# ALTERNATIVE RETAINED FOR DETAILED EVALUATION - YELLOW ALTERNAT





## INTERCHANGE OPTIONS SOUTH OF SUMMIT BRIDGE

# **Option 1**

Provides Loop ramp for Southbound SR 896



- 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

- Traffic volume near capacity on single-lane loop ramp (year 2030) likely requires two-lane loop
- Loop ramp constraints may not alleviate safety concerns speed of southbound vehicles coming off Summit Bridge onto loop ramp driver expectation ramp still below desired

## **ENGINEERING - TRAFFIC & SAFETY CONSIDERATIONS**

### **ENGINEERING / TRAFFIC**

- Retains 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

- 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
- Proximity to Cedar Lane Elementary School and new Middle School (under construction)
- Circuitous property access-one way frontage roads between Armstrong Corner Road and Boyds Corner Road
- High impact on existing communities (within 600 feet)
- 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 improvements on east/west roadways
- Lowest traffic volume using new US 301
- Requires acquisition of New Covenant Presbyterian Church under Boyds Corner Road Area Option 1
- Highest overall cost

### Comparison of the Retained Alternatives - Engineering

ALTERNATIVES IMPACT MATRIX	RANGE OF IMPACTS	RANGE OF IMPACTS	RANGE OF IMPACTS	RANGE OF IMPACTS	NORTH RANGE OF IMPACTS	SOUTH RANGE OF IMPACTS	
General Considerations							
Preliminary Cost (\$ millions) <sup>1</sup>	\$694	\$618 - \$674	\$581	\$541	\$531 - \$582	\$618 - \$674	
ENGINEERING CONSIDERATIONS							
Total length of alternative (miles)	12.7 - 12.9	15.3 - 15.5	15.5	15.9	17.5	17.3	
Total Area of Limit of Construction (acres)	855 - 880.49	813 - 889	921	907	863 - 935	847 - 919	
Number of Properties Impacted	354	140 - 167	113	123	125 - 149	123 - 148	
Interchange(s)							
Number	3	4	5	5	5	5	
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	Jamison Comer Road	Jamison Corner Road	SR1 North of Toll Plaza	SR1 North of Toll Plaza	
Type		Diamond	Diamond	Diamond	Directional	Directional	
5 Location(s)			SR1 North of Toll Plaza	SR1 North of Toll Plaza	SR15/SR896/Choptank Road	SR15/SR896/Choptank Road	
Type			Directional	Directional	Diamond	Diamond	
6 Location(s)							
Type							
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					

# **CULTURAL & ENVIRONMENTAL RESOURCES**

- Low DNREC Tidal Wetland impacts
- Lowest Agricultural District impacts
- Low forestland impacts
- Low floodplain impacts

**Advantages** 

- (wildlife & plants) Mid-range residential noise impacts
- Mid-range impact to Species Habitat Areas
- Disadvantages
- Highest Wetland impacts
- Highest Waters of the US impacts
- Highest direct impact on known historic properties / Section 4(f) potential fatal flaw in use of federal funds
- Potential noise and visual effects on Vandegrift property (Historic)

- Detailed evaluation process is on-going to identify cultural resources and assess potential effects - Phase II & III Bog Turtle Survey currently underway

### **Comparison of the Retained Alternatives - Cultural Resources**

APRIL 10-11, 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		RANGE OF IMPACTS	
Potential Impacts on Cultural Resources									
Historic Properties <sup>1</sup>									
Properties to be evaluated for Direct Effects <sup>2</sup>	4	0	0	0	0	0	0	- 4	
Properties to be evaluated for Visual and Audible Effects <sup>3</sup>	13	12-13	9	9	10	12	9	- 13	
Properties to be evaluated for this Alternative	15	12-13	9	9	10	12	9	- 15	
Total Area of Limit of Disturbance (acres)	855-880	813-889	921	907	863-935	847-919	813	- 935	
Predictive Model: Pre-Historic Sensitivity in the Limit of Disturbance									
High Sensitivity Area (acres   % of total area)	15 (1.7%) - 15 (1.8%)	17 (1.9%) - 17 (2.1%)	20 (2.2%)	21 (2.3%)	19 (2.1%) - 19 (2.3%)	21 (2.3%) - 21 (2.5%)	15 (1.7%)		
Moderate Sensitivity Area (acres   % of total area)	91 (10.7%) - 97 (11.2%)	162 (19.1%) - 167 (19.0%)	261 (28.6%)	254 (28.0%)	210 (24.5%) - 214 (23.6%)	238 (28.2%) - 242 (27.2%)	91 (10.7)	- 261 (28.6%)	
Low Sensitivity Area (acres   % of total area)	524 (60.8%) - 551 (62.5%)	514 (63.2%) - 577 (65.0%)	527 (57.8%)	504 (55.6 %)	524 (62.2%) - 575 (63.5%)	479 (58.1%) - 498 (59.1%)	479 (58.1%	) - 577 (65.0%)	
Nil Sensitivity Area (acres   % of total area)	223 (25.3%) - 225 (26.3%)	116 (13.7%) - 131 (14.9%)	103 (11.3%)	127 (14.0%)	87 (10.1%) - 98 (10.8%)	87(10.3%) - 98 (11.0%)	87 (10.1%)	- 225 (26.3%)	
Predictive Model: Historic Sensitivity in the Limit of Disturbance								-	
High Sensitivity Area [acres   % of total area]	38 (4.4%) - 41 (4.7%)	7 (0.9%) - 9 (1.0%)	5 (0.5%)	5 (0.5%)	5 (0.6%) - 7 (0.8%)	7 (0.8%) - 8 (0.9%)	5 (0.5%)	- 41 (4.7%)	
Moderate Sensitivity Area (acres   % of total area)	328 (37.3%) - 328 (38.1%)	199 (23.5%) - 228 (26.1%)	216 (23.6%)	212 (23.4%)	196 (22.8%) - 226 (24.9%)	196 (23.3%) - 226 (25.4%)	196 (22.8%	) - 328 (38.1%)	
Low Sensitivity Area (acres   % of total area)	490 (57.4%) - 511 (58.0%)		691 (75.8%)	688 (76.1%)	637 (75.7%) - 673 (74.3%)	620 (75.2%) - 655 (73.6%)	490 (57.4%	) - 691 (75.8%)	
Area of Potential Effects									
Number of Historic Properties <sup>8</sup>	15	12-13	9	9	10-11	11-12	9	- 15	
Potential Section 4(f) Properties									
Number of Historic Properties <sup>6</sup>	4	0	0	0	0	0	0	- 4	
Date of Alternative Design Update	01/12/06	03/12/05	11/18/05	11/18/05	01/12/06	01/12/05			
Date of Impacts Update	03/21/05	03/21/06	01/12/06	01/12/06	01/12/06	01/12/06			

### **Comparison of the Retained Alternatives - Natural Resources**

	YELLOW	PURPLE +	BROWN		GREEN	TOFUR	RANGE
APRIL 10-11, 2006		SPUR	NORTH	SOUTH	NORTH	SOUTH	
ALTERNATIVES IMPACT MATRIX	RANGE of	RANGE of	RANGE of	RANGE of	RANGE of	DANOE	OF
ALIENGERIES INVESTIGATION	IMPACTS					RANGE of	IMPACTS
) representation of the control of t	IIIII AOTO	IMPACTS	IMPACTS	IMPACTS	IMPACTS	IMPACTS	
Total Length of Alternative (miles)	12.7 - 12.9	100 - 100	15.5	15.6	17.5 - 17.5	70 - 70	127 - 17
Total Length of Attendative (mises) Total Area of Limit of Construction (scree)	855 - 880	10.3 - 10.5	15.5	10.9 907		17.3 - 17.3 EA7 - 010	813 - 93
Total Area of Potential ACOE Wetlands' (scree)	54.1 - 56.7	26.5 - 31.6	29.0	23.7	31.6 - 35.7	27.0 - 31.0	23.7 - 56.
High Quality Distriction Countred	10.2 - 10.3	8.4 - 10.6	14.0	12.5	10.5 - 12.0	11.3 - 12.6	8.4 - 14.
Palustian Foreignst Palustian Emergent	3.0 . 3.0	3.6 · 5.3 2.2 · 2.2	5.5	5.5	43 · 53 22 · 22	39 - 48	1.4 - 5.6
Paluttian Shrub-Scrub	0.0 - 0.0	0.0 - 0.0	0.0	2.7	0.0 : 0.0	0.0 - 0.0	
	5.9 - 5.9	26 . 31	4.0	4.2	40 - 44	52 - 56	0.0 - 0.0 2.8 - 5.9
Medium Quality	28.4 - 30.6	8.5 - 13.7	6.5	2.2	16.7 - 21.1	10.2 - 14.7	6.8 - 30.
Palustrian Forested	13.6 - 17.2	4.5 - 5.4	4.5	7.7	7.9 - 9.1	4.7 - 5.9	4.6 - 17
Paluation Emergent Datament Stock-Strock	1.5 - 2.0	1.5 - 7.8	0.5	0.5	1.5 - 7.1	1.5 - 7.2	0.8 - 7.8
Palustian Mixed	103 - 131	0.0 - 0.0	1.5	0.0 1.5	61 - 63	0.0 - 0.0	0.0 - 0.0 1.1 - 13.
Low Quality	164 . 165	29 45	8.2	13	3.2 . 4.2	45 54	1.3 - 14.
Palustrian Forested	0.5 - 0.5	0.0 - 0.9	0.9	0.7	0.0 - 0.9	00 - 09	0.0 0.0
Palustrian Emergent	8.8 - 8.9	2.9 - 3.6	7.3	0.6	3.2 - 3.3	45 - 45	0.0 - 0.9
Palustian Shrub-Scrub	0.0 - 0.0	0.0 - 0.0	0.0	0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0
Palustrian Mixed	52 - 52	0.0 - 0.0	0.0	0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 5.2
Other Witlands							
Type and/or quality undeterminded to date  Number of Wellands Impacted	10 - 10	53 - 56	0.0	0.0	03 - 03	00 - 00	0.0 - 5.6
Number of Wetlands Impacted Number of Wetland Crossinos	38 - 45	45 - 55	35	32 6	42 - 50 7 - 8	42 - 50	32 - 55 2 - 9
Number of Wetland Crossings Number of Wetlands with Complete Fragmentation	10 - 10	1 2 3	3				2 - 9
Number of Wetlands with Complete Fragmentation  Waters of the US (non-wetland)	18.613 - 21.282	14.063 - 16.019	11,879	13,178	12 002 . 13 010	13.750 . 14.934	12902 - 21
Streams (linear feet)	215 - 215	200 - 271	923	13,178	12,902 - 13,939	532 - 532	215 - 18
Diretes (incor feet)	15 397 . 21 057	13.703 - 15.750	12,955	11 250	12.547 - 13.605	13 226 - 14 452	11280 - 21
Criches (inear feet) Coen Waters (bonds, SWM) (acres)	3 . 4	3		6	3 - 3	3 - 3	3 - 6
DNRSC Sub-Acurous Lands (linear feet)	5.921 - 6.579	4.623 - 6.433	7,958	8.019	6.403 - 6.918	6.970 - 7.482	4893 - 80
Area of DNRSC State of Delaware Tidal Wetlands' (scree)	0.6 - 0.6	0.6 - 0.6	1.5	1.5	1.5 - 1.5	15 - 15	1 - 1
Recharge Areas (acres)	614 - 629	515 - 505	454	476	441 - 506	460 - 525	441 - 62
Tax Ditches Binear feet)	81 - 81	-4 OK		192		51 - 678	0 - 62
Tax Ditch Watershed area (acres)	12 - 12	33 - 58	28	55	23 - 58	33 - 58	12 - 58 112 - 17
Area of Hydric Soils (some) tental Floodolain Impacts - FEMA	156 - 178	125 - 146	117	112	132 - 145	125 - 138	112 - 1/3
sessai Hoodpian siigadts - HaMA Area of 100-Year Floodplain (acres)	1.7 - 1.7	177 - 177	2.5	2.5	2.5 - 2.5	25 - 25	17.25
tectal Agricultural Impacts	1.1 - 1.3	1.7 - 1.7			23 . 23	2.0 - 2.0	1.7 - 2.5
Agricultural Districts - Ten-Year Inumberi							1 - 1
Area (acres)	14.1 14.1	29.2 29.5	29.2	29.2	29.2 29.5	29.2 29.5	14.1 - 29
Number of Agricultural Districts within 3 miles of Alternative	9 - 9	7 - 7	6	6	7 - 7	7 - 7	6 - 9
Agricultural Preservation Easements - Permanent (number)	0 - 0	1 - 1	- 1	- 1	1 - 1	1 - 1	0 - 1
Area (acres)	0 - 0	6.1 - 6.1	2.4	11.7	6.1 - 6.1	6.1 - 6.1	0 - 11.
Number of Agricultural Easements within 3 miles of Alternative	6 . 6	6 - 6	2	2	3 - 3	3 - 3	2 - 8
Agricultural Suitability (Land Evaluation Site Assessment Model) <sup>5</sup>							194 - 213
Total LESA Model (score) LESA Model without existing and planned development (score)	194 - 195	203 - 206	122	203	213 - 213	205 - 207	194 - 21 202 - 22
Prine Farmland Soil Area (acres)	191 - 197	401 - 442	425	438	455 - 491	217 - 220	191 - 49
	0.26 - 0.26	401 - 442	0.55	0.50	0.61 - 0.66	416 - 452	03 - 07
sectial Hazandous Waste Impacts	121 121						
	0 - 0	0 - 0		0	0 - 0	0 - 0	0 - 0
Number of Sites identified as potential sources of contamination	8 - 8	0 - 0	7	7	5 - 5	5 - 5	5 - 8
Number of NPDES Locations enfail Natural Resource Impacts	0 . 0	0 - 0		0	0 - 0	0 - 0	0 - 0
Natural Areas Inventory (acres)		0 0			0 0	0 0	0 - 0
	27 : 27	277 - 227		- 8	0 . 0	0 . 0	0 - 0
State Resource Areas*	0 . 0	0 . 0	, a	ő	0 - 0	0 . 0	0 - 2
Proposed (acres)	27 . 27	27 . 27	0	0	0 - 0	0 - 0	0 - 27
Forestland: 2002 Land Use	38.8 - 42.3	202 - 403	42.1	55.4	47.2 - 52.4	40.0 - 45.1	38.8 - 55
Deciduous (acres)	23.1 - 25.0	38.5 - 46.1	40.4	51.1	46.5 - 51.7	39.3 - 44.5	23.1 - 51
Evergreen (acres)	9.3 - 10.2	0.0 - 0.7	1.0	3.7	0.0 - 0.7	0.0 - 0.7	0.0 - 10
Mind (scinc)  State Forest Lands	63 - 63	0.7 - 0.7	0.7	0.7	0.7 - 0.7	07 - 07	
State-Owned State Forest Properties (acres)	0 : 0		0	0	0 : 0	0 : 0	0 - 0
Consequation Essented Properties (acres)	0 : 0	0 : 0		0	0 : 0	0 - 0	8 - 8
Potential Rans. Threatened and Endangered Species Areas			_				12 de determin
Habitat Areas (Wildlife & Plant) (acres)	423 - 463	407 27.65	67.5	57.0	50.6 - 54.3	43.9 - 47.6	42.5 - 67
ectial Section 4(f) Properties							
Number of Publicly-Owned Parks and Recreation Areas*	0 - 0	0 - 0	0	0	0 - 0	0 - 0	0 - 0
Acres of Publicly-Owned Parks and Recreation Areas	0 - 0	0 - 0	0	0	0 - 0	0 - 0	0 - 0
Federally Owned	0 - 0	0 - 0	0	0	0 - 0	0 - 0	0 - 0
State Chined	0 : 0	0 : 0	9	0	0 : 0	0 - 0	0 - 0
County Owned Municipal Owned	0 - 0	0 - 0		0	0 - 0	0 - 0	8:8
Number of Publicly-Owned Wildlife and Waterfowl Refuges	0 : 0	0 - 0		0	0 - 0	0 - 0	0 - 0
				0			0 - 0
Number of Historic Properties'							

# Option 2 (New)

Bethel Church Road over SR 896 with loop ramp to SR 896 northb



- Eliminates existing SR 896 traffic signal within curve
- Provides continuous traffic flow for major movements on SR 896
- Improves curve radius to desired design speed

- Provides more direct and desirable access to Bethel Church / Choptank Road, potentially increasing traffic volumes on these
- 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