IV. EVALUATION OF CONCEPTS AND ALTERNATIVES

A two-step evaluation process was followed to evaluate the concepts. In Step One, each concept was measured for its performance in the context of specific elements of the project Purpose and Need as concurred with by the FHWA. The following elements were used because they could be measured at the concept level and were determined to be key differentiators in the initial evaluation of the concepts:

Measures of system linkage and continuity:

- Traffic circulation;
- Potential North Street intersection performance improvement;
- Traffic reduction on Camden-Wyoming Avenue; and
- Reduction in through traffic on existing local roads;
- Emergency service accessibility, including improved access and mobility across Norfolk Southern Railroad.

A preliminary traffic analysis was conducted for each of the concepts to understand the traffic benefits associated with it. DelDOT's statewide travel demand model was used to develop assignments of future traffic volumes, helping to evaluate the effectiveness of each concept to accommodate and address the transportation needs. Based on the results of the Step One evaluation, concepts that met the foregoing elements of the project Purpose and Need were transformed into preliminary alternatives. The preliminary alternatives were then evaluated under Step Two of the process. Concepts found to not meet the foregoing elements of the project Purpose and Need were eliminated from further consideration.

In Step Two, each preliminary alternative was evaluated for its performance related to specific environmental and engineering parameters. In order to quantify the potential impacts, conceptual level engineering was undertaken to determine a conceptual layout for each preliminary alternative (design speed, alignment, vertical profile, etc.). In addition, input from the Working Group, the environmental resource agencies and the general public was factored into the evaluation. At the end of Step Two, preliminary alternatives that performed at a high level were retained for detailed study and were named alternatives. The detailed study process and findings are described in Chapter V. Preliminary alternatives that underperformed in Step Two were eliminated from further consideration.

The analysis of preliminary alternatives adhered to specific guidance and standards for engineering and planning practice as per the latest available versions of AASHTO and DelDOT's Road Design Manual. A list of references and agencies consulted during the alternatives analysis is provided in Appendix C.

A. STEP ONE – PURPOSE AND NEED PERFORMANCE

A comparative preliminary traffic analysis was conducted during Step One of the evaluation process to determine the performance of each of the concepts with respect to the foregoing elements of the project Purpose and Need. The results were shared with the Working Group, the environmental resource agencies and the general public. Input from these entities was used in conjunction with the traffic analysis findings to determine which concepts merited further study and which did not.

i. Methodology and Tools Used

Traffic performance analyses were conducted at the following levels:

2003 Existing Condition Analysis:
Morning and evening peak period intersection turning movements were counted at 25 intersections within the study area. Twenty-four hour Automatic Traffic Recorder (ATR) counts were taken on consecutive seven-day periods at ten key locations within the study area. Three one-hour license plate-matching surveys were also performed to determine the nature of traffic flows within the study area, especially the nature and extent of cut-through traffic on the streets between New Burton Road and Governors Avenue.

Based on the traffic information collected in the field, a study-area traffic performance evaluation and simulation model was created using Synchro software for analyzing existing traffic performance at the 25 intersections within the study area during the morning and evening peak hours.

Future No-Build Condition Analysis:
The analysis of the future No-Build condition assumed that no transportation infrastructure improvements will be made within the study area (apart from the improvements that have already been committed by DelDOT in its Transportation Improvement Program).

Outputs from DelDOT's statewide travel demand model were used to forecast traffic volume assignments and the nature of traffic flows in 2015 and 2030. The statewide travel demand model is DelDOT's accepted forecasting tool. A model validation process was undertaken for the study area using existing traffic count data, and the model was calibrated to yield realistic outputs based on field-observed traffic counts and traffic flows.

The future No-Build condition traffic volume assignments provided by the travel demand model at the roadway segment level were converted into intersection turning movement volumes using the traffic flow patterns provided by the travel demand model. A study-area traffic performance evaluation and simulation model was created using Synchro transportation software to analyze future traffic performance at the 25 intersections within the study area during the evening peak hour for both 2015 and 2030 horizons.

Preliminary Alternatives Analysis:
The preliminary alternatives traffic analyses were conducted for two future target years: mid-term (2015) and long-term (2030). This enabled the determination of mid-range and long-range impacts and benefits of each of the concepts/alternatives.

Outputs from DelDOT's statewide travel demand model were used to forecast traffic volume assignments for study area roadways and the nature of traffic flows in 2015 and 2030 for each concept/alternative. Based on the project Purpose and Need, several traffic performance evaluation factors were developed to determine the relative benefits achieved by each concept/alternative compared to the No-Build alternative. This analysis was conducted at a roadway segment level, except for the Transportation System Management (TSM) alternative, which was analyzed at an intersection level since TSM improvements by definition are associated with intersection improvements.

ii. Description of Step One Performance Factors

Based on the project Purpose and Need, the concepts were evaluated according to the following performance factors:

Traffic Circulation (System Linkage and Continuity Criteria of the Project Need)
As shown in Figure IV-1, under existing conditions, nearly all southbound Saulsbury Road traffic turns left or right onto North Street and most of the traffic then circulates around the Eden Hill Farm and Schutte Park to head towards southern and eastern destinations. This circuitous traffic pattern adds distance and travel time to vehicular trips.

The traffic circulation performance evaluation factor analyzed how much circulatory trips around Eden Hill Farm and Schutte Park could be reduced. The reduction in circuitous trips under each concept was calculated in comparison with the No-Build alternative.

Potential North Street Intersection Performance Improvement (Existing and Future Congestion Criteria of the Project Need)
Significant turning movements occur at the three North Street intersections, as shown in Figure IV-2. The extent of turning movements at any roadway intersection is directly related to the performance of that intersection and its safety.

Thus, the potential of each of the concepts/alternatives to reduce turning movements at the North Street intersections was analyzed. The concepts/alternatives with the extension of Saulsbury Road could convert a significant number of these turning movements into through movements, helping to improve performance of the North Street intersections.

Traffic Reduction on Camden-Wyoming Avenue (Impacts on Historic Districts Criteria of the Project Need)
As its name suggests, Camden-Wyoming Avenue passes through the historic towns of Camden and Wyoming (see Figure IV-3). The traffic counts and license-plate surveys showed that Camden-Wyoming Avenue carries significant traffic volumes, with a high percentage of heavy vehicles. The foundations of the historic buildings along this road are susceptible to vibration impacts associated with heavy vehicle movements in the immediate vicinity.

Thus, this traffic factor evaluated the extent that traffic volumes would be reduced on Camden-Wyoming Avenue by each of the concepts/alternatives compared to the No-Build alternative.

Reduction in Cut-Through Traffic (System Linkage and Continuity Criteria of the Project Need)
During the public involvement process, Working Group members and study area residents expressed concerns about a significant proportion of through traffic using lower classification streets between New Burton Road and Governors Avenue (see Figure IV-4). License plate-matching surveys were conducted that showed a large proportion of cut-through trips along these streets, thus supporting local stakeholder and residents' perceptions.

Thus, this traffic evaluation factor analyzed the extent of reduction in traffic volumes that could be achieved along the lower classification streets between New Burton Road and Governors Avenue by each of the concepts/alternatives. The reduction in traffic volumes under each concept/alternative was calculated in comparison with the No-Build alternative.

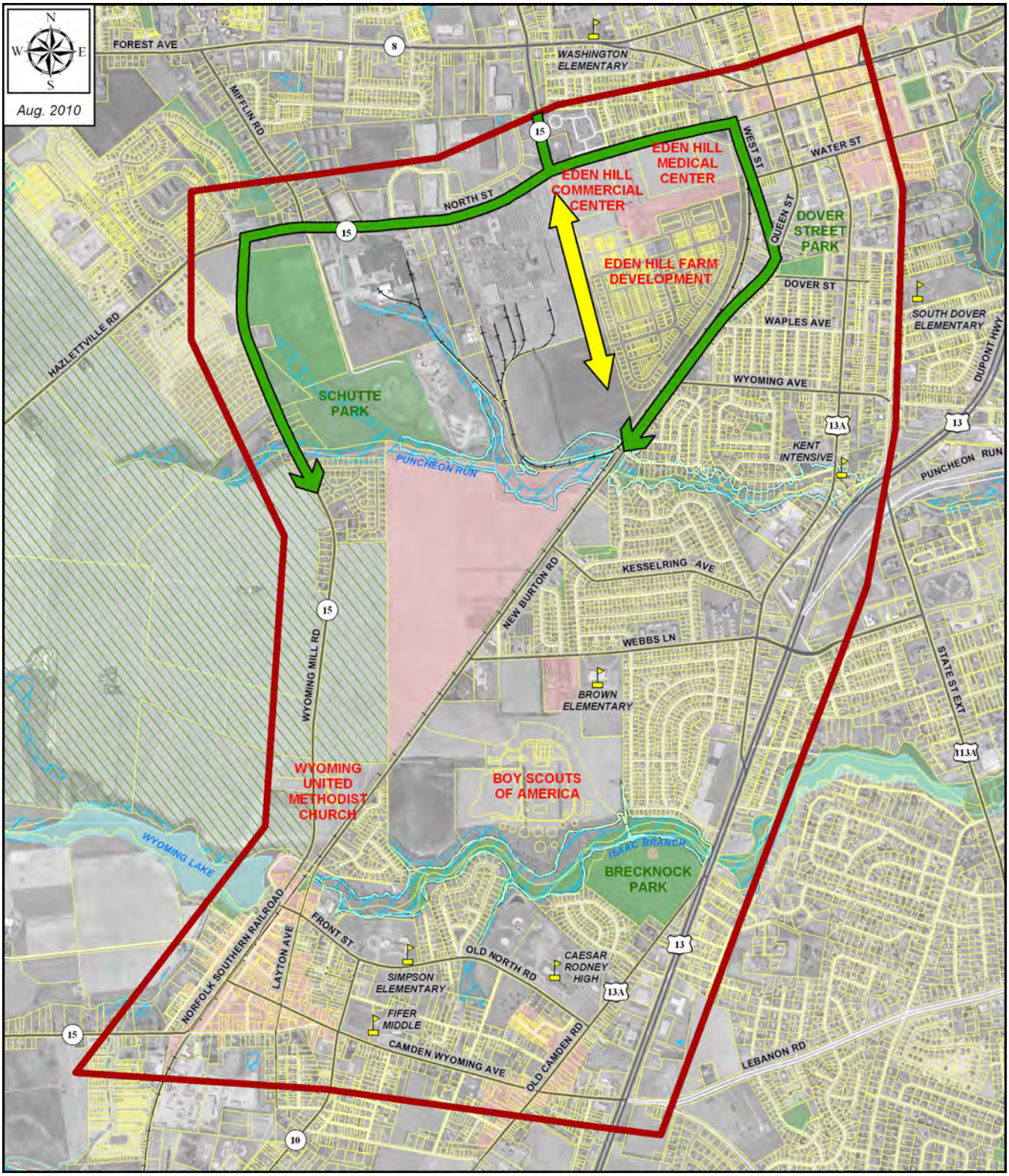


Figure IV-1: Study Area Traffic Circulation

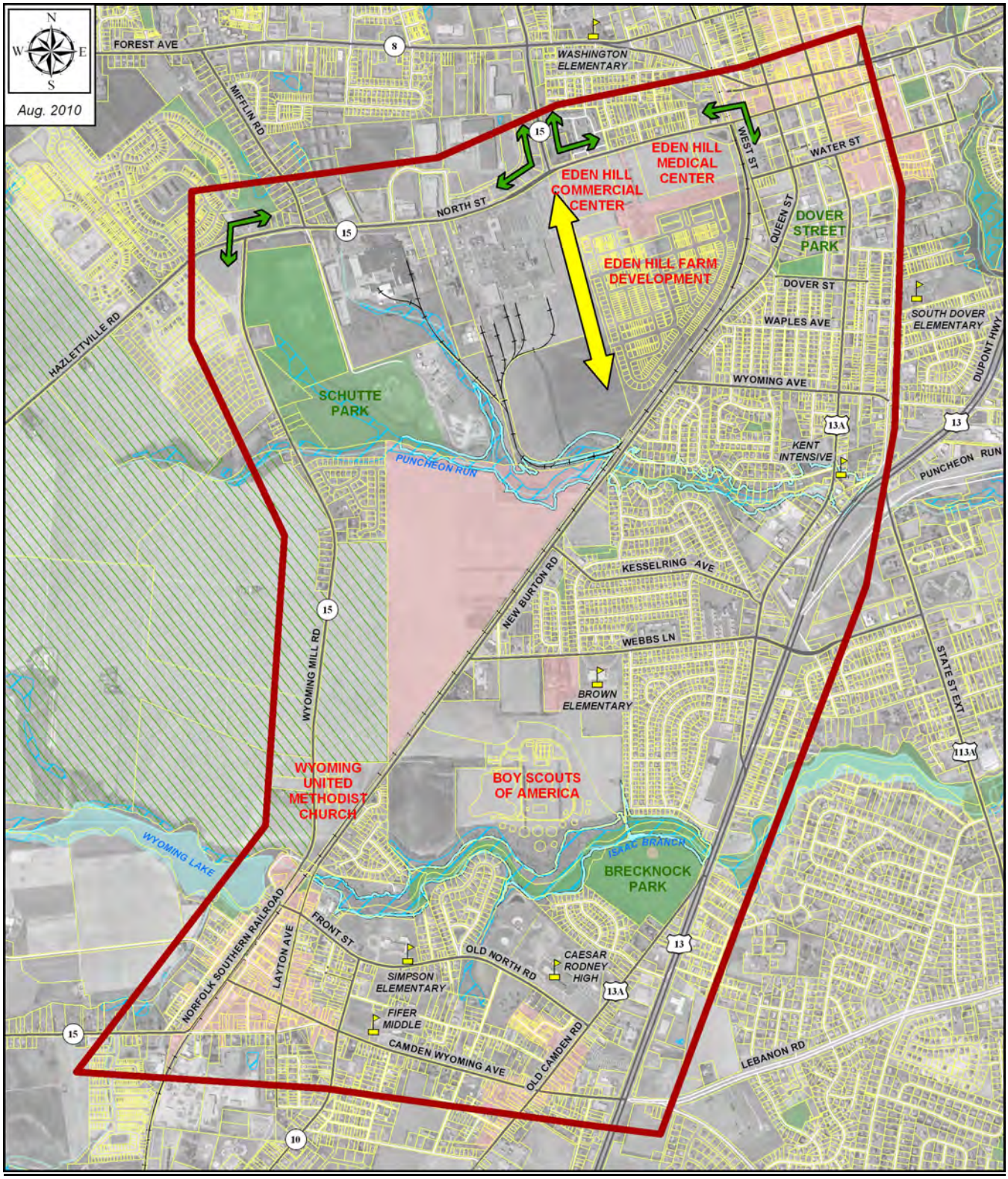


Figure IV-2: North Street Intersection Turning Movements

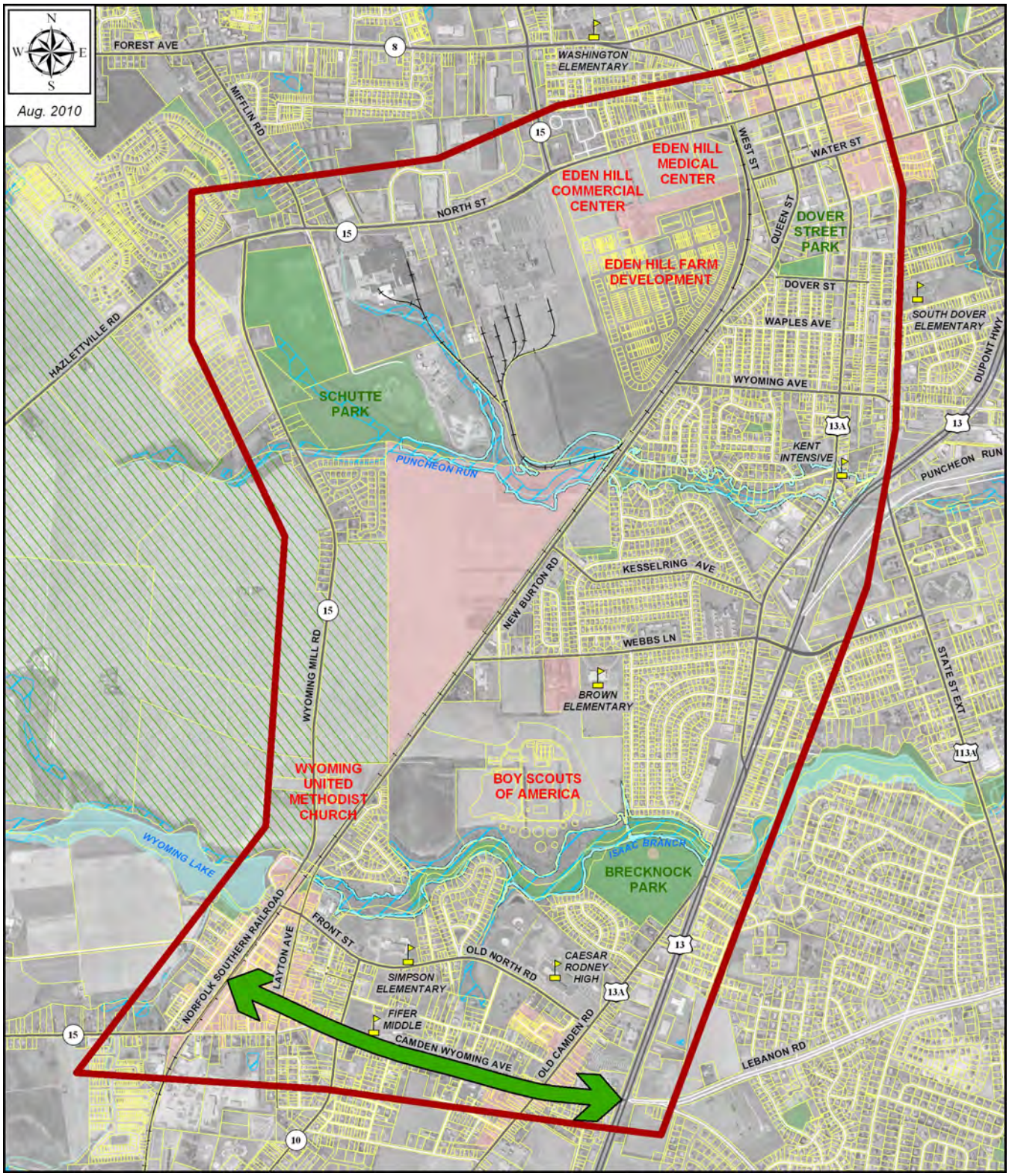


Figure IV-3: Traffic Reduction on Camden-Wyoming Avenue

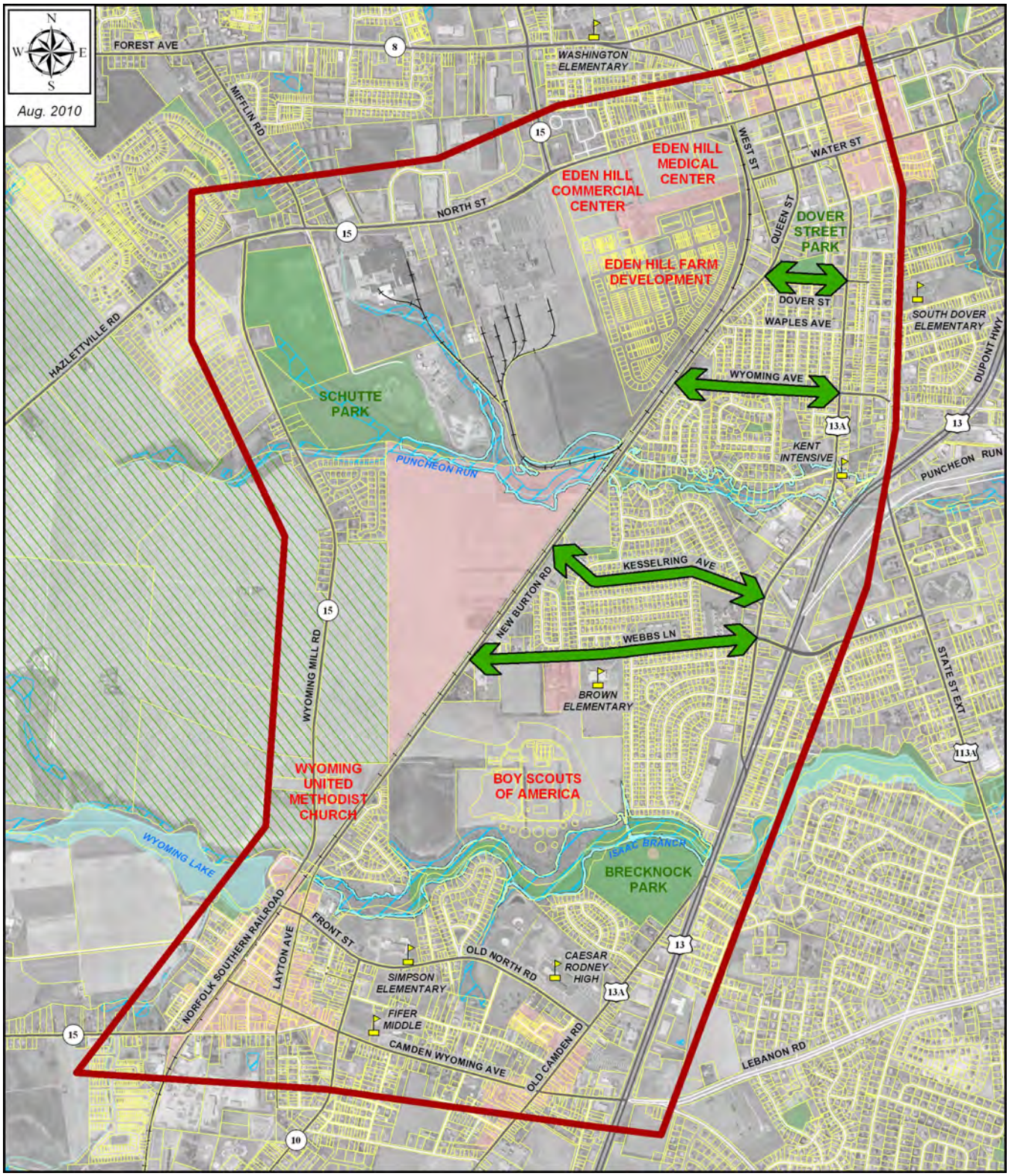


Figure IV-4: Cut-Through Streets

Access and Mobility Across Norfolk Southern Railroad (Emergency Service Accessibility and Improve Safety Criteria of the Project Need)

The Norfolk Southern Railroad diagonally bisects the study area. There is an existing at-grade crossing of the railroad at North Street, and the next railroad crossing (also at grade) is 2.9 miles south at Front Street (see Figure IV-5). Thus, there are issues related to access and mobility across the Norfolk Southern Railroad within the study area, especially for emergency services. The Bayhealth Medical Center is located on the east side of the railroad; if someone on the west side needs to be rushed to the Medical Center, the trip is long in terms of both distance and time due to access limitations.

Thus, this traffic evaluation factor considered the extent of improvement in access and mobility across the railroad that could be achieved by each of the concepts/alternatives. The concepts/alternatives that include a grade-separated crossing of the Norfolk Southern Railroad within the study area would provide higher access and mobility benefits, while the concepts/alternatives that do not include a railroad crossing within the study area would provide no access and mobility benefit.

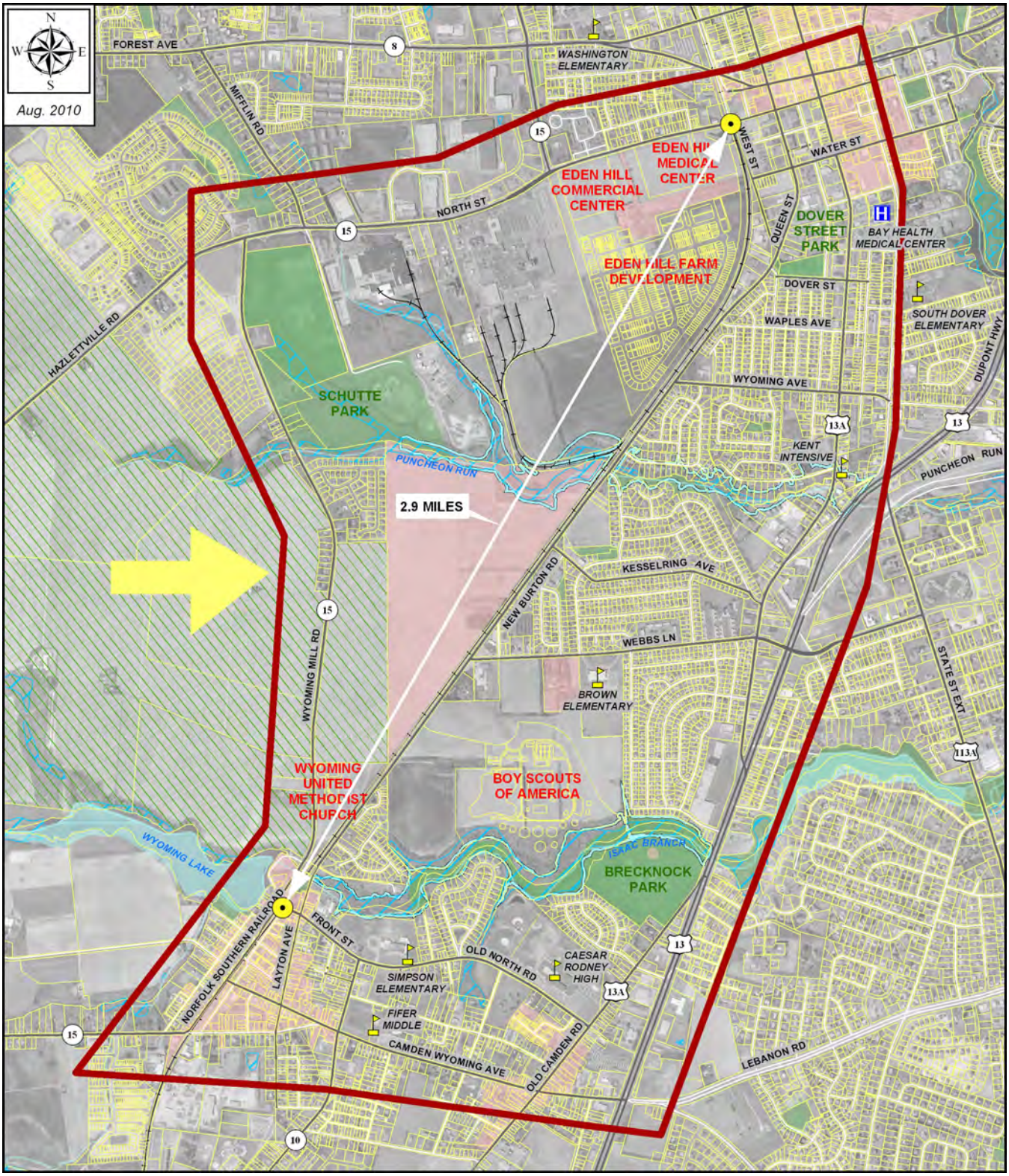


Figure IV-5: Emergency Service Accessibility

iii Performance Evaluation Results

At the end of Step One, 19 concepts were found to meet the elements of the project Purpose and Need at some level and were recommended for Step Two study. While Concept 1 did not meet the elements of the project Purpose and Need, it was advanced to Step Two for use as a baseline to compare the relative performance of the other concepts. Some concepts, such as Concept 4 and all versions of Concepts 5 and 12, would perform well in all five preliminary evaluation areas measured. Other concepts, such as Concept 3 and all versions of Concepts 2 and 14, would perform well in a few areas measured, but would perform poorly in other areas. These latter concepts were categorized as weak performers in responding to the project Purpose and Need. Six concepts were eliminated as they did not meet the project Purpose and Need (Concepts 6, 8, 9, 10, 11 and 13). The following figure summarizes the overall performance of the concepts as determined in Step One.

Figure IV-6: Summary of Step One – Concept Performance

Concept	Step 1 – Meets Purpose and Need(a)	Concept Advanced to Step 2
1 No-Build	No	Yes, baseline
2A, 2B, 2C, 2D	Yes, but weak	Yes
3	Yes, but weak	Yes
4	Yes	Yes
5A, 5B	Yes	Yes
5C	Yes	Yes
5C Spur	Yes	Yes
6	No	No
7A, 7B	Yes	Yes
7C, 7D	Yes	Yes
7C Spur	Yes	Yes
8	No	No
9	No	No
10	No	No
11	No	No
12A, 12B	Yes	Yes
13	No	No
14A	Yes, but weak	Yes
14B	Yes, but weak	Yes

(a) Specific elements of the project Purpose and Need as identified at the beginning of Chapter IV.

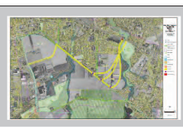
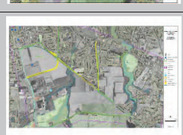
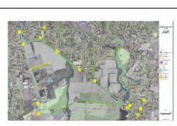
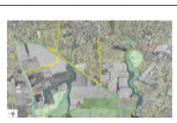
More descriptive rationale for retaining or eliminating each concept is presented in Section IV.D. Traffic Evaluation Scoring Sheets and Traffic Performance Data Matrices were developed as ways of presenting the performance of each concept and enabling comparison of the concepts. Tables IV-1 and IV-2 present the Scoring Sheet and Data Matrix for the mid-term future year (2015), while Tables IV-3 and IV-4 present the Scoring Sheet and Data Matrix for the long-term future year (2030). Performance enhancement ranges were established for each of the traffic factors based on the overall extent of improvement that could be achieved under each factor. These ranges are displayed in Tables IV-2 and IV-4.

As indicated earlier, analysis for the TSM concept (Concept #11) was performed at the intersection level. All 25 intersections within the study area were considered under the TSM analysis. Table IV-5 shows the details of the TSM analysis. First, all DelDOT-committed improvements as part of other

projects were included (Table IV-5: column 2) and level of service (LOS) was calculated at all the intersections under 2015 conditions (Table IV-5: column 3). Then 2015 TSM improvements were identified and applied to eliminate unacceptable performance, where possible (Table IV-5: column 4), and intersection LOS was recalculated (Table IV-5: column 5). Then, 2030 traffic volumes were considered, and intersection LOS was calculated using only the 2015 TSM improvements (Table IV-5: column 6). Additional 2030 TSM improvements were then identified and applied to eliminate unacceptable performance, where possible (Table IV-5: column 7), and intersection LOS was recalculated with all possible TSM improvements (Table IV-5: column 8).

Page Intentionally
Left Blank

2015 TRAFFIC PERFORMANCE COMPARISON WITH NO-BUILD ALTERNATIVE

Preliminary Alternative/Concept Number & Description	Map	Traffic Circulation	Potential North Street Intersections Performance Improvement	Traffic Reduction on Camden-Wyoming Avenue	Reduction in Through Traffic*	Improved Access and Mobilty Across NS Railroad within Study Area
Preliminary Alternative 1						
No-Build		---	---	---	---	---
Preliminary Alternative 2 - To New Burton Rd.						
Preliminary Alternative 2A		◉	●	○-	○-	●
Preliminary Alternative 2B		●	●	○-	○-	●
Preliminary Alternative 2C		◉	●	○-	○-	●
Preliminary Alternative 2D		◉	●	○-	○-	●
Preliminary Alternative 3						
Tie in to Wyoming Avenue to US 13		●	●	○	○	●
Preliminary Alternative 4						
Tie in to Webbs Lane to US 13; Auxiliary Connection to Wyoming Mill Road		◉	●	●	◉	●
Preliminary Alternative 5C**						
Tie in to (or in the vicinity of) Charles Polk Rd to US 13; Auxiliary Connection to Wyoming Mill Road		◉	●	●	●	●
Concept 6						
Bypass Around Towns of Camden & Wyoming to US 13		○	◉	◉	○	○
Preliminary Alternative 7C**						
Connect to New Burton Road North of Wyoming Avenue, Use New Burton Road & Connect to (or in the vicinity of) Charles Polk to US 13		●	●	●	○	●
Preliminary Alternative 7D						
Connect to New Burton Road North of Wyoming Avenue, Use New Burton Road & Connect to Webbs Lane to US 13		●	●	◉	○	●
Concept 8						
Connect Wyoming Mill Road to Webbs Lane to US 13		○	○	○	○	●
Concept 9						
Connect Wyoming Mill Road to (or in the vicinity of) Charles Polk Road to US 13		○	○	○	○	●
Concept 10						
Widen North Street from Saulsbury Road to Governors Avenue		○-	○-	○	○-	○
Concept 11						
Transportation system Management Improvements		○	●	○	○	○
Preliminary Alternative 12 -Extend Saulsbury Road, connect to and widen New Burton Road. Relocate the railroad						
Preliminary Alternative 12A - Connect to Webbs Lane		◉	●	◉	◉	◉
Preliminary Alternative 12B - Connect to Charles Polk Road		◉	●	●	◉	◉
Concept 13						
Extend Saulsbury Road, connect to Wyoming Mill Road; swing around Wyoming Lake, Camden and Wyoming; connect to US 13 in the vicinity of Briar Park		○	◉	◉	○	○
Concept 14A						
Capacity Improvement along Existing Roads: Wyoming Avenue, New Burton Road and Webbs Lane		○-	○-	○	○-	○
Preliminary Alternative 14B						
Extension of Saulsbury Road and Capacity Improvement along Existing Roads: Wyoming Avenue, New Burton Road and Webbs Lane		●	●	◉	○	●

Legend

●	Most Trip Reduction / High Intersection Benefits / Underpass or Overpass Railroad Crossing within Study Area
◉	Moderate Trip Reduction / Moderate Intersection Benefits / Underpass or Overpass Railroad Crossing within Study Area with One Directional Access
○	Low Trip Reduction / Low Intersection Benefits / No Underpass or Overpass Access Across Railroad Within Study Area / No Change
○-	No Trip Reduction (Increase in Trips) / Negative Impact of Intersection Performance

*Note - Reduction in (cut-) through traffic on all other streets between New Burton Road and Governors Avenue

** Note - Graphic in Column 2 shows all subset alternatives: A, B, C and Spur; scores in Columns 3 through 7 apply to A, B, C and Spur.

Note: Shading identifies DelDOT selected alternatives to be retained for detailed study.

Table IV-1

TABLE IV-2

TRAFFIC PERFORMANCE DATA MATRIX - 2015

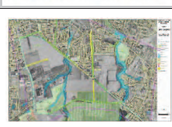
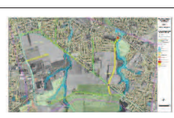
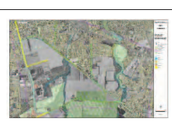
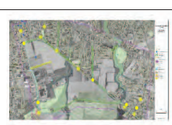
Comparison with 2015 No-Build Concept

Concepts	Traffic Circulation	Potential North Street Intersection Performance Improvement	Traffic Reduction on Camden-Wyoming Avenue	Reduction in Through Traffic	Improved Access and Mobility Across NS Railroad within Study Area
2015 No-Build Concept 1	---	Potential for North Street intersection performance improvement has been derived based on assessment of traffic flow patterns indicated by model outputs and thus, this factor is not quantifiable.	---	---	---
Concept 2A	-2,714		+1,782	+4,281	Full Under/Overpass Access
Concept 2B	-4,362		+1,525	+3,847	Full Under/Overpass Access
Concept 2C	-3,082		+1,801	+5,108	Full Under/Overpass Access
Concept 2D	-2,022		+1,873	+243	Full Under/Overpass Access
Concept 3	-4,331		-392	-551	Full Under/Overpass Access
Concept 4	-3,044		-1,482	-1,669	Full Under/Overpass Access
Concepts 5A-5C and Spur	-2,647		-1,524	-3,235	Full Under/Overpass Access
Concept 6	-433		-818	-295	No Under/Overpass Access
Concepts 7A-7C and Spur	-4,947		-1,443	-804	Full Under/Overpass Access
Concept 7D	-4,705		-862	-380	Full Under/Overpass Access
Concept 8	-186		-349	-152	Full Under/Overpass Access
Concept 9	-175		-325	-510	Full Under/Overpass Access
Concept 10	+4,549		-334	+748	No Under/Overpass Access
Concept 11	Not Applicable		Not Applicable	Not Applicable	No Under/Overpass Access
Concept 12A	-2,161		-857	-1,767	Partial Under/Overpass Access
Concept 12B	-2,593		-1,379	-2,025	Partial Under/Overpass Access
Concept 13	-601		-843	-495	No Under/Overpass Access
Concept 14A	+3,745		-151	+2,036	No Under/Overpass Access
Concept 14B	-4,863		-951	-271	Full Under/Overpass Access

Range	Traffic Volume		Traffic Volume	Traffic Volume	
●	- 4,000 and more reduction		- 1,000 and more reduction	- 3,000 and more reduction	
◎	-2,000 to - 4,000		- 500 to - 1,000	-1,500 to - 3,000	
○	0 to - 2,000		0 to - 500	0 to - 1,500	
○-	Increase (> 0)		Increase (> 0)	Increase (> 0)	

Page Intentionally
Left Blank

TRAFFIC PERFORMANCE COMPARISON WITH NO-BUILD ALTERNATIVE - 2030

Preliminary Alternative/Concept Number & Description	Map	Traffic Circulation	Potential North Street Intersections Performance Improvement	Traffic Reduction on Camden-Wyoming Avenue	Reduction in Through Traffic*	Improved Access and Mobilty Across NS Railroad within Study Area
Preliminary Alternative 1						
No-Build		---	---	---	---	---
Preliminary Alternative 2 - To New Burton Rd.						
Preliminary Alternative 2A		●	●	○-	○-	●
Preliminary Alternative 2B		●	●	○-	○-	●
Preliminary Alternative 2C		●	●	○-	○-	●
Preliminary Alternative 2D		◉	●	○-	○-	●
Preliminary Alternative 3						
Tie in to Wyoming Avenue to US 13		●	●	○	◉	●
Preliminary Alternative 4						
Tie in to Webbs Lane to US 13; Auxiliary Connection to Wyoming Mill Road		●	●	●	◉	●
Preliminary Alternative 5C**						
Tie in to (or in the vicinity of) Charles Polk Rd to US 13; Auxiliary Connection to Wyoming Mill Road		◉	●	●	●	●
Concept 6						
Bypass Around Towns of Camden & Wyoming to US 13		○	◉	◉	○	○
Preliminary Alternative 7C**						
Connect to New Burton Road North of Wyoming Avenue, Use New Burton Road & Connect to (or in the vicinity of) Charles Polk to US 13		●	●	●	○-	●
Preliminary Alternative 7D						
Connect to New Burton Road North of Wyoming Avenue, Use New Burton Road & Connect to Webbs Lane to US 13		●	●	◉	○-	●
Concept 8						
Connect Wyoming Mill Road to Webbs Lane to US 13		○	○	○	○	●
Concept 9						
Connect Wyoming Mill Road to (or in the vicinity of) Charles Polk Road to US 13		○	○	○	○	●
Concept 10						
Widen North Street from Saulsbury Road to Governors Avenue		○-	○-	○-	○-	○
Concept 11						
Transportation system Management Improvements		○	●	○	○	○
Preliminary Alternative 12 -Extend Saulsbury Road, connect to and widen New Burton Road. Relocate the railroad						
Preliminary Alternative 12A - Connect to Webbs Lane		●	●	◉	◉	◉
Preliminary Alternative 12B - Connect to Charles Polk Road		●	●	●	◉	◉
Concept13						
Extend Saulsbury Road, connect to Wyoming Mill Road; swing around Wyoming Lake, Camden and Wyoming; connect to US 13 in the vicinity of Briar Park		○	◉	◉	○	○
Concept 14A						
Capacity Improvement along Existing Roads: Wyoming Avenue, New Burton Road and Webbs Lane		○-	○-	○	○-	○
Preliminary Alternative 14B						
Extension of Saulsbury Road and Capacity Improvement along Existing Roads: Wyoming Avenue, New Burton Road and Webbs Lane		●	●	◉	○-	●

Legend

●	Most Trip Reduction / High Intersection Benefits / Underpass or Overpass Railroad Crossing within Study Area
◉	Moderate Trip Reduction / Moderate Intersection Benefits / Underpass or Overpass Railroad Crossing within Study Area with One Directional Access
○	Low Trip Reduction / Low Intersection Benefits / No Underpass or Overpass Access Across Railroad Within Study Area / No Change
○-	No Trip Reduction (Increase in Trips) / Negative Impact of Intersection Performance

*Note - Reduction in (cut-) through traffic on all other streets between New Burton Road and Governors Avenue
** Note - Graphic in Column 2 shows all subset alternatives: A, B, C and Spur; scores in columns 3 thru 7 apply to all subset alternatives.
Note: Shading identifies DelDOT selected alternatives to be retained for detailed study.

Table IV-3

TABLE IV-4

TRAFFIC PERFORMANCE DATA MATRIX - 2030
Comparison with 2030 No-Build Concept

Concepts	Traffic Circulation	Potential North Street Intersection Performance Improvement	Traffic Reduction on Camden-Wyoming Avenue	Reduction in Through Traffic	Improved Access and Mobility Across NS Railroad within Study Area
2030 No-Build Concept 1	--	Potential for North Street intersection performance improvement has been derived based on assessment of traffic flow patterns indicated by model outputs and thus, this factor is not quantifiable.	--	--	--
Concept 2A	-4,758		+2,108	+3,756	Full Under/Overpass Access
Concept 2B	-6,668		+1,779	+2,539	Full Under/Overpass Access
Concept 2C	-5,620		+2,251	+2,899	Full Under/Overpass Access
Concept 2D	-2,986		+1,909	+1,850	Full Under/Overpass Access
Concept 3	-4,935		-263	-1,993	Full Under/Overpass Access
Concept 4	-4,204		-1,490	-2,921	Full Under/Overpass Access
Concepts 5A - 5C and Spur	-3,559		-1,931	-5,076	Full Under/Overpass Access
Concept 6	-576		-909	- 373	No Under/Overpass Access
Concepts 7A - 7C and Spur	-5,301		-1,972	+1,052	Full Under/Overpass Access
Concept 7D	-5,585		-931	+979	Full Under/Overpass Access
Concept 8	-301		-407	-594	Full Under/Overpass Access
Concept 9	-94		-459	-480	Full Under/Overpass Access
Concept 10	+3,415		+736	+1,082	No Under/Overpass Access
Concept 11	Not Applicable		Not Applicable	Not Applicable	No Under/Overpass Access
Concept 12A	-4,384		-955	-2,138	Partial Under/Overpass Access
Concept 12B	-4,250		-1,573	-2,664	Partial Under/Overpass Access
Concept 13	-683		-927	-545	No Under/Overpass Access
Concept 14A	+2,308		-277	+1,543	No Under/Overpass Access
Concept 14B	-5,719		-981	+871	Full Under/Overpass Access

Range	Traffic Volume		Traffic Volume	Traffic Volume	
●	- 4,000 and more reduction		- 1,000 and more reduction	- 3,000 and more reduction	
⊙	-2,000 to - 4,000		- 500 to - 1,000	-1,500 to - 3,000	
○	0 to - 2,000		0 to - 500	0 to - 1,500	
○-	Increase (> 0)		Increase (> 0)	Increase (> 0)	

Page Intentionally
Left Blank

WEST DOVER CONNECTOR STUDY: TRANSPORTATION SYSTEMS MANAGEMENT (TSM) - ANALYSIS DETAILS

Intersection and Existing Control Type	DelDOT Committed Improvements	2015 Intersection Level Of Service (LOS) with Committed Improvements	2015 TSM Improvements*	2015 Intersection LOS with Committed & 2015 TSM Improvements	2030 LOS with Committed & 2015 TSM Improvements	Additional TSM Improvements to mitigate 2030 Volumes	2030 LOS assuming Committed Improvements and All Feasible TSM Improvements
North St. @Wyoming Mill Rd. STOP	None	LOS F	Signalization **, Right Turn Storage Lane on Northbound Wyoming Mill Rd.	LOS B	LOS E	Signal Cycle Length Modification	LOS D
North St. @Mill in Rd.	None	LOS E	Signal Phase Modification	LOS A	LOS C	No Improvements Required; Acceptable LOS	LOS C
North St. @Saulsbury Rd.	None	LOS C	No Improvements Required; Acceptable LOS	LOS C	LOS F	***Improvements Tried But Did Not Help:*** *Modification of Signal Timing and Phasing, Extension of Existing Storage Turn Lanes*	LOS F
North St. @West St. STOP	None	LOS F	Signalization**	LOS B	LOS E	***Improvements Tried But Did Not Help:*** *Modification of Signal Timing and Phasing, Provision of Storage Turn Lanes*	LOS E
North St. @Governors Ave.	None	LOS F	Left Turn Storage Lane on Northbound Governors Ave	LOS E	LOS F	***Improvements Tried But Did Not Help:*** *Modification of Signal Timing and Phasing, Provision /Extension of Storage Turn Lanes*	LOS F
West St. @New Burton Rd. STOP	None	LOS F	Right Turn Storage Lane on Eastbound West St.	LOS E	LOS F	***Improvements Tried But Did Not Help:*** *Provision / Extension of Storage Turn Lanes; Projected Traffic Volumes Did Not Meet Signal Warrants*	LOS F
New Burton Rd. @Dover St. STOP	None	LOS F	***Improvements Tried But Did Not Help:*** *Provision of Storage Turn Lanes; Projected Traffic Volumes Did Not Meet Signal Warrants*	LOS F	LOS F	***Improvements Tried But Did Not Help:*** *Provision of Storage Turn Lanes; Projected Traffic Volumes Did Not Meet Signal Warrants*	LOS F
Governors Ave. @Dover St. STOP	Left Turn Storage Lane on Northbound Governors Ave	LOS F	Right Turn Storage Lane on Eastbound Dover St.	LOS E	LOS F	Signalization**	LOS B
New Burton Rd. @Wyoming Ave. STOP	None	LOS F	Right Turn Storage Lane on Westbound Wyoming Ave	LOS D	LOS F	***Improvements Tried But Did Not Help:*** *Provision/Extension of Storage Turn Lanes; Projected Traffic Volumes Did Not Meet Signal Warrants*	LOS F
Governors Ave. @Wyoming Ave.	Right Turn Storage Lane on Eastbound and Westbound Wyoming Ave	LOS B	No Improvements Required; Acceptable LOS	LOS B	LOS C	No Improvements Required; Acceptable LOS	LOS C
Governors Ave. @Kesselring Ave. STOP	Left Turn Storage Lane on Northbound Governors Ave; Right Turn Storage Lane on Southbound Governors Ave	LOS F	***Improvements Tried But Did Not Help:*** *Provision / Extension of Storage Turn Lanes; Projected Traffic Volumes Did Not Meet Signal Warrants*	LOS F	LOS F	***Improvements Tried But Did Not Help:*** *Provision/Extension of Storage Turn Lanes; Projected Traffic Volumes Did Not Meet Signal Warrants*	LOS F
New Burton Rd. @Kesselring Ave. STOP	None	LOS C	No Improvements Required; Acceptable LOS	LOS C	LOS F	Right Turn Storage Lane on Westbound Kesselring Ave	LOS D
New Burton Rd. @Webbs Lane STOP	None	LOS E	***Improvements Tried But Did Not Help:*** *Provision of Storage Turn Lanes; Projected Traffic Volumes Did Not Meet Signal Warrants*	LOS E	LOS F	Signalization**	LOS B
Governors Ave. @Webbs Lane	None	LOS D	No Improvements Required; Acceptable LOS	LOS D	LOS E	***Improvements Tried But Did Not Help:*** *Modification of Signal Timing and Phasing, Provision /Extension of Existing Storage Turn Lanes*	LOS E
US13 @Webbs Lane	None	LOS D	No Improvements Required; Acceptable LOS	LOS D	LOS F	***Improvements Tried But Did Not Help:*** *Modification of Signal Timing and Phasing, Extension of Existing Storage Turn Lanes*	LOS F
Us13 @Charles Polk Rd	None	LOS C	No Improvements Required; Acceptable LOS	LOS C	LOS E	***Improvements Tried But Did Not Help:*** *Modification of Signal Timing and Phasing, Extension of Existing Storage Turn Lanes*	LOS E
Camden Wyoming Ave. @US 13	None	LOS F	***Improvements Tried But Did Not Help:*** *Modification of Signal Timing and Phasing, Extension of Existing Storage Turn Lanes*	LOS F	LOS F	***Improvements Tried But Did Not Help:*** *Modification of Signal Timing and Phasing, Extension of Existing Storage Turn Lanes*	LOS F
Camden Wyoming Ave. @Alt. US13	None	LOS F	***Improvements Tried But Did Not Help:*** *Modification of Signal Timing and Phasing, No Right-Of-Way Available to Add Storage Turn Lanes in Historic District*	LOS F	LOS F	***Provisions Tried But Did Not Help:*** *Modification of Signal Timing and Phasing, No Right-Of-Way Available to Add Storage Turn Lanes in Historic District*	LOS F
Camden Wyoming Ave. @ SR10	None	LOS E	Phase Modification, Left Turn Storage on Northbound SR10 and Southbound Caesar Rodney Ave	LOS D	LOS E	***Improvements Tried But Did Not Help:*** *Modification of Signal Timing and Phasing, Provision /Extension of Existing Storage Turn Lanes*	LOS E
Camden Wyoming Ave. @ Southern Blvd. STOP	None	LOS C	No Improvements Required; Acceptable LOS	LOS C	LOS D	No Improvements Required; Acceptable LOS	LOS D
Southern Blvd. @Railroad Ave. STOP	None	LOS B	No Improvements Required; Acceptable LOS	LOS B	LOS C	No Improvements Required; Acceptable LOS	LOS C
Camden Wyoming Ave. @ Layton Ave. STOP	None	LOS F	Signalization**	LOS B	LOS B	No Improvements Required; Acceptable LOS	LOS B
Railroad Ave. @Camden Wyoming Ave. STOP	None	LOS F	Additional Right Turn Storage on WB Camden Wyoming Ave	LOS D	LOS F	***Improvements Tried But Did Not Help:*** *Provision of Storage Turn Lanes; Projected Traffic Volumes Did Not Meet Signal Warrants*	LOS F
Wyoming Mill Rd. @Front St. STOP	None	LOS F	Signalization**	LOS B	LOS C	No Improvements Required; Acceptable LOS	LOS C
Front St. @Layton Ave. STOP	None	LOS C	No Improvements Required; Acceptable LOS	LOS C	LOS E	Southbound Right Turn Storage Lane	LOS C

NOTES:
* TSM improvements considered individual intersection approach deficiencies as well as overall intersection deficiencies
** Signalization of a stop-controlled intersection was considered ONLY WHEN current or projected traffic volumes met the 4-hour signal warrants requirement

Table IV-5

B. STEP TWO – ENVIRONMENTAL PERFORMANCE

The 20 surviving concepts from Step One (including the No-Build) were named as preliminary alternatives in Step Two and were evaluated according to their performance related to specific natural and built environment parameters. The determination of which preliminary alternatives merited further study was made based on performance as well as input from the Working Group, the general public and the environmental resource agencies, beginning at their quarterly meeting with DelDOT on July 8, 2004. This provided a common knowledge base for all stakeholders.

i. Methodology and Tools Used

Step Two involved collecting existing information on the natural and built environment. Data sources included the Delaware GIS database as well as available data from the following federal, state and local agencies:

- U.S. Environmental Protection Agency
- National Marine Fisheries Service
- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers
- U.S. Census Bureau
- Kent County
- Kent County Conservation District
- City of Dover
- Town of Camden
- Town of Wyoming
- Delaware Geological Survey
- Delaware Natural Heritage Program
- Delaware Department of Agriculture
- Delaware Department of Natural Resources and Environmental Control
    - Air and Waste Management
    - Fish and Wildlife
    - Natural Heritage and Endangered Species Program
    - Parks and Recreation
    - Soil and Water Conservation
    - Water Resources
- Delaware State Historic Preservation Office

Limited field reconnaissance was undertaken, at this level of study, to verify the nature and location of environmental resources.

ii. List of Built and Natural Environment Factors Considered

Existing environmental features and constraints were mapped on aerial photography base mapping. Natural and built environment features included the following subject areas:

Natural Environment Features

- Waterways, wetlands and floodplains – The Puncheon Run and Isaac Branch waterway corridors traverse the study area, draining in an easterly direction. Wetlands and floodplains in the study area are closely associated with these waterways. Wetlands are protected by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. Floodplains are

protected by federal agencies and the state to provide flood management. Figure IV-7 illustrates the locations of waterways, wetlands and floodplains in the study area.

- Prime farmland and soils of statewide importance – Prime farmland soils make up 90 percent of the study area; soils of statewide importance make up 5 percent. "Prime farmland" soils and "soils of statewide importance" are soils that have been designated by the U.S. Department of Agriculture as most desirable for food production.

- Rare, threatened and endangered species – The U.S. Fish and Wildlife Service reported that no federally listed species are known to occur in the study area. The Delaware Natural Heritage Program identified the red-headed woodpecker, a state-listed endangered bird, as having been observed in the Brecknock Park area. The state-designated rare black vulture was also observed in the Brecknock Park area. Two rare fish, the ironcolor shiner and mud sunfish, have been observed in Moores Lake east of and downstream from the study area.

Built Environment Features

- Community facilities – Schools, libraries, parks, open space, fire and emergency services, police stations, and hospitals were identified and mapped. Figure IV-8 illustrates the locations of community facilities in the study area.

- Planning information – Municipal boundaries, the Kent County Growth Area, and Investment Levels identified in Delaware's State Strategies for Policy and Spending were identified and mapped. Almost all of the study area is within county-designated growth zone and Investment Level One area. Figure IV-9 illustrates the planning information for the study area.

- Land use – Existing land use and land cover types were identified and mapped in the study area. Generally, residential and developed lands are located east of New Burton Road. Rural and industrial areas are generally located west of New Burton Road. Natural areas are located along Puncheon Run and Isaac Branch. Figure IV-10 illustrates the land use information for the study area.

- Community characterization – U.S. Census data was used to determine that the study area population is a diverse community. Minority population percentages in the study area are equal to or greater than that of the City of Dover (47%) along North Street and Webbs Lane, and several other locations as shown on Figure IV-15. The minority population in the study area is primarily African American, with growing percentages of Hispanic and Asian populations. The low-income household percentages in the study area are equal to or greater than that of the City of Dover (13%) primarily west of New Burton Road and north of Wyoming Avenue as shown in Figure IV-16.

- Parklands and open space – Parklands in the study area include Schutte, Brecknock, and numerous pocket parks. Open space is found primarily along the Puncheon Run and Isaac Branch corridors. Figure IV-10 illustrates parklands and open space in the study area.

- Agricultural preservation lands – State Agricultural Preservation Districts and Easements were identified and mapped. These areas are located west of New Burton Road and are known as the Farmlands L.P. District and the Raughley District. Figure IV-11 illustrates the agricultural preservation lands in the study area.

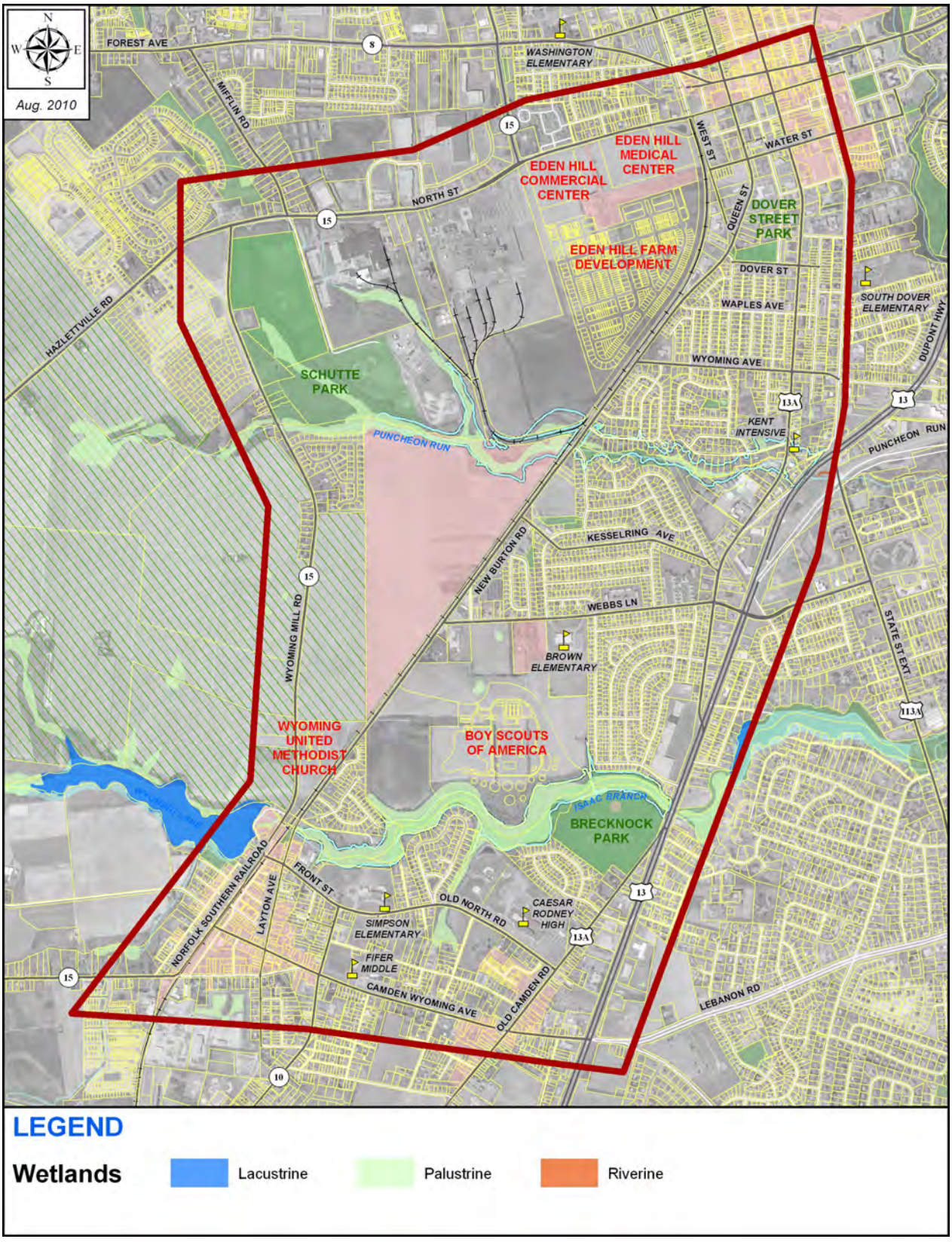


Figure IV-7 – Locations of Waterways, Wetlands and Floodplains

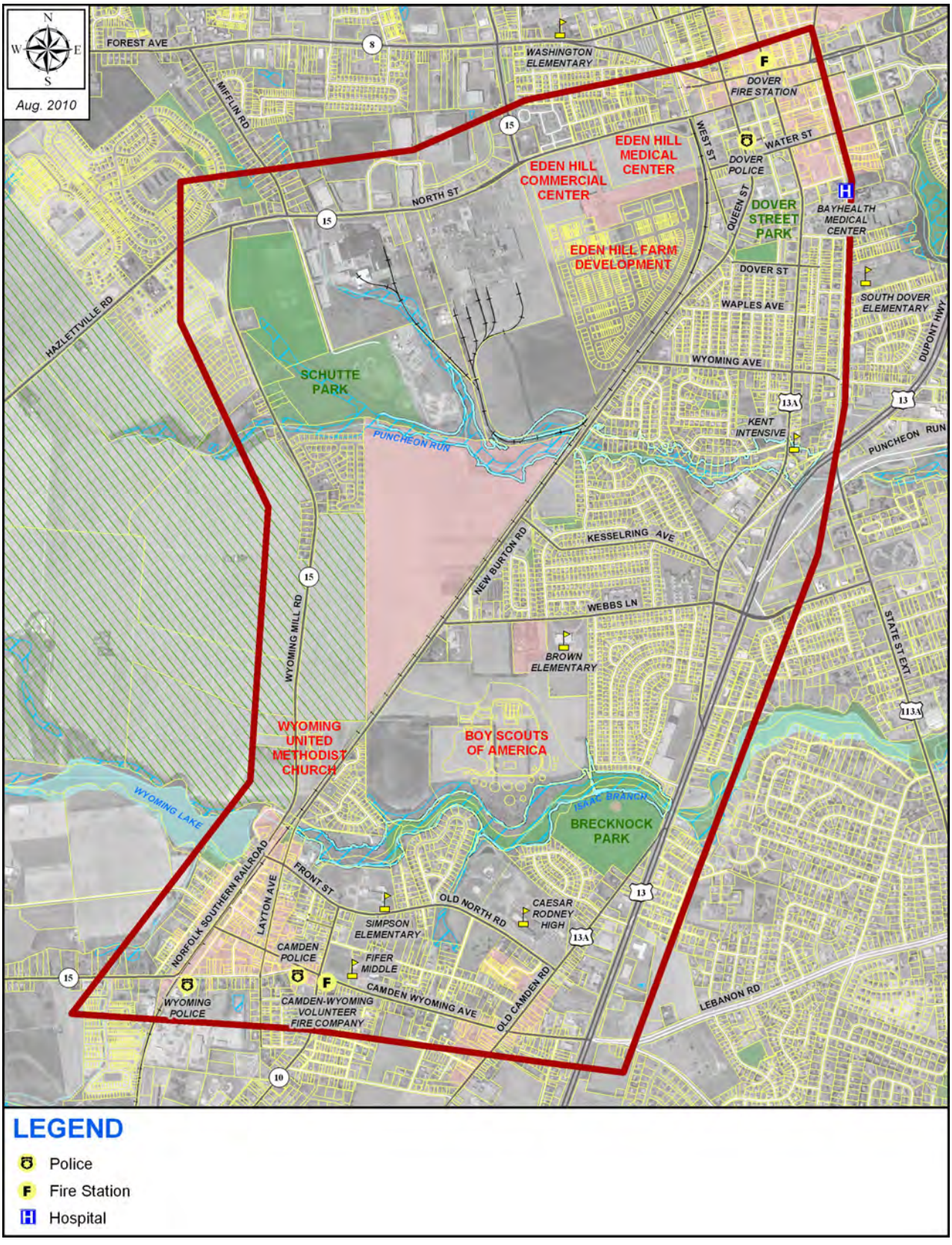


Figure IV-8 – Existing Community Facilities

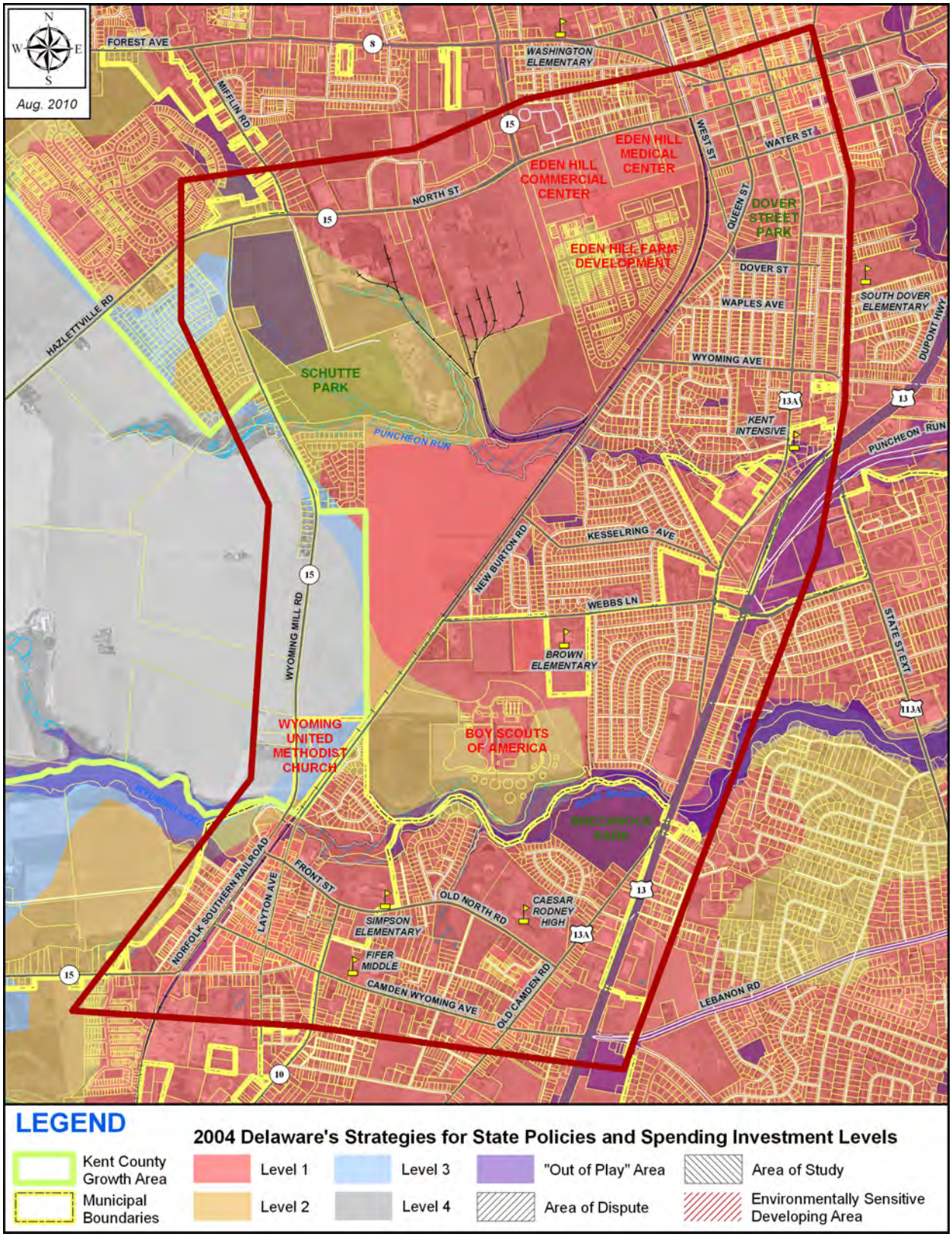


Figure IV-9 – Planning Information

Figure IV-10 – 2002 Land Use Land Cover Information

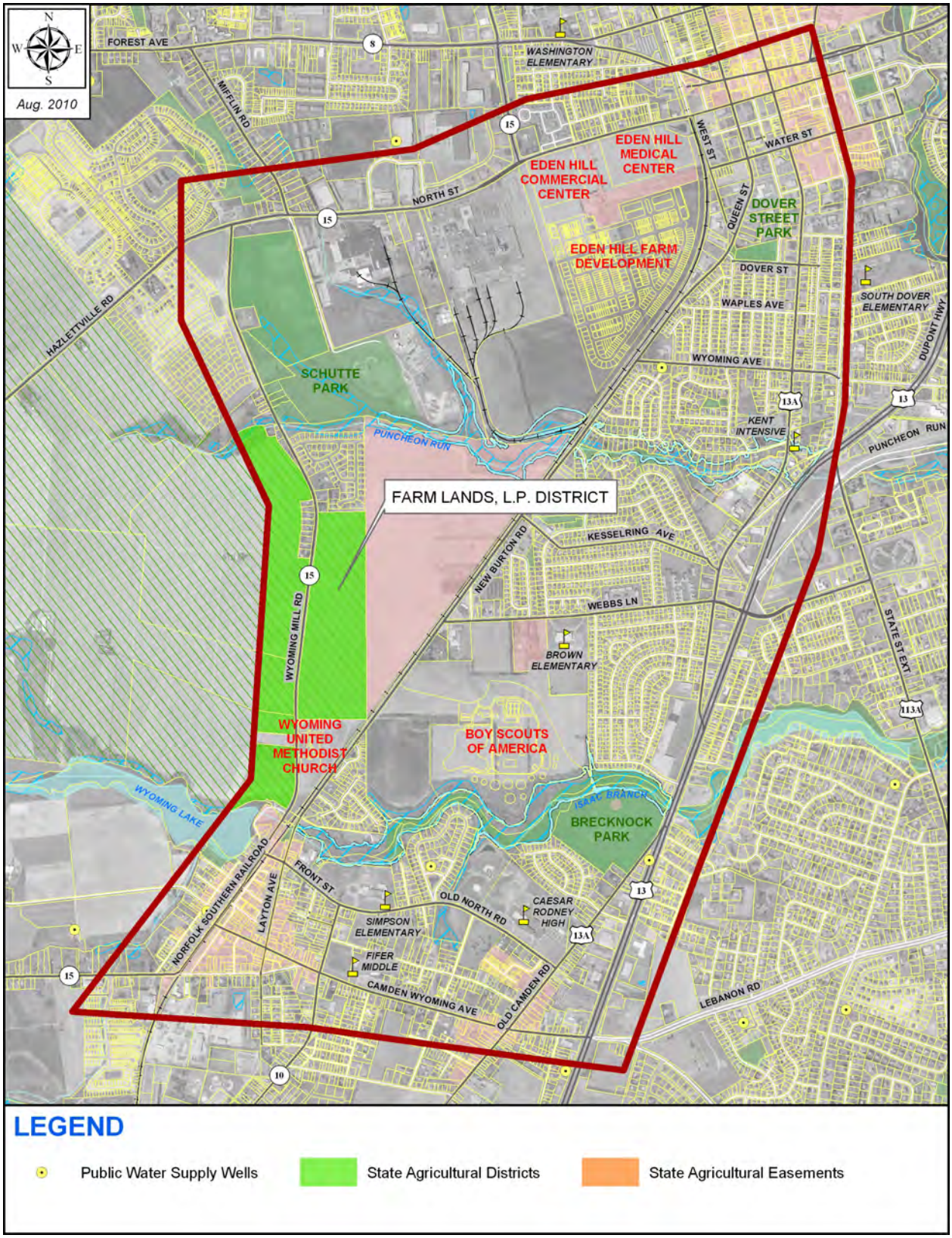


Figure IV-11 – Agricultural Preservation Lands

- Public wells and recharge areas – Public wells and well-head protection areas were identified and mapped in the study area. The capability of land in the study area to allow for the infiltration of precipitation and runoff to the groundwater, also known as recharge, was mapped using U.S. Department of Agriculture soils information. Most of the study area provides good to excellent recharge capability. Figure IV-12 illustrates the public wells and recharge capability in the study area.

- Historic and archaeological resources – Resources in the study area that are currently on the National Register of Historic Places include the Eden Hill Farm House, the Wyoming Railroad Station, the Camden Friends Meeting House, and the Historic Districts of Victorian Dover, Camden and Wyoming. Other inventoried structures and sites in the study area were also mapped. Figure IV-13 illustrates the historic and archaeological resources in the study area on DE SHPO records for the study area as of June 2004 which include listed, eligible and inventoried structures and archaeological sites..

- Sites of contamination concern – Facilities that store, handle or dispose of contaminated or hazardous materials were mapped in the study area. Figure IV-14 illustrates the sites of potential contamination concern in the study area.

- Air quality – Kent County is classified by the U.S. Environmental Protection Agency as nonattainment for ozone. The County does not meet the National Ambient Air Quality Standards for ozone. The West Dover Connector project is contained in the currently adopted Dover/Kent County MPO's 2011 – 2014 Transportation Improvement Program (TIP) and is shown as a Committed Project.

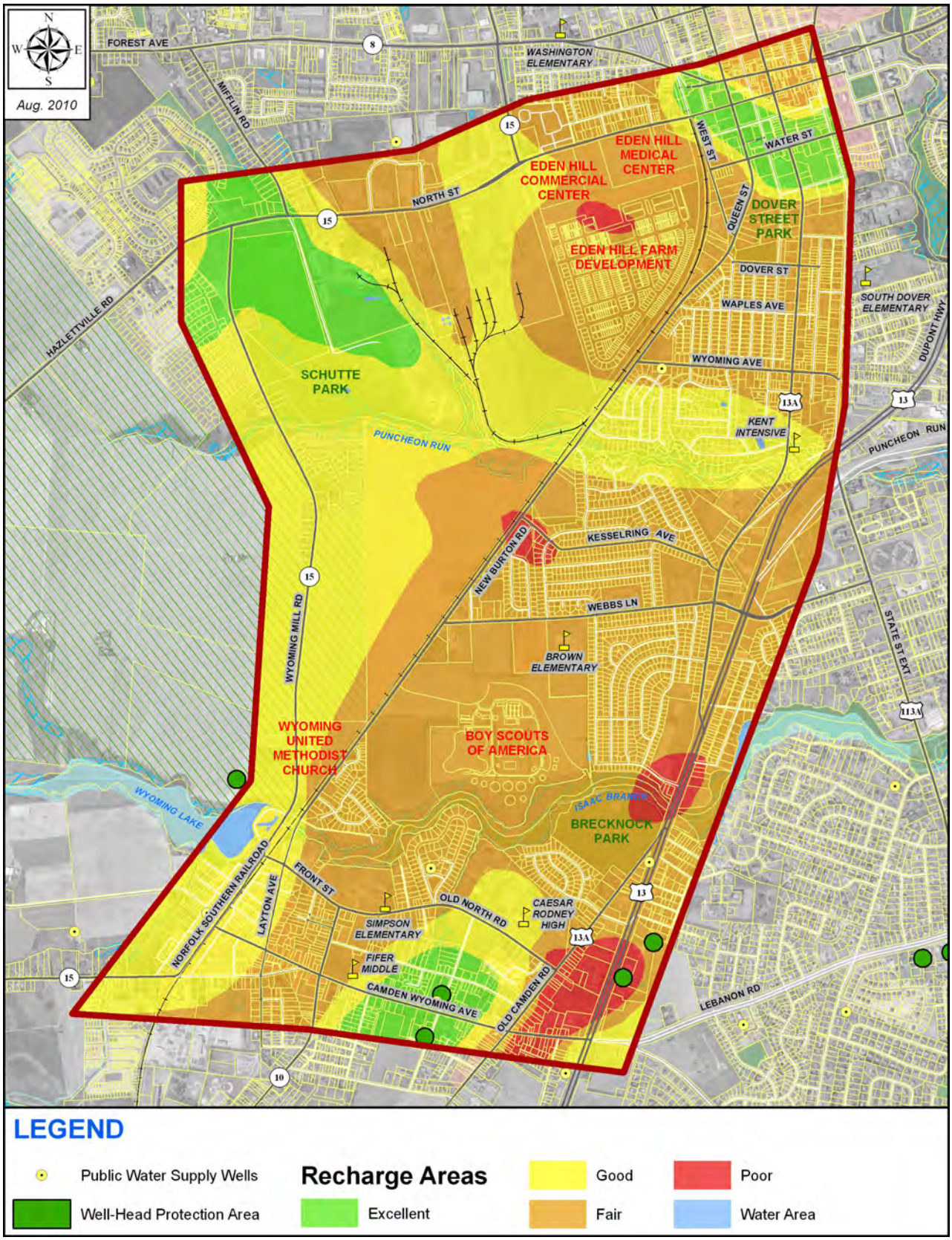


Figure IV-12 – Public Wells and Recharge Areas

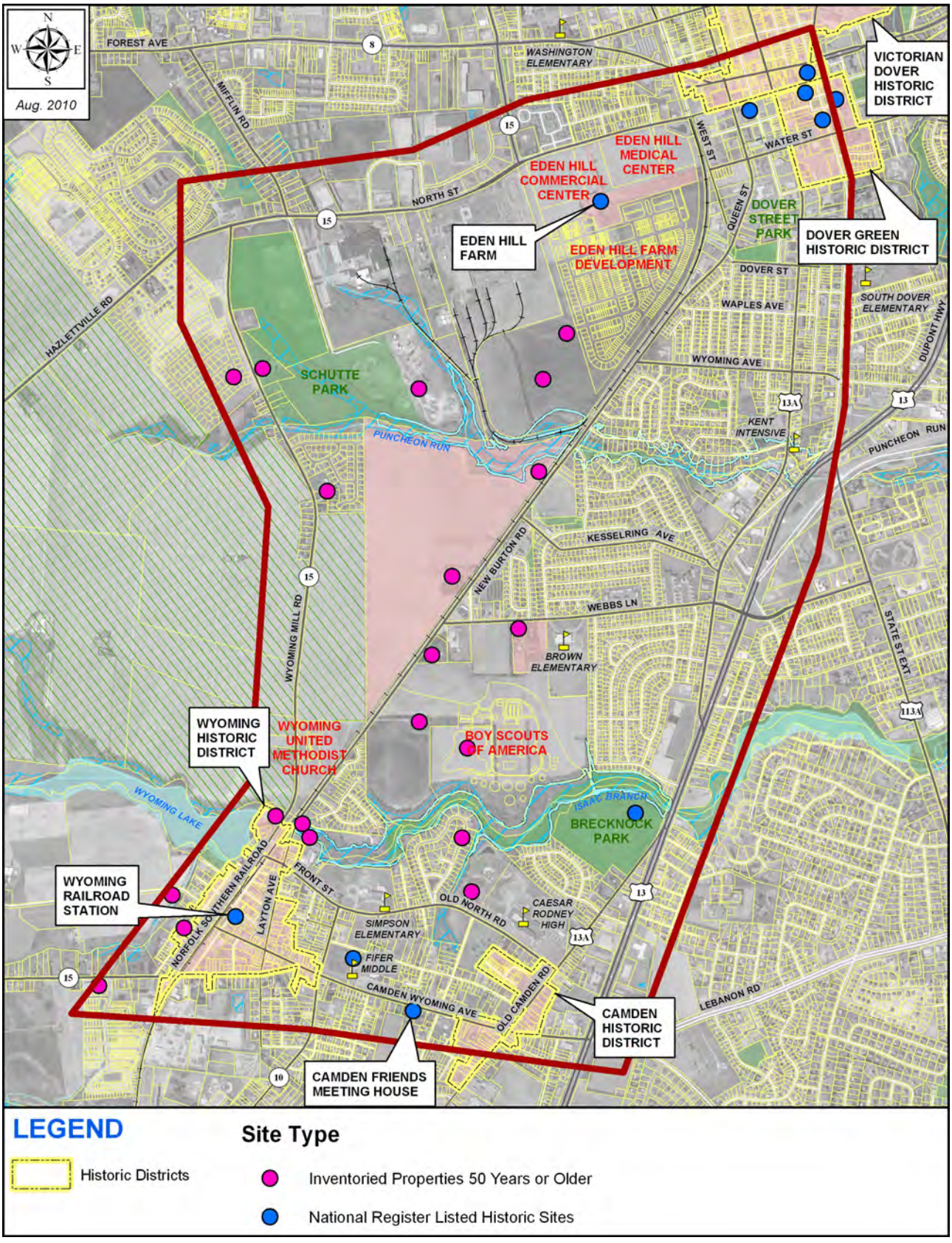


Figure IV-13 – Historic and Archaeological Sites

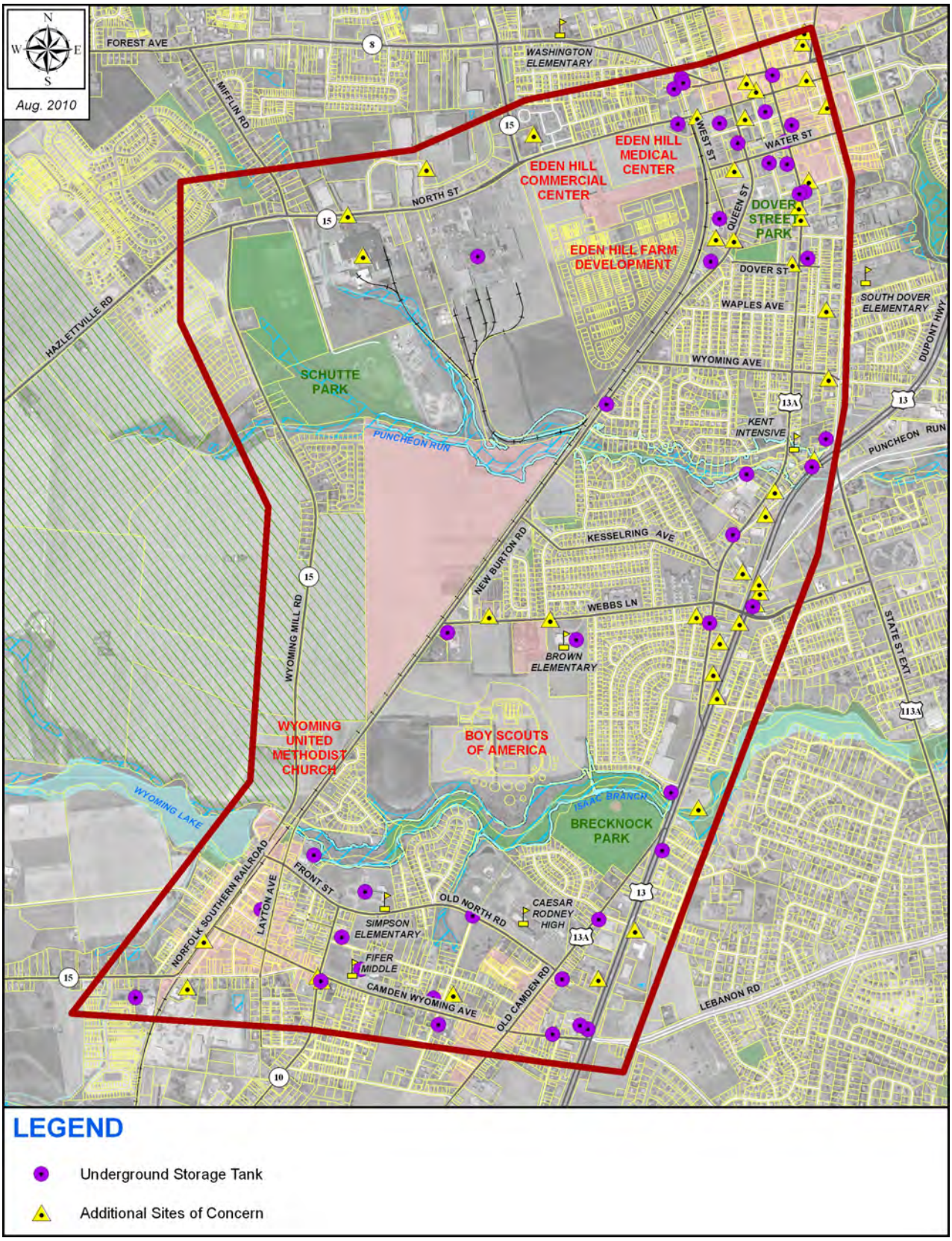


Figure IV-14 – Potential Contamination Concerns

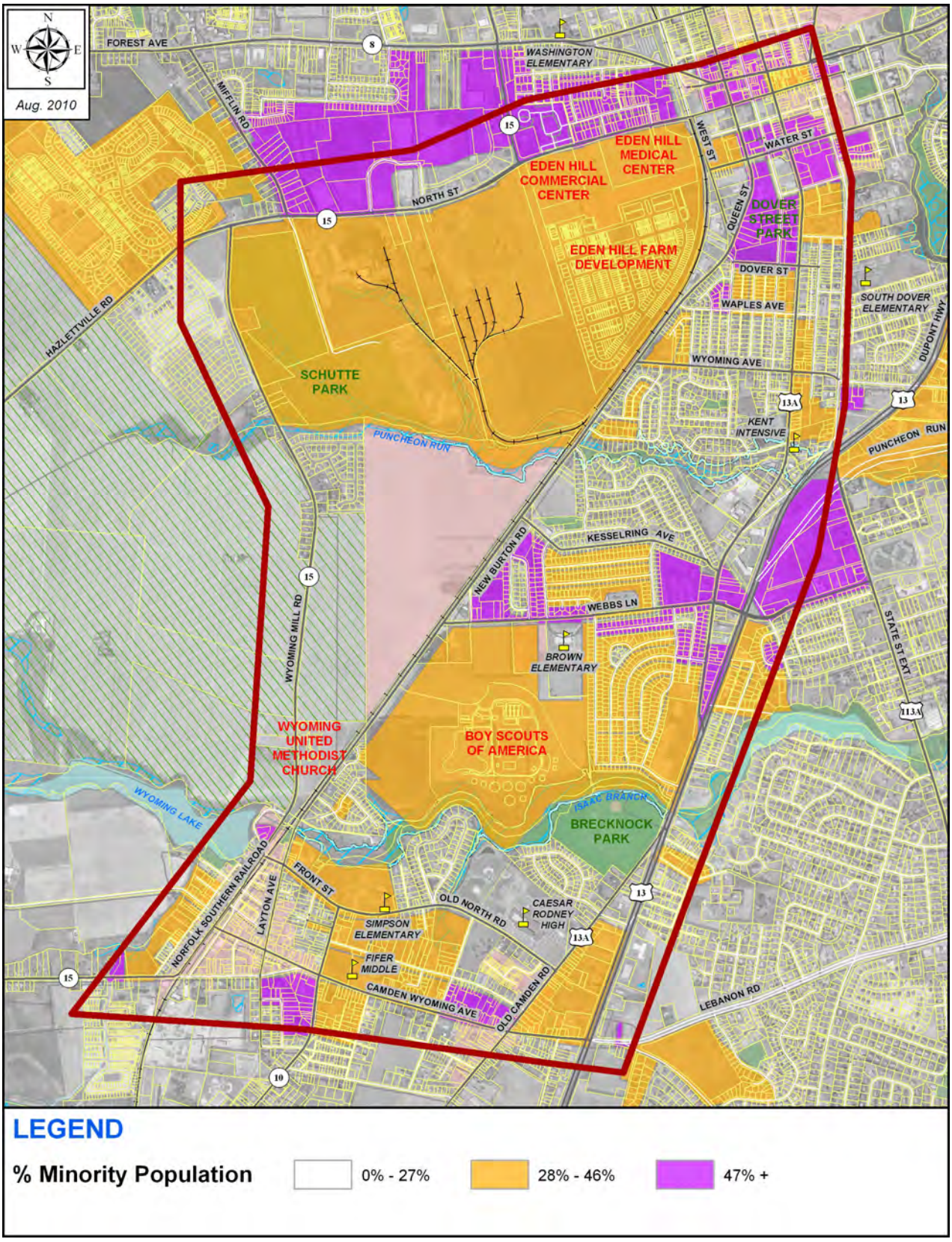


Figure IV-15 – Minority Households

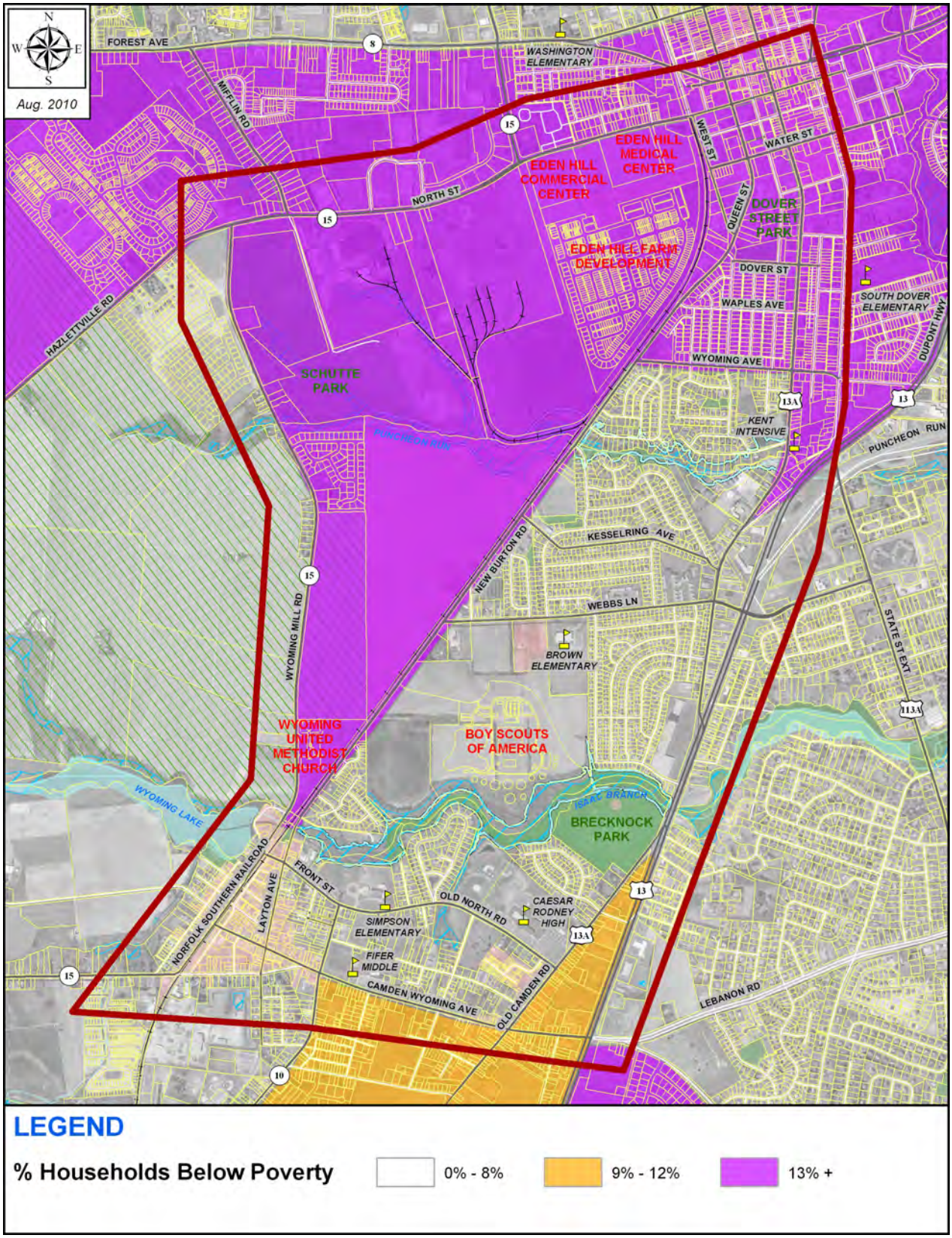


Figure IV -16 – Low-Income Households

iii. Natural and Built Environmental Impact Matrices

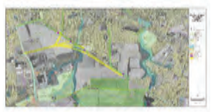
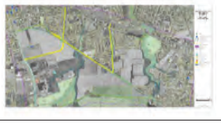
The natural and built environment features were used to develop and evaluate preliminary alternatives and identify fatal flaws. An Environmental Data Matrix and an Environmental Scoring Sheet were developed as ways of presenting the performance of each preliminary alternative and enabling comparison of the alternatives in terms of environmental impacts. Tables IV-6 and IV-7 present the Scoring Sheet and Data Matrix, respectively.

The environmental factors used in this screening evaluation included: property impacts (number of displacements and number of partial impacts), area of floodplain impacts, linear feet of waterway impact, area of wetland impacts, area of impact on agricultural preservation lands, and ability to achieve parkland connectivity. Impacts were quantified on the Data Matrix. The Scoring Sheet uses symbols to interpret the impacts of one alternative compared to another (e.g., none, least, moderate and most). The Scoring Sheet does not rank the alternatives but compares the relative impacts of each alternative.

All environmental factors except park connectivity were examined in terms of quantifiable impacts (i.e., acres or linear feet of impact). Park connectivity is defined as the relative ability of each alternative to improve multimodal travel between parks and between local communities and the parks. For the purpose of this screening evaluation two parks were considered: Schutte Park and Brecknock Park. Preliminary Alternatives demonstrating the ability to improve connectivity to the two parks received the highest score (most benefit); those with potential connectivity to one park received a low score (least benefit); and those with no potential connectivity to the parks received the lowest score (no benefit).

Section IV.D describes the findings of the Step Two evaluation, including the performance of the preliminary alternatives in terms of the environmental factors.

WEST DOVER CONNECTOR STUDY: ENVIRONMENTAL IMPACTS SCORING SHEET

Preliminary Alternative/ Concept Number & Description	Map	Number of Displacements	Acreage of Right of Way Required	Impacts to Streams	Impacts to Wetlands	Impacts to Floodplains	Impacts to Agricultural Land	Ability to Achieve Park Connectivity *
Preliminary Alternative 1								
No-Build		●	●	●	●	●	●	○-
Preliminary Alternative 2 - To New Burton Rd.								
Preliminary Alternative 2A		○	◉	●	●	●	●	○
Preliminary Alternative 2B		◉	◉	●	●	●	●	○
Preliminary Alternative 2C		◉	◉	●	○	○	●	○
Preliminary Alternative 2D		●	○-	◉	○-	○-	●	○
Preliminary Alternative 3								
Tie in to Wyoming Avenue to US 13		○	◉	●	●	●	●	○
Preliminary Alternative 4								
Tie in to Webbs Lane to US 13; Auxiliary Connection to Wyoming Mill Road		◉	○-	◉	○-	○-	◉	◉
Prelim. Alt. 5 -Tie in to (or in the vicinity of) Charles Polk Rd to US 13; Auxiliary Connection to Wyoming Mill Road								
Preliminary Alternative 5A		○-	○-	◉	○-	○-	◉	●
Preliminary Alternative 5B		○	○-					
Preliminary Alternative 5C**		○	○-					
Preliminary Alternative 5C Spur		○	○-	○	○-	○-	◉	●
Concept 6								
Bypass Around Towns of Camden & Wyoming to US 13								
Preliminary Alternative 7 -Connect to New Burton Road North of Wyoming Avenue, Use New Burton Road & Connect to (or in the vicinity of) Charles Polk to US 13								
Preliminary Alternative 7A		○-	○	●	●	◉	●	◉
Preliminary Alternative 7B		○-	○					
Preliminary Alternative 7C**		○-	○					
Preliminary Alternative 7C Spur		○-	○-	◉	◉	○	●	◉
Preliminary Alternative 7D								
Connect to New Burton Road North of Wyoming Avenue, Use New Burton Road & Connect to Webbs Lane to US 13		◉	◉	●	●	◉	●	◉
Concept 8								
Connect Wyoming Mill Road to Webbs Lane to US 13								
Concept 9								
Connect Wyoming Mill Road to (or in the vicinity of) Charles Polk Road to US 13								
Concept 10								
Widen North Street from Saulsbury Road to Governors Avenue								
Preliminary Alternative 11								
Transportation System Management Improvements		◉	◉	●	●	●	●	○-
Prelim. Alt. 12 -Extend saulsbury Road, connect to New Burton Road. Relocate the railroad .								
Prelim. Alt. 12A - Connect to Webbs Lane		◉	○	◉	○	○	◉	○
Prelim. Alt. 12B - Connect in the vicinity of Charles Polk Road		○	○-					◉
Concept 13								
Extend Saulsbury Road, connect to Wyoming Mill Road; swing around Wyoming Lake, Camden and Wyoming; connect to US 13 in the vicinity of Briar Park								
Concept 14A								
Capacity Improvement along Existing Roads: Wyoming Avenue, New Burton Road and Webbs Lane								
Preliminary Alternative 14B								
Capacity Improvement along Existing Roads: Wyoming Avenue, New Burton Road and Webbs Lane		◉	◉	●	●	●	●	◉

Legend

●	No Displacements and No Right of Way Required / No Impacts to Stream/Wetlands/Floodplains/Agricultural Land
◉	Least Number of Displacements and Minimal Right of Way Required / Minimal Impacts to Streams/Wetlands/Floodplains/Agricultural Land
○	Moderate Number of Displacements and Right of Way Required / Moderate Impacts to StreamsWetlandsFloodplains/Agricultural Land
○-	Most Number of Displacements and Right of Way Required / Highest Impacts to Streams/Wetlands/Floodplains/Agricultural Land

* Project Team is assuming parklands are developed in Eden Hill Farm as per Becker Morgan Group's current Master Plan Concept Map

**Graphic in Column 2 shows all subset alternatives: A, B, C and Spur.

Note: Shading identifies DelDOT selected alternatives to be retained for detailed study.

Table IV-6

CONCEPT STAGE ENVIRONMENTAL IMPACTS DATA MATRIX

PRE. ALT./ CONCEPT	PROPERTY IMPACTS									FLOOD-PLAIN (acres)	STREAMS (linear feet)	WET-LANDS (acres)	AG. DISTRICT (acres)	Pavement Construction (lf)		Bridge (sf) 60' width
	DISPLACEMENTS (ea)				PARTIAL IMPACTS (ea)				TOTAL ACRES							
	Residential	Commercial	Industrial	Total	Residential	Commercial	Industrial	Total	(Per Concept)					New	Existing	
1																
2A	12	1	0	13	13	3	5	21	11.62	0.00	0	0.00	0.00	1800	4400	7200
2B	7	1	0	8	16	1	1	18	11.86	0.00	0	0.00	0.00	2800	2350	19200
2C	1	0	0	1	4	1	1	6	13.07	1.10	75	0.10	0.00	3266	1134	42000
2D	0	0	0	0	2	1	2	5	36.62	2.05	75	0.95	0.00	10800	0	63600
3	11	1	0	12	48	4	1	53	14.11	0.00	0	0.00	0.00	1600	5400	12600
4	2	3	0	5	51	6	2	59	39.25	3.26	75	0.95	3.10	8816	9080	58500
5A	17	4	0	21	5	7	3	15	47.13	2.05	75	0.95	2.80	12157	1450	63600
5B	15	0	0	15	4	4	4	12	48.39	2.05	75	0.95	3.20	13527	1450	63600
5C	14	0	0	14	4	7	1	12	51.62	2.05	75	0.95	2.70	14868	0	63600
5C Spur	0	0	0	0	0	1	0	1	57.32	3.32	195	1.96	2.70	16513	0	85800
6																
7A	24	3	0	27	27	11	5	43	30.96	0.08	0	0.00	0.00	7000	9050	19200
7B	22	1	0	23	28	10	5	43	29.66	0.08	0	0.00	0.00	6900	9900	19200
7C	22	1	0	23	28	10	5	43	30.99	0.08	0	0.00	0.00	7250	10250	19200
7C Spur	0	0	0	0	0	1	0	1	36.69	1.35	120	1.01	0.00	8895	0	41400
7D	7	1	0	8	75	13	4	92	16.17	0.08	0	0.00	0.00	3300	10370	19200
8																
9																
10																
11	-	-	-	0	-	-	-	-	-	-	-	-	-	1500	0	-
12A	1	0	0	1	48	11	2	61	31.3	1.19	75	0.10	1.82	3266	8366	65700
12B	15	1	0	16	7	2	1	10	43.9	1.19	75	0.10	1.82	7216	7066	65700
13																
14A																
14B	7	1	0	8	127	17	4	148	17.67	0	0	0	0	3300	15040	19200

C. STEP TWO - CIVIL ENGINEERING PERFORMANCE

i. Methodology and Tools Used

Conceptual alignments of the preliminary alternatives were engineered during Step Two using standard methods of highway engineering practice, supported by current AASHTO design guidelines. Preliminary horizontal alignments and vertical profiles were based on initial design speed assumptions described below. Activities included locating the conceptual structural footprint for bridges and verifying that the locations were theoretically suitable for structures. The conceptual length of bridge structures and limits of retaining walls were calculated. Connection points to New Burton Road and other local roadways were determined and presented with the alignments.

ii. Description of Civil Engineering Assumptions and Factors Considered

Design Speed

A design speed of 40 mph (40 mph design speed) was used for vertical and horizontal curves along the mainline. This was deemed appropriate for the future connector road, which is likely to be categorized as a major collector. The posted speed limit may be 30 to 35 miles per hour (mph). A design speed of 30 mph for horizontal curves on ramps and auxiliary roads was also assumed.

Typical Roadway Section

The connector road would be constructed as a boulevard or parkway type facility that serves multiple modes of transportation, including personal vehicles, transit, walking, and bicycling. The ultimate typical section may call for up to four lanes of vehicular traffic. Portions that pass through residential areas may require a center turn lane, and the travel demand model could indicate that up to four travel lanes may be required to accommodate demand. The road is envisioned as having a wide grassed or landscaped median, in which left-turn bays can be constructed if required. In addition, sidewalks and wider shared-use paths are also being considered.

A 150-foot bandwidth was assumed along those areas where the connector road would traverse new alignments. This width is more than sufficient to accommodate the ultimate typical section described above. The corridor bandwidth was narrowed to 100 feet in the immediate vicinity of any New Burton Road connection and narrowed further to 80 feet along any existing roadway alignment (Wyoming Avenue, Webbs Lane and Charles Polk Road). Initial concepts were developed showing what the elevated roadway might look like in the vicinity of a flyover. There are options to build the roadway on fill or to minimize impacts and use retaining walls. Those concepts are shown in Figures IV-17 and IV-18.

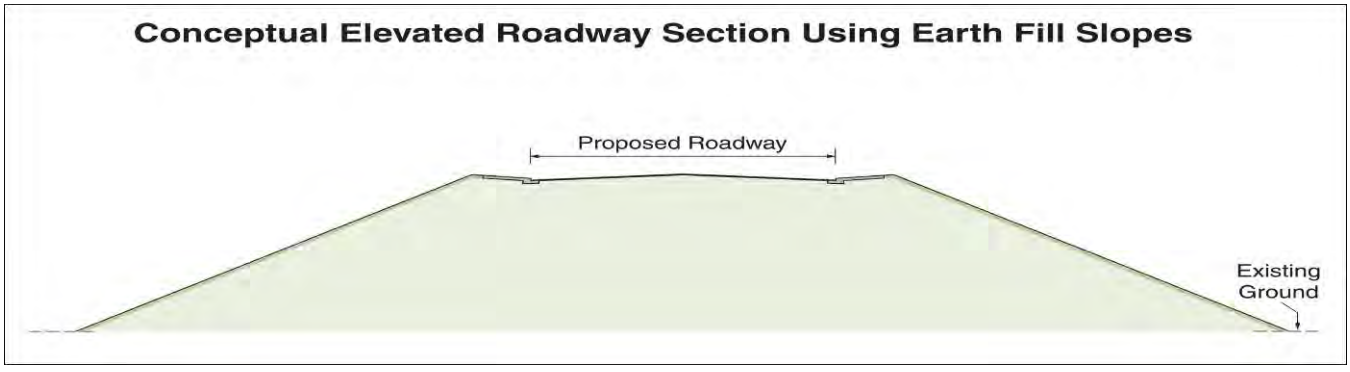


Figure IV-17 – Conceptual Elevated Roadway Section Using Earth Fill Slopes

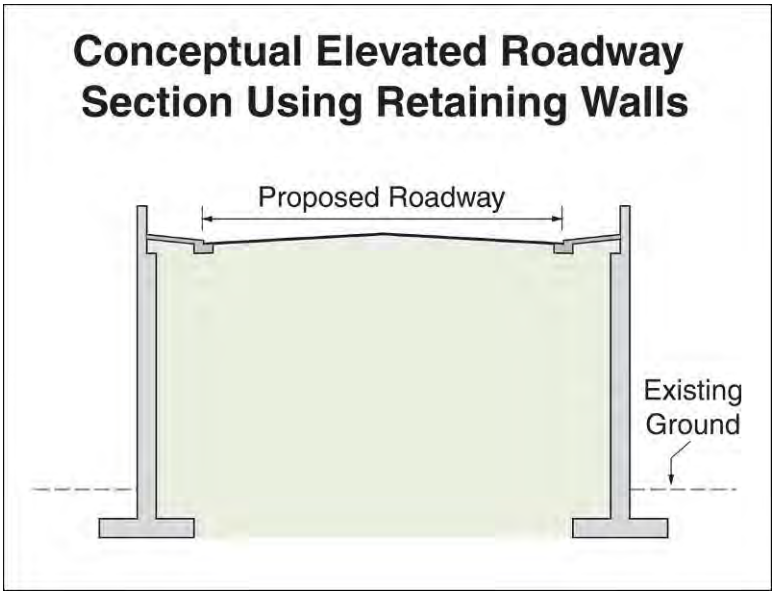


Figure IV-18 – Conceptual Elevated Roadway Section Using Retaining Walls

Roadway Profile and Bridge Structures

Profile development was restricted to those areas immediately adjacent to any structure over the Norfolk Southern Railroad and New Burton Road. Using the 40 mph design speed and clearance requirements from Norfolk Southern Railroad, a roadway profile was developed to assist in determining the impacts to adjacent properties in the immediate vicinity of any proposed structure. Figure IV-19 shows that the proposed roadway surface is approximately 30 feet above the elevation of the railroad tracks.

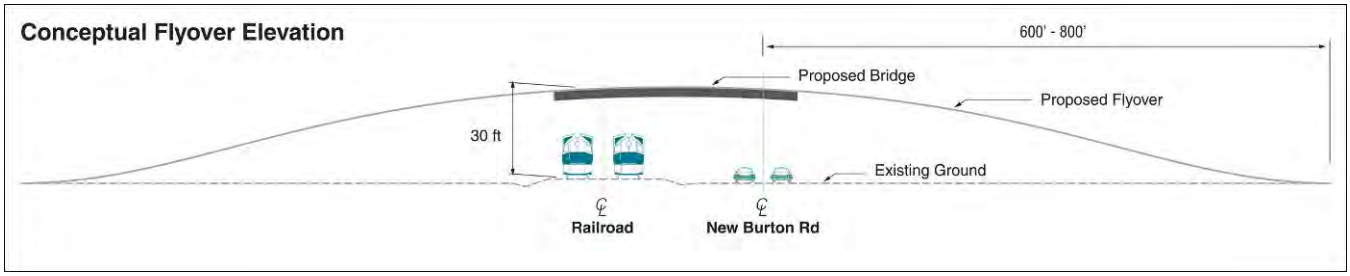


Figure IV-19 – Conceptual Flyover Elevation (40 mph design speed)

The preliminary alternatives that run on new alignment west of New Burton Road all contain some type of elevated bridge structure that would cross a Norfolk Southern Railroad spur, Puncheon Run and ultimately New Burton Road. The required under-clearance over the railroad for these structures is 23'-6."

Section IV.D describes the findings of the Step One and Two evaluations, including the performance of the preliminary alternatives in terms of the civil engineering factors.

D. STEPS ONE AND TWO - DISCUSSION OF CONCEPTS AND ALTERNATIVES

A discussion of the performance of each concept and preliminary alternative in the Step One and Step Two evaluation processes is presented in this section. Included in each discussion are the following elements:

- Step One - A discussion of the performance of each concept in terms of specific elements of the project Purpose and Need;
- Step Two - A discussion of the performance of each preliminary alternative in terms of environmental and civil engineering factors; and
- The input received from the Working Group, environmental resource agencies and the general public regarding the concepts and preliminary alternatives.

Terms presented in quotes (“ “) denote the scoring results as presented on the Scoring Sheets, Tables IV-1, IV-3 and IV-6.

Preliminary Alternative 1: No-Build

2030 Traffic Performance, Steps One and Two: Study area traffic circulation patterns under the future No-Build alternative would remain similar to the existing condition. However, significantly higher traffic volumes would circulate around the Eden Hill Farm parcel and Schutte Park. The performance of the North Street intersections would significantly deteriorate due to higher volumes. Also, there would be considerably more cut-through traffic compared to existing conditions, and there would be “no” improvement in mobility and access across the Norfolk Southern railroad in the study area.

Environmental Performance, Steps One and Two: No new displacements, required right-of-way acreage, impacts to streams, wetlands, floodplains, or preserved agricultural lands. No change in park connectivity.

Civil Engineering Factors, Steps One and Two: None.

Working Group Input, Steps One and Two: Would not address project Purpose and Need; would avoid environmental impacts; no new cost.

Resource Agency Input, Steps One and Two: Alternative 1 would have minimal natural environmental impacts as there would be no new crossing of Puncheon Run or Isaac Branch; no impact on cultural resources.

Public Input, Steps One and Two: Mixed support for the No-Build Alternative; would not resolve peak traffic problems; would exacerbate access and circulation problems at South Governors Avenue, Webbs Lane, New Burton Road and Wyoming Avenue.

The No-Build Alternative has been used as a baseline for comparing the extent of benefits achieved by the remaining Concepts and Preliminary Alternatives.

Preliminary Alternative 2A

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 2A would provide high circulation benefits as circuitous trips around the Eden Hill Farm parcel would almost be eliminated due to extension of Saulsbury Road to New Burton Road. Circuitous trips around Schutte Park would also be reduced slightly. High North Street intersection performance improvement would occur as significant turning movements at the North Street intersections would be converted to through movements at the intersection of North Street and Saulsbury Road. Since the extension of Saulsbury Road would terminate at New Burton Road, it would bring higher traffic volumes to New Burton Road without a connection to US 13. Thus, negative impacts in terms of traffic would be expected along Camden-Wyoming Avenue and also negative impacts with respect to cut-through traffic on roads between New Burton Road and Governors Avenue. Since Alternative 2A would provide a grade separated crossing of the Norfolk Southern Railroad within the study area, there would be high improvement in mobility and access across the railroad.

Environmental Performance, Steps One and Two: "Moderate" number of displacements; "least" acreage of right-of-way required; "no" impacts to streams, wetlands, floodplains or preserved agricultural lands; "least" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: This is one of the shortest connectors in terms of new roadway length. Grade separation would be obtained by elevating New Burton Road to meet the new connector road flying over the railroad. The railroad crossing would be located at the existing storage yard, where four tracks need to be crossed, instead of the typical two. Because of the requirements for vertical clearance over the railroad and the existing roadway profile of New Burton Road, the tie-in point at the southern end of the structure would extend back across the existing bridge over Puncheon Run. As a result, the elevated-T structure configuration that is envisioned for Preliminary Alternative 2A would be disproportionately large. This is seen as a fatal flaw from an engineering standpoint.

Working Group Input, Steps One and Two: Preliminary Alternative 2A does not meet the goals and objectives established by the Working Group (does not connect to US 13 or have enough traffic benefits). The Working Group voted unanimously to eliminate Preliminary Alternative 2A from further study.

Resource Agency Input, Steps One and Two: This alternative would have minimal natural environmental impacts as there would be no new crossing of Puncheon Run or Isaac Branch.

Public Input, Steps One and Two: Would have less impact on the environment, farmland, businesses and residents; seems more direct with less possibility for congestion and accidents; would put traffic in residential areas with no plan; would not connect to US 13; would increase traffic on New Burton Road; property impacts.

Preliminary Alternative 2B

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 2B would also provide circulation benefits as circuitous trips around Eden Hill Farm would almost be eliminated due to the extension of Saulsbury Road to New Burton Road. Circulatory trips around Schutte Park would also be reduced slightly. The performance of the North Street intersections would improve greatly as significant turning movements would be converted to through movements at the intersection of North Street and Saulsbury Road. Since the extension of Saulsbury Road would terminate at New Burton Road, Preliminary Alternative 2B would bring higher traffic volumes to New Burton Road without a connection to US 13. Thus, there would be negative impacts in terms of traffic along Camden-

Wyoming Avenue and cut-through traffic on roads between New Burton Road and Governors Avenue would increase. Since Preliminary Alternative 2B would provide a grade-separated crossing of the Norfolk Southern Railroad within the study area, mobility and access would improve greatly across the railroad.

Environmental Performance, Steps One and Two: "Least" number of displacements; "least" acreage of right-of-way required; "no" impacts to streams, wetlands, floodplains or preserved agricultural lands; "least" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: Preliminary Alternative 2B, also short in comparison to the others, includes a flyover of the four railroad tracks just north of Wyoming Avenue. The bridge structure would span the four tracks, swing to the north and tie-down to existing ground near the Waples Avenue intersection with New Burton Road. It would require retaining walls along New Burton Road and Wyoming Avenue. This alignment would displace seven residential properties and a church. Preliminary Alternative 2B would avoid adverse effects to the Puncheon Run and Isaac Branch waterways.

Working Group Input, Steps One and Two: Preliminary Alternative 2B does not meet the goals and objectives established by the Working Group (does not connect to US 13 or have enough traffic benefits). The Working Group voted unanimously to eliminate Preliminary Alternative 2B from further study.

Resource Agency Input, Steps One and Two: Preliminary Alternative 2B would have minimal natural environmental impacts as there would be no new crossing of Puncheon Run or Isaac Branch.

Public Input, Steps One and Two: Would put traffic in residential areas with no plan; would not connect to US 13; would increase traffic on New Burton Road; property impacts.

Preliminary Alternative 2C

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 2C would also provide high circulation benefits as circuitous trips around Eden Hill Farm would almost be eliminated due to the extension of Saulsbury Road to New Burton Road. Circulatory trips around Schutte Park would also be reduced slightly. The performance of the North Street intersections would improve greatly as significant turning movements would be converted to through movements at the intersection of North Street and Saulsbury Road. Since the extension of Saulsbury Road would terminate at New Burton Road, it would bring higher traffic volumes to New Burton Road without a connection to US 13. Thus, there would be negative impacts in terms of traffic along Camden-Wyoming Avenue and with respect to cut-through traffic on roads between New Burton Road and Governors Avenue. Since 2C would provide a grade-separated crossing of the Norfolk Southern Railroad within the study area, mobility and access across the railroad would improve greatly.

Environmental Performance, Steps One and Two: "Least" number of displacements; "least" acreage of right-of-way required; "no" impacts to streams or preserved agricultural lands; "moderate" impacts to wetlands and floodplains; "least" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: Preliminary Alternative 2C would cross a Norfolk Southern Railroad spur, the railroad mainline, New Burton Road and Puncheon Run on one 700-foot-long elevated structure. The bridge would touch down south of Blue Beach Road on the Capital Baptist Church and Christian School property. The structure height would be exacerbated relative to the

existing road due to the elevation difference between the railroad and the roadway. Minimum clearance requirements over the railroad would govern the height of the structure.

Working Group Input, Steps One and Two: Preliminary Alternative 2C does not meet the goals and objectives established by the Working Group (does not connect to US 13 or have enough traffic benefits). The Working Group voted unanimously to eliminate Preliminary Alternative 2C from further study.

Resource Agency Input, Steps One and Two: None.

Public Input, Steps One and Two: Less impact on the environment, farmland, businesses and residents; seems more direct with less possibility for congestion and accidents; would put traffic in residential areas with no plan; would not connect to US 13; would increase traffic on New Burton Road; property impacts.

Preliminary Alternative 2D

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 2D would provide "moderate" circulation benefits as circuitous trips around Eden Hill Farm would be moderately reduced due to the extension of Saulsbury Road and its connection to New Burton Road in the southern portion of the study area in the vicinity of Webbs Lane. Circuitous trips around Schutte Park would also be reduced moderately. The performance of the North Street intersections would improve greatly as significant turning movements would be converted to through movements at the intersection of North Street and Saulsbury Road. Since the extension of Saulsbury Road would terminate at New Burton Road, it would bring higher traffic volumes to New Burton Road without connecting to US 13. Thus, there would be negative impacts in terms of traffic along Camden-Wyoming Avenue and with respect to cut-through traffic on roads between New Burton Road and Governors Avenue. Since this alternative would provide a grade-separated crossing of the Norfolk Southern Railroad within the study area, mobility and access across the railroad would improve greatly.

Environmental Performance, Steps One and Two: "No" displacements; "most" acreage of right-of-way required; "moderate" impacts to streams; "most" impacts to wetlands and floodplains; "no" impacts on preserved agricultural lands; "least" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: Preliminary Alternative 2D would run on new alignment parallel to New Burton Road with one 800-foot-long structure over a railroad spur and Puncheon Run, and would require a second flyover structure over the mainline railroad and New Burton Road south of Webbs Lane. Preliminary Alternative 2D contains two structures and significant new roadway alignment, but still has no direct connection to US 13.

Working Group Input, Steps One and Two: Preliminary Alternative 2D would not meet the goals and objectives established by the Working Group (does not connect to US 13 or have enough traffic benefits). The Working Group voted unanimously to eliminate Preliminary Alternative 2D from further study.

Resource Agency Input, Steps One and Two: None.

Public Input, Steps One and Two: Would not provide a bike/pedestrian connection between the south Dover neighborhoods and Schutte Park; would put traffic in residential areas with no plan; would not connect to US 13; would increase traffic on New Burton Road; property impacts.

Preliminary Alternative 3

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 3 would provide high circulation benefits as circuitous trips around Eden Hill Farm would almost be eliminated due to the extension of Saulsbury Road and its connection to Wyoming Avenue and New Burton Road. Circuitous trips around Schutte Park would also be reduced slightly. The performance of the North Street intersections would improve greatly as significant turning movements would be converted to through movements at the intersection of North Street and Saulsbury Road. Since Preliminary Alternative 3 would provide a northerly connection via Wyoming Avenue to US 13, there would not be any significant reduction in traffic volumes along Camden-Wyoming Avenue. The connector would be too far north to make any noticeable change. Cut-through traffic would be moderately reduced, especially along Dover Street and Kesselring Avenue, since the traffic would be channelized along an improved Wyoming Avenue corridor due to the new connector road. Since Preliminary Alternative 3 would provide a grade-separated crossing of the Norfolk Southern Railroad within the study area, mobility and access across the railroad would be greatly improved.

Environmental Performance, Steps One and Two: "Moderate" number of displacements; "least" acreage of right-of-way required; "no" impacts to streams, wetlands, floodplains or preserved agricultural lands; "least" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: Preliminary Alternative 3 is very similar to Alternative 2B, but would provide a direct connection to US 13 via an elevated structure along Wyoming Avenue. The touchdown point east of New Burton Road would be approximately 600 to 800 feet to the east, requiring the closure of Holly Drive at New Burton Road. Preliminary Alternative 3 would introduce significant circulation problems within the neighborhood. New connections to New Burton Road would be required to handle the turning movements to and from an elevated structure along Wyoming Avenue.

Working Group Input, Steps One and Two: Preliminary Alternative 3 would address some elements of the project purpose and need, although additional improvements would be needed; community impacts would be high. The Working Group voted unanimously to eliminate Preliminary Alternative 3 from further study.

Resource Agency Input, Steps One and Two: Preliminary Alternative 3 would have minimal natural environmental impacts as there is no new crossing of Puncheon Run or Isaac Branch.

Public Input, Steps One and Two: Would address cut-through traffic without affecting Webbs Lane and the Reilly Brown Elementary School; would use existing roads (a good thing); would put too much traffic on Governors Avenue, New Burton Road, Wyoming Avenue; high residential impacts.

Preliminary Alternative 4

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 4 would provide high circulation benefits as circuitous trips around the Eden Hill Farm parcel would be significantly reduced due to the extension of Saulsbury Road and its connection to Webbs Lane and New Burton Road. Circuitous trips around Schutte Park would be reduced moderately. The performance of the North Street intersections would improve greatly as significant turning movements would be converted to through movements at the intersection of North Street and Saulsbury Road. There would be a significant reduction in traffic volumes along Camden-Wyoming Avenue because Preliminary Alternative 4 would provide an improved parallel connection to US 13 near it. The auxiliary connection from Wyoming Mill Road to the new connector road would help reduce traffic volumes along Camden-Wyoming Avenue. Cut-through

traffic would be moderately reduced, especially along Kesselring Avenue, since the traffic would be channelized along an improved Webbs Lane corridor due to the new connector road. Since Preliminary Alternative 4 would provide a grade-separated crossing of the Norfolk Southern Railroad within the study area, mobility and access across the railroad would be greatly improved.

Environmental Performance, Steps One and Two: "Least" number of displacements; "most" acreage of right-of-way required; "least" impacts to streams; "most" impacts to wetlands and floodplains; "moderate" impacts on preserved agricultural lands; "moderate" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: This alternative would follow an identical alignment to Preliminary Alternative 2D, but it would fly over the railroad at Webbs Lane. As with the connections along Wyoming Avenue, the tie-down point east of New Burton Road is 600-800 feet. The existing Webbs Lane roadway width is approximately 44 feet. A connector road along this corridor would require widening that would impact existing parking along the shoulders and could push back sidewalks and utility poles along both sides of the roadway.

Working Group Input, Steps One and Two: Preliminary Alternative 4 would address some elements of the project purpose and need, although additional improvements would be needed; community impacts would be high; concern for the proximity of the school on Webbs Lane. The Working Group voted to further study Preliminary Alternative 4.

Resource Agency Input, Steps One and Two: None.

Public Input, Steps One and Two: Would provide the most direct route to US 13; cost effective because it would use existing roads; mixed opinion on whether school and related pedestrian safety concerns can be addressed; impact on Webbs Lane and residences; would increase traffic on New Burton Road; connection to Wyoming Mill Road is needed.

Preliminary Alternative 5A

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 5A would provide "moderate" circulation benefits; circuitous trips around Eden Hill Farm would only be moderately reduced because the new connector would provide a more southern connection to Charles Polk Road and New Burton Road. Circuitous trips around Schutte Park would also be reduced moderately. However, the performance of the North Street intersections would improve greatly as significant turning movements would be converted to through movements at the intersection of North Street and Saulsbury Road. There would be a significant reduction in traffic volumes along Camden-Wyoming Avenue as this alternative would provide an improved parallel roadway connection to US 13. The auxiliary connection from Wyoming Mill Road to the new connector road would help reduce traffic volumes along Camden-Wyoming Avenue. Cut-through traffic would be significantly reduced, especially along Kesselring Avenue and Webbs Lane, since the traffic would be channelized along the new connector road. Since Preliminary Alternative 5A would provide a grade-separated crossing of the Norfolk Southern Railroad within the study area, mobility and access across the railroad would be greatly improved.

Environmental Performance, Steps One and Two: "Most" number of displacements; "most" acreage of right-of-way required; "least" impacts to streams; "most" impacts to wetlands and floodplains; "moderate" impacts on preserved agricultural lands; "most" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: Preliminary Alternatives 5A, 5B, 5C, and 5D would follow alignments similar to Alternatives 2D and 4, but would have multiple options for crossing the farm property on the east side of New Burton Road and south of Webbs Lane. From an engineering

standpoint, Preliminary Alternative 5A is the most complex because it would use the Garton Road corridor to connect to Webbs Lane. This area would be entirely reconstructed to elevate existing Garton Road and a portion of Webbs Lane to meet the flyover roadway. Once the connector roadway touched down to existing ground beyond Webbs Lane, it would be "on the ground" across the former farm, now the Boys Scouts, before connecting to Charles Polk Road and US 13. (See the section below on "Connecting to Charles Polk Road.")

Working Group Input, Steps One and Two: Preliminary Alternative 5A would address many elements of the project purpose and need; community impacts would be high, particularly along Charles Polk Road. The Working Group voted to further study Preliminary Alternative 5A.

Resource Agency Input, Steps One and Two: None.

Public Input, Steps One and Two: A connection to US 13; least impact on Reilly Brown Elementary School, Webbs Lane, businesses, and Brecknock Park; mixed opinion about residential impacts; would retain New Burton Road and Queen Street as "local" roads; parallel road to New Burton Road would remove through traffic from it; like the connection to Wyoming Mill Road; too close to the school; Charles Polk Road alignment should not become a barrier for residents north of the road to access Brecknock Park; impact on wetlands and farmlands (now Boy Scouts of America) is a negative.

Preliminary Alternative 5B

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 5B would perform in a similar way as explained under Preliminary Alternative 5A.

Environmental Performance, Steps One and Two: "Moderate" number of displacements; "most" acreage of right-of-way required; "least" impacts to streams; "most" impacts to wetlands and floodplains; "moderate" impacts on preserved agricultural lands; "most" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: Preliminary Alternatives 5A, 5B, 5C, and 5D would follow similar alignments as Alternatives 2D and 4, but have multiple options for crossing the farm property on the east side of New Burton Road and south of Webbs Lane. Preliminary Alternatives 5B and 5C are similar in that they have a flyover that would span the railroad and New Burton Road. Once the connector roadway touched down to existing ground beyond New Burton Road, it would be "on the ground" across the former farm, now the Boys Scouts of America. The connection to Charles Polk Road is similar for Preliminary Alternatives 5A, 5B, 5C, and 5D. (See the section below on "Connecting to Charles Polk Road.")

Working Group Input, Steps One and Two: Preliminary Alternative 5B would address many elements of the project purpose and need; community impacts would be high, particularly along Charles Polk Road. The Working Group voted to further study Preliminary Alternative 5B.

Resource Agency Input, Steps One and Two: None.

Public Input, Steps One and Two: A connection to US 13; least impact on Reilly Brown School, Webbs Lane, businesses, and Brecknock Park; mixed opinion about residential impacts; would retain New Burton Road and Queen Street as "local" roads; parallel road to New Burton Road would remove through traffic from New Burton Road; like connection to Wyoming Mill Road; Charles Polk Road alignment should not become a barrier for residents north of the road to access Brecknock Park; impact on wetlands and farmlands (now Boy Scouts of America) is a negative.

Preliminary Alternative 5C

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 5C would perform in a similar way as explained under 5A.

Environmental Performance, Steps One and Two: "Moderate" number of displacements; "most" acreage of right-of-way required; "least" impacts to streams; "most" impacts to wetlands and floodplains; "moderate" impacts on preserved agricultural lands; "most" ability to achieve park connectivity. Preliminary Alternative 5C would have the "most" natural environmental impacts compared with Preliminary Alternatives 7C and 12B.

Civil Engineering Factors, Steps One and Two: Preliminary Alternative 5C would involve similar engineering factors as explained under Preliminary Alternative 5A. (See the section below on "Connecting to Charles Polk Road.")

Working Group Input, Steps One and Two: Preliminary Alternative 5C would address many elements of the project purpose and need; community impacts would be high, particularly along Charles Polk Road. The Working Group voted to further study Preliminary Alternative 5C.

Resource Agency Input, Steps One and Two: None.

Public Input, Steps One and Two: A connection to US 13; least impact on Reilly Brown School, Webbs Lane, businesses, farmland and Brecknock Park; mixed opinion about residential impacts; would retain New Burton Road and Queen Street as "local" roads; parallel road to New Burton Road would remove through traffic from New Burton Road; plenty of room for grade-separated crossing at the railroad; like connection to Wyoming Mill Road; would open the most land for new development (a positive); Charles Polk Road alignment should not become a barrier for residents north of the road to access Brecknock Park; impact on wetlands and farmlands (now Boy Scouts of America) is a negative.

Preliminary Alternative 5C Spur

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 5C Spur would perform in a similar way as explained under Preliminary Alternative 5A.

Environmental Performance, Steps One and Two: "Moderate" number of displacements; "most" acreage of right-of-way required; "moderate" impacts to streams; "most" impacts to wetlands and floodplains; "moderate" impacts on preserved agricultural lands; "most" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: Crossing Isaac Branch would require a bridge of some length, which has not been determined, as well as major improvements to US 13 at the intersection with the connector. Given the proximity to the existing Charles Polk Road intersection and the bridge on US 13 over Isaac Branch, this could be infeasible.

Working Group Input, Steps One and Two: Preliminary Alternative 5C Spur would address many elements of the project purpose and need; parkland and environmental impacts would be unacceptably high. The Working Group voted unanimously to eliminate Preliminary Alternative 5C Spur from further study.

Resource Agency Input, Steps One and Two: Preliminary Alternative 5C Spur would have unacceptable environmental impacts as there would be a new crossing of Puncheon Run and Isaac Branch, and Brecknock Park would be impacted.

Public Input, Steps One and Two: Too much impact on forested stream adjacent to Brecknock Park; Brecknock Park impact is unacceptable.

Concept 6

2030 Traffic Performance, Steps One and Two: For Concept 6, the new connector road would not provide any connection to New Burton Road or to any other streets between New Burton Road and Governors Avenue within the study area. Thus, there would be "no" significant change in circuitous trips or cut-through traffic volumes in the study area. Some turning movements at the North Street intersections would be converted into through movements, providing "moderate" benefits. Since the new connector alignment would provide an at-grade intersection with Wyoming Mill Road, some traffic on Wyoming Mill Road heading towards/coming from Camden-Wyoming Avenue would shift to the new connector road, providing a "moderate" reduction in Camden-Wyoming Avenue traffic volumes. Concept 6 would not provide a grade-separated crossing of the Norfolk Southern Railroad within the study area, thus, providing "no" improvement in mobility and access across the railroad.

Environmental Performance, Steps One and Two: Environmental performance was not measured as this concept did not meet the purpose and need of the project based on the traffic analysis.

Civil Engineering Factors, Steps One and Two: Civil engineering factors were not analyzed as Concept 6 did not meet the purpose and need of the project based on the traffic analysis.

Working Group Input, Steps One and Two: Concept 6 would not address many elements of the project purpose and need. The Working Group voted unanimously to eliminate Concept 6 from further study.

Resource Agency Input, Steps One and Two: None.

Public Input, Steps One and Two: Generally little support for Concept 6; would connect to US 13 without putting traffic on local streets; seems cost effective; would not address cut-through traffic.

Preliminary Alternative 7A

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 7A would provide high circulation benefits; circuitous trips around Eden Hill Farm would almost be eliminated due to the extension of Saulsbury Road and its northerly connection to New Burton Road. Circuitous trips around Schutte Park would be reduced slightly. The performance of the North Street intersections would improve greatly as significant turning movements would be converted to through movements at the intersection of North Street and Saulsbury Road. There would be a significant reduction in traffic volumes along Camden-Wyoming Avenue as Preliminary Alternative 7A would provide an improved parallel connection to US 13 within the immediate proximity of Camden-Wyoming Avenue. However, since Preliminary Alternative 7A would use New Burton Road, cut-through traffic on roads between New Burton Road and Governors Avenue would increase. Since Preliminary Alternative 7A would provide a grade-separated crossing of the Norfolk Southern Railroad within the study area, mobility and access across the railroad would be greatly improved.

Environmental Performance, Steps One and Two: "Most" number of displacements; "moderate" acreage of right-of-way required; "no" impacts on streams, wetlands or preserved agricultural lands; "least" impacts on floodplains; "moderate" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: Preliminary Alternatives 7A, 7B, 7C, and 7D would initially follow alignments identical to Preliminary Alternatives 2B and 2C in how they connect to New Burton Road just north of Wyoming Avenue. The use of New Burton Road would eliminate a new crossing of Puncheon Run but would require the rehabilitation or replacement of the existing bridge to support a wider roadway section. Below Puncheon Run, the alignment options are similar to Preliminary Alternatives 5A, 5B, 5C, and 5D, but would not involve additional bridges because the connector would use New Burton Road at that point. Preliminary Alternative 7A would require the reconfiguration of three existing intersections (New Burton Road at Garton Road, New Burton Road at Webbs Lane and Webbs Lane at Garton Road) to accommodate the movements to and from the connector. Once the connector crossed Webbs Lane, it would cross the former farm property, now Boy Scouts of America, south of Webbs Lane before connecting to Charles Polk Road and US 13. The connection to Charles Polk Road would be similar for Preliminary Alternatives 7A, 7B, 7C, and 7D. (See the section above on "Connecting to Charles Polk Road.")

Working Group Input, Steps One and Two: Preliminary Alternative 7A would address some elements of the project purpose and need; community impacts would be high, particularly along New Burton Road and Charles Polk Road. The Working Group voted to eliminate Preliminary Alternative 7A from further study.

Resource Agency Input, Steps One and Two: Preliminary Alternative 7A would have minimal natural environmental impacts as there would be no new crossing of Puncheon Run or Isaac Branch.

Public Input, Steps One and Two: May best address bike/pedestrian connectivity; high residential impacts; would increase traffic on New Burton Road, Webbs Lane; school safety; impacts to wetlands and farmland (now Boy Scouts of America); visual impact at grade-separation over the railroad.

Preliminary Alternative 7B

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 7B would perform in a similar way as explained under Preliminary Alternative 7A.

Environmental Performance, Steps One and Two: "Most" number of displacements; "moderate" acreage of right-of-way required; "no" impacts on streams, wetlands or preserved agricultural lands; "least" impacts on floodplains; "moderate" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: Preliminary Alternatives 7A, 7B, 7C, and 7D would follow identical alignments as Preliminary Alternatives 2B and 2C in how they connect to New Burton Road just north of Wyoming Avenue. Preliminary Alternative 7B would involve a new T-intersection with New Burton Road south of Webbs Lane. Connection to Charles Polk Road is similar for Preliminary Alternatives 7A, 7B, 7C, and 7D. (See the section above on "Connecting to Charles Polk Road.")

Working Group Input, Steps One and Two: Preliminary Alternative 7B would address some elements of the project purpose and need; community impacts would be high, particularly along New Burton Road and Charles Polk Road. The Working Group voted to eliminate Preliminary Alternative 7B from further study.

Resource Agency Input, Steps One and Two: Preliminary Alternative 7B would have minimal natural environmental impacts as there would be no new crossing of Puncheon Run or Isaac Branch.

Public Input, Steps One and Two: May best address bike/pedestrian connectivity; high residential impacts; would increase traffic on New Burton Road, Webbs Lane; school safety; impacts to wetlands and farmland (now Boy Scouts of America); visual impact at grade-separation over the railroad.

Preliminary Alternative 7C

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 7C would perform in a similar way as explained under Preliminary Alternative 7A.

Environmental Performance, Steps One and Two: "Most" number of displacements; "moderate" acreage of right-of-way required; "no" impacts on streams, wetlands or preserved agricultural lands; "least" impacts on floodplains; "moderate" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: Preliminary Alternatives 7A, 7B, 7C, and 7D would follow identical alignments as Preliminary Alternatives 2B and 2C in how they connect to New Burton Road just north of Wyoming Avenue. Preliminary Alternative 7C would involve a new T-intersection with New Burton Road south of Webbs Lane. Connection to Charles Polk Road is similar for Preliminary Alternatives 7A, 7B, 7C, and 7D. (See the section above on "Connecting to Charles Polk Road.")

Working Group Input, Steps One and Two: Preliminary Alternative 7C would address some elements of the project purpose and need; community impacts would be high, particularly along New Burton Road and Charles Polk Road. The Working Group voted to eliminate Preliminary Alternative 7C from further study.

Resource Agency Input, Steps One and Two: Preliminary Alternative 7C would have minimal natural environmental impacts as there would be no new crossing of Puncheon Run or Isaac Branch.

Public Input, Steps One and Two: Of the Alternative 7 options, some prefer Preliminary Alternative 7C; may best address bike/pedestrian connectivity; high residential impacts; would increase traffic on New Burton Road, Webbs Lane; school safety; impacts to wetlands and farmland (now Boy Scouts of America); visual impact at grade-separation over the railroad.

Preliminary Alternative 7C Spur

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 7C Spur would perform in a similar way as explained under Preliminary Alternative 7A.

Environmental Performance, Steps One and Two: "Most" number of displacements; "most" acreage of right-of-way required; "least" impacts on streams or wetlands; "moderate" impacts on floodplains; "no" impacts on preserved agricultural lands; and "moderate" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: As described in Section III.B, Preliminary Alternative 7C Spur would cross Isaac Branch and pass through Brecknock Park. Such a crossing would require a bridge of some length, which has not been determined, as well as major improvements to US 13 at the intersection with the connector. Given the proximity to the existing Charles Polk Road intersection and the bridge on US 13 over Isaac Branch, this could be infeasible.

Working Group Input, Steps One and Two: Preliminary Alternative 7C Spur would address some elements of the project purpose and need; parkland and environmental impacts would be unacceptably high. The Working Group voted unanimously to eliminate Preliminary Alternative 7C Spur from further study.

Resource Agency Input, Steps One and Two: Preliminary Alternative 7C Spur would have unacceptable environmental impacts as there would be a new crossing of Isaac Branch and impacts to Brecknock Park.

Public Input, Steps One and Two: Park impact is unacceptable.

Preliminary Alternative 7D

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 7D would provide high circulation benefits; circuitous trips around Eden Hill Farm would almost be eliminated due to the extension of Saulsbury Road and its northerly connection to New Burton Road. Circuitous trips around Schutte Park would be reduced slightly. The performance of the North Street intersections would improve greatly as significant turning movements would be converted to through movements at the intersection of North Street and Saulsbury Road. There would be a "moderate" reduction in traffic volumes along Camden-Wyoming Avenue. Although Preliminary Alternative 7D would provide an improved parallel connection to US 13 near Camden-Wyoming Avenue, some traffic may continue heading south on New Burton Road to Camden-Wyoming Avenue. Also, since Preliminary Alternative 7D would use New Burton Road, cut-through traffic on roads between New Burton Road and Governors Avenue would increase. Since Preliminary Alternative 7D would provide a grade-separated crossing of the Norfolk Southern Railroad within the study area, mobility and access across the railroad would be greatly improved.

Environmental Performance, Steps One and Two: "Least" number of displacements; "least" acreage of right-of-way required; "no" impacts on streams or wetlands; "moderate" impacts on floodplains; "no" impacts on preserved agricultural lands; "moderate" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: Preliminary Alternative 7D would initially follow alignments identical to Preliminary Alternative 2B as it would connect to New Burton Road just north of Wyoming Avenue. The use of New Burton Road would eliminate a new crossing of Puncheon Run but would require the rehabilitation or replacement of the existing bridge to support a wider roadway section. Below Puncheon Run, Preliminary Alternative 7D is similar to Preliminary Alternatives 5A, 5B, 5C, and 5D, but would not involve additional bridges because the connector would use New Burton Road. Preliminary Alternative 7D would reconfigure the intersection of Webbs Lane at New Burton Road. The existing Webbs Lane roadway width is approximately 44 feet. A connector road along this corridor would require widening that would impact existing parking along the shoulders and could push back sidewalks and utility poles along both sides of the roadway.

Working Group Input, Steps One and Two: Preliminary Alternative 7D would address some elements of the project purpose and need; community impacts would be high, particularly along New Burton Road and Webbs Lane. The Working Group voted to eliminate Preliminary Alternative 7D from further study.

Resource Agency Input, Steps One and Two: None to date.

Public Input, Steps One and Two: None to date.

Concept 8

2030 Traffic Performance, Steps One and Two: Concept 8 would not provide for an extension of Saulsbury Road. Thus, there would be "no" significant change in the circuitous trips around Eden Hill Farm and Schutte Park. Similarly, Concept 8 would not help reduce turning movements at North Street intersections and thus would not improve their performance. This concept would not reduce traffic volumes on Camden-Wyoming Avenue or cut-through traffic by much. However, since it would provide a grade-separated crossing of the Norfolk Southern railroad within the study area, mobility and access across the railroad would be greatly improved.

Environmental Performance, Steps One and Two: Environmental performance was not measured as this concept did not meet the Purpose and Need of the project based on the traffic analysis.

Civil Engineering Factors, Steps One and Two: Civil engineering factors were not analyzed as Concept 8 did not meet the Purpose and Need of the project based on the traffic analysis.

Working Group Input, Steps One and Two: Concept 8 would not address many elements of the project Purpose and Need. The Working Group voted unanimously to eliminate Concept 8 from further study.

Resource Agency Input, Steps One and Two: Concept 8 would have minimal environmental impacts as there would be no new crossing of Puncheon Run or Isaac Branch.

Public Input, Steps 1 and 2: Generally no support for Concept 8; would put traffic on Governors Avenue and Webbs Lane; residential and school impacts; would not address traffic issues; would not connect Route 15 to US 13.

Concept 9

2030 Traffic Performance, Steps One and Two: Concept 9 would not provide an extension of Saulsbury Road. Thus, there would be "no" significant change in the circuitous trips around Eden Hill Farm and Schutte Park. Similarly, Concept 9 would not help reduce turning movements at North Street intersections and thus would not improve their performance. Concept 9 would not reduce traffic volumes on Camden-Wyoming Avenue or cut-through traffic by much. However, since it would provide a grade-separated crossing of the Norfolk Southern Railroad within the study area, mobility and access across the railroad would be greatly improved.

Environmental Performance, Steps One and Two: Environmental performance was not measured as this concept did not meet the Purpose and Need of the project based on the traffic analysis.

Civil Engineering Factors, Steps One and Two: Civil engineering factors were not analyzed as this concept did not meet the Purpose and Need of the project based on the traffic analysis.

Working Group Input, Steps One and Two: Concept 9 would not address many elements of the project Purpose and Need. The Working Group voted unanimously to eliminate Concept 9 from further study.

Resource Agency Input, Steps One and Two: Although Concept 9 generally had no support, it was noted that it would have minimal natural environmental impacts as there would be "no" new crossing of Puncheon Run or Isaac Branch.

Public Input, Steps One and Two: Most direct and smallest land impact; would not address cut-through traffic; would impact Webbs Lane; high property impacts on Charles Polk Road.

Concept 10

2030 Traffic Performance, Steps One and Two: The capacity improvement along North Street under Concept 10 would attract more traffic to North Street and thus more traffic volumes would circulate around the Eden Hill Farm, resulting in negative circulation impacts. Also, turning movements at the North Street intersections would increase, thus, deteriorating their performance. More cut-through traffic would occur and traffic volumes on Camden-Wyoming Avenue would slightly increase because this concept would result in more traffic traveling along New Burton Road. Concept 10 would not provide a grade-separated crossing of the Norfolk Southern Railroad within the study area, thus, providing "no" improvement in mobility and access across the railroad.

Environmental Performance, Steps One and Two: Environmental performance was not measured as this concept did not meet the Purpose and Need of the project based on the traffic analysis.

Civil Engineering Factors, Steps One and Two: Civil engineering factors were not analyzed as Concept 10 did not meet the Purpose and Need of the project based on the traffic analysis.

Working Group Input, Steps One and Two: Concept 10 would not address many elements of the project Purpose and Need. The Working Group voted unanimously to eliminate Concept 10 from further study.

Resource Agency Input, Steps One and Two: Concept 10 would have minimal natural environmental impacts as there would be "no" new crossing of Puncheon Run or Isaac Branch.

Public Input, Steps One and Two: Generally, Concept 10 had no support; would not address cut-through traffic; impact on Webbs Lane; high impact on residences.

Preliminary Alternative 11

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 11 would be limited to intersection improvements only and thus it would not improve traffic circulation around Eden Hill Farm and Schutte Park, cut-through traffic, Camden-Wyoming traffic volume or mobility/access across the Norfolk Southern Railroad.

Environmental Performance, Steps One and Two: "Least" number of displacements; "least" acreage of right-of-way required; "no" impacts on streams, wetlands, floodplains or preserved agricultural lands; "no" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: By its nature as an alternative that improves intersection capacity by providing auxiliary lanes and improved traffic control devices, Preliminary Alternative 11 would require pavement widening, drainage improvements and right-of-way impacts at each of the identified intersections, although the specific impacts were not identified because the alternative would not fully meet the project Purpose and Need.

Working Group Input, Steps One and Two: Preliminary Alternative 11 would not address many elements of the project Purpose and Need; however, Preliminary Alternative 11 should be retained for detailed study. The Working Group voted to further study Preliminary Alternative 11.

Resource Agency Input, Steps One and Two: Preliminary Alternative 11 would have minimal natural environmental impacts as there would be no new crossing of Puncheon Run or Isaac Branch.

Public Input, Steps One and Two: Least intrusive; makes sense because all that is needed is to improve existing roads; would not address traffic issues.

Preliminary Alternative 12A

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 12A would provide high circulation benefits; circuitous trips around Eden Hill Farm would be significantly reduced due to the extension of Saulsbury Road and its connection to New Burton Road using partial interchange ramps. Circuitous trips around Schutte Park would also be reduced moderately. The performance of the North Street intersections would improve greatly as significant turning movements would be converted to through movements at the intersection of North Street and Saulsbury Road. There would be a "moderate" reduction in traffic volumes along Camden-Wyoming Avenue. Although Preliminary Alternative 12A would provide an improved parallel connection to US 13 near Camden-Wyoming Avenue, some traffic may continue heading south on New Burton Road to Camden-Wyoming Avenue. There would be a "moderate" reduction in cut-through traffic, especially along Kesselring Avenue. This alternative would provide a partial-access (only two of the four movements allowed – see alternative description in Chapter III) and a grade-separated crossing of the Norfolk Southern Railroad, thus improving access and mobility moderately.

Environmental Performance, Steps One and Two: "Least" number of displacements; "moderate" acreage of right-of-way required; "least" impacts on streams; "moderate" impacts on wetlands and floodplains; "least" impacts on preserved agricultural lands; "least" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: Preliminary Alternative 12A would require constructing a single bridge structure over a railroad spur, Puncheon Run and the mainline railroad just south of Blue Beach Road. However, this structure would split into two one-way ramps; one would head south and merge from the connector on the right onto New Burton Road and one would head north and diverge from the right to access the connector heading north. The ramp configuration would require the relocation of the mainline Norfolk Southern Railroad to the west to allow widening of New Burton Road into the existing railroad right-of-way.

There is an obvious requirement to obtain agreement with Norfolk Southern to relocate the railroad. Two options for the railroad realignment were considered; one would impact the historic Kesselring Farm building complex and one would curve around behind the building complex. Curving around behind the building complex and developing more separation from New Burton Road could improve access to New Burton Road via an additional grade separation, possibly under the relocated railroad in the vicinity of Webbs Lane. Regardless of the railroad alignment, Preliminary Alternative 12A would reconfigure the intersection of Webbs Lane at New Burton Road. The existing Webbs Lane roadway width is approximately 44 feet. A connector along this corridor would require widening that would impact existing parking along the shoulders and could push back sidewalks and utility poles along both sides of the roadway.

Working Group Input, Steps One and Two: Preliminary Alternative 12A would address some elements of the project purpose and need; community impacts would be high. The Working Group voted to eliminate Preliminary Alternative 12A from further study.

Resource Agency Input, Steps One and Two: None to date.

Public Input, Steps One and Two: None to date.

Preliminary Alternative 12B

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 12B would provide high circulation benefits; circuitous trips around Eden Hill Farm would be significantly reduced due to the extension of Saulsbury Road and its connection to New Burton Road using partial interchange ramps. Circuitous trips around Schutte Park would also be reduced moderately. The performance of the North Street intersections would improve greatly as significant turning movements would be converted to through movements at the intersection of North Street and Saulsbury Road. Since Preliminary Alternative 12B would provide a connection to Charles Polk Road to US 13, there would be a significant reduction in traffic volumes along Camden-Wyoming Avenue. There would be a "moderate" reduction in cut-through traffic, especially along Kesselring Avenue. Preliminary Alternative 12B would provide a partial-access (only two of the four movements allowed – see alternative description in Chapter III), grade-separated crossing of the Norfolk Southern Railroad, thus providing "moderate" mobility and access benefits.

Environmental Performance, Steps One and Two: "Moderate" number of displacements; "most" acreage of right-of-way required; "least" impacts on streams; "moderate" impacts on wetlands and floodplains; "least" impacts on preserved agricultural lands; "moderate" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: As with Preliminary Alternative 12A, Preliminary Alternative 12B would require constructing a single bridge structure over a railroad spur, Puncheon Run and the mainline railroad just south of Blue Beach Road. Preliminary Alternative 12B would require a new T-intersection with New Burton Road south of Webbs Lane. Connection to Charles Polk Road is identical to Preliminary Alternatives 5C and 7C. (See the section above on "Connecting to Charles Polk Road.")

Working Group Input, Steps One and Two: Preliminary Alternative 12B would address many elements of the project purpose and need, although community impacts would be high. The Working Group voted to further study Preliminary Alternative 12B.

Resource Agency Input, Steps One and Two: None to date.

Public Input, Steps One and Two: None to date.

Concept 13

2030 Traffic Performance, Steps One and Two: Under Concept 13, the new connector road would not provide any connection to New Burton Road or to any other streets between New Burton Road and Governors Avenue within the study area. Thus, there would be "no" significant change in study area circuitous trips or in cut-through traffic volumes. Some turning movements at the North Street intersections would be converted into through movements, providing "moderate" benefits to their performance. Since the new connector alignment would provide an at-grade intersection with Wyoming Mill Road, some traffic on Wyoming Mill Road heading towards/coming from Camden-Wyoming Avenue would shift to the new connector, providing a "moderate" reduction in Camden-Wyoming Avenue traffic volumes. Concept 13 would not provide a grade-separated crossing of the Norfolk Southern Railroad within the study area, thus, it would not improve mobility and access across the railroad.

Environmental Performance, Steps One and Two: Environmental performance was not measured as this concept did not meet the Purpose and Need of the project based on the traffic analysis.

Civil Engineering Factors, Steps One and Two: Civil engineering factors were not analyzed as Concept 13 did not meet the Purpose and Need of the project based on the traffic analysis.

Working Group Input, Steps One and Two: Concept 13 would not address many elements of the project Purpose and Need. The Working Group voted unanimously to eliminate Concept 13 from further study.

Resource Agency Input, Steps One and Two: None to date.

Public Input, Steps One and Two: None to date.

Concept 14A

2030 Traffic Performance, Steps One and Two: The capacity improvement along Wyoming Avenue, New Burton Road and Webbs Lane under Concept 14A would attract more traffic that would then need to circulate around Eden Hill Farm, resulting in negative circulation impacts. Also, turning movements at the North Street intersections would increase, and their performance would deteriorate. More cut through traffic would occur and traffic volumes on Camden-Wyoming Avenue would slightly increase because Concept 14A would result in more traffic along New Burton Road. Concept 14A would not provide a grade-separated crossing of the Norfolk Southern Railroad within the study area, thus, it would not improve mobility and access across the railroad.

Environmental Performance, Steps One and Two: Environmental performance was not measured as Concept 14A did not meet the Purpose and Need of the project based on the traffic analysis.

Civil Engineering Factors, Steps One and Two: Civil engineering factors were not analyzed as this concept did not meet the Purpose and Need of the project based on the traffic analysis.

Working Group Input, Steps One and Two: The Working Group voted not to further study Concept 14A.

Resource Agency Input, Steps One and Two: None to date.

Public Input, Steps One and Two: None to date.

Preliminary Alternative 14B

2030 Traffic Performance, Steps One and Two: Preliminary Alternative 14B would provide high circulation benefits; circuitous trips around Eden Hill Farm would be almost eliminated due to the extension of Saulsbury Road and its northerly connection to New Burton Road. Circuitous trips around Schutte Park would also be reduced slightly. The performance of the North Street intersections would improve greatly as significant turning movements would be converted to through movements at the intersection of North Street and Saulsbury Road. There would be a “moderate” reduction in traffic volumes along Camden-Wyoming Avenue. This is because although Preliminary Alternative 14B would provide improved parallel connections to US 13 north of Camden-Wyoming Avenue, some traffic may still continue heading south on New Burton Road to Camden-Wyoming Avenue. In terms of cut-through traffic, since Preliminary Alternative 14B would use New Burton Road, cut-through traffic on roads between New Burton Road and Governors Avenue would increase indicating a negative impact. Preliminary Alternative 14B would provide a grade-separated crossing of the NS railroad within the study area, thus improving mobility and access across the railroad.

Environmental Performance, Steps One and Two: "Least" number of displacements; "least" acreage of right-of-way required; "no" impacts" on streams, wetlands, floodplains, and preserved agricultural lands; "moderate" ability to achieve park connectivity.

Civil Engineering Factors, Steps One and Two: Preliminary Alternative 14B would initially follow the same alignment as Preliminary Alternative 2B in how it connects to New Burton Road just north of Wyoming Avenue. The use of New Burton Road would eliminate a new crossing of Puncheon Run but would require rehabilitating or replacing the existing bridge to support a wider roadway section. Below Puncheon Run, the alignment is similar to Preliminary Alternative 7D and would not involve additional bridges because the connector would use New Burton Road. Preliminary Alternative 14B would reconfigure the intersection of Webbs Lane at New Burton Road and Webbs Lane would be widened.

Working Group Input, Steps One and Two: The Working Group voted to further study Preliminary Alternative 14B.

Resource Agency Input, Steps One and Two: None to date.

Public Input, Steps One and Two: None to date.

E. ALTERNATIVES RETAINED FOR DETAILED STUDY

Of the 20 surviving alternatives from Step 1, five alternatives were retained for detailed study after Step 2 (Alternatives 1, 4, 5C, 7C and 7D) with 15 alternatives being eliminated (Alternatives 2A through 2D, 3, 5A, 5B, 5C Spur, 7A, 7B, 7C Spur, 12A, 12B, 14A, and 14B). Five of the surviving alternatives from Step One were determined not prudent after further examination of their performance in terms of the project Purpose and Need. Additional traffic analysis and comparison with other surviving alternatives determined that other alternatives would address more elements of the project Purpose and Need more effectively. In particular, nine of the alternatives were found to have greater adverse traffic, right-of-way, and/or environmental impacts than other surviving alternatives with no compensating benefit. Figure IV-20 summarizes the overall performance of the alternatives as determined in Step Two. More descriptive rationale for retaining or eliminating each concept is presented in Section IV.D of this chapter.

Figure IV-20: Summary of Step Two – Preliminary Alternative Performance

Alternative	Step Two Result - Alternative Retained for Detailed Study	Rationale
1 No-Build	Yes	Baseline alternative
2A, 2B, 2C, 2D	No	Weak on Purpose and Need; no connection to US 13; no reduction in cut-through traffic; large structures with no compensating benefit; other alternatives avoid or minimize natural and right-of-way impacts; lack of Working Group support; public opinion mixed
3	No	Other alternatives avoid or minimize right-of-way impacts; lack of Working Group and public support
4	Yes	High to moderate performance on Step 1 elements of Purpose and Need; avoids or minimizes natural and right-of-way impacts compared to other alternatives; Working Group support; public opinion mixed
5A, 5B	No	Other alternatives avoid or minimize right-of-way impacts; public support mixed
5C	Yes	High to moderate performance on Step 1 elements of Purpose and Need; avoids or minimizes right-of-way impacts compared to other alternatives; Working Group support
5C Spur	No	Other alternatives avoid or minimize impacts on Brecknock Park and Isaac Branch; lack of Working Group, Resource agency and public support
7A, 7B	No	Other alternatives avoid or minimize social and traffic impacts; lack of Working Group support; public opinion mixed
7C, 7D	Yes	Moderate performance on Step 1 elements of Purpose and Need, negative impact for one element of Need; avoids or minimizes right-of-way impacts compared to other alternatives; Resource Agency support for 7C
7C Spur	No	Other alternatives avoid or minimize impacts on Brecknock Park and Isaac Branch; lack of Working Group, Resource agency and public support
12A, 12B	No	Relocation of NS railroad determined infeasible; lack of Working Group support for 12A
14A	No	Weak on Purpose and Need; lack of Working Group support
14B	No	Weak on Purpose and Need; other alternatives avoid or minimize right-of-way impacts; engineering, operational limitations at New Burton Road

In summary, based on the evaluation of concepts and alternatives in Steps One and Two, DelDOT retained the following preliminary alternatives for detailed study: Preliminary Alternatives 1, 4, 5C, 7C, and 7D. The rationale for detailed study of these alternatives is summarized below:

Preliminary Alternative 1 (No-Build) must be retained as required by the implementing regulations of the National Environmental Policy Act.

Preliminary Alternative 4 would have high benefits for four elements of the Purpose and Need related performance evaluation criteria and a moderate benefit for one element. The Working Group voted to retain Preliminary Alternative 4, and there is some public support for Preliminary Alternative 4.

Preliminary Alternative 5C would have high benefits for four elements of the Purpose and Need related performance evaluation criteria and a moderate benefit for one element; 5C has public support; the Working Group voted to further study Preliminary Alternative 5C.

Preliminary Alternative 7C would have high benefits for four elements of the Purpose and Need and a negative impact for one element. Preliminary Alternative 7C would have the least natural environment impacts compared with Preliminary Alternative 5C. The public expressed preference for 7C over Preliminary Alternatives 7A and 7B. Although the Working Group voted to eliminate Preliminary Alternative 7C from further study, Preliminary Alternative 7C would avoid or minimize environmental impacts, as desired by the resource agencies.

Preliminary Alternative 7D would have high benefits for three elements of the Purpose and Need, a moderate benefit for one element and a negative impact for one element. Preliminary Alternative 7D would have fewer effects on the natural environment than Preliminary Alternative 4.