

Technical Memorandum

US 30 Coatesville-Downingtown Bypass Traffic Study



July 2008



Delaware Valley Regional Planning Commission
190 North Independence Mall West, 8th Floor
Philadelphia, PA 19106-1520

Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty, and intercity agency which provides continuing, comprehensive, and coordinated planning to shape a vision for the future growth of the Delaware Valley region. The region includes Bucks, Chester, Delaware, and Montgomery counties as well as the City of Philadelphia, in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer counties in New Jersey. DVRPC provides technical assistance and services, conducts high priority studies that respond to the request and demands of member state and local governments, fosters cooperation among various constituents to forge a consensus on diverse regional issues, determines and meets the needs of the private sector, and practices public outreach efforts to promote two-way communication and public awareness of regional issues and the commission.



Our logo is adapted from the official DVRPC seal, and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole while the diagonal bar signifies the Delaware River. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey.

DVRPC is funded by a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Pennsylvania and New Jersey departments of transportation, as well as by DVRPC's state and local member governments. The authors, however, are solely responsible for its findings and conclusions, which may not represent the official views or policies of the funding agencies.

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I. INTRODUCTION

US 30 extends across the United States, from the coast of Oregon to Atlantic City, New Jersey. Much of the historic Lincoln Highway, the first coast-to-coast roadway to be completed, became part of US 30 following its designation in 1926. In Pennsylvania, US 30 runs east-west across the southern part of the state, passing through Pittsburgh, York, Lancaster, and Philadelphia on its way from the West Virginia state line to the Benjamin Franklin Bridge.

The Coatesville-Downingtown Bypass, which was built in the early 1960s, extends from just east of PA 10 (Octorara Trail) in Sadsbury Township to the Exton Bypass near the East Caln/West Whiteland township line, in Chester County, Pennsylvania. This facility generally parallels US 30 Business (Lincoln Highway/West Lancaster Avenue) and provides a bypass around Coatesville City, Downingtown and South Coatesville boroughs, and the commercial portions of Caln, East Caln, and Valley townships.

The Pennsylvania Department of Transportation (PENNDOT) is developing a reconstruction plan for the Coatesville-Downingtown Bypass. Elements of this plan may include the completion of the partial interchanges at Airport Road, Norwood Road, and PA 113, the elimination of the Norwood Road interchange, collector-distributor roads between Norwood Road and PA 113, the provision of a westbound truck-climbing lane from PA 340 to Reeceville Road, and the construction of an additional through lane in each direction east of PA 340.

This memo documents the results of a traffic study that examines the effects on traffic volumes resulting from the various elements of the reconstruction plan. Both 2010 and 2030 traffic forecasts were prepared and will be used to complete the required planning studies and provide design volumes for the proposed US 30 Coatesville-Downingtown Bypass reconstruction project.

Chapter II of this report documents the existing characteristics of the study area, including counted daily and AM and PM peak hour traffic volumes. Chapter III describes the alternatives analyzed in the study. Chapter IV explains the travel forecasting methodology, including a description of the travel simulation model used to develop the traffic projections. The study area's population and employment projections, which provide necessary inputs into the travel model, are also presented in this chapter. Chapter V presents an analysis of the requested daily and peak hour traffic forecasts. Finally, conclusions drawn from the traffic study are listed in Chapter VI.

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II. BASE YEAR TRAFFIC VOLUMES

The study area is located in western Chester County and is shown in Figure 1. It extends from West Sadsbury Township to West Whiteland Township. In addition to these two townships, it includes the municipalities of Atglen, Downingtown, Modena, Parkesburg, and South Coatesville boroughs; Coatesville City; and Caln, East Bradford, East Brandywine, East Caln, East Fallowfield, Highland, Sadsbury, Uwchlan, Valley, West Brandywine, West Bradford, and West Caln townships.

The Coatesville-Downingtown Bypass is a four-lane, limited-access, urban freeway for its entire length. Along its approximately 14-mile distance are interchanges with Airport Road, PA 82 (Manor Road), Reeceville and Fisherville roads, PA 340 (Bondsville Road), US 322 (Horseshoe Pike/Manor Avenue), Norwood Road, PA 113 (West Uwchlan Avenue), and US 30 Business at Quarry Road.

A. Base Year Average Daily Traffic Volumes

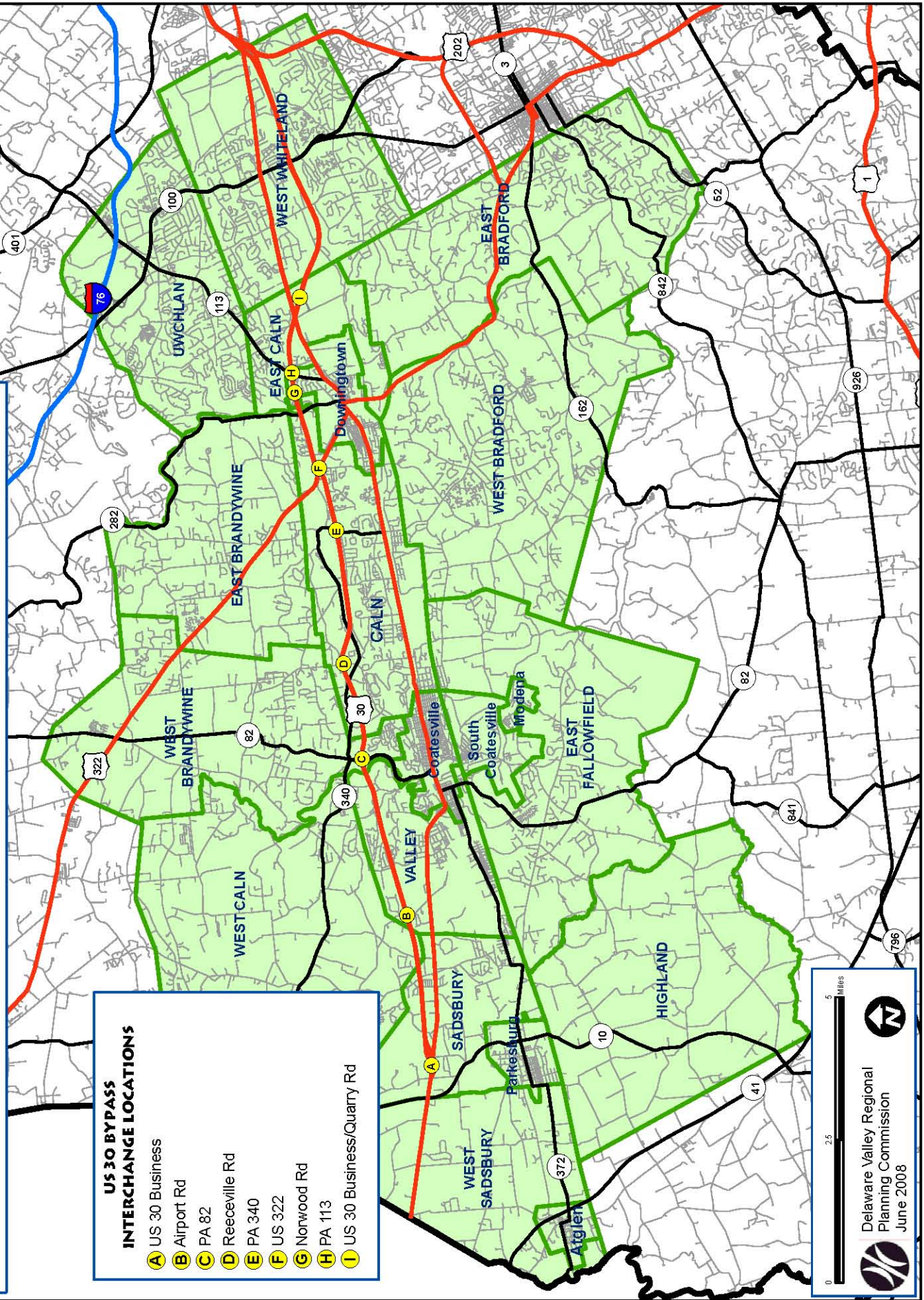
This traffic study is primarily concerned with the Coatesville-Downingtown Bypass, although other facilities, including those that have interchanges with the Bypass and some parallel roads, are also considered. Figures 2A - 2E display the base year average annual daily traffic (AADT) volumes for these facilities. For this analysis, the base year is defined as 2003, which is when data collection activities were undertaken in support of this traffic study.

Base year traffic volumes along the Coatesville-Downingtown Bypass range from 20,400 to 61,500 vehicles per day (vpd). The lowest volume occurs at its western terminus, near PA 10. Traffic volumes steadily increase as one moves east until they reach their highest value between Norwood Road and PA 113. East of PA 113, daily volumes decrease to 46,000 vpd, and remain at a nearly identical volume (45,500 vpd) as the Coatesville-Downingtown Bypass becomes the Exton Bypass.

Volumes on US 30 Business vary from 5,800 to 23,800 vpd. The highest volume occurs between PA 10 and the US 30 Bypass, while the lowest volume occurs between the Bypass and Airport Road. At most other locations along US 30 Business, daily traffic volumes are between 12,000 and 18,700 vpd.

High volume facilities that cross the Coatesville-Downingtown Bypass include Reeceville Road, which carries between 9,400 and 15,000 vpd; US 322, which carries between 13,100 and 16,700 vpd; and PA 113, which carries between 14,300 and 19,700 vpd. Most of the other crossing facilities carry 10,000 vpd or less.

Figure 1. US 30 Coatesville-Downingtown Bypass Traffic Study Area



US 30 BYPASS

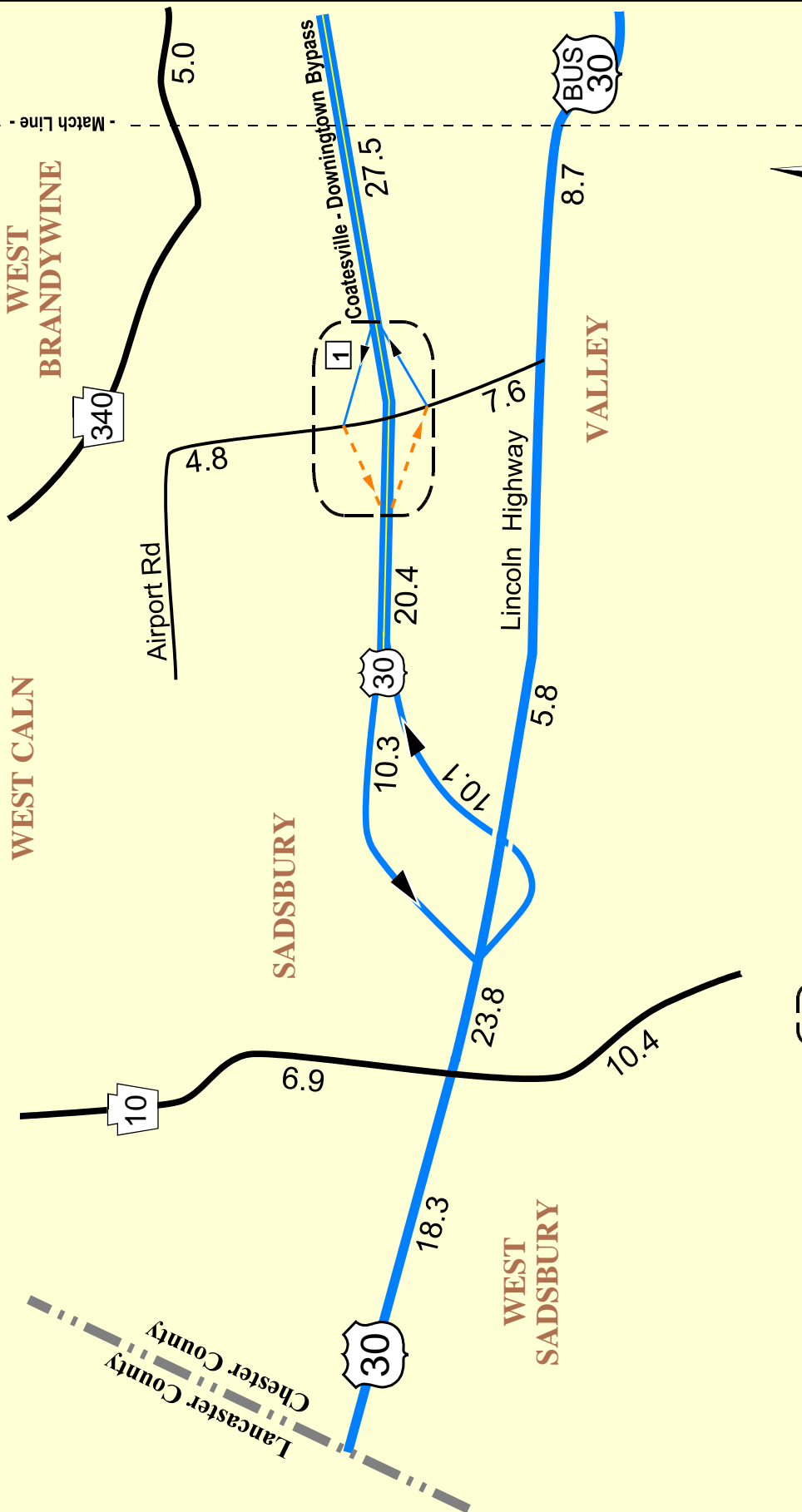
INTERCHANGE LOCATIONS

- A** US 30 Business
- B** Airport Rd
- C** PA 82
- D** Reeceville Rd
- E** PA 340
- F** US 322
- G** Norwood Rd
- H** PA 113
- I** US 30 Business/Quarry Rd

0 2.5 5 Miles

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 2A. Base Year Average Daily Traffic Volumes



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See Figure 2D for Interchange Volumes

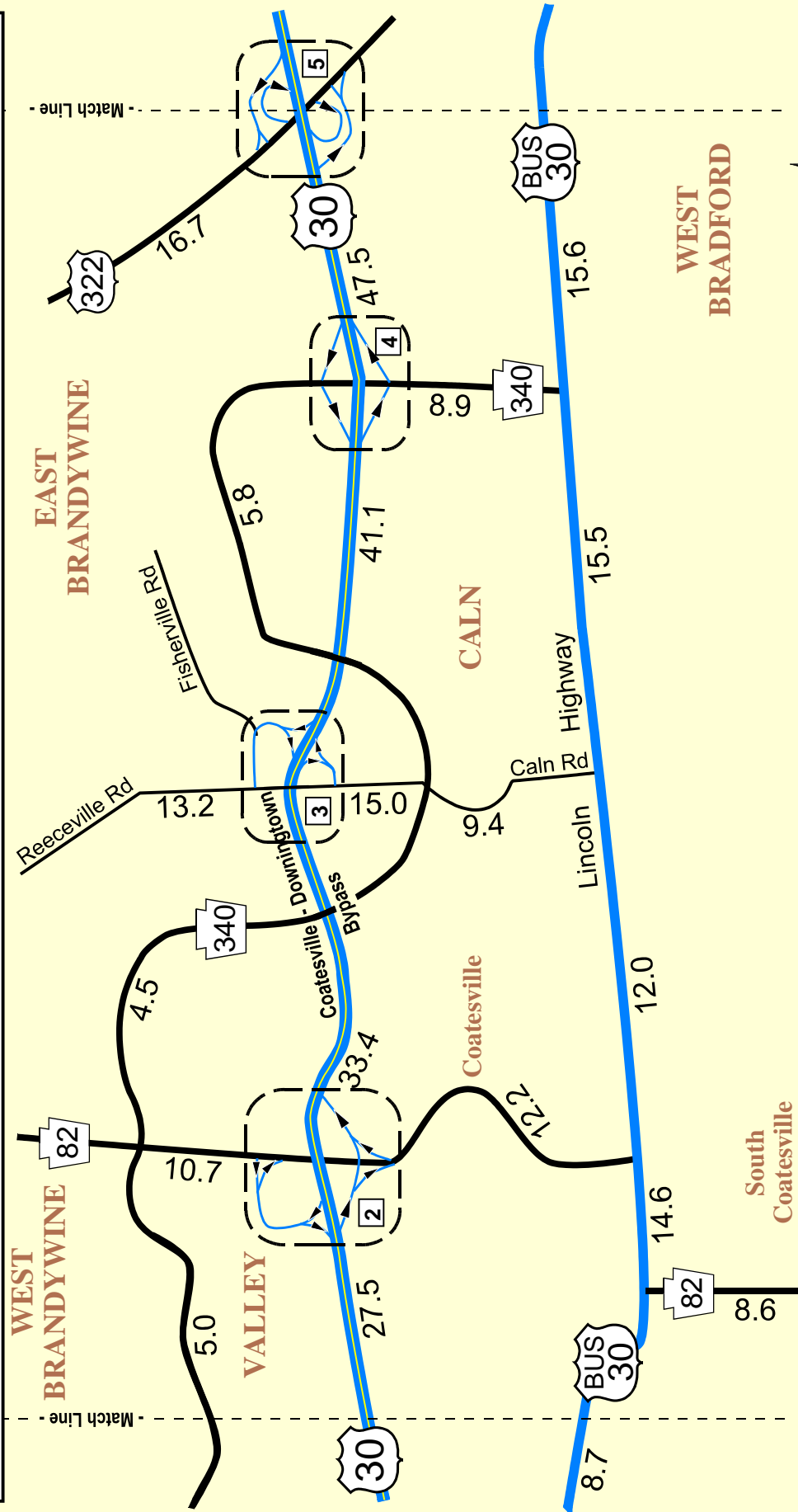
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Base Year AADT (000s)



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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 2B. Base Year Average Daily Traffic Volumes



See Figure 2D for Interchange Volumes

Base Year AADT (000s)



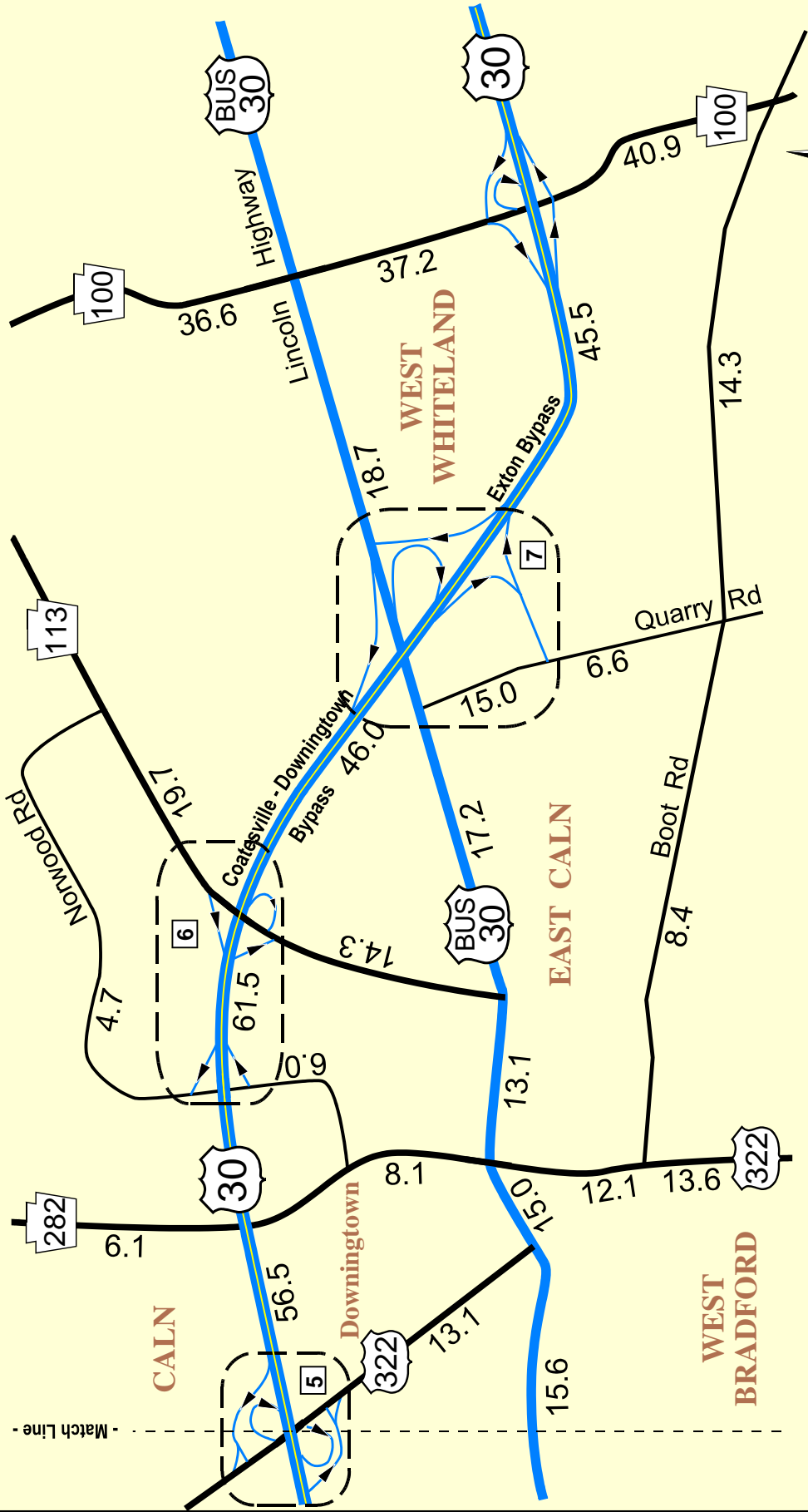
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Figure 2C. Base Year Average Daily Traffic Volumes



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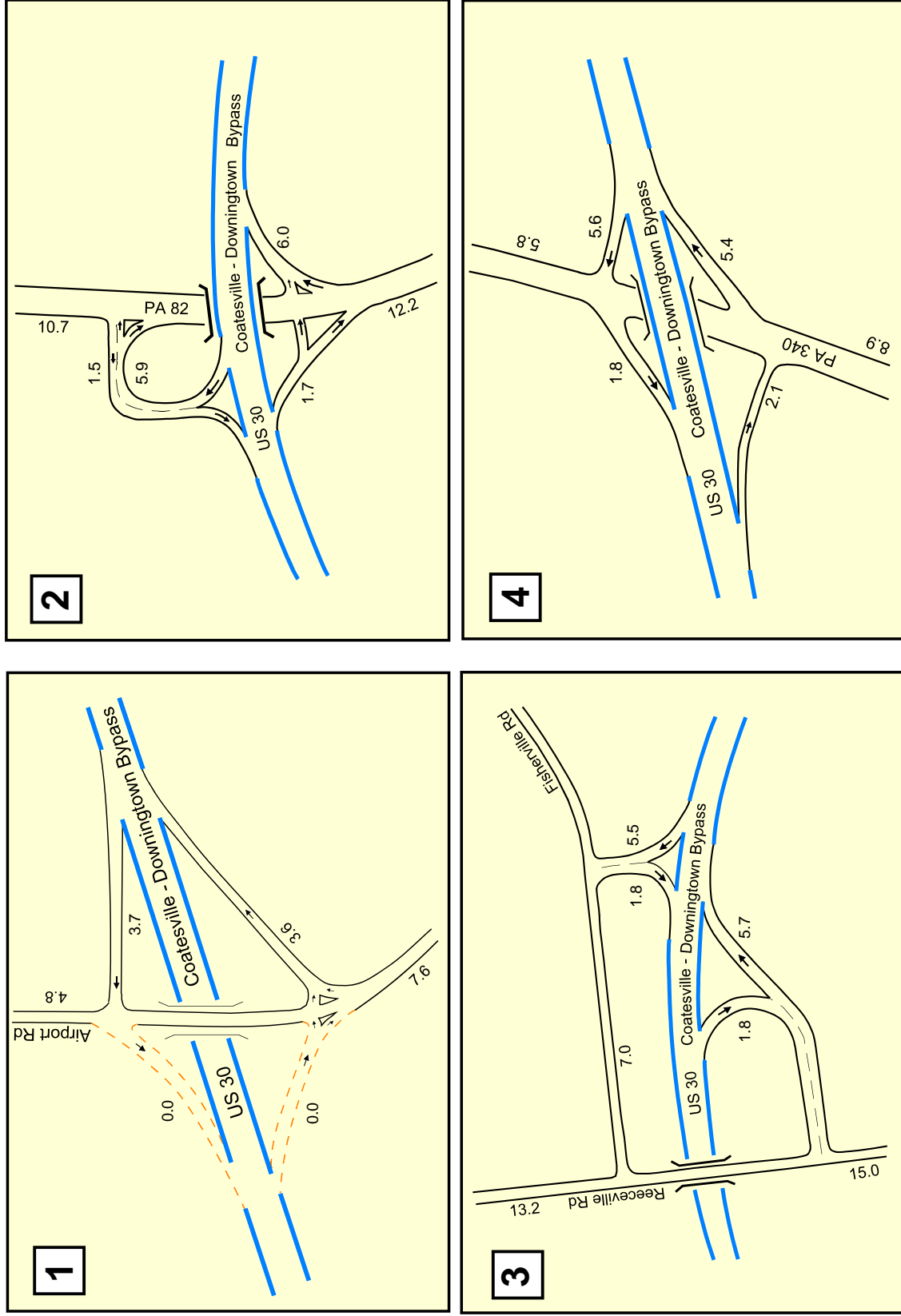
[6] See Figure 2E for Interchange Volumes

13.6 Base Year AADT (000s)

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Figure 2D. Base Year Average Daily Traffic Volumes

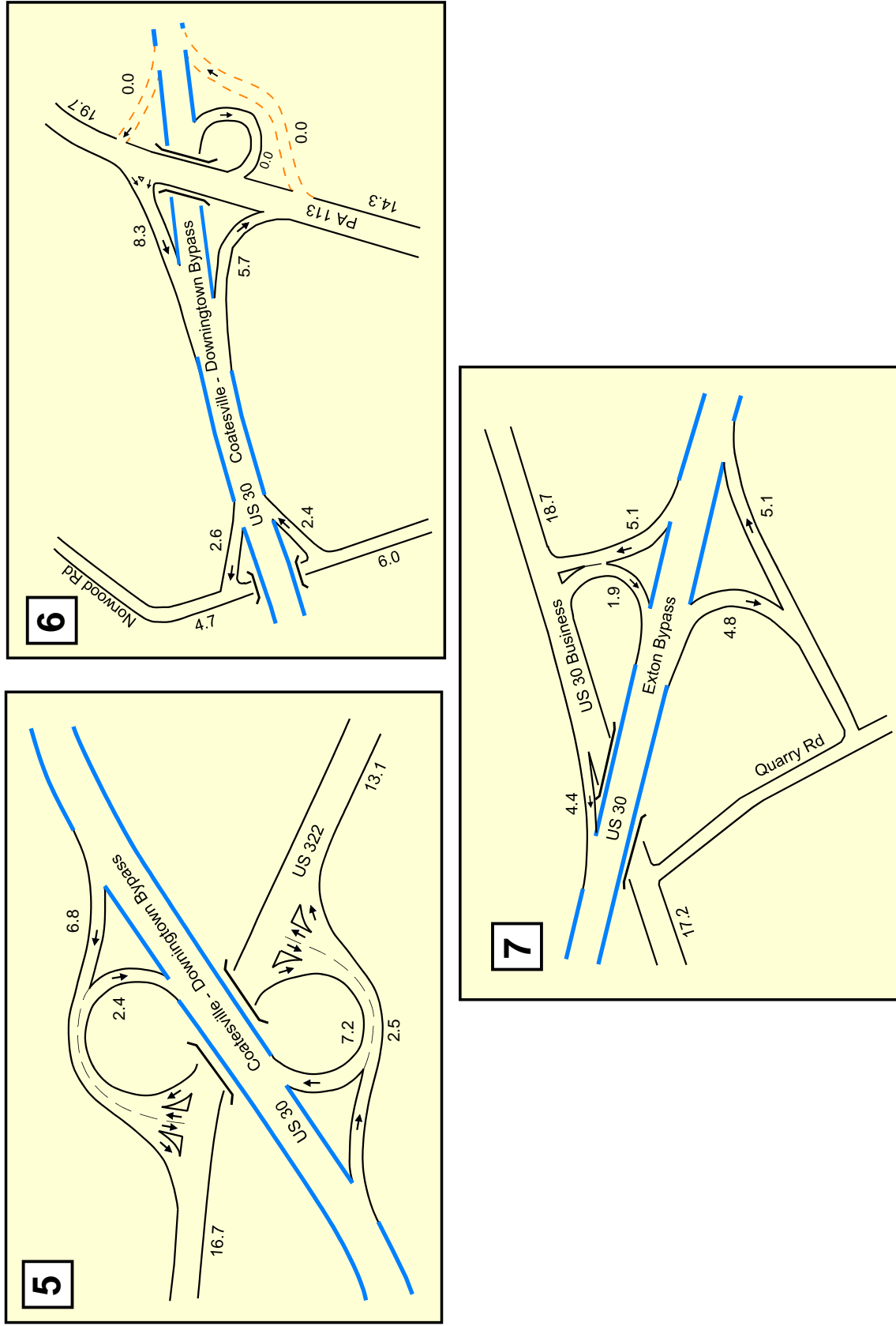


0.0 Base Year AADT (000s)



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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 2E. Base Year Average Daily Traffic Volumes



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0.0 Base Year AADT (000s)

Most of the interchange ramps along the US 30 Bypass serve considerably higher volumes to and from the east, compared to the western direction. For example, at the PA 340 interchange, the eastbound on-ramp to US 30 Bypass carries 5,400 vpd and the westbound off-ramp carries 5,600 vpd. In contrast, the eastbound off-ramp and westbound on-ramp, which serve traffic to and from the west, carry only 2,100 and 1,800 vpd, respectively.

The highest volume interchange ramps along the Coatesville-Downingtown Bypass include the westbound on-ramp from PA 113 (8,300 vpd), the eastbound on-ramp from US 322 (7,200 vpd), the westbound off-ramp to US 322 (6,800 vpd), and the eastbound on-ramp from PA 82 (6,000 vpd). All other ramps in the study area serve less than 6,000 vpd.

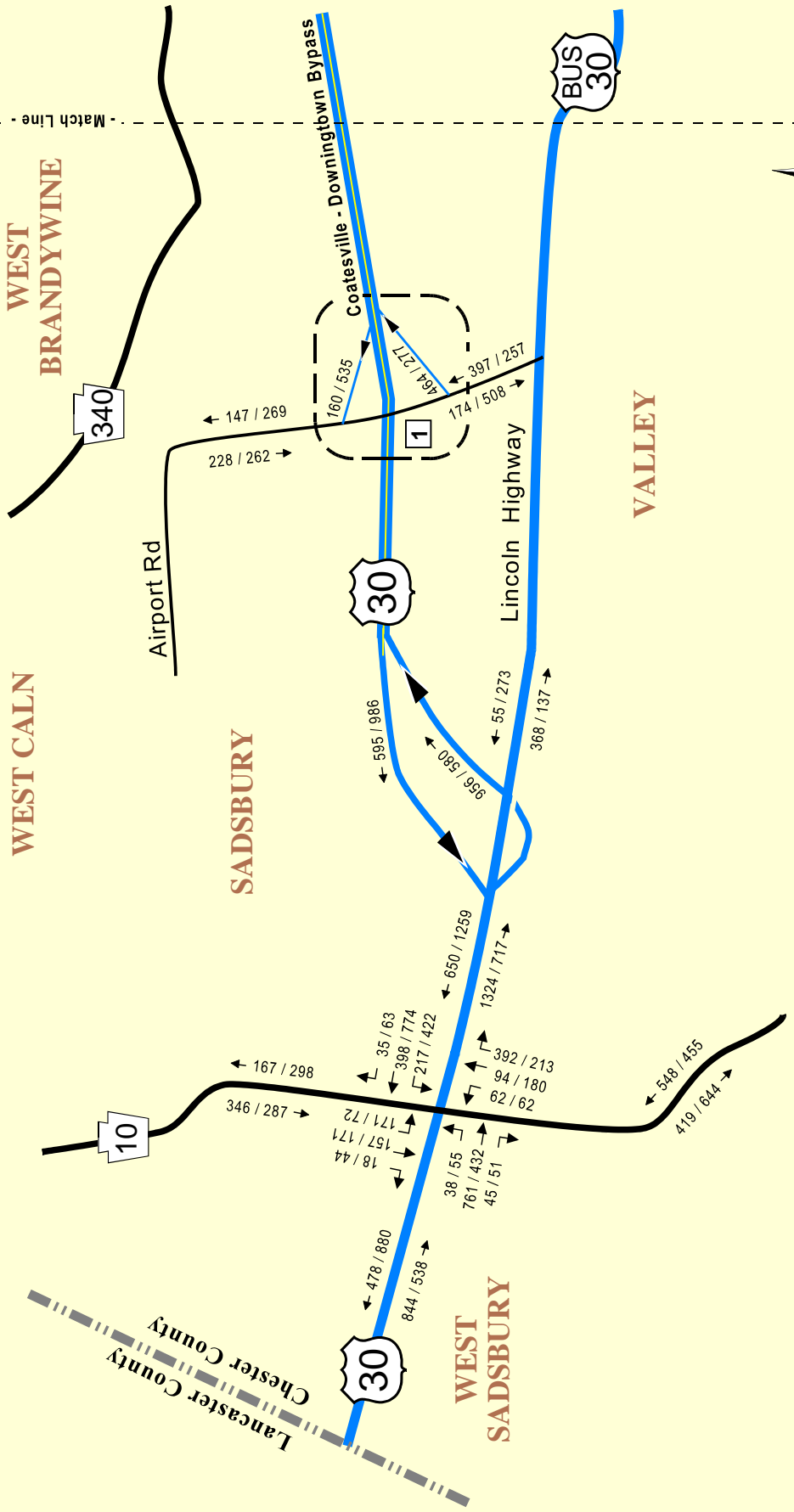
B. Base Year AM and PM Peak Hour Volumes

Base year AM and PM peak hour traffic volumes were also collected along the US 30 Bypass and its ramps. In addition, peak hour turning movement counts were taken at the intersections of the on- and off-ramps and crossing streets, as well as at several other key intersections in the study area. These volumes are displayed in Figures 3A - 3F. During the AM peak hour, the eastbound direction of the Bypass experiences the higher volumes, while the westbound direction has higher volumes during the PM peak hour.

During the AM peak hour, eastbound volumes along the Coatesville-Downingtown Bypass range from 956 to 4,133 vehicles per hour (vph). These volumes increase steadily as one moves east, from Airport Road to PA 113. Once past PA 113, eastbound AM peak hour volumes drop to just over 3,700 vph. In the westbound direction during the AM peak hour, US 30 volumes range from 595 to 1,526 vph, with the highest volume occurring between the PA 113 and Norwood Road interchanges.

During the PM peak hour, eastbound Bypass volumes range from 580 to 1,949 vpd. Again, these volumes increase as one moves from west to east, peaking just before the PA 113 interchange. Westbound volumes are considerably higher and range from 986 to 4,211 vph. These volumes generally decrease as one moves from east to west along the Bypass.

**US 30 Coatesville-Downingtwn Bypass Traffic Study
 Figure 3A. Base Year AM and PM Peak Hour Traffic Volumes**



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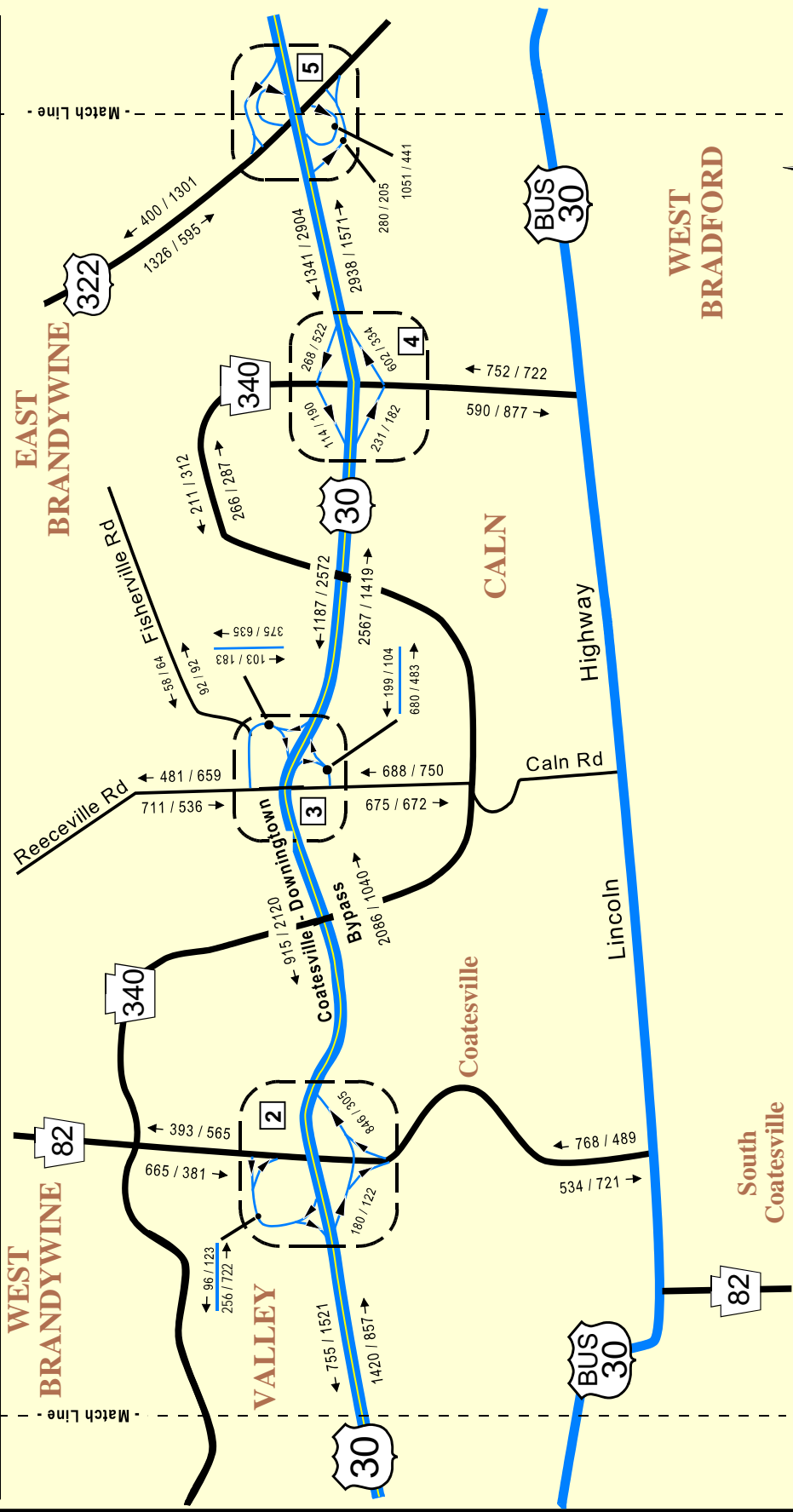
See Figure 3D for Interchange Volumes
 Base Year AM / PM Peak Hour Volumes



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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 3B. Base Year AM and PM Peak Hour Traffic Volumes



See Figure 3D for Interchange Volumes
 Base Year AM / PM Peak Hour Volumes

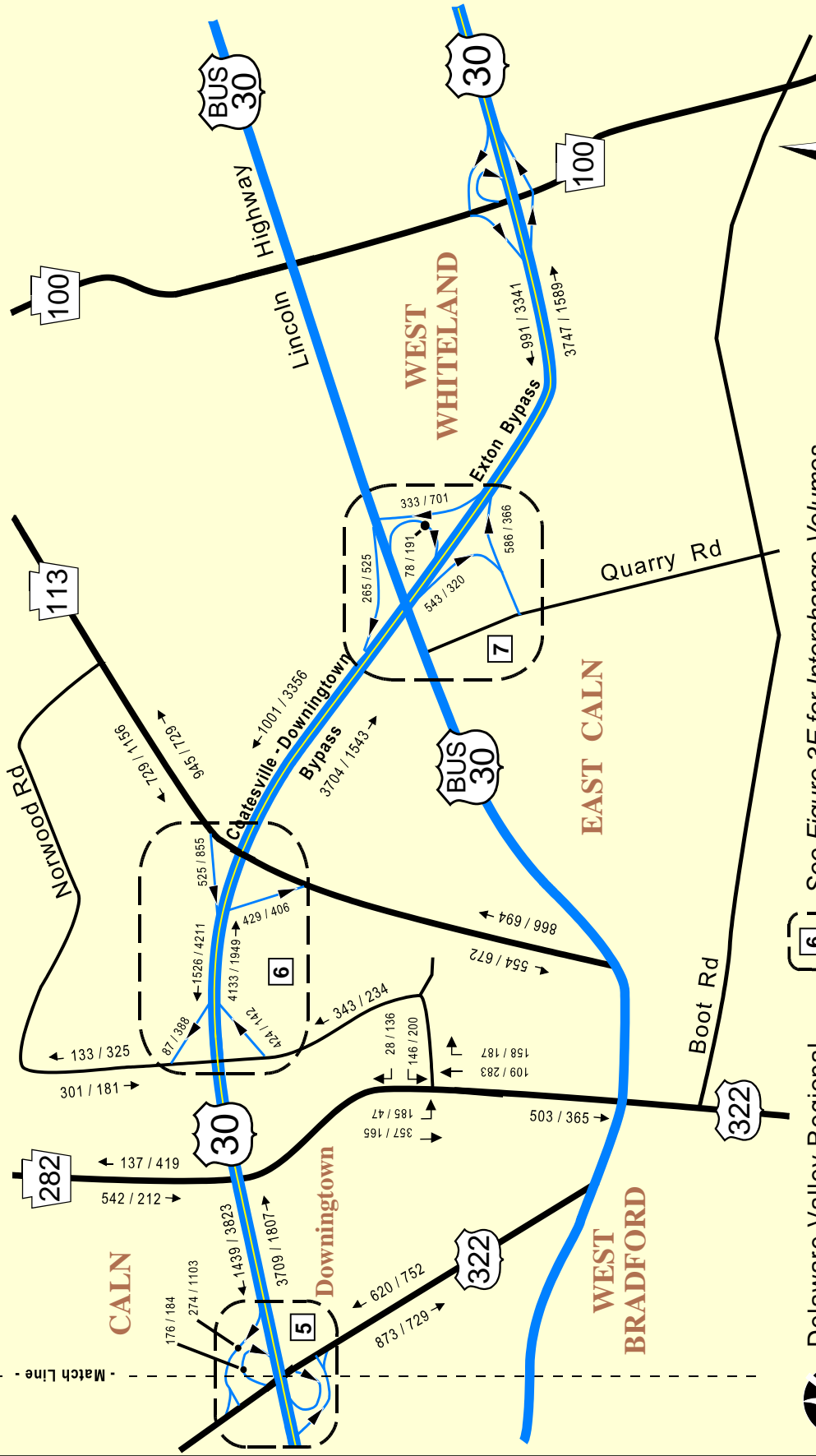


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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 3C. Base Year AM and PM Peak Hour Traffic Volumes

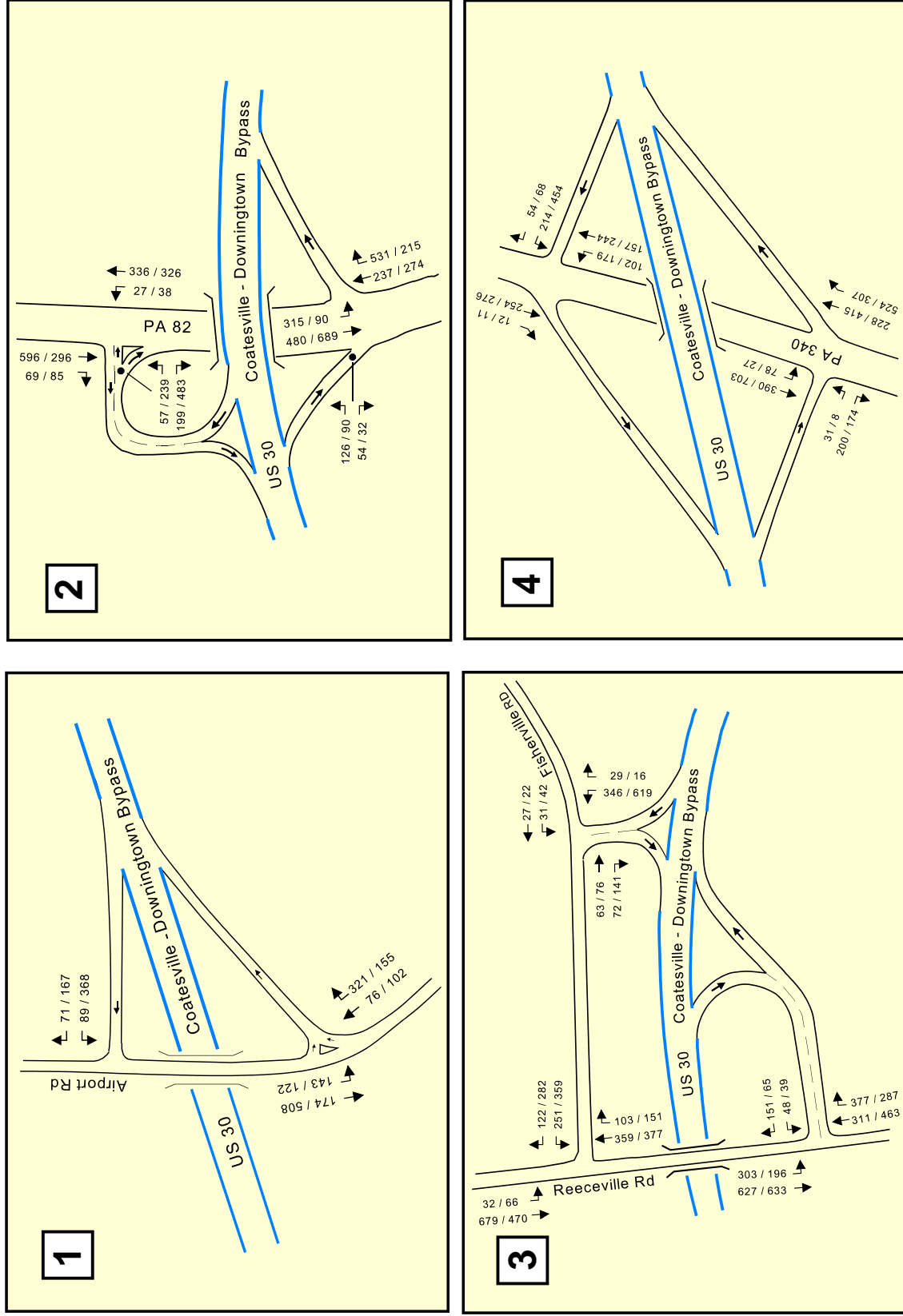


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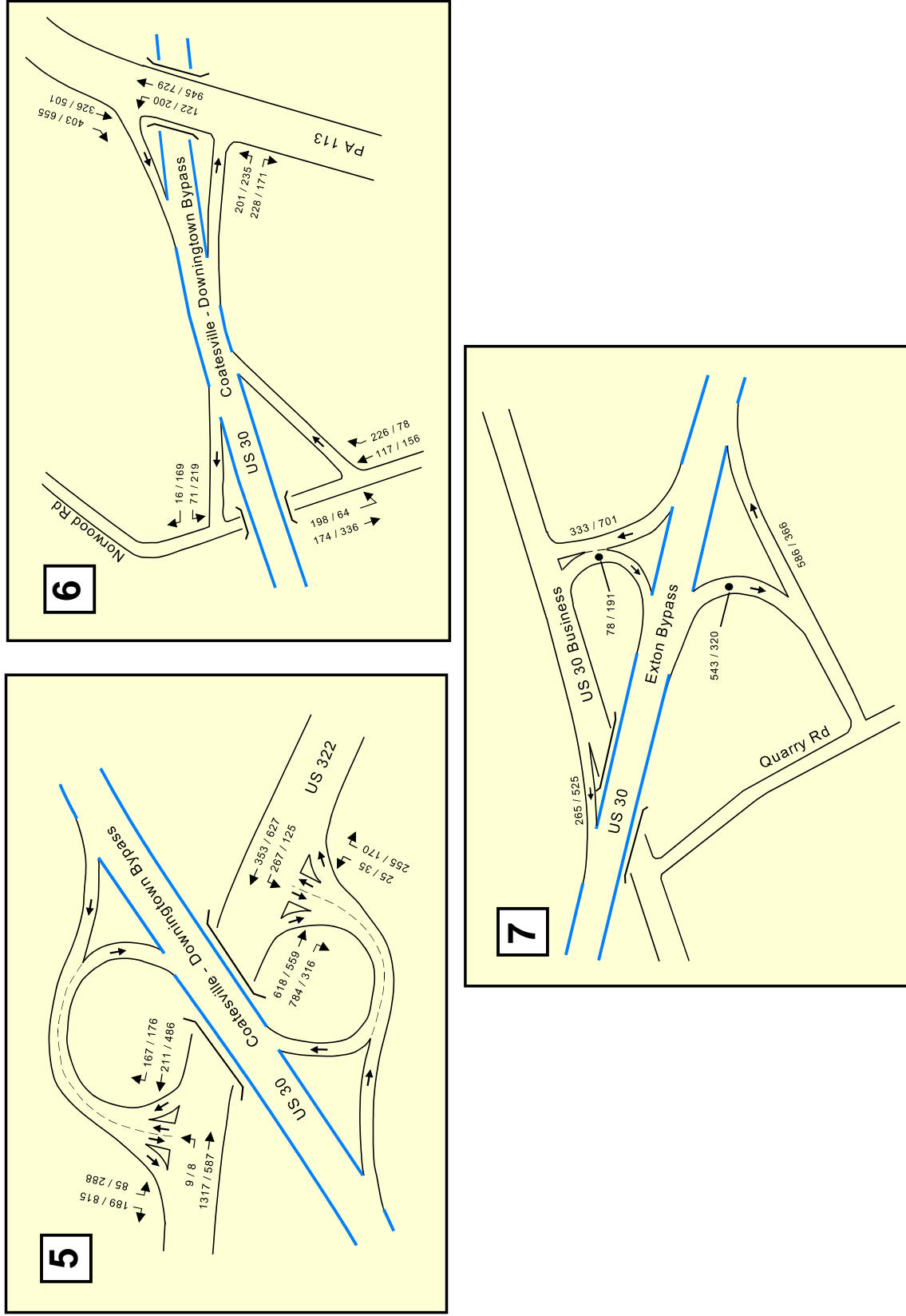
See Figure 3E for Interchange Volumes
 Base Year AM / PM Peak Hour Volumes

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 3D. Base Year AM and PM Peak Hour Traffic Volumes



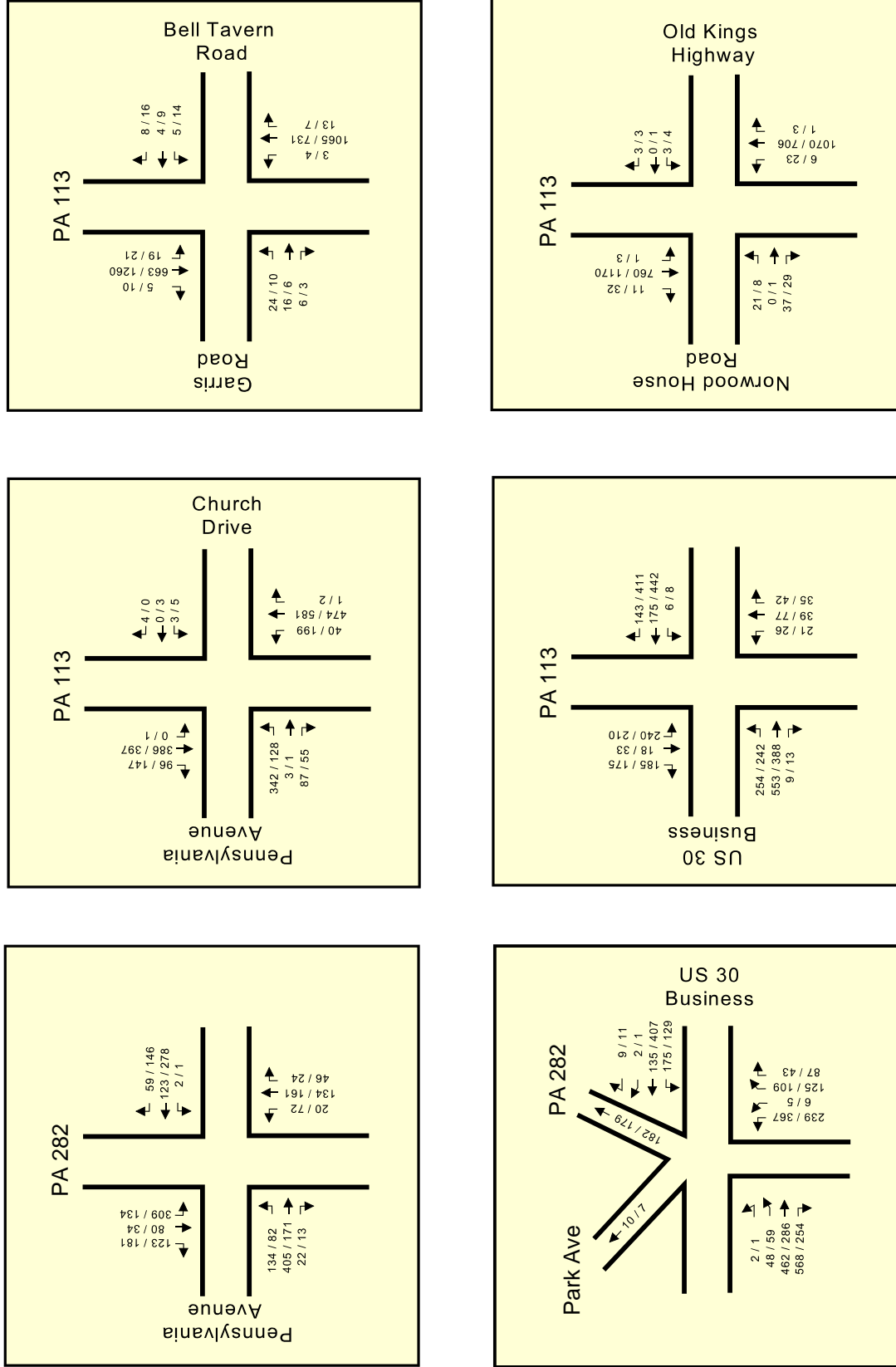
US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 3E. Base Year AM and PM Peak Hour Traffic Volumes



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US 30 Coatesville-Downtowner Bypass Traffic Study
Figure 3F. Base Year AM and PM Peak Hour Traffic Volumes



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Base Year AM / PM Peak Hour Volumes

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III. IMPROVEMENT ALTERNATIVES

Traffic forecasts are prepared and evaluated for the years 2010 and 2030 under four different highway network alternatives: a No-Build and three Build alternatives. For each of these alternatives, DVRPC's travel simulation model is modified to reflect the alternative under consideration and is used to prepare travel forecasts representative of that scenario. The No-Build Alternative provides a useful future-year reference against which any impacts associated with the Build alternatives may be compared and quantified.

A. No-Build Alternative

The No-Build Alternative does not include any proposed changes to the US 30 Coatesville-Downingtown Bypass. This alternative does, however, include improvements to other regional facilities that are included in DVRPC's Transportation Improvement Program (TIP) or Long Range Plan that may have an impact on travel patterns in the study area.

These TIP and Plan projects include the widening of the Pennsylvania Turnpike between the Valley Forge and Mid-County interchanges, the widening of US 202 between the Exton Bypass and King of Prussia, the widening of PA 100 between Shoen Road and Gordon Drive, widening US 30 Business between the Exton Mall and US 202, and access improvements along PA 100 in the vicinity of the proposed Vanguard corporate campus. These projects are also included as part of each of the Build Alternatives.

B. Build Alternative 1

Build Alternative 1 would provide a full interchange on the US 30 Bypass at Airport Road by constructing a new eastbound off-ramp and westbound on-ramp. This alternative would also widen the Coatesville-Downingtown Bypass to three travel lanes in each direction between PA 340 (Bondsville Road) and Norwood Road. Between the Norwood Road and PA 113 (West Uwchlan Avenue) interchanges, three through lanes and a collector-distributor lane would be provided in each direction. In addition, a westbound truck-climbing lane would be provided between Bondsville Road and Reeceville Road. Finally, a full interchange would be provided at PA 113 by constructing a new eastbound on-ramp and a new westbound off-ramp.

C. Build Alternative 2

Build Alternative 2 would also complete the partial interchange at Airport Road by constructing a new eastbound off-ramp and westbound on-ramp and by providing a westbound truck-climbing lane between Bondsville and Reeceville roads. Build Alternative 2 would widen the US 30 Bypass between PA 340 and the US 30 Business interchange

near Quarry Road by constructing a third travel lane in each direction. In addition to the extra through lane, a collector-distributor lane would be maintained in each direction between Norwood Road and PA 113. However, no new interchange ramps would be constructed at PA 113.

D. Build Alternative 3

Like Alternatives 1 and 2, Build Alternative 3 would provide for a complete interchange at Airport Road and a westbound truck climbing lane between Bondsville and Reeceville roads. Alternative 3 would widen the US 30 Bypass to six lanes between PA 340 and the US 30 Business interchange at Quarry Road. This alternative would also provide a complete interchange at PA 113 by constructing a new eastbound on-ramp and westbound off-ramp. However, the existing Norwood Road ramps would be removed under Build Alternative 3, and, therefore, no collector-distributor lanes would be needed or provided between Norwood Road and PA 113.

IV. TRAVEL FORECASTING PROCEDURES

DVRPC's travel simulation models are used to forecast future travel patterns. These models utilize a system of traffic zones that follow Census boundaries and rely on demographic and employment data, land use, and transportation network characteristics to simulate trip making patterns throughout the region.

A. Socioeconomic Projections

DVRPC's long-range population and employment forecasts are revised periodically to reflect changing market trends, development patterns, local and national economic conditions, and available data. The completed forecasts reflect all reasonably known current information and the best professional judgement of predicted future conditions.

DVRPC uses a multi-step, multi-source methodology to produce its forecasts at the county level. County forecasts serve as control totals for municipal forecasts, which are disaggregated from county totals. Municipal forecasts are based on an analysis of historical data trends adjusted to account for infrastructure availability, environmental constraints to development, local zoning policy, and development proposals. Municipal population forecasts are constrained using density ceilings and floors. County, and, where necessary, municipal input is used throughout the process to derive the most likely population forecasts for all geographic levels.

1. Population Forecasting

Population forecasting at the regional level involves review and analysis of six major components: births, deaths, domestic in-migration, domestic out-migration, international immigration, and changes in group quarters populations (e.g., dormitories, military barracks, prisons, and nursing homes). DVRPC uses both the cohort survival concept to age individuals from one age group to the next, and a modified Markov transition probability model based on the most recent US Census and the US Census' recent Current Population Survey (CPS) research to determine the flow of individuals between the Delaware Valley and the outside world. For movement within the region, Census and IRS migration data, coupled with CPS data, are used to determine migration rates between counties. DVRPC relies on county planning offices to provide information on any known, expected, or forecasted changes in group quarters populations. These major population components are then aggregated and the resulting population forecasts are reviewed by member governments for final adjustments based on local knowledge.

2. Employment Forecasting

Employment is influenced by local, national, and global political and socioeconomic factors. The US Census Bureau provides the most reasonable and consistent time series data on county employment by sector and serves as DVRPC's primary data source for employment forecasting. Employment sectors include mining, agriculture, construction, manufacturing, transportation, wholesale, retail, finance/insurance, service, government, and military. Other supplemental sources of data include the Bureau of Economic Analysis, the Bureau of Labor Statistics, Occupational Privilege tax data, and other public and private sector forecasts. As in the population forecasts, county-level total employment is used as a control total for sector distribution and municipal level forecasts. Forecasts are then reviewed by member counties for final adjustments based on local knowledge.

3. US 30 Coatesville-Downingtown Bypass Study Area Forecasts

As part of the US 30 Coatesville-Downingtown Bypass traffic study, DVRPC staff reviewed its most recent current population and employment estimates, its long-range population and employment forecasts, and all proposed land use developments in the study area. Based on this review, DVRPC developed municipal-level population and employment forecasts for use as inputs to the traffic simulation models. Table 1 summarizes the population and employment forecasts used in the study.

Between 2000 and 2025, the total population in the greater study area is projected to increase by over 50,000 residents to 179,686, an increase of 39 percent. The municipalities that will have the greatest number of new residents include Caln, Valley, Uwchlan, and West Whiteland townships. Each of these municipalities are projected to add over 4,000 new residents between 2000 and 2025.

The study area will also add over 37,000 new jobs between 2000 and 2025, an increase of 60 percent. Municipalities that are projected to add 5,000 or more new jobs include Coatesville City, and Uwchlan and West Whiteland townships.

Table 1. Population and Employment in the Study Area

Municipality	2000 - 2025 Growth				2000 - 2025 Growth			
	2000	2025	Abs.	Pct.	2000	2025	Abs.	Pct.
Atglen Borough	1,217	2,054	837	68.8%	531	796	265	49.9%
Caln Township	11,916	18,821	6,905	57.9%	6,927	8,413	1,486	21.5%
Coatesville City	10,838	14,656	3,818	35.2%	2,310	7,648	5,338	231.1%
Downingtown Borough	7,589	8,080	491	6.5%	7,104	8,224	1,120	15.8%
East Bradford Township	9,405	13,380	3,975	42.3%	1,435	2,088	653	45.5%
East Brandywine Township	5,822	8,542	2,720	46.7%	676	1,824	1,148	169.8%
East Caln Township	2,857	4,585	1,728	60.5%	2,756	4,084	1,328	48.2%
East Fallowfield Township	5,157	7,746	2,589	50.2%	570	854	284	49.8%
Highland Township	1,125	1,441	316	28.1%	320	496	176	55.0%
Modena Borough	610	590	-20	-3.3%	131	328	197	150.4%
Parkesburg Borough	3,373	5,841	2,468	73.2%	927	1,437	510	55.0%
Sadsbury Township	2,582	4,154	1,572	60.9%	437	3,305	2,868	656.3%
South Coatesville Borough	997	1,546	549	55.1%	907	1,682	775	85.4%
Uwchlan Township	16,576	20,760	4,184	25.2%	9,208	16,135	6,927	75.2%
Valley Township	5,116	10,790	5,674	110.9%	1,779	4,411	2,632	147.9%
West Bradford Township	10,775	13,290	2,515	23.3%	1,565	2,269	704	45.0%
West Brandywine Township	7,153	10,130	2,977	41.6%	2,419	2,950	531	22.0%
West Caln Township	7,054	9,140	2,086	29.6%	710	1,133	423	59.6%
West Sadsbury Township	2,444	3,130	686	28.1%	847	2,328	1,481	174.9%
West Whiteland Township	16,499	21,010	4,511	27.3%	20,173	28,368	8,195	40.6%
Study Area Total	129,105	179,686	50,581	39.2%	61,732	98,773	37,041	60.0%



DVRPC, August 2005

B. DVRPC's Travel Simulation Process

For the US 30 Coatesville-Downingtown Bypass traffic study, a focused simulation process was employed. A focused simulation process allows the use of DVRPC's regional simulation models, but includes a more detailed representation of the study area. Local streets not included in the regional network, but of interest in this study, are added to the highway network. Traffic zones inside the study area are subdivided so that traffic from existing and proposed land use developments may be loaded more precisely onto the network. The focusing process increases the accuracy of the travel forecasts within the detailed study area. At the same time, all existing and proposed highways throughout the region, and their impact on both regional and interregional travel patterns become an integral part of the simulation process.

DVRPC's travel models follow the traditional steps of trip generation, trip distribution, modal split, and traffic assignment. However, an iterative feedback loop is employed from traffic assignment to the trip distribution step. The feedback loop ensures that the congestion levels used by the models when determining trip origins and destinations are equivalent to

those that result from the traffic assignment step. Additionally, the iterative model structure allows trip making patterns to change in response to changes in traffic patterns, congestion levels, and improvements to the transportation system.

The DVRPC travel simulation process uses the Evans Algorithm to iterate the model. Evans re-executes the trip distribution and modal split models based on updated highway speeds after each iteration of highway assignment and assigns a weight to each iteration. This weight is then used to prepare a convex combination of the link volumes and trip tables for the current iteration and a running weighted average of the previous iterations. This algorithm converges rapidly to the equilibrium solution on highway travel speeds and congestion levels. About seven iterations are required for the process to converge to the equilibrium state for study area travel patterns.

The DVRPC travel simulation models are disaggregated into separate peak, midday, and evening time periods. This disaggregation begins in trip generation, where factors are used to separate daily trips into peak, midday, and evening travel. The enhanced process then utilizes completely separate model chains for peak, midday, and evening travel simulation runs. Time-of-day sensitive inputs to the models, such as highway capacities and transit service levels, are disaggregated to be reflective of time-period-specific conditions. Capacity factors are used to allocate daily highway capacity to each time period. Separate transit networks are used to represent the difference in transit service over the course of a day.

The enhanced model is disaggregated into separate model chains for the peak (combined AM and PM), midday (the period between the AM and PM peaks), and evening (the remainder of the day) periods for the trip distribution, modal split, and travel assignment phases of the process. The peak period is defined as 7:00 AM to 9:00 AM and 3:00 PM to 6:00 PM. Peak period and midday travel are based on a series of factors that determine the percentage of daily trips that occur during those periods. Evening travel is then defined as the residual after peak and midday travel are removed from daily travel.

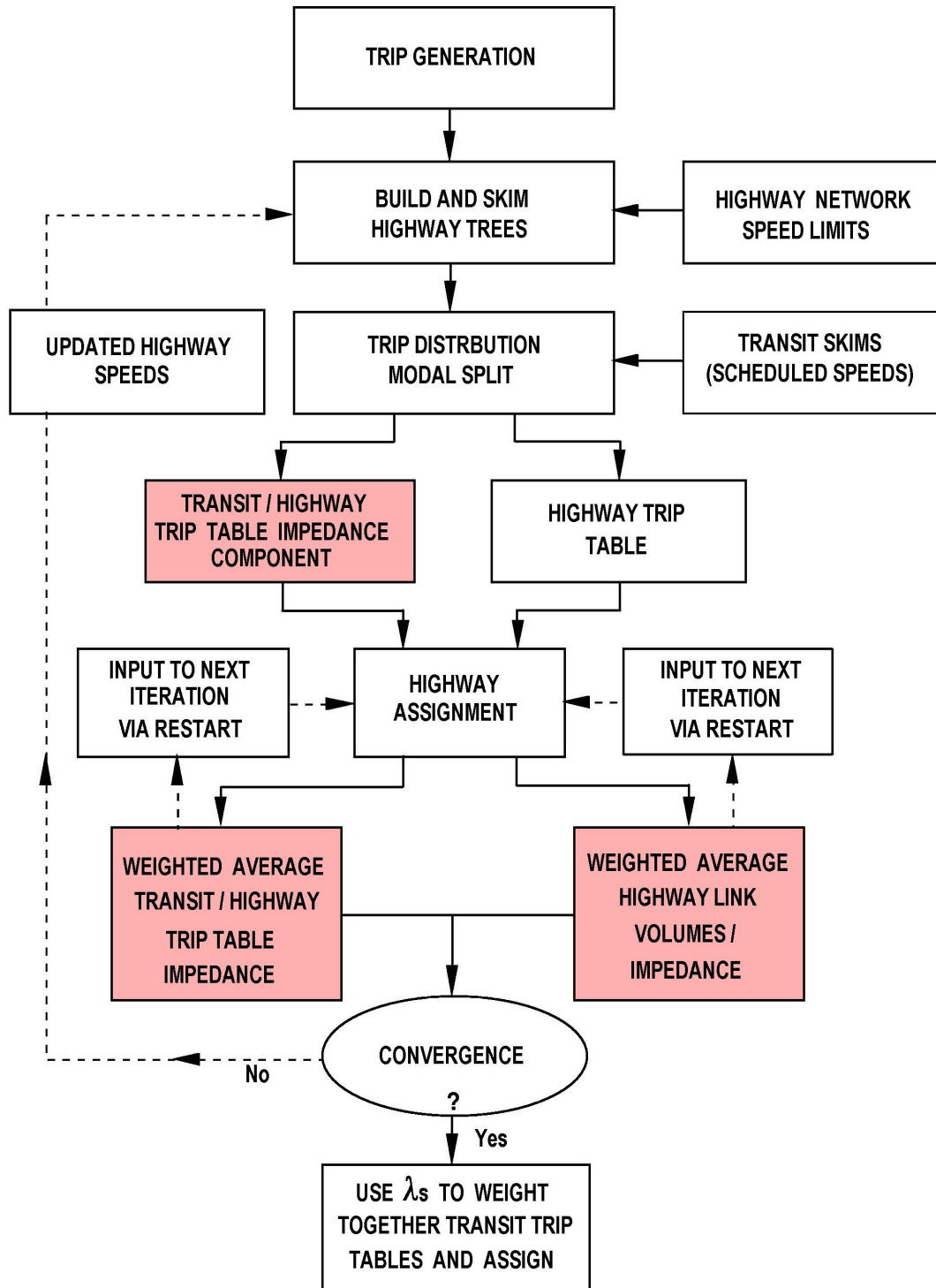
External-local productions at the nine-county cordon stations are disaggregated into peak, midday, and evening components using percentages derived from the temporal distribution of traffic counts taken at each cordon station.

Figure 4 provides a flow chart of the travel demand forecasting process. The first step in the process involves generating the number of trips that are produced by and destined for each traffic zone and cordon station throughout the nine-county region.

1. Trip Generation

Both internal trips (those made within the DVRPC region) and external trips (those that cross the boundary of the region) must be considered in the simulation of regional travel.

Figure 4. DVRPC's Travel Modeling Process



EVANS ALGORITHM ONLY

For the simulation of travel demand, internal trip generation is based on zonal forecasts of population and employment, whereas external trips are extrapolated from cordon line traffic counts and other sources. The latter also include trips that pass through the Delaware Valley region. Estimates of internal trip productions and attractions by zone are established for each trip purpose on the basis of trip rates applied to the zonal estimates of demographic and employment data. Trip purposes include work and nonwork trips, light and heavy truck trips, and taxi trips. This part of the DVRPC model is not iterated on highway travel speed. Rather, estimates of daily trip making by traffic zone are calculated and then disaggregated into peak, midday, and evening time periods.

2. Evans Iterations

The iterative portion of the Evans forecasting process involves updating the highway network restrained link travel speeds, rebuilding the minimum time paths through the network, and skimming the interzonal travel time for the minimum paths. Then the trip distribution, modal split, and highway assignment models are executed in sequence for each pass through the model chain. After convergence is reached, the transit trip tables for each iteration are weighted together and the weighted average table is assigned to the transit network. The highway trip tables are loaded onto the network during each Evans iteration. For each time period, seven iterations of the Evans process are performed to ensure that convergence on travel times is reached.

3. Trip Distribution

Trip distribution is the process whereby the zonal trip ends established in the trip generation analysis are linked together to form origin-destination patterns in the trip table format. Peak, midday, and evening trip ends are distributed separately. For each Evans iteration, a series of ten gravity-type distribution models are applied at the zonal level. These models follow the trip purpose and vehicle type stratifications established in trip generation.

4. Modal Split

The modal split model is also run separately for the peak, midday, and evening time periods. The modal split model calculates the fraction of each person-trip interchange in the trip table that should be allocated to transit, and then assigns the residual to the highway side. The choice between highway and transit usage is made on the basis of comparative cost, travel time, and frequency of service, with other aspects of modal choice being used to modify this basic relationship. In general, the better the transit service, the higher the fraction assigned to transit, although trip purpose and auto ownership also affect the allocation. The model subdivides highway trips into auto drivers and passengers. Auto driver trips are added to the truck, taxi, and external vehicle trips in preparation for assignment to the highway network.

5. Highway Assignment

For highway trips, the final step in the focused simulation process is the assignment of vehicle trips to the highway network representative of the alternative being modeled. For peak, midday, and evening travel, the assignment model produces the future traffic volumes for individual highway links that are required for the evaluation of each alternative. The regional nature of the highway network and trip table underlying the focused assignment process allow the diversion of travel into and through the study area to various points of entry and exit in response to the improvements made in the transportation system.

For each Evans iteration, highway trips are assigned to the network representative of a given alternative by determining the best (minimum time) route through the highway network for each zonal interchange, and then allocating the interzonal highway travel to the highway facilities along that route. This assignment model is "capacity restrained" in that congestion levels are considered when determining the best route. The Evans equilibrium assignment method is used to implement the capacity constraint. When the assignment and associated trip table reach equilibrium, no path faster than the one actually assigned for each trip can be found through the network, given the capacity restrained travel times on each link.

6. Transit Assignment

After equilibrium is achieved, the weighted average transit trip tables are assigned to the transit network to produce link and route passenger volumes. The transit person trips produced by the modal split model are "linked," which means that they do not include any transfers that occur either between transit trips or between auto approaches and transit lines. The transit assignment procedure accomplishes two major tasks. First, the transit trips are "unlinked" to include transfers, and second, the unlinked transit trips are associated with specific transit facilities to produce link, line, and station volumes. These tasks are accomplished simultaneously within the transit assignment model, which assigns the transit trip matrix to minimum impedance paths built through the transit network. There is no capacity restraining procedure in the transit assignment model.

C. Traffic Assignment Validation

Before a focused simulation model is used to predict future trip making patterns, its ability to replicate existing conditions is tested. The simulated highway assignment outputs are compared to base year traffic counts taken on roadways serving the study area. The focused simulation model is executed with base year conditions and the results are compared to traffic counts taken during the base year. Based on this analysis, the focused model produces accurate traffic volumes. The validated model is then executed for the No-

Build and each Build alternative with socioeconomic and land use inputs reflective of future year conditions.

The following tabulation summarizes the aggregate error in the assigned daily traffic volumes. A total of 82 locations in the study area with available daily traffic counts were used for model validation. Eleven of these locations are along the US 30 mainline; 29 are on US 30 Bypass interchange ramps; 16 are on US 30 Business and other parallel facilities to the US 30 Bypass; and 26 are on crossing roads. The total assigned traffic on all facilities, 1.095 million vehicles, is within 0.2 percent of the total counted volume of 1.093 million vehicles.

<u>Facilities</u>	<u>Number of Locations</u>	<u>Counted Volume</u>	<u>Simulated Volume</u>	<u>Difference</u>	<u>Percent Difference</u>
US 30 Bypass	11	421,450	435,028	13,578	3.2 %
US 30 Interchange Ramps	29	131,796	122,918	-8,878	-6.7 %
Parallel Facilities	16	180,933	200,587	19,654	10.9 %
Crossing Facilities	26	358,447	335,968	-22,479	-6.3 %
All Facilities	82	1,092,626	1,094,501	1,875	0.2 %

V. PROJECTED TRAFFIC VOLUMES

Projected traffic volumes for 2010 and 2030 are presented and analyzed in this chapter. Daily and peak hour forecasts for the No-Build and three Build alternatives are presented. For each alternative, a focused 2025 trip table was prepared by disaggregating the zonal demographic and employment inputs to the trip generation model and executing the DVRPC travel model through traffic assignment. The resulting travel matrix includes all travel patterns throughout the Delaware Valley region, including trips entering and exiting the region at its cordon. Traffic volumes for 2010 were developed by interpolating between the base year and 2025 trip tables. Volumes for 2030 were found by extrapolating the trend between the base year and 2025 traffic patterns.

Estimates of future year AM and PM peak hour volumes, including intersection turning movements, were calculated by scaling base year peak hour volumes according to growth factors on each link and intersection leg. These growth factors represent the ratio of future year peak hour link volumes to base year peak hour volumes. The future year peak hour volumes for each link and intersection leg were determined by multiplying the forecasted AADT by directional AM and PM peak hour “K” factors. Existing “K” factors were calculated from traffic counts as the ratio of the highest morning and evening hourly volumes to the total AADT. Future year “K” factors were based on the existing “K” factors and the AADT growth on each highway segment or intersection approach, accounting for the “peak spreading” that typically occurs as daily traffic volumes and congestion levels increase. The resulting forecasted AM and PM link volumes and intersection turning movements were adjusted as necessary to balance traffic flows between adjacent interchanges and intersections.

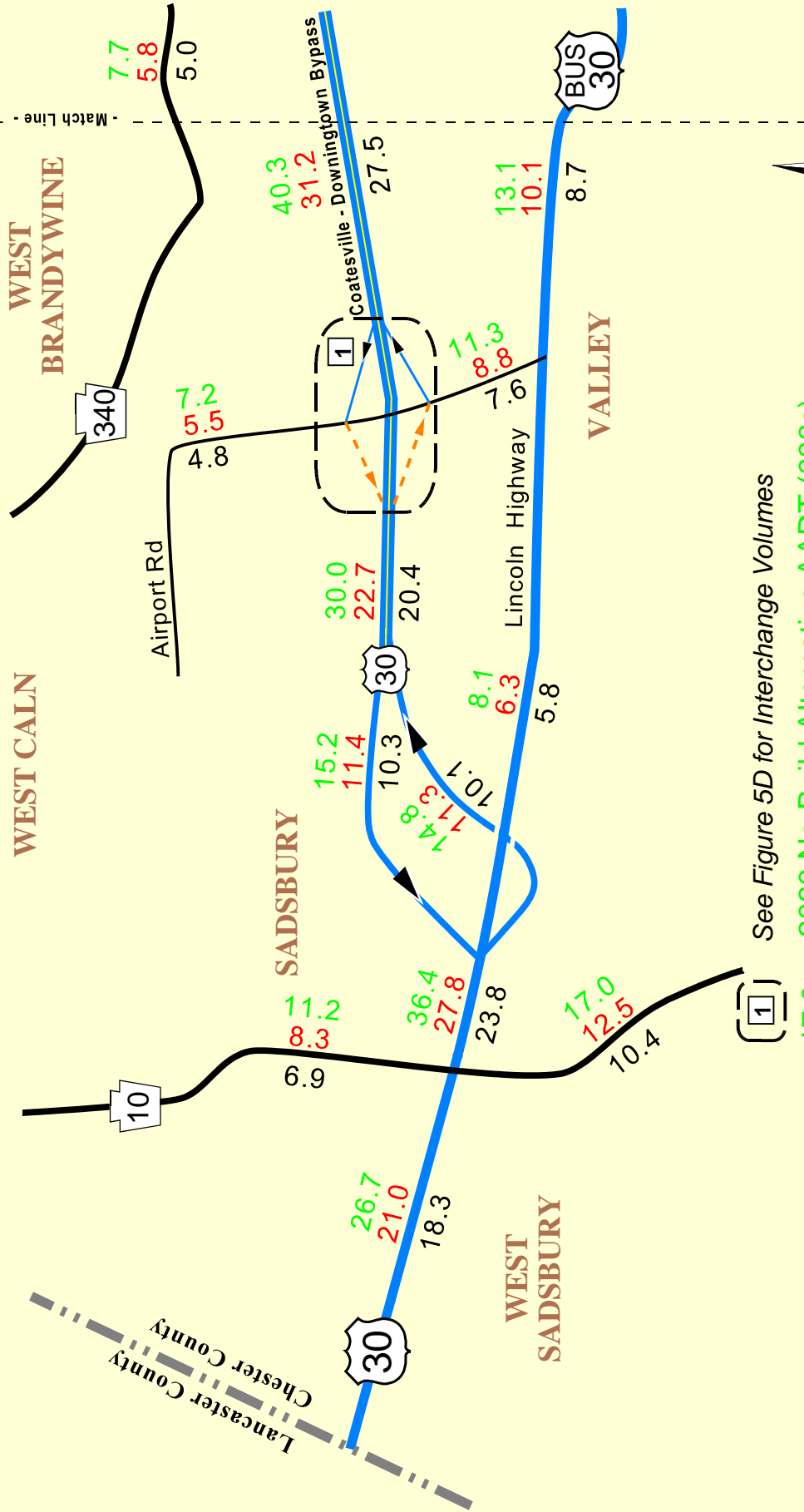
A. No-Build Alternative Daily Traffic Forecasts

Figures 5A - 5E provide the 2010 and 2030 average daily traffic volumes for the No-Build Alternative, along with the base year traffic volumes for comparison. In the figures, base year traffic volumes are shown in black, underneath the line representing the highway links; 2010 No-Build volumes are shown in red, just above the line, and 2030 volumes in green.

Under the No-Build Alternative, 2010 daily traffic volumes along the US 30 Coatesville-Downingtown Bypass range from 22,700 to 68,700 vehicles per day (vpd). These volumes represent increases of 2,700 to 7,500 vpd over counted traffic volumes. These increases are 11 to 18 percent above base year levels. The highest growth occurs on the eastern portion of the Bypass. West of the PA 82 interchange, growth in daily traffic volumes is less than 4,000 vpd. Between the PA 82 and US 322 interchanges, US 30 Bypass volumes are approximately 6,000 vpd above base year volumes under the 2010 No-Build Alternative. East of the US 322 interchange, the increases are approximately 7,000 vpd.

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Figure 5A. No-Build Alternative Average Daily Traffic Volumes



See Figure 5D for Interchange Volumes

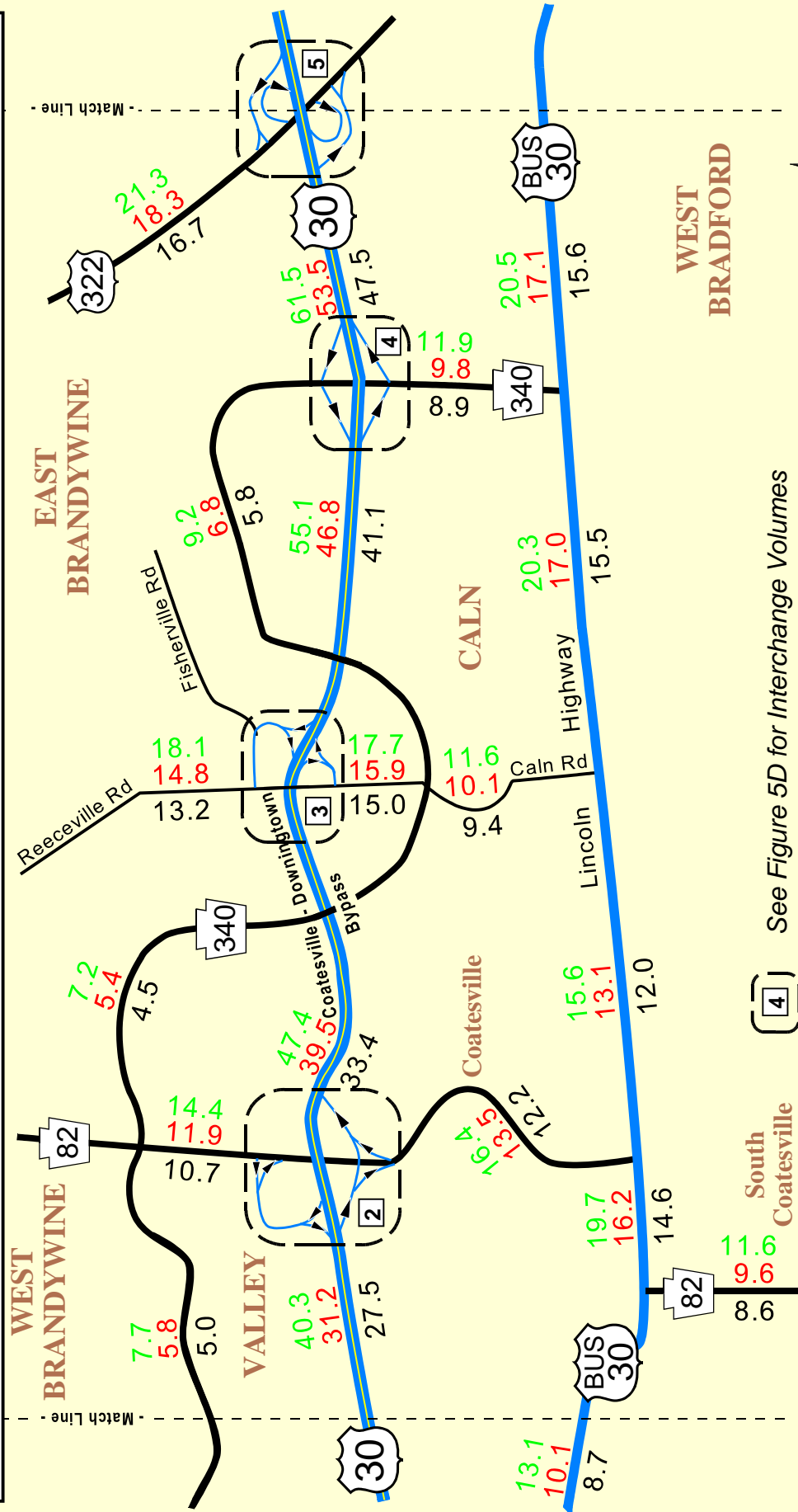
Legend	2030 No-Build Alternative AADT (000s)	2010 No-Build Alternative AADT (000s)
1	17.0	12.5
2	10.4	10.4

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Figure 5B. No-Build Alternative Average Daily Traffic Volumes



See Figure 5D for Interchange Volumes

11.6 2030 No-Build Alternative AADT (000s)

9.6 2010 No-Build Alternative AADT (000s)

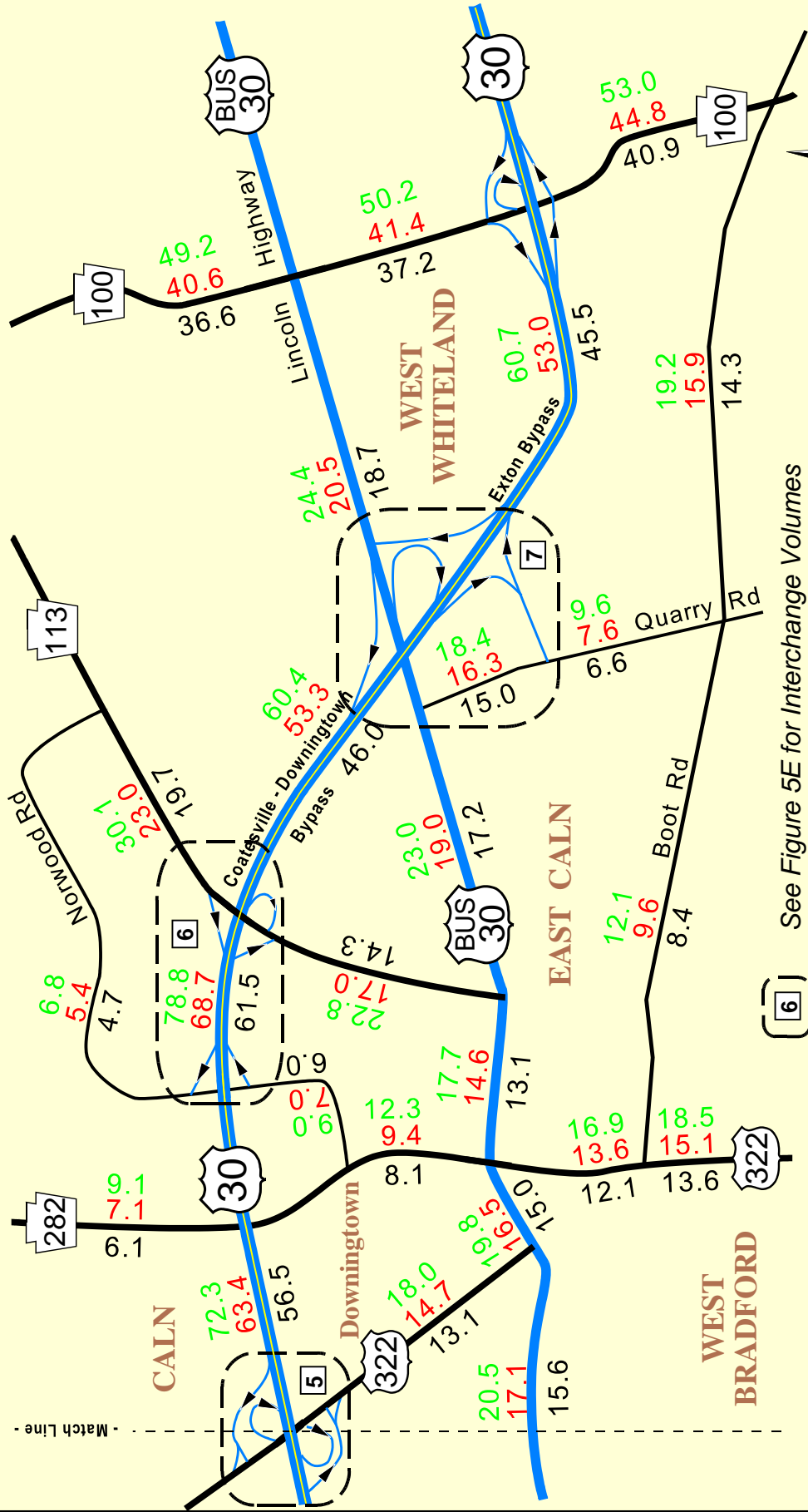
8.6 Base Year AADT (000s)

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 5C. No-Build Alternative Average Daily Traffic Volumes



See Figure 5E for Interchange Volumes

18.5 2030 No-Build Alternative AADT (000s)
 15.1 2010 No-Build Alternative AADT (000s)

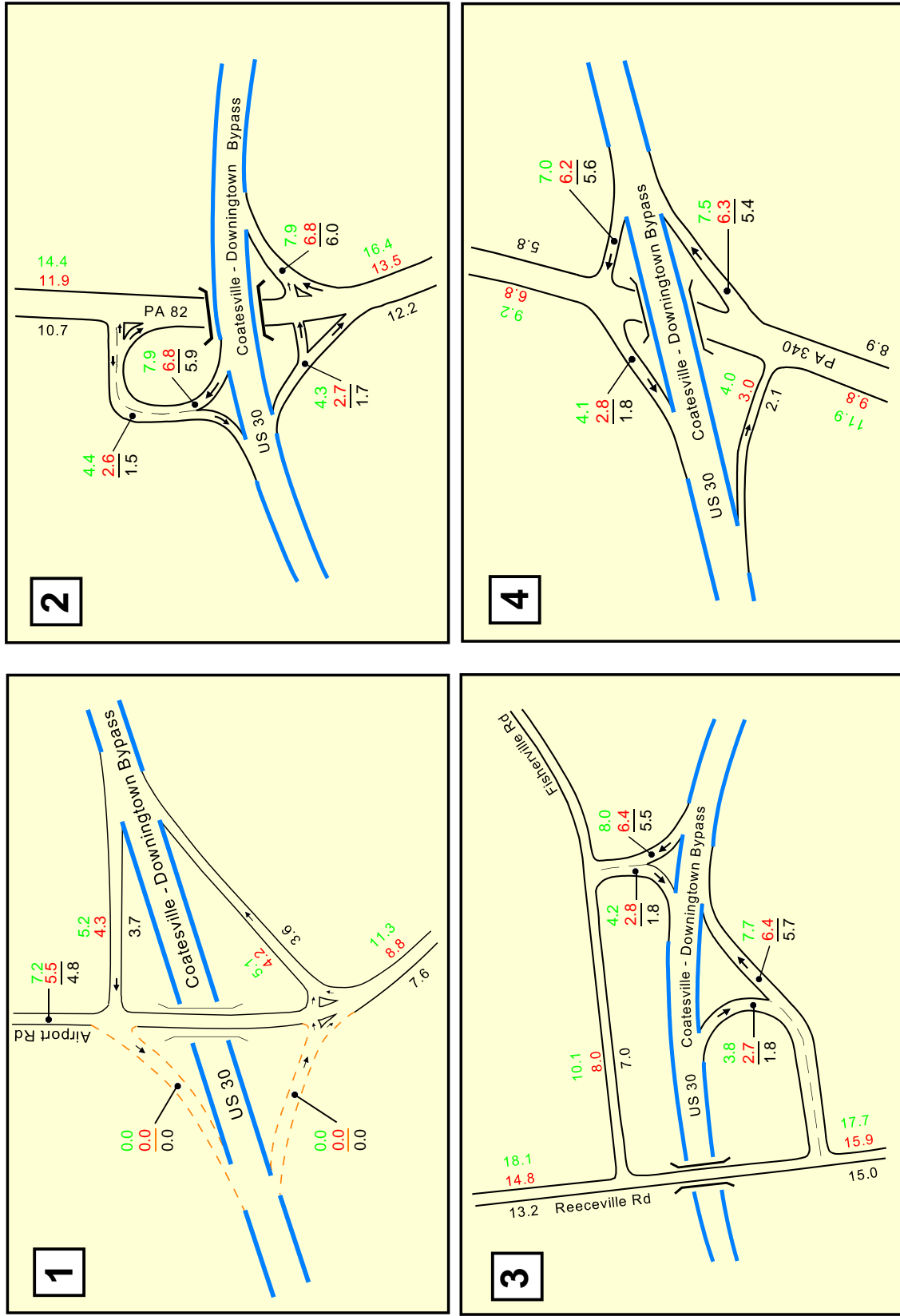
13.6 Base Year AADT (000s)

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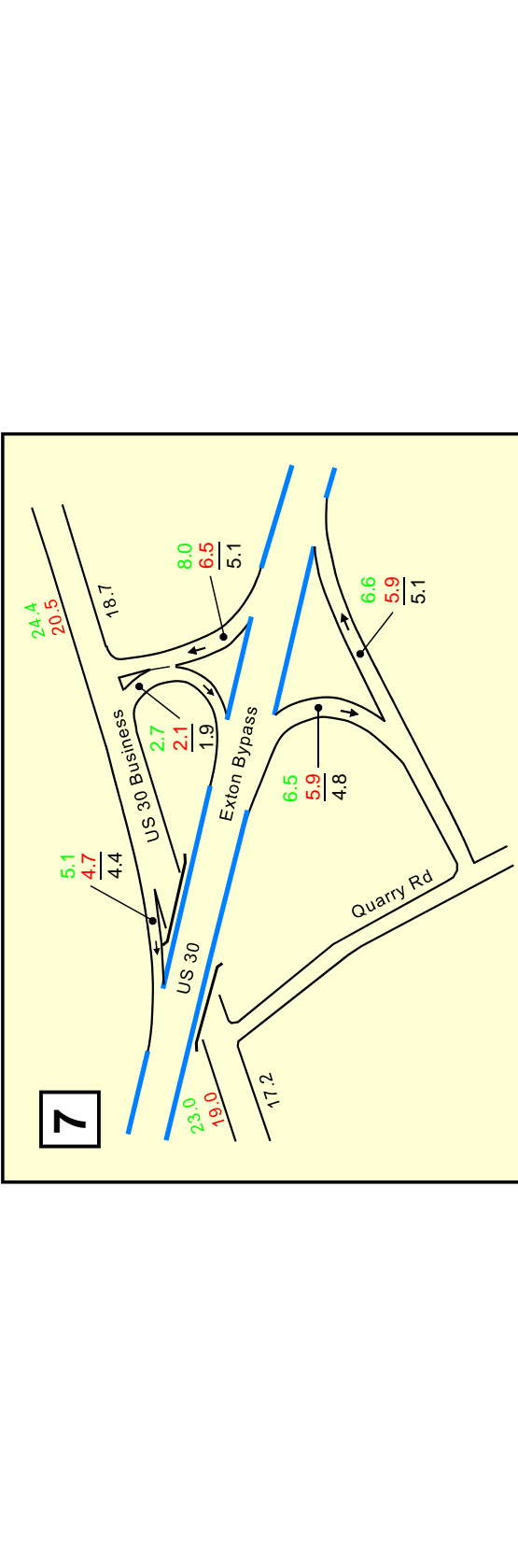
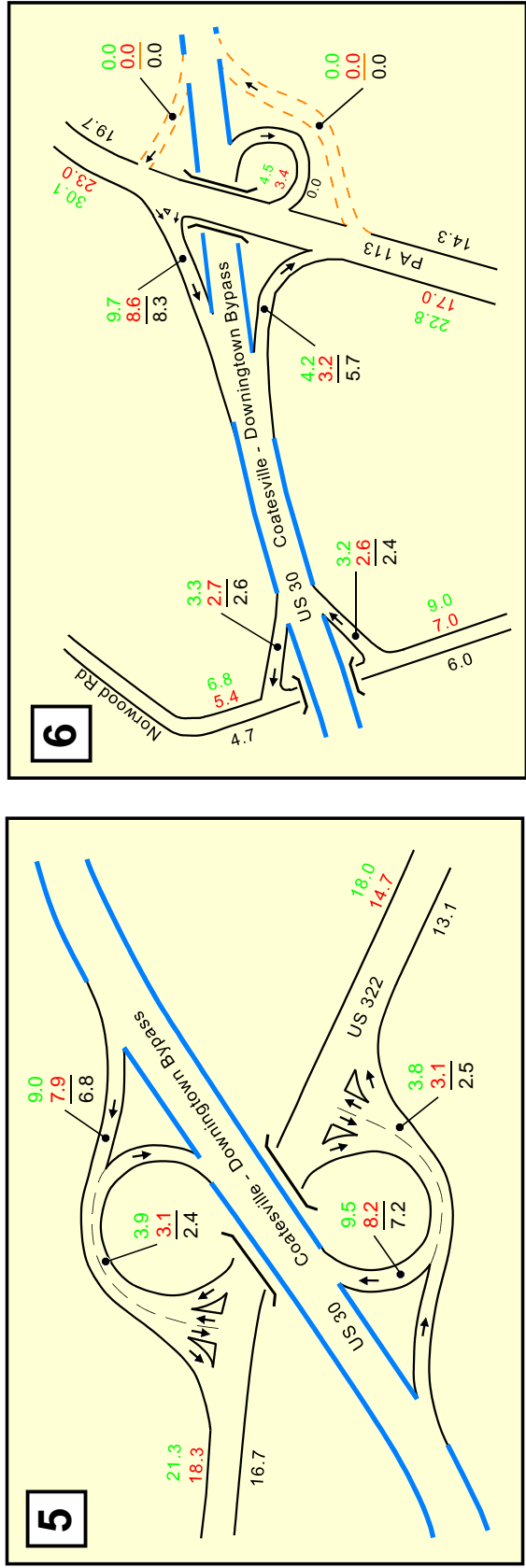


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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 5D. No-Build Alternative Average Daily Traffic Volumes



US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 5E. No-Build Alternative Average Daily Traffic Volumes



In 2010, under the No-Build Alternative, daily traffic volume increases on individual ramps are generally between 500 and 1,000 vpd over base year traffic volumes. A few ramps exhibit smaller increases. These include the two Norwood Road ramps, whose volumes increase by less than 200 vpd, and the two westbound on-ramps from US 30 Business (although the combined increase on these two ramps is about 500 vpd).

Daily traffic volumes on US 30 west of the Coatesville-Downingtown Bypass are 21,000 west of PA 10 and 27,800 east of PA 10, or 3,000 to 4,000 vpd above base year counts. Traffic volumes on US 30 Business, which parallels the US 30 Bypass, are approximately 1,500 vpd higher than counted volumes, which represent increases of 10 to 12 percent. PA 340, which also parallels the US 30 Bypass, exhibits smaller increases in daily volumes (800 to 1,000 vpd), but these represent larger relative increases (17 to 19 percent).

In 2010, under the No-Build Alternative, daily traffic volumes on crossing streets are generally between 1,000 and 2,000 vpd higher than counted volumes. However, increases on PA 113 and PA 100 are 2,700 to 4,200 vpd over base year volumes.

These trends in traffic volume growth under the No-Build Alternative continue through 2030. By 2030, No-Build Alternative daily traffic volumes along the US 30 Bypass range from 30,000 to 78,800 vpd. These volumes are 9,600 to 17,300 vpd over base year daily traffic volumes, which represent increases of 28 to 47 percent. The highest volume, as well as the highest growth over counted traffic, occurs between the Norwood Road and PA 113 interchanges.

In 2030, daily traffic volume increases on individual ramps tend to be 1,300 to 3,000 vpd over base year traffic volumes. Several ramps have daily traffic volumes approaching or exceeding 8,000 vpd. These include the eastbound on- and westbound off-ramps at the PA 82, Reeceville/Fisherville Road, and US 322 interchanges; the westbound on-ramp at PA 113; and the westbound off-ramp to US 30 Business.

No-Build Alternative daily traffic volumes on US 30 Business range from 8,100 to 24,400 vpd in 2030. At most locations along US 30 Business, these volumes are between 4,000 and 6,000 vpd higher than base year traffic volumes. The highest volumes occur between Reeceville Road and US 322 and locations east of PA 113.

Daily traffic volumes on facilities that cross the US 30 Bypass also exhibit large increases in daily traffic volumes in 2030 under the No-Build Alternative. The highest growth occurs on PA 113, where traffic increases by 8,000 to 10,000 vpd over counted traffic volumes, which represents increases of over 50 percent. In 2030, PA 113 volumes are 22,800 vpd south of the US 30 Bypass and 30,100 vpd north of the bypass. US 322 also experiences large increases, which approach 5,000 vpd. Daily volumes on US 322 are between 16,900 and 21,300 vpd in 2030 under the No-Build Alternative.

B. 2010 Daily Traffic Forecasts for the Build Alternatives

Figures 6A - 6E provide the 2010 average daily traffic volumes for the three Build alternatives, along with the corresponding No-Build Alternative traffic volumes for comparison. These volumes are also provided in Table 2. In addition, Table 2 provides both absolute and relative comparisons between base year and No-Build daily traffic volumes and between No-Build and Build alternative traffic volumes.

At most locations, the differences between Build and No-Build alternative traffic volumes, and between the various Build alternatives, differ by only a few hundred vehicles per day or less. The largest differences occur on the US 30 Bypass between the US 322 and US 30 Business interchanges and on individual ramps where interchanges are reconfigured under one or more of the Build alternatives.

Build alternative traffic volumes on the US 30 Bypass west of Airport Road are 600 to 800 vpd higher than the No-Build Alternative volume in 2010. These differences are primarily due to the new eastbound off- and westbound on-ramps that are provided at Airport Road under all of the Build alternatives. US 30 Bypass volumes are also higher under the Build alternatives east of PA 340. These increases are due to the widening of US 30 Bypass in this area under the Build alternatives.

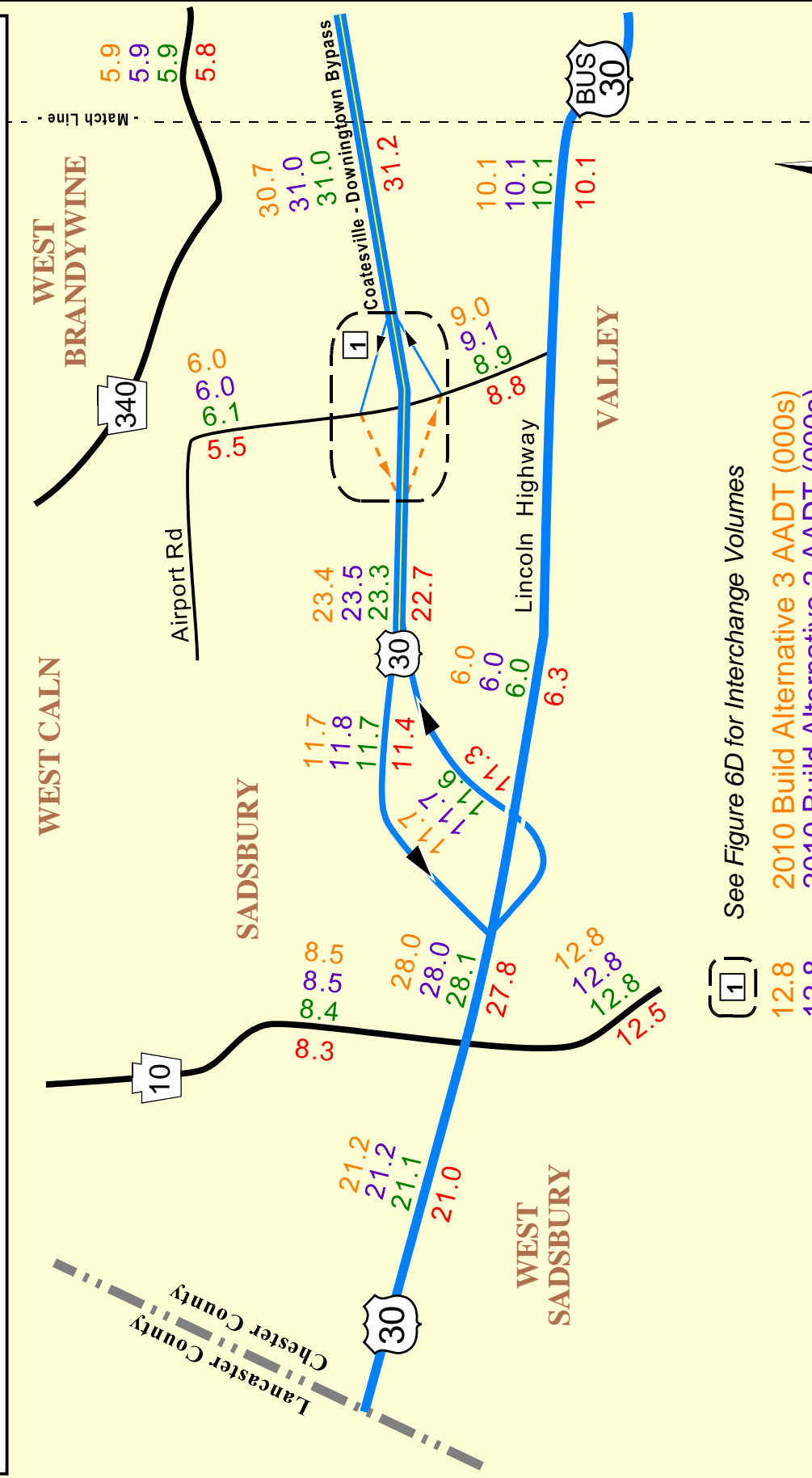
Under Build Alternative 1, US 30 Bypass volumes east of PA 340 range from 53,900 to 67,900 vpd in 2010. These volumes are 400 to 2,100 vpd higher than the corresponding No-Build Alternative volumes. One exception occurs between Norwood Road and PA 113. Here, the Build Alternative 1 volume is 800 vpd lower than the No-Build Alternative volume, because some traffic is diverted from the Norwood Road ramps to the new PA 113 eastbound on- and westbound off-ramps under this alternative.

Build Alternative 2, which does not provide for a complete interchange at PA 113, has the highest volumes of all the Build alternatives at most locations along the Coatesville-Downingtown Bypass. East of PA 340, these volumes range from 54,300 to 70,500 vpd, which is 800 to 2,800 vpd higher than the No-Build Alternative volumes and 400 to 2,600 vpd higher than the corresponding Build Alternative 1 volumes.

In 2010, under Build Alternative 3, US 30 Bypass volumes east of PA 340 range from 54,000 to 65,000 vpd. The removal of the Norwood Road ramps in this alternative diverts some traffic to the US 322 interchange and some to the new PA 113 ramps. As a result, Build Alternative 3 has the highest volume between US 322 and Norwood Road, but the lowest volume between Norwood Road and PA 113. This volume (65,000 vpd) is 900 vpd higher than the Build Alternative 1 volume between US 322 and Norwood Road, but 5,500 vpd lower than the Build Alternative 2 volume between Norwood Road and PA 113.

All three Build alternatives provide a full interchange on the US 30 Bypass at Airport Road. Under Alternative 1, the new eastbound off-ramp carries 700 vpd and the westbound on-

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Figure 6A. 2010 Build Alternatives Average Daily Traffic Volumes



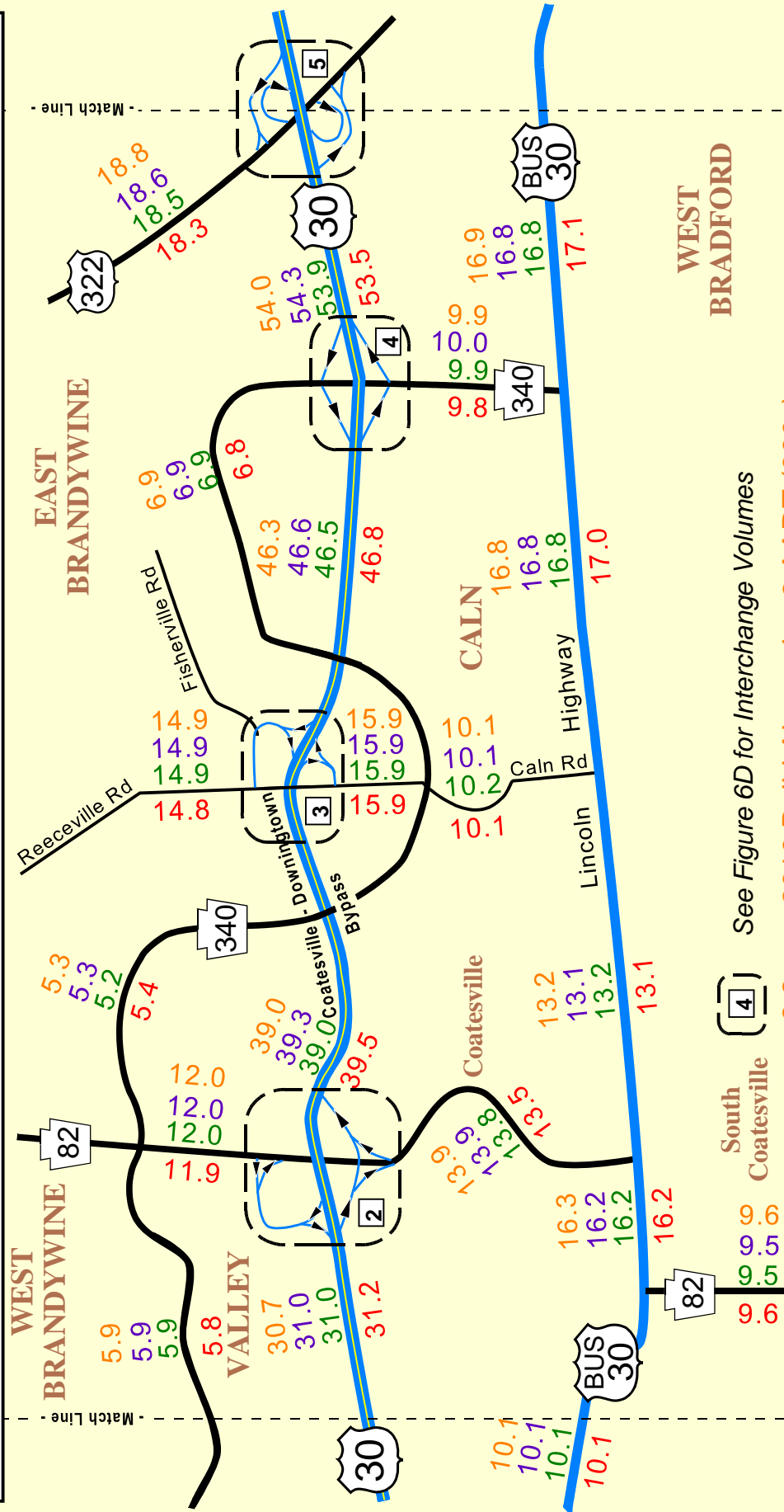
See Figure 6D for Interchange Volumes

- 12.8 2010 Build Alternative 3 AADT (000s)
- 12.8 2010 Build Alternative 2 AADT (000s)
- 12.8 2010 Build Alternative 1 AADT (000s)
- 12.5 2010 No-Build Alternative AADT (000s)



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Figure 6B. 2010 Build Alternatives Average Daily Traffic Volumes



See Figure 6D for Interchange Volumes

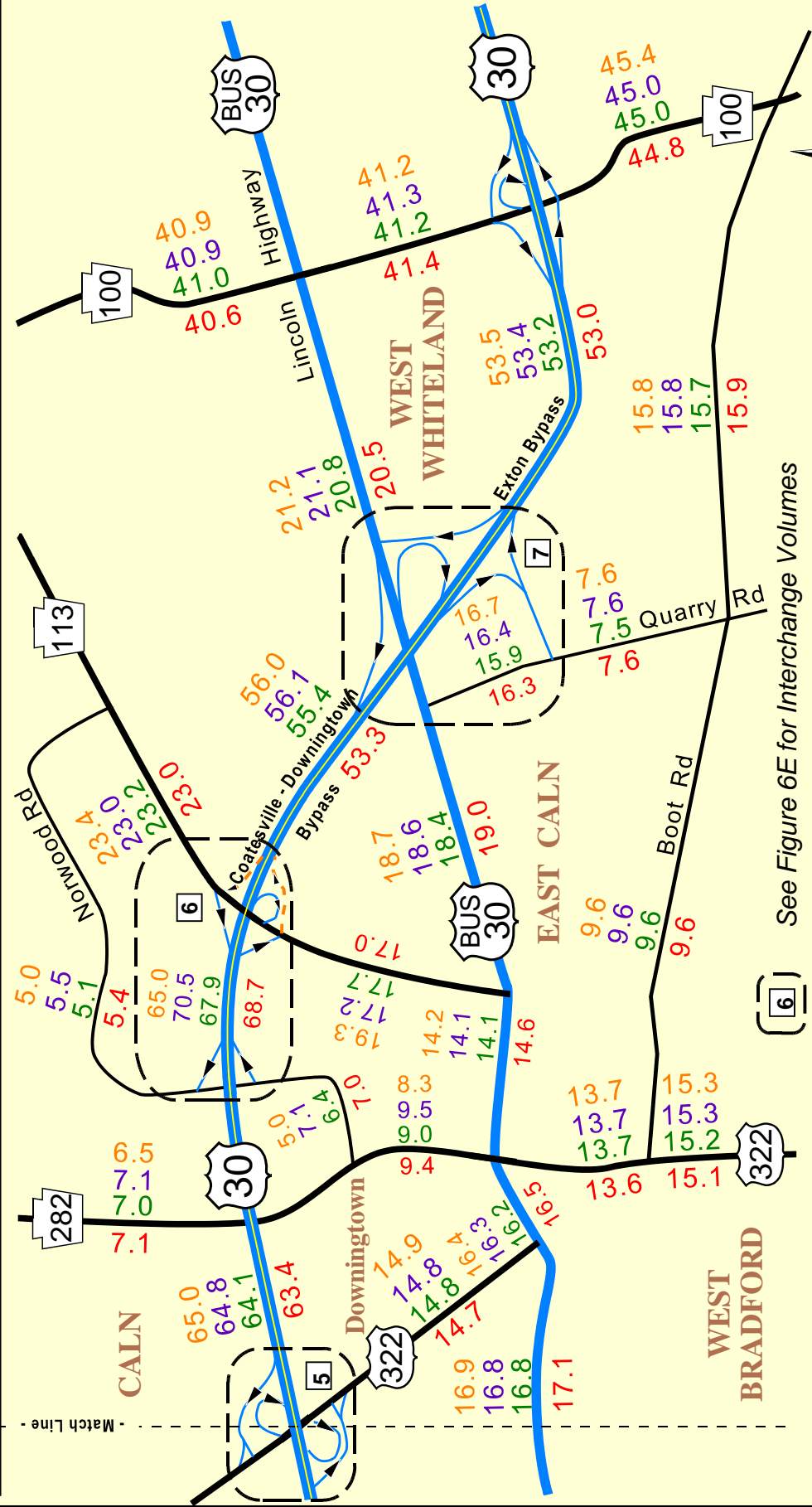
- 2010 Build Alternative 3 AADT (000s) 9.6
- 2010 Build Alternative 2 AADT (000s) 9.5
- 2010 Build Alternative 1 AADT (000s) 9.5
- 2010 No-Build Alternative AADT (000s) 9.6

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Figure 6C. 2010 Build Alternatives Average Daily Traffic Volumes

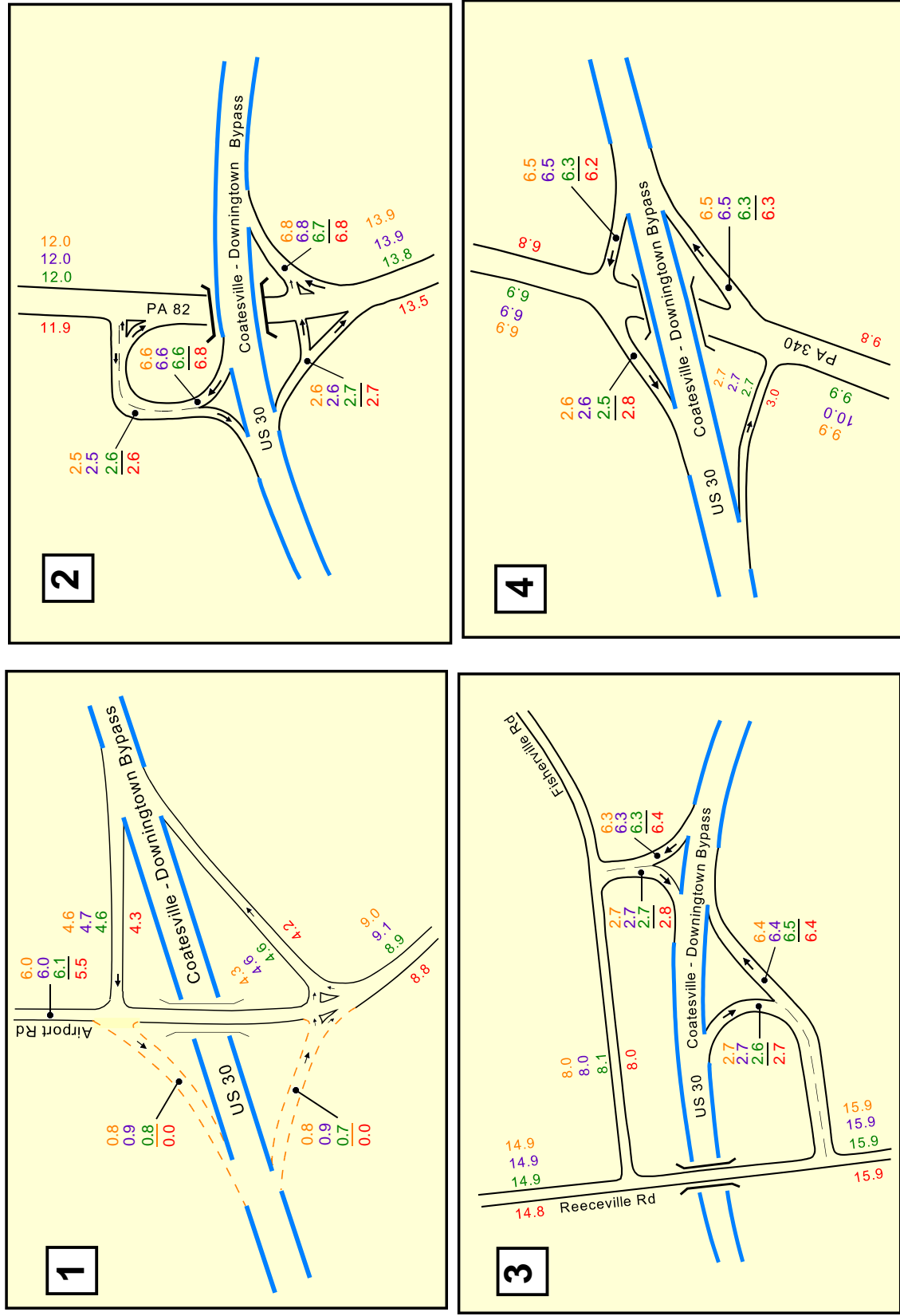


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- See Figure 6E for Interchange Volumes
- 2010 Build Alternative 3 AADT (000s) 15.3
 - 2010 Build Alternative 2 AADT (000s) 15.3
 - 2010 Build Alternative 1 AADT (000s) 15.2
-
- 2010 No-Build Alternative AADT (000s) 15.1

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Figure 6D. 2010 Build Alternatives Average Daily Traffic Volumes



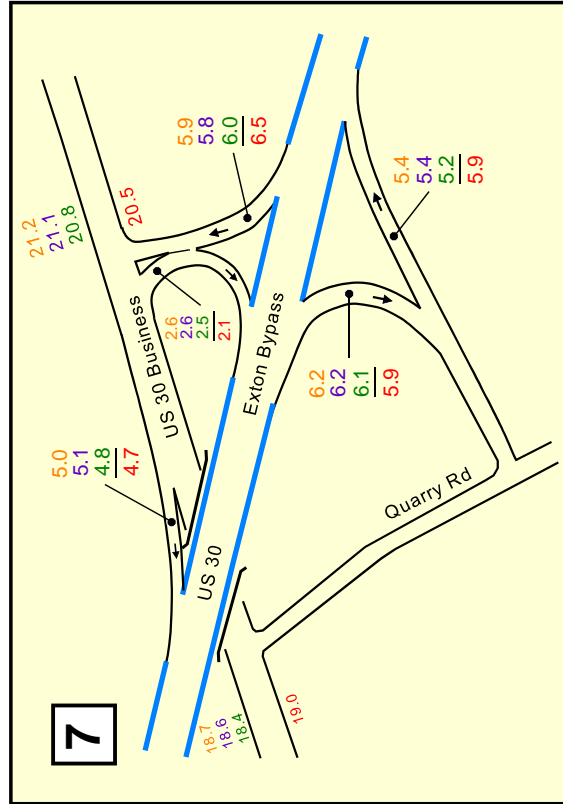
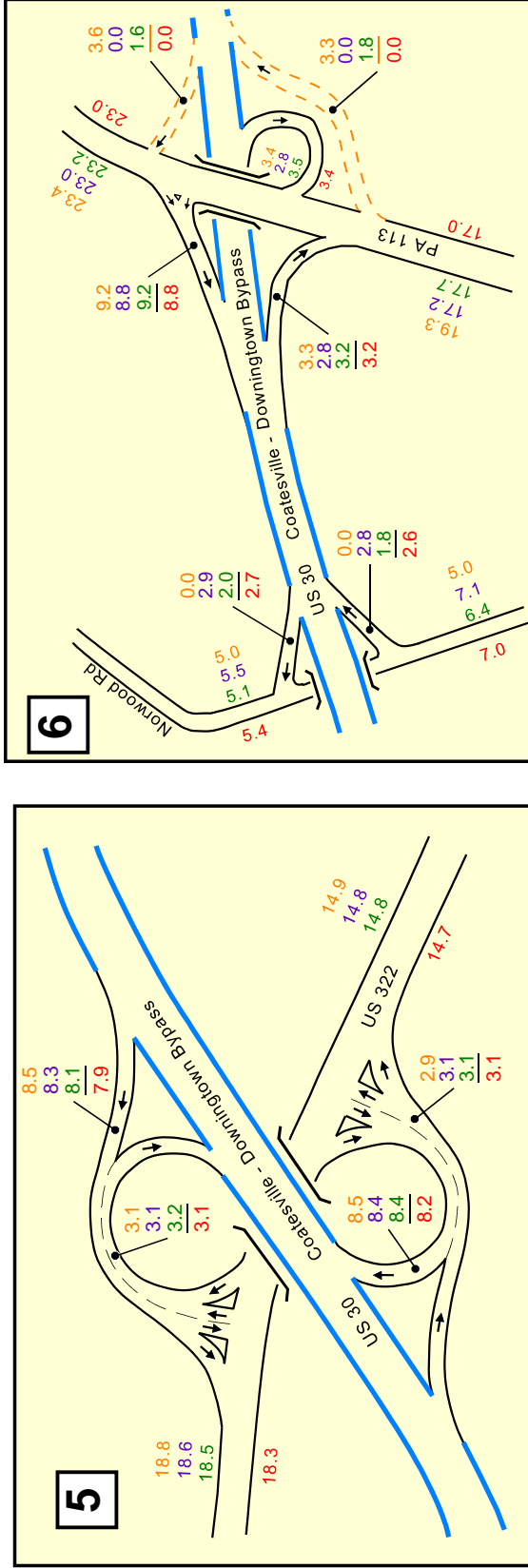
2010 Build Alternative 3 AADT (000s)
 2010 Build Alternative 2 AADT (000s)
 2010 Build Alternative 1 AADT (000s)
 2010 No-Build Alternative AADT (000s)

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 6E. 2010 Build Alternatives Average Daily Traffic Volumes



- 2010 Build Alternative 3 AADT (000s)
- 2010 Build Alternative 2 AADT (000s)
- 2010 Build Alternative 1 AADT (000s)
- 2010 No-Build Alternative AADT (000s)



Table 2. Base Year and 2010 Average Daily Traffic Volumes

Location	Base Year			2010			2010 Build Alternative 1			2010 Build Alternative 2			2010 Build Alternative 3		
	AAADT	No-Build	Diff. / Base Yr.	AAADT	No-Build	Diff. / Base Yr.	AAADT	Build / No-Build	Pct.	AAADT	Build / No-Build	Pct.	AAADT	Build / No-Build	Pct.
<i>US 30 Mainline</i>															
Lancaster Line to PA 10	18,286	21,000	2,714	14.8%	100	0.5%	21,200	200	1.0%	21,200	200	1.0%	21,200	200	1.0%
PA 10 to US 30 Business	23,789	27,800	4,011	16.9%	300	1.1%	28,000	200	0.7%	28,000	200	0.7%	28,000	200	0.7%
US 30 Business to Airport Rd	20,386	22,700	2,314	11.4%	600	2.6%	23,300	800	3.5%	23,500	800	3.5%	23,500	700	3.1%
Airport Rd to PA 82	27,537	31,200	3,663	13.3%	-200	-0.6%	31,000	-200	-0.6%	31,000	-200	-0.6%	30,700	-500	-1.6%
PA 82 to Reeceville Rd	33,446	39,500	6,054	18.1%	-500	-1.3%	39,000	-500	-1.3%	39,300	-200	-0.5%	39,000	-500	-1.3%
Reeceville Rd to PA 340	41,059	46,800	5,741	14.0%	-300	-0.6%	46,500	-300	-0.6%	46,600	-200	-0.4%	46,300	-500	-1.1%
PA 340 to US 322	47,477	53,500	6,023	12.7%	400	0.7%	53,900	400	0.7%	54,300	800	1.5%	54,000	500	0.9%
US 322 to Norwood Rd	56,525	63,400	6,875	12.2%	700	1.1%	64,100	700	1.1%	64,800	1,400	2.2%	65,000	1,600	2.5%
Norwood Rd to PA 113	61,464	68,700	7,236	11.8%	-800	-1.2%	67,900	-800	-1.2%	70,500	1,800	2.6%	65,000	-3,700	-5.4%
PA 113 to US 30 Business	46,002	53,300	7,298	15.9%	2,100	3.9%	55,400	2,100	3.9%	56,100	2,800	5.3%	56,000	2,700	5.1%
US 30 Business to PA 100	45,479	53,000	7,521	16.5%	200	0.4%	53,200	200	0.4%	53,400	400	0.8%	53,500	500	0.9%
<i>US 30 Ramps</i>															
Eastbound On-Ramp from US 30 Bus.	10,110	11,300	1,190	11.8%	300	2.7%	11,600	300	2.7%	11,700	400	3.5%	11,700	400	3.5%
Westbound Off-Ramp to US 30 Bus.	10,276	11,400	1,124	10.9%	300	2.6%	11,700	400	3.5%	11,800	400	3.5%	11,700	300	2.6%
Eastbound Off-Ramp to Airport Rd	0	0	0	-----	700	-----	700	700	-----	900	900	-----	800	800	-----
Eastbound On-Ramp from Airport Rd	3,620	4,200	580	16.0%	400	9.5%	4,600	400	9.5%	4,600	400	9.5%	4,300	100	2.4%
Westbound Off-Ramp to Airport Rd	3,711	4,300	589	15.9%	300	7.0%	4,600	300	7.0%	4,700	400	9.3%	4,600	300	7.0%
Westbound On-Ramp from Airport Rd	0	0	0	-----	800	-----	800	800	-----	900	900	-----	800	800	-----
Eastbound Off-Ramp to PA 82	1,670	2,700	1,030	61.7%	0	0.0%	2,700	0	0.0%	2,600	-100	-3.7%	2,600	-100	-3.7%
Eastbound On-Ramp from PA 82	6,008	6,800	792	13.2%	-100	-1.5%	6,700	-100	-1.5%	6,800	0	0.0%	6,800	0	0.0%
Westbound Off-Ramp to PA 82	5,941	6,800	859	14.5%	-200	-2.9%	6,600	-200	-2.9%	6,600	-200	-2.9%	6,600	-200	-2.9%
Westbound On-Ramp from PA 82	1,480	2,600	1,120	75.7%	0	0.0%	2,600	0	0.0%	2,500	-100	-3.8%	2,500	-100	-3.8%
Eastbound Off-Ramp to Reeceville Rd	1,838	2,700	862	46.9%	-100	-3.7%	2,600	-100	-3.7%	2,700	0	0.0%	2,700	0	0.0%
Eastbound On-Ramp from Reeceville Rd	5,717	6,400	683	11.9%	100	1.6%	6,500	100	1.6%	6,400	0	0.0%	6,400	0	0.0%
Westbound Off-Ramp to Fisherville Rd	5,530	6,400	870	15.7%	-100	-1.6%	6,300	-100	-1.6%	6,300	-100	-1.6%	6,300	-100	-1.6%
Westbound On-Ramp from Fisherville Rd	1,796	2,800	1,004	55.9%	-100	-3.6%	2,700	-100	-3.6%	2,700	-100	-3.6%	2,700	-100	-3.6%
Eastbound Off-Ramp to PA 340	2,068	3,000	932	45.1%	-300	-10.0%	2,700	-300	-10.0%	2,700	-300	-10.0%	2,700	-300	-10.0%
Eastbound On-Ramp from PA 340	5,427	6,300	873	16.1%	0	0.0%	6,300	0	0.0%	6,500	200	3.2%	6,500	200	3.2%
Westbound Off-Ramp to PA 340	5,558	6,200	642	11.6%	100	1.6%	6,300	100	1.6%	6,500	300	4.8%	6,500	300	4.8%
Westbound On-Ramp from PA 340	1,777	2,800	1,023	57.6%	-300	-10.7%	2,500	-300	-10.7%	2,600	-200	-7.1%	2,600	-200	-7.1%
Eastbound Off-Ramp to US 322	2,498	3,100	602	24.1%	0	0.0%	3,100	0	0.0%	3,100	0	0.0%	2,900	-200	-6.5%
Eastbound On-Ramp from US 322	7,215	8,200	985	13.7%	200	2.4%	8,400	200	2.4%	8,400	200	2.4%	8,500	300	3.7%
Westbound Off-Ramp to US 322	6,772	7,900	1,128	16.7%	200	2.5%	8,100	200	2.5%	8,300	400	5.1%	8,500	600	7.6%
Westbound On-Ramp from US 322	2,441	3,100	659	27.0%	100	3.2%	3,200	100	3.2%	3,100	0	0.0%	3,100	0	0.0%
Eastbound On-Ramp from Norwood Rd	2,441	2,600	159	6.5%	-800	-30.8%	1,800	-800	-30.8%	2,800	200	7.7%	0	-2,600	-100.0%
Westbound Off-Ramp to Norwood Rd	2,574	2,700	126	4.9%	-700	-25.9%	2,000	-700	-25.9%	2,900	200	7.4%	0	-2,700	-100.0%
Eastbound Off-Ramp to PA 113 northbound	5,706	3,200	894	15.7%	0	0.0%	3,200	0	0.0%	2,800	-400	-12.5%	3,300	100	3.1%
Eastbound Off-Ramp to PA 113 northbound	0	3,400	0	-----	100	2.9%	3,500	100	2.9%	2,800	-600	-17.6%	3,400	0	0.0%
Eastbound On-Ramp from PA 113	0	0	0	-----	1,800	-----	1,800	1,800	-----	0	0	-----	3,300	3,300	-----
Westbound Off-Ramp to PA 113	0	0	0	-----	1,600	-----	1,600	1,600	-----	0	0	-----	3,600	3,600	-----
Westbound On-Ramp from PA 113	8,313	8,800	487	5.9%	400	4.5%	9,200	400	4.5%	8,800	0	0.0%	9,200	400	4.5%
Eastbound Off-Ramp to Quarry Rd	4,849	5,900	1,051	21.7%	200	3.4%	6,100	200	3.4%	6,200	300	5.1%	6,200	300	5.1%
Eastbound On-Ramp from Quarry Rd	5,092	5,900	808	15.9%	-700	-11.9%	5,200	-700	-11.9%	5,400	-500	-8.5%	5,400	-500	-8.5%
Westbound Off-Ramp to US 30 Bus.	5,100	6,500	1,400	27.5%	-500	-7.7%	6,000	-500	-7.7%	5,800	-700	-10.8%	5,900	-600	-9.2%
Westbound On-Ramp from US 30 Bus. EB	1,856	2,100	244	13.1%	400	19.0%	2,500	400	19.0%	2,600	500	23.8%	2,600	500	23.8%
Westbound On-Ramp from US 30 Bus. WB	4,412	4,700	288	6.5%	100	2.1%	4,800	100	2.1%	5,100	400	8.5%	5,000	300	6.4%

Table 2. Base Year and 2010 Average Daily Traffic Volumes

Location	Base Year			2010			2010 Build Alternative 1			2010 Build Alternative 2			2010 Build Alternative 3		
	AAADT	No-Build	Base Yr. Pct.	AAADT	No-Build	Diff.	AAADT	Build / No-Build Diff.	Pct.	AAADT	Build / No-Build Diff.	Pct.	AAADT	Build / No-Build Diff.	Pct.
<i>Parallel Streets</i>															
US 30 Business - US 30 to Airport Rd	5,784	6,300	8.9%	516	-300	-4.8%	6,000	-300	-4.8%	6,000	-300	-4.8%	6,000	-300	-4.8%
US 30 Business - Airport Rd to Strode Ave	8,690	10,100	16.2%	1,410	0	0.0%	10,100	0	0.0%	10,100	0	0.0%	10,100	0	0.0%
US 30 Business - Strode Ave to PA 82	14,525	16,200	11.5%	1,675	0	0.0%	16,200	0	0.0%	16,200	0	0.0%	16,300	100	0.6%
US 30 Business - PA 82 to Reeceville Rd	11,951	13,100	9.6%	1,149	100	0.8%	13,100	100	0.8%	13,200	100	0.8%	13,200	100	0.8%
US 30 Business - Reeceville Rd to PA 340	15,489	17,000	9.8%	1,511	-200	-1.2%	16,800	-200	-1.2%	16,800	-200	-1.2%	16,800	-200	-1.2%
US 30 Business - PA 340 to US 322	15,587	17,100	9.7%	1,513	-300	-1.8%	16,800	-300	-1.8%	16,800	-300	-1.8%	16,900	-200	-1.2%
US 30 Business - US 322 to PA 282	15,034	16,500	9.8%	1,466	-300	-1.8%	16,200	-300	-1.8%	16,300	-200	-1.2%	16,400	-100	-0.6%
US 30 Business - PA 282 to PA 113	13,095	14,600	11.5%	1,505	-500	-3.4%	14,100	-500	-3.4%	14,100	-500	-3.4%	14,200	-400	-2.7%
US 30 Business - PA 113 to US 30	17,152	19,000	10.8%	1,848	-600	-3.2%	18,400	-600	-3.2%	18,600	-400	-2.1%	18,700	-300	-1.6%
US 30 Business - US 30 to PA 100	18,658	20,500	9.9%	1,842	300	1.5%	20,800	300	1.5%	21,100	600	2.9%	21,200	700	3.4%
PA 340 west of PA 82	4,960	5,800	16.9%	840	100	1.7%	5,900	100	1.7%	5,900	100	1.7%	5,900	100	1.7%
PA 340 - PA 82 to Reeceville Rd	4,532	5,400	19.2%	868	-200	-3.7%	5,200	-200	-3.7%	5,300	-100	-1.9%	5,300	-100	-1.9%
PA 340 - Reeceville Rd to US 30 interchange	5,755	6,800	18.2%	1,045	100	1.5%	6,900	100	1.5%	6,900	100	1.5%	6,900	100	1.5%
Fisherville Rd - US 30 Ramp to Reeceville Rd	6,993	8,000	14.4%	1,007	100	1.3%	8,100	100	1.3%	8,000	0	0.0%	8,000	0	0.0%
Boot Rd - US 322 to Grove Rd	8,423	9,600	14.0%	1,177	0	0.0%	9,600	0	0.0%	9,600	0	0.0%	9,600	0	0.0%
Boot Rd - Grove Rd to PA 100	14,305	15,900	11.1%	1,595	-200	-1.3%	15,700	-200	-1.3%	15,800	-100	-0.6%	15,800	-100	-0.6%
<i>Crossing Streets</i>															
PA 10 - North of US 30	6,892	8,300	20.4%	1,408	100	1.2%	8,400	100	1.2%	8,500	200	2.4%	8,500	200	2.4%
PA 10 - South of US 30	10,445	12,500	19.7%	2,055	300	2.4%	12,800	300	2.4%	12,800	300	2.4%	12,800	300	2.4%
Airport Rd - North of US 30	4,756	5,500	15.6%	744	600	10.9%	6,100	600	10.9%	6,000	500	9.1%	6,000	500	9.1%
Airport Rd - US 30 to US 30 Business	7,642	8,800	15.2%	1,158	100	1.1%	8,900	100	1.1%	9,100	300	3.4%	9,000	200	2.3%
PA 82 - North of US 30	10,720	11,900	11.0%	1,180	100	0.8%	12,000	100	0.8%	12,000	100	0.8%	12,000	100	0.8%
PA 82 - US 30 to US 30 Business	12,210	13,500	10.6%	1,290	300	2.2%	13,800	300	2.2%	13,900	400	3.0%	13,900	400	3.0%
PA 82 - South of US 30 Business	8,633	9,600	11.2%	967	-100	-1.0%	9,500	-100	-1.0%	9,500	-100	-1.0%	9,600	0	0.0%
Reeceville Rd - North of Fisherville Rd	13,200	14,800	12.1%	1,600	100	0.7%	14,900	100	0.7%	14,900	100	0.7%	14,900	100	0.7%
Reeceville Rd - US 30 to PA 340	15,009	15,900	5.9%	891	0	0.0%	15,900	0	0.0%	15,900	0	0.0%	15,900	0	0.0%
Reeceville Rd - PA 340 to US 30 Business	9,357	10,100	7.9%	743	100	1.0%	10,200	100	1.0%	10,100	0	0.0%	10,100	0	0.0%
PA 340 - US 30 to US 30 Business	8,876	9,800	10.4%	924	100	1.0%	9,900	100	1.0%	10,000	200	2.0%	9,900	100	1.0%
US 322 - North of US 30	16,740	18,300	9.3%	1,560	200	1.1%	18,500	200	1.1%	18,600	300	1.6%	18,800	500	2.7%
US 322 - US 30 to US 30 Business	13,132	14,700	11.9%	1,568	100	0.7%	14,800	100	0.7%	14,800	100	0.7%	14,900	200	1.4%
US 322 - US 30 Business to Boot Rd	12,104	13,600	12.4%	1,496	100	0.7%	13,700	100	0.7%	13,700	100	0.7%	13,700	100	0.7%
US 322 - South of Boot Rd	13,568	15,100	11.3%	1,532	100	0.7%	15,200	100	0.7%	15,300	200	1.3%	15,300	200	1.3%
PA 282 - North of Norwood Rd	6,104	7,100	16.3%	996	-100	-1.4%	7,000	-100	-1.4%	7,100	0	0.0%	6,500	-600	-8.5%
PA 282 - Norwood Rd to US 30 Business	8,070	9,400	16.5%	1,330	-400	-4.3%	9,000	-400	-4.3%	9,500	100	1.1%	8,300	-1,100	-11.7%
Norwood Rd - North of US 30	4,713	5,400	14.6%	687	-300	-5.6%	5,100	-300	-5.6%	5,500	100	1.9%	5,000	-400	-7.4%
Norwood Rd - South of US 30	6,008	7,000	16.5%	992	-600	-8.6%	6,400	-600	-8.6%	7,100	100	1.4%	5,000	-2,000	-28.6%
PA 113 - North of US 30	19,708	23,000	16.7%	3,292	200	0.9%	23,200	200	0.9%	23,000	0	0.0%	23,400	400	1.7%
PA 113 - US 30 to US 30 Business	14,306	17,000	18.8%	2,694	700	4.1%	17,700	700	4.1%	17,200	200	1.2%	19,300	2,300	13.5%
Ackwork Station Rd - US 30 Bus. to Ramps	14,951	16,300	9.0%	1,349	-400	-2.5%	15,900	-400	-2.5%	16,400	100	0.6%	16,700	400	2.5%
Ackwork Station Rd - Ramps to Boot Rd	6,591	7,600	15.3%	1,009	-100	-1.3%	7,500	-100	-1.3%	7,600	0	0.0%	7,600	0	0.0%
PA 100 - North of US 30 Business	36,576	40,600	11.0%	4,024	400	1.0%	41,000	400	1.0%	40,900	300	0.7%	40,900	300	0.7%
PA 100 - US 30 Business to US 30	37,218	41,400	11.2%	4,182	-200	-0.5%	41,200	-200	-0.5%	41,300	-100	-0.2%	41,200	-200	-0.5%
PA 100 - US 30 to PA 100 Connector	40,918	44,800	9.5%	3,882	200	0.4%	45,000	200	0.4%	45,000	200	0.4%	45,400	600	1.3%

ramp carries 800 vpd. Under Alternative 2, both new ramps carry 900 vpd, while they both carry 800 vpd under Alternative 3 in 2010. Build alternatives 1 and 3 also provide a full interchange at PA 113. Under Alternative 1, the new eastbound on-ramp carries 1,800 vpd and the westbound off-ramp carries 1,600 vpd. These ramps will serve higher volumes under Build Alternative 3 due to the closure of the Norwood Road ramps under this alternative. In 2010, the new eastbound on-ramp serves 3,300 vpd and the westbound off-ramp serves 3,600 vpd.

The different treatments of the Norwood Road and PA 113 interchanges under the various Build alternatives also result in traffic volume differences at some locations in the vicinity of these interchanges. For example, Norwood Road between US 30 Bypass and PA 282 carries 7,100 vpd under Build Alternative 2, but only 5,000 vpd under Build Alternative 3. However, PA 113 south of the Bypass carries 2,100 vpd more under Build Alternative 3, compared to Build Alternative 2.

C. 2030 Daily Traffic Forecasts for the Build Alternatives

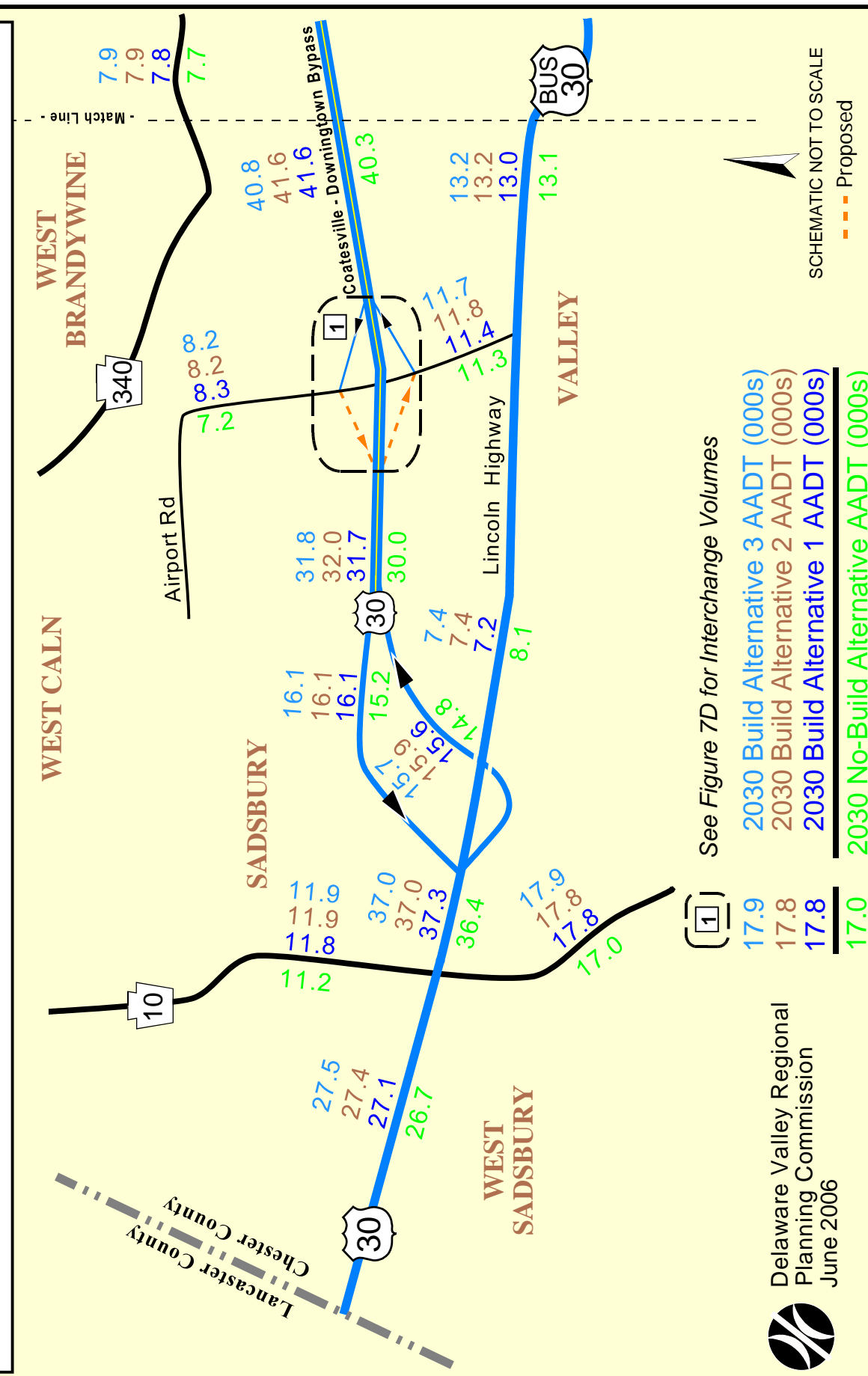
The 2030 average daily traffic volumes for the Build alternatives are shown in Figures 7A - 7E. These figures also includes the 2030 No-Build Alternative volumes for comparison. These same volumes are also provided in Table 3, along with comparisons between 2030 No-Build and base year daily traffic volumes and between 2030 Build and No-Build daily traffic volumes.

In most locations in the study area, traffic volumes in 2030 are significantly higher than the corresponding volumes in 2010. Nevertheless, the traffic patterns and trends among the various alternatives in 2010 continue into 2030. However, the differences between Build and No-Build alternatives and between the three Build alternatives are more pronounced. For example, US 30 Coatesville-Downingtown Bypass traffic volumes are as much as 8,100 vpd higher under the Build alternatives, than under the No-Build Alternative.

Under Build Alternative 1, daily traffic volumes on the US 30 Bypass range from 31,700 to 82,000 vpd. West of PA 340, these volumes are within 2,000 vpd of the corresponding No-Build Alternative volume. East of PA 340, however, the Build Alternative 1 traffic volumes in 2030 are 3,200 to 6,300 vpd higher than the No-Build volume. The largest differences occur just east of the PA 113 interchange and between the US 322 and Norwood Road interchanges.

West of the Coatesville-Downingtown Bypass, volumes on US 30 under Build Alternative 1 are 27,100 vpd and 37,300 vpd west of and east of PA 10, respectively. US 30 Business volumes range from 7,200 to 25,300 vpd. Traffic volumes on US 30 Business between PA 340 and the US 30 Bypass interchange at Quarry Road are 1,000 to 1,800 vpd lower than the corresponding No-Build Alternative volume. This reduction is due to traffic diverted to the US 30 Bypass, which is widened in this area under Build Alternative 1.

US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 7A. 2030 Build Alternatives Average Daily Traffic Volumes



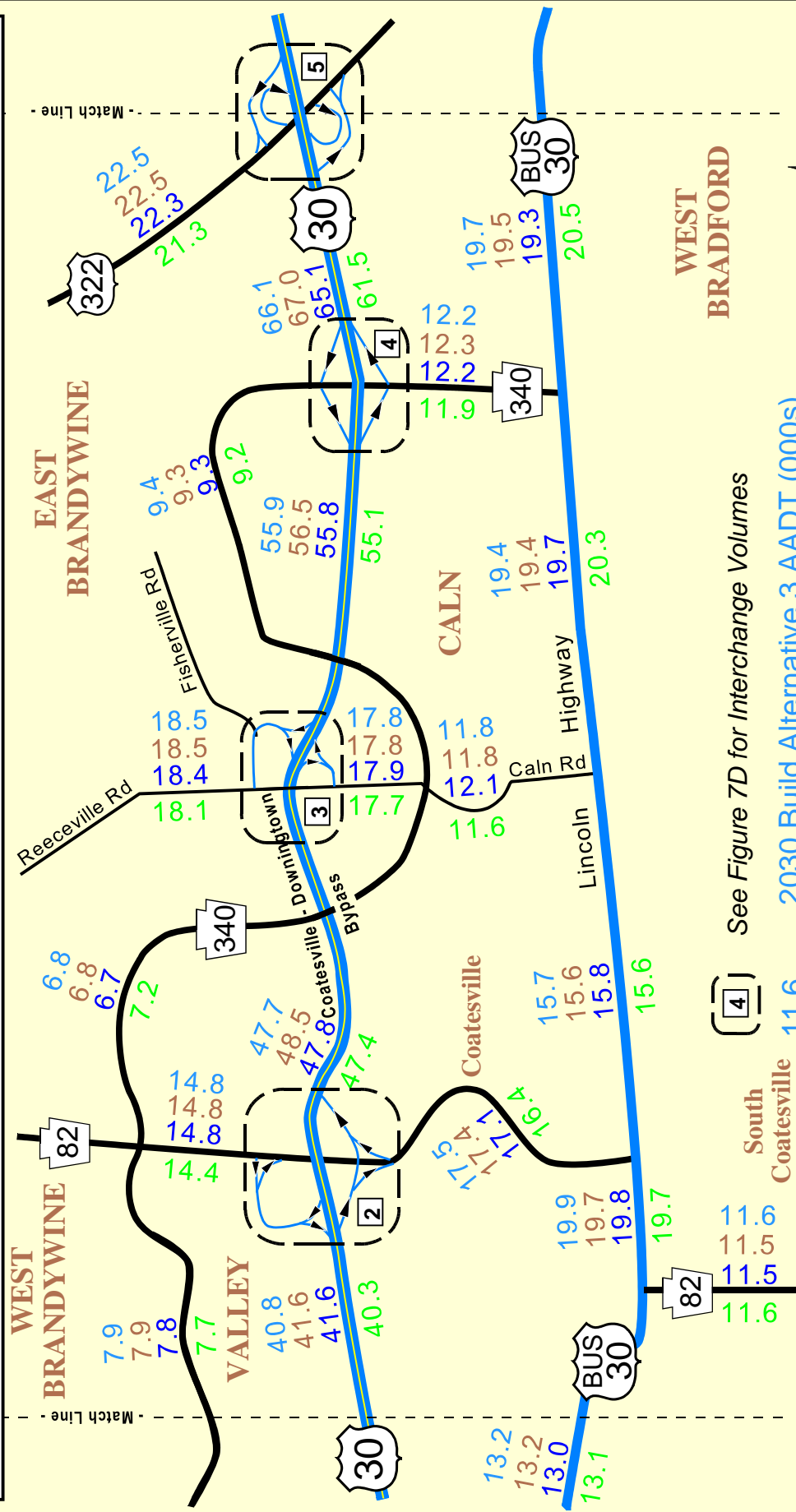
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 Planning Commission
 June 2006

See Figure 7D for Interchange Volumes

- 17.9 2030 Build Alternative 3 AADT (000s)
- 17.8 2030 Build Alternative 2 AADT (000s)
- 17.8 2030 Build Alternative 1 AADT (000s)
- 17.0 2030 No-Build Alternative AADT (000s)

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 7B. 2030 Build Alternatives Average Daily Traffic Volumes



See Figure 7D for Interchange Volumes

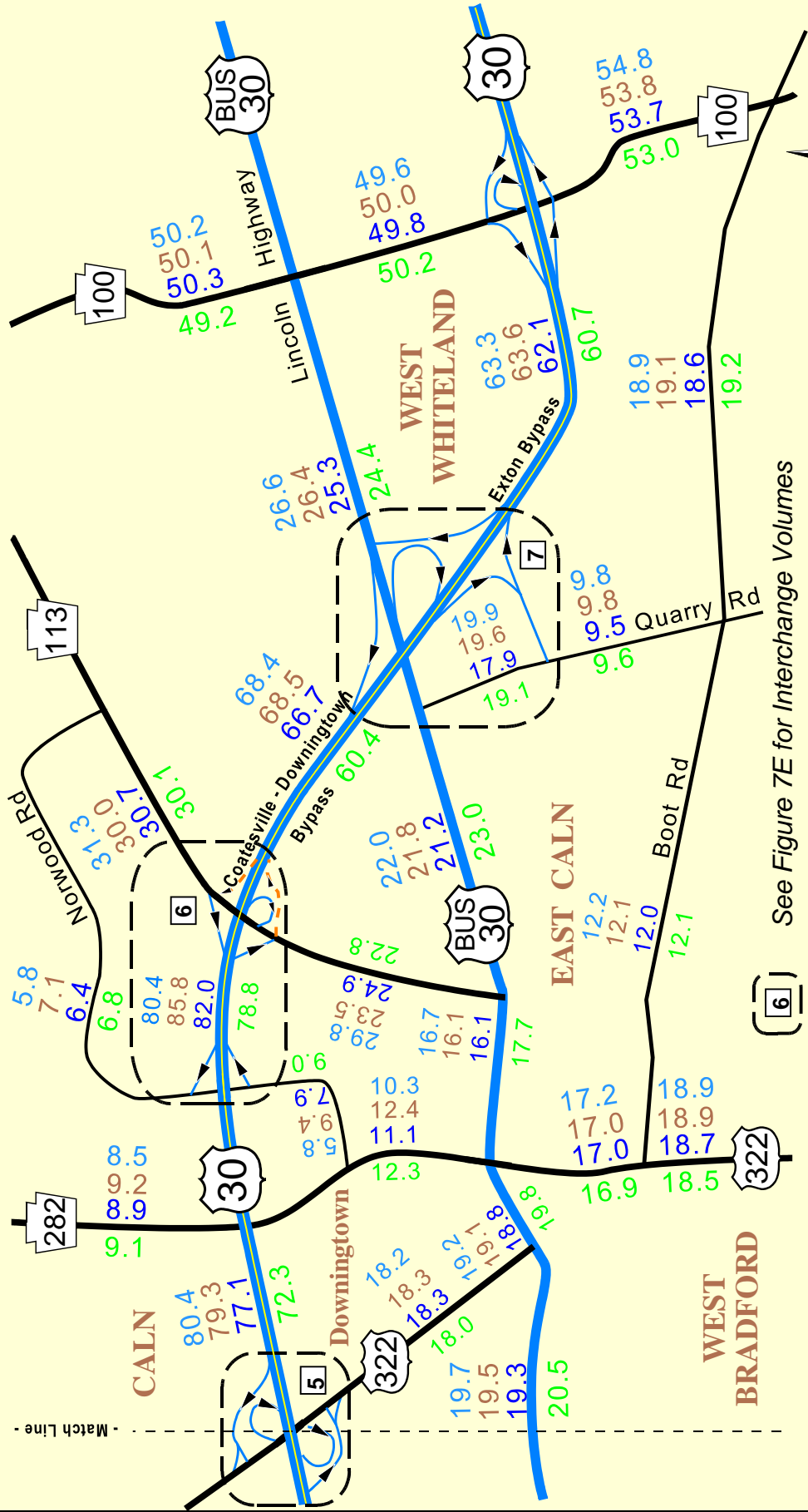
2030 Build Alternative 3 AADT (000s)	11.6
2030 Build Alternative 2 AADT (000s)	11.5
2030 Build Alternative 1 AADT (000s)	11.5
2030 No-Build Alternative AADT (000s)	11.6

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 7C. 2030 Build Alternatives Average Daily Traffic Volumes



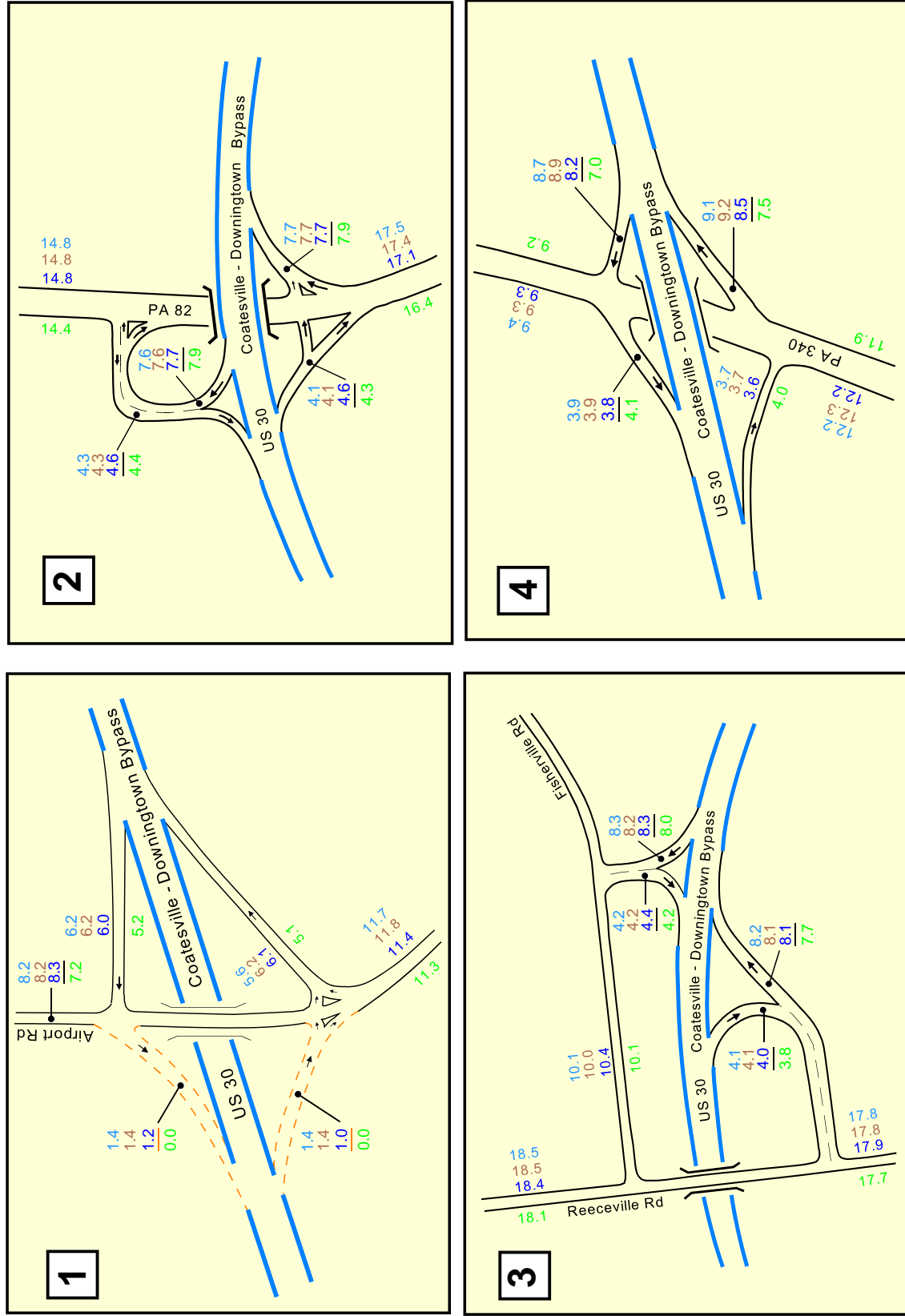
- See Figure 7E for Interchange Volumes
- 18.9 2030 Build Alternative 3 AADT (000s)
 - 18.9 2030 Build Alternative 2 AADT (000s)
 - 18.7 2030 Build Alternative 1 AADT (000s)
 - 18.5 2030 No-Build Alternative AADT (000s)

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 7D. 2030 Build Alternatives Average Daily Traffic Volumes



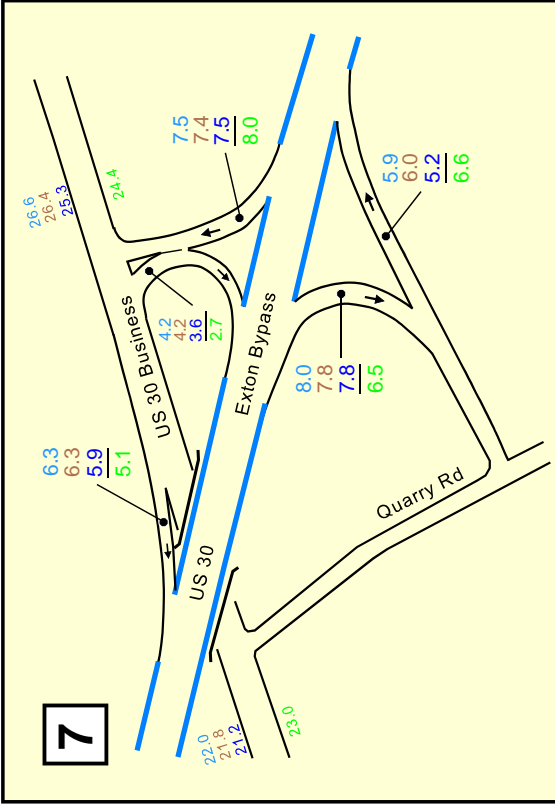
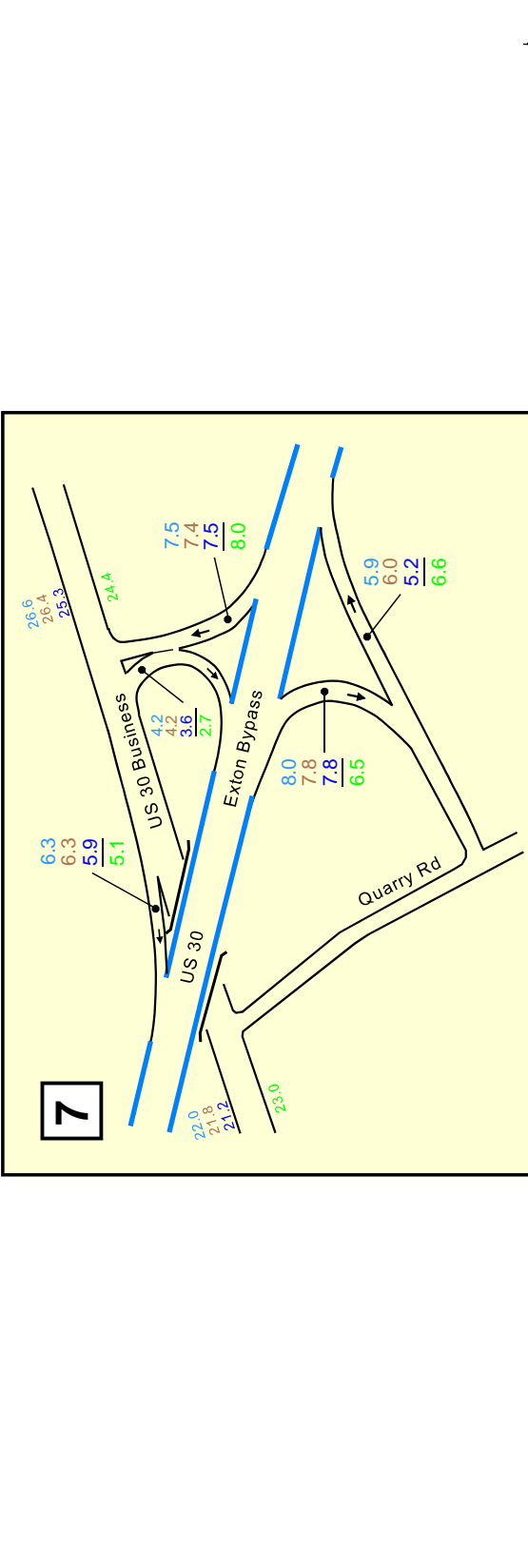
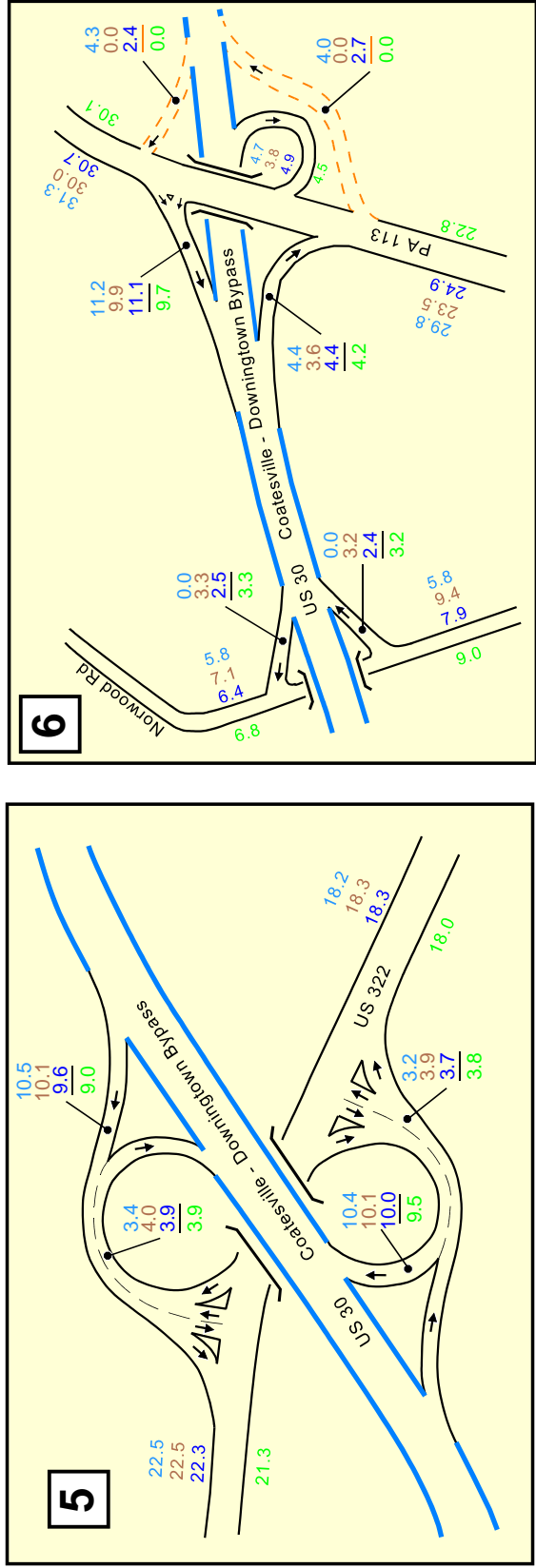
2030 Build Alternative 3 AADT (000s)
 2030 Build Alternative 2 AADT (000s)
 2030 Build Alternative 1 AADT (000s)
 2030 No-Build Alternative AADT (000s)

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 7E. 2030 Build Alternatives Average Daily Traffic Volumes



--- Proposed
--- 2030 Build Alternative 3 AADT (000s)
--- 2030 Build Alternative 2 AADT (000s)
--- 2030 Build Alternative 1 AADT (000s)
--- 2030 No-Build Alternative AADT (000s)



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Table 3. Base Year and 2030 Average Daily Traffic Volumes

Location	Base Year		2030		2030 Build Alternative 1			2030 Build Alternative 2			2030 Build Alternative 3		
	AAADT	No-Build / Base Yr. Diff.	AAADT	No-Build / Base Yr. Pct.	AAADT	Build / No-Build Diff.	Pct.	AAADT	Build / No-Build Diff.	Pct.	AAADT	Build / No-Build Diff.	Pct.
<i>US 30 Mainline</i>													
Lancaster Line to PA 10	18,286	8,414	26,700	46.0%	27,100	400	1.5%	27,400	700	2.6%	27,500	800	3.0%
PA 10 to US 30 Business	23,789	12,611	36,400	53.0%	37,300	900	2.5%	37,000	600	1.6%	37,000	600	1.6%
US 30 Business to Airport Rd	20,386	9,614	30,000	47.2%	31,700	1,700	5.7%	32,000	2,000	6.7%	31,800	1,800	6.0%
Airport Rd to PA 82	27,537	12,763	40,300	46.3%	41,600	1,300	3.2%	41,600	1,300	3.2%	40,800	500	1.2%
PA 82 to Reeceville Rd	33,446	13,954	47,400	41.7%	47,800	400	0.8%	48,500	1,100	2.3%	47,700	300	0.6%
Reeceville Rd to PA 340	41,059	14,041	55,100	34.2%	55,800	700	1.3%	56,500	1,400	2.5%	55,900	800	1.5%
PA 340 to US 322	47,477	14,023	61,500	29.5%	65,100	3,600	5.9%	67,000	5,500	8.9%	66,100	4,600	7.5%
US 322 to Norwood Rd	56,525	15,775	72,300	27.9%	77,100	4,800	6.6%	79,300	7,000	9.7%	80,400	8,100	11.2%
Norwood Rd to PA 113	61,464	17,336	78,800	28.2%	82,000	3,200	4.1%	85,800	7,000	8.9%	80,400	1,600	2.0%
PA 113 to US 30 Business	46,002	14,398	60,400	31.3%	66,700	6,300	10.4%	68,500	8,100	13.4%	68,400	8,000	13.2%
US 30 Business to PA 100	45,479	15,221	60,700	33.5%	62,100	1,400	2.3%	63,600	2,900	4.8%	63,300	2,600	4.3%
<i>US 30 Ramps</i>													
Eastbound On-Ramp from US 30 Bus.	10,110	4,690	14,800	46.4%	15,600	800	5.4%	15,900	1,100	7.4%	15,700	900	6.1%
Westbound Off-Ramp to US 30 Bus.	10,276	4,924	15,200	47.9%	16,100	900	5.9%	16,100	900	5.9%	16,100	900	5.9%
Eastbound Off-Ramp to Airport Rd	0	0	0	-----	1,000	1,000	-----	1,400	1,400	-----	1,400	1,400	-----
Eastbound On-Ramp from Airport Rd	3,620	1,480	5,100	40.9%	6,100	1,000	19.6%	6,200	1,100	21.6%	5,600	500	9.8%
Westbound Off-Ramp to Airport Rd	3,711	1,489	5,200	40.1%	6,000	800	15.4%	6,200	1,000	19.2%	6,200	1,000	19.2%
Westbound On-Ramp from Airport Rd	0	0	0	-----	1,200	1,200	-----	1,400	1,400	-----	1,400	1,400	-----
Eastbound Off-Ramp to PA 82	1,670	2,630	4,300	157.5%	4,600	300	7.0%	4,100	-200	-4.7%	4,100	-200	-4.7%
Eastbound On-Ramp from PA 82	6,008	1,892	7,900	31.5%	7,700	-200	-2.5%	7,700	-200	-2.5%	7,700	-200	-2.5%
Westbound Off-Ramp to PA 82	5,941	1,959	7,900	33.0%	7,700	-200	-2.5%	7,600	-300	-3.8%	7,600	-300	-3.8%
Westbound On-Ramp from PA 82	1,480	2,920	4,400	197.3%	4,600	200	4.5%	4,300	-100	-2.3%	4,300	-100	-2.3%
Eastbound Off-Ramp to Reeceville Rd	1,838	1,962	3,800	106.7%	4,000	200	5.3%	4,100	300	7.9%	4,100	300	7.9%
Eastbound On-Ramp from Reeceville Rd	5,717	1,983	7,700	34.7%	8,100	400	5.2%	8,100	400	5.2%	8,200	500	6.5%
Westbound Off-Ramp to Fisherville Rd	5,530	2,470	8,000	44.7%	8,300	300	3.8%	8,200	200	2.5%	8,300	300	3.8%
Westbound On-Ramp from Fisherville Rd	1,796	2,404	4,200	133.9%	4,400	200	4.8%	4,200	0	0.0%	4,200	0	0.0%
Eastbound Off-Ramp to PA 340	2,068	1,932	4,000	93.4%	3,600	-400	-10.0%	3,700	-300	-7.5%	3,700	-300	-7.5%
Eastbound On-Ramp from PA 340	5,427	2,073	7,500	38.2%	8,500	1,000	13.3%	9,200	1,700	22.7%	9,100	1,600	21.3%
Westbound Off-Ramp to PA 340	5,558	1,442	7,000	25.9%	8,200	1,200	17.1%	8,900	1,900	27.1%	8,700	1,700	24.3%
Westbound On-Ramp from PA 340	1,777	2,323	4,100	130.7%	3,800	-300	-7.3%	3,900	-200	-4.9%	3,900	-200	-4.9%
Eastbound Off-Ramp to US 322	2,498	1,302	3,800	52.1%	3,700	-100	-2.6%	3,900	100	2.6%	3,200	-600	-15.8%
Eastbound On-Ramp from US 322	7,215	2,285	9,500	31.7%	10,000	500	5.3%	10,100	600	6.3%	10,400	900	9.5%
Westbound Off-Ramp to US 322	6,772	2,228	9,000	32.9%	9,600	600	6.7%	10,100	1,100	12.2%	10,500	1,500	16.7%
Westbound On-Ramp from US 322	2,441	1,459	3,900	59.8%	3,900	0	0.0%	4,000	100	2.6%	3,400	-500	-12.8%
Eastbound On-Ramp from Norwood Rd	2,441	759	3,200	31.1%	2,400	-800	-25.0%	3,200	0	0.0%	0	-3,200	-100.0%
Westbound Off-Ramp to Norwood Rd	2,574	726	3,300	28.2%	2,500	-800	-24.2%	3,300	0	0.0%	0	-3,300	-100.0%
Eastbound Off-Ramp to PA 113 northbound	5,706	2,994	4,200	52.5%	4,400	200	4.8%	3,600	-600	-14.3%	4,400	200	4.8%
Eastbound On-Ramp to PA 113 northbound	0	0	0	-----	4,900	400	8.9%	3,800	-700	-15.6%	4,700	200	4.4%
Westbound Off-Ramp from PA 113	0	0	0	-----	2,700	2,700	-----	0	0	-----	4,000	4,000	-----
Westbound On-Ramp to PA 113	0	0	0	-----	2,400	2,400	-----	0	0	-----	4,300	4,300	-----
Westbound On-Ramp from PA 113	8,313	1,387	9,700	16.7%	11,100	1,400	14.4%	9,900	200	2.1%	11,200	1,500	15.5%
Eastbound Off-Ramp to Quarry Rd	4,849	1,651	6,500	34.0%	7,800	1,300	20.0%	7,800	1,300	20.0%	8,000	1,500	23.1%
Eastbound On-Ramp from Quarry Rd	5,092	1,508	6,600	29.6%	5,200	-1,400	-21.2%	6,000	-600	-9.1%	5,900	-700	-10.6%
Westbound Off-Ramp to US 30 Bus.	5,100	2,900	8,000	56.9%	7,500	-500	-6.3%	7,400	-600	-7.5%	7,500	-500	-6.3%
Westbound On-Ramp from US 30 Bus. EB	1,856	844	2,700	45.5%	3,600	900	33.3%	4,200	1,500	55.6%	4,200	1,500	55.6%
Westbound On-Ramp from US 30 Bus. WB	4,412	688	5,100	15.6%	5,900	800	15.7%	6,300	1,200	23.5%	6,300	1,200	23.5%

Table 3. Base Year and 2030 Average Daily Traffic Volumes

Location	2030			2030 Build Alternative 1			2030 Build Alternative 2			2030 Build Alternative 3			
	Base Year AADT	No-Build AADT	No-Build / Base Yr. Pct.	AADT	Build / No-Build Diff.	Pct.	AADT	Build / No-Build Diff.	Pct.	AADT	Build / No-Build Diff.	Pct.	
<i>Parallel Streets</i>													
US 30 Business - US 30 to Airport Rd	5,784	8,100	2,316	40.0%	7,200	-900	-11.1%	7,400	-700	-8.6%	7,400	-700	-8.6%
US 30 Business - Airport Rd to Strode Ave	8,680	13,100	4,410	50.7%	13,000	-100	-0.8%	13,200	100	0.8%	13,200	100	0.8%
US 30 Business - Strode Ave to PA 82	14,525	19,700	5,175	35.6%	19,800	100	0.5%	19,700	0	0.0%	19,900	200	1.0%
US 30 Business - PA 82 to Reeceville Rd	11,951	15,600	3,649	30.5%	15,800	200	1.3%	15,600	0	0.0%	15,700	100	0.6%
US 30 Business - Reeceville Rd to PA 340	15,489	20,300	4,811	31.1%	19,700	-600	-3.0%	19,400	-900	-4.4%	19,400	-900	-4.4%
US 30 Business - PA 340 to US 322	15,587	20,500	4,913	31.5%	19,300	-1,200	-5.9%	19,500	-1,000	-4.9%	19,700	-800	-3.9%
US 30 Business - US 322 to PA 282	15,034	19,800	4,766	31.7%	18,800	-1,000	-5.1%	19,100	-700	-3.5%	19,200	-600	-3.0%
US 30 Business - PA 282 to PA 113	13,095	17,700	4,605	35.2%	16,100	-1,600	-9.0%	16,100	-1,600	-9.0%	16,700	-1,000	-5.6%
US 30 Business - PA 113 to US 30	17,152	23,000	5,848	34.1%	21,200	-1,800	-7.8%	21,800	-1,200	-5.2%	22,000	-1,000	-4.3%
US 30 Business - US 30 to PA 100	18,658	24,400	5,742	30.8%	25,300	900	3.7%	26,400	2,000	8.2%	26,600	2,200	9.0%
PA 340 west of PA 82	4,960	7,700	2,740	55.2%	7,800	100	1.3%	7,900	200	2.6%	7,900	200	2.6%
PA 340 - PA 82 to Reeceville Rd	4,532	7,200	2,668	58.9%	6,700	-500	-6.9%	6,800	-400	-5.6%	6,800	-400	-5.6%
PA 340 - Reeceville Rd to US 30 interchange	5,755	9,200	3,445	59.9%	9,300	100	1.1%	9,300	100	1.1%	9,400	200	2.2%
Fisherville Rd - US 30 Ramp to Reeceville Rd	6,993	10,100	3,107	44.4%	10,400	300	3.0%	10,000	-100	-1.0%	10,100	0	0.0%
Boot Rd - US 322 to Grove Rd	8,423	12,100	3,677	43.7%	12,000	-100	-0.8%	12,100	0	0.0%	12,200	100	0.8%
Boot Rd - Grove Rd to PA 100	14,305	19,200	4,895	34.2%	18,600	-600	-3.1%	19,100	-100	-0.5%	18,900	-300	-1.6%
<i>Crossing Streets</i>													
PA 10 - North of US 30	6,892	11,200	4,308	62.5%	11,800	600	5.4%	11,900	700	6.3%	11,900	700	6.3%
PA 10 - South of US 30	10,445	17,000	6,555	62.8%	17,800	800	4.7%	17,800	800	4.7%	17,900	900	5.3%
Airport Rd - North of US 30	4,756	7,200	2,444	51.4%	8,300	1,100	15.3%	8,200	1,000	13.9%	8,200	1,000	13.9%
Airport Rd - US 30 to US 30 Business	7,642	11,300	3,658	47.9%	11,400	100	0.9%	11,800	500	4.4%	11,700	400	3.5%
PA 82 - North of US 30	10,720	14,400	3,680	34.3%	14,800	400	2.8%	14,800	400	2.8%	14,800	400	2.8%
PA 82 - US 30 to US 30 Business	12,210	16,400	4,190	34.3%	17,100	700	4.3%	17,400	1,000	6.1%	17,500	1,100	6.7%
PA 82 - South of US 30 Business	8,633	11,600	2,967	34.4%	11,500	-100	-0.9%	11,500	-100	-0.9%	11,600	0	0.0%
Reeceville Rd - North of Fisherville Rd	13,200	18,100	4,900	37.1%	18,400	300	1.7%	18,500	400	2.2%	18,500	400	2.2%
Reeceville Rd - US 30 to PA 340	15,009	17,700	2,691	17.9%	17,900	200	1.1%	17,800	100	0.6%	17,800	100	0.6%
Reeceville Rd - PA 340 to US 30 Business	9,357	11,600	2,243	24.0%	12,100	500	4.3%	11,800	200	1.7%	11,800	200	1.7%
PA 340 - US 30 to US 30 Business	8,876	11,900	3,024	34.1%	12,200	300	2.5%	12,300	400	3.4%	12,200	300	2.5%
US 322 - North of US 30	16,740	21,300	4,560	27.2%	22,300	1,000	4.7%	22,500	1,200	5.6%	22,500	1,200	5.6%
US 322 - US 30 to US 30 Business	13,132	18,000	4,868	37.1%	18,300	300	1.7%	18,300	300	1.7%	18,200	200	1.1%
US 322 - US 30 Business to Boot Rd	12,104	16,900	4,796	39.6%	17,000	100	0.6%	17,000	100	0.6%	17,200	300	1.8%
US 322 - South of Boot Rd	13,568	18,500	4,932	36.4%	18,700	200	1.1%	18,900	400	2.2%	18,900	400	2.2%
PA 282 - North of Norwood Rd	6,104	9,100	2,996	49.1%	8,900	-200	-2.2%	9,200	100	1.1%	8,500	-600	-6.6%
PA 282 - Norwood Rd to US 30 Business	8,070	12,300	4,230	52.4%	11,100	-1,200	-9.8%	12,400	100	0.8%	10,300	-2,000	-16.3%
Norwood Rd - North of US 30	4,713	6,800	2,087	44.3%	6,400	-400	-5.9%	7,100	300	4.4%	5,800	-1,000	-14.7%
Norwood Rd - South of US 30	6,008	9,000	2,992	49.8%	7,900	-1,100	-12.2%	9,400	400	4.4%	5,800	-3,200	-35.6%
PA 113 - North of US 30	19,708	30,100	10,392	52.7%	30,700	600	2.0%	30,500	-100	-0.3%	31,300	1,200	4.0%
PA 113 - US 30 to US 30 Business	14,306	22,800	8,494	59.4%	24,900	2,100	9.2%	23,500	700	3.1%	29,800	7,000	30.7%
Ackwork Station Rd - US 30 Bus. to Ramps	14,951	19,100	4,149	27.8%	17,900	-1,200	-6.3%	19,600	500	2.6%	19,900	800	4.2%
Ackwork Station Rd - Ramps to Boot Rd	6,591	9,600	3,009	45.7%	9,500	-100	-1.0%	9,800	200	2.1%	9,800	200	2.1%
PA 100 - North of US 30 Business	36,576	49,200	12,624	34.5%	50,300	1,100	2.2%	50,100	900	1.8%	50,200	1,000	2.0%
PA 100 - US 30 Business to US 30	37,218	50,200	12,982	34.9%	49,800	-400	-0.8%	50,000	-200	-0.4%	49,600	-600	-1.2%
PA 100 - US 30 to PA 100 Connector	40,918	53,000	12,082	29.5%	53,700	700	1.3%	53,800	800	1.5%	54,800	1,800	3.4%

In 2030, under Build Alternative 1, the new eastbound off-ramp to Airport Road serves 1,000 vpd and the westbound on-ramp serves 1,200 vpd. The new ramps at PA 113 under Build Alternative 1 serve more than twice this volume. The eastbound on-ramp carries 2,700 vpd, and the westbound off-ramp carries 2,400 vpd. In contrast, both Norwood Road ramps carry 800 fewer vehicles per day in 2030 under Build Alternative 1 than under the No-Build Alternative.

West of PA 340, Build Alternative 2 serves very similar traffic volumes to Build Alternative 1 at nearly all locations. East of PA 340, however, Build Alternative 2 volumes along the Coatesville-Downingtown Bypass are 1,800 to 3,800 vpd higher than the Build Alternative 1 traffic volumes. The largest difference occurs between Norwood Road and PA 113, where Bypass volumes reach 85,800 vpd. The only other large differences between Build Alternative 1 and Build Alternative 2 traffic volumes occur in the vicinity of the Norwood Road and PA 113 interchanges.

In 2030, under Build Alternative 3, US 30 Bypass volumes range from 31,800 vpd to 80,400 vpd. As was the case for 2010, Build Alternative 3 exhibits the highest traffic volumes of all the Build alternatives between US 322 and Norwood Road, but the lowest volumes between Norwood Road and PA 113. This alternative does, however, serve the highest volumes on all of the PA 113 interchange ramps.

D. AM and PM Peak Hour Traffic Forecasts

Generally, the relationships between base year and future peak hour volumes and between the various future year alternatives follow the same patterns and trends as the daily traffic volumes. However, the percentage of daily traffic that occurs during the future AM and PM peak hours is somewhat less than the percentage under base year conditions. This is consistent with the “peak spreading” that occurs as traffic volumes increase. As congestion levels rise, a greater percentage of traffic is shifted to the “shoulders” of the peak, i.e., immediately before and after the peak hour.

AM and PM peak hour traffic forecasts for the US 30 mainline, individual interchange ramps and selected intersections for 2010 for the No-Build and all three Build alternatives are provided in Figures 8A through 11F in Appendix A. Similarly, the peak hour traffic forecasts for 2030 are shown in Figures 12A through 15F in Appendix B. Both the 2010 and 2030 peak hour forecasts for Build Alternative 3 include six additional Downingtown area intersections. These intersections are included for this alternative because Build Alternative 3 includes the closure of the Norwood Road ramps, which affect traffic patterns in Downingtown Borough between PA 282 and PA 113.

VI. CONCLUSIONS

The US 30 Coatesville-Downingtown Bypass traffic study supports a reconstruction plan for the Chester County Bypass. Elements of this plan may include the completion of the partial interchanges at Airport Road and PA 113, the elimination of the Norwood Road interchange, collector-distributor roads between Norwood Road and PA 113, the provision of a westbound truck-climbing lane from PA 340 to Reeceville Road, and the construction of an additional through lane in each direction east of PA 340.

Both the population and employment in the surrounding areas are projected to increase by significant margins. Between 2000 and 2025, the total population in the study area is projected to increase by over 50,000 residents, or 39 percent. The study area will also add over 37,000 new jobs, an increase of 60 percent.

Base year traffic volumes along the Coatesville-Downingtown Bypass range from 20,400 to 61,500 vehicles per day (vpd). The lowest volume occurs at its western terminus, near PA 10. Traffic volumes steadily increase as one moves east until they reach their highest value between Norwood Road and PA 113. East of PA 113, daily volumes decrease to 46,000 vpd.

By 2030, if no improvements are made to the US 30 Bypass, traffic volumes will increase by 10,000 to 17,000 vehicles per day, increases of 28 to 47 percent. Daily traffic volumes on the Bypass will range from 30,000 to 78,800 vpd.

To address existing deficiencies and accommodate future growth, three Build alternatives have been proposed. Although they differ in their treatments of the Norwood Road and PA 113 interchanges, all three provide for additional travel lanes on the US 30 Bypass east of its interchange with PA 340.

This additional capacity results in increased traffic volumes on the Bypass. In 2030, the Coatesville-Downingtown Bypass traffic volumes east of PA 340 under the Build alternatives are 3,600 to 8,100 vpd higher than the corresponding No-Build Alternative traffic volumes. However, these traffic volumes represent significantly less traffic per lane than the No-Build Alternative volumes.

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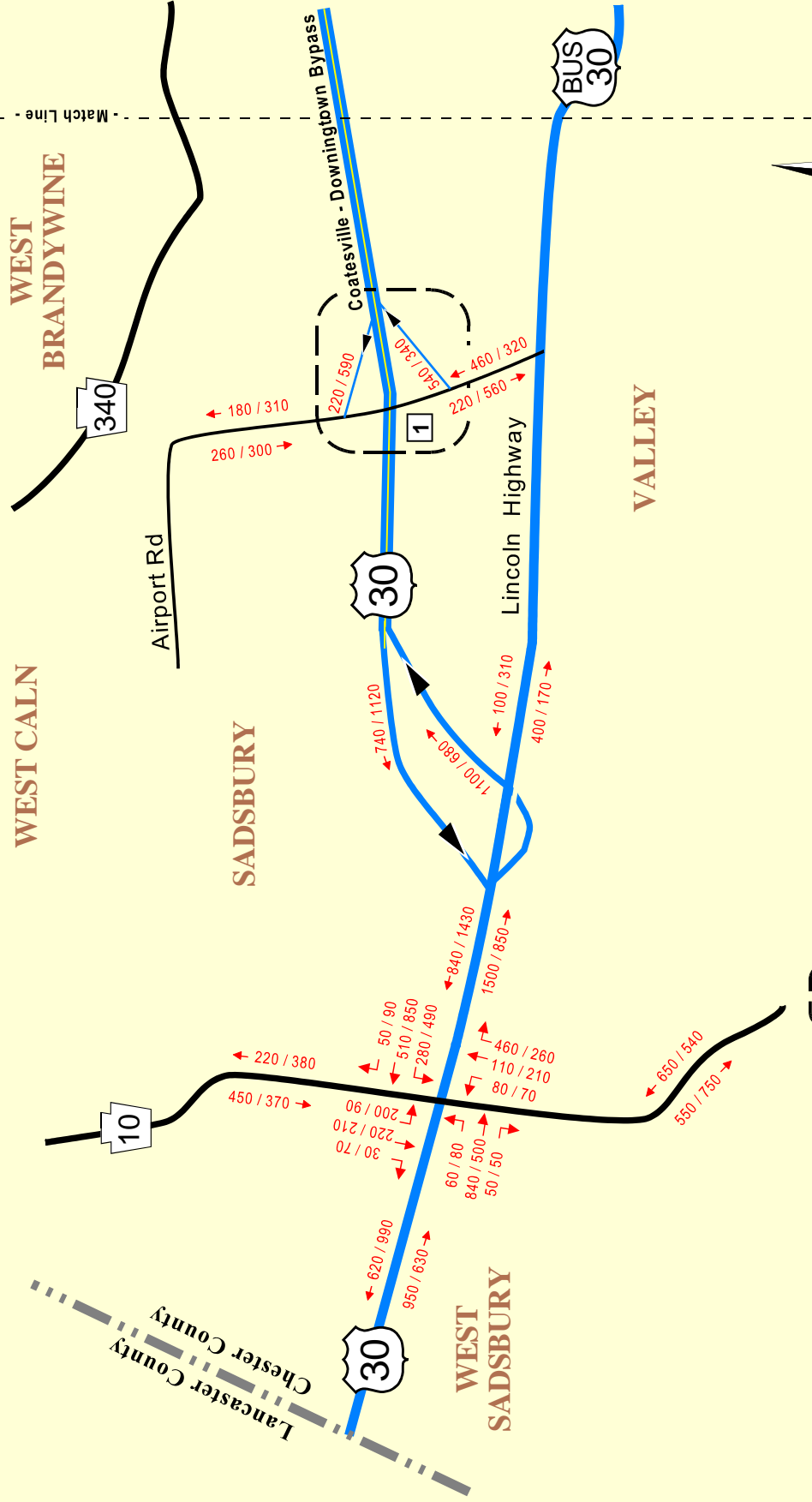
Appendix A

2010 AM / PM Peak Hour Traffic Volumes

Figure 8A-E. 2010 No-Build Alternative AM / PM Peak Hour Traffic Volumes	A-3
Figure 9A-E. 2010 Build Alternative 1 AM / PM Peak Hour Traffic Volumes	A-8
Figure 10A-E. 2010 Build Alternative 2 AM / PM Peak Hour Traffic Volumes	A-13
Figure 11A-F. 2010 Build Alternative 3 AM / PM Peak Hour Traffic Volumes	A-18

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US 30 Coatesville-Downingtown Bypass Traffic Study Figure 8A. 2010 No-Build Alternative AM / PM Peak Hour Traffic Volumes

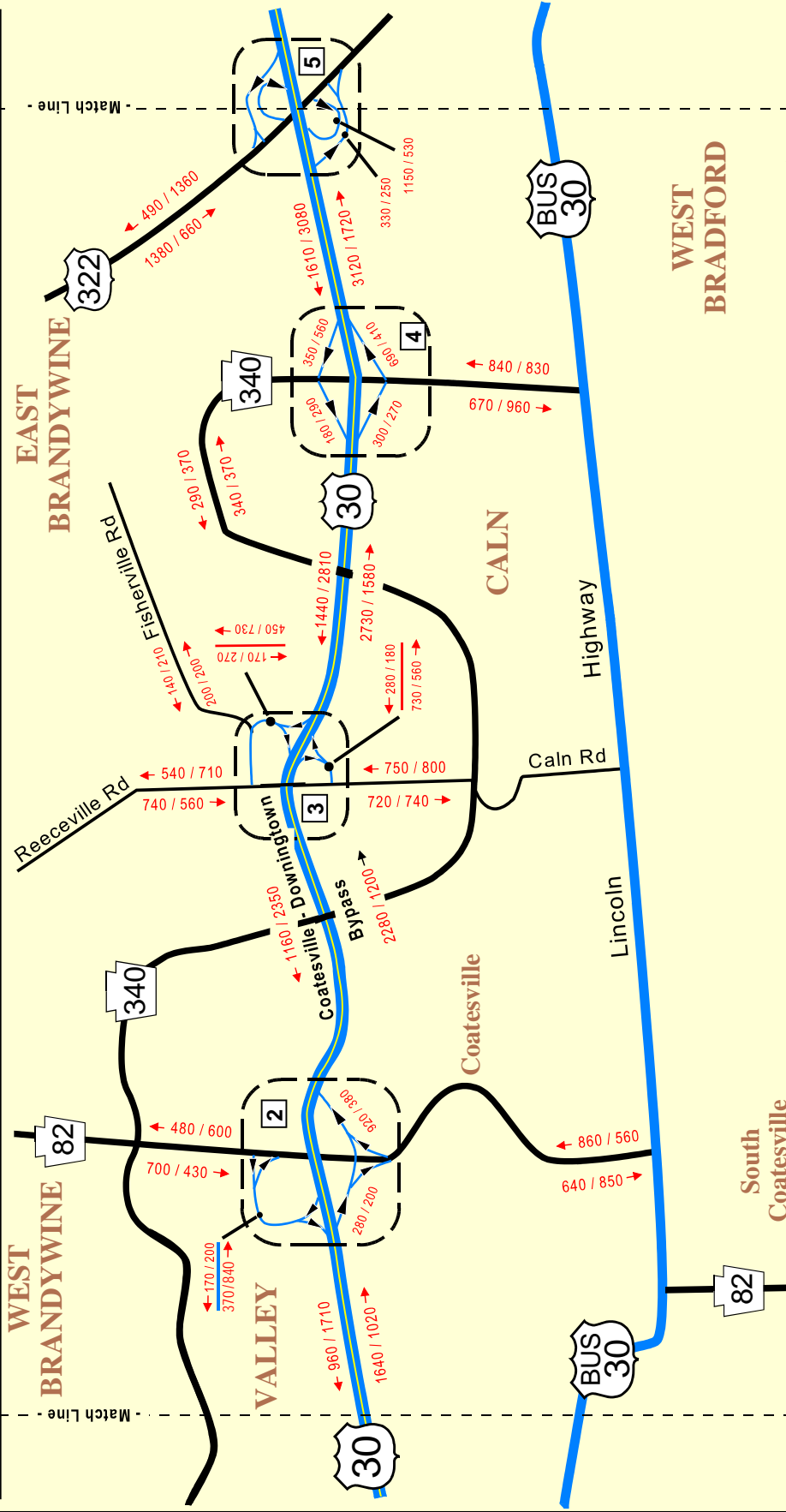


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See Figure 8D for Interchange Volumes
2010 No-Build AM / PM Peak Hour Volumes

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 8B. 2010 No-Build Alternative AM / PM Peak Hour Traffic Volumes



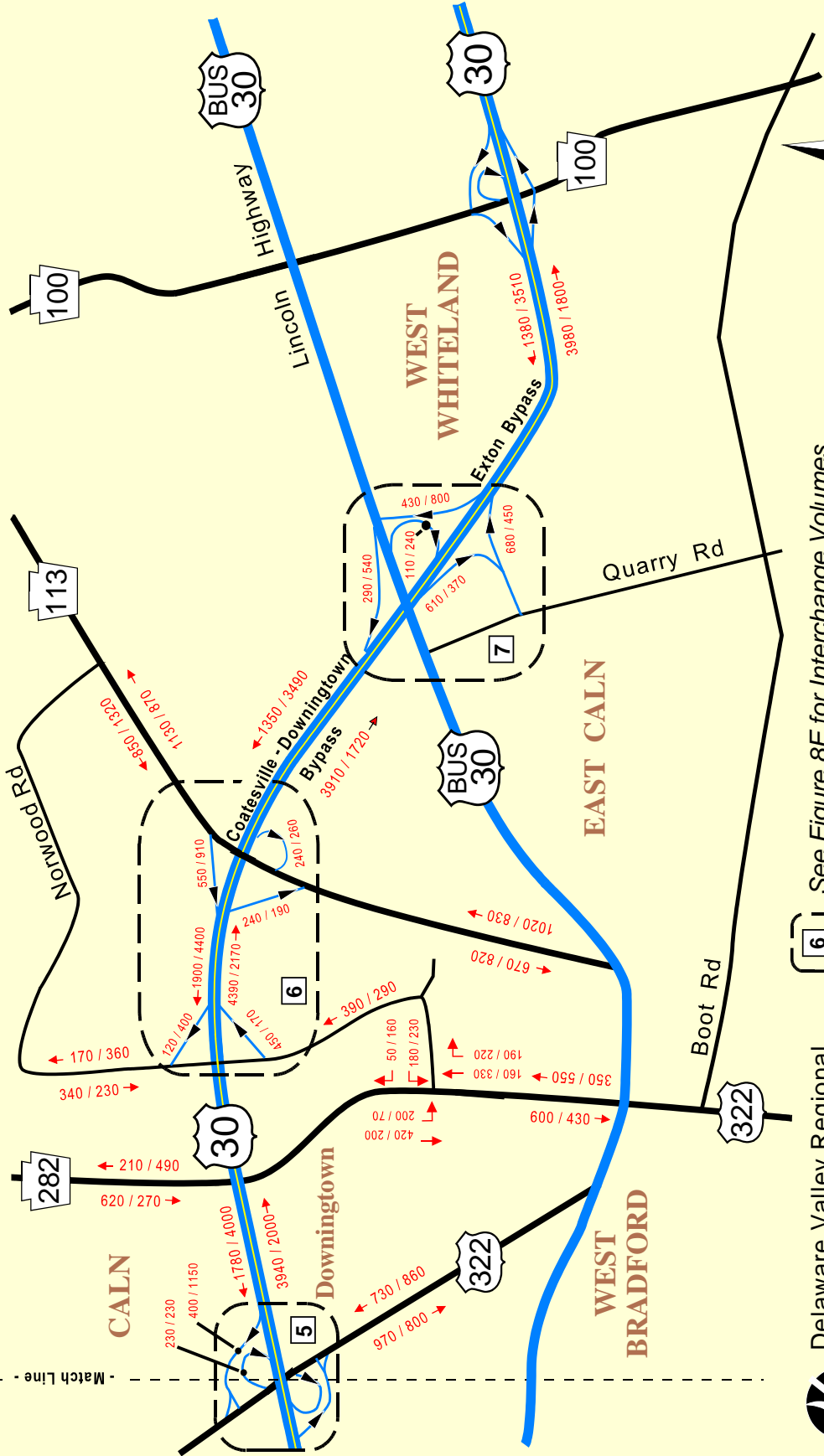
See Figure 8D for Interchange Volumes
 2010 No-Build AM / PM Peak Hour Volumes

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 8C. 2010 No-Build Alternative AM / PM Peak Hour Traffic Volumes

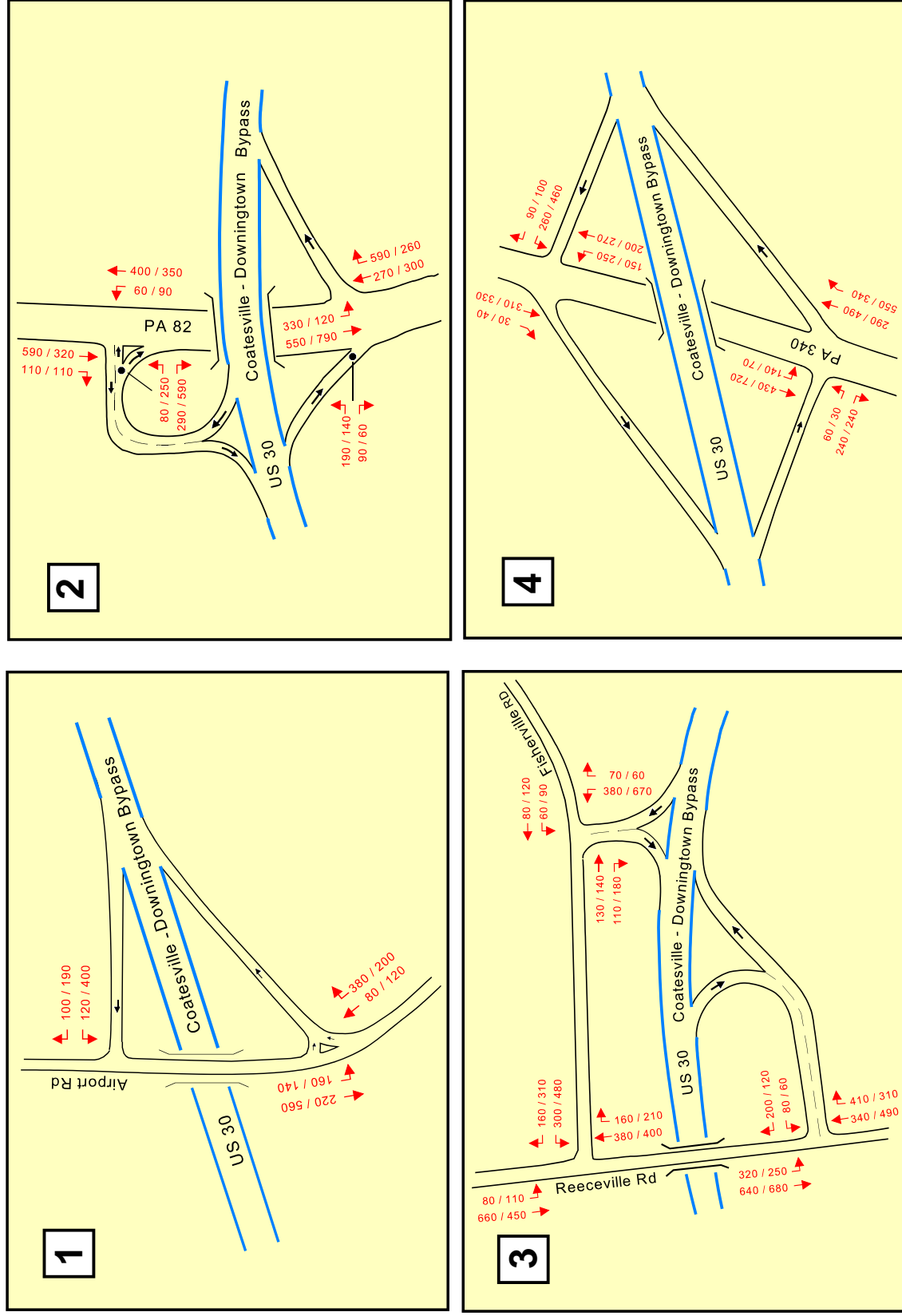


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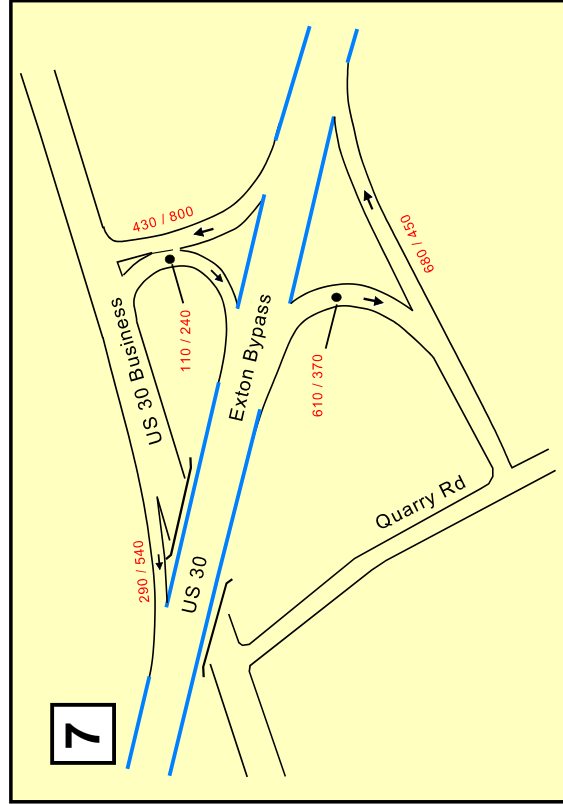
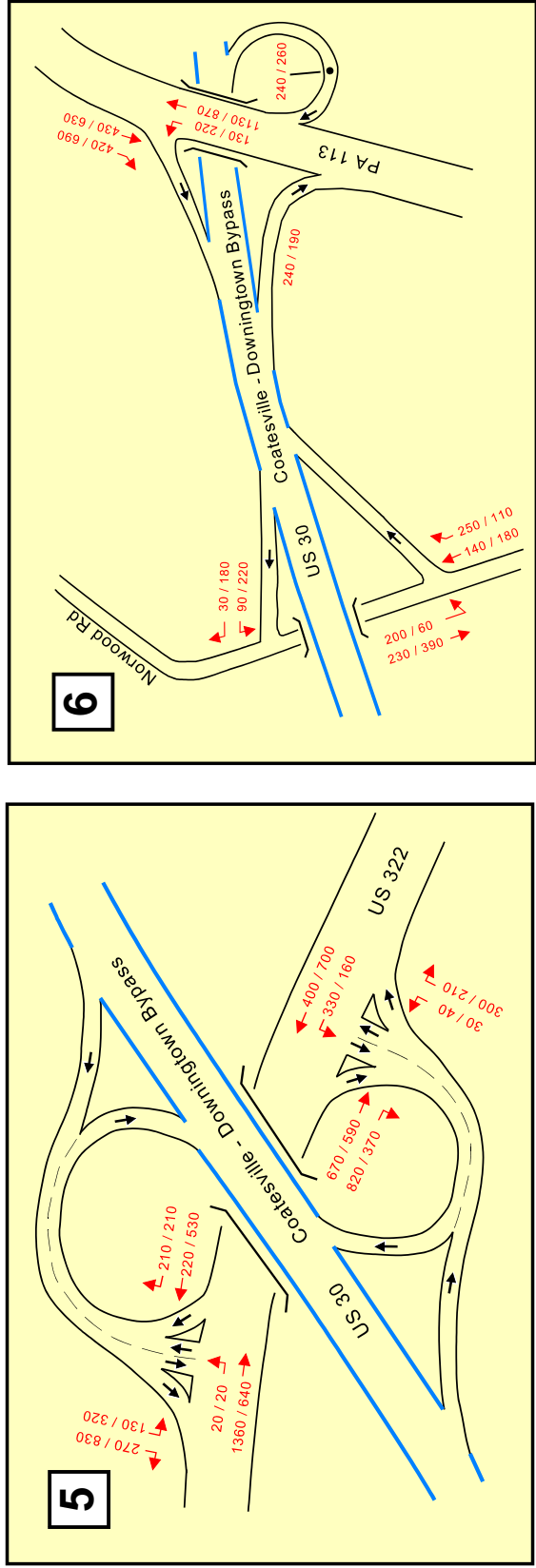
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 2010 No-Build AM / PM Peak Hour Volumes



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Figure 8D. 2010 No-Build Alternative AM / PM Peak Hour Traffic Volumes



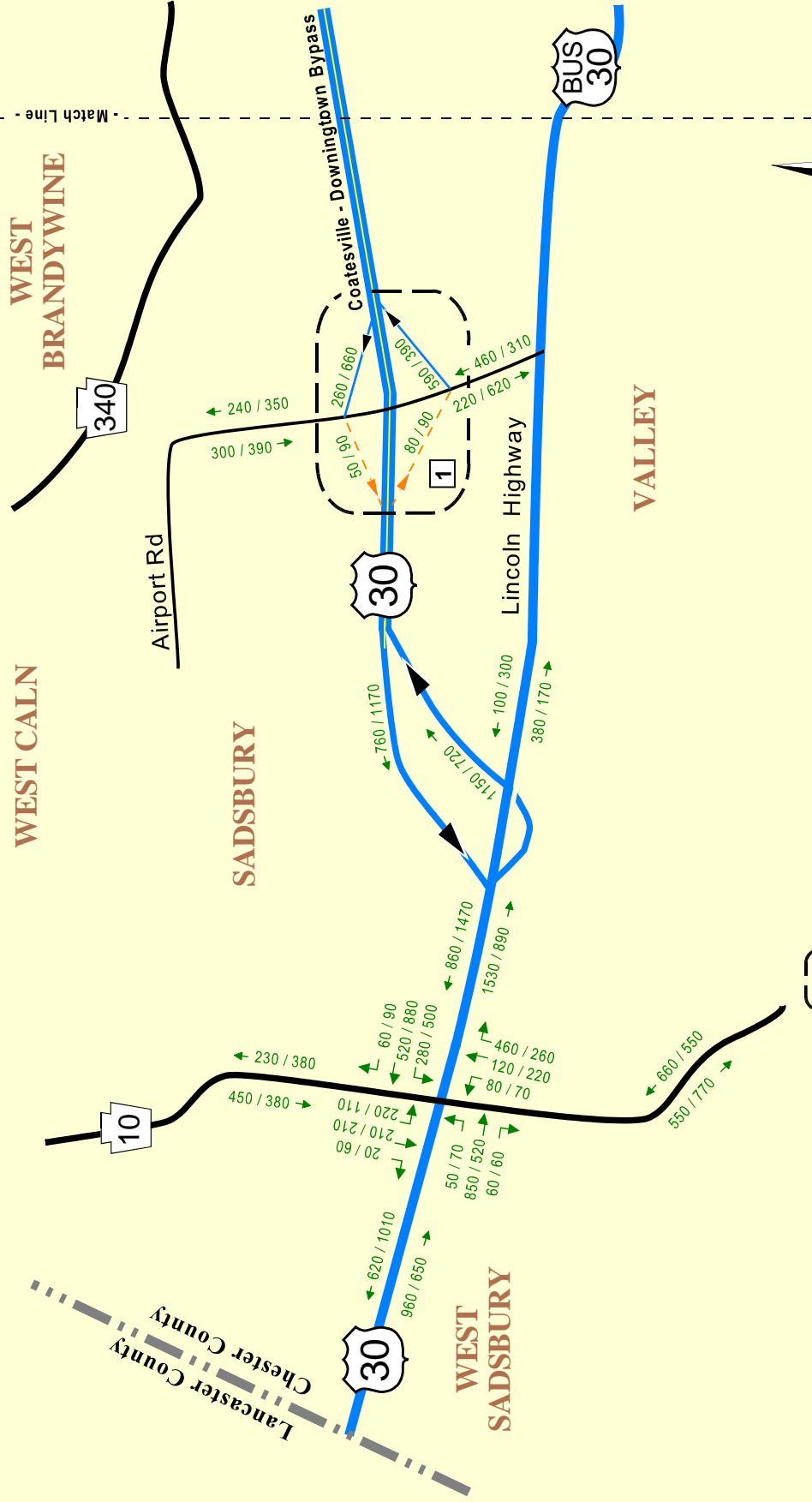
US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 8E. 2010 No-Build Alternative AM / PM Peak Hour Traffic Volumes



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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 9A. 2010 Alternative 1 AM / PM Peak Hour Traffic Volumes



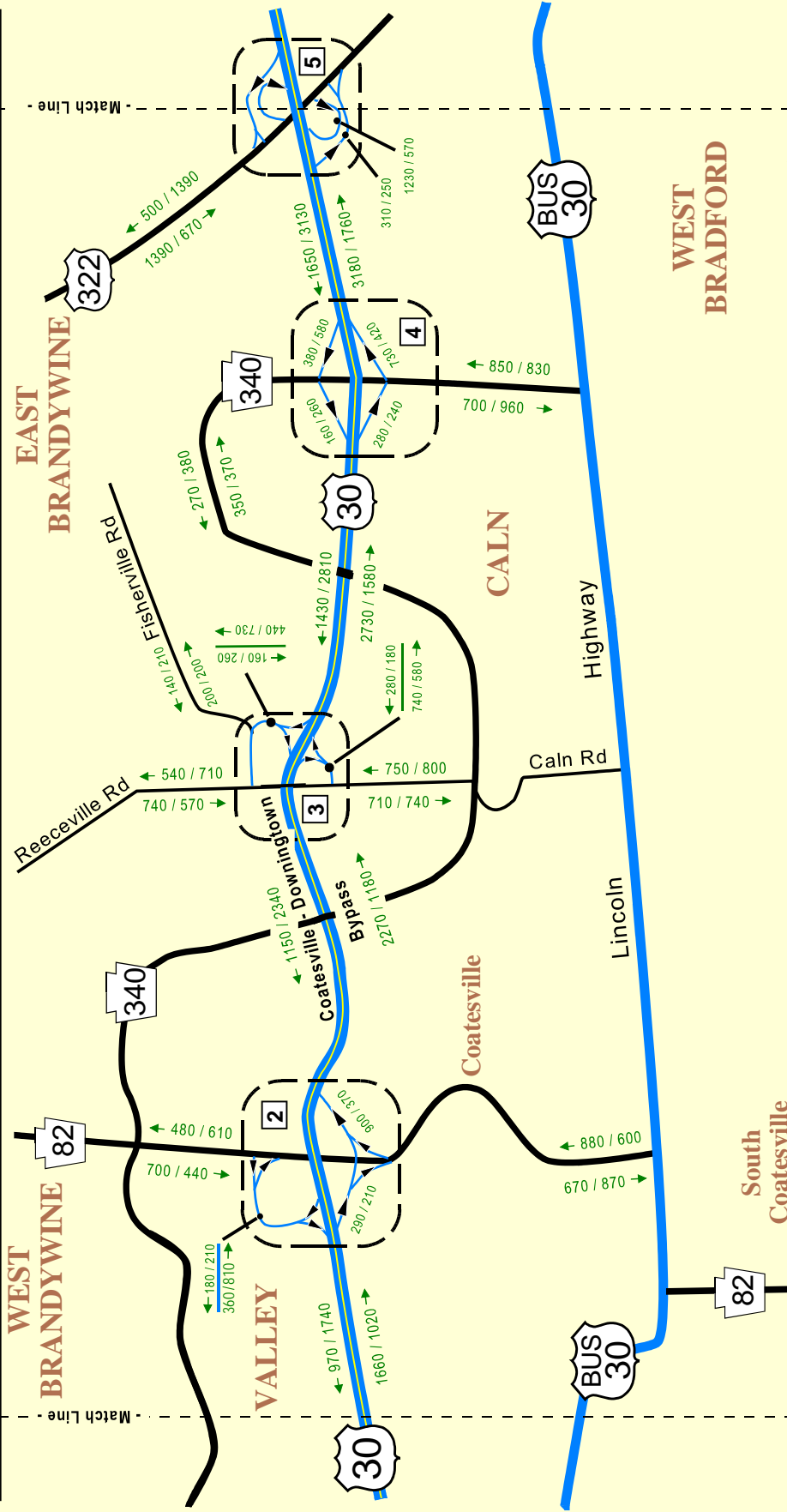
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See Figure 9D for Interchange Volumes
 2010 Alternative 1 AM / PM Peak Hour Volumes

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 9B. 2010 Alternative 1 AM / PM Peak Hour Traffic Volumes



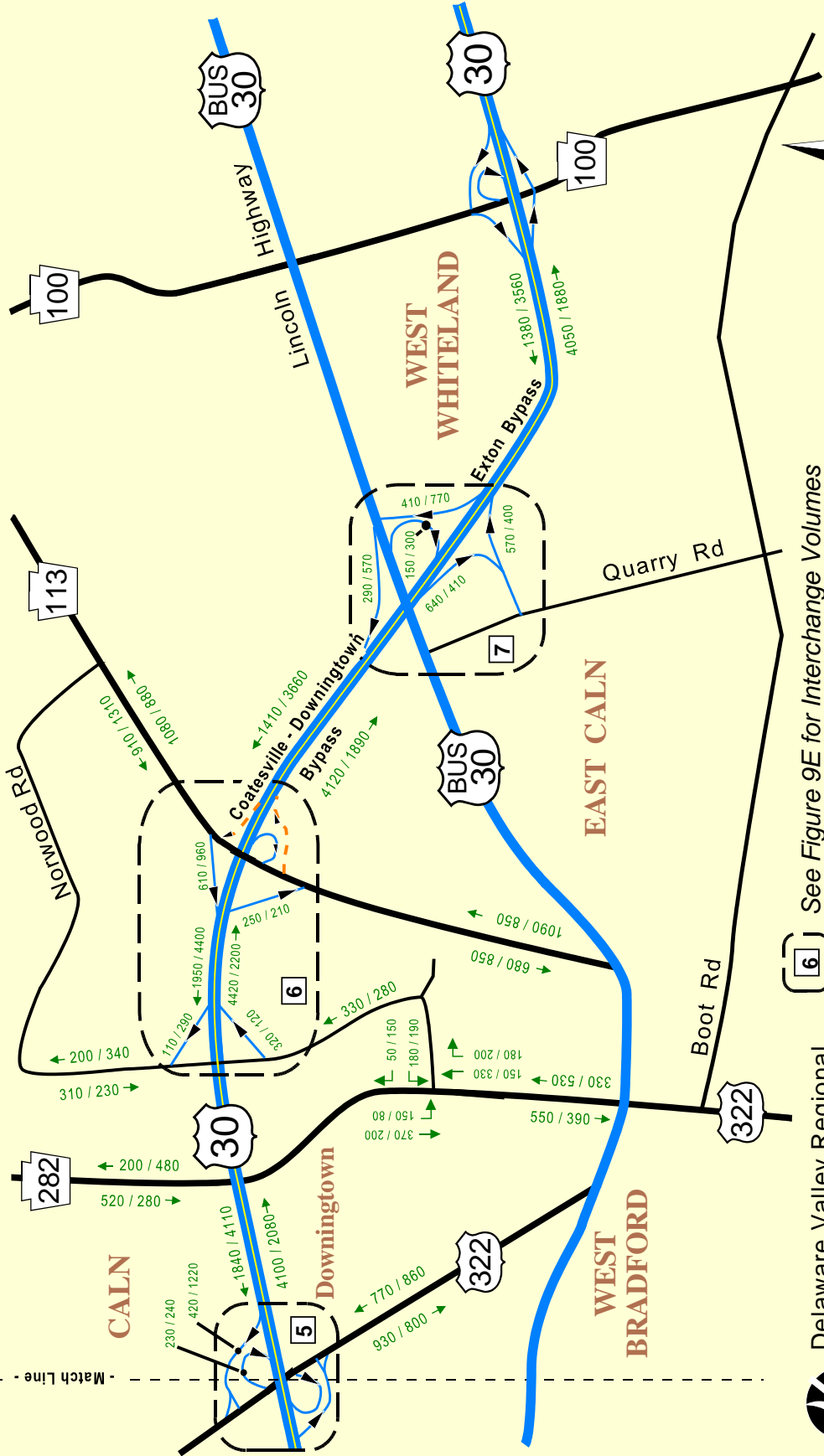
See Figure 9D for Interchange Volumes
 2010 Alternative 1 AM / PM Peak Hour Volumes

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 9C. 2010 Alternative 1 AM / PM Peak Hour Traffic Volumes



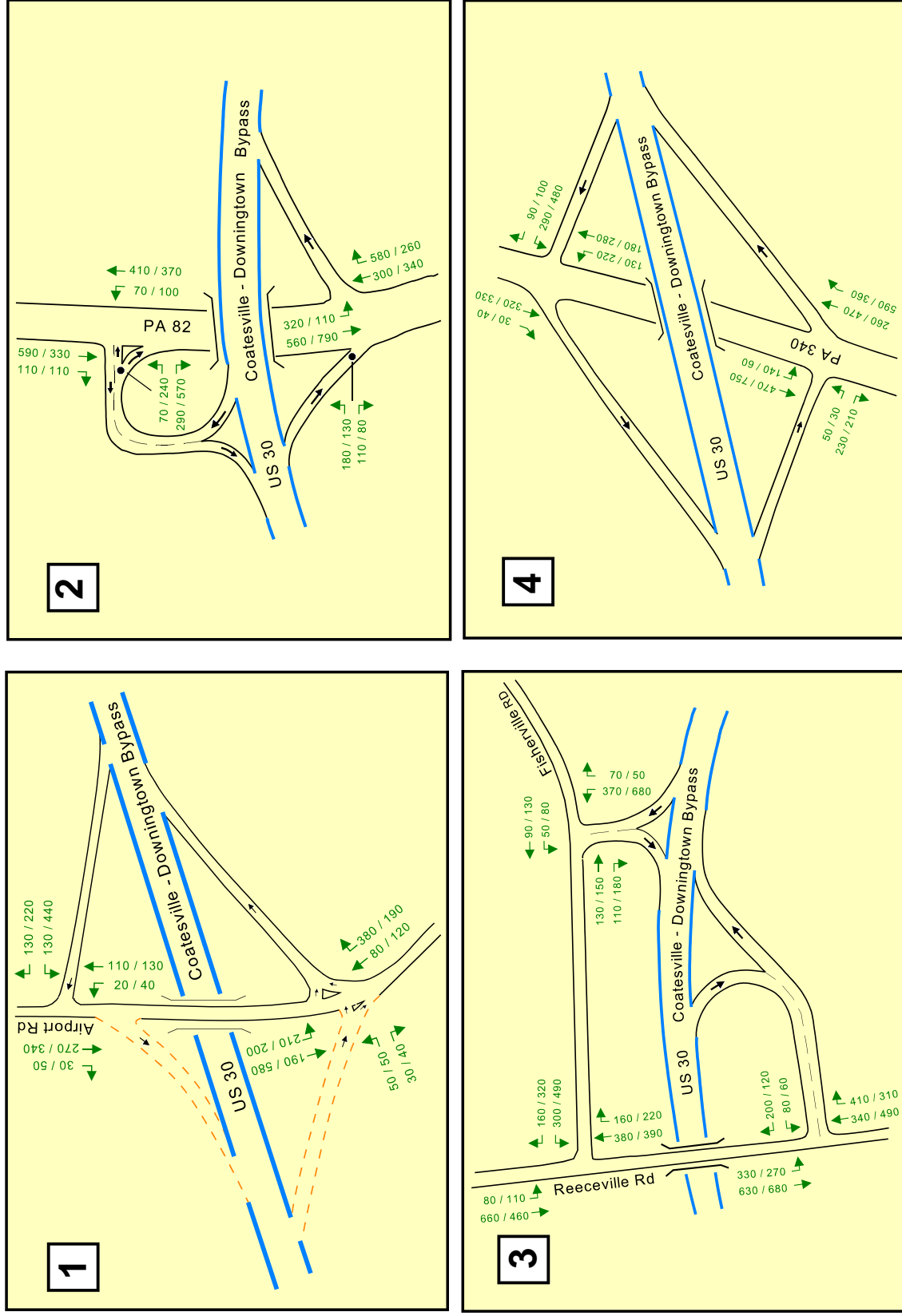
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See Figure 9E for Interchange Volumes
 2010 Alternative 1 AM / PM Peak Hour Volumes
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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 9D. 2010 Alternative 1 AM / PM Peak Hour Traffic Volumes

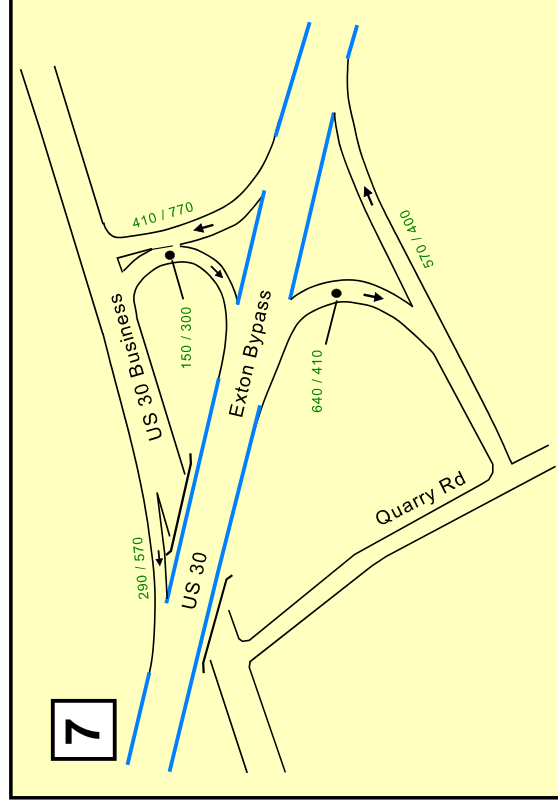
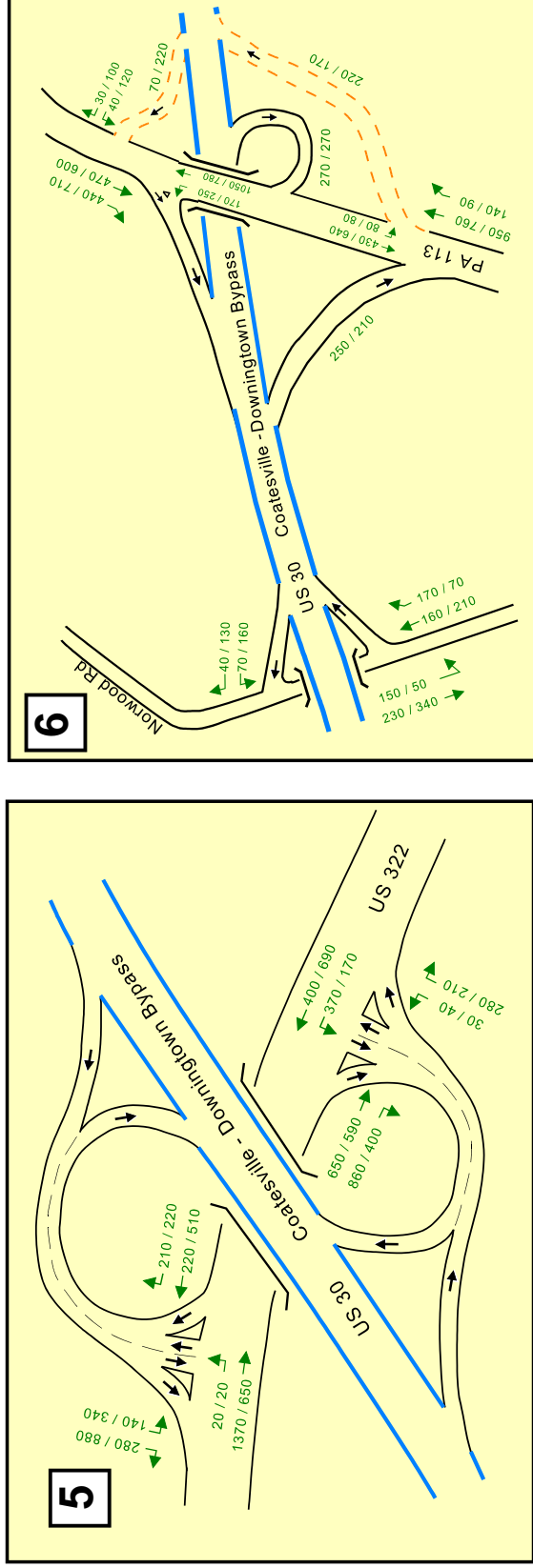


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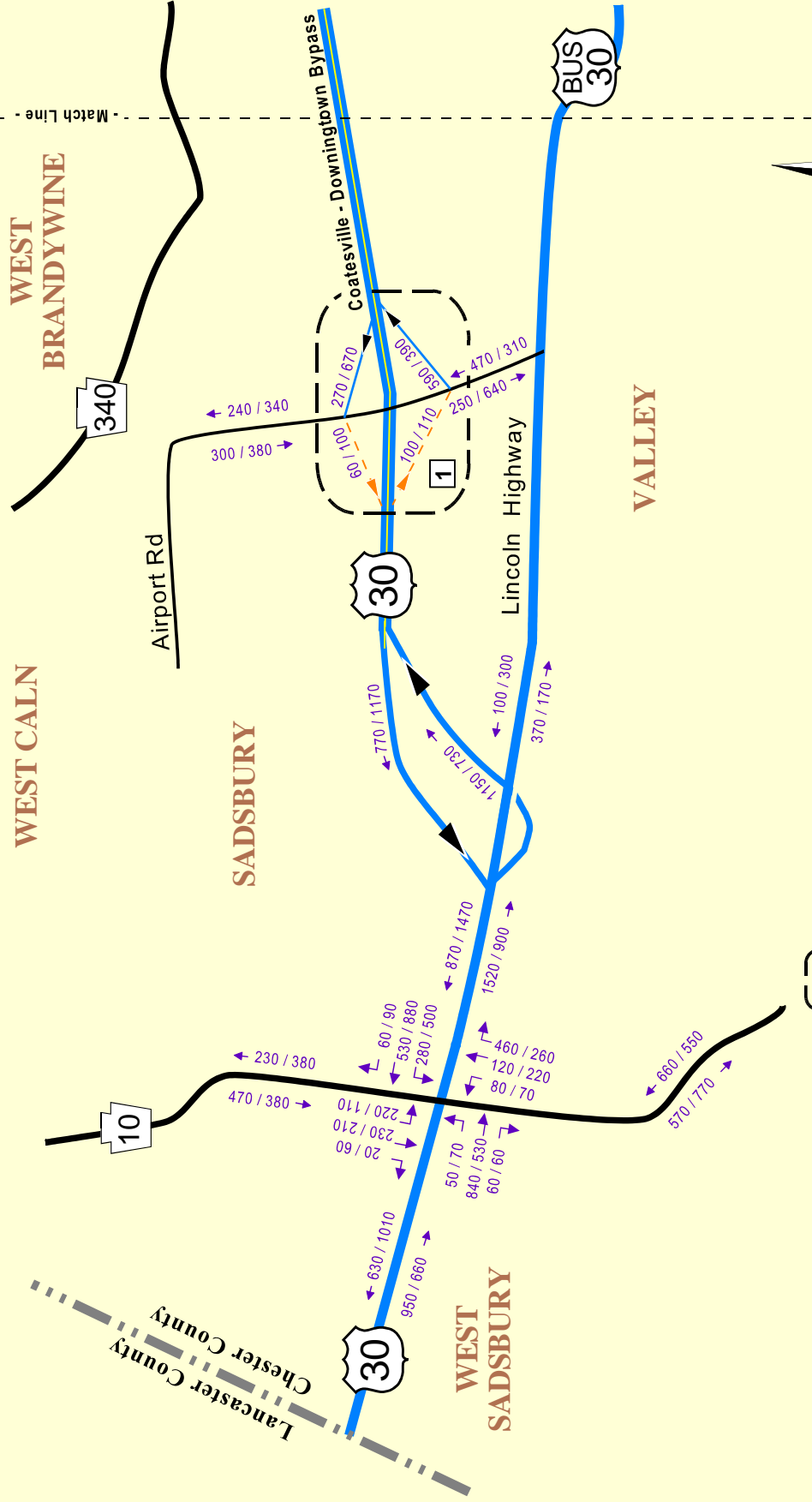
2010 Alternative 1 AM / PM Peak Hour Volumes
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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 9E. 2010 Alternative 1 AM / PM Peak Hour Traffic Volumes



**Figure 10A. US 30 Coatesville-Downingtown Bypass Traffic Study
2010 Alternative 2 AM / PM Peak Hour Traffic Volumes**



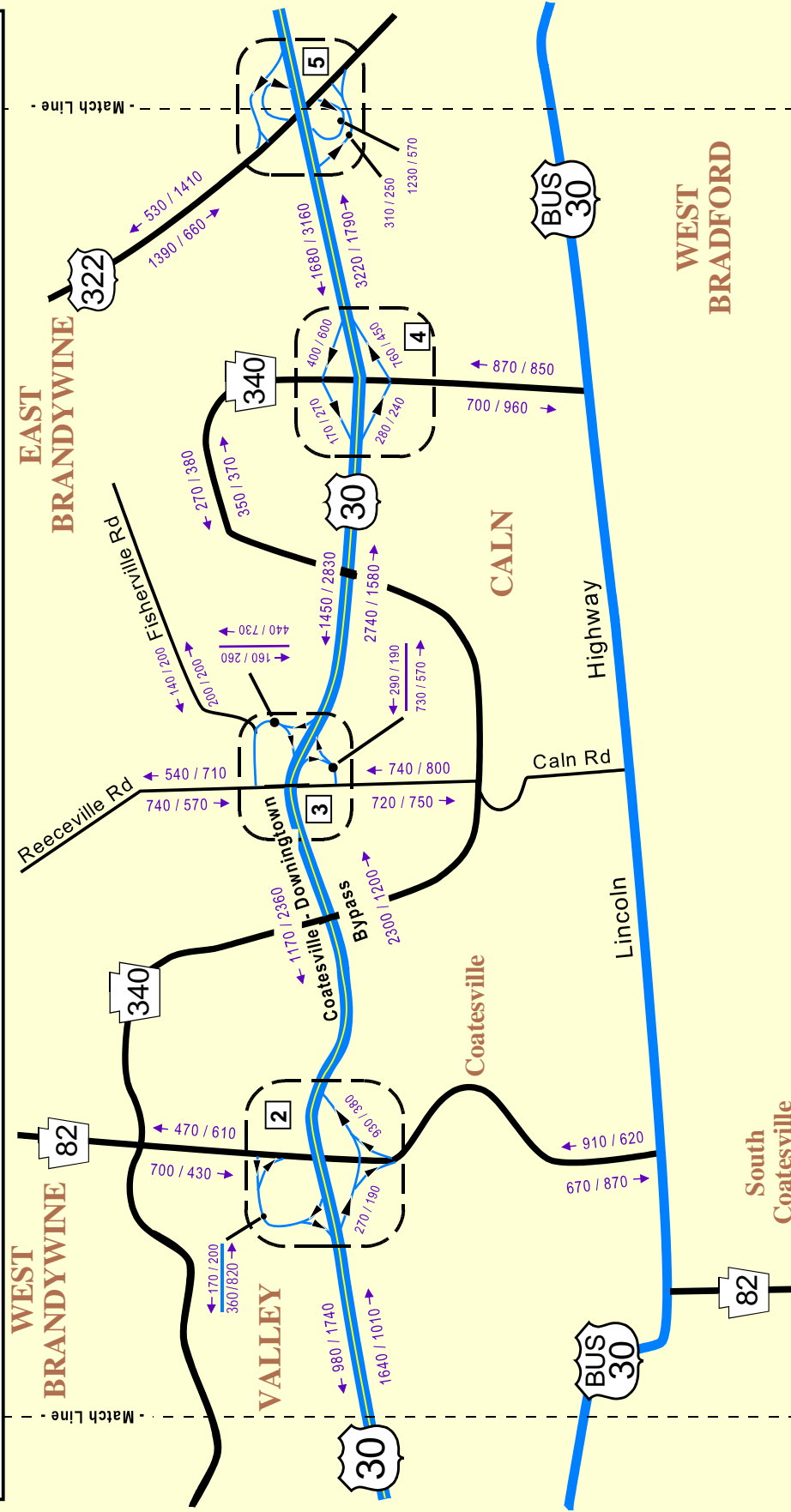
See Figure 10D for Interchange Volumes

2010 Alternative 2 AM / PM Peak Hour Volumes

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 10B. 2010 Alternative 2 AM / PM Peak Hour Traffic Volumes



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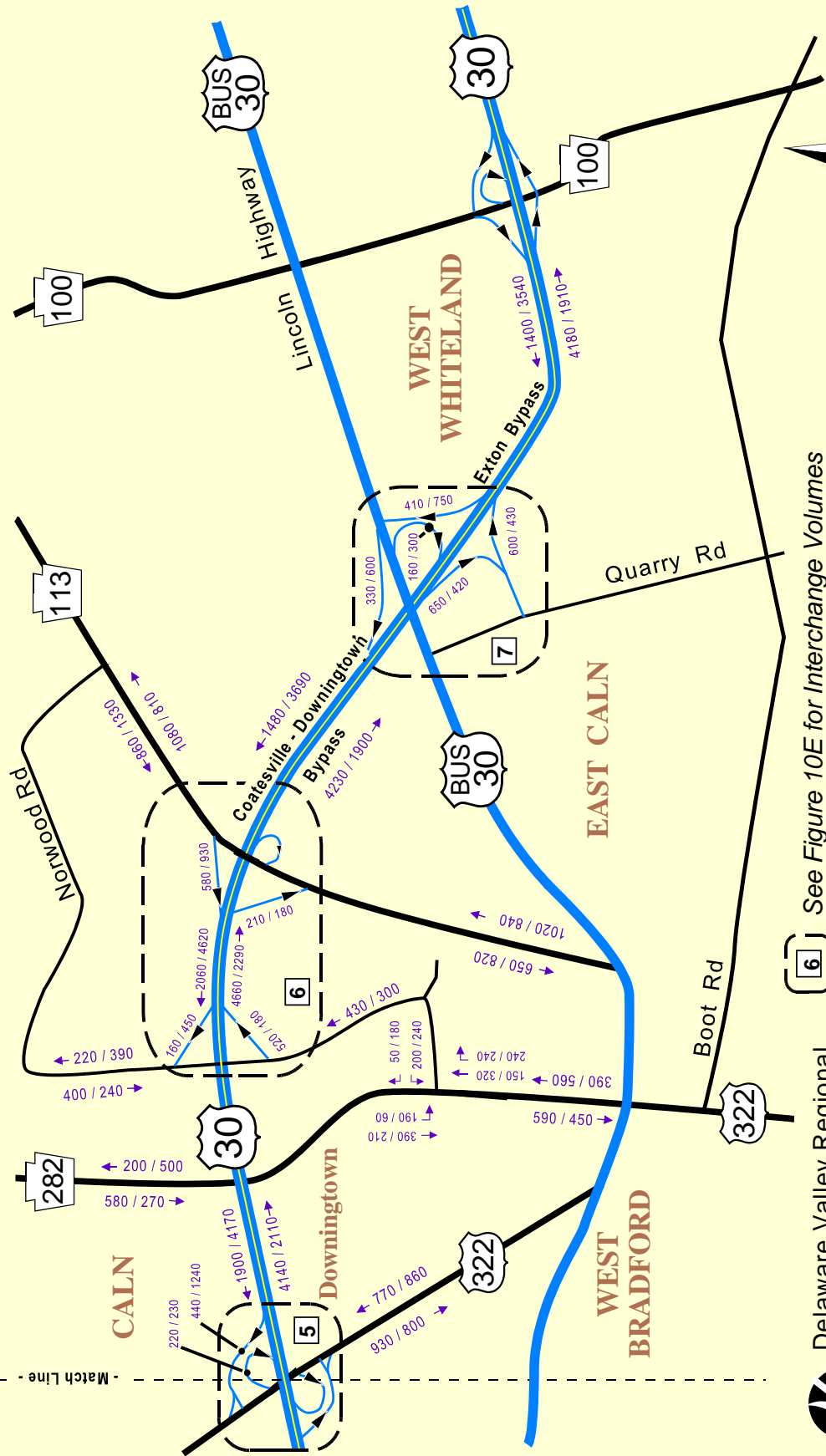
See Figure 10D for Interchange Volumes
 2010 Alternative 2 AM / PM Peak Hour Volumes

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Figure 10C. 2010 Alternative 2 AM / PM Peak Hour Traffic Volumes



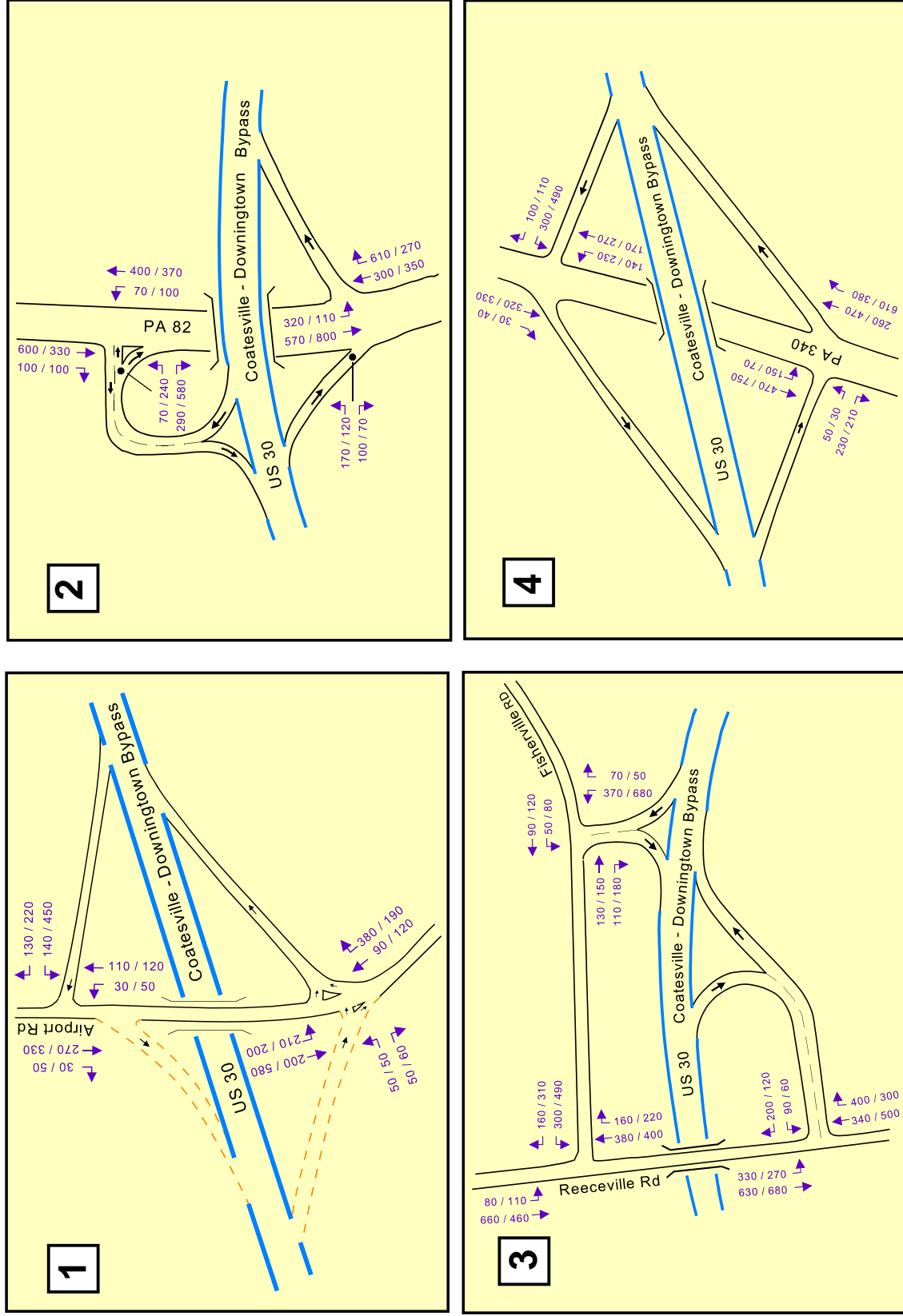
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See Figure 10E for Interchange Volumes
2010 Alternative 2 AM / PM Peak Hour Volumes

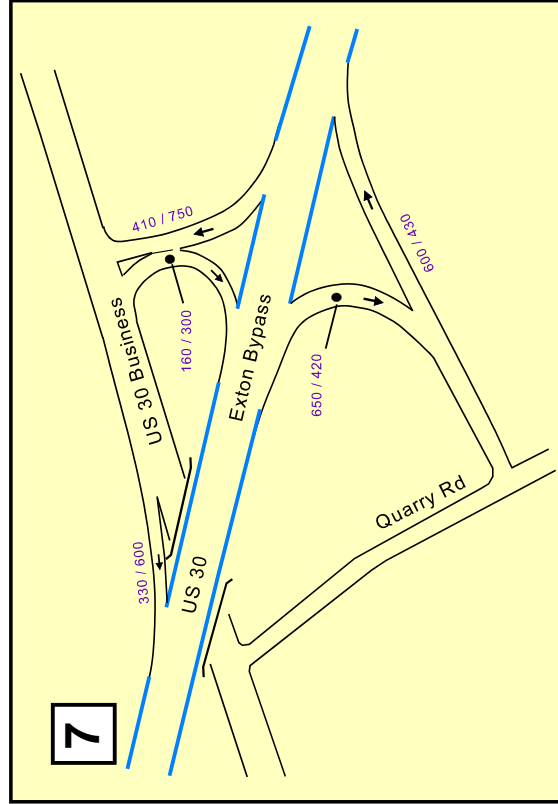
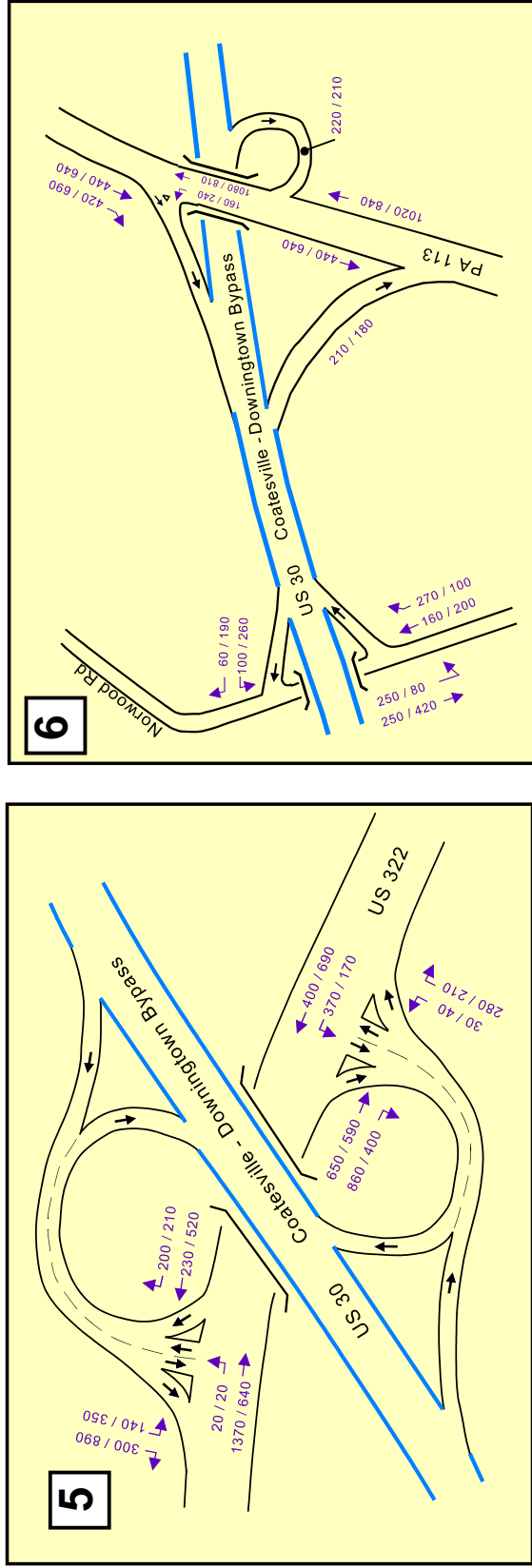
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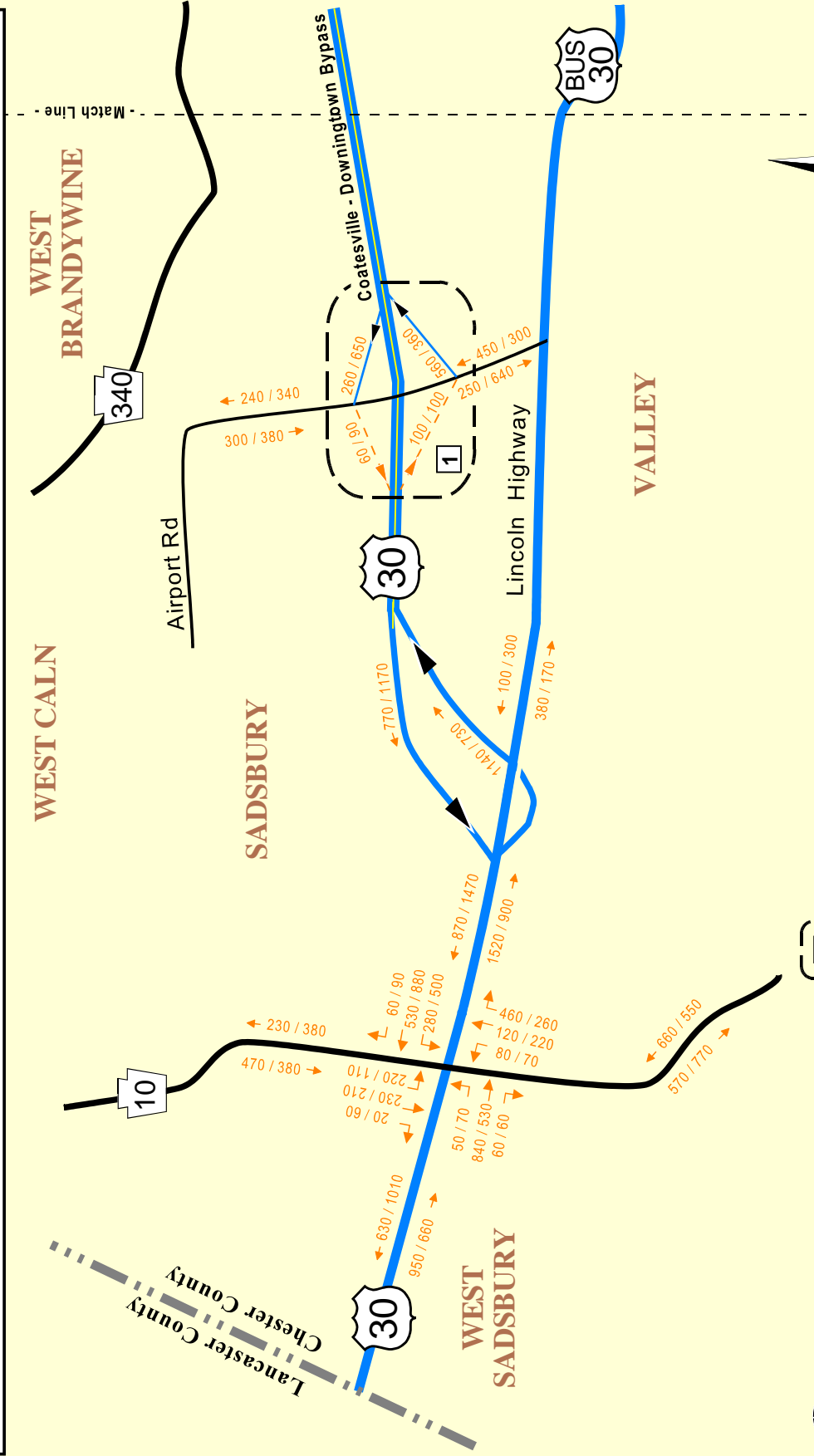
US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 10D. 2010 Alternative 2 AM / PM Peak Hour Traffic Volumes



US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 10E. 2010 Alternative 2 AM / PM Peak Hour Traffic Volumes



**Figure 11A. US 30 Coatesville-Downingtown Bypass Traffic Study
2010 Alternative 3 AM / PM Peak Hour Traffic Volumes**



See Figure 11D for Interchange Volumes

2010 Alternative 3 AM / PM Peak Hour Volumes

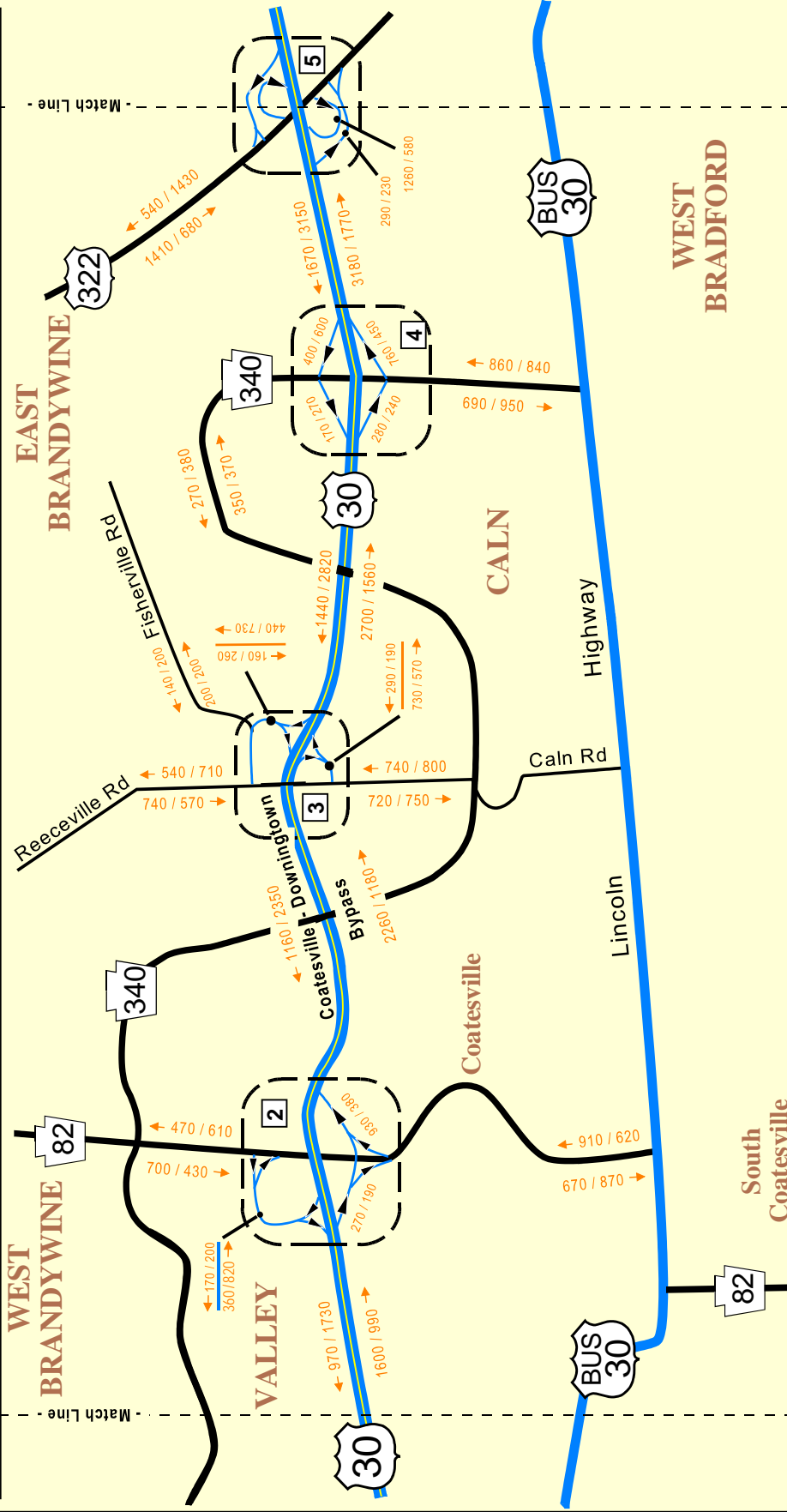
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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 11B. 2010 Alternative 3 AM / PM Peak Hour Traffic Volumes



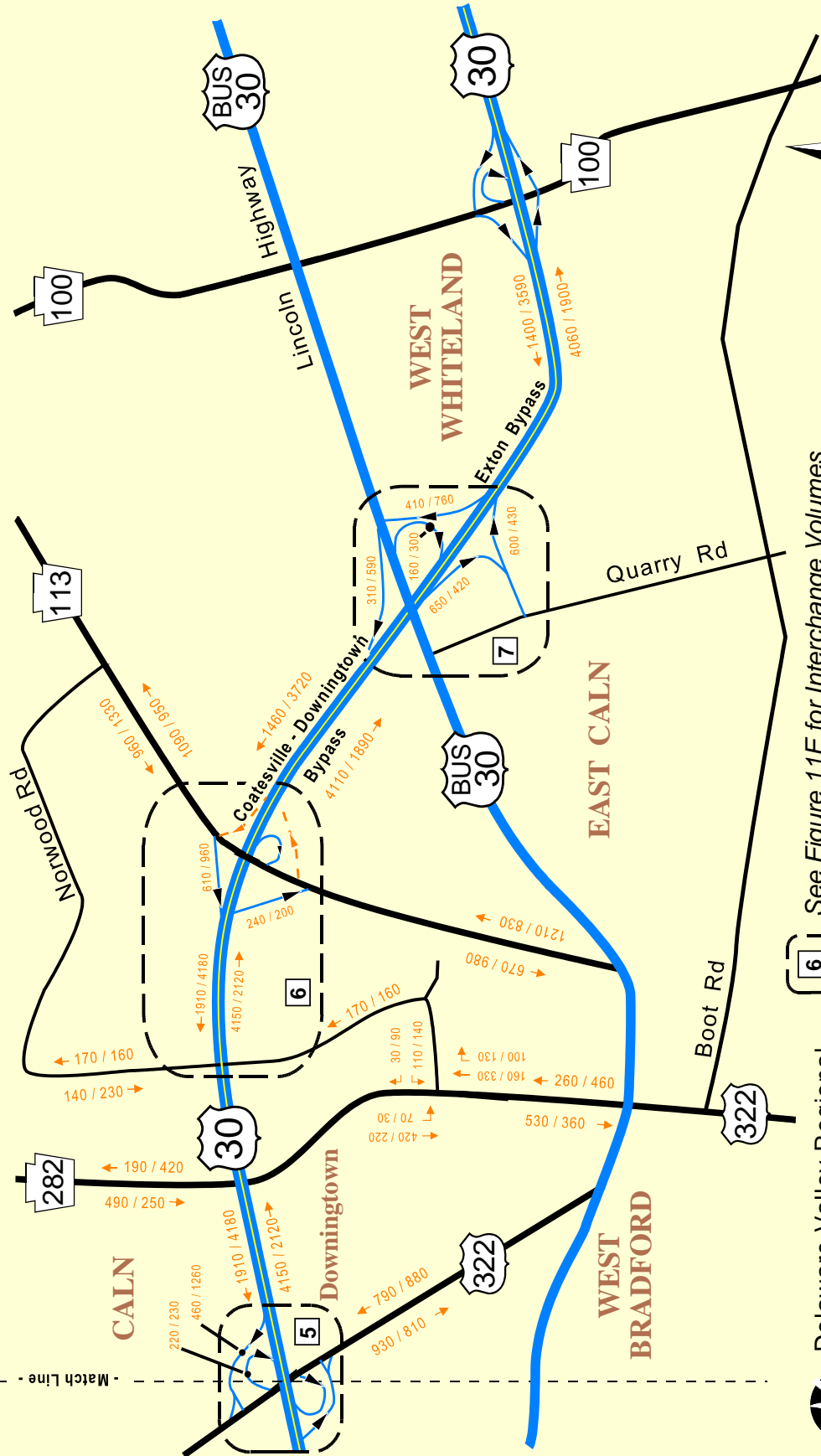
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See Figure 11D for Interchange Volumes
 2010 Alternative 3 AM / PM Peak Hour Volumes

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Figure 11C. 2010 Alternative 3 AM / PM Peak Hour Traffic Volumes

US 30 Coatesville-Downingtown Bypass Traffic Study



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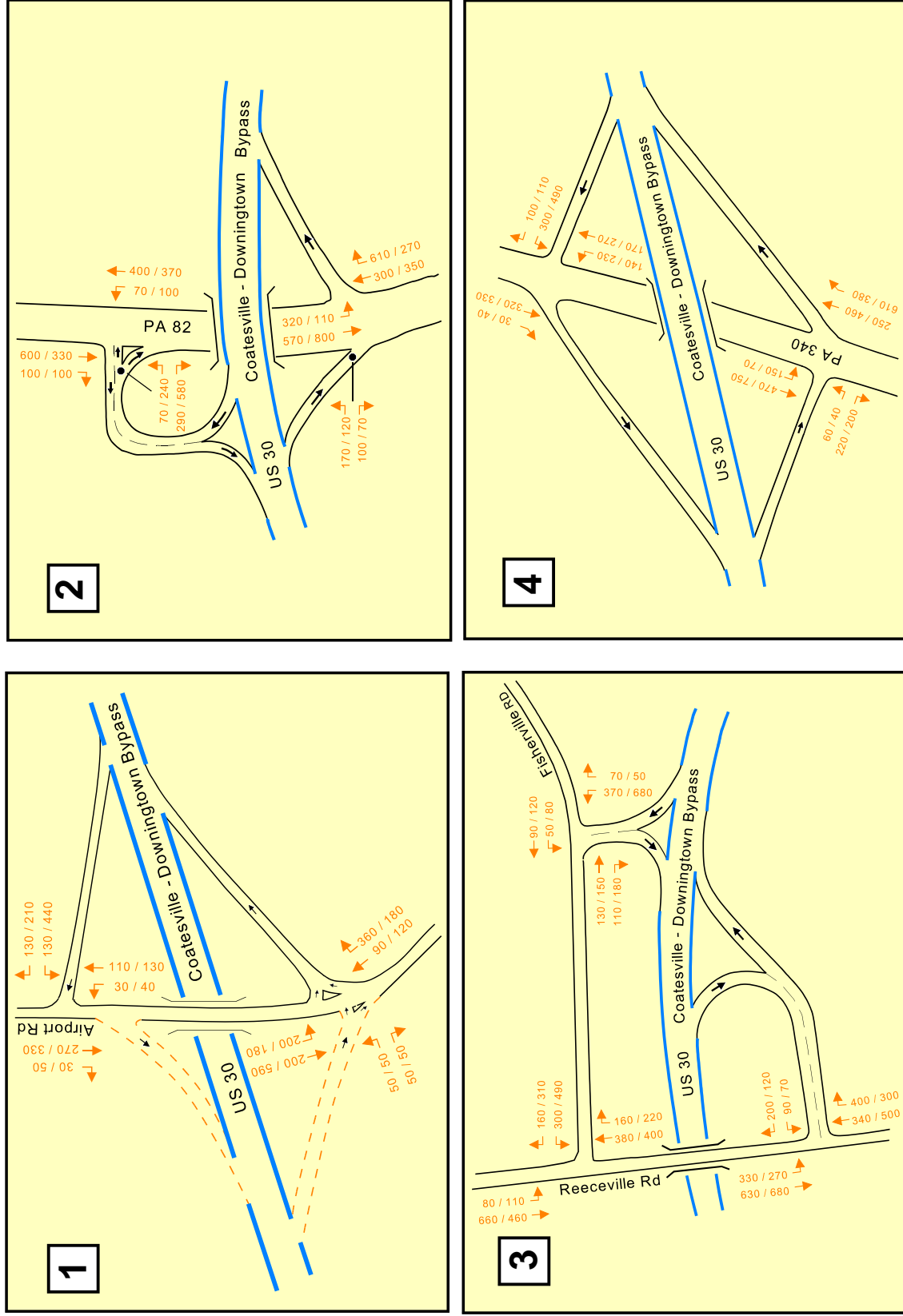
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 2010 Alternative 3 AM / PM Peak Hour Volumes
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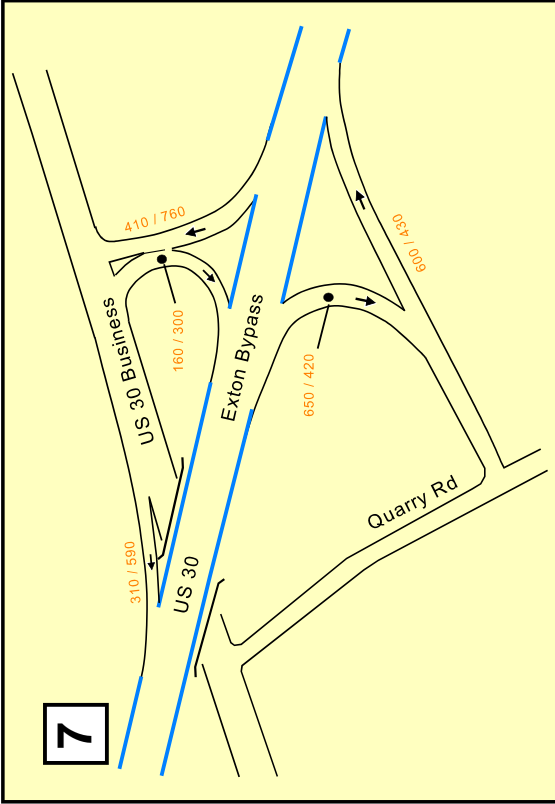
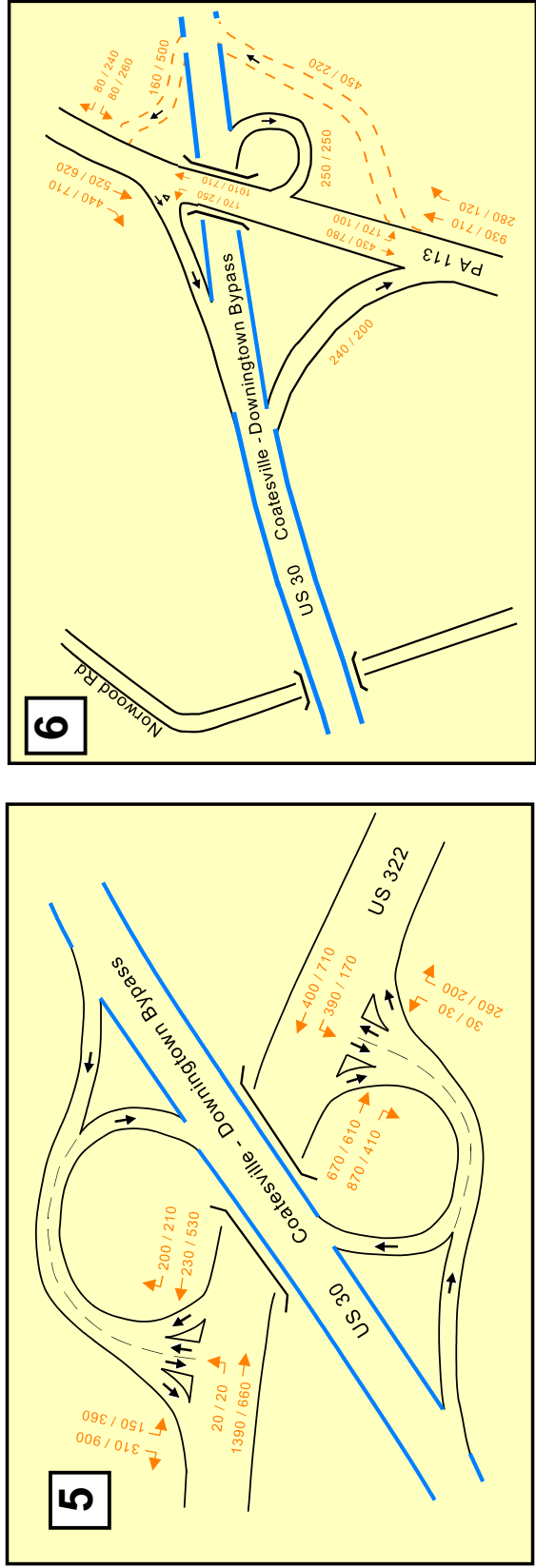
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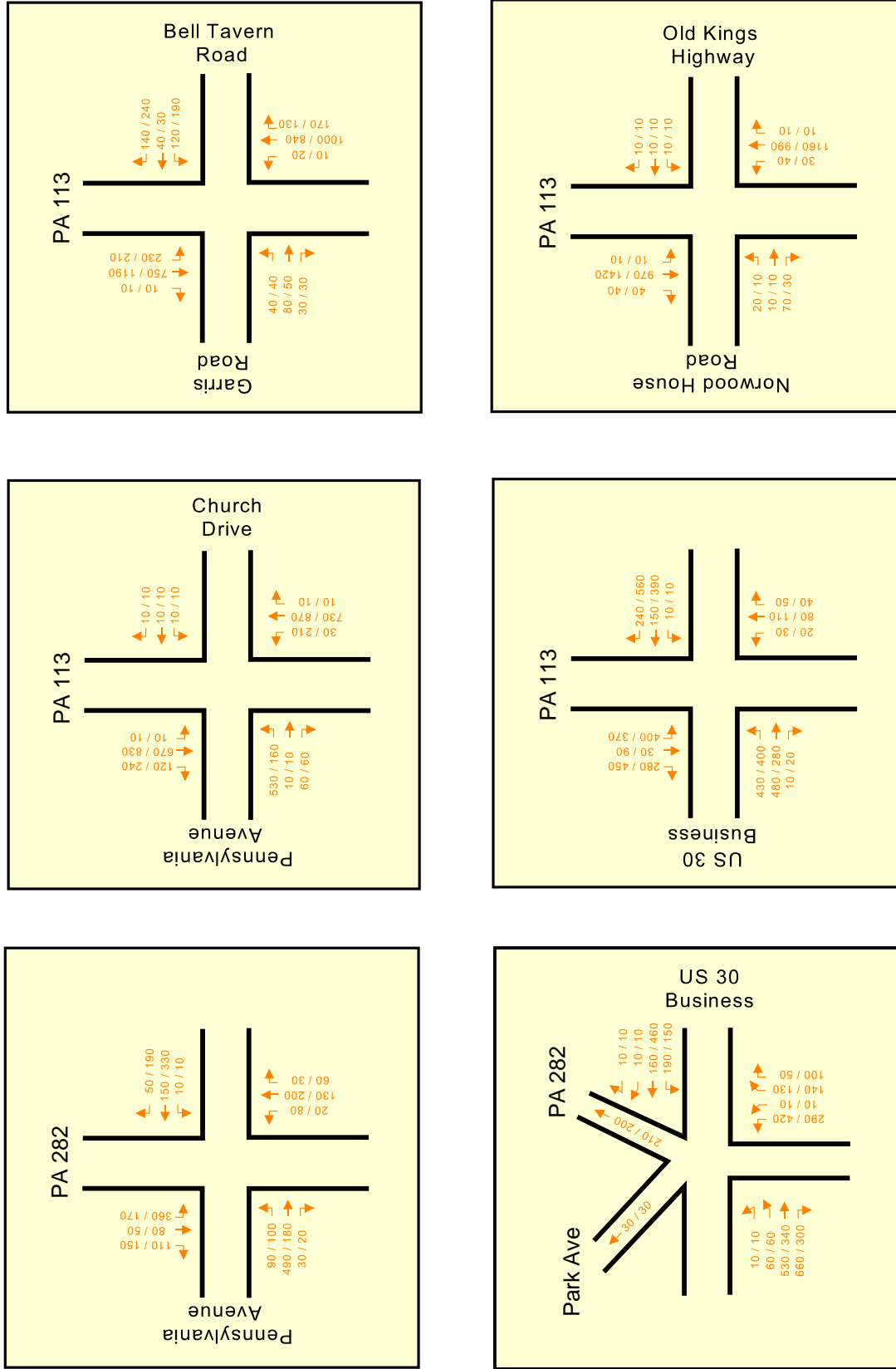
US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 11D. 2010 Alternative 3 AM / PM Peak Hour Traffic Volumes



US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 11E. 2010 Alternative 3 AM / PM Peak Hour Traffic Volumes



US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 11F. 2010 Alternative 3 AM / PM Peak Hour Traffic Volumes



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2010 Alternative 3 AM / PM Peak Hour Volumes

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Appendix B

2030 AM / PM Peak Hour Traffic Volumes

Figure 12A-E. 2030 No-Build Alternative AM / PM Peak Hour Traffic Volumes	B-3
Figure 13A-E. 2030 Build Alternative 1 AM / PM Peak Hour Traffic Volumes	B-8
Figure 14A-E. 2030 Build Alternative 2 AM / PM Peak Hour Traffic Volumes	B-13
Figure 15A-F. 2030 Build Alternative 3 AM / PM Peak Hour Traffic Volumes	B-18

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 12A. 2030 No-Build Alternative AM / PM Peak Hour Traffic Volumes

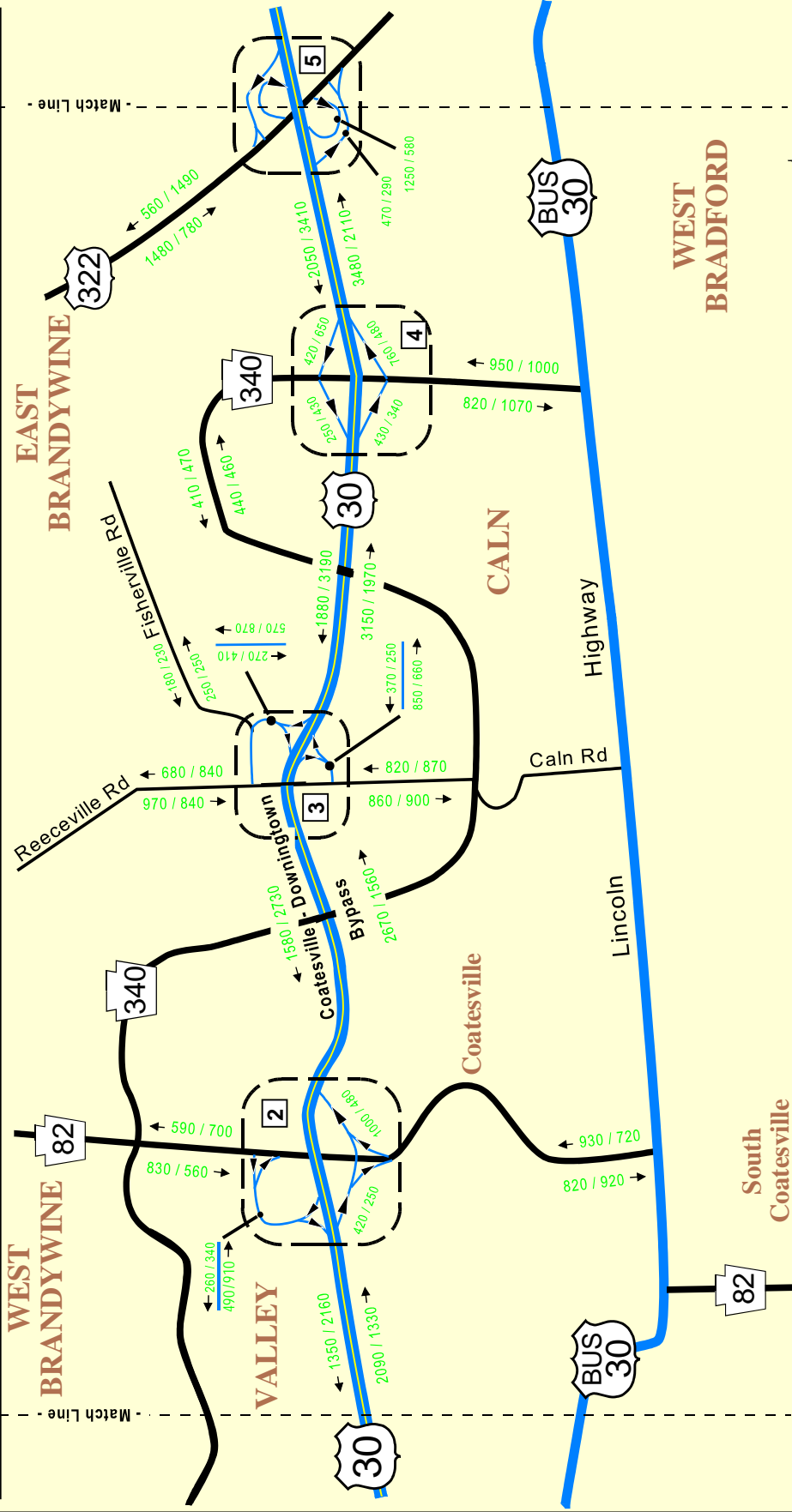


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See Figure 12D for Interchange Volumes
 2030 No-Build AM / PM Peak Hour Volumes

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Figure 12B. 2030 No-Build Alternative AM / PM Peak Hour Traffic Volumes

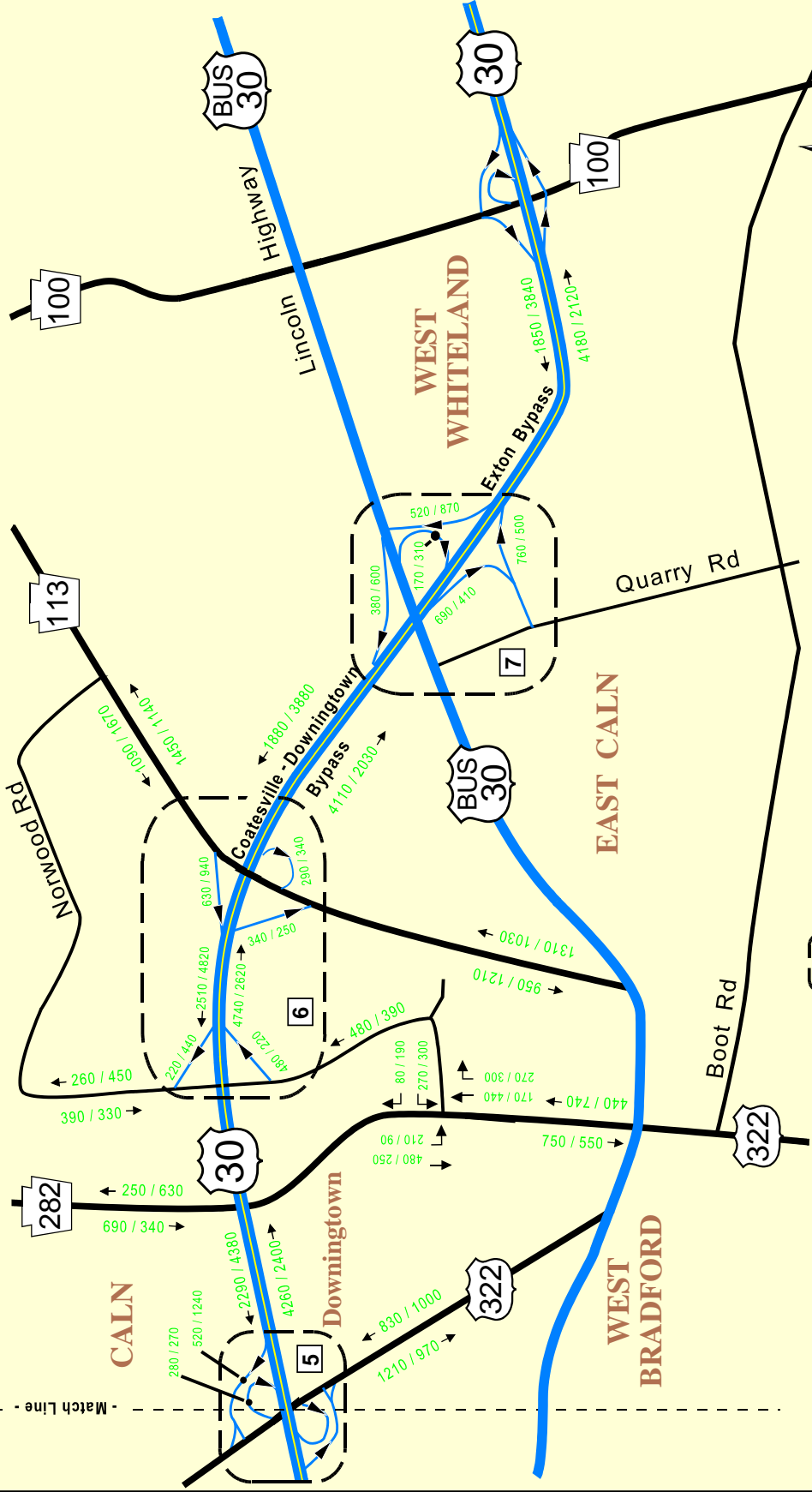


See Figure 12D for Interchange Volumes
 2030 No-Build AM / PM Peak Hour Volumes

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Figure 12C. 2030 No-Build Alternative AM / PM Peak Hour Traffic Volumes

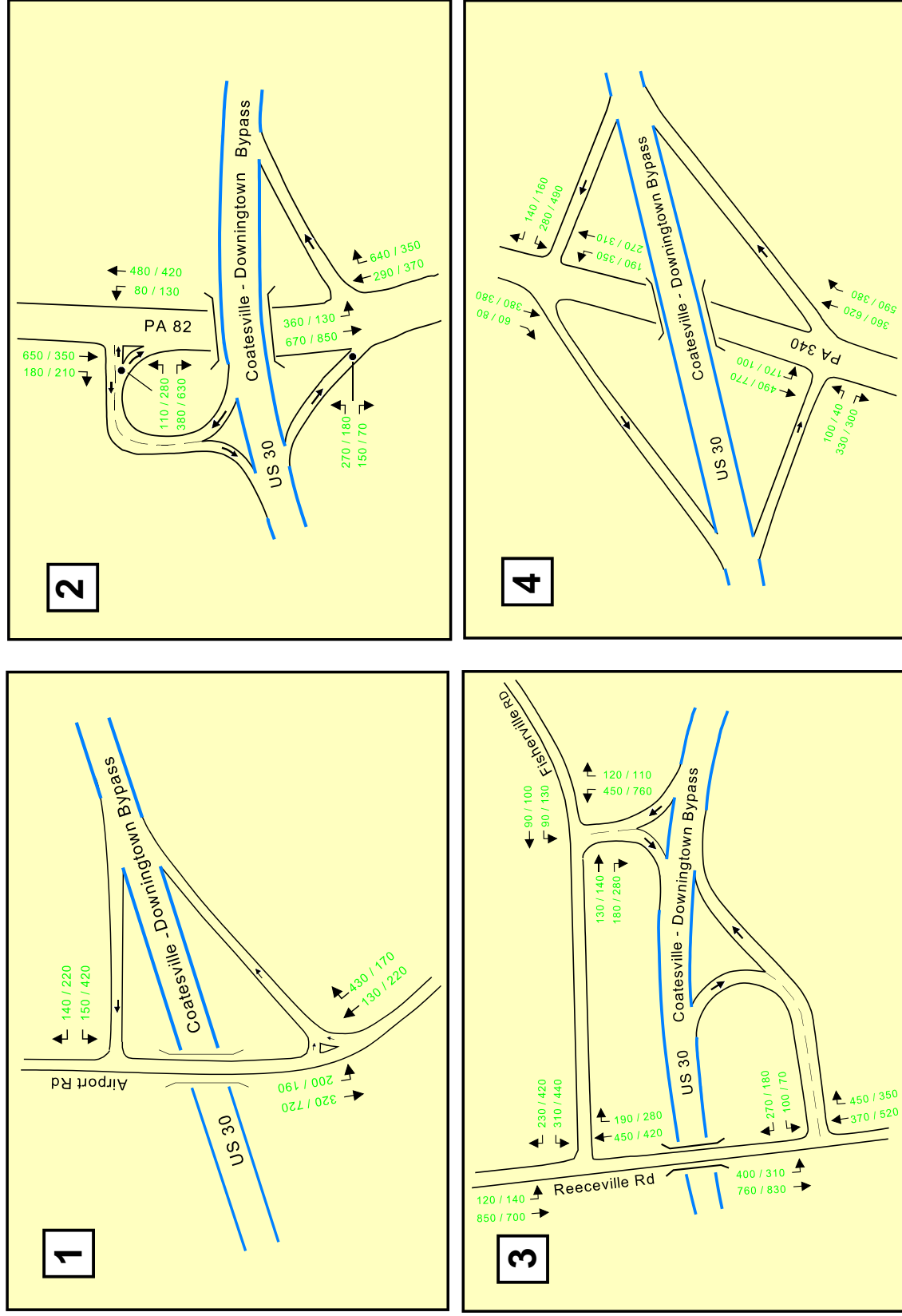


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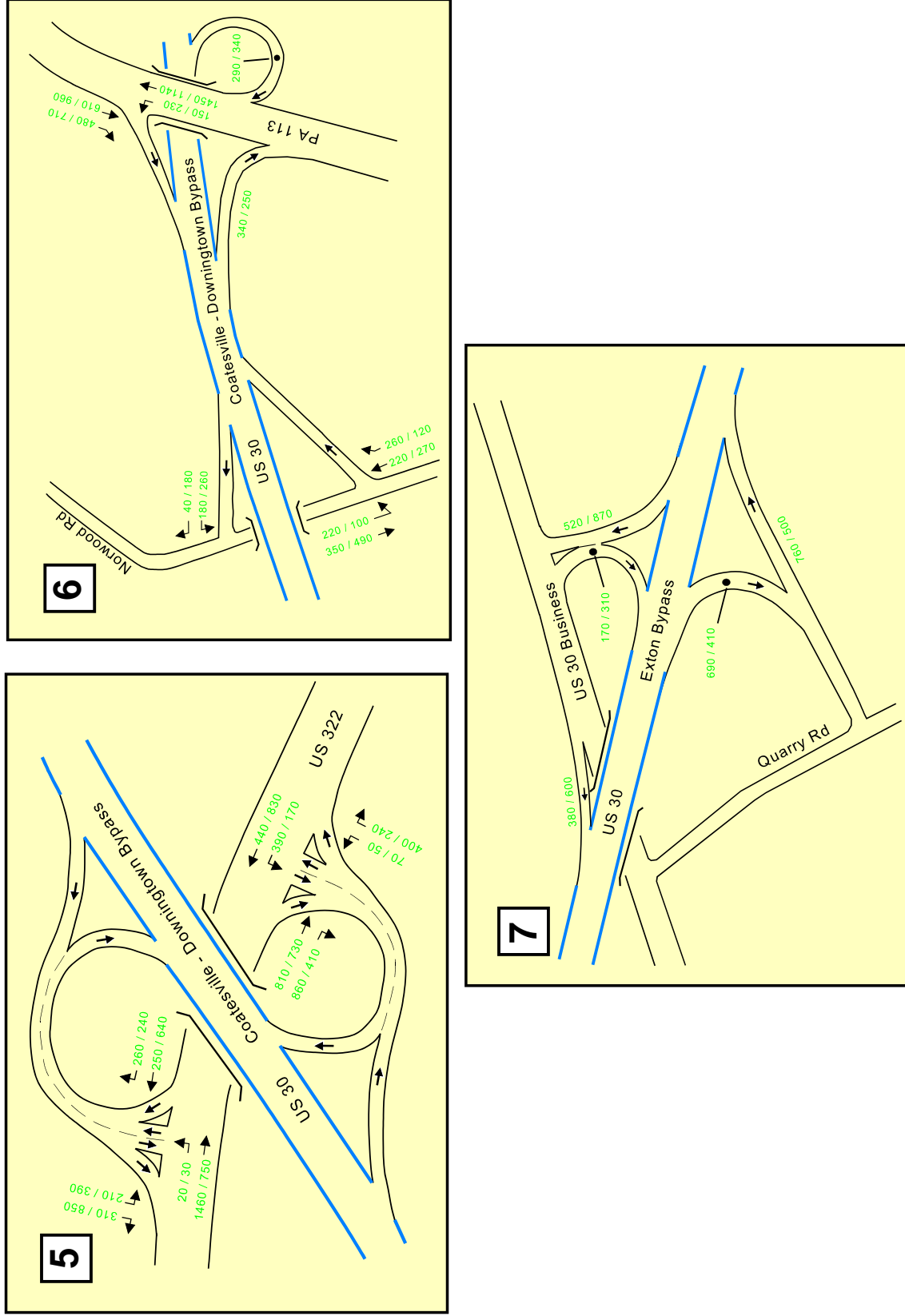
See Figure 12E for Interchange Volumes
 2030 No-Build AM / PM Peak Hour Traffic Volumes

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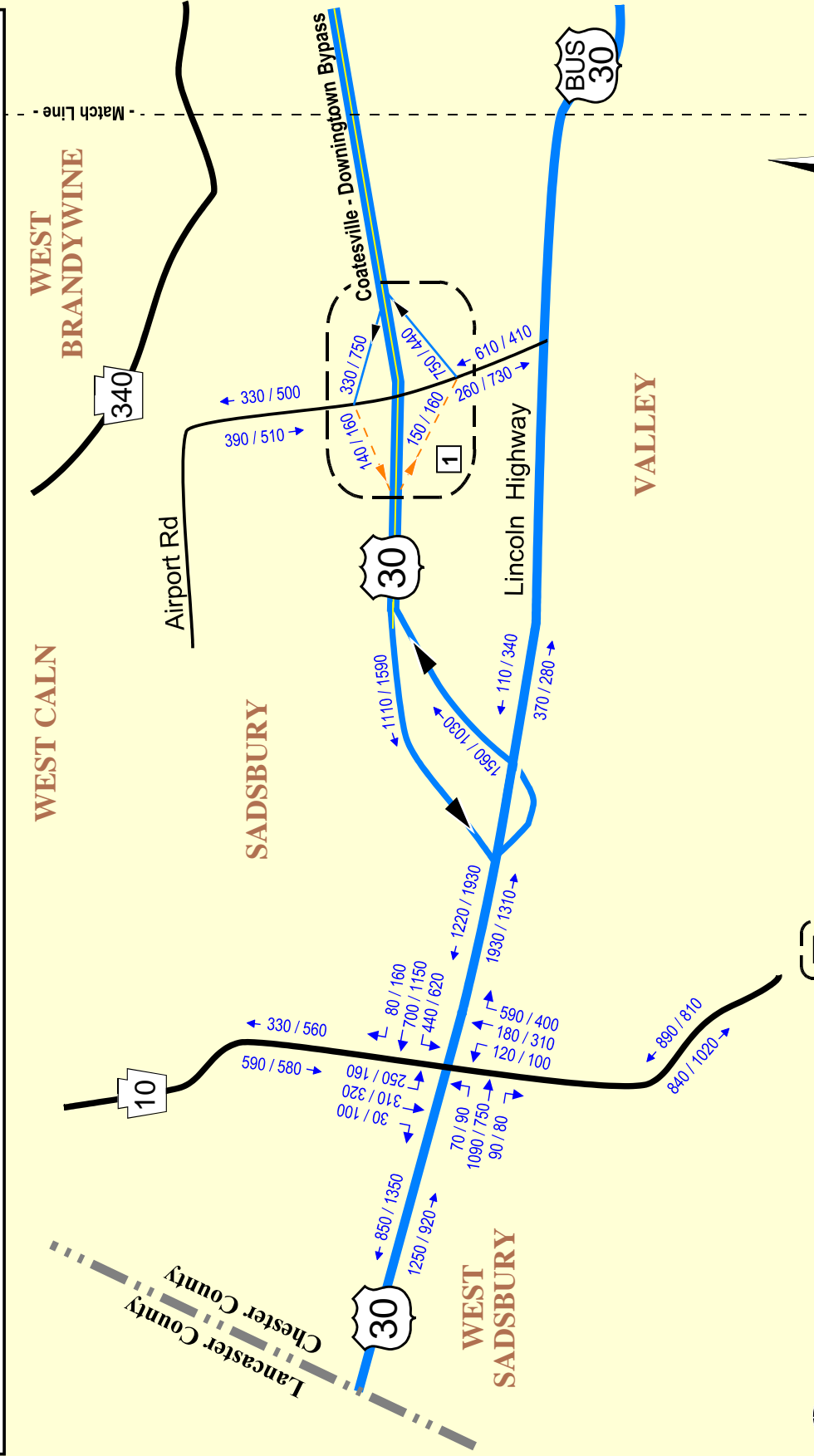
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Figure 12D. 2030 No-Build Alternative AM / PM Peak Hour Traffic Volumes



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Figure 12E. 2030 No-Build Alternative AM / PM Peak Hour Traffic Volumes



**Figure 13A. US 30 Coatesville-Downingtown Bypass Traffic Study
2030 Alternative 1 AM / PM Peak Hour Traffic Volumes**



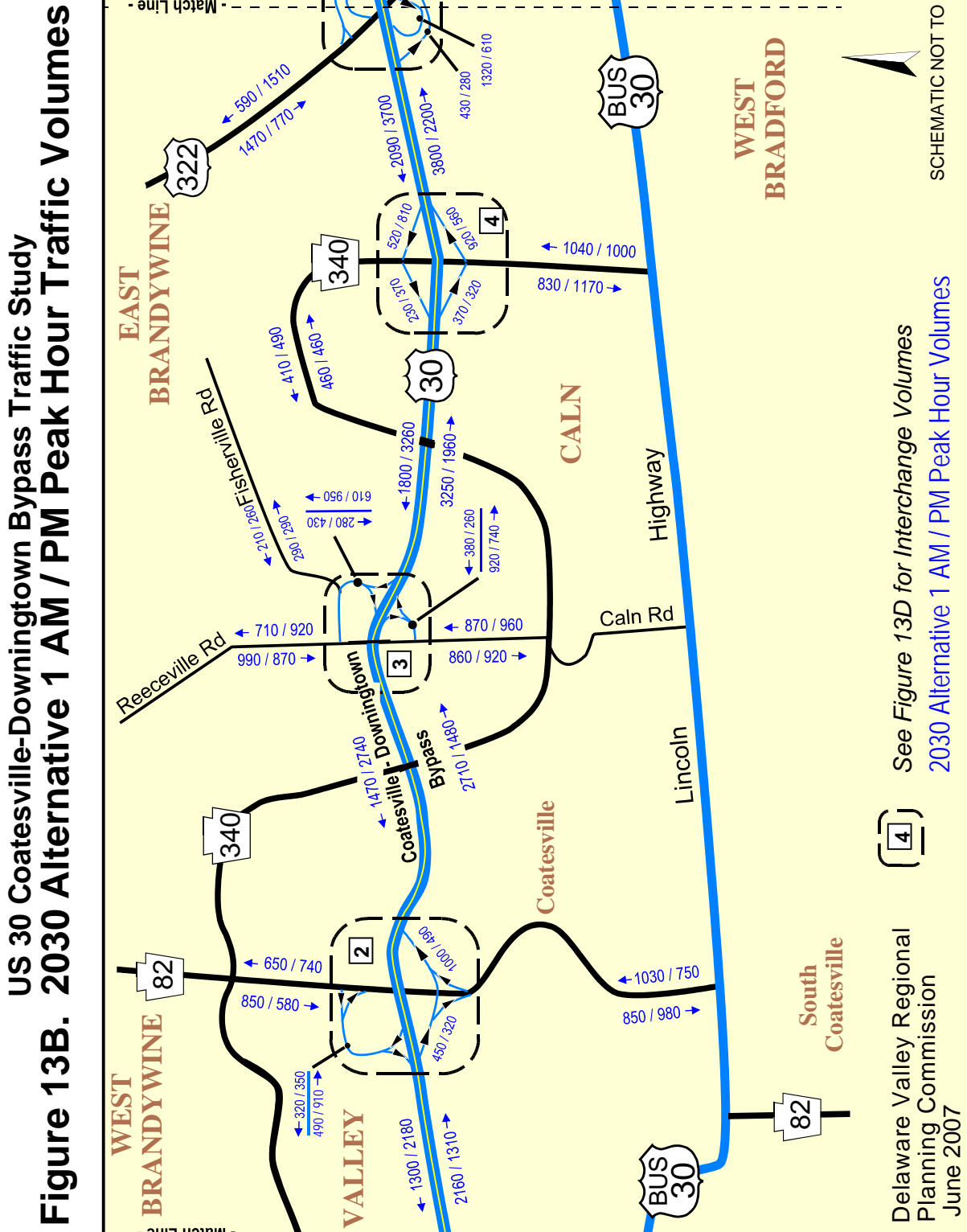
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See Figure 13D for Interchange Volumes
2030 Alternative 1 AM / PM Peak Hour Volumes

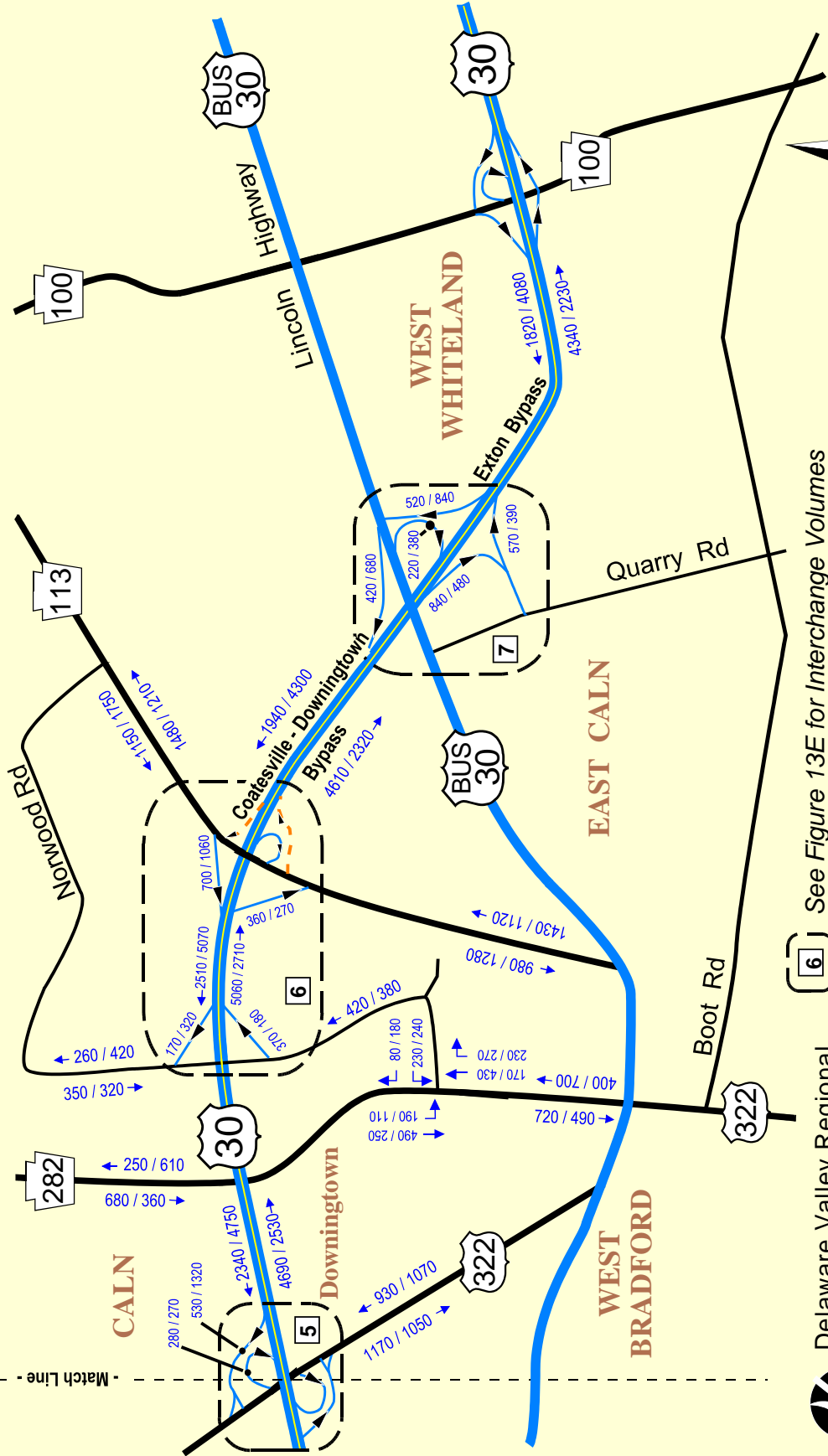
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Proposed

Figure 13B. 2030 Alternative 1 AM / PM Peak Hour Traffic Volumes

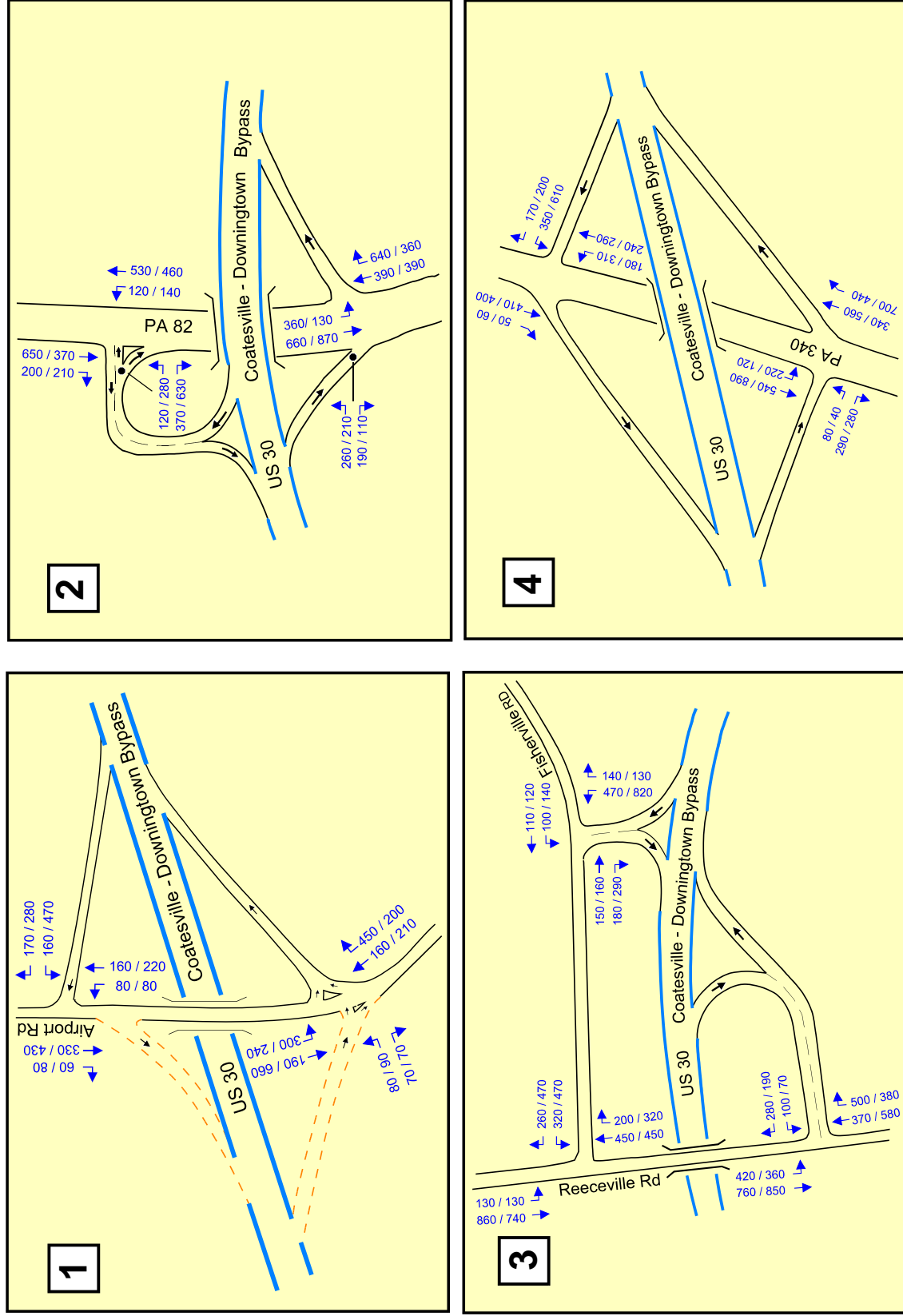


US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 13C. 2030 Alternative 1 AM / PM Peak Hour Traffic Volumes

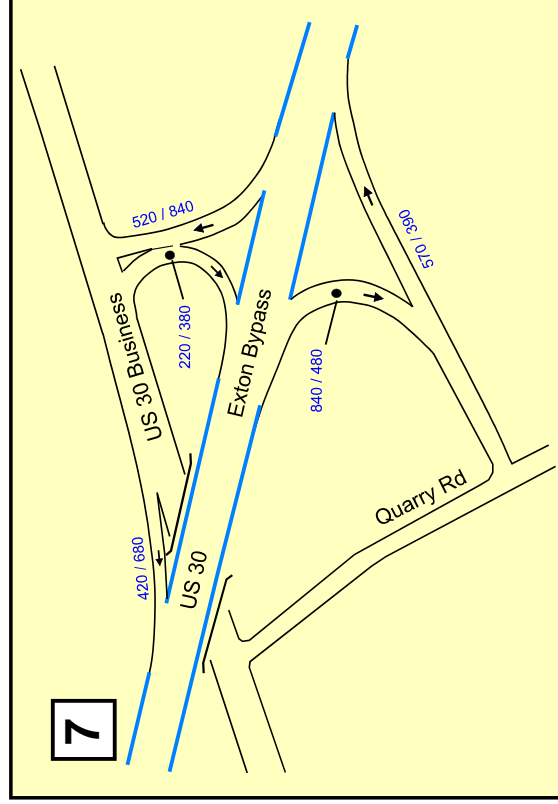
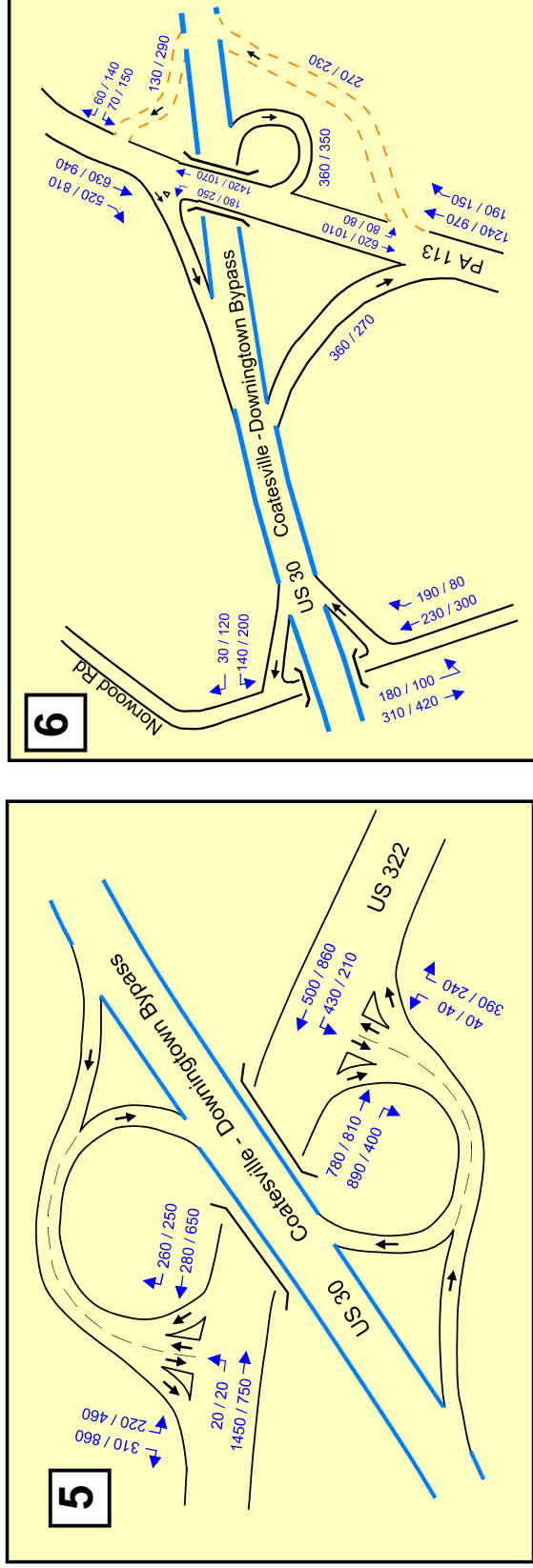


See Figure 13E for Interchange Volumes
 2030 Alternative 1 AM / PM Peak Hour Volumes
 - - - - - Proposed

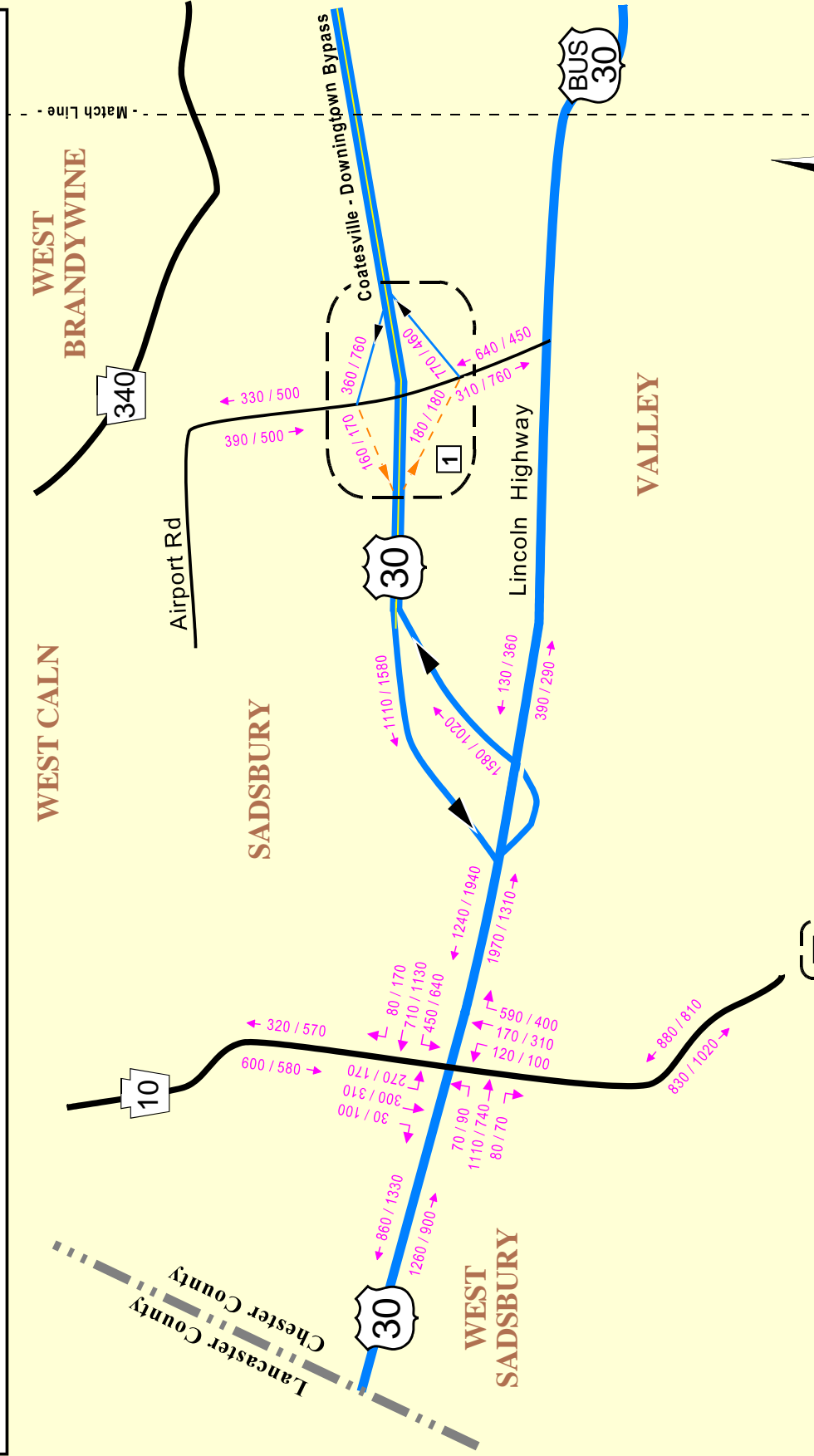
US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 13D. 2030 Alternative 1 AM / PM Peak Hour Traffic Volumes



US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 13E. 2030 Alternative 1 AM / PM Peak Hour Traffic Volumes



**Figure 14A. US 30 Coatesville-Downingtown Bypass Traffic Study
2030 Alternative 2 AM / PM Peak Hour Traffic Volumes**



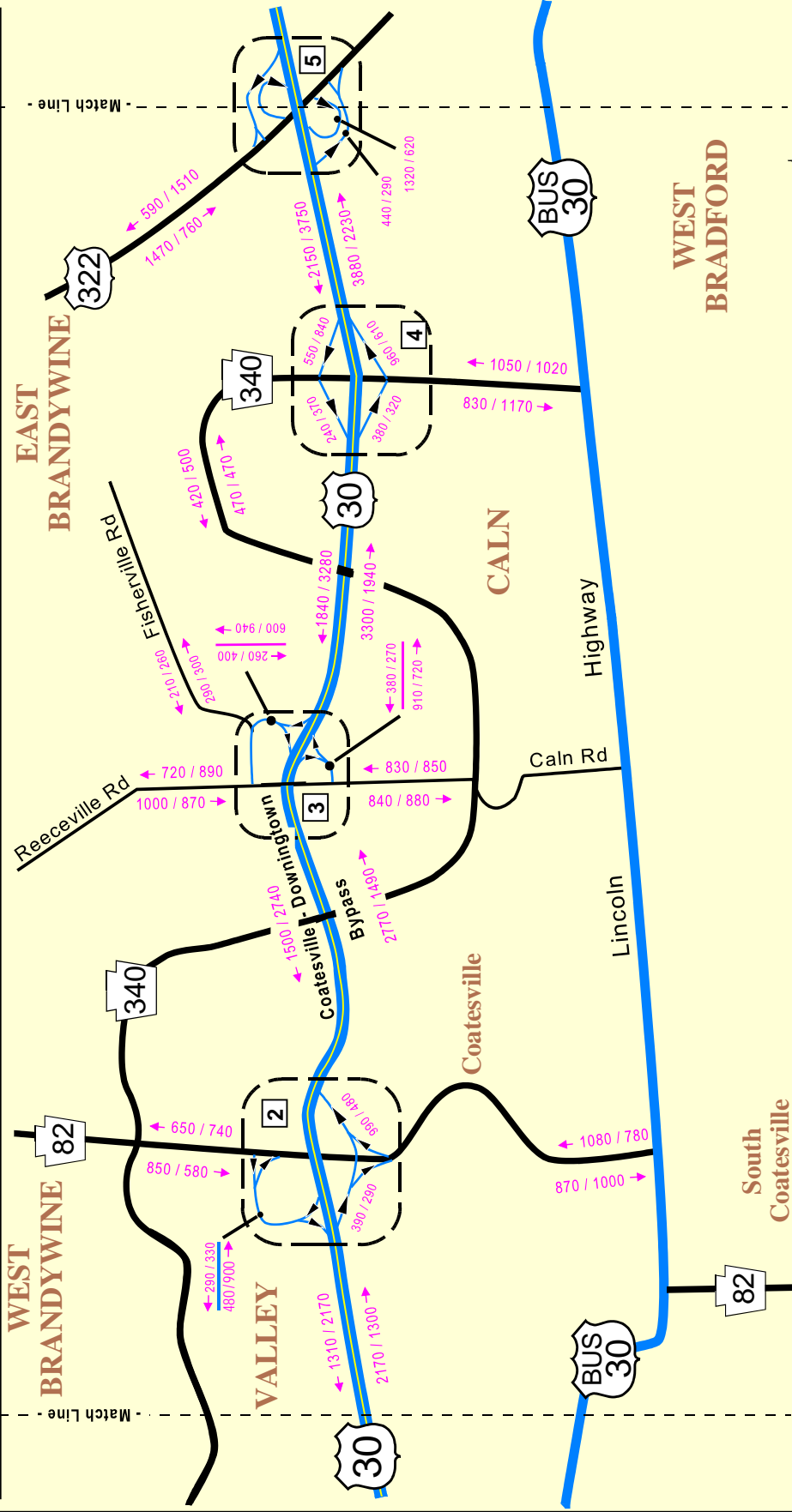
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See Figure 14D for Interchange Volumes
2030 Alternative 2 AM / PM Peak Hour Volumes

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 14B. 2030 Alternative 2 AM / PM Peak Hour Traffic Volumes



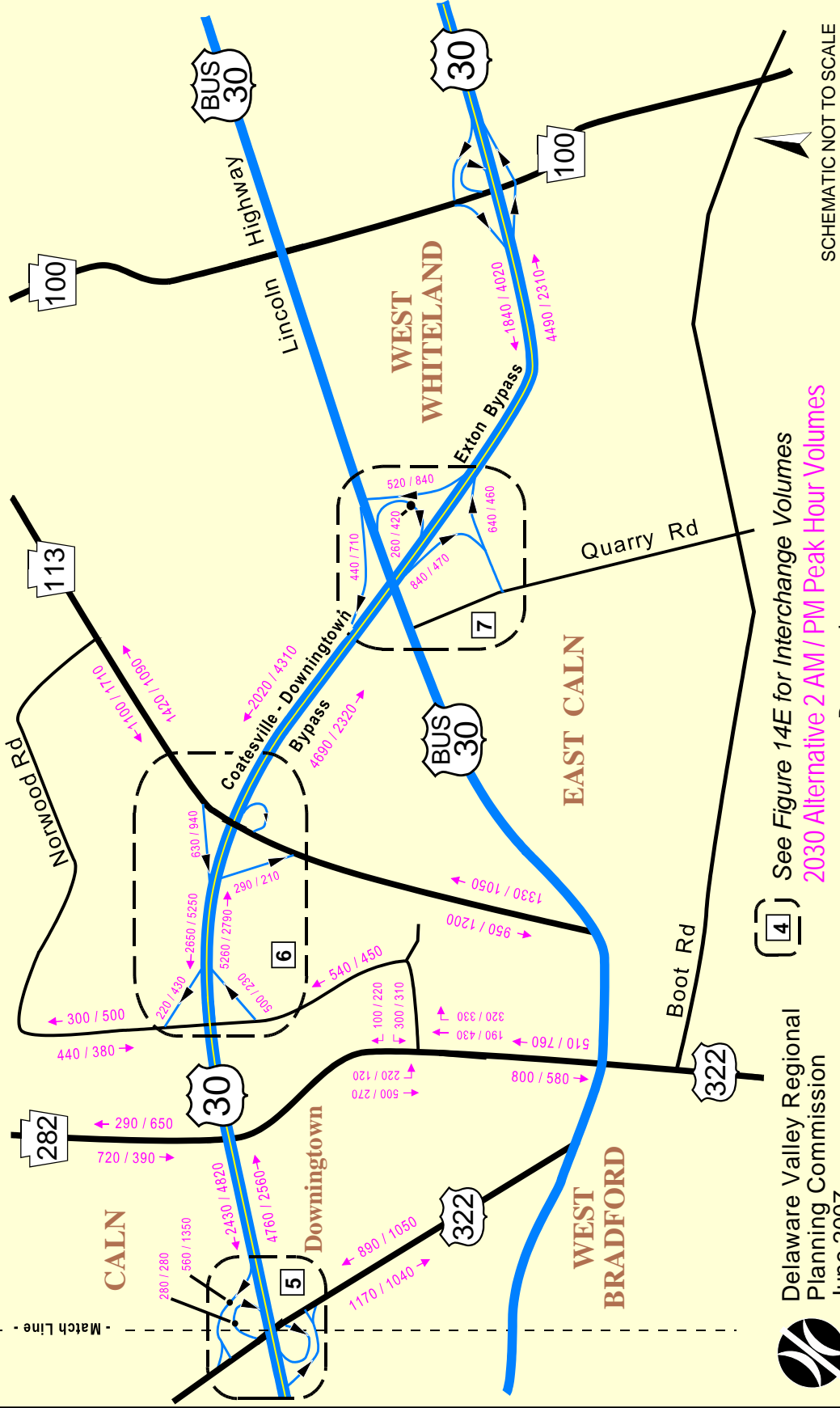
See Figure 14D for Interchange Volumes
 2030 Alternative 2 AM / PM Peak Hour Volumes



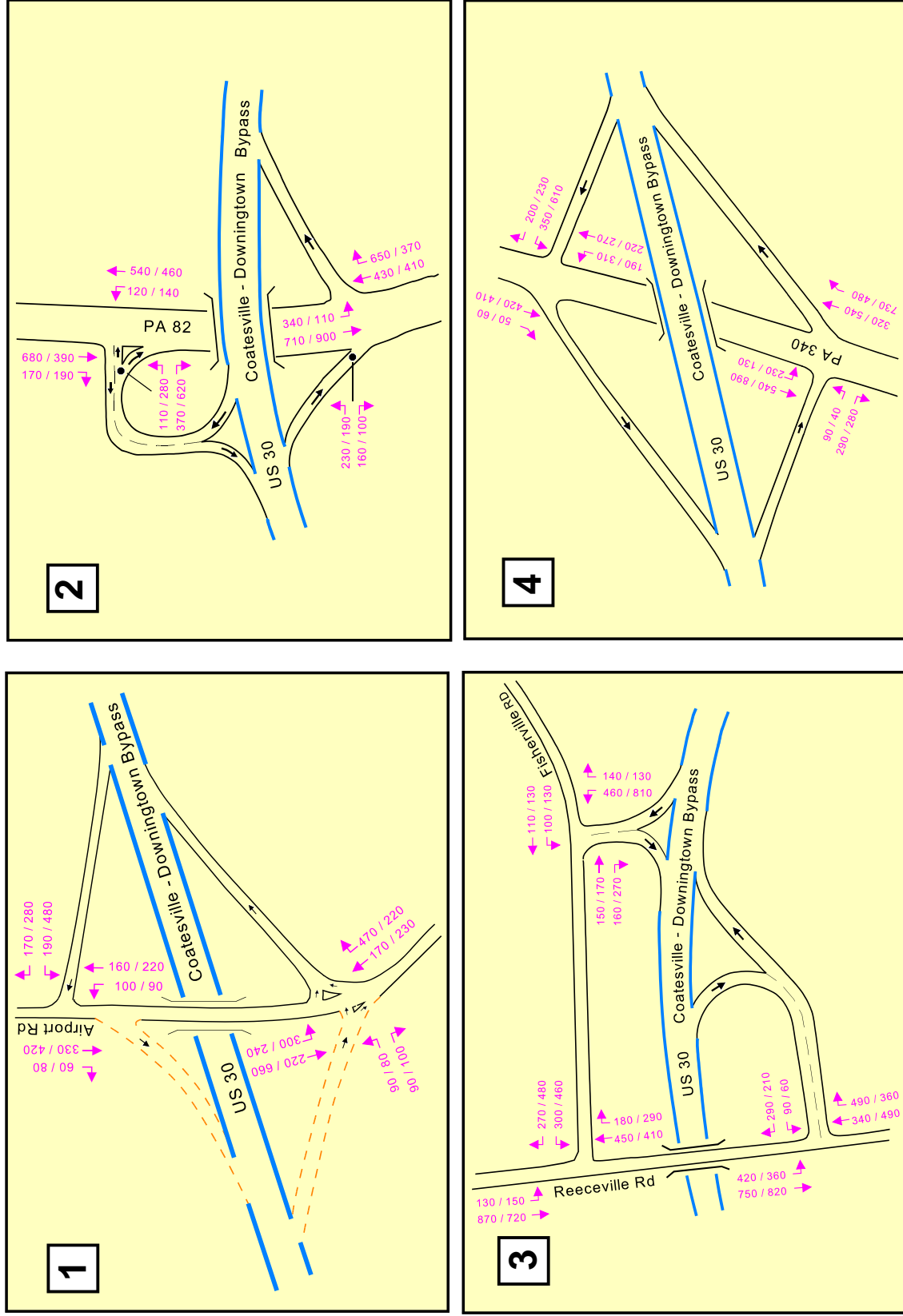
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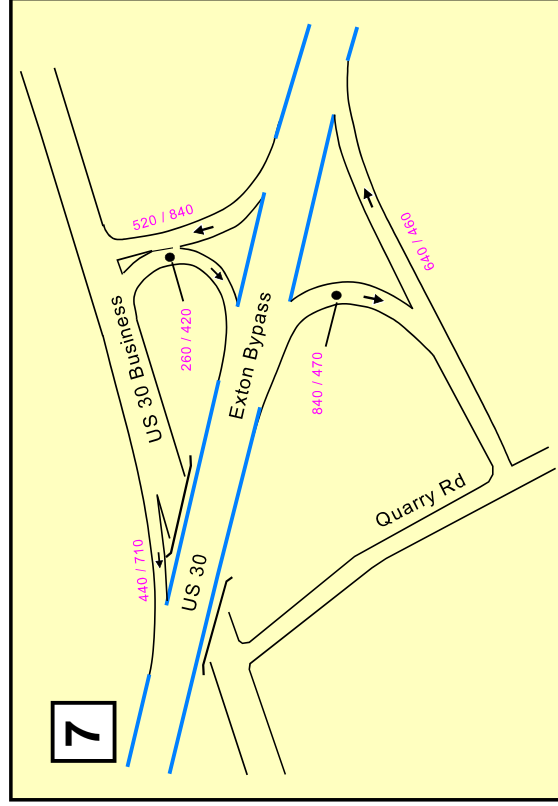
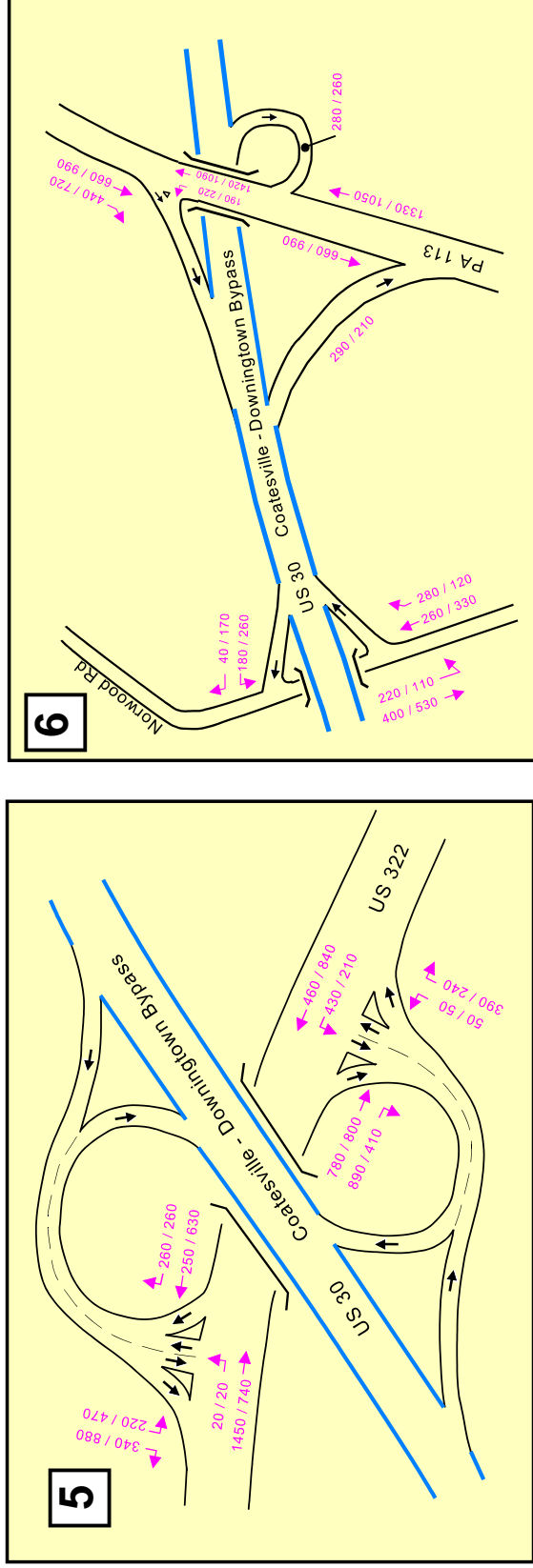
US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 14C. 2030 Alternative 2 AM / PM Peak Hour Traffic Volumes



US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 14D. 2030 Alternative 2 AM / PM Peak Hour Traffic Volumes



US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 14E. 2030 Alternative 2 AM / PM Peak Hour Traffic Volumes



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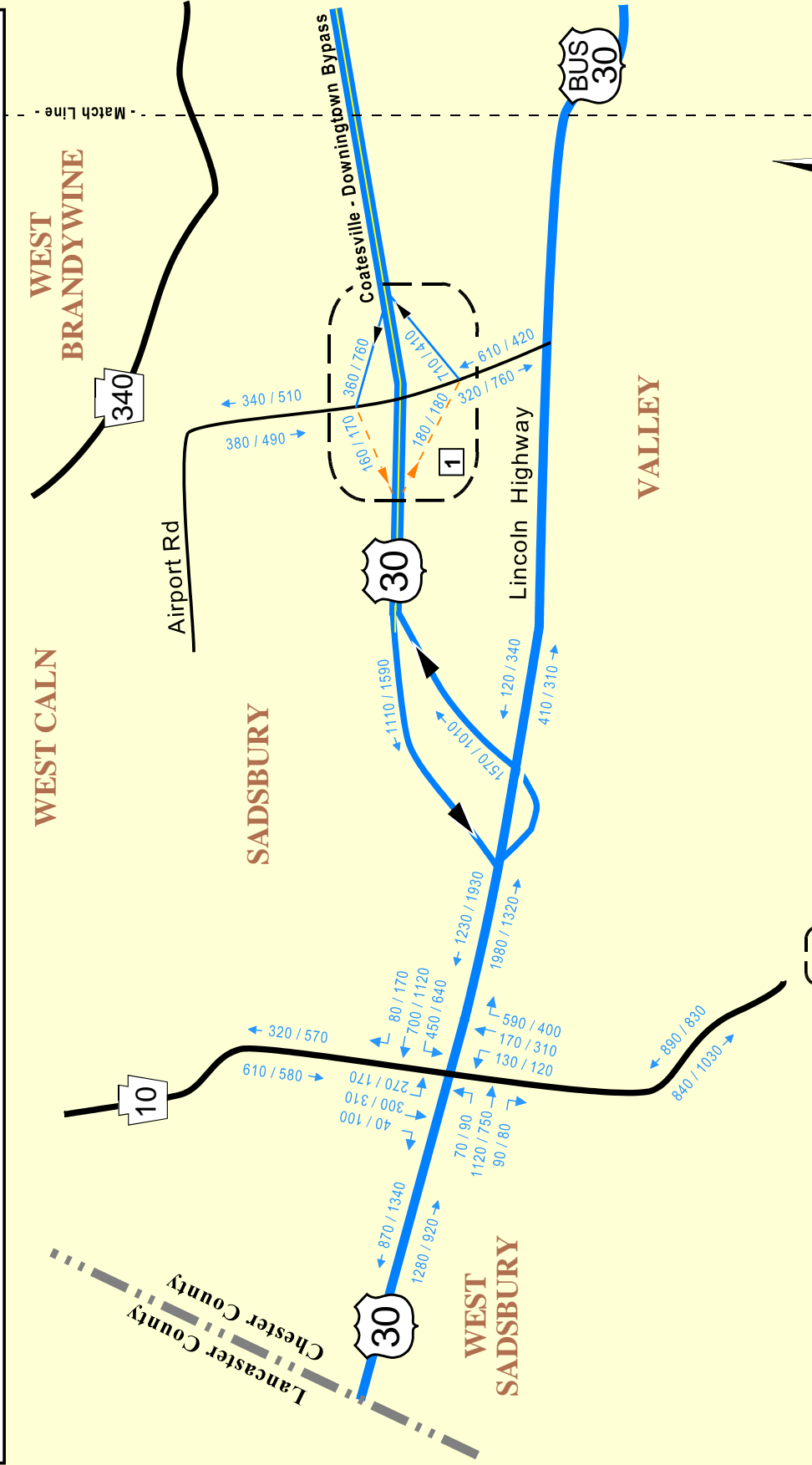
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2030 Alternative 2 AM / PM Peak Hour Volumes



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**Figure 15A. US 30 Coatesville-Downingtwn Bypass Traffic Study
2030 Alternative 3 AM / PM Peak Hour Traffic Volumes**



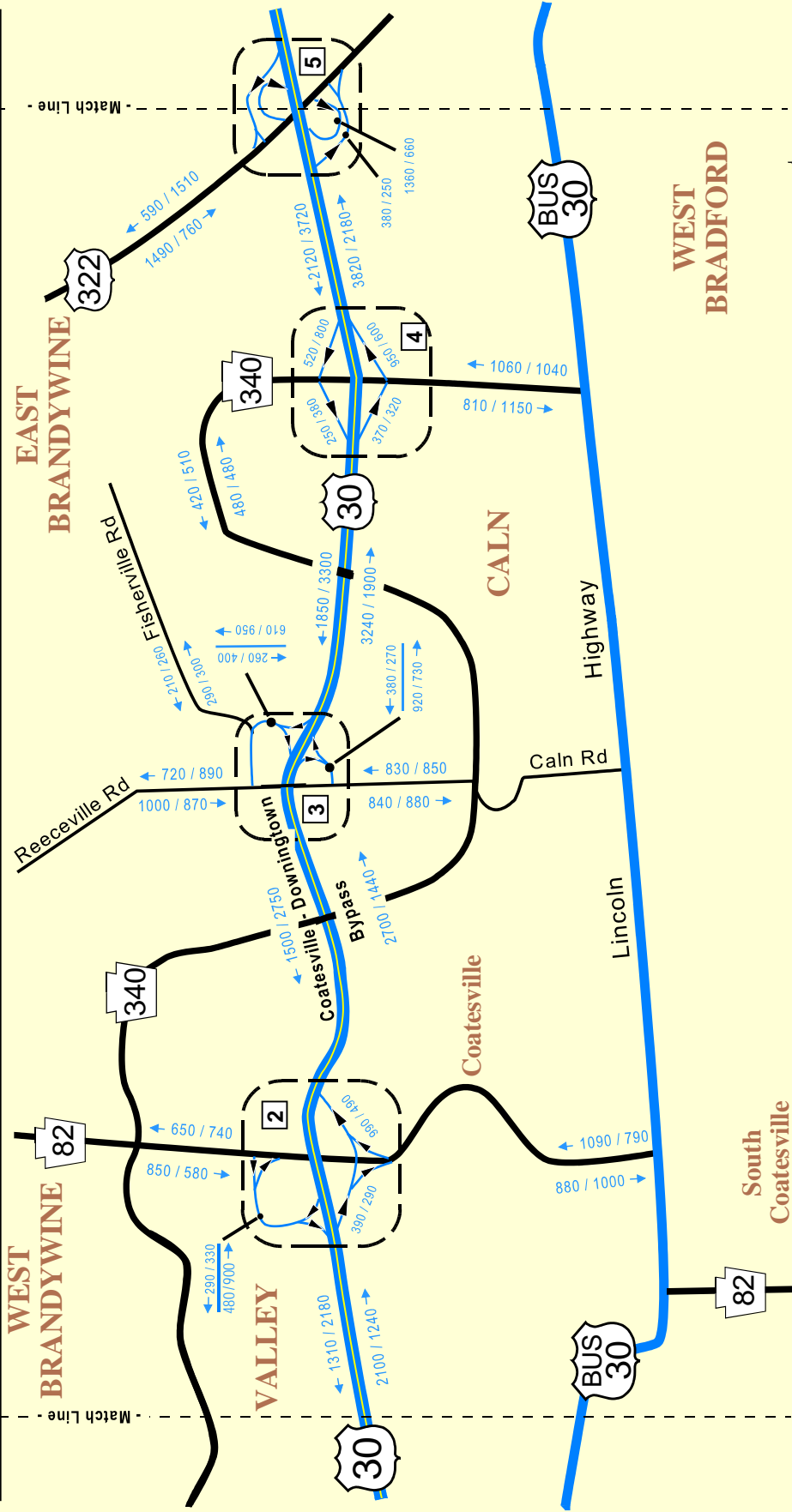
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See Figure 15D for Interchange Volumes
2030 Alternative 3 AM / PM Peak Hour Volumes

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Legend: — Existing, - - - Proposed

**Figure 15B. US 30 Coatesville-Downingtown Bypass Traffic Study
2030 Alternative 3 AM / PM Peak Hour Traffic Volumes**

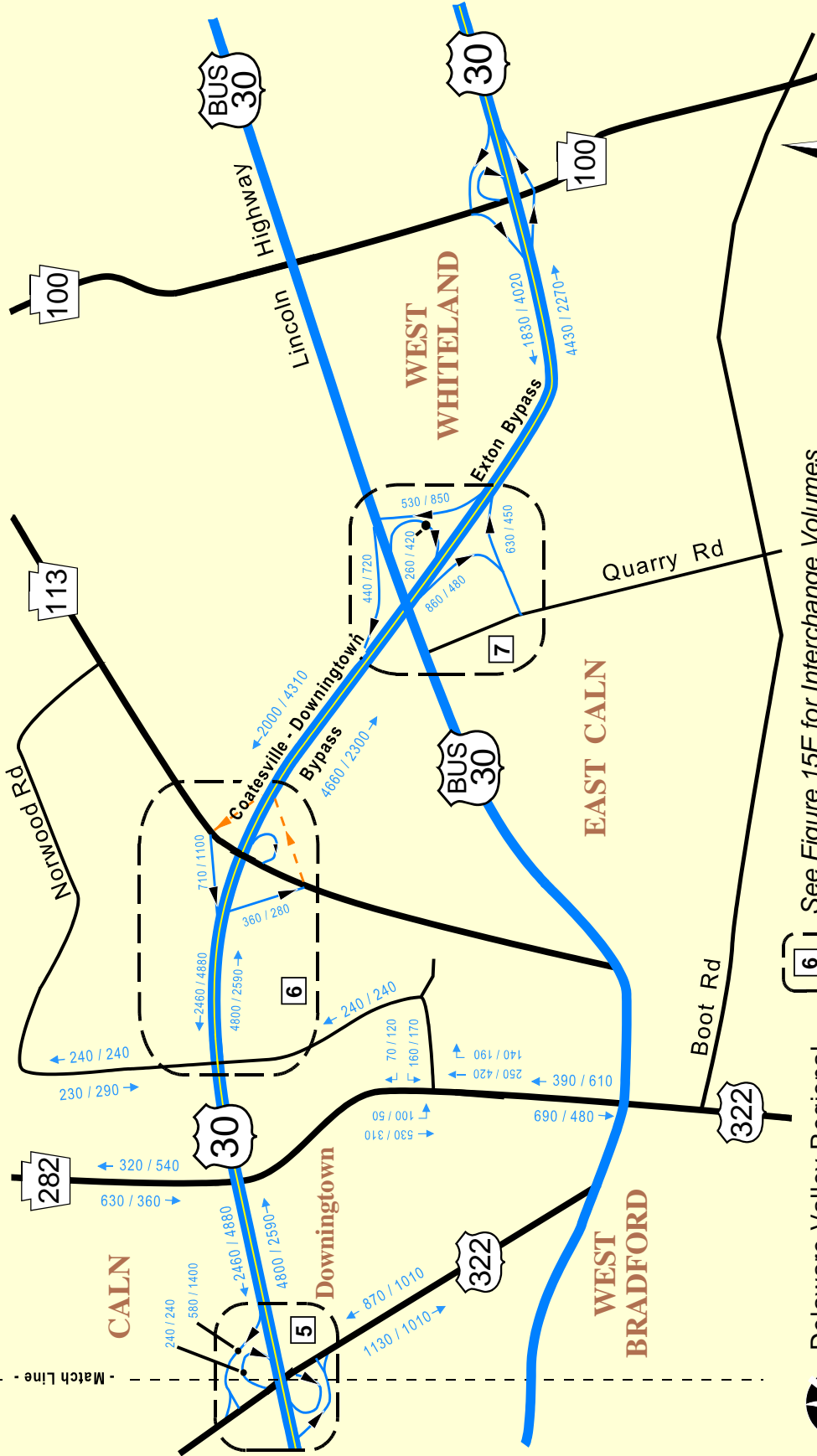


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See Figure 15D for Interchange Volumes
2030 Alternative 3 AM / PM Peak Hour Volumes

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US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 15C. 2030 Alternative 3 AM / PM Peak Hour Traffic Volumes



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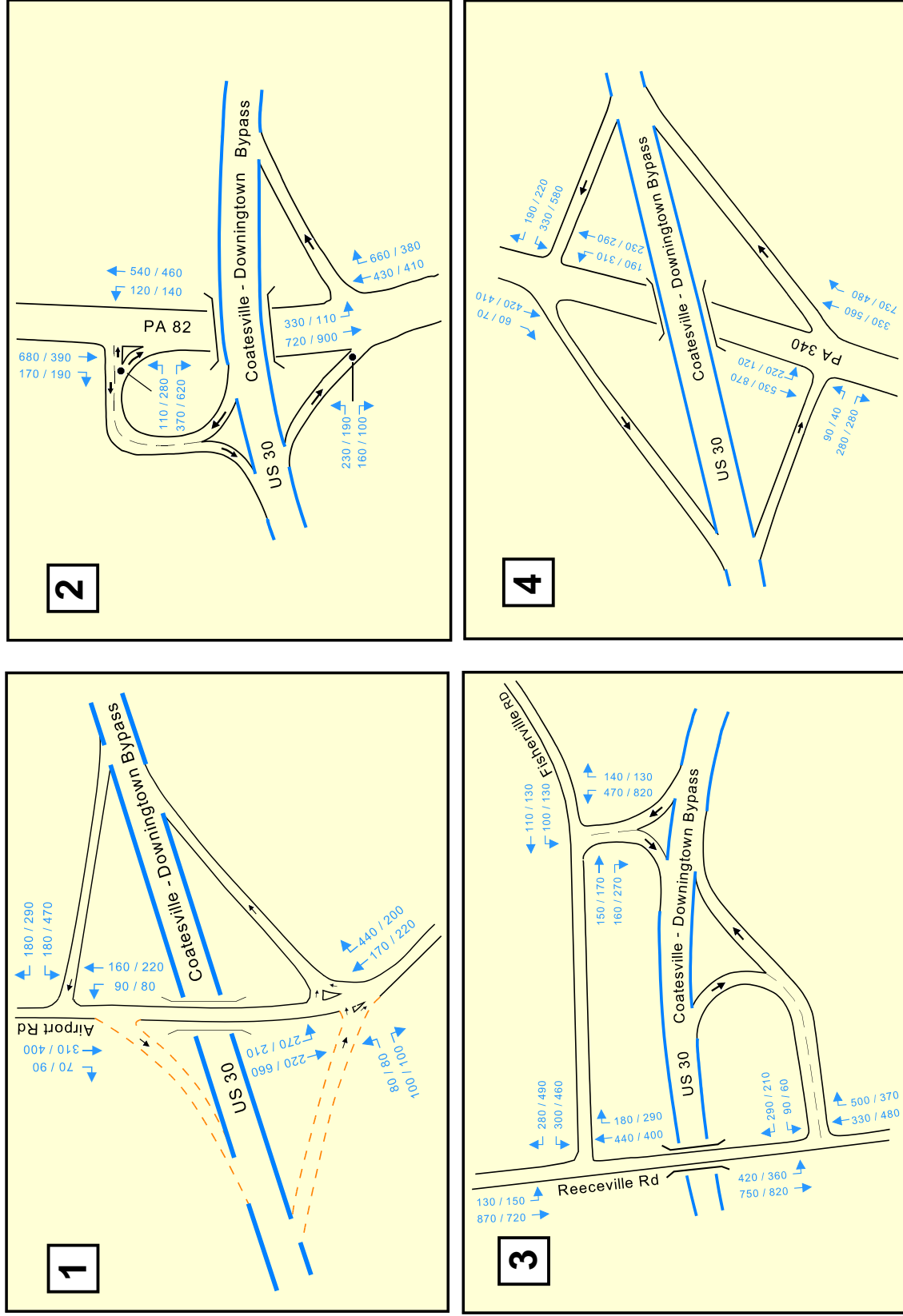
See Figure 15E for Interchange Volumes
 2030 Alternative 3 AM / PM Peak Hour Volumes

Proposed

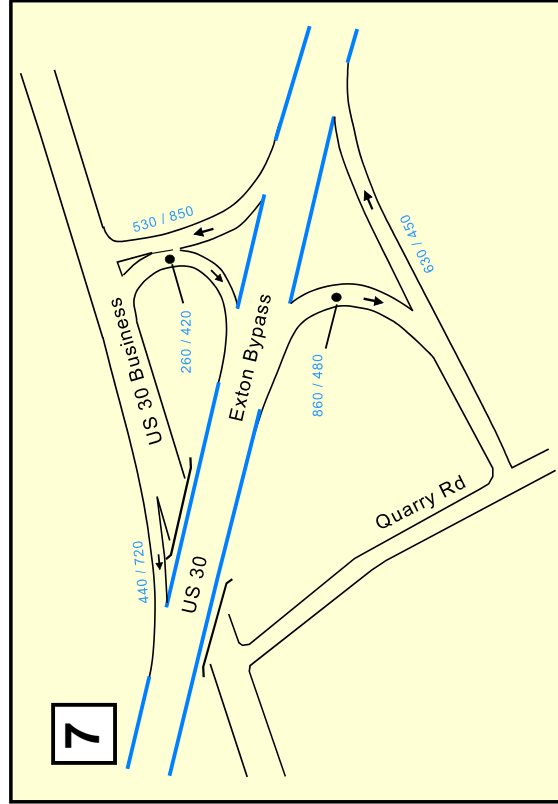
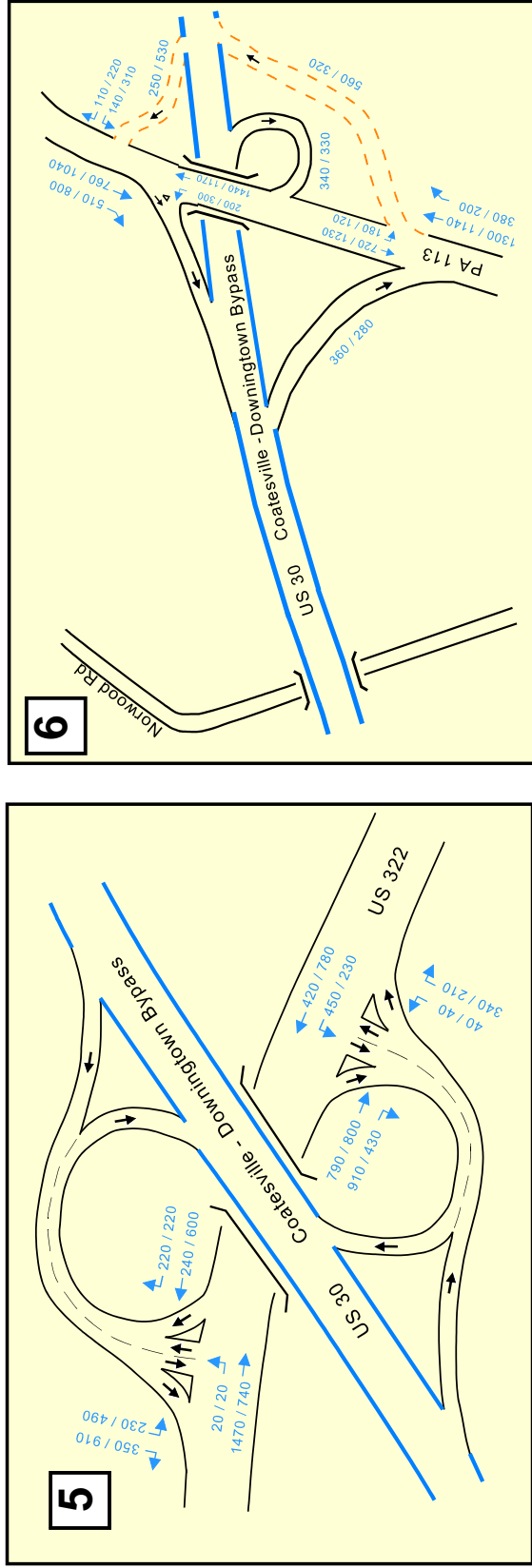
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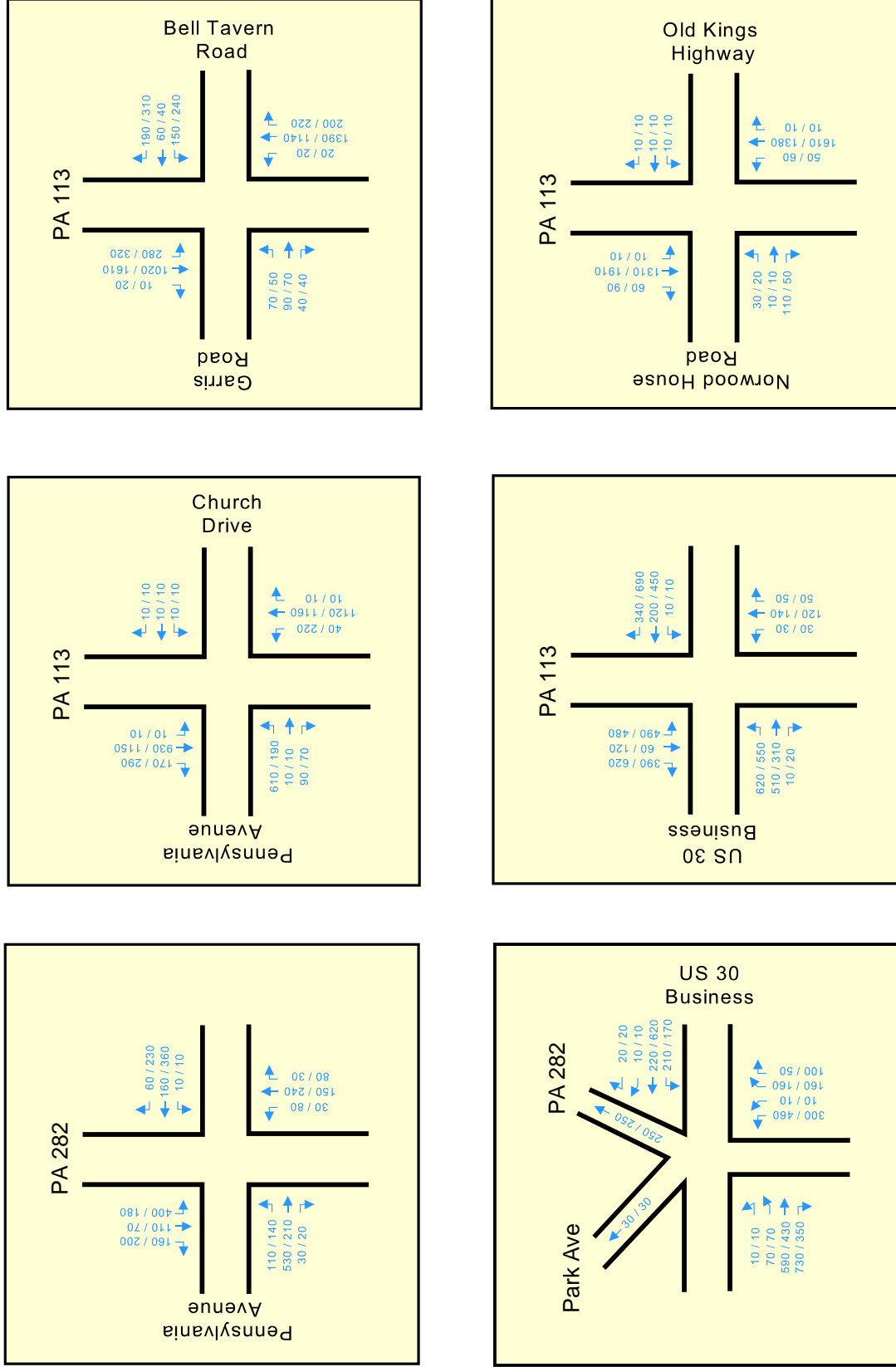
US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 15D. 2030 Alternative 3 AM / PM Peak Hour Traffic Volumes



US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 15E. 2030 Alternative 3 AM / PM Peak Hour Traffic Volumes



US 30 Coatesville-Downingtown Bypass Traffic Study
Figure 15F. 2030 Alternative 3 AM / PM Peak Hour Traffic Volumes



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US 30 Coatesville-Downingtown Bypass Traffic Study

Publication Number: 08099

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Geographic Area Covered: The municipalities of Atglen Borough, Caln Township, Coatesville City, Downingtown Borough, East Bradford Township, East Brandywine Township, East Caln Township, East Fallowfield Township, Highland Township, Modena Borough, Parkesburg Borough, Sadsbury Township, South Coatesville Borough, Uwchlan Township, Valley Township, West Bradford Township, West Brandywine Township, West Caln Township, West Sadsbury Township, and West Whiteland Township in Chester County Pennsylvania.

Key Words: Traffic Forecasts, Travel Simulation, AADT, Peak Hour Volumes, Intersection Turning Movements.

ABSTRACT

This report documents 2010 and 2030 traffic forecasts for the US 30 Coatesville-Downingtown Bypass and surrounding area in Chester County. Average daily and AM and PM peak hour traffic forecasts are provided for a No-Build and three Build alternatives and compared to base year volumes.

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