



II. ALTERNATIVES

This section describes the alternatives selection process and evaluates the alternatives that have been considered for implementation through the US 301 Project Development process. The process began with prior alternatives evaluated in the 1993 DEIS and the 2000 MIS and continued with the addition of alternatives developed during the current effort. A broad range of alternatives was considered, and the No-Build Alternative and four build alternatives were retained for detailed evaluation. The four build alternatives were evaluated for potential impacts and subjected to modifications and refinements to avoid or minimize these impacts. Alignment and engineering modifications were made that provide a more efficient flow of projected traffic and avoid potential impacts to the natural and built environmental resources.

DelDOT published the Draft Environmental Impact Statement (DEIS) for the current effort in November 2006. The DEIS recommended the Green Alternative North Option (plus Spur Road), with Armstrong Corner Road Area Option 2A and Summit Interchange Option 3B (Green North), as the preferred alignment, based upon the calculated impacts at the level of engineering completed for the DEIS. Following the Combined Location-Design Public Hearing on January 8 and 9, 2007, and with consideration of comments received throughout the planning process from the resource and regulatory agencies, stakeholders and the public, the Green North Alternative was subjected to more detailed planning-level engineering to refine the alignment.

DelDOT announced its Preferred Alternative, the Green North Alignment plus Spur Road, on May 17, 2007. Several alignment options have been considered for the Preferred Alternative. Detailed engineering has refined the alignment further while attempting to avoid impacts and minimize those impacts that cannot be avoided.

The Chapter begins with a presentation of the Preferred Alternative in Section A. Section B presents the No-Build Alternative and the build alternatives that were retained for detailed evaluation but are not preferred. Section C presents a discussion of the alignment options that were considered for the alternatives during the evaluation process. Section D briefly describes those alternatives in the initial range of alternatives that were eliminated from further evaluation.

A. Preferred Alternative

The Preferred Alternative, the **Green Alternative North Option with Armstrong Corner Road Area Option 2A, Summit Interchange Option 3B and Ratledge Road Area Option 4B Modified**, will be constructed on new location along the ridge route (also called the ridge alignment - generally follows the ridgeline or drainage divide between the Delaware River watershed and the Chesapeake Bay watershed) as a four-lane, limited access roadway, traveling generally northward from the Delaware/Maryland state line to north of Middletown near Armstrong Corner Road. In the vicinity of Armstrong Corner Road, the mainline alignment will continue northeast to cross over existing US 301, the Norfolk Southern Railroad and existing SR 896 (Boys Corner Road) before tying into SR 1 north of the Biddles Corner Toll Plaza. Near Armstrong Corner Road, where the alignment extends to the northeast, a two-lane, limited

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



access Spur Road will continue north on new location along the ridge route to intersect SR 15/SR 896 south of Summit Bridge and the C & D Canal.

The Preferred Alternative measures a total length of 17.5 miles including the Spur Road, and has six interchanges: a diamond interchange southwest of Middletown at Levels Road; right-on/right-off ramps at existing US 301 in the vicinity of Armstrong Corner Road; a diamond interchange at Jamison Corner Road; ramps that tie into SR 1 north of the Biddles Corner Toll Plaza; a partial cloverleaf interchange along the Spur Road at an extended Bethel Church Road; and Spur Road ramps tying into existing US 301/SR 896 just south of Summit Bridge over the C&D Canal. The Green North Alternative is shown in *Appendix A*. The Preferred Alternative is shown in detail on *Preferred Alternative, Sheets 1 through 9, in Appendix B*.

The Green North Alternative is preferred by DelDOT, based on a holistic evaluation of all of the impacts of the alternatives on the natural, historic and socioeconomic environment. Generally, the Green North Alternative's effects on the natural environment (wetlands, streams and habitat areas) are comparable in number to those of the Brown and Purple Alternatives, making the choice dependent upon other elements of the various alignments and options, such as location of impacts, mitigation potential, and impacts to communities. Community impacts of the Green Alternative North and South Options are fewer when compared to those of the Brown and Purple Alternatives and have the best potential for mitigation. Although the Green North and South Alternatives both traverse open space and farm fields north of Boyds Corner Road, this area is slated for future development. The Green Alternative Options best meet the project purpose and need based on the analysis of future traffic. The Green North's single, less complex, shorter and more perpendicular crossing of Scott Run, compared with a longer and more skewed crossing of Scott Run required by the Green South Alternative plus the need for an additional crossing of Scott Run supports the choice of the Green North Option over the South. Alignment refinements to the North Option allowed the avoidance of the Wooleyhan and Emerson Farms as well as the proposed high school parcel north of Boyds Corner Road and east of Ratledge Road.

1. Description of the Preferred Green North Alternative

a. *Mainline - State Line to Norfolk Southern Railroad*

Beginning just west of the Delaware/Maryland state line, in Maryland, the Green North Alternative will tie into the existing four-lane Maryland portion of US 301 prior to entering Delaware. Continuing north, the alignment will be located on new location on the ridge route, west of Middletown, between existing US 301 and Choptank Road. The Green North Alternative will shift from a northerly direction to a northeasterly direction in the vicinity of Armstrong Corner Road and will continue in a northeasterly direction, crossing over existing US 301 approximately 3,000 feet north of Marl Pit Road. The alignment will then cross over the Norfolk Southern rail line.



b. Mainline - Norfolk Southern Railroad to SR 1

East of the Norfolk Southern Railroad overpass, the Green North Alternative alignment will continue in a northeast direction, then turns almost directly north to follow the old Delaware Power & Light (DP&L) right-of-way to pass over SR 896 (Boyds Corner Road). North of Boyds Corner Road, the North Option will continue in a northerly direction before turning almost directly east toward SR 1. The new US 301 alignment will interchange with a reconstructed Jamison Corner Road, pass south of the Airmont community, cross over Scott Run and under a reconstructed Hyetts Corner Road, and continue east, terminating at SR 1 north of the existing Biddles Corner Toll Plaza and south of the SR 1 bridge (recently named the Senator William V. Roth, Jr. Bridge) over the C&D Canal. Directional ramps would be provided from southbound SR 1 to southbound US 301 and from northbound US 301 to northbound SR 1.

c. Spur Road - Armstrong Corner Road Area to Summit Bridge

The Green North Alternative Spur Road would extend from the new US 301 mainline in the vicinity of Armstrong Corner Road and continue on the ridge alignment, between Choptank Road and existing US 301, to just south of the Summit Bridge. A potential interchange would replace the existing US 301/SR 896/SR 15 intersection. Old Schoolhouse Road and Churchtown Road would overpass the Spur Road (no access). Bethel Church Road would be extended east from the existing intersection of Bethel Church Road and Choptank Road, and would interchange with the Spur Road (providing access to and from the north only).

d. Preferred Options

Armstrong Corner Road (ACR) Area

Armstrong Corner Road Area Option 2A will provide right-on/right-off ramps between new and existing US 301. The northbound entrance and exit ramps will be located on existing US 301 approximately 1,000 feet north of Armstrong Corner Road. The southbound entrance and exit ramps will be located on existing US 301, approximately 3,500 feet north of Armstrong Corner Road. Two new signalized intersections on existing US 301 will control exit and entry traffic.

This option locates the interchange access on an arterial road (existing US 301) rather than on a local road (Armstrong Corner Road), and has a low amount of impacts to high quality wetlands and forests and a relatively high amount of impacts to waters of the US, when compared to other options. Traffic operations will be affected by the two additional signals required on existing US 301 for the access ramps, but the signal spacing will be greater than with Option 2 (see **Section C.1** of this chapter for a discussion of the options not preferred). Option 2A will require a wider bridge crossing over existing US 301 to accommodate the deceleration lane for the loop ramp from new southbound US 301 to existing US 301, and turn lanes may have to be added on existing US 301 to accommodate queues accessing the ramps. Option 2A will be closer to the Springmill community (700 feet) than Options 1 (1,300 feet) and 2 (800 feet). Option 2A will

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



not require relocation of the Middletown Baptist Church and will avoid direct impacts to the Middletown Baptist Church property.

ACR Area Option 2A is preferred, because it locates the interchange on an arterial road rather than a local road, has significantly less right-of-way and relocation impacts than Option 2, and balances impacts to local community and cultural resources (Middletown Baptist Church, Springmill community and Armstrong-Walker House). Option 2A is also preferred because it has a low impact (0.8 acre) to high quality wetlands and minimal impact to forested lands (9.9 acres).

Summit Interchange (SI) Area

SI Area Option 3B will provide a directional “Y” interchange between SR 896 and the US 301 Spur Road. This Option will improve the sharp curve (through movement) on SR 896 to the desired design speed and eliminate the signalized intersection on the curve. Access from SR 15 to SR 896 would be relocated to an east-west extension of Bethel Church Road from Choptank Road to the Spur Road and a grade separated/trumpet interchange would be provided at the Spur Road/Bethel Church Road extended, providing access to and from the north (Summit Bridge). Access to SR 896 from the communities to the north (Lea Eara Farms and Summit Bridge) will be provided at the existing signalized intersection of Old Summit Bridge Road and SR 896.

Option 3B will improve traffic operations and safety on the Spur Road by providing interchange ramps to and from the north at this location rather than an intersection (Option 3). A discussion of the Summit Interchange Options not preferred is located in **Section C.2** of this Chapter.

SI Area Option 3B is preferred because it provides for safer, free-flowing traffic on the Spur Road, removes the proposed signal on the Spur Road (Options 1, 3 and 4 require signals), and reduces potential noise associated with the signal (braking, stopping and starting). The interchange at the proposed extension of Bethel Church Road and the Spur Road improves traffic operations and safety on the Spur Road by providing a limited access facility with a continuous divided median and no access points or intersections.

Ratledge Road (RR) Area

Ratledge Road Area Option 4B is an option proposed by community members in order to avoid impacts to active farm properties. The modified alignment will follow the former DP&L right-of-way from northeast of the Norfolk Southern railroad alignment to north of Boyds Corner Road. Option 4B Modified will minimize farmland impacts and has moderate impacts to wetlands, waters of the US and forests. RR Area Option 4B (see **Section C.4** of this Chapter for a discussion of other options) was modified slightly, shifting the alignment on the north side of Boyds Corner Road slightly eastward to minimize impacts to a higher quality wetland system and forest land to become Option 4B Modified. The modification reduced wetland impacts by one acre and forest impacts by more than 2.5 acres. This option results in adverse effects to an additional historic property, the T.J. Houston Farm.

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



RR Area Option 4B Modified is preferred because it avoids impacts to active family-owned/operated farms (Wooleyhan and Emerson) and the associated farming community and has lower impacts to high quality wetlands and forest areas. It has received concurrence from the ACOE, EPA, USFWS, DDA and DNREC provided that sufficient protections and mitigation can be achieved to offset additional natural resources impacts through the creation of forested wetlands and the protection of existing high quality wetlands in the Scott Run watershed (see Chapter III, F.6.c for a discussion of mitigation and protection commitments.)

e. Additional Alignment Refinements for the Preferred Alternative

Since publication of the DEIS on November 17, 2007, several engineering solutions have been developed to address issues raised by the public and agencies prior to and during the public comment period following its publication.

Visual Screening Earth Berm – Middletown Veterinary Hospital

An earth berm will be included in the design of US 301 in the vicinity of the relocated Warwick Road, north of the state line, adjacent to the Middletown Veterinary Hospital. This six foot high, 900 foot long berm will provide visual screening for the hospital. The berm is shown on the Preferred Alternative design sheets in ***Appendix B (Sheet 1)***.

Existing US 301 Connection to Strawberry Lane

A roadway connection will be provided between existing US 301 and Strawberry Lane, just north of the proposed truck weigh station on the east (northbound) side of new US 301. This connection is in response to farmers west of US 301 who frequently drive and transport farm machinery to a repair/sales business located on existing US 301 as well as to provide access to the granary in Townsend. The connection will allow easy movement for farm vehicles without lengthy detours or travel on new US 301. Farm vehicles are usually bulky, oversized, frequently loaded with farm produce, and travel at speeds lower than other vehicles; the connection is made to assure safe travel conditions for these vehicles. The connection is shown on the Preferred Alternative design sheets in ***Appendix B (Sheet 1)***.

Stormwater Management Facilities

Preliminary studies of existing topography and drainage patterns along the proposed Preferred Alternative alignment have been completed to determine the appropriate placement of stormwater management facilities (shown on the engineering drawings in ***Appendix B)***. Locations and capacities of the facilities have been refined in order to maximize functionality and minimize impacts. Capacity and number of facilities are based on current Delaware SWM regulations and sized to determine the maximum ROW footprint necessary to treat SWM conventionally. It is anticipated that Delaware SWM regulations will change prior to construction and these changes will not increase the size or number of facilities needed for SWM

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



management. During final design, low impact development technologies and alternate facility types will be evaluated and utilized where possible and may include linear infiltration trenches, bioretention swales, and grass filter strips. It is anticipated that inclusion of low impact development technologies will dramatically reduce the overall number and the size of remaining SWM treatment facilities.

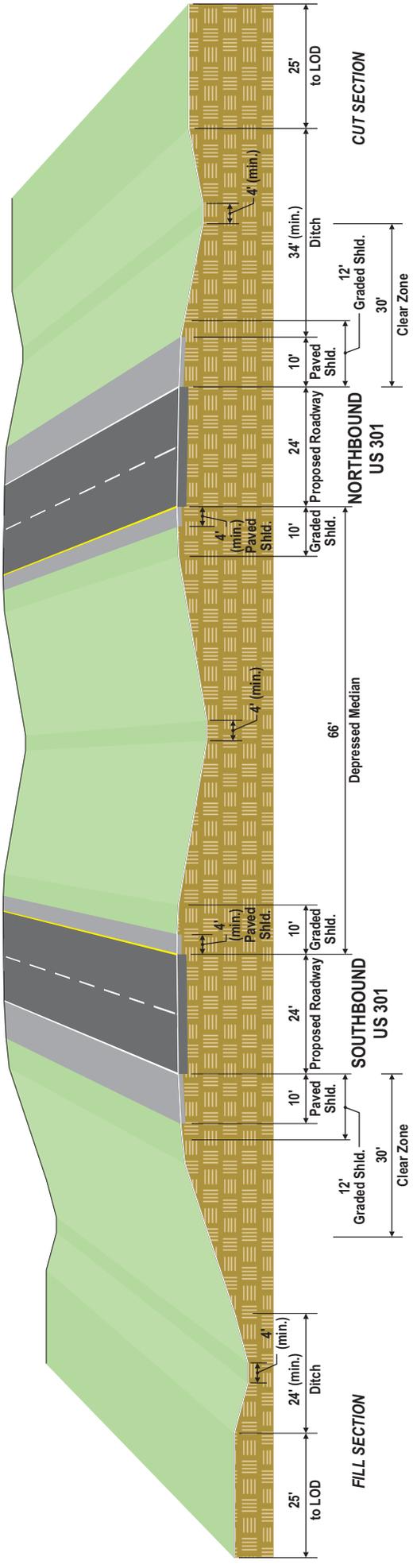
Engineering Design Modifications

The Preferred Alternative has been refined in order to minimize or avoid impacts where possible. These planning-level refinements include minor alignment shifts throughout the alignment as well as the use of steeper side slopes, retaining walls, lowering the roadway profile, and otherwise minimizing footprint in sensitive areas. Retaining walls are proposed along the southbound ramp from SR 1 to US 301 to minimize impacts to the wetlands near Scott Run, which has been identified as potential bog turtle habitat. The Churchtown Road overpass of the Spur Road has been modified to reduce impacts to the residential properties along Churchtown Road and to minimize impacts and retain access to Tidewater Utilities. In addition, maintenance of traffic concepts have been developed that allow crossroads to remain open during construction of overpasses at Old Schoolhouse Road, Churchtown Road, Bohemia Mill Road, Bunker Hill Road, Jamison Corner Road and Hyetts Corner Road. Refinements to avoid or minimize community, property and natural resource impacts will continue during final design.

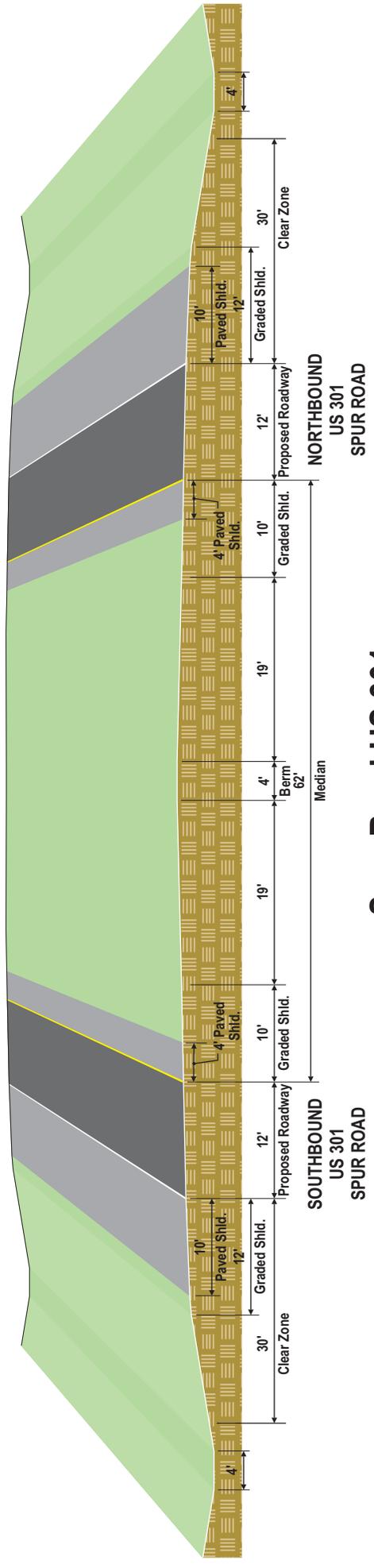
f. General Engineering Concepts

US 301 Mainline

The typical section for the mainline, for all alternatives, is developed for a 70 mile per hour (MPH) design speed and is shown in *Figure II-1*. The mainline section will be limited access and include two 12-foot lanes in each direction and a 66-foot median. The outside shoulders would be 12 feet wide (ten feet paved and two feet graded), and the inside shoulders would be ten feet wide (four feet paved and six feet graded). Beyond the travel lane is a 30-foot wide clear zone, which includes the 12-foot shoulder and 18 feet of grading at a 6:1 slope. The clear zone provides a recovery area for errant vehicles that is free of hazards such as trees, ditches, culverts, etc. The standard side slopes beyond the clear zone range from 4:1 to 2:1 depending on the height of the cut or fill. Drainage ditches are included along the toe of fill to manage runoff and carry the flow to natural drainage channels, thereby minimizing impact to adjacent properties. The proposed right-of-way (ROW) and limit of disturbance (LOD) are set at 25 feet beyond the top of cut or fill slope drainage ditch to accommodate erosion and sediment control and construction. Visual screening earth berms are included along the outside shoulders in some sensitive areas and are included in the proposed ROW and LOD. The ROW/LOD line is used throughout this document to estimate environmental and property impacts for the alternatives.



Mainline US 301



Spur Road US 301



US 301 Project Development

FINAL ENVIRONMENTAL IMPACT STATEMENT

Typical Sections for US 301



November 2007

Figure II-1

US 301 Spur Road

The typical section for the US 301 Spur Road is developed for a 70 MPH design speed and is shown in *Figure II-1*. The Spur Road will be limited access and include one 12-foot lane in each direction and a 62-foot median. The outside shoulders would be 12 feet wide (ten feet paved and two feet graded), and the inside shoulders would be ten feet wide (four feet paved and six feet graded). The clear zone, side slopes, and limit of disturbance proposed for the mainline also apply to the Spur Road.

Interchange Ramps

The interchange ramps are developed with design speeds ranging from 35 MPH for loop ramps, 50 MPH for directional ramps, to 60 MPH for the ramps between US 301 and SR 1. The typical section for the interchange ramps is shown in *Figure II-2*. Ramps typically include one lane, 16 feet wide on loop and directional ramps and 12 feet wide on flyover ramps. The right shoulders would be six feet wide (all paved) on loop and directional ramps and 12 feet wide (ten feet paved and two feet graded) on flyover ramps. The left shoulders would be four feet wide (all paved). The clear zone, side slopes, and limit of disturbance proposed for the mainline also apply to the interchange ramps.

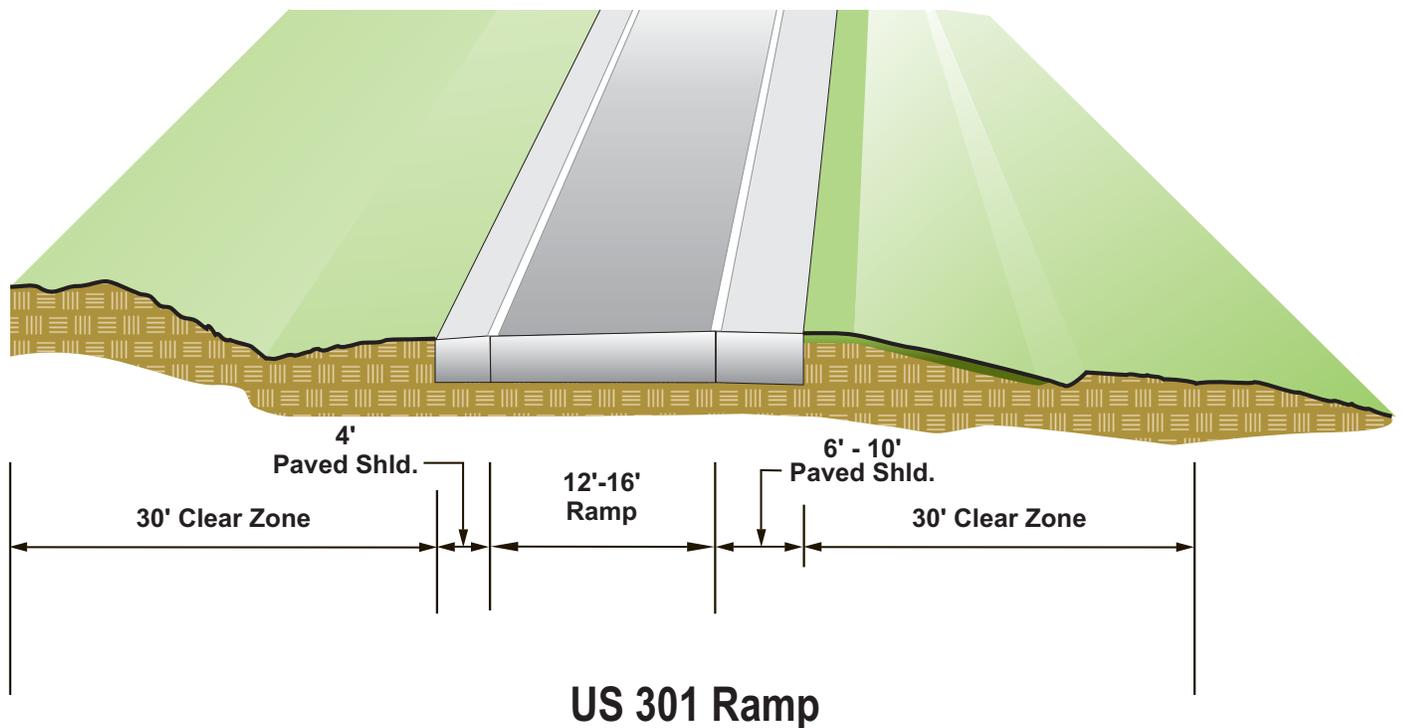
Local, Collector and Arterial Roads

The local and collector roads are developed with design speeds ranging from 35 MPH to 40 MPH. The typical section for local and collector roads, shown in *Figure II-3*, consists of two 11-foot lanes and two five-foot wide paved shoulders. The clear zone varies from 16 to 30 feet and includes the shoulders and grading at a 6:1 slope. A 50 MPH design speed is used for the arterial roads. The typical section for arterial roads, also shown in *Figure II-3*, consists of two 12-foot lanes, two eight-foot wide paved shoulders, and a 30-foot clear zone. The side slopes and limit of disturbance proposed in the mainline also apply to the local, collector and arterial roads.

B. Alternatives Retained for Detailed Evaluation

The No-Build Alternative and four build alternatives (Yellow, Purple, Brown (North and South Options) and Green (North and South Options)) were retained for detailed evaluation during the alternatives development planning process. The four build alternatives are shown on *Figure II-4* and in *Appendix A*. Programmed improvements included in the Delaware Department of Transportation *Capital Transportation Program FY 2008 – FY 2013* (CTP) are assumed under the No-Build Alternative as well as the build alternatives, and none of the build alternatives would preclude the completion of any of the programmed improvements.

The No-Build Alternative reflects the existing roadway conditions, with only scheduled maintenance and minor roadway and safety improvements.



US 301 Project Development

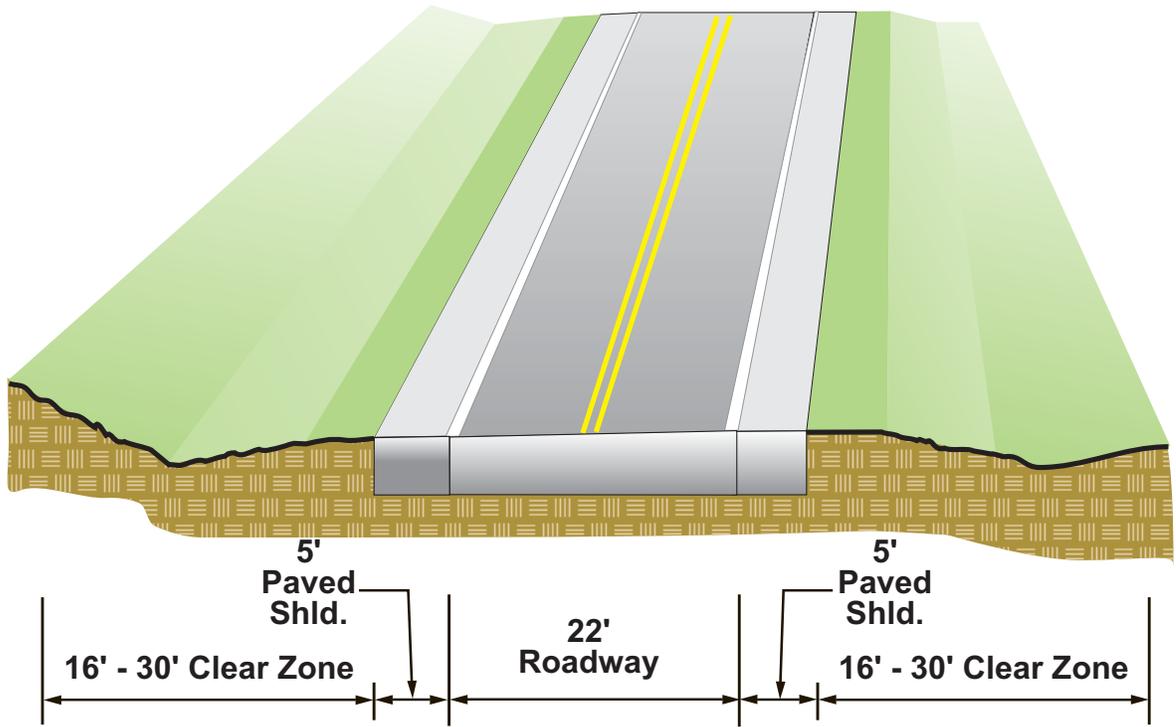
FINAL ENVIRONMENTAL IMPACT STATEMENT

Typical Sections for US 301 Ramps

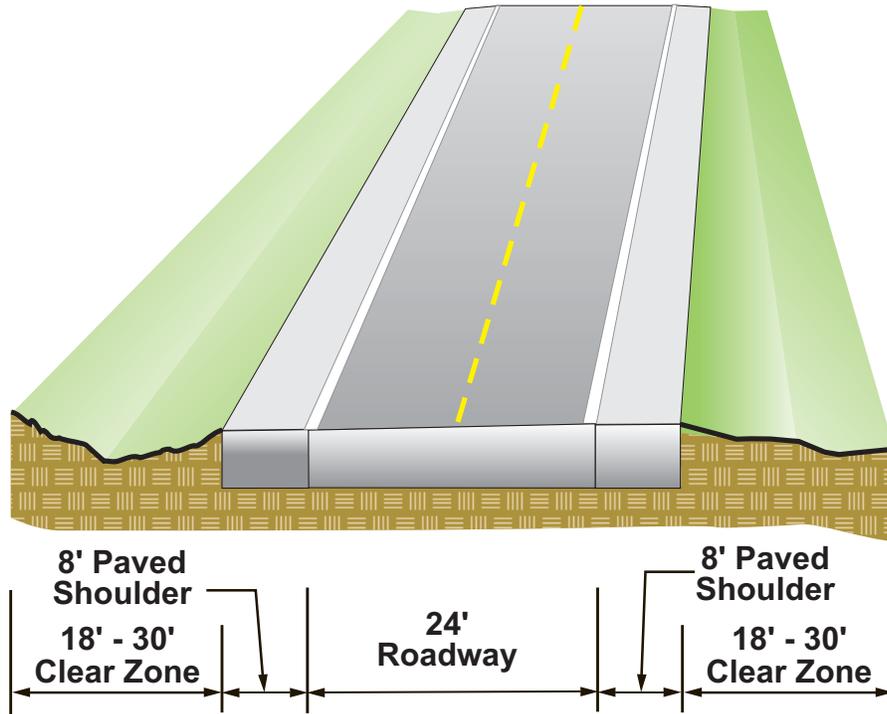


November 2007

Figure II-2



Local Road / Collector Road



Arterial Road



US 301 Project Development

FINAL ENVIRONMENTAL IMPACT STATEMENT

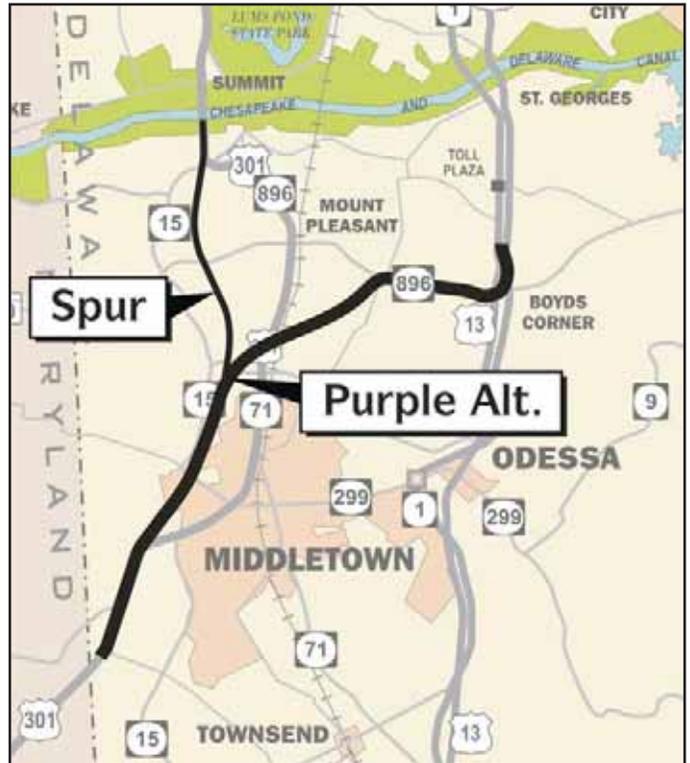
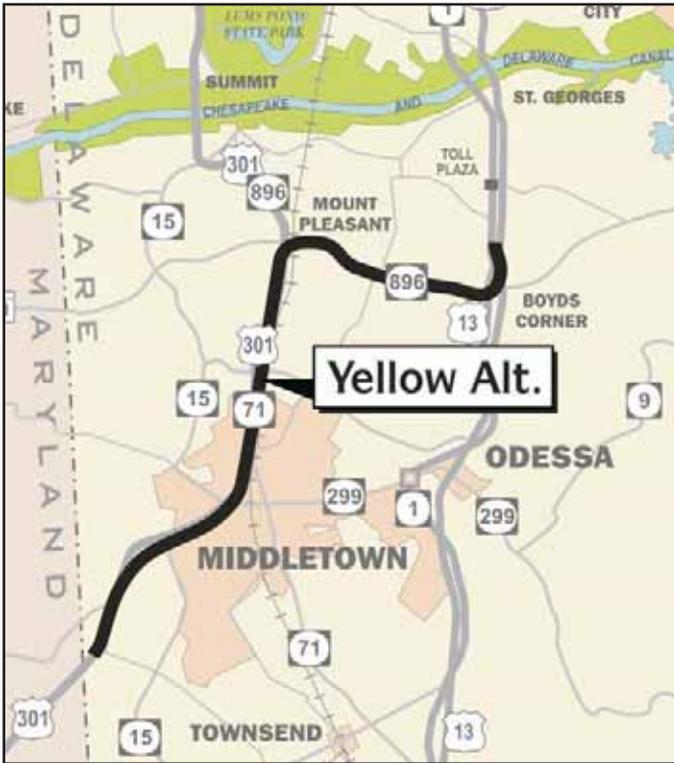
Typical Sections for US 301 Local Roads, Collector Roads and Arterial Roads



November 2007

Figure II-3

The dimensions shown are for the purpose of determining cost estimates and environmental impacts and are subject to change during the final design phase.



US 301 Project Development

FINAL ENVIRONMENTAL IMPACT STATEMENT

ALTERNATIVES RETAINED FOR DETAILED EVALUATION



Not to Scale



November 2007

Figure II-4

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



All of the retained build alternatives would provide a four-lane (two lanes in each direction), divided, fully access controlled (denial of access along both sides of roadway except at interchange locations), tolled roadway from the Delaware/Maryland state line to SR 1, south of the C&D Canal. The Purple and Green Alternatives also provide a two-lane (one lane in each direction), divided, access controlled Spur Road from the Armstrong Corner Road area to an interchange with SR 15/SR 896 south of the Summit Bridge. Each of the Alternatives Retained for Detailed Evaluation is shown on a separate graphic in *Appendix A* and described in the following sections.

All of the build alternatives would include a mainline toll plaza north of the Delaware/Maryland state line prior to any local access points. The collection of tolls is proposed on all north-serving ramps (all on-ramps for vehicles entering the roadway traveling northbound and all off-ramps for vehicles traveling southbound as they exit the roadway).

There are two toll collection options currently under consideration. The first option, traditional tolling, would consist of a mainline toll plaza with highway speed E-ZPass™ toll lanes and cash toll collection lanes (which would also accept E-ZPass™) in each direction. North serving ramps would include highway speed E-ZPass™ and cash toll collection lanes (which would also accept E-ZPass™).

The second toll collection option, Open Road Tolling (ORT), would use overhead gantries with cameras and E-ZPass™ reading equipment. Drivers would not be required to stop under the Open Road Tolling option. The overhead cameras would photograph the license plate of those vehicles not having E-ZPass™ and an invoice would be sent to those non- E-ZPass™ users of the US 301 facility.

The Department is continuing to evaluate the advantages and disadvantages of the two options, including construction and operating costs and effects on toll revenues. The impacts, construction and real estate costs included in this document assume the traditional toll collection option. ORT would reduce the area required for toll collection facilities by replacing toll plazas with overhead gantries, cameras and E-ZPass™ reading equipment.

1. No-Build Alternative, Programmed Improvements and Multi-Modal Elements

The No-Build Alternative reflects the existing roadway conditions, with only scheduled maintenance and minor roadway and safety improvements. Programmed improvements included in the Delaware Department of Transportation CTP *FY 2008 – FY 2013* are assumed under the No-Build Alternative as well as the build alternatives, but none of the alternatives, build or No-Build, would include any of the impacts associated with the CTP improvements. The build alternatives are compared to the No-Build Alternative with respect to impacts to the natural and built environment.

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



a. Description of the Existing Roadway

US 301, Delaware/Maryland State Line to Chesapeake and Delaware Canal

US 301 enters Delaware from Maryland approximately eight miles south of the Chesapeake and Delaware (C&D) Canal. A four-lane divided highway in Maryland, US 301 narrows to two lanes before crossing the state line, and continues in Delaware as a two-lane undivided roadway with at-grade intersections through Middletown to Mount Pleasant. In Middletown, SR 71 from Townsend merges with US 301. The roadway alignment in this area is generally north/northeast through Middletown and is approximately parallel to the Norfolk Southern railroad alignment. North of Mount Pleasant, US 301 (Summit Bridge Road) merges with SR 896 and continues as a four-lane divided roadway towards the Summit Bridge crossing of the C&D Canal. South of the C&D Canal, US 301/SR 896 curves to the west for approximately 3,500 feet before making a sharp turn to the north, where the alignment merges with SR 15 (Bethel Church Road) before crossing the Summit Bridge. The existing intersection of SR 15 and US 301/SR 896 is a signalized intersection located on a 90 degree curve at the base of a steep grade descending from the Summit Bridge. This location has a history of serious accidents that includes 54 injuries and three fatalities between September 1999 and October 2004. The Summit Bridge carries two lanes of traffic in each direction.

US 301/SR 896, C&D Canal to I-95

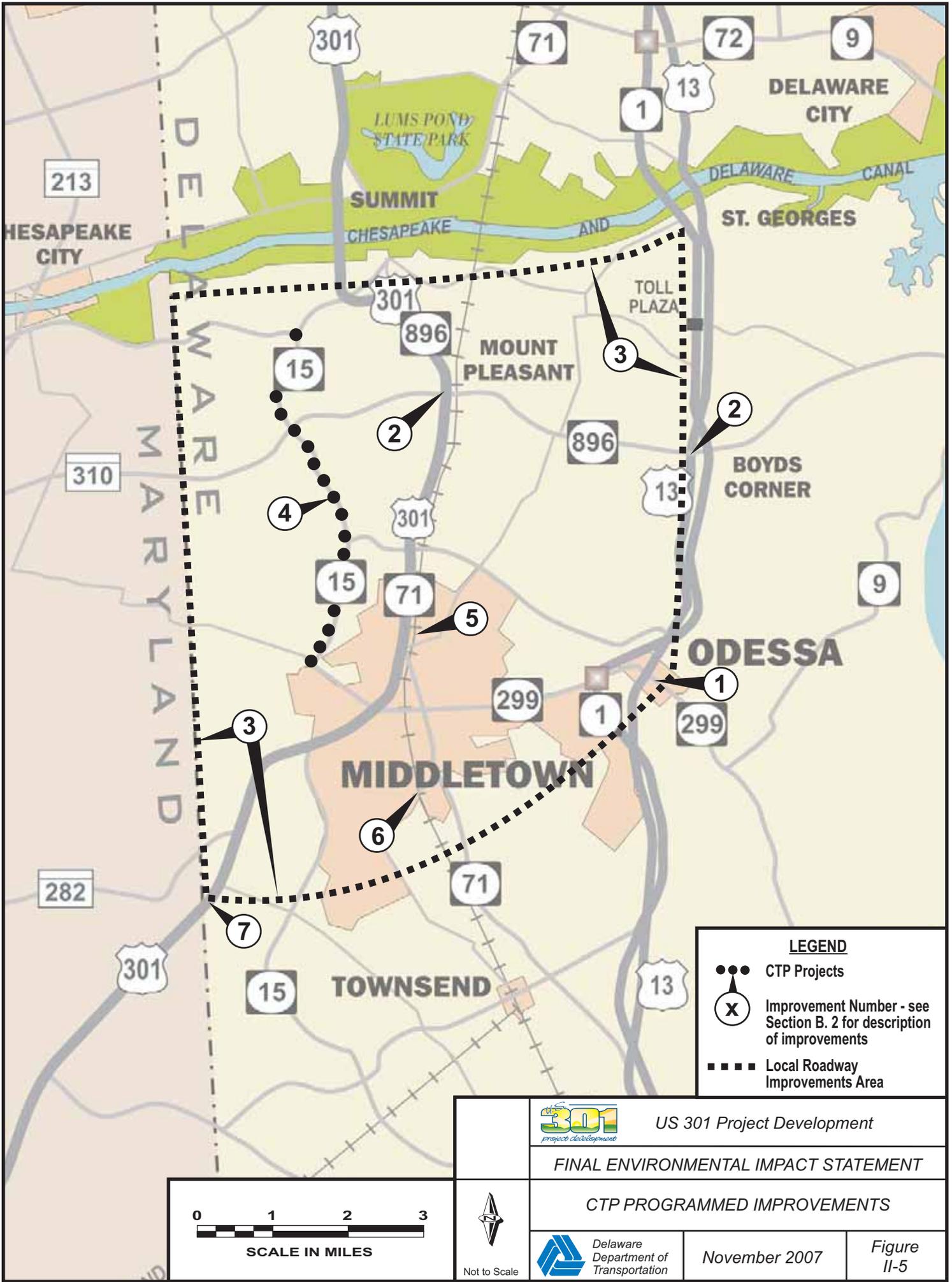
Approximately 6,000 feet north of the C&D Canal, US 301/SR 896 becomes a four-lane divided highway extending north to US 40. SR 896 extends from US 40 to I-95 as a four-lane divided highway. An additional lane in each direction is provided at the SR 896/US 40 intersection to facilitate the flow of traffic through the intersection. The additional lanes end approximately 2,000 feet north and south of US 40. The US 301/SR 896 alignment north of the C&D Canal is generally north to south, with a variable width grassed median and at-grade intersections. SR 71 leaves the roadway before the divided highway begins, and the US 301 designation stops at US 40 while the roadway extends north as SR 896 to I-95.

SR 896 (Boyds Corner Road), US 301 to SR 1

Prior to merging with US 301 at Mount Pleasant, SR 896 (Boyds Corner Road) is a two-lane local road that extends east to Boyds Corner, where it intersects US 13 and interchanges with SR 1. East of SR 1, Boyds Corner Road continues as Pole Bridge Road to Port Penn on the Delaware River.

b. Programmed Improvements

Programmed improvements in the area are included in DelDOT's currently adopted CTP *FY 2008 – 2013*. These improvements are scheduled for completion whether or not a build alternative is selected and constructed for the US 301 project. These projects are shown in **Figure II-5** and include:



LEGEND

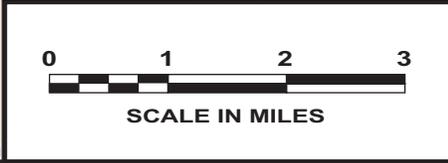
-  CTP Projects
-  Improvement Number - see Section B. 2 for description of improvements
-  Local Roadway Improvements Area



US 301 Project Development

FINAL ENVIRONMENTAL IMPACT STATEMENT

CTP PROGRAMMED IMPROVEMENTS



November 2007

Figure II-5

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



- 1 US 13, Odessa Transportation Plan Implementation – focus on SR 299 from Memorial Park to the Causeway: safety, streetscaping, pedestrian, bicycle improvements and safe crossing of US 13 (completed)
- 2 US 13 and SR 896 (Boyd's Corner Road) and SR 896 (Boyd's Corner Road) and SR 71 Mt. Pleasant Intersection Improvements – address traffic congestion problems at the intersections (SR 896/SR 71 improvements completed)
- 3 Southern New Castle County Local Road Circulation Plan (including Westown) – recommended intersection, road and operational safety improvements to Mount Pleasant intersection (completed), Armstrong Corner Road/US 301 intersection (installed signal; completed), US 301, Levels Road, Bunker Hill Road, Choptank Road, Boyd's Corner Road (intersection improvements and lane addition), Wiggins Mill Road, Saint Anne's Church Road, Cedar Lane Road, Jamison Corner Road, Route 412A and Lorewood Grove Road; prioritized and phased in consideration of existing deficiencies, emerging development and sewer phasing; includes the infrastructure improvements necessary to support the Westown development
- 4 SR 15, Choptank Road from Bunker Hill Road to Bethel Church Road – widen the existing roadway from 18 feet to 22 feet with additional five-foot pedestrian and bicycle shoulders, realign some sections, construct three roundabouts at Choptank Road/Bethel Church Road, Choptank Road/Churchtown Road, and Choptank Road/Bunker Hill Road (under construction)
- 5 Passenger Rail Study to review the feasibility of providing passenger service on the Norfolk Southern Rail alignment from Wilmington through Middletown to Dover (completed).
- 6 St. Ann's Railroad Bridge Improvements – Replace the existing St. Ann's Church Road bridge over the Norfolk Southern Railroad just south of Middletown
- 7 Truck Weight Enforcement – Provide truck weigh and inspection station on northbound US 301 just north of the Maryland state line.

c. *Multi-Modal Improvements*

The 2000 MIS looked at a wide range of multi-modal alternatives to consider within the project area, with the goals of reducing the percentage of trips by single occupancy vehicles (SOVs) and increasing the trip share of non-automotive modes of travel. Multi-modal options evaluated included bus and rail transit, high occupancy vehicle lanes, pedestrian and bicycle facilities, Transportation Demand Management Strategies (TDMS), Intelligent Transportation Management Systems (ITMS, or DelTrac) and major and minor roadway improvements. Many of these elements have been implemented and are ongoing, including bus transit service expansion and the construction of park and ride lots, commuter rail studies, the statewide bicycle study, ITMS improvements and local road improvements. Although these measures would help alleviate the growing and projected congestion in the corridor, the MIS also recognized the need for a limited access highway in the corridor.

2. Yellow Alternative

The Yellow Alternative would be constructed along the existing north/south alignment of US 301 from the Delaware/Maryland state line to Mount Pleasant, where the alignment would turn east/west and travel along existing SR 896 (Boyds Corner Road) to tie into SR 1, north of the SR 1/Boyds Corner Road interchange. Directional ramps from US 301 would join SR 1 north of the Biddles Corner Toll Plaza.

The Yellow Alternative measures a total length of 19.4 miles, including frontage roads, and has four interchanges: right-on/right-off ramps southwest of Middletown at Levels Road; slip ramps to service roads north of Middletown; directional ramps to and from SR 1 near Boyds Corner Road; and an interchange at the junction of SR 15/SR 896 at the base of Summit Bridge. The Yellow Alternative is shown in *Appendix A* and was shown in detail on *Yellow Alternative, Sheets 1 through 6 in Appendix B of the DEIS*.

a. *Detailed Description of the Yellow Alternative*

State Line to Mount Pleasant

Beginning just west of the Delaware/Maryland state line, the Yellow Alternative would tie into the existing four-lane Maryland portion of US 301 prior to entering Delaware. The new alignment would parallel existing US 301 on the west side, minimizing impacts to a series of historic (listed or eligible for listing in the National Register of Historic Places) properties along existing US 301. Arterial frontage roads located parallel to the mainline would provide access for properties along existing US 301 and allow for the circulation of local traffic. From Bunker Hill Road to Mount Pleasant, the Yellow Alternative would overpass SR 299, Bunker Hill Road, Main Street, SR 71, Frogtown Crossing, Armstrong Corner Road, and the Norfolk Southern rail line just south of Mount Pleasant.

Mount Pleasant to SR 1

After crossing over the Norfolk Southern rail line, the Yellow Alternative extends in an east-west direction parallel to SR 896 (Boyds Corner Road). Existing Boyds Corner Road would continue to provide local access. The new US 301 would cross over Jamison Corner Road, Emerson Road, Shallcross Lake Road, US 13 and SR 1 and tie into SR 1, north of the SR 1/Boyds Corner Road interchange and south of the existing Biddles Corner Toll Plaza. Directional ramps from southbound SR 1 to southbound US 301 and from northbound US 301 to northbound SR 1 would bypass the toll plaza.

SR 15/SR 896 Interchange

An interchange would replace the existing SR 15/SR 896 intersection at the base of Summit Bridge to address traffic and safety issues.

b. Why the Yellow Alternative is not Preferred

The Yellow Alternative is *not preferred* because of having the highest impacts to communities (seven existing and four proposed), individual properties, and businesses that would occur with this alternative. An estimated 377 properties would be impacted, the highest of all the alternatives, including 118 residential relocations and 32 business relocations. Property acquisitions would result in the highest real estate costs and total costs of all of the alternatives. Although the Yellow Alternative would have a mid-level number of residential noise impacts (74 residences), noise barrier mitigations would not be feasible in most locations, including residences in Summit Bridge Farms, Grande View Farms, and along Boyds Corner Road, because of the need to retain local access, additional impacts from adjacent roadways and/or the need for additional right-of-way to construct earth berms without additional property impacts. The location of the alignment adjacent to the existing US 301 and SR 896 corridors would have resulted in a 350 to 400 foot wide highway corridor along most of its length that would impede community cohesion within Middletown and the project area. One-way access roads alongside the roadway corridor would provide circuitous access to local business and residential properties along existing US 301.

The Yellow Alternative had among the lowest impacts to streams (215 linear feet), farmland, forest (36.9 acres) and other habitat. However, although the Yellow Alternative closely followed the existing US 301 and SR 296 corridors, it had the highest amount of impacts to wetlands of any of the alternatives (50.5 acres). Only the Yellow Alternative would physically impacted four known historic properties, requiring property acquisition from two and causing the destruction of two others. The Yellow Alternative would be the most difficult to construct and would have the greatest impact on the traveling public during construction. The Yellow Alternative would carry less traffic than the other build alternatives, thus would be less effective in fulfilling the project's purpose and need. The Yellow Alternative had less public support than the other alternatives.

3. Purple Alternative

The Purple Alternative would be constructed on new location along the ridge route, west of Middletown, extending north from the Delaware/Maryland state line to Armstrong Corner Road, where the alignment would then continue northeast to cross over existing US 301, the Norfolk Southern Railroad, and existing SR 896 (Boyds Corner Road), then extend parallel to existing Boyds Corner Road and tie into SR 1 north of the SR 1/Boyds Corner Road interchange and south of the Biddles Corner Toll Plaza. Near Armstrong Corner Road, a two-lane, limited access Spur Road would continue north on new location along the ridge route to interchange with SR 896, south of Summit Bridge and the C&D Canal.

The Purple Alternative measures a total length of 16.9 miles, including the Spur Road, and has five interchanges: a diamond interchange southwest of Middletown at Levels Road; right-on/right-off ramps at existing US 301 in the vicinity of Armstrong Corner Road; a flyover ramp at the terminus of the Spur Road at SR 896; flyover ramps at SR 1 near US 13 and SR 896 (Boyds Corner Road); and a partial cloverleaf interchange along the Spur Road at an extended

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



Bethel Church Road. The Purple Alternative is shown in *Appendix A* and was shown in detail on *Purple Alternative, Sheets 1 through 8 in Appendix B of the DEIS*.

a. Detailed Description of the Purple Alternative

State Line to Armstrong Corner Road Area

The Purple Alternative alignment would be identical to the Preferred Green North Alternative alignment in this portion of the roadway.

Armstrong Corner Road Area to SR 1 - Mainline

After crossing to the north side of Boyds Corner Road, the Purple Alternative extends to the east, parallel to SR 896 (Boyds Corner Road). In this location, the Purple and Yellow Alternatives share a common alignment. Existing Boyds Corner Road would continue to provide local access. The new US 301 would cross over Jamison Corner Road, Emerson Road, Shallcross Lake Road, US 13 and SR 1 and tie into SR 1, north of the SR 1/Boyds Corner Road interchange and south of the existing Biddles Corner Toll Plaza. Directional ramps from southbound SR 1 to southbound US 301 and from northbound US 301 to northbound SR 1 would bypass the SR 1 Biddles Corner Toll Plaza.

Armstrong Corner Road Area to Summit Bridge - Spur Road

The Purple Alternative Spur Road would extend from the new US 301 mainline in the vicinity of Armstrong Corner Road and continue on the ridge alignment, between Choptank Road and existing US 301, to just south of the Summit Bridge. The existing US 301/SR 896/SR 15 intersection would be replaced with a “Y” type interchange. Old Schoolhouse Road and Churchtown Road would overpass the Spur Road (no access). Bethel Church Road would be extended east from the existing intersection of Bethel Church Road and Choptank Road, and would interchange with the Spur Road (partial cloverleaf providing access to and from the north).

b. Why the Purple Alternative is not Preferred

The Purple Alternative is *not preferred* because of greater social impacts to communities and community facilities along the portion of the alignment that follows SR 896 (Boyds Corner Road), including noise and visual impacts that could not be easily mitigated. The Purple Alternative had the highest number of potential residential noise impacts (148), and many (45) of the potential noise impacts were identified at residences and communities along Boyds Corner Road, where mitigation would not be feasible. There were potential impacts to the New Covenant Presbyterian Church, potential farmland/approved development impacts, and potential noise impacts to the Cedar Lane Educational Campus. The location of the alignment adjacent to Boyds Corner Road (which is programmed for expansion to four lanes) would have created a 350-foot wide transportation corridor along Boyds Corner Road, disrupting community cohesion

in the area. The Purple Alternative would require relocation of the Odessa Fire Department substation. Higher right-of-way costs and complex interchange and access road configurations led to a greater cost than the Green North Alternative. In general, the Purple Alternative has similar numbers of natural environmental impacts to the Green North Alternative, with slightly less wetlands impacts, less subaqueous lands impacts, and slightly greater waters of the US impacts. The Purple Alternative had the highest potential number (22) of historic properties indirectly affected (visual and noise effects) of all of the retained alternatives.

4. Brown Alternative, North and South Options

The Brown Alternative would be constructed on new location along the ridge route, west of Middletown, from the Delaware/Maryland state line to south of Summit Bridge. It would then curve and extend on an easterly alignment to intersect with SR 1 north of the Biddles Corner Toll Plaza and south of the SR 1 bridge over the C&D Canal. The alignment of the Brown Alternative would be identical to the Purple Alternative from the state line to just south of Armstrong Corner Road, where it would continue north on the ridge alignment to north of Churchtown Road (similar to the Spur Road alignment for the Purple and Green Alternatives). At that point, the Brown Alternative provides two options for the east-west segment, the North Option and the South Option.

The Brown Alternative North and South options measure a total length of 15.5 and 15.9 miles, respectively, and have five interchanges. Both options include a diamond interchange southwest of Middletown at Levels Road; directional ramps and a half diamond interchange at SR 15/SR 896 south of Summit Bridge; a diamond interchange at Jamison Corner Road; and directional ramps between US 301 and SR 1 north of the Biddles Corner Toll Plaza. The North Option has an additional diamond interchange at SR 896 east of Summit Airpark, and the South Option includes a partial cloverleaf at SR 896 east of Summit Airpark. The Brown Alternative with North and South Options is shown in *Appendix A* and was shown in detail on *Brown Alternative, Sheets 1 through 6 in Appendix B of the DEIS*.

a. Detailed Description of the Brown Alternative North and South Options

State Line to North of Churchtown Road

This portion of the Brown Alternative would be identical to the Purple Alternative until just south of Armstrong Corner Road, where the Brown Alternative would continue north along the ridge route until north of Churchtown Road.

North of Churchtown Road to SR 1 – North Option

Just north of Churchtown Road, the Brown Alternative North Option would continue in a northerly direction towards the existing SR 15/SR 896 intersection south of Summit Bridge. The North alignment would then continue east/west on a new alignment toward SR 1, passing between the communities of Summit Bridge Farms and Lea Earra Farms. The North Alignment

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



would cross over the Norfolk Southern rail line and under both a reconstructed Ratledge Road and a reconstructed Jamison Corner Road, pass south of the Airmont community, cross over Scott Run and under a reconstructed Hyetts Corner Road, and continue east to an interchange with SR 1 north of the existing Biddles Corner Toll Plaza and south of the SR 1 bridge over the C&D Canal. Directional ramps would be provided from southbound SR 1 to southbound US 301 and from northbound US 301 to northbound SR 1.

North of Churchtown Road to SR 1 – South Option

Just north of Churchtown Road, the Brown Alternative South Option alignment would turn northeast between the communities of Chesapeake Meadow and Summit Bridge Farms. The alignment would pass through the Summit Airport and cross over SR 896 and the Norfolk Southern Railroad. East of Ratledge Road, the alignment would then extend to SR 1 on the same alignment as the Brown North Option.

b. Why the Brown Alternative Options are not Preferred

The Brown Alternative North and South Options are *not preferred* primarily because of their impact on Summit Airport. The Brown South option would impact the existing airport runway and support buildings, and the Brown North option would impact the runway clear zone and affect expansion plans approved by the Federal Aviation Administration (FAA). Impacts to the natural environment would be somewhat similar to the Green and Purple Alternatives, although the Brown Alternatives would have the greatest impacts to high quality wetlands, streams and habitat areas. DNREC does not support the Brown Alternatives because of their impacts to high quality wetlands and relatively undisturbed natural stream systems and wildlife corridors.

The Brown Alternatives would impact one additional historic resource whose eligibility has not been determined, as this effort would require removal of parts of the building. Community impacts were also deemed high, as the North Option results in a three-level interchange between the communities of Summit Bridge Farms and Lea Earra Farms. Although the potential for noise impacts was lowest for the Brown Alternatives, some of the impacts would be difficult to minimize for communities adjacent to the Summit Interchange area. The Brown Alternatives also received consistent and considerable opposition at the public workshops and community meetings.

5. Green Alternative South Option

The Green Alternative South Option would be constructed on new location along the ridge route, west of Middletown, from the Delaware/Maryland state line to north of Middletown near Armstrong Corner Road, where the mainline alignment would then continue northeast to cross over existing US 301, the Norfolk Southern Railroad, and existing SR 896 (Boyds Corner Road). The Green South Alternative would continue generally northeasterly, curving to the east to interchange with Jamison Corner Road, south of the proposed Scott Run Business Park. From Jamison Corner Road, the alignment extends generally northeasterly, then curves to the north,

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



tying into SR 1 north of the Biddles Corner Toll Plaza. Near Armstrong Corner Road, a two-lane, limited access Spur Road would continue north on new location along the ridge route and interchange with SR 15/SR 896 south of Summit Bridge and the C&D Canal.

The Green Alternative South Option measures a total length of 17.3 miles, including the Spur Road, and has six interchanges: a diamond interchange southwest of Middletown at Levels Road; right-on/right-off ramps at existing US 301 in the vicinity of Armstrong Corner Road; a diamond interchange at Jamison Corner Road; directional ramps with SR 1 north of the Biddles Corner Toll Plaza; a partial cloverleaf interchange along the Spur Road at an extended Bethel Church Road; and directional ramps with SR 896, south of Summit Bridge. The Green Alternative with North and South Options is shown in *Appendix A*. The Green Alternative, South Option was shown in detail in the *DEIS in Appendix B*.

a. Detailed Description of the Green Alternative South Option

State Line to Armstrong Corner Road Area

The alignment of the Green Alternative South Option would be identical to the Preferred Green Alternative North Option and Purple Alternatives for this portion of the roadway.

Mainline - Armstrong Corner Road Area to SR 1

East of the Norfolk Southern Railroad overpass, the Green Alternative South Option alignment would continue in a northeasterly direction to pass over SR 896 (Boyd's Corner Road). North of Boyd's Corner Road, the South Option would continue on new location in a northeasterly direction toward SR 1, passing over Jamison Corner Road. The alignment would then cross over Scott Run and under a reconstructed Hyetts Corner Road, continuing on the same alignment as the North Option from east of Hyetts Corner Road.

Armstrong Corner Road Area to Summit Bridge - Spur Road

The alignment of the Green Alternative Spur Road would be identical to the Preferred and Purple Alternatives Spur Road for this portion of the roadway.

b. Why the Green Alternative South Option is not Preferred

For the Green South Alternative, effects on the natural environment (wetlands, streams and habitat areas) would be generally comparable to those for the Purple, Brown and Green North Alternatives. When comparing the natural impacts of the two Green Alternatives, the Green South option had slightly greater impacts to wetlands (N = 26.2; S = 28.3 acres), waters of the US (N = 15,515; S = 16,326 linear feet) and forests (N = 34.1; S = 36.8 acres). For both the Green North and Green South Alternatives, community impacts were fewer than for the other alternatives retained for detailed evaluation and had the greatest potential for mitigation. The

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



Green South Alternative ranked equally with the Green North Alternative in meeting the purpose and need for the project, based on the analysis of future traffic.

The Green Alternative South Option is *not preferred* because, although the impacts to resources are similar to those of the preferred North Option, the South Option requires two crossings of Scott Run while the North Option requires a single crossing. In addition, the South Option's crossing of Scott Run, east of Jamison Corner Road, is longer and more skewed than the North Option's crossing. The Green South Alternative would impact the family-owned and operated Emerson Farm and the potential future high school parcel north of Boyds Corner Road. Although a similar modification could have been made for Green South to avoid impacts to the potential school parcel and the Emerson Farm (as was made for Green North in Ratledge Road Area Option 4B Modified), it is likely that this would have increased the length of the second crossing of Scott Run, further increasing the amount of the impact to this sensitive watershed. Because of the additional Scott Run crossing and the greater impacts to wetlands and waters of the US of the South Option when compared to the North Option, DNREC preferred the Green North Option.

6. Preliminary Comparison of Engineering Features

Each of the Alternatives Retained for Detailed Evaluation was compared on the basis of its engineering features and on its ability to meet the project's Purpose and Need. A comparison of the engineering and design features and estimated costs, as reported in the DEIS, is summarized in *Table II-1*.

Table II-1: Comparison of Engineering Features and Costs

Features	Yellow Alternative	Purple Alternative	Brown Alternative North Option	Brown Alternative South Option	Green Alternative North Option	Green Alternative South Option
Alignment Description	On alignment US 301 plus E/W SR 896	Ridge route plus on alignment E/W SR 896 (with spur)	Ridge route plus new northern E/W alignment	Ridge route plus new northern E/W alignment	Ridge route plus new E/W alignment (with spur)	Ridge route plus new E/W alignment (with spur)
Alignment Length, miles	19.4	16.9	17.5	15.9	17.5	17.3
Total Area of LOD, acres	870	902	896	894	897	876
Number of Properties Impacted	301	164	114	121	142	139
# of Interchanges	4	5	5	5	6	6
Interchange Locations	<ul style="list-style-type: none"> • Levels Road • 301 north of Middletown • SR1 at Boyds Corner Rd • SR 15/SR 896 	<ul style="list-style-type: none"> • Levels Road • Armstrong Corner Rd • SR1 at Boyds Corner Rd • Bethel Church Rd • SR 15/SR 896 	<ul style="list-style-type: none"> • Levels Road • SR896/Summit Bridge • SR896/Summit Airpark • Jamisons Corner Rd • SR1 north of Toll Plaza 	<ul style="list-style-type: none"> • Levels Road • SR896/Summit Bridge • SR896/Summit Airpark • Jamisons Corner Rd • SR1 north of Toll Plaza 	<ul style="list-style-type: none"> • Levels Road • Armstrong Corner Rd • Jamisons Corner Rd • SR1 north of Toll Plaza • Bethel Church Rd • SR 15/SR 896 	<ul style="list-style-type: none"> • Levels Road • Armstrong Corner Rd • Jamisons Corner Rd • SR1 north of Toll Plaza • Bethel Church Rd • SR 15/SR 896



Table II-1: Comparison of Engineering Features and Costs

Features	Yellow Alternative	Purple Alternative	Brown Alternative North Option	Brown Alternative South Option	Green Alternative North Option	Green Alternative South Option
# Overpasses/ Underpasses	11	11	8	8	9	9
Overpass/ Underpass Locations	<ul style="list-style-type: none"> • Strawberry Lane • Middletown B&T Park • Bunker Hill Rd • Broad Street • Marl Pit Rd • US 301 • Norfolk Southern RR • SR 896 • Jamisons Corner Rd • SR 896 • Shallcross Lake Rd 	<ul style="list-style-type: none"> • Strawberry Lane • Bunker Hill Rd • Armstrong Corner Rd • US 301 • Norfolk Southern RR • SR 896 • Jamisons Corner Rd • SR 896 • Shallcross Lake Rd • Old Schoolhouse Rd • Churchtown Rd 	<ul style="list-style-type: none"> • Strawberry Lane • Bunker Hill Rd • Bohemia Mill Rd • Old Schoolhouse Rd • Churchtown Rd • Norfolk Southern RR • Ratledge Rd • Hyetts Corner Rd 	<ul style="list-style-type: none"> • Strawberry Lane • Bunker Hill Rd • Bohemia Mill Rd • Old Schoolhouse Rd • Churchtown Rd • Norfolk Southern RR • Ratledge Rd • Hyetts Corner Rd 	<ul style="list-style-type: none"> • Strawberry Lane • Bunker Hill Rd • Armstrong Corner Rd • US 301 • Norfolk Southern RR • SR 896 • Hyetts Corner Rd • Old Schoolhouse Rd • Churchtown Rd 	<ul style="list-style-type: none"> • Strawberry Lane • Bunker Hill Rd • Armstrong Corner Rd • US 301 • Norfolk Southern RR • SR 896 • Hyetts Corner Rd • Old Schoolhouse Rd • Churchtown Rd
Preliminary Cost (\$ millions)	\$686 - \$758	\$616 - \$680	\$550 - \$608	\$499 - \$551	\$534 - \$590	\$526 - \$582

All of the retained alternatives met the project’s Purpose and Need to varying degrees with respect to relieving congestion, separating through traffic from local traffic, and improving safety. All of the alternatives would provide comparable or improved levels of service in the design year (2030) as compared to the No-Build Alternative.

C. Alignment Options Considered

Following the presentation of the Alternatives Retained for Detailed Evaluation to the environmental resource and regulatory agencies on November 8, 2005, the alternatives, in response to Agency and public comments, underwent further evaluation and options development to avoid or minimize potential impacts. These options were presented to the public at workshops in December 2005, February 2006, and April 2006. Options for the alternatives were developed in three major locations, as shown on *Figure II-6*: the Armstrong Corner Road Area (ACR Area); the Boyds Corner Road Area (BCR Area); and on the Spur Road at the intersection of SR 15/SR 896, the Summit Interchange Area (SI Area). *Table II-2* lists the options considered for the alternatives.



Table II-2: Alternatives Options Considered

Options	Yellow Alternative	Purple Alternative	Brown Alternative North Option	Brown Alternative South Option	Green Alternative North Option	Green Alternative South Option
Interchange Options in the Armstrong Corner Road Area ACR Area Options	N/A	Option 1 Option 2 Option 2A Option 3	N/A	N/A	Option 1 Option 2 Option 2A Option 3	Option 1 Option 2 Option 2A Option 3
Optional Alignments in the Boyds Corner Road Area BCR Area Options	Option 1 Option 2 Option 3 Option 4	Option 1 Option 2 Option 3 Option 4	N/A	N/A	N/A	N/A
Interchange Options and Spur Road access at SR 15/SR 896 SI Area Options	Option 1 Option 2	Option 1 Option 2 Option 3 Option 3B Option 4	N/A	N/A	Option 1 Option 2 Option 3 Option 3B Option 4	Option 1 Option 2 Option 3 Option 3B Option 4
Optional Alignments in the Ratledge Road Area RR Area Options	N/A	N/A	N/A	N/A	Option 1 Option 2 Option 3 Option 4 Option 4A Option 4B Option 4B Modified	N/A

Following publication of the DEIS, additional options were developed in the Ratledge Road Area (RR Area) as a result of comments received at the Public Hearings and during the public comment period. *Figure II-6* and *Table II-2* also include the RR Area Options.

A comparison of environmental impacts, advantages and disadvantages of the options is presented in *Tables II-3* through *II-7*. The Preferred Alternative shown in *Appendix B* includes the preferred options for the Armstrong Corner Road area, Summit Interchange area and Ratledge Road area.

1. Armstrong Corner Road (ACR) Area Options –Purple and Green Alternatives

Four interchange options were considered for the Purple and Green Alternatives in the Armstrong Corner Road (ACR) area. In this location, the new US 301 mainline leaves the ridge route and travels northeast towards existing US 301 and the Norfolk Southern rail line. The Spur Road extends from the new US 301 mainline, in the ACR area, north along the ridge route towards the Summit Bridge.

An interchange is provided in the Armstrong Corner Road area on the new US 301 mainline to access the areas north of Middletown. The options were developed in an attempt to minimize or balance impacts to community facilities and other properties located in this area.



Each of the ACR Area options is described in the sections below, with the reasons why it was or was not preferred. The potential impacts associated with each option are compared in **Table II-3**. The ACR Area Options were shown in detail in the **DEIS Appendix C, Figures 1-4**.

All of the options would impact forests, waters of the US including wetlands, prime farmland soils and one agricultural preservation district. All of the options will impact the Midland Farms community (individual properties and visual and noise impacts), and some of the options will cause the location of the roadway to be closer to/farther from the Springmill community, the Middletown Baptist Church and the historic Armstrong-Walker House.

**Table II-3: Purple and Green Alternatives
Impacts Comparison of the Armstrong Corner Road Area Options**

Option	Option 1	Option 2	Option 2A	Option 3
Total Length of Option (miles)	4.0	3.9	3.9	3.9
Total area of Limit of Construction (acres)	218	301	226	200
Wetlands (acres) ¹	7.6	9.2	10.0	11.7
High quality (acres)	0.8	2.3	0.8	1.4
Medium quality (acres)	5.3	6.3	8.7	9.7
Low quality (acres)	1.6	0.6	0.6	0.6
Waters of the US (lf) ²	2,867	3,020	2,955	1,816
Hydric Soils (acres) ³	39	53	52	47
DNREC Sub-Aqueous Lands (linear feet)	853	1,676	1,630	853
Habitat Areas (Wildlife & Plant) (acres)	26.9	23.8	24.3	23.2
Prime Farmland Soils (acres)	134	153	136	120
Agricultural Preservation Districts (#)	1 (10.0 ac.)	1 (10.3 ac.)	1 (9.9 ac.)	1 (10.0 ac.)
Agricultural Preservation Easements (#)	0	0	0	0
Forested Land (acres) ⁴	15.7	12.0	9.9	10.6
Historic Properties ⁵ Potential Adverse Effects				
Physical (#)	0	0	0	0
Audible (A), Visual (V), Atmospheric (M) (#)	1 (V,A)	2 (V,A)	2 (V,A)	2 (V,A)

- Notes
1. Total area of ACOE wetlands impacted.
 2. Does not include waters within wetlands. lf = linear feet
 3. Includes hydric soils not in wetlands.
 4. Includes deciduous, evergreen and mixed forest types not included in wetlands. Based on DE Department of Land Use & Planning 2002 Land Use data.
 5. Historic Properties are defined in Chapter III.B as "resources listed in or determined eligible for listing in the National Register of Historic Places"

a. ACR Area Option 1

ACR Area Option 1 would provide a diamond interchange between the new US 301 and Armstrong Corner Road east of Choptank Road. Interchange ramps would provide local access on Armstrong Corner Road, west of existing US 301. A programmed traffic signal would be provided at the intersection of existing US 301 and Armstrong Corner Road. Armstrong Corner Road would overpass both the new US 301 mainline and spur road.

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



*ACR Area Option 1 is **not preferred** because it requires the relocation of Middletown Baptist Church (impacting both building and parking lot), only meets minimum design standards for spacing between the Spur Road/US 301 interchange and the US 301/Armstrong Corner Road interchange, does not provide a direct connection between Armstrong Corner Road and Bohemia Mill Road, locates the interchange on a local road (Armstrong Corner Road) rather than an arterial road (existing US 301), and has the highest impacts to forested land and habitat areas of all of the options.*

b. ACR Area Option 2

ACR Area Option 2 would provide a diamond interchange between new US 301 and a relocated existing US 301. Existing US 301 would be relocated to the west, beginning at Armstrong Corner Road and extending to just south of Post and Rail Farms to rejoin the existing US 301 alignment. Armstrong Corner Road would be realigned to overpass the Spur Road. New US 301 would overpass Armstrong Corner Road south of a diamond interchange between new and existing US 301. Signalized intersections with the realigned existing US 301 would provide ramp access.

*ACR Area Option 2 is **not preferred** because it requires the relocation of existing US 301 in order to accommodate the north-serving ramps. The relocation of existing US 301 results in greater right-of-way and relocation impacts with increased right-of-way, structure and roadway costs, and could affect traffic operations on existing US 301 with two closely spaced additional traffic signals. Option 2 has the highest impacts to waters of the US.*

c. ACR Area Option 2A (Preferred)

ACR Area Option 2A would provide right-on/right-off interchange ramps between new and existing US 301. The northbound entrance and exit ramps would be located on existing US 301 approximately 1,000 feet north of Armstrong Corner Road. The southbound entrance and exit ramps would be located on existing US 301, approximately 3,500 feet north of Armstrong Corner Road. Two new signalized intersections on existing US 301 would control exit and entry traffic.

*ACR Area Option 2A is **preferred**, because it locates the interchange on an arterial road (existing US 301) rather than a local road (Armstrong Corner Road), does not require relocation of existing US 301, has significantly less right of way and relocation impacts and a lower cost than Option 2, and does not require the relocation of Middletown Baptist Church (avoids direct impacts to the building and parking area). The Option provides an acceptable level of impacts to wetlands (the majority of impacts are to medium quality wetlands (8.7 of 10.0 acres of impact)) and the least (9.9 acres) impacts to forests in the area.*



d. ACR Area Option 3

ACR Area Option 3 would provide a diamond interchange between the new US 301 and Armstrong Corner Road similar to Option 1; however, the mainline would leave the ridge alignment and travel to in a northeasterly direction approximately 2,200 feet south of the directional change for Option 1. Interchange ramps would provide local access on Armstrong Corner Road, west of existing US 301, and a signal would be provided on existing US 301 at Armstrong Corner Road. Armstrong Corner Road would overpass both the mainline and spur road.

*ACR Area Option 3 is **not preferred** because it has greater wetland impacts than the other options (1, 2, and 2A) and impacts a previously undisturbed wetland in the area, it locates the interchange on a local road (Armstrong Corner Road) rather than an arterial road (existing US 301), and is closer to the Armstrong-Walker House (a historic resource) and the Springmill community than the other options. Option 3 has the lowest impacts on subaqueous lands but the highest impacts on wetlands.*

2. Boyd's Corner Road (BCR) Area Options – Yellow and Purple Alternatives

Four mainline options were considered for the Yellow and Purple Alternatives that would minimize or avoid impacts to community facilities located at the corner of SR 896 (Boyd's Corner Road) and Jamison Corner Road, active farmland (Emerson Dairy Farm), and the planned Bayberry Town Center/Village of Bayberry. The options explored various alignments of the segment of new US 301 from Mount Pleasant to SR 1.

Each of the Boyd's Corner Road Area options is described in the sections below. The potential impacts of each option are compared in **Table II-4**. The BCR Area options were shown in detail in the **DEIS Appendix C, Figures 5-8**. There is no consideration of preference because these options do not apply to the Preferred Alternative.

Table II-4: Yellow and Purple Alternatives Impacts Comparison of the Boyd's Corner Road Area Options					
Option		Option 1	Option 2	Option 3	Option 4
Total Length of Option (miles)	Yellow Alternative	3.4	3.5	3.5	3.5
	Purple Alternative	4.0	4.2	4.2	4.1
Total area of Limit of Construction (acres)	Yellow Alternative	156	159	155	143
	Purple Alternative	184	173	169	163
Wetlands (acres) ¹	Yellow Alternative	9.3	8.7	11.7	12.5
	Purple Alternative	5.5	3.7	3.7	4.3
Waters of the US (lf) ²	Yellow Alternative	3,523	2,709	1,809	3,307
	Purple Alternative	1,556	1,799	1,371	1,282
Hydric Soils (acres) ³	Yellow Alternative	22	44	27	25
	Purple Alternative	23	30	26	21
DNREC Sub-Aqueous Lands (linear feet)	Yellow Alternative	88	710	879	1,398
	Purple Alternative	552	1,577	723	552



**Table II-4: Yellow and Purple Alternatives
Impacts Comparison of the Boyds Corner Road Area Options**

Option		Option 1	Option 2	Option 3	Option 4
Habitat Areas (acres) (Wildlife & Plant)	Yellow Alternative	7.9	4.2	7.3	5.7
	Purple Alternative	7.8	9.7	7.4	7.5
Prime Farmland Soils (acres)	Yellow Alternative	39	44	39	35
	Purple Alternative	38	34	34	37
Ten-year Agricultural Preservation Easements (#)		0	0	0	0
Permanent Agricultural Preservation Easements (#)		0	0	0	0
Forested Land (acres) ⁴	Yellow Alternative	4.2	6.8	3.6	4.1
	Purple Alternative	9.0	6.6	6.6	8.3
Historic Properties ⁵ Potential Adverse Effects Physical (P), Audible (A), Visual (V), Atmospheric (M) (#)		Yellow ⁵ – 1 (P); 3 (V,A) Purple – 1 (V,A)	Yellow ⁵ – 1 (P); 3 (V,A) Purple – 1 (V,A)	Yellow ⁵ – 1 (P); 3 (V,A) Purple – 1 (V,A)	Yellow ⁵ – 1 (P); 3 (V,A) Purple – 1 (V,A)

- NOTES: 1. Total area of ACOE wetlands impacted.
 2. Does not include waters within wetlands. lf = linear feet
 3. Includes hydric soils not in wetlands.
 4. Includes deciduous, evergreen and mixed forest types not included in wetlands. Based on DE Department of Land Use & Planning 2002 Land Use data.
 5. There would be audible and visual impacts to the remainder of Mt. Pleasant Farm, the resource directly physically impacted.
 6. Historic Properties are defined in Chapter III.B as “resources listed in or determined eligible for listing in the National Register of Historic Places”

a. BCR Area Option 1

The BCR Area Option 1 mainline alignment is the most closely aligned to the existing SR 896 (Boyd's Corner Road), leaving minimal space between the mainline and existing SR 896. Option 1 would cross to the north of SR 896, just west of Cedar Lane Road and be less than 300 feet north of SR 896 at Jamison Corner Road. The Option 1 alignment would remain on the north side of existing SR 896 to just east of Jamison Corner Road, where the alignment would cross over SR 896 and follow on the south side of existing Boyd's Corner Road to cross over Shallcross Lake Road, US 13, and SR 1 and tie into SR 1.

b. BCR Area Option 2

The BCR Area Option 2 mainline alignment would overpass SR 896 (Boyd's Corner Road) west of Cedar Lane Road. Option 2 would continue northeast and cross Jamison Corner Road approximately 2,200 feet north SR 896 along the southern side of the Emerson Dairy Farm parcel. Option 2 would continue east through the Emerson Farm parcel and then turn towards the south to cross over Milford Drive and SR 896, where it would continue on the south side and parallel to existing SR 896, crossing over US 13 and SR 1 before tying into SR 1.

c. BCR Area Option 3

The BCR Area Option 3 mainline would overpass Boyds Corner Road west of Cedar Lane Road, then cross over Jamison Corner Road approximately 1,500 feet north of SR 896. The Option 3 alignment would traverse the northwest corner of the proposed Bayberry Town Center property and the southeast corner of the Emerson Dairy Farm, continuing east through the Bayberry Town Center property, and then turns south to cross over Milford Drive and SR 896, where it would continue on the south side of and parallel to existing SR 896, crossing over US 13 and SR 1 before tying into SR 1.

d. BCR Area Option 4

The BCR Area Option 4 mainline alignment would overpass Boyds Corner Road and then cross over Jamison Corner Road approximately 750 feet north of SR 896. The Option 4 alignment would traverse the southwest corner of the proposed Bayberry Town Center property prior to crossing over SR 896 to the south side approximately 2,400 feet east of Jamison Corner Road. The alignment would cross over Shallcross Lake Road, US 13 and SR 1 before tying into SR 1.

3. Summit Interchange (SI) Area Options – Yellow, Purple and Green Alternatives

Two interchange options were considered for the Yellow Alternative at the SR 15/SR 896 intersection at the base of Summit Bridge to address safety and traffic issues. Five interchange options were considered for the Purple and Green Alternatives at this location to address safety and traffic operations. The Brown Alternative North and South Options include an interchange to serve traffic and address safety at this location. No additional options were considered for the Brown Alternative.

The SI Area Options are described in the sections below. The potential impacts of each option are compared in *Tables II-5 and II-6*. The SI Area Options were shown in the *DEIS Appendix C, Figures 9-17*. There are no preferences expressed for the Options associated with the Yellow Alternative.

a. SI Area Option 1 – Yellow Alternative

SI Area Option 1 for the Yellow Alternative would provide a partial cloverleaf interchange in the present location of the SR 15/SR 896 intersection at the base of Summit Bridge. The interchange would include a loop ramp for traffic traveling southbound from Summit Bridge to SR 896 eastbound. Directional ramps would provide for the balance of the movements in the interchange.

b. SI Area Option 2 – Yellow Alternative

SI Area Option 2 for the Yellow Alternative would include a grade-separated interchange in the present location of the SR 15/SR 896 intersection at the base of Summit Bridge. The interchange



would provide an at-grade through movement for vehicles traveling to/from SR 896 and the Summit Bridge by improving the existing curve. Access between SR 15 and SR 896 to/from Middletown would pass over the improved curve. A directional ramp would connect the Summit Bridge to southbound SR 15.

**Table II-5: Yellow Alternative
Impacts Comparison of the Summit Interchange Area Options**

Options	Option 1	Option 2
Total area of Limit of Construction (acres)	49	28
Wetlands (acres) ¹	4.3	0.4
Waters of the US (ditches) (lf) ²	2,260	1,271
Hydric Soils (acres) ³	53	4
DNREC Sub-Aqueous Lands (linear feet)	393	0
Habitat Areas (Wildlife & Plant) (acres)	5.3	1.9
Prime Farmland Soils (acres)	17	12
Forested Land (acres) ⁴	0.5	0.1
Historic Properties Potential Adverse Effects		
Physical (#)	0	0
Audible (A), Visual (V), Atmospheric (M) (#)	0	0

- NOTES: 1. Total area of ACOE wetlands impacted.
 2. Does not include waters within wetlands. lf = linear feet
 3. Includes hydric soils not in wetlands.
 4. Includes deciduous, evergreen and mixed forest types not included in wetlands. Based on DE Department of Land Use & Planning 2002 Land Use data.
 5. Historic Properties are defined in Chapter III.B as "resources listed in or determined eligible for listing in the National Register of Historic Places"

c. SI Area Option 1 – Purple and Green Alternatives

SI Area Option 1 would provide a full diamond interchange at the intersection of SR 15, SR 896, and the Spur Road, with free traffic flow between the Spur Road and the Summit Bridge. The ramp termini would be signalized.

*SI Area Option 1 is **not preferred** because the heaviest local traffic movements (southbound and northbound on SR 896) must pass through signalized intersections, with the southbound movement requiring double left turning movements through a traffic signal during the PM peak period. Other options provide better traffic operations. The option keeps SR 896 adjacent to the Summit Bridge Farms community.*

d. SI Area Option 2 - Purple and Green Alternatives

SI Area Option 2 would provide a directional “Y” interchange between SR 896 and the US 301 Spur Road. Option 2 would improve the sharp curve (the direct movement) on SR 896 to the desired design speed and provide a continuous traffic flow for the major movements on SR 896. The northbound Spur Road would pass over SR 896. SR 15 would pass over both SR 896 and the Spur Road to intersect with Old Summit Bridge Road, east of the interchange. Access to SR 896 would be provided at the existing signalized intersection of Old Summit Bridge Road

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



and SR 896. A sub-option, Option 2A, would relocate the existing traffic signal at Old Summit Bridge Road to the entrance to Summit Bridge Farms, and Old Summit Bridge Road would be extended to this location. This would provide a two-directional signalized entrance for Summit Bridge Farms (existing entrance is right-in/right-out only).

*SI Area Options 2 and 2A are **not preferred** due to the circuitous access for SR 15 traffic west of SR 896 wishing to access SR 896, results in a greater number of vehicles on Bethel Church Road (6,200 vpd) and Old Summit Bridge Road (6,900 vpd), an increased construction cost due to increased number of structures, and would be elevated adjacent to Lea Eara Farms and Summit Bridge Farms (additional visual impact). The “A” Option is not preferred because of operational issues along SR 896 associated with the proposed signalized intersection at Old Summit Bridge Road/Summit Bridge Farms and because of the proximity of the intersections of SR 896 with Summit Bridge Road and Old Summit Bridge Road/Bethel Church Road.*

e. SI Area Option 3 – Purple and Green Alternatives

SI Area Option 3 would provide a directional “Y” interchange between SR 896 and the US 301 Spur Road, similar to SI Area Option 2. However, Option 3 would include a cul-de-sac on Bethel Church Road both east and west of the interchange. Access from Choptank Road and Bethel Church Road to the Spur Road would be provided via a new signalized intersection between an extended Bethel Church Road and the Spur Road. As with SI Area Option 2, access to SR 896 from the communities to the north (Lea Eara Farms and Summit Bridge) would be provided at the existing signalized intersection of Old Summit Bridge Road and SR 896. SI Area Option 3A, similar to Option 2A, would relocate the existing traffic signal at Old Summit Bridge Road to the entrance to Summit Bridge Farms.

*SI Area Options 3 and 3A are **not preferred** because they provide a signalized intersection on the Spur Road, thus not providing free-flowing traffic, resulting in potential noise increases at the signal (braking, stopping and starting) and could result in a higher number of accidents than the preferred Option 3B.*

f. SI Area Option 3B - Purple and Green Alternatives (Preferred)

SI Area Option 3B would provide the same roadways and interchange ramps as Option 3, but would replace the signalized intersection between the Spur Road and Bethel Church Road extended with a trumpet interchange. The interchange would provide access to and from the north only. SI Area Option 3BA, similar to Option 2A and 3A, would relocate the existing traffic signal at Old Summit Bridge Road to the entrance to Summit Bridge Farms.

*SI Area Option 3B is **preferred** because it provides free flowing traffic on the Spur Road, does not include any signals/intersections on the Spur Road (thus reducing noise associated with stopping/starting), and it provides an unbroken median along the entire Spur Road length, resulting in improved safety. The “A” Option is **not preferred** for the reasons stated previously.*

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



g. SI Area Option 4 – Purple and Green Alternatives

SI Area Option 4 would provide the same interchange as Option 3; however, access to the Spur Road at Churchtown Road and Old Schoolhouse Road would be included. Traffic signals would be provided at the three intersections on the Spur Road. SI Area Sub-Option 4A, similar to Option 2A and 3A, would relocate the existing traffic signal at Old Summit Bridge Road to the entrance to Summit Bridge Farms.

*SI Area Options 4 and 4A are **not preferred** due to the introduction of additional access on the Spur Road, which would increase traffic on Choptank Road south of Old Schoolhouse Road, on Old Schoolhouse Road, and on Churchtown Road as a result of providing local access, and would prevent the free flow of traffic on the Spur Road due to the introduction of signalized intersections and result in increased potential for accidents. Option 4 was opposed by the public and New Castle County due to the potential to encourage growth in areas west of the Spur Road not currently proposed for development. The “A” Option is not preferred for reasons previously stated.*

**Table II-6: Purple and Green Alternatives
Impacts Comparison of the Summit Interchange Area Options**

Option	Option 1	Option 2	Option 3	Option 3B	Option 4
Total Length of Option (miles)	2.0	2.9	2.9	2.9	2.9
Total area of Limit of Construction (acres)	142	145	143	145	117
Wetlands (acres) ¹	5.0	7.0	7.0	7.0	6.3
Waters of the US (lf) ²	4,396	4,374	4,106	4,130	2,511
Streams (lf)	260	260	260	260	0
Ditches (lf)	4,136	4,114	3,846	3,870	2,511
Hydric Soils (acres) ³	30	31	32	32	25
DNREC Sub-Aqueous Lands (linear feet)	1,509	1,490	1,621	1,643	777
Habitat Areas (Wildlife & Plant) (acres)	11.1	12.9	12.8	12.8	12.3
Prime Farmland Soils (acres)	71	70	74	79	63
Ten-year Agricultural Preservation Easements (#)	0	0	0	0	0
Permanent Agricultural Preservation Easements (#)	1 (6.1 ac.)				
Forested Land (acres) ⁴	6.1	6.0	5.9	5.9	5.0
Historic Properties ⁵ Potential Adverse Effects					
Physical (#)	0	0	0	0	0
Audible (A), Visual (V), Atmospheric (M) (#)	0	0	0	0	0

- NOTES: 1. Total area of ACOE wetlands impacted.
 2. Does not include waters within wetlands. lf = linear feet
 3. Includes hydric soils not in wetlands.
 4. Includes deciduous, evergreen and mixed forest types not included in wetlands. Based on DE Department of Land Use & Planning 2002 Land Use data.
 5. Historic Properties are defined in Chapter III.B as “resources listed in or determined eligible for listing in the National Register of Historic Places”



4. Ratledge Road (RR) Area Options – Preferred (Green North) Alternative

Seven options were developed for the Preferred Alternative as a result of comments received from members of the public following publication of the DEIS and during the Public Hearings. FHWA, DelDOT and the ACOE were asked to avoid impacts to two long-term family-owned and operated farms in the Ratledge Road/Jamison Corner Road area. Citizens offered alternative alignments for consideration, and these and other options were subsequently developed and evaluated with the environmental resource and regulatory agencies and stakeholders with the goal to avoid or minimize impacts to active farmlands while minimizing impacts to wetlands, waters of the US and forests in the area. All of the options evaluated the proposed alignment from approximately 4,800 feet south of Boyds Corner Road to the proposed interchange with Jamison Corner Road.

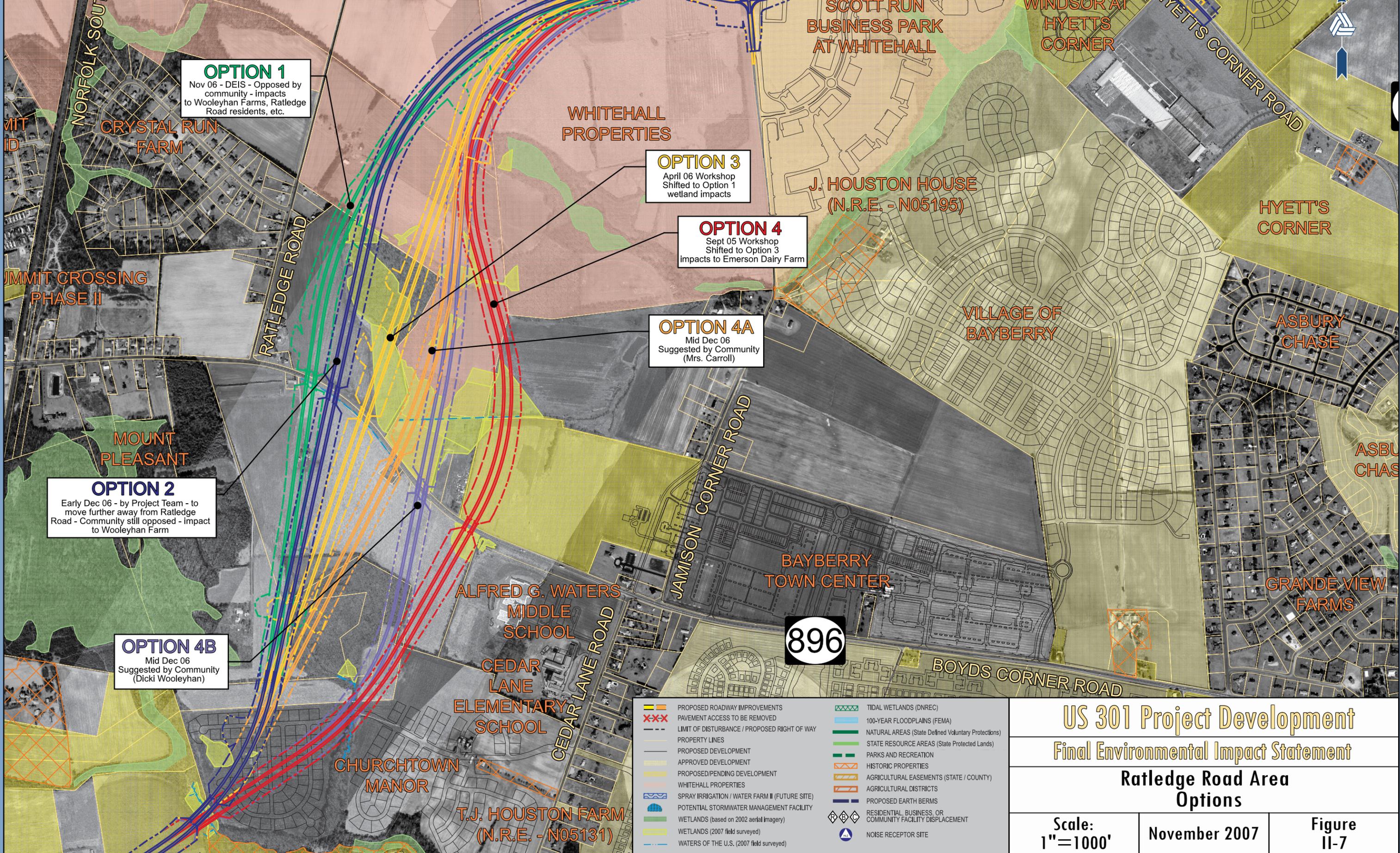
The RR Area Options are described in the sections below. The potential impacts of each option are compared in *Table II-7*. The RR Area Options are shown on *Figure II-7*. The preferred option is also shown on the Preferred Alternative drawings in *Appendix B*.

Table II-7: Comparison of Ratledge Road Area Options (Preferred Alternative)

Option	Option 1	Option 2	Option 3	Option 4	Option 4A	Option 4B	Option 4B Mod
Wetlands (acres)	27.4	32.2	35.4	31.2	36.1	35.2	34.2
High Quality	10.1	14.3	12.0	9.0	9.0	9.0	9.0
Medium quality	13.3	13.3	13.6	13.1	20.5	19.9	19.4
Low quality	4.1	4.6	9.8	9.8	6.6	6.3	5.6
Number of wetlands	51	53	53	50	53	49	50
Number of wetland crossings	4	4	4	4	4	4	4
Number of wetlands fragmented	7	7	7	7	7	7	7
Waters of the US, total (lf)	15,679	15,947	15,923	16,207	16,059	16,015	16,019
Streams	323	534	340	517	340	415	436
Ditches	15,356	15,413	15,583	15,690	15,720	15,600	15,582
DNREC Tidal wetlands (acres)	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Floodplains (acres)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Agricultural districts (No.)	1	1	1	1	1	1	1
Agricultural Easements (No.)	1	1	1	1	1	1	1
Forestland (acres)	34.21	34.28	42.17	33.24	44.56	40.60	37.98
T.J. Houston Farm Potential Adverse Effects: Visual (V)	0	0	0	(V)	0	(V)	(V)

a. *RR Area Option 1*

As presented in the November, 2006 DEIS, the RR Area Option 1 alignment would follow an almost due north alignment, crossing Boyds Corner Road approximately 450 feet east of Ratledge Road. RR Area Option 1 would provide the least amount of impacts to wetlands (27.4 acres), waters of the US (15, 679 lf) and forest (34.21 acres). Option 1 would also be least proximate to the Cedar Lane School campus, but would eliminate an operating farm (Wooleyhan Farm).



OPTION 1
Nov 06 - DEIS - Opposed by community - impacts to Wooleyhan Farms, Ratledge Road residents, etc.

OPTION 3
April 06 Workshop Shifted to Option 1 wetland impacts

OPTION 4
Sept 05 Workshop Shifted to Option 3 impacts to Emerson Dairy Farm

OPTION 4A
Mid Dec 06 Suggested by Community (Mrs. Carroll)

OPTION 2
Early Dec 06 - by Project Team - to move further away from Ratledge Road - Community still opposed - impact to Wooleyhan Farm

OPTION 4B
Mid Dec 06 Suggested by Community (Dicki Wooleyhan)

- | | |
|--|---|
| <ul style="list-style-type: none"> PROPOSED ROADWAY IMPROVEMENTS PAVEMENT ACCESS TO BE REMOVED LIMIT OF DISTURBANCE / PROPOSED RIGHT OF WAY PROPERTY LINES PROPOSED DEVELOPMENT APPROVED DEVELOPMENT PROPOSED/PENDING DEVELOPMENT WHITEHALL PROPERTIES SPRAY IRRIGATION / WATER FARM II (FUTURE SITE) POTENTIAL STORMWATER MANAGEMENT FACILITY WETLANDS (based on 2002 aerial imagery) WETLANDS (2007 field surveyed) WATERS OF THE U.S. (2007 field surveyed) | <ul style="list-style-type: none"> TIDAL WETLANDS (DNREC) 100-YEAR FLOODPLAINS (FEMA) NATURAL AREAS (State Defined Voluntary Protections) STATE RESOURCE AREAS (State Protected Lands) PARKS AND RECREATION HISTORIC PROPERTIES AGRICULTURAL EASEMENTS (STATE / COUNTY) AGRICULTURAL DISTRICTS PROPOSED EARTH BERMS RESIDENTIAL, BUSINESS, OR COMMUNITY FACILITY DISPLACEMENT NOISE RECEPTOR SITE |
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US 301 Project Development
Final Environmental Impact Statement

Ratledge Road Area Options

Scale: 1"=1000'	November 2007	Figure II-7
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**US 301 Project Development
Final Environmental Impact Statement
November 2007**



Option 1 is not preferred because of impacts to the Wooleyhan Farm, an active family-owned and operated farm, which would result in cessation of the farming operation, and impacts to the surrounding community along Jamison Corner Road.

b. RR Area Option 2

RR Area Option 2 would follow an almost due north alignment, approximately 425 feet east of Option 1, crossing Boyds Corner Road approximately 875 feet east of Ratledge Road. Option 2 would avoid impacts to the majority of farmable acreage but would increase impacts to high quality wetlands and waters of the US.

Option 2 is not preferred because the regulatory and resource agencies could not support the greater impacts to wetlands that would occur with this option.

c. RR Area Option 3

RR Area Option 3 would follow a more northeasterly alignment, crossing Boyds Corner Road approximately 1,350 feet east of Ratledge Road, impacting a larger quantity of wetlands (35.4 acres) and forest (42.17 acres). This alignment was originally evaluated in April, 2006 and eliminated from consideration in favor of RR Area Option 1.

Option 3, like Option 2, is not preferred because the regulatory and resource agencies could not support the greater impacts to wetlands that would occur with this option.

d. RR Area Option 4

RR Area Option 4 would follow an almost due north alignment, crossing Boyds Corner Road approximately 2,900 feet east of Ratledge Road, and would be closest to the Cedar Lane School campus. Option 4 would impact the western portion of the Emerson Dairy Farm. This alignment was originally evaluated in September, 2005 and was eliminated from consideration because of the farm impacts, impacts to a parcel being considered by New Castle County as the location of a new high school and proximity to the Cedar Lane school campus. Option 4 would have a potential adverse effect (audible and visual) on the TJ Houston Farm, an historic resource.

Option 4 is not preferred because of its proximity to the Cedar Lane School campus, and because of impacts to the Emerson Dairy Farm, a long-term family-owned and operated farm operation and one of the last dairy farms in New Castle County. Option 4 also impacts a parcel north of Boyds Corner Road that is being considered for acquisition for a future high school.

e. RR Area Option 4A

RR Area Option 4A would be the “middle ground” follow an alignment slightly to the east of Option 3 and west of Option 4, crossing Boyds Corner Road approximately 1,900 feet east of Ratledge Road. alignment from northeast of the Norfolk Southern railroad alignment to north of

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



Boyd's Corner Road. This option was proposed by community members in order to avoid impacts to the active long-term family-owned and operated farm properties (Wooleyhan and Emerson farms) on either side. Option 4A would have the greatest wetlands impacts (36.1 acres) and forest impacts (44.56 acres).

Option 4A is not preferred because of its greater impacts to wetlands and forests.

f. RR Area Option 4B

RR Area Option 4B was also proposed by community members in order to avoid impacts to long-term family-owned and operated farm properties. RR Area Option 4B would follow the Delaware Power and Light (DP&L) right-of-way, crossing Boyd's Corner Road approximately 2,140 feet east of Ratledge Road. Option 4B would avoid farmland impacts and has moderate impacts to wetlands (35.2 acres), waters of the US (16,015 linear feet) and forests (40.60 acres). Option 4B would have a potential adverse effect (audible and visual) on the TJ Houston Farm, an historic resource.

Option 4B is aligned to avoid high quality wetlands, but impacts to lower quality wetlands along the suggested corridor are high (35.2 acres) as are impacts to forests (40.6 acres). This option is not preferred because a slight modification to the east (as shown in Option 4B Modified) reduced wetland impacts by one acre and forest impacts by 2.5 acres.

g. RR Area Option 4B Modified (Preferred)

RR Area Option 4B was modified slightly, moving the alignment on the north side of Boyd's Corner Road slightly eastward to minimize impacts to a wetland system and forest land to become Option 4B Modified. Wetland impacts were reduced by one acre; forest impacts were reduced by more than 2.5 acres. Option 4B Modified would have a potential adverse effect (audible and visual) on the T.J. Houston Farm, an historic resource.

*Option 4B Modified is preferred because it impacts a lesser amount of high quality wetlands and forests than Option 4B and is supported by the community. Option 4B Modified avoids impacts to both the Wooleyhan and Emerson Farms (long-term family-owned and operated). Option 4B Modified was concurred on by the resource and regulatory agencies provided a recommended mitigation plan be provided. The mitigation plan includes conservation of high quality wetlands, enhancement of wetlands and uplands within the Scott Run watershed, additional wetland creation (15 acres) at the proposed Levels Road mitigation site, and additional reforestation. The mitigation commitments are discussed in detail in **Chapter III.F**.*

D. Alternatives Not Carried Forward for Further Consideration

1. Toll Free Facility

All of the retained alternatives are proposed to provide a four-lane, divided, fully access controlled, tolled roadway from the Delaware/Maryland state line to SR 1, south of the C&D Canal. Tolls would be collected at a new mainline toll plaza, located just north of the state line and the planned weigh and inspection station on northbound US 301. Tolls would be collected in both directions at the mainline toll plaza. Tolls would also be collected on all north-serving ramps accessing US 301 (on all ramps entering US 301 traveling northbound and on all ramps exiting US 301 traveling southbound).

Non-tolled options for all of the alternatives were dropped from consideration during the project development process because it was determined that tolls would be necessary to provide funding for the project. Preliminary cost estimates indicate that the total project cost would range between \$500 and \$750 million for construction.

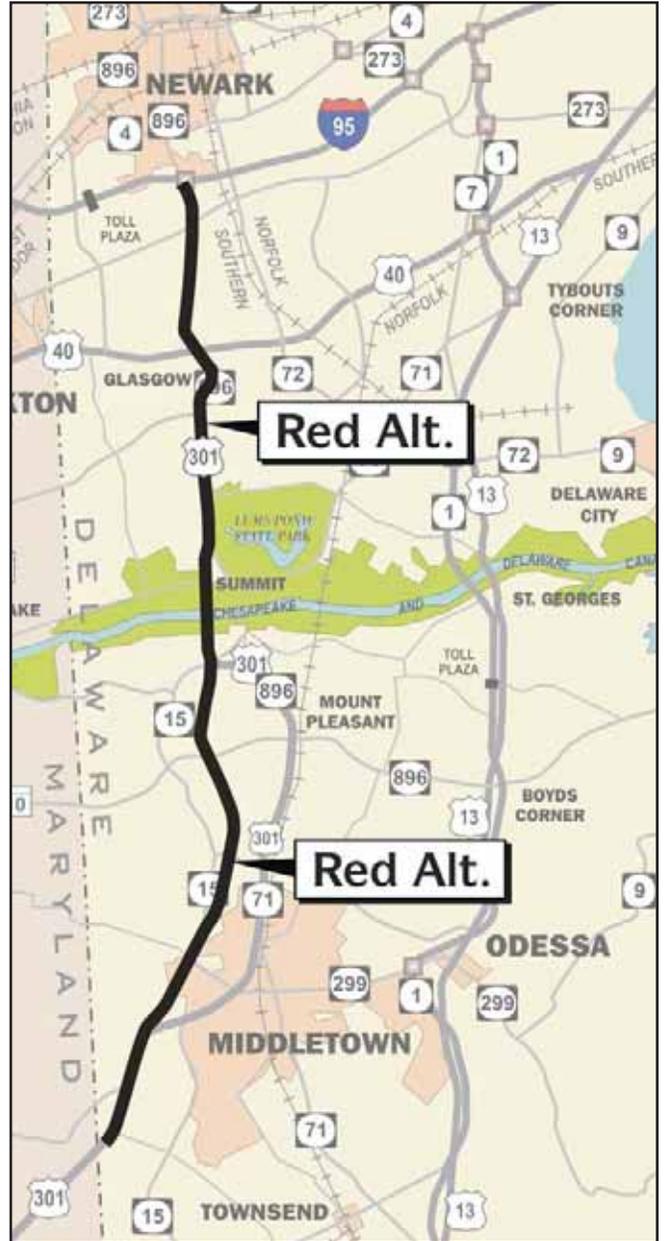
2. Alignment Alternatives

The Red, Orange and Blue Alternatives were eliminated from further consideration during the evaluation of the range of alternatives based on their inability to meet Purpose and Need, significant environmental impacts, resource and regulatory agency input and concurrence, and public input. The Red, Orange and Blue Alternatives are shown on **Figure II-8**. Additional information on these alternatives is available in *US 301 Project Development: Alternatives Retained for Detailed Evaluation* (Delaware Department of Transportation, November 2005).

a. *Red Alternative*

The Red Alternative, under early design measures, provided a new four-lane limited-access roadway on new location on the ridge route from the state line to south of the Summit Bridge. The Red Alternative modified the existing Summit Bridge to provide three lanes for northbound traffic, and constructed a second bridge crossing to the west of the existing bridge to carry three lanes of traffic southbound. North of the Canal, the Red Alternative modified existing SR 896 to provide a six-lane limited-access roadway, with frontage roads for local access, from the Canal to I-95. The Red Alternative was 17.4 miles long, with seven interchanges and ten overpass structures.

The Red Alternative was dropped from further consideration because it provided improvements in the SR 896 corridor (with 35 percent of traffic destinations) as opposed to providing a more direct connection to the northeast and I-95 via the SR 1 corridor (with 65 percent of traffic destinations). The Red Alternative does not provide direct access to SR 1. The Red Alternative was also eliminated from further consideration because of impacts to environmental resources.



US 301 Project Development

FINAL ENVIRONMENTAL IMPACT STATEMENT

ALTERNATIVES DROPPED FROM FURTHER CONSIDERATION



Not to Scale



November 2007

Figure II-8

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



Upon preliminary analysis, the Red Alternative was found to have significant environmental impacts. The Red Alternative had high impacts to waters of the US (32.9 acres of wetlands, streams and ditches), hydric soils (123 acres), floodplains (5.3 acres) and forests (88.9 acres), and had the greatest number of property acquisitions (279) of all of the range of alternatives considered. It had potential and known impacts to historic properties as well as known and unavoidable Section 4(f) impacts (Iron Hill Park, Lums Pond State Park, and the C&D Canal Wildlife Area). The Red Alternative would also increase traffic volumes on Summit Bridge by over 50 percent, thus requiring construction of a new bridge over the C&D Canal and a new interchange with US 301/SR 896/I-95, while not taking advantage of the existing infrastructure capacity on SR 1 or programmed capacity improvements in the SR 1 corridor. The Red Alternative was the longest of the proposed alternatives (17.4 miles), required the construction of the most overpasses (10) and interchanges (7) and had the highest estimated cost (\$789 million).

b. Orange Alternative

The Orange Alternative, under early design measures, provided a new four-lane limited-access roadway along the existing alignment of US 301 from the Delaware/Maryland state line to north of Mount Pleasant and on a new location east/west south of the C&D Canal to intersect with SR 1 north of the Biddles Corner Toll Plaza. Frontage roads provided access for properties along existing US 301 and allowed for the circulation of local traffic. The Orange Alternative was 14.2 miles long, and included four interchanges and ten overpass structures associated with roadways and the Norfolk Southern Railroad.

The Orange Alternative was dropped from further consideration because, on preliminary analysis, it was found to have significant disadvantages including various environmental impacts, high estimated cost and a number of community impacts. The Orange Alternative would have the highest impacts to wetlands (47.5 acres), would impact 1.5 acres of tidal wetlands and would impact 14,438 linear feet of waters of the US.

The Orange Alternative would result in potential and known impacts to four Section 4(f) resources. The Orange Alternative would have a high number of property impacts (300) and also would impact a large number of existing communities within 600 feet of the corridor (including Middletown Village, Springmill, The Legends, Post and Rail Farms, Summit Pond, and Airmont Acres). The Orange Alternative would bisect Middletown, thus separating the community in two and affecting east-west access through town. The Orange Alternative would impact the current operations and future expansion of Summit Airpark and would likely cause issues for emergency services access.

c. Blue Alternative, North and South Options

The Blue Alternative Options, under early design measures, provided a direct east-west connection between US 301 and SR 1 on a new alignment south of Middletown. The North Option alignment was located north of Townsend and the South Option south of Townsend. The

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



Blue Alternative Options were 7.2 and 7.8 miles long, respectively, with two interchanges and six and eight overpasses, respectively.

The Blue Alternative Options were dropped from further consideration because they did not address traffic needs to a satisfactory level; the options did not address traffic congestion, caused in large part by development from Middletown north to the C&D Canal, by building a roadway south of Middletown. The Blue Alternatives Options introduced a highway into an area not planned for significant development.

The Blue Alternative Options would not significantly reduce traffic volumes on Boyds Corner Road, SR 299, existing US 301, or local roads. The Blue Alternative Options would not provide local access which would likely result in the roadway being underutilized. Strong environmental resource and regulatory agencies opposition, along with public opposition, was a factor in the decision.

The Blue Alternative would have high environmental impacts and impacts to the Townsend area communities. The South Option would have the second highest impacts to wetlands (46.1 acres). The North Option would impact 3.0 acres of (then) proposed state resource conservation areas and 5.8 acres in the Noxontown Pond Natural Area. The Blue Alternative would have significant potential impacts to historic properties. The North Option would have potential Section 4(f) impacts to Wiggins Mill Pond. The Blue Alternative would impact agricultural preservation lands and has a greater potential for impacts to rare, threatened and endangered species than other alternatives; the South Option impacted the most environmentally sensitive area of all the alternatives.

3. Purple and Green Alternatives without Spur Road

The Purple and Green Alternatives both include a two-lane (one lane in each direction) Spur Road that extends from the Armstrong Corner Road area to Summit Bridge, with an interchange at SR 15/SR 896 south of Summit Bridge. The Purple and Green Alternatives were originally developed without the Spur Road, which was added to the Purple and Green Alternatives because, without the Spur Road, they did not meet traffic or safety needs to a satisfactory level. The Purple and Green Alternatives without the Spur Road were evaluated prior to the publication of the *Alternatives Retained for Detailed Evaluation* in November 2005.

The Spur Road provides a more direct, faster and safer route for motorists traveling to points north of Summit Bridge from south of Middletown, the Eastern Shore of Maryland, and other areas. Currently, 35 percent of all northbound motorists have destinations north of Summit Bridge. Without the Spur Road, this traffic would remain on Choptank Road or existing US 301 to reach destinations north of the C&D Canal via Summit Bridge. The result would be a substantial increase in traffic volumes on these roadways in 2030.

Testimony was received at the Public Hearing suggesting that DelDOT revisit the addition of the Spur Road to the Preferred Alternative, and additional traffic studies were completed to compare

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



the differences between the Green (Preferred) Alternative with the Spur Road and without the Spur Road. Members of the community also requested that DelDOT further evaluate using/improving existing US 301 to serve as the “Spur” route for those wishing to travel north on SR 896.

Additional traffic studies showed that the Spur Road relieves traffic on alternate routes to the Summit Bridge. For example, without the Spur Road, Choptank Road traffic in 2030, north of Churchtown Road, is projected to increase to 14,500 vehicles per day (vpd) as compared to 6,200 vpd with the Spur Road, and traffic on existing US 301 north of Boyds Corner Road is projected to increase to 37,200 vpd without the Spur Road compared to a projected volume of 27,900 vpd with the Spur Road. Although improvements to existing Choptank Road (travel lanes increased to 11 feet wide, with added shoulders and bicycle lanes on both sides) are currently under construction, this increase in the number of vehicles traveling this local, 2-lane roadway will increase safety concerns (see below) for those traveling on Choptank Road. Additionally, the increase in vehicles on existing US 301 would exacerbate the already congested conditions there. No improvements are included in the current Capital Transportation Program and/or Long Range Transportation Plan for US 301, north of Middletown.

As an alternative to simply eliminating the Spur Road, further evaluation was completed to determine an upgraded existing US 301 would be a feasible replacement for the Spur Road. US 301 would, in this scenario, require upgrading to four lanes (two in each direction) with added turn lanes from Peterson Road to Mount Pleasant. Even with these improvements the roadway would not meet the project purpose and need to manage truck traffic, especially through traffic on existing roadways. Upgrading existing US 301 would result in higher volumes of local and through traffic with a continuing mix of truck traffic with local traffic. Specifically, between Armstrong Corner Road and Summit Bridge, total traffic volumes in 2030 are projected to be approximately 33 percent higher without the Spur Road (37,200 vpd) than with the Spur Road (27,900), while truck volumes are projected to be nearly 70 percent higher.

Community impacts associated with the suggested improvements to existing US 301 were substantial. Compared with the Spur Road, which requires no residential or business relocations, the upgrade to existing US 301 would require a significant number of potential relocations in order to avoid or minimize impacts to historic resources as required by federal regulations: nine homes, three businesses and the Ringold Chapel AME Church. An additional 14 businesses, three residential properties and two subdivisions would be partially impacted by the upgrade.

Safety concerns were also considered in the comparison analysis between the Spur Road and an improved existing US 301. A widened US 301 would not separate local and through traffic, especially through truck traffic, on existing US 301 between the proposed interchange between new and existing US 301 and Summit Bridge. A widened US 301 would not reduce traffic on local roads, especially Choptank Road. A widened US 301 would not eliminate the many access points that exist on existing US 301, including signalized intersections. Existing US 301 between Petersen Road and Summit Bridge currently has seven signalized intersections and 87 unsignalized intersections/access points. The Spur Road, therefore, would provide a safer

**US 301 Project Development
Final Environmental Impact Statement
November 2007**



facility than a widened US 301 because there would be no signals, intersections or access points and a continuous, unbroken median.

Since January 2000, 18 people died in crashes on existing US 301 south of the C&D Canal, including five on the dualized section north of Boyds Corner Road. These fatalities have occurred at a rate of one every 4½ months. In the seven-year period between January 2000 and December 2006, nearly 250 crashes (a rate of over three per month) occurred on existing US 301 south of the C&D Canal, resulting in injuries to motorists, pedestrians and bicyclists. The most recent fatal crash occurred in July 2007 at the intersection of US 301 and Old Summit Bridge Road. This intersection was also identified as a Highway Safety Improvement Project (HSIP) site, indicating that accidents have been occurring at a rate that is higher than the statewide average. If the Spur Road were not built, increased volumes of traffic (30 percent more total vehicles including almost 70 percent more trucks) would increase the likelihood of more crashes on existing US 301 and other local roadways. In addition, if the Spur Road is not included, motorists making left turns from residential streets and driveways onto Choptank Road and existing US 301 would experience significant delays.

The increased traffic would also likely result in a proportional increase in the accident rates along Choptank Road and on existing US 301 (from the Armstrong Corner Road area to Summit Bridge). There are significant concerns about safety on Choptank Road, which is currently being reconstructed and widened to include a bicycle lane. Without the Spur, traffic volumes north of Churchtown Road are projected to be nearly triple the current levels of 5,400 vpd, or 14,500 vpd, by 2030. These increased volumes would increase the potential for crashed of all types.

The Spur Road provides roadway capacity that accommodates projected traffic demand for year 2030. The Spur Road removes traffic from rural two-lane roadways and shifts it to a much safer divided two-lane highway and provides for a better opportunity to address the sharp curve south of Summit Bridge. Furthermore, the Spur Road addresses regional connectivity south of the C&D Canal by providing another north-south route that could carry traffic in the event of a closure on SR 1 or US 301. For these reasons, among others, the Green North Alternative with the Spur Road remains the Preferred Alternative.