion year for each of the improvements is also included in Table 15.

2015 Future Development Transportation Capital Improvements Program

The Future Development Transportation Capital Improvements Program is summarized in **Table 16,** and details the improvements necessary to achieve the preferred levels of service under future 2015 development traffic conditions. Table 16 also provides cost allocations for the improvements, indicating the portions of the total cost for which the Township, PennDOT, and future development should be responsible. **The total cost of the Future Development Transportation Capital Improvement Program is approximately $9,877,000, with $4,224,000 for TSA-North and $5,653,000 for TSA-South.** The anticipated completion year for each of the improvements is also included in Table 16.

Table 15
Pass Through Improvements Cost Estimates - TSA South

Int. No.	Intersection or Corridor	Improvements Required	Total Project Cost	Allocated Funding			Construction Completion
				PennDOT Costs	Others Costs	Township Costs	
6	Fairfield Road (Route 116) and Old Mill Road	Install Traffic Signal	$152,000	$50,667	$0	*$101,333*	2015
		Totals	$152,000	$50,667	$0	$101,333	

Pass Through Improvements Cost Estimates - TSA North

Int. No.	Intersection or Corridor	Improvements Required	Total Project Cost	Allocated Funding			Construction Completion
				PennDOT Costs	Others Costs	Township Costs	
1	Biglerville Road (Route 34) and Herrs Ridge Road	Install Traffic Signal	$152,000	$50,667	$0	*$101,333*	2015
2	Biglerville Road (Route 34) and Boyds School Road	Install Traffic Signal	$175,000	$43,750	$0	*$131,250*	2015
4	Chambersburg Road (Route 30) and Knoxlyn Road (Route 3012)	Install Traffic Signal	$152,000	$76,000	$0	*$76,000*	2015
5	Chambersburg Road (Route 30) and Herrs Ridge Road	Install NB left-turn lane, traffic signal modifications	$257,000	$64,250	$0	*$192,750*	2015
		Totals	$736,000	$234,667	$0	$501,333	
			$888,000	*$285,333*	*$0*	*$602,667*	
				32.1%	*0.0%*	*67.9%*	

Table 16
Development Improvements Cost Estimates - TSA North

Int. No.	Intersection or Corridor	Improvements Required	Total Project Cost	Allocated Funding			Construction Completion
				PennDOT Costs	Others Costs	Developer Costs	
5	Chambersburg Road (Route 30) and Herrs Ridge Road	Install SB left-turn and right-turn lane, install WB left-turn and right-turn lane, install EB left-turn (continue as center left-turn lane through Belmont Road) and right-turn lane, traffic signal modifications	$4,224,000	$1,056,000	$0	**$3,168,000**	2015
		Totals	$4,224,000	$1,056,000	$0	**$3,168,000**	

Development Improvements Cost Estimates - TSA South

Int. No.	Intersection or Corridor	Improvements Required	Total Project Cost	Allocated Funding			Construction Completion
				PennDOT Costs	Others Costs	Developer Costs	
7	Fairfield Road (Route 116) and Park Avenue	Install Traffic Signal	$152,000	$50,667	$0	**$101,333**	2015
8	Fairfield Road (Route 116) and Blackhorse Tavern Road/Breams Hill Road	Install Traffic Signal	$175,000	$43,750	*$0*	**$131,250**	2015
10	Emmitsburg Road (Route 3001) and Ridge Road	Install SB left-turn lane, install traffic signal	$360,000	$120,000	*$0*	**$240,000**	2015
11	Emmitsburg Road (Route 3001) and Barlow-Greenmount Road (S.R. 3006)	Install SB center left-turn lane, install traffic signal	$3,214,000	$1,607,000	*$0*	**$1,607,000**	2015
13	Taneytown (Route 134) and Route 15 Southbound Ramp	Install WB left-turn lane, install traffic signal	$345,000	$172,500	*$0*	**$172,500**	2015
14/16	Taneytown (Route 134) and Route 15 Northbound Off-Ramp/Solomon Road	Install 100' EB left-turn lane on Route 15 NB Off-Ramp, Install 100' WB left-turn lane on Solomon Road, Install Traffic Signal	$1,407,000	$527,625	*$0*	**$879,375**	2015
		Totals	$5,653,000	$2,521,542	$0	**$3,131,458**	
			$9,877,000	*$3,577,542*	*$0*	*$6,299,458*	
				36.2%	*0.0%*	*63.8%*	

Improvements Summary

The total costs of the Cumberland Township *Transportation Capital Improvements Plan*, which includes existing, pass-through, and development improvements, are summarized in **Table 17**. As indicated, the total cost of the *Transportation Capital Improvements Plan* is approximately **$10,765,000**, and is allocated to the Township (approximately 6 percent), to PennDOT (approximately 36 percent), and to future development (approximately 58 percent).

Impact Fee

The impact fee calculations for development improvements are summarized in **Table 18** for each transportation service area.

Table 18. Transportation Impact Fee by Service Area

Transportation Service Area	Development Capital Improvement Costs[1]	Development Trips	Impact Fee[2],[3]
TSA-North	$3,168,000	1,472 trips	***$2,159***
TSA-South	$3,141,458	1,421 trips	***$2,210***

[1] Inclusive of the prorata share of costs incurred for the completion of the *Roadway Sufficiency Analysis* that is attributable to development ($10,153 in TSA-North and $10,036 in TSA-South, as allocated by the cost of development-warranted improvements in each TSA).

[2] To be assessed on a per weekday afternoon peak hour trip basis.

[3] Development capital improvement costs divided by new development trips (rounded down to nearest dollar).

Table 17

Overall Study Intersections/Roadways

	Cost Allocations				
	PennDOT	**Others**	**Township**	**Development**	**Total**
Existing Program	$0.00	$0.00	$0.00	$0.00	***$0.00***
Pass-Through Program	$285,333.33	$0.00	$602,666.67	$0.00	***$888,000.00***
Development Program	$3,577,541.67	$0.00	$0.00	$6,299,458.33	***$9,877,000.00***
	$3,862,875.00	***$0.00***	***$602,666.67***	***$6,299,458.33***	***$10,765,000.00***

Allocation	35.88%	0.00%	5.60%	58.52%
Cost of RSA	34500			
	TSA North	$3,168,000.00	0.502900382	0.29
	TSA South	$3,131,458.33	0.497099618	0.29
	Total	$6,299,458.33		