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ALTERNATIVE RETAINED FOR DETAILED EVALUATION - YELLOW ALTERNATIVE

TWO INTERCHANGE OPTIONS SOUTH OF SUMMIT BRIDGE

Option 1

Description

- Provides loop ramp for Southbound SR 896

Advantages

- Eliminates existing SR 896 sharp curve and traffic signal
- Slows traffic down by using ramp movements
- Provides continuous traffic flow for major movements on SR 896

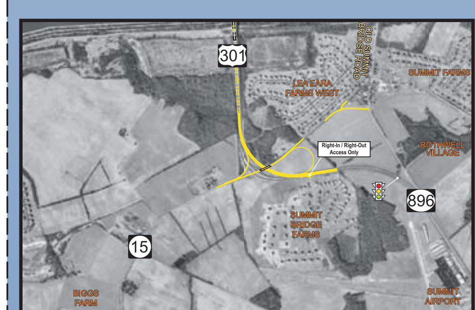
Disadvantages

- Traffic volume near capacity on single-lane loop ramp (year 2030) – likely requires two-lane loop
- Loop ramp design speed may not alleviate safety concerns – speed of southbound vehicles coming off Summit Bridge onto loop ramp – driver expectation – ramp still below desired design speed
- High wetland and waters of the US impacts

Option 2

Description

- Bethel Church Road over SR 896 with loop ramp to SR 896 northbound



Advantages

- Improves SR 896 curve radius to desired design speed
- Eliminates existing SR 896 traffic signal within curve
- Provides continuous traffic flow for major movements on SR 896
- Low wetland and waters of US impacts

Disadvantages

- Provides more direct and desirable access to Bethel Church / Choptank Road, potentially increasing traffic volumes on these roads
- Access to SB 896 from SR 15 and NB 896 to SR 15 indirect, provided by overpass to Bethel Church Road, to Old Summit Bridge Road, to SR 896 at existing signal
- Additional traffic near Lea Eara Farms community

ENGINEERING / TRAFFIC / SAFETY / COMMUNITY

Advantages

- Provides the new roadways in existing roadway corridors (US 301 and Boyds Corner Road/SR 896)
- Improves safety by separating local from through traffic, including truck traffic

Disadvantages

- Highest number of properties directly impacted - businesses and homes along existing US 301 and SR 896
- Higher potential for traffic impacts during construction along existing US 301 and Boyds Corner Road/Route 896
- Close proximity to Cedar Lane Schools
- Circuitous property access-one way frontage roads between Armstrong Corner Road and Boyds Corner Road
- High number of existing communities (within 600 feet) impacted
- Not possible to lower roadway profile, due to overpass of Main Street, SR 71, Frogtown Crossing, Marl Pit Road, Boyds Corner Road (2), realigned Shallcross Lake Road, US 13 and SR 1; therefore, difficult to mitigate indirect impacts (noise, visual, etc.)
- Least improvement to traffic conditions on north/south roadways - US 301, Choptank Road, Cedar Lane Road
- Moderate traffic improvements on east/west roadways
- Lowest traffic volume using new US 301
- Longest alternative
- Highest cost alternative
- Requires acquisition of the Odessa Fire Station at Boyds Corner
- High residential noise impacts to north side of Summit Bridge Farms, residents along Boyds Corner Road, just east of Mt. Pleasant,

Comparison of the Retained Alternatives - Engineering

NOVEMBER 2006 ALTERNATIVES IMPACT MATRIX		YELLOW RANGE OF IMPACTS	PURPLE + SPUR RANGE OF IMPACTS	BROWN NORTH RANGE OF IMPACTS	BROWN SOUTH RANGE OF IMPACTS	GREEN + SPUR NORTH RANGE OF IMPACTS	GREEN + SPUR SOUTH RANGE OF IMPACTS
General Considerations							
Preliminary Cost ($ millions)[1]		$686-$758	$616 - $680	$550-$608	$499-$551	$534 - $590	$526 - $582
ENGINEERING CONSIDERATIONS							
Total length of alternative (miles)		19.4	16.9	17.5	15.9	17.5	17.3
Total Area of Limit of Construction (acres)		870.5	901.9	895.9	894.3	897.4	876.3
Number of Properties Impacted		377	154	100	100	132	130
Interchange(s)							
	Number	4	5	5	5	6	6
1	Location(s)	Levels Road/SR15	Levels Road/SR15	Levels Road/SR15	Levels Road/SR15	Levels Road/SR15	Levels Road/SR15
	Type	Split Diamond	Diamond	Diamond	Diamond	Diamond	Diamond
2	Location(s)	North of Middletown	North of Middletown	SR896 at the base of Summit Bridge	North of Middletown	North of Middletown	North of Middletown
	Type	Slip Ramps	Diamond	Partial Cloverleaf	Half Diamond	Diamond	Diamond
3	Location(s)	SR1 at Boyds Corner Road	SR1 at Boyds Corner Road	SR896 north of Summit Aviation	SR896 north of Summit Aviation	Jamison Corner Road	Jamisons Corner Road
	Type	Directional	Directional	Partial Cloverleaf	Partial Cloverleaf	Diamond	Diamond
4	Location(s)	SR15/SR896/Choptank Road	SR15/SR896/Choptank Road	Jamison Corner Road	Jamison Corner Road	SR1 North of Toll Plaza	SR1 North of Toll Plaza
	Type	Partial Cloverleaf	Directional	Diamond	Diamond	Directional	Directional
5	Location(s)		Bethel Church Road	SR1 North of Toll Plaza	SR1 North of Toll Plaza	SR15/SR896/Choptank Road	SR15/SR896/Choptank Road
	Type		Partial Cloverleaf	Directional	Directional	Directional	Directional
6	Location(s)					Bethel Church Road	Bethel Church Road
	Type					Partial Cloverleaf	Partial Cloverleaf
7	Location(s)						
	Type						
Overpass(es)							
	Number	11	11	8	8	9	9
1	Location(s)	Strawberry Lane	Strawberry Lane	Strawberry Lane	Strawberry Lane	Strawberry Lane	Strawberry Lane
2	Location(s)	Middletown Business & Technology Park	Bunker Hill Road	Bunker Hill Road	Bunker Hill Road	Bunker Hill Road	Bunker Hill Road
3	Location(s)	Bunker Hill Road	Bohemia Mill/Armstrong Corner Road	Bohemia Mill Road	Bohemia Mill Road	Bohemia Mill/Armstrong Corner Road	Bohemia Mill/Armstrong Corner Road
4	Location(s)	Broad Street	US 301 Local	Old School House Road	Old School House Road	US 301 Local	US 301 Local
5	Location(s)	Marl Pit Road	Norfolk-Southern Railroad	Churchtown Road	Churchtown Road	Norfolk-Southern Railroad	Norfolk-Southern Railroad
6	Location(s)	Existing US 301	SR 896	Norfolk-Southern Railroad	Norfolk-Southern Railroad	SR896	SR896
7	Location(s)	Norfolk-Southern Railroad	Jamison Corner Road	Ratledge Road	Ratledge Road	Hyetts Corner Road	Hyetts Corner Road
8	Location(s)	SR896	SR 896	Hyett's Corner Road	Hyett's Corner Road	Old Schoolhouse Road	Old Schoolhouse Road
9	Location(s)	Jamison Corner Road	Shallcross Lake Road			Churchtown Road	Churchtown Road
10	Location(s)	SR896	Old Schoolhouse Road				
11	Location(s)	Shallcross Lake Road	Churchtown Road				

Note 1: Cost Estimate includes Right of Way costs and Relocation costs for displaced properties.

Note 2: The Brown alternative includes costs for property acquition at Summit Airport; however, it does not include any costs for improvements to the airport that may be required due to property acquisition.

June 22, 2006

CULTURAL & NATURAL ENVIRONMENT

Advantages

- Lowest Agricultural District impacts
- Low forestland impacts
- Lowest impacts to Species Habitat Areas (wildlife & plants)

Disadvantages

- High residential noise impacts
- Highest wetland impacts
- Highest waters of the US impacts
- Only alternative that directly impacts on known historic properties / Section 4(f) - fatal flaw in use of federal funds
- Highest noise and visual effects on historic properties

Comparison of the Retained Alternatives - Cultural Resources

CULTURAL RESOURCES ALTERNATIVES IMPACT MATRIX NOVEMBER 2006	YELLOW		PURPLE with Spur		BROWN				GREEN with SPUR			
	Boyds Corner Road Option 4 Spur Option 2		Boyds Corner Road Option 4 Armstrong Corner Road Option 2A Spur Option 3B		NORTH		SOUTH		NORTH Armstrong Corner Road Option 2A Spur Option 3B		SOUTH Armstrong Corner Road Option 2A Spur Option 3B	
Potential Impacts on Cultural Resources												
Historic Properties[1]												
Count of Properties to be evaluated for Direct Effects[2]	4		0		0		0		0		0	
Count of Properties to be evaluated for Visual and Audible Effects[3]	15		17		11		11		13		15	
Count of Properties to be evaluated for this Alternative[5]	17		17		11		11		13		15	
Total Area of Limit of Disturbance (acres)	876		916		911		909		910		891	
Predictive Model: Pre-Historic Sensitivity in the Limit of Disturbance												
High Sensitivity Area [acres | % of total area]	16	1.8%	24	2.7%	26	2.9%	28	3.0%	26	2.8%	28	3.1%
Moderate Sensitivity Area [acres | % of total area]	106	12.1%	212	23.1%	287	31.5%	272	29.9%	238	26.1%	292	32.8%
Low Sensitivity Area [acres | % of total area]	528	60.3%	552	60.3%	496	54.4%	483	53.1%	558	61.3%	482	54.1%
Nil Sensitivity Area [acres | % of total area]	225	25.7%	128	14.0%	101	11.1%	127	14.0%	89	9.7%	88	9.9%
Predictive Model: Historic Sensitivity in the Limit of Disturbance												
High Sensitivity Area [acres | % of total area]	91	10.4%	35	3.8%	30	3.3%	31	3.4%	34	3.7%	32	3.6%
Moderate Sensitivity Area [acres | % of total area]	272	31.0%	187	20.4%	186	20.4%	182	20.0%	177	19.4%	177	19.8%
Low Sensitivity Area [acres | % of total area]	513	58.6%	694	75.7%	694	76.3%	696	76.5%	700	76.8%	682	76.6%
Area of Potential Effects												
Number of Historic Properties[3]	17		17		11		11		13		15	
Number of Known Archeological Resources	0		1		1		1		1		1	
Potential Section 4(f) Properties												
Number of Historic Properties[4]	4		0		0		0		0		0	
Date of Alternative Design Update	07/14/06		07/14/06		07/14/06		07/14/06		07/14/06		07/14/06	
Date of Impacts Update	08/02/06		08/02/06		08/02/06		08/02/06		08/02/06		08/02/06	

Note 1: Historic Properties are resources Listed on or Determined Eligible for the National Register of Historic Places
Note 2: Properties to be evaluated for Direct Effects include any property within the limit of disturbance for the Alternative, and also include situations where demolition of all or some of the contributing components to the resource is proposed.
Note 3: Properties to be evaluated for Visual and Audible Effects are located within 600 feet of the centerline of the Alternative.
Note 4: Number of Properties to be evaluated for this Alternative reflects the unique number of historic properties with potential direct, visual or audible effects. Because some properties will be evaluated for more than one effect type, this number IS NOT the total of the three lines above it.
Note 5: Number of properties Listed on or Determined Eligible for the National Register of Historic Places (Consultant Recommendation) that may be directly, visually, or audible affected by the Alternative (within 600 feet of the centerline).
This number IS THE SAME as the Number of Properties to be Evaluated for this Alternative (see above).
Note 6: Number of resources Listed on or Determined Eligible for the National Register of Historic Places (Consultant Recommendation) that may be directly affected by the Alternative (within the limit of disturbance).
Assumes that Archeological Sites are generally exempted from Section 4(f) protection. This number IS THE SAME as the Number of Properties to be evaluated for Direct Effects (see above).
Note 7: The National Register status of archeological resources has not yet been determined.

Comparison of the Retained Alternatives - Natural Resources

	YELLOW	PURPLE with SPUR	BROWN		GREEN with SPUR		NOVEMBER 2006 ALTERNATIVES ENVIRONMENTAL IMPACT MATRIX
	Boyd's Corner Road Option 4 Spur Option 2	Boyd's Corner Road Option 4 Armstrong Corner Road Option 2A Spur Option 3B	NORTH	SOUTH	NORTH Armstrong Corner Road Option 2A Spur Option 3B	SOUTH Armstrong Corner Road Option 2A Spur Option 3B	
Total Length of Alternative (miles)	19.4	16.9	17.5	15.9	17.5	17.3	Total Length of Alternative (miles)
Total Area of Limit of Construction (acres)	870.5	901.9	895.9	894.3	897.4	876.3	Total Area of Limit of Construction (acres)
Potential Wetland/Waters of the US Impacts							Potential Wetland/Waters of the US Impacts
Total Area of Potential ACOE Wetlands[1] (acres)	50.5	24.9	23.9	18.5	26.2	28.3	Total Area of Potential ACOE Wetlands[1] (acres)
High Quality	8.6	7.6	11.5	9.9	9.0	9.6	High Quality
Palustrian Forested	1.4	3.7	5.6	5.4	4.5	4.0	Palustrian Forested
Palustrian Emergent	3.0	2.9	4.4	2.7	2.9	2.9	Palustrian Emergent
Palustrian Shrub-Scrub	0	0	0	0	0	0	Palustrian Shrub-Scrub
Palustrian Mixed	4.2	1.0	1.6	1.8	1.5	2.7	Palustrian Mixed
Medium Quality	30.6	13.2	4.2	7.3	13.2	13.6	Medium Quality
Palustrian Forested	18	3.9	1.9	5.0	4.1	3.8	Palustrian Forested
Palustrian Emergent	1.5	7.6	0.8	0.8	7.6	7.6	Palustrian Emergent
Palustrian Shrub-Scrub	0	0	0	0	0	0	Palustrian Shrub-Scrub
Palustrian Mixed	10.7	1.7	1.5	1.5	1.5	2.2	Palustrian Mixed
Low Quality	11.2	4.2	8.2	1.3	4.0	5.1	Low Quality
Palustrian Forested	0.5	1.3	0.9	0.7	1.3	1.3	Palustrian Forested
Palustrian Emergent	5.6	2.8	7.3	0.6	2.7	3.8	Palustrian Emergent
Palustrian Shrub-Scrub	0	0	0	0	0	0	Palustrian Shrub-Scrub
Palustrian Mixed	5.2	0	0	0	0	0	Palustrian Mixed
Other Wetlands							Other Wetlands
Type and/or quality undetermined to date	0	0	0	0	0	0	Type and/or quality undetermined to date
Number of Wetlands Impacted	33	45	39	35	43	40	Number of Wetlands Impacted
Number of Wetland Crossings	4	9	10	8	8	8	Number of Wetland Crossings
Number of Wetlands with Complete Fragmentation	7	6	3	4	6	7	Number of Wetlands with Complete Fragmentation
Waters of the US (non-wetland)[2]	20,708	16,257	15,158	14,278	15,515	16,326	Waters of the US (non-wetland)[2]
Streams (linear feet)	215	260	921	1,895	327	521	Streams (linear feet)
Ditches (linear feet)	20,492	15,997	14,237	12,383	15,188	15,805	Ditches (linear feet)
Open Waters (ponds, SWM) (acres)	3.4	3.2	3.2	5.8	3.2	3.2	Open Waters (ponds, SWM) (acres)
DNREC Sub-Aqueous Lands (linear feet)	7,167	6,461	7,885	8,232	8,162	8,481	DNREC Sub-Aqueous Lands (linear feet)
Area of DNREC State of Delaware Tidal Wetlands[1] (acres)	0.4	0.4	0.4	0.4	0.4	0.4	Area of DNREC State of Delaware Tidal Wetlands[1] (acres)
Recharge Areas (acres)	614	563	494	486	486	501	Recharge Areas (acres)
Tax Ditches (linear feet)	81	1,511	0	192	1,511	1,511	Tax Ditches (linear feet)
Tax Ditch Watershed area (acres)	12	67	28	56	67	67	Tax Ditch Watershed area (acres)
Area of Hydric Soils (acres)	158	147	119	115	146	145	Area of Hydric Soils (acres)
Potential Floodplain Impacts - FEMA							Potential Floodplain Impacts - FEMA
Area of 100-Year Floodplain (acres)	1.5	1.5	1.0	1.0	1.0	1.0	Area of 100-Year Floodplain (acres)
Potential Agricultural Impacts							Potential Agricultural Impacts
Agricultural Districts - Ten-Year (number)	1	1	1	1	1	1	Agricultural Districts - Ten-Year (number)
Area (acres)	14.1	32.6	32.6	32.6	32.6	32.6	Area (acres)
Number of Agricultural Districts within 3 miles of Alternative	9	7	6	6	6	6	Number of Agricultural Districts within 3 miles of Alternative
Agricultural Preservation Easements - Permanent (number)	0	1	1	1	1	1	Agricultural Preservation Easements - Permanent (number)
Area (acres)	0	6.0	9.4	12.4	6.0	6.0	Area (acres)
Number of Agricultural Easements within 3 miles of Alternative	3	3	2	2	2	2	Number of Agricultural Easements within 3 miles of Alternative
Agricultural Suitability (Land Evaluation Site Assessment Model)[3]							Agricultural Suitability (Land Evaluation Site Assessment Model)[3]
Total LESA Model (score)	192	203	198	202	210	204	Total LESA Model (score)
LESA Model without existing and planned development (score)	212	218	202	209	218	213	LESA Model without existing and planned development (score)
Prime Farmland Soil Area (acres)	203	415	412	424	437	398	Prime Farmland Soil Area (acres)
Ratio of prime farmland to total prime farmland in New Castle County (percent) (74,454 acres total)	0.27	0.56	0.55	0.57	0.59	0.53	Ratio of prime farmland to total prime farmland in New Castle County (percent)
Potential Hazardous Waste Impacts							Potential Hazardous Waste Impacts
Number of EPA Sites	0	0	0	0	0	0	Number of EPA Sites
Number of Sites identified as potential sources of contamination	9	9	8	8	6	6	Number of Sites identified as potential sources of contamination
Number of NPDES Locations	0	0	0	0	0	0	Number of NPDES Locations
Potential Natural Resource Impacts							Potential Natural Resource Impacts
Natural Areas Inventory (acres)	0.3	0.3	0	0	0	0	Natural Areas Inventory (acres)
State Resource Areas[4]	0.8	2.3	2	1	2	2	State Resource Areas[4]
Protected (acres)	0.8	2.3	1.9	1.2	2.0	2.0	Protected (acres)
Green Infrastructure (acres)	0	0	0	0	0	0	Green Infrastructure (acres)
Forestland: 2002 Land Use	36.9	39.9	37.4	51.0	34.1	36.8	Forestland: 2002 Land Use
Deciduous (acres)	21.4	39.2	35.8	46.6	33.4	36.1	Deciduous (acres)
Evergreen (acres)	9.2	0	1.0	3.7	0	0	Evergreen (acres)
Mixed (acres)	6.3	0.7	0.7	0.7	0.7	0.7	Mixed (acres)
State Forest Lands							State Forest Lands
State-Owned State Forest Properties (acres)	0	0	0	0	0	0	State-Owned State Forest Properties (acres)
Conservation Easement Properties (acres)	0	0	0	0	0	0	Conservation Easement Properties (acres)
Potential Rare, Threatened and Endangered Species Areas[5]	tbd	tbd	tbd	tbd	tbd	tbd	Potential Rare, Threatened and Endangered Species Areas[5]
Habitat Areas (Wildlife & Plant) (acres)[5]	42.3	54.9	67.5	57.6	54.6	49.4	Habitat Areas (Rare and Common Species) (acres)[5]
Potential Section 4(f) Properties							Potential Section 4(f) Properties
Number of Publicly-Owned Parks and Recreation Areas[6]	0	0	0	0	0	0	Number of Publicly-Owned Parks and Recreation Areas[6]
Acres of Publicly-Owned Parks and Recreation Areas	0	0	0	0	0	0	Acres of Publicly-Owned Parks and Recreation Areas
Federally Owned	0	0	0	0	0	0	Federally Owned
State Owned	0	0	0	0	0	0	State Owned
County Owned	0	0	0	0	0	0	County Owned
Municipal Owned	0	0	0	0	0	0	Municipal Owned
Number of Publicly-Owned Wildlife and Waterfowl Refuges	0	0	0	0	0	0	Number of Publicly-Owned Wildlife and Waterfowl Refuges
Number of Historic Properties[7]	4	0	0	0	0	0	Number of Historic Properties[7]
Date of Alternative Design Update	09/20/06	09/20/06	09/20/06	09/20/06	09/20/06	09/20/06	Date of Alternative Design Update
Date of Impacts Update	09/26/06	09/26/06	09/26/06	09/26/06	09/26/06	09/26/06	Date of Impacts Update

Work in Progress. Impacts DO NOT include portions of the alternatives in Maryland, except wetlands.

Note 1: Total Potential ACOE Wetlands equals total of high, medium, low and other quality wetlands.
ACOE and DNREC Tidal Wetlands should not be added together.
Wetlands are based on field delineations, updated on February 10, 2006.
Field delineations were done using Global Positioning System (GPS) and verified by ACOE. Field delineations extend length of alternative, including Maryland.
Some impacts may include a small percentage of 2002 Land Use data (instead of field delineations) where the alternative has been revised to extend beyond the fieldwork area.
The number of wetlands impacted is the number of unique wetland features within the limit of disturbance (LOD) for the alternative.
The number of crossings is the number of unique wetland features spanned by structures included in the alternative.
Delaware's Tidal Wetlands were identified using DNREC's delineation maps.

Note 2: Includes GPS'd, field delineated streams, ditches, ponds and SWMs. Does not include stream segments within wetlands. Some ditches are also included in the Tax Ditch impacts.
Note 3: The Land Evaluation Site Assessment (LESA) Model is a State and Federally approved land analysis system; this 300 point-based rating system identifies farm parcels that are most suitable for long-term agricultural practices.
The Land Evaluation (LE) factor is determined by using a land use dependent soil productivity index, the Site Assessment (SA) factor is derived from non-soil factors many of which are non-agricultural.
A higher LESA score indicates high agricultural suitability for a particular parcel.
The LESA score for each parcel impacted by each alternative was calculated, that LESA score was multiplied by amount of land within the parcel impacted by each alternative to obtain the acre-weighted total score for the specific segment of land impacted.
The same math was applied to each parcel affected; the acre-weighted total score for each segment of a parcel affected was then added and divided by the number of acres impacted by each alternative. The result was the acre-weighted score for each corresponding alternative
Note 4: State Resource Areas include State Parks and Forests. Properties listed include protected and proposed designations.

Note 5: Anticipated impacts to Rare, Threatened and Endangered Species based on coordination to date with DNREC. Detailed evaluation and coordination with DNREC and US Fish and Wildlife Service is continuing.
The data represented in the Potential Rare, Threatened and Endangered (RTE) Species Areas row are not exhaustive.
These data represent known occurrences of RTE Species, not potential habitat for RTE Species. Many habitats that may be impacted by the US 301 project have never been surveyed for RTE's and;
that these yet to be surveyed areas may well harbor RTE's that would not be represented in the ratings given to them in the matrix.
The habitats represented encompass both upland and wetland terrestrial habitats

Note 6: From DNREC's Outdoor Recreation Inventory and New Castle County Parks files.

Note 7: Same as total of Historic Properties. Assumes that Archeological Sites are generally exempted from Section 4(f) protection.