Design Refinements Report

US 301: MD / DE Line to SR1, South of the C&D Canal

New Castle County, Delaware

US Department of Transportation
Federal Highway Administration
Delaware Division
FHWA ID No. 52-0599112

November 2011

U.S. Department
of Transportation

**Federal Highway
Administration**

DelMar Division

**Delaware Office
300 South New Street, Suite 2101
Dover, DE 19904
(302) 734-5323**

December 7, 2011

Refer to: HDA-DE

Secretary Shailen Bhatt
Delaware Department of Transportation
800 Bay Road
P.O. Box 778
Dover, DE 19903

Dear Secretary Bhatt:

We have reviewed the October 2011 US 301 Design Refinement Report submitted to our office as part of the required project environmental reevaluation in accordance with 23 CFR 771.129. Based on review of the document and appended information supporting the sixteen (16) design refinements to the Selected Alternative, we have determined that the Record of Decision (ROD) issued April 30, 2008 remains valid and that the design refinements will not result in a significant change in socioeconomic, cultural or natural resources impacts as previously approved. In making this determination we have concluded based on the information provided that Section 4(f) does not apply to the C&D Canal property and the historic Armstrong-Walker House property. We have also determined that no additional noise analysis is required.

We understand that as the project progresses there may be additional project related refinements that may be required. We will coordinate with your staff on any of these changes to ensure that the ROD will remain valid.

If you have any questions, please contact Dan Montag at 302-734-1719.

Sincerely yours,

Hassan Raza
Division Administrator

cc: Natalie Barnhart, Chief Engineer, DelDOT
Drew Boyce, Asst. Dir., Project Development North, DelDOT
Mark Tudor, Group Engineer, Project Development North, DelDOT
File: T200511301

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

SHAILEN P. BHATT
SECRETARY

November 29, 2011

Mr. Hassan Raza, P.E.
Division Administrator
Federal Highway Administration
300 South New Street, Suite 2101
Dover, Delaware 19904

Dear Mr. Raza:

Reference is made to the U.S. 301 Project Re-evaluation, Design Refinements Report, FHWA ID No. 52-0599112. In accordance with 23 CFR 771.129, please find attached for your review the October 2011 U.S. 301 Design Refinements Report that incorporates and/or addresses FHWA's November 10, 2011 comments. This document evaluates and compares the environmental consequences of the 16 proposed design refinements on the U.S. 301 Selected Alternative.

In response to your comments, revisions are tracked in the attached "Comments and Responses" table. For your convenience, the location of the revisions in the document is also tracked. The Executive Summary and body of the report were r e-printed for your file binder. In addition, pages added to Appendix A, Appendix C and Appendix H include the following:

- Additional project commitments for mitigation, previously published in the 2008 ROD as Appendix A, to be added to Appendix B – "ROD Commitments";
- Information regarding continuance of Section 106 consultation related to the relocation of the U.S. 13 toll-free ramp to northbound SR 1 to be added to Appendix C; and
- Notes from the October 20, 2011 meeting with the U.S. Army Corps of Engineers to be added as the last item in Appendix H, along with the New Tab, "Agency Meeting October 20, 2011"

This re-evaluation of the U.S. 301 Project supports DelDOT's opinion and conclusion that the post-ROD design refinements are adequately documented and are consistent with the findings in the project's 2007 Final Environmental Impact Statement and 2008 NEPA approvals. We consider the ROD to remain valid, with no additional supplemental environmental documentation required. Should future design refinements occur, DelDOT will continue to coordinate with FHWA for review and concurrence.

We request FHWA's determination whether this re-evaluation prepared for the U.S. 301 project remains valid and that the proposed post-ROD design refinements will not result in a significant change in socioeconomic, cultural or natural resource impacts. Upon receipt of your decision, FHWA's determination will be inserted into the document. Electronic copies (CDs) of the entire document (with appendices and roll maps from the September 6, 2011 Public Workshop) will be provided for your files and mailed to the environmental resource and regulatory agencies who have contributed substantially in the development of the design refinements.

DelDOT

Should you have any questions or comments, please call me at 302-760-2305 or Ms. Diane Gunn at 302-326-4487.

Sincerely,

Natalie Barnhart

Natalie Barnhart
Chief Engineer
Delaware Department of Transportation

Attachments

cc: Drew Boyce, Assistant Director, Project Development North
Mark Tudor, U.S. 301 Project Director
Diane Gunn, U.S. 301 Project Manager
Therese Fulmer, Environmental Manager
Bill Hellmann, GEC Project Manager, RKK
Basharat Siddiqi, Assistant Division Administrator, FHWA
Dan Montag, Senior Area Engineer, FHWA

US 301 Project Development

US 301: MD/DE Line to SR 1, South of the C&D Canal
New Castle County, Delaware
Delaware State Contract Number 200511301
Federal Highway Administration Number 00NH2006(018)

Design Refinements Report

FINAL - November 2011

U. S Department of Transportation
Federal Highway Administration
DelMar Division
FHWA ID No. 52-0599112

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EXECUTIVE SUMMARY

Introduction

This report presents a review and evaluation of the environmental consequences of design refinements to the US 301 Selected Alternative, the Green North + Spur Road Alternative, that was detailed in the November 2007 Final Environmental Impact Statement (FEIS) and approved in the April 30, 2008 Record of Decision (ROD) issued by the Federal Highway Administration (FHWA).

According to FHWA regulations contained in 23 CFR 771.129, a written evaluation may be necessary prior to requesting major approvals to establish whether or not the approved environmental document remains valid for the requested Administrative Action. A number of design refinements have occurred since approval of the FEIS and the ROD. The Delaware Department of Transportation (DelDOT) has prepared this Design Refinements Report (reevaluation) that compares the impacts of the post-ROD/current refined design for the US 301 Project to that approved in the ROD. DelDOT requests that FHWA concur that the changes in impacts due to the design refinements are not significantly different from those detailed in the FEIS and the ROD, and that the FEIS/ROD remains valid.

Following the Executive Summary, the Design Refinements Report presents a description of the ROD Selected Alternative, the Green North + Spur Road. The document then takes the reader through the status of the design refinement process, introducing the design sections and construction contracts. A section then follows that summarizes and compares the total impacts of the proposed refinements by resource to those of the 2008 ROD Selected Alternative and the proposed mitigation elements of the project. Following the summary, the impacts of each resource and the proposed mitigation for each impacted resource are detailed. Adding more detail, the report then describes, by Design Section, each individual design refinement including: a description and figure showing the refinement, impacts, advantages and disadvantages, public involvement and agency coordination, and how the decision regarding the incorporation of each refinement was achieved. Finally, the Design Refinements Report discusses public involvement and agency coordination since the 2008 ROD. The document concludes with a discussion of commitments monitoring and project permitting. The Appendix presents (A) expanded impacts matrices; (B) a copy of the ROD commitments; (C) cultural resources (Section 106) coordination and Section 4(f) coordination; (D) a spreadsheet showing the proposed real estate acquisitions (affected properties and relocations); (E) a summary review of DelDOT's revised Noise Policy, which became effective July 13, 2011, and berm refinements; (F) summary of the March 23, 2009 Public Workshops and DelDOT's August 3, 2009, letter to the stakeholders following the 2009 Workshop; (G) summary of the September 6, 2011 Public Workshop. Roll maps of the current Design Sections, presented at the September 6, 2006 Workshop, are included with the electronic copy (CD) of this document. Appendix H provides a compilation of agency meetings materials including minutes of each meeting, handouts, figures, and copies of PowerPoint™ presentations.

Project Status

Initial funding authorization for final design and right-of-way acquisition was provided by the General Assembly on June 30, 2008. Right-of-way acquisition and final design activities were authorized by the FHWA in June and September 2008, respectively. A General Engineering

Consultant (GEC) was selected by DelDOT to assist in managing this major transportation project, and issued notice to proceed in August 2008. The Selected Alternative was divided into four design sections, and Section Design Consultants (SDCs) were selected. Notices to proceed on design were issued on the US 301 Mainline portion of the project (Design Sections 1, 2 and 3) in September 2008 and on the US 301 Spur Road portion (Design Section 4) in July 2009. The four design sections are listed below and shown on ***Figure i***.

Section 1 – US 301 Mainline from east of the Norfolk Southern Railroad (NSRR) to SR 1
Section 2 – US 301 Mainline from Levels Road to east of the NSRR
Section 3 – US 301 Mainline from south of the Delaware/Maryland State Line to Levels Road
Section 4 – US 301 Spur Road and the SR 896/Bethel Church Road Interchange

Figure i: US 301 Design Sections

Each of the design sections, except Section 3, was further divided into individual construction contracts, as shown in ***Table i***. Construction contract locations are shown on ***Figure ii***.

Final design/preparation of construction contract documents is currently at the final stage (95% to 100% complete) for most of the US 301 Mainline construction contracts and at the preliminary stage (40% to 50% complete) for the US 301 Spur Road.

Table i. US 301 Design Sections and Construction Contract Limits

Design Section	Design Section Limits	Construction Contracts	Construction Contract Limits
1	US 301 Mainline, East of Norfolk-Southern Railroad to SR 1	1A	US 301, SR 896 to SR 1
		1B	US 301 and SR 1 Interchange
		1C	US 301, NSRR to SR 896
		1D	US 13 and Port Penn Road Intersection
2	US 301 Mainline, Levels Road to East of Norfolk-Southern Railroad	2A	US 301, Levels Road to NSRR
		2B	US 301: Bridges 1-468N and 1-468S over NSRR; and Bridges 1-470N and 1-470S over Summit Bridge Road
		2C	Armstrong Corner Road and Summit Bridge Road Intersection Improvements
3	US 301 Mainline, MD/DE Line to Levels Road	3	US 301, Maryland State Line to Levels Road
4	US 301 Spur Road	4A	US 301 Spur Road/SR 896/Bethel Church Road Interchange
		4B	US 301 Spur Road, Churchtown Road to SR896/Bethel Church Road Interchange
		4C	US 301 Spur Road, US 301 to Churchtown Road

Right-of-way acquisition activities are currently underway for the US 301 Mainline and projected to be completed in approximately August 2012. Right-of-way acquisitions will begin on the US 301 Spur Road when the design drawings and right-of-way plans reach the semi-final phase in 2012 and be completed in 2013. Ten of the 19 relocations required for the US 301 Mainline have been completed. There are no relocations required for the US 301 Spur Road.

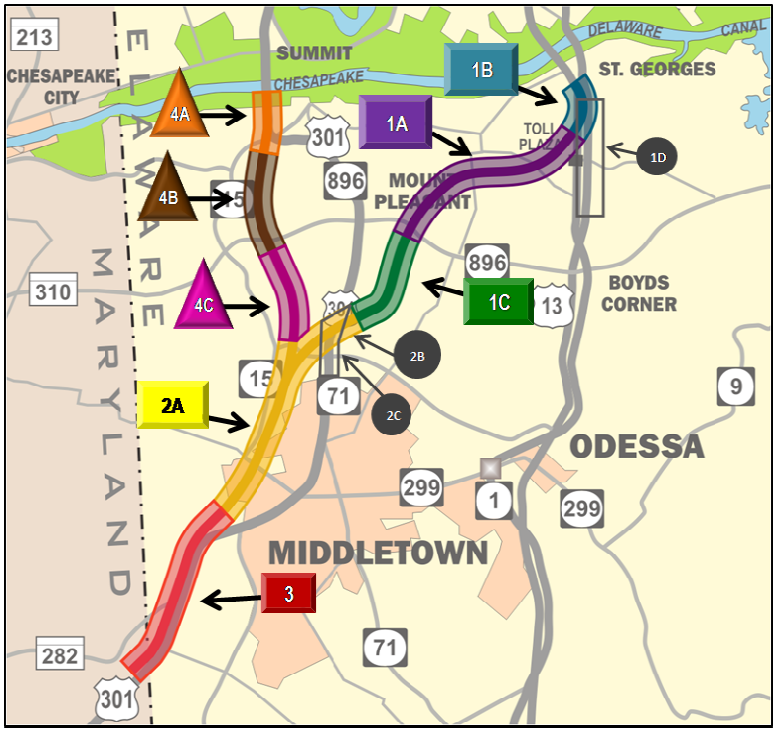

Figure ii: US 301 Construction Contracts

Summary of Design Refinements, Impacts and Mitigation

The recommended refinements to the Selected Alternative result in relatively minor changes in the overall impacts to the environment. ***Table ii*** lists the design refinements, while ***Table iii*** on the following page summarizes the environmental impacts identified in the 2008 ROD, updates ROD

impacts based upon information or changes in regulations, and compares the impacts of the 2008ROD Selected Alternative with Updated 2011 Features to the Refined Design. As noted previously, the final design/preparation of construction contract documents for the US 301 Mainline is nearing completion. Thus, additional refinements are not anticipated. The US 301 Spur Road is approximately 40% to 50% complete, and, based on US 301 Mainline experience, only minor refinements would be anticipated in the future. However, should additional refinements occur, their effects will be appropriately assessed and this document updated in accordance with applicable FHWA requirements.

Design Refinements Summary

Following the notices to proceed issued to the Section Designers and a review of agency and public comments on the 2007 FEIS design, the engineers and resource agency representatives collaborated with DelDOT to refine the design of the new US 301. With a desire to continue to lower the environmental impact of the roadway on natural and human resources, designers and agencies proposed a series of refinements. Refinements were discussed at agency meetings and field views, and changes in impacts were calculated and compared. Two workshops were held to inform the public of the progress on the project and the proposed refinements to the design of the US 301 roadway. As each refinement was presented to the public, and agency and public comments considered, DelDOT requested no objection/concurrence from the agencies to include the refinement in the final design. ***Table ii*** lists the Design Refinements to date. This Report summarizes the impacts of the design refinements and compares the total impacts of the Refined Design to that of the ROD design. Individual design refinements and their impacts are discussed in the body of this Report.

Table ii: Design Refinements

Design Section	Refinement
All Sections	(1) Narrow Median Width to 54 Feet
1	(2) Design of Bridges over Scott Run and Scott Run Tributary at SR 1 Interchange (3) Relocation of US 13 to Northbound SR 1 Toll-Free Ramp to the South at Port Penn Road (4) Hyetts Corner Road Closure during Construction of US 301 Bridges over Scott Run and Hyetts Corner Road Bridges over Scott Run and US 301 (5) Jamison Corner Road Interchange Roundabouts (6) US 301 Bridges over Drawyer Creek Tributary
2	(7) Reconfigure the New US 301/Existing US 301 Interchange (8) Northbound US 301 Exit to the Northbound Spur Road, Right Side rather than Median Side (9) Levels Road Interchange Shift 125 Feet to the South to Minimize Impacts (also Section 3)
3	(10) Levels Road South-Serving Ramps and Toll Plaza Ramps Operational Improvements (11) Strawberry Lane Local Connector to Existing US 301 (12) Eastward Shift of US 301 Mainline at the State Line
4	(13) SR 896/Bethel Church Road Interchange (14) Spur Road Alignment Refinements to Minimize Impacts (15) Churchtown Road Overpass of Spur Road/Tidewater Utilities Access
1,2,4	(16) Emergency Access Ramps for Incident Management

Impacts Summary

Table iii compares the impacts of the 2008 ROD Selected Alternative, identifies the updated impacts associated with the same ROD design based upon updates in 2011 of the Selected Alternative, and finally, compares the impacts of the 2008 ROD Selected Alternative with Updated

2011 Features to the current Refined Design that includes all sixteen refinements. The Refined Design has small increases in impacts associated with natural resources; cultural resources impacts have not changed, and noise impacts have been reduced. The number of affected parcels has increased, and the number of relocations has decreased. Impacts to agricultural preservation parcels have decreased. The discussion of impacts and mitigation continues through page xxii and is presented in detail in the Report on pages 13 through 36.

Table iii: Summary Comparison of Resource Impacts – Selected Alternative vs. Refined Design

Resource	2008 ROD Selected Alternative[1]	2008 ROD Selected Alternative with Updated 2011 Features[2,3,4]	Refined Design[2]
Alignment Length (mi.)	17.5	17.5	17.5
Natural Resources			
Wetlands (acres)[5]	35.4	34.0	36.7
Wetlands (No.)	63	44	51
Tidal Wetlands (acres)	0	0	0.01
Waters of the US – Ditches and Streams (linear feet)	17,883	10,337	12,181
100-Year Floodplain (acres)	0.7	0.7	1.1
Prime Farmland Soils (acres)	616	428.9	550.5
Hydric Soils (acres)	166	159.9	204.8
Upland Forested Land (acres)	61	62.2	64.1
Cultural Resources			
National Register Properties: Physical Impacts (No.)	0	0	0
National Register Properties: Visual or Noise Impacts (No.)[6]	15	15	15
Socioeconomic Resources			
Affected Parcels (No.)	143	143	218
Total Relocations (No.)	21	21	19
Agricultural Districts (number)	1	1	1
Agricultural Districts (acres)	32.6	0.37	0.1
Agricultural Easements (number)	1	1	2
Agricultural Easements (acres)	1.8	5.3	3.8
Communities/Properties with Visual Impacts and Berms (No.)	6	6	7
Residential Noise Impacts (No.)[7]	133	135	135/77
Residential Noise Impacts after Proposed Visual Earth Berms (No.)[7]	46	34	34/28
Total Cost ($M) [8]	$704	$746	$746

[1] *Record of Decision, April 30, 2008, page 79.*
[2] *Impact Matrix prepared September 9, 2011.*
[3] *See explanation detailing updated features on pages viii through xxii and in the Report on pages 13 through 36.*
[4] *Roadway supporting areas discussed in the ROD; calculated figures not presented in the ROD (see Pages xv & xvi)*
[5] *Total area of potential wetlands acres impacted. Includes DNREC tidal wetlands impacted.*
[6] *Includes properties having an Adverse Effect (12) and a No Adverse Effect (3) determination.*
[7] *2008 DelDOT Noise Policy/2011 DelDOT Noise Policy*
[8] *The cost is estimated in year of expenditure $ including inflation.*

Mitigation Summary

Impacts to natural resources would be mitigated through natural resource preservation, enhancement and creation at 26 sites in the US 301 project area (see ***Table iv*** and ***Figure iii***). The mitigation package includes wetland/waters/upland forest preservation (114 acres), wetland enhancement/ restoration (8.4 acres), wetland creation (68+ acres) and reforestation/riparian buffer enhancement (221 acres). In addition, all significant stream crossings would be bridged to minimize impacts, a wildlife crossing would be included north of SR 896 (Boyds Corner Road) and impacts to ditches would be mitigated through in-kind ditch replacement and creation.

Table iv. Natural Resources Mitigation Summary

Mitigation Type	Total Mitigation Extent
Wetland Mitigation	
Wetland Creation	68+ acres
Wetland Enhancement	7 acres
Wetland/Waters/Upland Forest Preservation	75 acres
Upland Buffer Reforestation	66 acres
Other Waters of the US Mitigation	
Stream Restoration	550 linear feet
Wetland/Riparian Buffer Restoration	1.4 acres
Riparian Buffer Enhancement	59 acres
Wetland/Waters Preservation	19 acres
Bridges at Significant Stream Crossings	8 bridges
Wildlife Crossing	1 wildlife crossing
In-kind Ditch Mitigation	Replacement & Creation
Coastal Zone Management Mitigation	
Reforestation	28 acres
Wetland/Waters Preservation	4 acres
Forest Mitigation	
Reforestation	68 acres
Forest Preservation	16 acres

Visual impacts to communities adjacent to the new US 301 would be mitigated through the construction of landscaped visual earthen screening berms. Berms are proposed for the communities of Airmont, Summit Bridge Farms, Chesapeake Meadow, Springmill, Middletown Village, and Spring Arbor. An additional visual screening berm is proposed for the Middletown Veterinary Hospital.

Visual and/or noise impacts to cultural resources may include landscaping and plantings adjacent to the new US 301, based upon consultation (in accordance with Section 106) with the property owners and the Delaware State Historical Preservation Office (SHPO). Conditions for mitigation are itemized in the Section 106 Memorandum of Agreement (MOA).

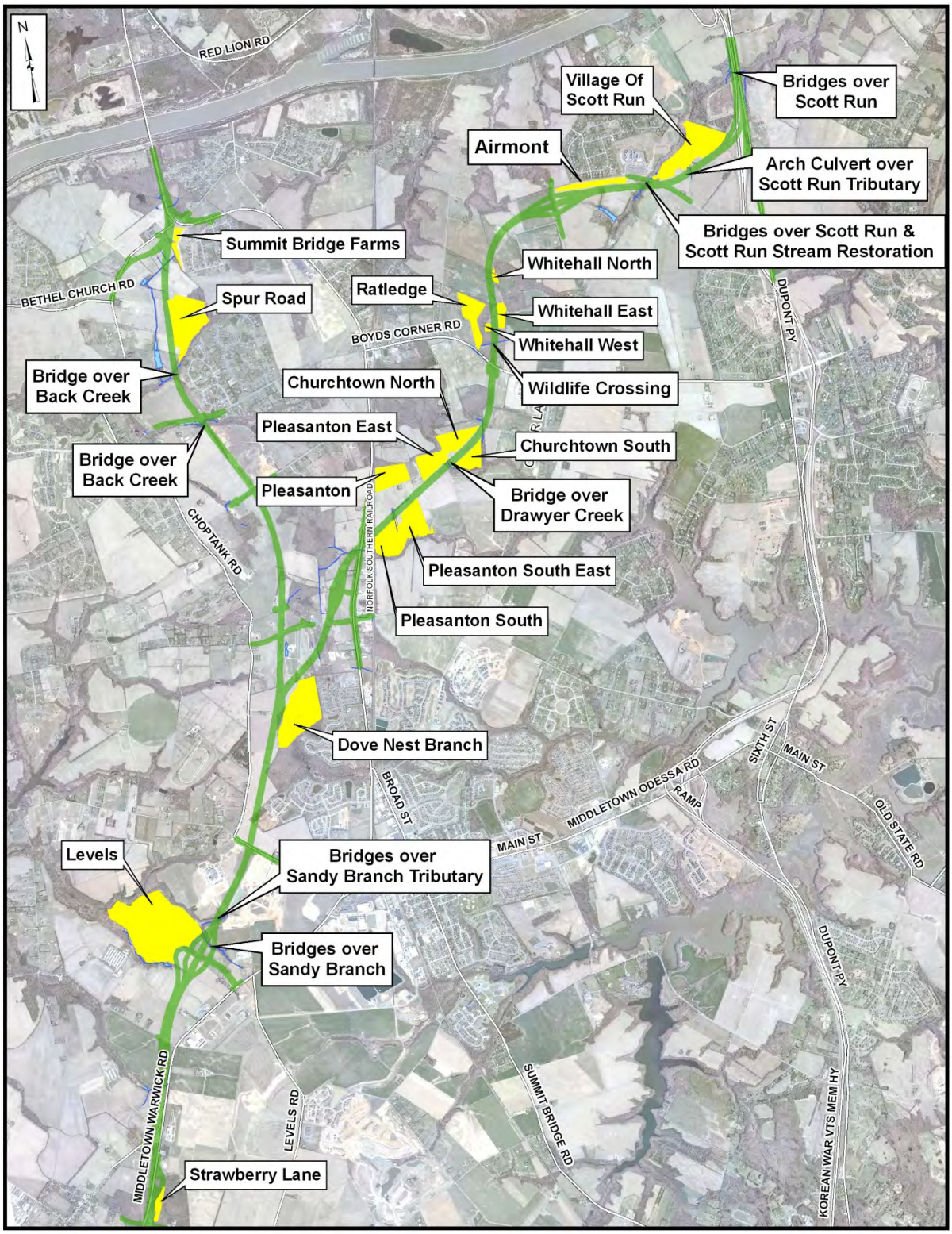

Figure iii. Total Potential Mitigation Sites

Environmental Impacts and Mitigation

Environmental impacts associated with the proposed design refinements are evaluated and compared to those identified in the 2008 ROD Selected Alternative with Updated 2011 Features. An expanded matrix of impacts is included as ***Appendix A***. For each resource, a summary of proposed mitigation follows the impacts.

Natural Resources

Table v summarizes and compares the natural resource impacts of the Refined Design to those of the ROD Selected Alternative. The sections following identify the potential impacts and the proposed mitigation for each natural resource affected by the US 301 Project.

Table v: Comparison of Natural Resource Impacts – Selected Alternative vs. Refined Design

Resource	2008 ROD Selected Alternative[1]	2008 ROD Selected Alternative with Updated 2011 Features[2,3,4]	Refined Design[2]
Alignment Length (mi.)	17.5	17.5	17.5
Wetlands (acres)[5]	35.4	34.0	36.7
Wetlands (No.)	63	44	51
Tidal Wetlands (acres)	0	0	0.01
Waters of the US – Ditches and Streams (linear feet)	17,883	10,337	12,180.8
100-Year Floodplain (acres)	0.7	0.7	1.1
Prime Farmland Soils (acres)	616	428.9	550.5
Hydric Soils (acres)	166	159.9	204.8
Upland Forested Land (acres)	61	62.2	64.1

[1] *Record of Decision, 4/30/08, page 79.*
[2] *Impact Matrix prepared 9/9/11.*
[3] *See explanation below detailing updated features.*
[4] *Roadway supporting areas discussed in the ROD; calculated figures not presented in the ROD (see Pages xv -xvii)*
[5] *Total area of potential wetlands acres impacted. Includes DNREC tidal wetlands impacted.*

Wetlands

Impacts
The 2008 ROD Selected Alternative with Updated 2011 Features would impact a total of 34.0 acres of wetlands. Impacts would include permanent impacts, including displacing or filling the wetland systems or causing interruption to wetland or stream hydrology, as well as shading impacts for wetlands that would be bridged and temporary impacts for construction access.

Implementation of the design refinements would increase total wetland impacts from 33.9 acres to 36.7 acres, an increase of 2.8 acres. Included in this total is 0.01 acre of impact to Delaware Department of Natural Resources and Environmental Control (DNREC) tidal wetlands near the US 301/SR 1 interchange.

Impacts to wetlands were calculated by measuring the total wetland area within the limits of construction. Therefore, the impacts shown in this Report include the fill/cut for roadway construction and direct impacts of construction of bridge abutments and piers in wetlands. The impacts also include the wetland area adjacent to fill, under and adjacent to the bridge decks, and along temporary haul roads that will be used for erosion and sediment control (ESC) measures and construction access.

Mitigation

Impacts to wetlands will be mitigated through wetland creation at Levels and Pleasanton and wetland enhancement and preservation at Ratledge Road.

Levels Wetland Mitigation Site

The Levels wetland mitigation is a proposed 58+ acre, perennially-saturated, forested wetland creation project. In addition to wetland creation, the mitigation at the site will include 8 acres of wetland/waters preservation, 48 acres of upland buffer reforestation, and 40 acres of forest preservation. The final design for the site was completed in September 2011 and appraisals are underway to acquire the site, with site acquisition anticipated by August 2012. The location of the site is shown on ***Figure 8*** in the Report. The resource agencies were involved with the mitigation site selection and are providing input throughout the design process, both at agency meetings and during field reviews. Key elements of the design, including grading, outlets, forestation, and beaver deterrents are the result of coordination with DNREC, the US Environmental Protection Agency (EPA), and the US Army Corps of Engineers (ACOE). The agencies did not object to preliminary design plans presented at the May 25, 2010 agency meeting, but stressed that there should be provisions for monitoring and adaptive management during borrow operations and mitigation site construction. Soils removed from the site to create appropriate grading and drainage would be used as borrow material for the construction of Section 2 and Section 3 roadway segments. The semi-final design was presented at the June 9, 2011 agency meeting.

Pleasanton Wetland Mitigation Site

The Pleasanton wetland mitigation is a proposed 10 acre seasonally saturated, forested wetland creation project and includes 18 acres of upland buffer reforestation. The final design for the site is complete and DelDOT has acquired the property. The resource agencies approved the selection of this mitigation site and have provided feedback on the site design, which focuses on restoring wetland hydrology and wetland vegetation. The site design provides for three distinct areas of wetland and would be successful based upon the growth of planted tree species and establishment of wetland hydrology. The agencies did not object to the final design plans presented at the June 9, 2011 agency meeting. The location of the site is shown on ***Figure 8*** in the Report.

Ratledge Road Wetland Preservation and Enhancement Sites

The Ratledge Road sites would preserve 20 acres of high quality wetland and upland forest and enhance seven acres of low quality farmed wetlands on the Wooleyhan property north of Boyds Corner Road. The seven-acre wetland enhancement area is currently farmed and restoration would involve permanently protecting the site, ceasing the farm operations, and reforesting the site. DelDOT would purchase a conservation easement on the mitigation site. To date, a three-party conservation easement agreement has been drafted, reviewed with the ACOE, and the appraisal of the value has been approved. DelDOT anticipates making an offer by the end of 2011.

Other Waters of the U.S.

Impacts
The 2008 ROD Selected Alternative with Updated 2011 Features would impact a total of 10,337 linear feet of streams and ditches. Impacts would include permanent impacts, including stream/ditch grading, stream/ditch filling or interrupting stream/ditch hydrology, as well as shading impacts for streams that would be bridged, and temporary impacts associated with construction access. Impacts were calculated by measuring the total area of waters of the U.S. within the limits of construction (LOC), including at bridge crossings.

The sizeable decrease in the ROD impacts to waters of the U.S. (17,883 linear feet decreased to 10,337 linear feet) can be explained by the reassessment of jurisdictional waters as affected by the Supreme Court Decision in Rapanos v. U.S. and Carabell v. U.S. (December 2, 2008) and the ACOE/EPA joint guidance memoranda. The guidance resulted in the elimination of swales, small washes, and many ditches previously determined jurisdictional.

The design refinements would increase the total impacts to waters of the U.S. (streams and ditches) from 10,337 linear feet to 12,181 linear feet, an increase of 1,844 linear feet. This would be the result of a decrease in impacts to streams (-513.1 linear feet, resulting in a total impact of 4,611.5 linear feet) and an increase in impacts to ditches (+2,357.3 linear feet).

Mitigation
Impacts to other waters of the U.S. will be minimized through the construction of bridges and mitigated through stream restoration and in-kind ditch replacement.

Bridges over Streams
The following significant stream systems will be bridged: Scott Run (three locations), Drawyer Creek, Sandy Branch and tributary (three locations), and Back Creek (two locations). As a result, streams in these locations will not be permanently impacted. In addition, bottomless arch culverts will be placed over a tributary to Scott Run and Sandy Branch to minimize stream impacts.

Scott Run Stream Restoration
The Scott Run Stream Restoration Site is located at Hyetts Corner Road in the vicinity of the proposed bridge crossings (Bridge 1-6, Hyetts Corner Road, and Bridge 1-7, US 301, over Scott Run). Preliminary stream restoration plans have been reviewed by the agencies and final design has been completed. The mitigation will include 550 linear feet of stream restoration along Scott Run and 1.4 acres of wetland/riparian buffer restoration adjacent to the stream restoration site.

Ditch Replacement
A significant portion of the other waters of the U.S. impacts are to ditches with minor ecological significance beyond water conveyance. These features will be replaced with a new network of ditches and swales designed to continue water conveyance throughout the alignment.

Subaqueous Lands Mitigation
DNREC regulates impacts to subaqueous lands (a subset of other Waters of the U.S.) and state jurisdictional tidal wetlands. The mitigation for impacts to DNREC subaqueous lands will include 59 acres of riparian buffer enhancement and 19 acres of wetland/waters preservation at Pleasanton East, Pleasanton South and Village of Scott Run, in addition to the Scott Run Stream Restoration.

Coastal Zone Management Mitigation
Additional mitigation has been included in the project to satisfy Special Condition 3 of the Project's Coastal Zone Management (CZM) Consistency Certification. The mitigation for DNREC Coastal Zone Management includes 28 acres of reforestation and four acres of wetland/waters preservation at Pleasanton Southeast.

Riparian Buffer Enhancement along Back Creek
DelDOT has committed to provide riparian buffer enhancement along the north branch of Back Creek to compensate for the additional impacts of the longer bridges over Back Creek associated with the Refined Design alignment of the US 301 Spur Road.

Floodplains

Impacts
The 2008 ROD Selected Alternative with Updated 2011 Features would construct bridges over 0.70 acre of 100-year floodplains associated with the SR 1 and US 301 ramps over Scott Run. The Design Refinements would construct bridges over 1.14 acres of floodplain, an increase of 0.44 acre. Bridges will be designed to ensure that there is no increase in the 100-year floodplain, resulting in no impact.

Mitigation
No mitigation is required, since there will be no impact to the 100-year floodplain. Floodplain permits will be required for construction in the 100-year floodplain, as well as for each blue line stream shown on USGS quad maps, to ensure flooding potential will not be increased as a result of the project.

Soils

Impacts
An error was discovered when the area of prime farmland soils (previously 616 acres) was re-measured during detailed design. Previously, a number of the areas used in the calculation of prime farmland soils were found to overlap, resulting in double counting. This error has been corrected, and the updated value of 429 acres is confirmed as correct for the Selected Alternative alignment shown in the ROD. There is an overall increase of approximately 121.6 acres of impact in the Refined Design, for a total of 550.6 acres. Of the 121.6 additional acres, most (110.5 acres) are the result of the inclusion of mitigation parcels, borrow areas (landlocked parcels) and staging/stockpile areas (temporary construction easements) in the final figures, see ***Table vii***. The Design Refinements impact 11.1 acres of additional prime farmland soils.

The 2008 ROD Selected Alternative with Updated 2011 Features would impact 159.9 acres of hydric soils. Hydric soil impacts would increase by 45.0 acres to 204.8 acres. The increase is due primarily to the inclusion of parcels being utilized for mitigation sites, land-locked parcels used for borrow, and temporary construction easements used for staging or stockpiling areas within the limit of disturbance (LOD) for the Refined Design.

Mitigation
There are no mitigation requirements for impacts to soils.

Water Quality/Stormwater Management

Design refinements would minimize impacts to all natural resources. Approximately 140 proposed stormwater management (SWM) practices would mitigate any potential negative effects to surface and groundwater quality. These practices include the use of innovative Low Impact Development (LID)/Green Technology techniques, such as disconnection of impervious areas through vegetative filter strips for pre-treatment, roadside bioengineered swales, infiltration ditches to enhance groundwater recharge, and wet ponds. These practices would meet the recently introduced DNREC SWM rules as mandated by EPA. Unavoidable stream impacts would be minimized and mitigated through "Natural Channel Design" practices. ESC measures would be designed to include phased measures for interim construction and various major construction phases. All non-infiltration SWM practices would be utilized as sediment traps/basins to avoid any increase to the project's footprint and respective impacts. These facilities would be built as one of the first construction items to maximize capture of construction related pollutants. SWM facilities in the vicinity of the Summit Airport were reduced, relocated, and/or otherwise converted to dry ponds as needed and were approved by the Summit Airport officials.

Forests

Impacts
The 2008 ROD Selected Alternative with Updated 2011 Features would impact 62.2 acres of forest. The majority of the impacted forest is deciduous (54.6 acres) with a small amount of mixed forest (7.6 acres). The Design Refinements would impact 64.3 acres of forest, an increase of 2.1 acres.

Mitigation
Several potential reforestation sites, mainly land-locked parcels anticipated to be purchased by DelDOT, have been identified to accommodate the project's reforestation needs. Reforestation would occur on an acre-for-acre basis and would be distributed throughout the length of the project. The parcels would be planted with native tree seedlings. The following sites, shown in ***Figure iii***, will be used for reforestation: Summit Bridge Farms, Churchtown (North and South), and Village of Scott Run. In addition, 16 acres of existing forest will be preserved at these sites and at the Pleasanton sites.

Cultural Resources

Impacts and Mitigation
The 2008 ROD Selected Alternative would not physically affect any National Register listed or eligible property. There would be adverse effects (visual and/or noise impacts) to 15 properties listed or eligible for listing in the National Register. There is no change in the number of historic properties affected by the current Refined Design when comparing the 2008 ROD Alternative with the Design Refinements. A summary of consultation to date is included in **Appendix C**. There may be minor changes in the intensity of the visual and/or audible effects to the Armstrong-Walker House (N-5146), S. Holton Farm (N-0107), and the Rumsey Farm (N-0113).

Design Refinement 3 - Relocation of US 13 to Northbound SR 1 Toll-Free Ramp to the South at Port Penn Road resulted in the expansion of the Section 106 Area of Potential Effect (APE) east of US 13. Two additional resources within the expanded APE were evaluated and concurred as not

eligible for the National Register. Two eligible resources, the Biddle Property (N-3935) and Retirement Farm (N-5201) were consulted with the SHPO and concurred that there is no adverse effect to either resource. The Mondamin Farm (N-5253), also eligible, continues to be outside of the APE. Additional archeological investigations were also undertaken and the results submitted and reviewed by the SHPO as a part of ongoing Section 106 consultation.

Design Refinement 7 - Reconfigure the New US 301/Existing US 301 Interchange would continue to have an adverse effect on the Armstrong-Walker House. The revised East Diamond interchange design would continue to have a visual impact on the resource that will be similar to that of the ROD design. Proposed widening of existing US 301 (Summit Bridge Road) as it passes the Armstrong-Walker House would also have a visual effect. As a result of consultation between DelDOT, the Delaware SHPO, and the owners, some landscaping, including around the SWM facility in the southwest corner of the new/existing US 301 interchange ramps intersection with Summit Bridge Road and along the northbound side of new US 301 as it passes the resource, is being designed and coordinated with the owners and SHPO.

Design Refinement 8 - Right Side Northbound US 301 Exit to the Northbound Spur Road would continue to have an adverse effect on the S. Holton Farm. The right-hand exit ramp to the US 301 Spur Road would be approximately 100 feet further away from the resource; however, the visual and audible impacts of the US 301 Spur Road and US 301 Mainline would be slightly greater than the ROD design. Consultation to date among the owners, DelDOT and the Delaware SHPO did not provide any decisions on mitigation.

Design Refinement 10 - Levels Road South-Serving Ramps and Toll Plaza Ramps Operational Adjustments would continue to have an adverse effect on the Rumsey Farm. The visual impact of Levels Road extended and the ramps from US 301 mainline to Levels Road Extended would be similar to that of the ROD design.

Other owners with whom mitigation has been discussed are the owners of The Maples on Bunker Hill Road, where much of the property adjoining the historic boundary would be acquired for the construction of new US 301. Consultation with the owners did not lead to any decision on mitigation.

Coordination with the SHPO and property owners has and will continue to be the basis for the design and treatment of audible/visual minimization and mitigation. All property owners have been apprised of the conditions included in the MOA (ROD Attachment D) and all owners have been contacted regarding visual mitigation. Follow up meetings are continuing. Archaeological investigations of the project's area of disturbance are continuing. The Phase I investigation is completed in Design Sections 1, 2 and 3 and is ongoing for Design Section 4. To date, 61 archaeological sites have been identified and 26 are undergoing Phase II investigation. The Phase II program is complete in Design Section 3 and is ongoing in Design Section 2 and the Port Penn area (Design Refinement 3) of Design Section 1. Phase II investigations have not begun in Design Section 4, and Phase III has not begun in any area of the project.

Burnham House (N-5151), a previously identified archeological site located directly in the path of the US 301 Spur Road between Bohemia Mill Road and Old Schoolhouse Road, has been evaluated under Phase II and found not eligible for listing in the National Register.

Section 4(f)

The 2007 FEIS and 2008 ROD conclude the US 301 Selected Alternative would not require use of Section 4(f) protected properties. As a result of continued efforts to avoid and minimize potential use of Section 4(f) resources since issuance of the 2008 ROD, this evaluation report documents the subsequent Section 4(f) coordination that has occurred resulting in no use of Section 4(f) resources by any of the Design Refinements. This coordination includes the Chesapeake and Delaware (C&D) Canal Wildlife Refuge with the ACOE and the historic Armstrong-Walker House (N-5146) with the SHPO as jurisdictional officials related to Section 4(f).

C&D Canal Wildlife Refuge

DelDOT consulted with the ACOE to determine whether the proposed strip take of land adjacent to the existing Summit Bridge approach roadway (SR 896) constitutes a Section 4(f) use under 23 CFR 774. The 1.1-acre of land from the C&D Canal property would be used for improvements associated with the SR 896/Bethel Church Road Interchange. At the agency coordination meeting held on October 20, 2011 (**Appendix H**), the ACOE indicated that the areas adjacent to the roadway are not considered a part of the refuge, but are used for general maintenance of the canal, notably for disposal of dredged materials, and are not areas that provide recreational activities. ACOE has no proposed plans, leases or management programs to change the land use in this area. As such, ACOE does not consider this area significant on administering functional use of the land. FHWA and DelDOT staff agreed that the lands and use of this property from the ACOE does not constitute a Section 4(f) use under 23 CFR 774.

Armstrong-Walker House

DelDOT is requesting an exception from Section 4(f) use in connection with improvements proposed for Summit Bridge Road in the vicinity of Armstrong Corner Road and the proposed US 301 interchange ramp intersection/tie in with Summit Bridge Road. Proposed improvements would be made to existing US 301 (Summit Bridge Road) to provide two through lanes in each direction as well as turn lanes and other improvements to facilitate users access from Summit Bridge Road to the new US 301. The design of improvements to Summit Bridge Road is based upon DelDOT's established and understood 85-foot roadway width, and would not further encroach onto the historic boundary of the resource.

Since the issuance of the ROD and independent of the US 301 project, the owners of the Armstrong-Walker House have pursued the subdivision of the property into two lots. In mid-2008, as part of that subdivision process, an additional 15 feet of right-of-way was required and dedicated to the state for purposes of the subdivision review and approval process. The intent of this action was to unify Summit Bridge Road as a uniform 85-foot width throughout the existing corridor. Thus, the understood 85-foot roadway right-of-way lies within the initially dedicated 15 feet that is still considered as within the historic boundary established for the resource.

The improvements along Summit Bridge Road are proposed on both the east and west sides of Summit Bridge Road, except in front of the Armstrong-Walker House historic property boundary, where DelDOT is proposing to maintain the existing edge of roadway with a closed curb. A clear zone with a stormwater bioswale is proposed within the westernmost 15 feet of existing DelDOT right-of-way (within the historic boundary). This area currently serves as a drainage area for roadway runoff. Improvements would include minor re-grading, clearing of scrub vegetation, and

relocation of three utility poles. The duration of the construction of these improvements would be temporary, short-term, and shorter than the construction period for the roadway improvements themselves; there would be no change of ownership of the area; there will be no change of use; and the result would not change or interfere with the protected activities of the 4(f) resource.

Thus, determining the proposed use of this 4(f) land as temporary occupancy only, DelDOT is requesting an exception under CFR 774.13(d), a temporary occupancy so minimal so as not to constitute a use within the meaning of Section 4(f). Section 4(f) correspondence can be found in **Appendix C**.

Socioeconomic Resources

Table vi summarizes and compares the socioeconomic resource impacts of the Refined Design to those of the ROD Selected Alternative. The sections following identify the potential impacts and the proposed mitigation for socioeconomic resources affected by the US 301 Project.

Table vi: Summary Comparison of Socioeconomic Resource Impacts

Resource	2008 ROD Selected Alternative[1]	2008 ROD Selected Alternative with Updated 2011 Features[2,3]	Refined Design[2]
Total Affected Properties (No.)	143	143	218
Total Relocations (No.)	21	21	19
Agricultural Districts (number)	1	1	1
Agricultural Districts (acres)	32.6	0.37	0.1
Agricultural Easements (number)	1	1	2
Agricultural Easements (acres)	1.8	5.3	3.8
Residential Noise Impacts (No.)[4]	133	135	135/77
Residential Noise Impacts after Proposed Visual Earth Berms (No.)[4]	46	34	34/28
Total Area of Roadway LOD (acres)	941	926.4	1,043.9
Total Area Roadway Supporting Areas Limit of Disturbance (LOD) (acres)[5]	--	--	323.1
Total Area Limit of Construction (LOC) (acres)	941	926.4	1367.0
Capital Cost ($M) (2011 dollars)[6]	$704	n/a	$746

[1] *Record of Decision, 4/30/08, page 79.*
[2] *Impact Matrix prepared 9/9/11.*
[3] *See explanation below detailing updated features.*
[4] *2008 DelDOT Noise Policy/2011 DelDOT Noise Policy*
[5] *Roadway supporting areas discussed in the ROD, but calculated figures not presented in the ROD (see Pages xv - xvii)*
[6] *The cost is estimated in year of expenditure $ including inflation.*

Right-of-Way

Impacts

The impacted LOC for the roadway and SWM has changed from the 926.4 acres noted in the 2008 ROD Selected Alternative with Updated 2011 Features to a total of 1,367.0 acres for the Refined Design, an increase of 440.6 acres. The Design Refinements and changes due to current SWM requirements account for 117.5 acres. The additional 323.1 acres of increase are due to roadway

supporting areas that would be used for mitigation, borrow, staging or stockpiling. Although these elements were discussed in the ROD and were presented to the Agencies and the public prior to the ROD, they were not originally reported in the ROD. These roadway supporting areas, many of which are land-locked parcels (those portions of a real estate parcel that are rendered inaccessible to the property owners because of roadway construction) include: (1) the two major mitigation/borrow sites at Levels Road and at Pleasanton, (2) landlocked remnant parcels to be used for borrow, and (3) temporary construction easements (TCE) to be used for staging/stockpiling and reforestation located along the US 301 Mainline. These roadway supporting areas and their associated natural resources impacts are identified on ***Table vii*** below and on ***Figure 8*** in the Report.

Table vii: Roadway Supporting Areas and Impacts

Resource	Selected Alternative –Updated Features[1]	Roadway Supporting Areas				Total Roadway Supporting Areas	Design Refinements[2]
		Levels Road Mitigation Site	Pleasanton Mitigation Site	Borrow Sites	Staging and Stockpile Areas		
Total Limit of Construction, acres	926.4	103.69	31.88	136.01	51.51	323.09	117.5
Wetlands Impacts, acres	34.0	0.41	0	0.56	0	0.97	1.8
Streams Impacts, linear feet	10,337	0	0	0	0	0	1,844
Subaqueous Lands, linear feet	8,516	0	0	0	0	0	-7.7
Hydric Soils, acres	159.9	5.00	17.81	5.40	4.35	32.57	12.4
Agricultural Districts, acres	0.37	0	0	0	0	0	-0.28
Agricultural Easements, acres	5.31	0.55	0	0	0	0	-1.0
Prime Farmland Soils, acres	428.9	78.87	0.17	8.83	22.65	110.53	11.10
Forest, acres	62.2	0.90	0	0.38	0.37	1.64	0.23

Notes:
[1] *Refers to 2008 ROD Selected Alternative with Updated 2011 Features LOC from* ***Table iii****.*
[2] *The total roadway supporting areas (323.09 acres), when added to the 2008 ROD with Updated 2011 Features LOC (924.6 acres), totals 1,249.5 acres. The 117.5-acre difference between 1,249.5 and the total LOD of 1,367.0 is attributed to the Design Refinements.*

While the areas shown in ***Table vii*** were not included in the LOD figures noted in the ROD, the acquisition or temporary use of most of these landlocked remnant parcels would be for borrow material, staging, or stockpiling material prior to its use for construction. Following the completion of construction, temporary construction easements would be restored and many of the landlocked borrow sites are planned to be planted as reforestation mitigation. Many of the ultimate mitigation sites were discussed with the Resource Agencies and presented to the public, prior to the ROD, and discussed in the ROD. In early discussions of the mitigation package at the August 15, 2006 resource agency meeting, DelDOT indicated that public lands, right-of-way acquisitions or landlocked parcels would be given first priority as mitigation sites.

Mitigation

The compensatory mitigation package that was presented to the resource agencies on January 24, 2008 included 318 acres of land. Areas identified as wetland, riparian buffer and forest mitigation sites were not included in the ROD roadway LOC, but many of these areas are included in the Refined Design LOD as mitigation, stockpile, staging or borrow sites. Borrow sites at Pleasanton East and at Pleasanton Southeast were not included in the original 318-acre mitigation package.

These two landlocked remnant parcels are incorporated into the Refined Design and would add over 30 acres of riparian buffer enhancement, reforestation and preservation to the mitigation package.

All of the temporary construction easement sites used for stockpile and/or staging areas would be restored upon completion of the construction of US 301, using appropriate vegetation. Although most of these purchased sites (landlocked parcels) are proposed to be planted as reforestation mitigation areas, those not utilized for mitigation would be planted with appropriate DelDOT seeding mixes. Previously mowed areas would be replanted with the DelDOT standard seed mix; a DelDOT seeding mix specified for steep slopes would be planted in areas of steep slopes; and flat upland areas outside of the roadway clear zone would be planted with a "no-mow mix" of native warm-season grasses.

Property Acquisition and Relocations:

Impacts
As reported in the ROD, the Selected Alternative would require 21 relocations and affect a total of 143 properties through total or partial acquisition. The Refined Design would affect a total of 218 parcels and require relocation of the occupants of 19 businesses or residences. The increase in the properties affected is mainly the result of including additional partial strip acquisitions for roadway widening along existing US 301 (Summit Bridge Road) to accommodate the refined interchange with new US 301; the tie into existing dual US 301 at the Maryland line; the inclusion of roadway supporting areas including mitigation sites, borrow sites, and temporary construction easements; and in the improvements along US 301 at the Port Penn Road/Toll-Free Ramp intersection. In addition, a number of properties (counted as a single property in the FEIS/ROD) were subsequently determined to be multiple parcels. Thirty-one parcels have already been purchased by DelDOT.

The difference in the number of relocations (21 identified in the ROD reduced to 19 in the Refined Design) can be attributed to the proposed design refinements. One new relocation on Summit Bridge Road was identified and another avoided to accommodate improvements needed for the intersection of new/existing US 301, and two relocations were avoided through adjustments of the Mainline and Spur Road alignments. Nine relocations have been completed (see **Appendix D**).

Mitigation
Owners of affected properties would be fairly compensated for the acreage required based on assessment of property value and the size of the acquisition. In addition to just monetary compensation for the assessed value, owners whose residences or business properties would be acquired in whole, requiring relocation, would be provided relocation assistance in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended by the Uniform Relocation Act Amendments of 1987.

Farms and Agricultural Preservation Areas:

Impacts
The ROD Selected Alternative would require the conversion of 752 acres of land used for agricultural purposes to transportation use. Approximately 50 percent of those acres were slated for development. Although some of the planned and approved development has proceeded as scheduled, the current economic recession has delayed others. The ROD Alternative would impact

26 active farm parcels not planned for development through partial or total acquisition of right-of-way.

The agricultural district impact reported in the ROD is the impact to the Maples property, located on the north side of Bunker Hill Road in Design Section 3. The property was entered into the state's 10-year preservation program in 1998, and the owners did not extend their involvement in the program when the agreement expired in 2008. Therefore, the 32.6 acre agricultural district impact reported in the ROD no longer exists, since the property is no longer recorded in the state conservation program. In addition, it was determined after publication of the ROD that the Strawberry Lane Connector to US 301 would impact portions of the Clay Farms, which are a part of the Baker Farms Agricultural District. With the elimination of the Maples as an agricultural district and the addition of the Clay Farms impact, the number of agricultural districts impacted by the Selected Alternative remains at one. The 2008 ROD Selected Alternative with Updated 2011 Features column correctly reports that impact as 0.37 acres.

The most consistent impact to agricultural easements is a result of the US 301 Spur Road alignment crossing the Steele Farm just north of Chesapeake Meadow, which was reported consistently in the DEIS (6.0 acres) and the FEIS (6.0 acres). In the ROD, however, the acreage was incorrectly reported as 1.8 acres. The 2008 ROD Selected Alternative with Updated 2011 Features column correctly reports the impact as 5.3 acres (less than the FEIS as a result of some adjustment of the alignment). With the Refined Design, the impact to the Steele Farm would only be 3.2 acres. With the inclusion of the Levels Road Mitigation site in the LOD, there would be an additional impact (permanent conservation easement requiring approximately 0.6 acre) on an agricultural easement in the Baker Farms District (Design Section 3). Construction of the mitigation site would require the permanent easement to access the outlet structure for maintenance. This permanent easement will not affect the farm operations or preservation of the nearby wetland area. This additional impact results in a total potential impact to two agricultural easements of 3.8 acres.

The 2008 ROD Selected Alternative with Updated 2011 Features would impact one permanent agricultural preservation easement (5.3 acres) and one ten-year preservation district (0.37 acres). The Design Refinements would impact two preservation easements (3.76 acres) and 0.09 acre on one preservation district. The potential amount of preserved farmland impacted has decreased by a total of 1.8 acres.

Mitigation

In response to DNREC comments on the alignment of the selected alternative in the Ratledge Road area (Option 4B Modified), DelDOT committed to make a good faith effort to pursue a voluntary agricultural conservation easement on the Wooleyhan farm, with the understanding that condemnation would not/could not be used to secure such easement from the property owner. DelDOT approached the landowner, who refused to join the State's voluntary agricultural conservation easement program. The owner was also unwilling to allow DelDOT to purchase development rights on the property in order to secure the easement. In lieu of securing this easement, DelDOT proposed alternative compensation that includes preserving five acres of riparian forest and seven acres of wetlands as well as reforesting 28 acres at the Pleasanton Southeast site, and DNREC accepted this proposal.

Communities and Community Facilities:

Impacts

There are no substantial changes in impacts to communities associated with the Design Refinements when compared to the ROD Alternative. In three locations, shifts of alignment would cause the US 301 Spur Road to be somewhat closer to three communities:

- The US 301 right-hand exit ramp from the US 301 Mainline to the US 301 Spur Road would be approximately 100 feet closer to the community of Springmill (1,600 feet away) than the left-hand exit ramp design shown in the ROD (1,700 feet away);
- The refined alignment of the US 301 Spur Road would be approximately 12 feet closer to the community of Chesapeake Meadow (221 feet away) at closest point on the northwestern edge of the community than the ROD alignment of the Spur Road (233 feet away); and
- The Refined Design of the US 301 Spur Road would be approximately 35 feet closer to the northern edge of the community of Summit Bridge Farms (407 feet away) than the ROD design (442 feet away).

One factor that influences community impacts is the continued progress of residential development within the project area. One community, Southridge/Spring Arbor, was not constructed at the time of the ROD (April 2008); many of its new residents attended the March 23, 2009 Public Workshop to gather information about the project and inquire about the efficacy of the visual earthen berm proposed in minimizing roadway noise impacts. A pre-workshop meeting was held with the Spring Arbor community on August 23, 2011 and residents requested that the height of the proposed visual earth berm along the community be increased from 10 feet to 16 feet. DelDOT has agreed to provide a 16-foot high berm for 2,600 feet along the community and a 10-foot high berm for 400 feet along the south end of the community to avoid impacting utilities. The south end of the berm is limited by existing wetlands.

There are no changes in impacts to community facilities. The Tidewater Utilities drinking water facility, located close to the proposed US 301 Spur Road alignment on Churchtown Road, would be provided with an access driveway (Design Refinement 15), and the eastward shift of the alignment near the DE/MD state line (Design Refinement 12) would avoid impacts to the major power transmission towers.

Mitigation

Proposed visual mitigation for communities in the form of landscaped earthen screening berms has been modified slightly during design to increase the benefits. The opportunity for additional visual screening for affected communities is primarily due to the availability of excess excavation material resulting in a project cost saving when compared to soil disposal costs. In some cases, additional visual screening was also requested by the communities. For the communities of Airmont, Chesapeake Meadow, Middletown Village, and Southridge/Spring Arbor, berm lengths were extended. For the communities of Airmont and Spring Arbor, the berm heights have been increased. The berm length for Springmill is reduced by 400 feet with no lowering of benefits. An additional screening berm is proposed for the west side of Summit Bridge Farms. Further details about the modifications of the visual berms for Airmont, Middletown Village, Spring Arbor and Summit Bridge Farms are included in **Appendix E**. A comparison of the length and height of the screening earth berms proposed in the ROD versus the Refined Design is presented in ***Table viii***.

Table viii. Visual Screening Berms - ROD versus Refined Design

Community	ROD	Refined Design
Airmont	6' x 1,670'	12' x 2,000'
Chesapeake Meadow	11' x 1,600'	11' x 1,800'
Middletown Village	16' x 2,000'	16' x 2,700'
Southridge/Spring Arbor	10' x 2,840'	16' x 2,600'; 10' x 400'
Springmill	6' x 2,200'	6' x 1,800'
Summit Bridge Farms	--	11' x 1,840'
Middletown Veterinary Hospital	6' x 900'	No change

Economic Benefits:

Impacts and Mitigation
The Design Refinements would not alter the anticipated economic benefits that accrue from the completion of the US 301 project, i.e., reduced congestion on local roadways, decreases in accidents on local roadways and better accessibility to businesses located in the project area. No mitigation is required.

Secondary and Cumulative Effects:
The 2007 FEIS Secondary and Cumulative Effects Analysis (SCEA) (pages III-212 to III-233) concluded that the construction of the US 301 project would not directly influence the amount or location of development anticipated to occur within the SCEA boundary. The transportation and traffic benefits forecast as a result of the implementation of a build alternative would provide adequate public roadway capacity for permitting purposes, thus allowing approval of development that may have been disallowed under existing or No-Build conditions. The improved transportation facility may result in future zoning change requests for higher density developments in areas not currently zoned for such development. Among the effects of this project, therefore, is the potential for secondary development that would not occur without the construction of a new four-lane limited access roadway to relieve existing and future traffic volumes on existing roads, especially in areas easily served by access ramps. The refinements developed during the design of the US 301 Selected Alternative would not alter the typical design of the roadway (four-lanes, tolled, limited access) from the design identified in the 2007 FEIS/2008 ROD, and therefore the conclusions of the SCEA would not change.

Noise

Impacts and Mitigation
As identified in the 2008 ROD, 133 residences would experience noise impacts as a result of the implementation of the Selected Alternative. Impacts were defined as noise levels of 66 decibels (dBA) or greater, or an increase of 10 dBA or greater. Noise mitigation was not considered reasonable and/or feasible in accordance with the DelDOT noise policy effective in 2008 for all locations except the newly-constructed Southridge/Spring Arbor community. However, proposed visual screening landscaped earth berms adjacent to a number of communities would provide beneficial noise effects, and reduce Selected Alternative noise impacts to 46 residences.

The Refined Design would extend the length and increase the height of a number of visual earth berms from those indicated in the ROD, and construct a new visual screening berm on the west side

of the Summit Bridge Farms community (refer to ***Table ix***). Under DelDOT's 2008 noise policy, the Refined Design would also lower the number of noise impacts at various locations throughout the alignment. With the Refined Design, 135 residences would experience noise impacts without visual screening berms. Noise impacts are reduced to 34 with the construction of the refined visual earth berms.

FHWA recently amended the Noise Standard. Implementation of DelDOT's new noise policy, which complies with these amendments, became effective on July 13, 2011. Following a sample analysis of noise mitigation under new policy guidance (the details of which are included in Noise Section and **Appendix E** of this report), it was determined that, while noise abatement was found feasible and reasonable for the Southridge/Spring Arbor community under the 2008 DelDOT noise policy, noise mitigation would not meet such criteria under the new policy.

DelDOT concluded that no new noise analyses would be undertaken using the updated noise policy, and that visual earth berms offering varying degrees of noise benefits would continue to be provided for communities adjacent to the new US 301 corridor. In accordance with policy guidance, DelDOT consulted with FHWA on this recommendation and FHWA determined that no further reanalysis under the revised policy was required.

A complete reanalysis of noise mitigation was not performed using the updated noise policy; however, the Refined Design was evaluated for noise impacts with the updated policy for no-berm and with-berm conditions, using the refined visual earth berm dimensions.

Table ix summarizes noise impacts, with and without visual earth berms, for the ROD and Refined Designs, using the previous noise policy effective in 2008, as well as the Refined Design with DelDOT's current noise policy.

Table ix. Noise Impact Comparison - ROD versus Refined Design

Community	FEIS/ROD Noise Impacts 2008 Noise Policy		Refined Design Noise Impacts 2008 Noise Policy		Refined Design Noise Impacts 2011 Noise Policy	
	no Berm	with Berm	no Berm	with Berm	no Berm	with Berm
Airmont 6' x 1,670' berm refined to 12' x 2,000'	0	0	0	0	0	0
Chesapeake Meadow 11' x 1,600' berm refined to 11' x 1,800'	11	0	7	0	2	0
Middletown Village 16' x 2,000' berm refined to 16' x 2,700'	15	0	16	0	10	0
Southridge/Spring Arbor 10' x 2,840' berm refined to 16'/10' x 2,600'/400'	75	14	81	3	38	1
Springmill 6' x 2,200' berm refined to 6' x 1,800'	0	0	0	0	0	0
Summit Bridge Farms [1] 11' x 1,841' berm added to west of community	12	12	12	12	12	12
Individual Residences Visual berms not feasible nor reasonable	20	20	19	19	15	15
TOTAL IMPACTS	**133**	**46**	**135**	**34**	**77**	**28**

1. Twelve (12) properties are impacted in the existing condition by traffic on SR 896, not the proposed US 301 Spur Road

The addition of a visual screening earth berm on the west side of Summit Bridge Farms would visually shield the community from a portion of the US 301 Spur Road. However, a berm is not feasible on the north side adjacent to SR 896, and twelve (12) residences would remain impacted by SR 896 on the north side of the community.

The visual screening berm recommended for Southridge/Spring Arbor would provide significant noise reductions for the community and eliminate all but three (3) residential impacts (applying the 2008 noise policy) or one (1) residential impact (applying the 2011 noise policy) at the southern end of the community. These impacts involve planned residential sites, not existing residential sites. Existing wetlands precluded extending the visual earth berm further to the south to benefit the impacted sites.

Air Quality

The US 301 project is a DelDOT priority and construction funding is included in the fiscally constrained Capital Transportation Program (CTP) FY 2011-FY 2016 and the Statewide Transportation Improvement Program (STIP) FY 2009-FY 2014 for regional air quality. The US 301 project is identified in the Wilmington Area Planning Council's (WILMAPCO's) current 2040 Regional Transportation Plan Update (October 2010) for in-service 2017 and in WILMAPCO's FY 2012-2015 TIP approved March 2011 amended September 2011. There would be no substantial change in local air quality impacts due to the changes made in the current design. No additional analysis is warranted at this time.

Commitments Monitoring

DelDOT remains firmly committed to all of the elements of the mitigation package as well as to the additional commitments made to the public during the planning process. All the project commitments have been placed in a tracking database to aid in project tracking efforts. Commitment tracking reports assessing compliance with each of the project commitments applicable to design contracts are developed for each construction contract at each design submission. Commitments applicable to the GEC and DelDOT are assessed in report every six months. Commitment tracking will continue into construction with tracking assessments being conducted on each contract and for the GEC and DelDOT every six months. Assessment tracking reports will ensure that all commitments are met throughout the project and a final commitment compliance assessment would be developed at the conclusion of the project.

Two commitments, however, would not be met exactly as noted in the ROD:

- Although a commitment was made to maintain crossroads open during overpass construction, the design team has identified considerable benefits to safety, natural resources, construction time and cost, by closing Hyetts Corner Road during construction of US 301. Closing Hyetts Corner road during construction would eliminate the need to construct a temporary haul road through the wetlands associated with Scott Run, avoiding impacts to this important habitat area. Safety benefits would accrue from maintaining separation of construction equipment and hauling vehicles from personal vehicle traffic. The closure of Hyetts Corner Road during construction would also decrease construction time by at least 15 months and result in an estimated $20M in capitalized interest cost savings. A proposed detour route using existing

roads has been identified for the duration of construction, approximately three years (see Design Refinement 4 for rationale to revise this ROD commitment).

- While the ROD included a commitment to limit construction to weekday daylight hours, there are significant safety and traffic benefits to allowing some construction work at night and/or during the weekend. In order to ensure motorist safety and eliminate long traffic delays during some construction activities, such as the installation of overhead beams across high-volume roadways, DelDOT would schedule these activities at night rather that during weekday daylight hours. DelDOT will provide adequate and appropriate notices of such events.

Agency and Public Involvement

Resource Agency Coordination

Throughout the design process, DelDOT has continued coordination with the resource and regulatory agencies through regular quarterly meetings, special meetings and field reviews. Seven agency coordination meetings were held between publication of the ROD in April 2008 and the March 23, 2009 Public Workshop. Since the Workshop, agency coordination has continued during the design process. A total of 15 meetings and field reviews have taken place since the March 23, 2009 Public Workshop (through the end of October 2011) to provide constant review of the final design progress. Coordination will continue throughout the remaining design effort and during construction.

During the three years of agency coordination since the ROD, the agencies have concurred with/not objected to all 16 of the proposed design refinements for incorporation into the final design of US 301. Two refinements, the Relocation of US 13 to Northbound SR 1 Toll-Free Ramp at Port Penn Road and the Spur Road Alignment Refinements to Minimize Impacts, have been continuously refined in order to achieve the most desirable design with minimal impacts to resources and communities. Agency representatives strongly endorsed Design Refinement 4 as a way to reduce impacts to natural resources; requested Design Refinement 6 and Design Refinement 9 to shift natural resource impacts into lower quality resources; and determined the ultimate configuration of the bridges/culverts in Design Refinement 2 and Design Refinement 14 to preserve the most valuable portions of the impacted resources. See **Appendix H** for materials from the resource agency coordination meetings and field views.

Public Involvement

Community meetings were held in January through March 2009, and a Public Workshop was held on March 23, 2009 to present the US 301 Spur Road Alternatives. In addition, 11 of the current 16 design refinements were presented at the March 2009 Workshop. See the **Public Involvement** section of this report for the details and **Appendix F** for a summary of the workshop. The public was later notified of the decisions regarding six of the proposed Design Refinements presented at the Public Workshop in DelDOT's August 3, 2009 letter to the stakeholders (see **Appendix F**). The letter also provided a link to an on-line resource for updated information on the progress of the project.

An additional round of community meetings and public official briefings were held during the summer of 2011 preceding the second post-ROD Public Workshop held on September 6, 2011. The workshop presented a review of the 12 refinements that had received concurrence/no objection from the agencies for inclusion in the Refined Design. Final refinements for the Relocation of US 13 to Northbound SR 1 Toll-Free Ramp to the South at Port Penn Road and the Spur Road Alignment Refinements to Minimize Impacts were presented along with two new refinements, Churchtown Road Overpass of the Spur Road/Tidewater Utilities Access and Emergency Access Ramps for Incident Management. A summary of the September 6, 2011 Public Workshop is included in **Appendix G**.

Permits

The US 301 project requires federal, state and county permits and approvals prior to construction. Delaware Coastal Management Federal Consistency Certification from the Delaware Coastal Management Program was granted on September 14, 2007, and an ACOE Provisional Permit was issued on August 18, 2009. Maryland Department of the Environment (MDE) Non-tidal wetlands and waterways and Maryland 401 Water Quality Certification was applied for on March 22, 2010, and a field site visit was conducted on April 27, 2010. On May 6, 2010, MDE requested additional information to approve the permit, including full-size detailed plans that include approved ESC plans. MDE SWM and ESC plan approval was granted on January 13, 2011. The final design plans and additional information for the non-tidal wetland permit were submitted to MDE on September 22, 2011. The Maryland National Pollution Discharge Elimination System (NPDES) permit was granted on May 31, 2011. The US 301 Project Section 3 application for DNREC Subaqueous Lands, Tidal Wetlands, and Delaware 401 Water Quality Certification was submitted July 29, 2011. The applications for the other US 301 Mainline design sections are anticipated to be submitted in December 2011 for Section 1 and January 2012 for Section 2. County floodplain approvals for each United States Geological Survey (USGS) Blue Line Stream will be applied for following submission of final design plans for each stream. A final ACOE Permit will be issued with the first Delaware 401 Water Quality Certification approval for each design section.

Conclusion

This document has been prepared by DelDOT in compliance with 23 CFR 771.129 – Reevaluations. The information contained in this document indicates that the impacts associated with the post-2008 ROD Design Refinements to date for the US 301 Project are not significantly different from those impacts detailed in the 2007 FEIS and ROD, issued by FHWA on April 30, 2008. The Resource Agencies have concurred/not objected to all 16 design refinements and all of the design refinements have been presented to the project stakeholders, with comments received and considered in the finalization of the design refinements for incorporation into the project.

US 301 DESIGN REFINEMENTS REPORT

INTRODUCTION

This report presents a review and evaluation of the environmental consequences of design refinements to the US 301 Selected Alternative: the Green North + Spur Road Alternative. The Selected Alternative was detailed in the November 2007 Final Environmental Impact Statement (FEIS) and approved in the April 30, 2008 Record of Decision (ROD) issued by the Federal Highway Administration (FHWA).

Purpose of this Report

In accordance with FHWA regulations contained in 23 CFR 771.129 - Reevaluations, "the applicant shall consult with the Administration prior to requesting any major approvals or grants to establish whether or not the approved environmental document or CE designation remains valid for the requested Administration action. These consultations will be documented when determined necessary by the Administration." A number of design refinements have occurred since approval of the FEIS and the 2008 ROD. The Delaware Department of Transportation (DelDOT) has prepared this US 301 Design Refinements Report (Report) to document the refinements, compare the impacts of the refined design, and present its determination that the changes in impacts due to the design refinements are not significantly different from those detailed in the FEIS and the ROD. Should additional refinements be necessary, their effects will be appropriately assessed and this Report will be updated and resubmitted in accordance with applicable FHWA requirements.

The Executive Summary provides an overview of the project status, summarizes the design refinement process and the Design Refinements, and summarizes the total impacts of the current Refined Design and proposed mitigation. The impacts and mitigation are then compared by resource to those of the 2008 ROD. Following a summary of the commitments monitoring program, the Executive Summary concludes with a summary of agency and public involvement, the status of the permit process, and a request that FHWA concur with the finding that the impacts of the Refined Design are not significantly different from those identified in the ROD.

This US 301 Design Refinements Report follows a similar direction, presenting an introduction to the document and its purpose, followed by a project status update. The Report introduces the design sections and design contracts, describes the design refinement process, and lists the 16 current Design Refinements. The Report then presents an impact comparison and mitigation summary and describes the commitments monitoring program established to track the status of the commitments listed in the 2008 ROD. A detailed section then summarizes the differences in impacts comparing the 2008 ROD design to the 2011 Refined Design by resource and summarizes the mitigation provided for each resource impact. The Report also provides the details of each individual design refinement by location, description, impacts (compared to the 2008 ROD design), advantages and disadvantages, public involvement and agency coordination, and DelDOT's decision regarding including the refinement in the project's final design. Finally, the Design Refinements Report discusses public involvement and agency coordination since the ROD, updates the status of the permitting process, and concludes with a reiteration of the goals of the Report and a request for FHWA concurrence. The Appendix includes: (A) expanded impacts matrices; (B) a

copy of the ROD commitments; (C) cultural resources (Section 106) coordination and Section 4(f) coordination; (D) a spreadsheet showing the proposed real estate acquisitions (affected properties and relocations); (E) a summary review of DelDOT's revised Noise Policy, which became effective July 13, 2011, and berm refinements; (F) the summary of the March 23, 2009 Public Workshop and DelDOT's August 3, 2009 letter to stakeholders; and (G) the summary of the September 6, 2011 Public Workshop. Roll maps of the current Design Sections, presented at the September 6, 2006 Workshop, are included with the electronic copy (CD) of this document. Appendix H contains a compilation of agency meetings materials including minutes of each meeting, handouts, and copies of presentations.

ROD Selected Alternative – April 30, 2008

The Selected Alternative (Green North + Spur Road, as shown on ***Figure 1***) would extend a new US 301 roadway approximately 13.0 miles from just south of the Maryland/Delaware (MD/DE) Line to SR 1, near the Biddles Toll Plaza and south of the Roth Bridge crossing of the Chesapeake and Delaware (C&D) Canal in southern New Castle County. The US 301 Spur Road would extend approximately 4.5 miles from the new US 301 roadway, near Armstrong Corner Road, to SR 896, just south of the Summit Bridge crossing of the C&D Canal.

The Selected Alternative mainline would have a 66-foot median and four US 301 interchanges, located at Levels Road, existing US 301 (Summit Bridge Road) north of Armstrong Corner Road, Jamison Corner Road, and SR 1 near the Biddles Toll Plaza, south of the C&D Canal.

Figure 1: US 301 ROD Selected Alternative

The Selected Alternative would provide a four-lane, limited access US 301 mainline roadway on a new location, extending generally northward from just south of the MD/DE state line, west of Middletown, to the vicinity of Armstrong Corner Road. In the vicinity of Armstrong Corner Road, the new US 301 mainline alignment would curve and extend northeast, crossing over existing US 301 (Summit Bridge Road), the Norfolk Southern Railroad (NSRR), and existing SR 896 (Boyds Corner Road) before curving and extending east and tying into SR 1, north of the Biddles Toll Plaza and south of the C&D Canal. The US 301 Mainline would include three interchanges: at extended Levels Road south of Middletown, with existing US 301 (Summit Bridge Road) north of Armstrong Corner Road, and at Jameson Corner Road.

The US 301 Spur Road portion of the Selected Alternative would be a limited access toll highway with a 62-foot median with three interchanges located at new US 301, Bethel Church Road

Extended (north-serving only), and SR 896 south of Summit Bridge. Near Armstrong Corner Road, the two-lane US 301 Spur Road would extend north from new US 301 on a new location, along the Ridge Route, to interchange with Bethel Church Road and SR 896 south of the Summit Bridge and the C&D Canal.

The Selected Alternative would include interchange Option 2A in the Armstrong Corner Road area, Interchange Option 3B at Summit Bridge, Alignment Option 4B Modified in the Ratledge Road/Boyds Corner Road area, and Alignment Option 1 Modified for the local road connection between Strawberry Lane and existing US 301. The Selected Alternative would include associated improvements along intersecting highways in order to accommodate traffic operations. The most extensive of such improvements are the extension of Levels Road and Bethel Church Road to new interchanges with the US 301 Mainline and Spur Road, respectively.

Additional information about the Selected Alternative and the options selected can be found in the ROD, Sections IV and V, and the FEIS, Section II.

The Selected Alternative would utilize electronic toll collection (E-ZPass™) at highway speeds to collect tolls at the US 301 mainline toll barrier located just north of the Maryland/Delaware state line. E-ZPass™ lanes would also be available on the north-serving interchange ramps at Levels Road, existing US 301 (Summit Bridge Road), and Jamison Corner Road. The north-serving ramps at the SR896/Bethel Church Road interchange would be toll free. Current plans are to provide E-ZPass™ and cash lanes. Transition in the future to Open Road Tolling (ORT) is anticipated, but the actual timing has not been determined.

PROJECT STATUS

Initial funding authorization for final design and right-of-way acquisition was provided by the General Assembly on June 30, 2008. Right-of-way acquisition and final design activities were authorized by the FHWA in June and September 2008, respectively. A General Engineering Consultant (GEC) was selected by DelDOT to assist in managing this major transportation project, and was issued notice to proceed in August 2008. The Selected Alternative was divided into four design sections, and Section Design Consultants (SDCs) were selected. Notices to proceed were issued for the US 301 Mainline portion of the project (Design Sections 1, 2, and 3) in September 2008 and on the US 301 Spur Road portion (Design Section 4) in July 2009. The four design sections, located on ***Figure 2***, are:

Section 1 – US 301 Mainline from east of the NSRR to SR 1
Section 2 – US 301 Mainline from Levels Road to east of the NSRR
Section 3 – US 301 Mainline from south of the DE/MD State Line to Levels Road
Section 4 – US 301 Spur Road and SR 896/Bethel Church Road Interchange

Figure 2: US 301 Design Sections

Each of the design sections, except Section 3, was further divided into individual construction contracts, as shown in ***Table 1***. ***Figure 3*** locates the construction contracts.

Table 1. US 301 Design Sections and Construction Contract Limits

Design Section	Design Section Limits	Construction Contracts	Construction Contract Limits
1	US 301 Mainline, East of NSRR to SR 1	1A	US 301, SR 896 to SR 1
		1B	US 301 & SR 1 Interchange
		1C	US 301, NSRR to SR 896
		1D	US 13 and Port Penn Road Intersection
2	US 301 Mainline, Levels Road to East of Norfolk-Southern Railroad	2A	US 301, Levels Road to NSRR
		2B	US 301: Bridges 1-468N and 1-468S over NSRR; and Bridges 1-470N and 1-470S over Summit Bridge Road
		2C	Armstrong Corner Road and Summit Bridge Road Intersection Improvements
3	US 301 Mainline, MD/DE Line to Levels Road	3	US 301, Maryland State Line to Levels Road
4	US 301 Spur Road	4A	US 301 Spur Road/SR 896/Bethel Church Road Interchange
		4B	US 301 Spur Road, Churchtown Road to SR896/Bethel Church Road Interchange
		4C	US 301 Spur Road, US 301 to Churchtown Road

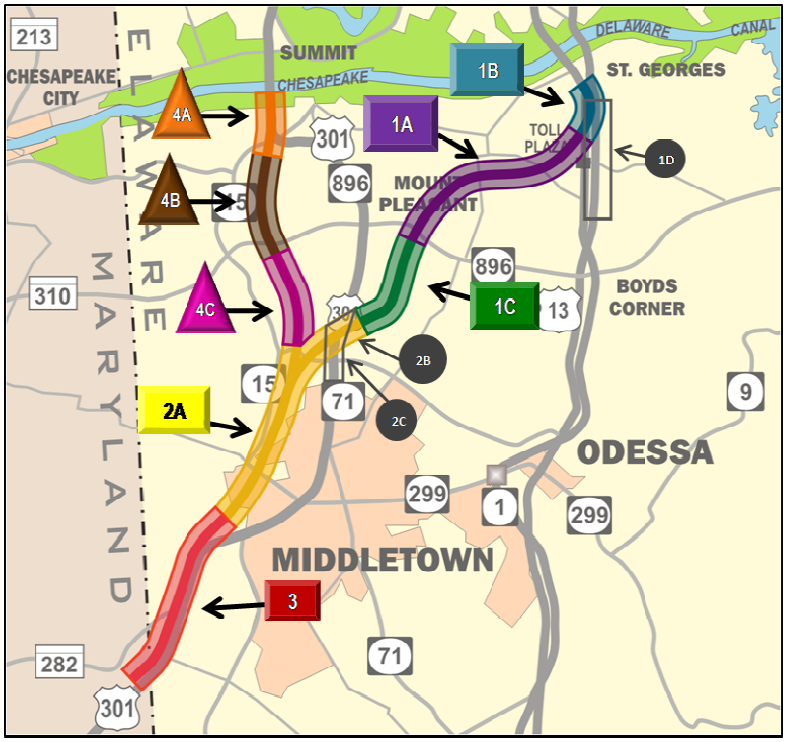

Figure 3: US 301 Construction Contracts

Engineering
Final design and preparation of construction contract documents is at the final stage (95 percent to 100 percent complete) for most of the US 301 Mainline contracts and at the preliminary stage (40 percent to 50 percent complete) for the US 301 Spur Road. Copies of roll plans, presented at the September 2011 Public Workshop, are included in the electronic copy (CD) of this document.

Right-of Way
Right-of-way acquisition activities are currently underway for the US 301 Mainline and projected to be completed in approximately August 2012 and will begin on the US 301 Spur Road when the design drawings and right-of-way plans reach the semi-final phase in 2012 and be completed in 2013. Ten of the 19 relocations required for the US 301 Mainline have been completed. There are no relocations required for the Spur Road.

Public Workshops
During the design development of the US 301 Mainline and the US 301 Spur Road, public workshops were held to inform the public about design refinements and encourage their input. Each public workshop was preceded by a round of community meetings and public official briefings. The Public Workshops were held in March 2009 and in September 2011.

Resource Agency Coordination
Continuing throughout the design process, meetings were held between DelDOT and the resource and regulatory agencies. Since FHWA's approval of the ROD in 2008, 22 meetings/field views have been held to discuss design refinements and mitigation as well as to update the agencies on the design progress of each section.

DESIGN REFINEMENTS, IMPACTS AND MITIGATION SUMMARY

Design Refinements Summary

Since the March 23, 2009 Workshop, the SDCs have continued to refine the Selected Alternative in accordance with the comments received from stakeholders and the resource agencies, commitments contained in the ROD, and the goal to reduce environmental impacts and improve traffic operations and safety. Refinements have been presented to and discussed with the regulatory and resource agencies at regular intervals during interagency meetings and field reviews, listed in the **Agency Coordination** section of this Report.

The 16 current design refinements, public involvement, agency actions and changes in resource impacts are summarized in ***Table 2***. ***Figure 4***, following ***Table 2***, provides an overview of the location of each refinement to the Selected Alternative.

Eleven of the design refinements were presented to the public at the March 2009 Workshop. These 11 refinements were re-presented at the September 6, 2011 Workshop. Two additional refinements, Design of Bridges over Scott Run and Scott Run Tributary at SR 1 Interchange and US 301 Bridges over Drawyer Creek (Refinements 2 and 6 in ***Table 2***) were initiated at the suggestions of resource agency representatives as a means to reduce resource impacts and were not provided for public review at the March 2009 public workshop. Refinement 4 – Hyetts Corner Road Closure during construction of the US 301 bridges over Scott Run and the Hyetts Corner Road bridges over Scott Run and US 301 was initiated by the Section Designer to improve safety, avoid potential temporary impacts to natural resources in the sensitive Scott Run area, facilitate construction and reduce construction costs, time and project financing costs.

Two of the refinements that were presented at the March 2009 Public Workshop, Relocation of US 13 to Northbound SR 1 Toll-Free Ramp at Port Penn Road to the South and Spur Road Alignment Refinements to Minimize Impacts (Refinements 3 and 14 on ***Table 2***) were further refined and re-presented as preferred refinements at the September 6, 2011 Workshop. Refinements 15 and 16 (Churchtown Road Overpass Alignment and Tidewater Utilities Access and Emergency Accerss Ramps for Incident Management, respectively) were introduced by DelDOT to the agencies at the June 9, 2011 Interagency Meeting. All 16 refinements were presented to the public at the September 6, 2011 workshop, and reviewed at the September 19, 2011 Interagency Meeting. Each refinement is being incorporated into the US 301 design plans.

Details of each individual refinement are included following the **Environmental Impacts and Mitigation** section of this report. Details include a description of the engineering modifications; a sketch/drawing of each refinement; the advantages, disadvantages and impacts of each; and agency coordination, public input, and DelDOT's decision to include the refinement in the final design.

Table 2: US 301 Design Refinements Summary

Design Section (Refinement Number)	Refinement	Rationale	Public Involvement		Resource Agencies Consultation			Resource Impacts Change	
			March 2009 Workshop	September 2011 Workshop	Dates Presented to Agencies	Agency Actions	Agencies Receive Design Plans	Resource	Impacts Change
All Sections (1)	Narrow Mainline Median Width to 54 Feet	Narrowing median will reduce impacts	Yes[1]	Presented final design & construction details	Jan 13, 2009; Feb 19, 2009	Concurrence/no objection to incorporate into design – Jan 13, 2009	Semi-final: see Refinements 1-11 Final: see Refinements 1-11	Impacts not calculated separately, but included in each refinement.	
	Narrow Spur Road Median Width to 54 Feet			Presented Preferred Option concept plans			Semi-final: see Refinements 12-14 Final: see Refinements 12-14		
1 (2)	Design of Bridges over Scott Run and Scott Run Tributary at SR 1 Interchange	Bridge refinements would lower impacts to streams and bog turtle habitat in this location – result of field review with agencies	Yes	Presented final design & construction details	Feb 19, 2009; Mar 5, 2009 (F); Mar 26, 2009; Jul 7, 2009 (F); Aug 25, 2009; Sept 15, 2009	Concurrence/no objection to incorporate into design – Sep 15, 2009	Semi-final: Mar/Apr 2011 Final: Aug 2011	Total LOD Total Wetlands Total Streams & Ditches Subaqueous Lands Hydric Soils Floodplain Prime Farmland Soils Forest	+63.7 ac +1.1 ac -172.3 lf -172.3 lf +3.3 ac +0.5 ac +8.5 ac +0.3 ac
1 (3)	Relocation of US 13 to Northbound SR 1 Toll-Free Ramp to the South at Port Penn Road	Improves safety/operations of toll free ramp from US 13 to northbound SR 1; avoids potential historic property impact	Yes[1,2]	Presented preferred final design & construction details	Feb 19, 2009; Mar 26, 2009; Dec 19, 2009; Jun 9, 2011	Concurrence/no objection to incorporate into design – Dec 10, 2009; Reviewed again – Jun 9, 2011.	Semi-final: Mar/Apr 2011 Final: Aug 2011	Total LOD Total Wetlands Total Streams & Ditches Subaqueous Lands Hydric Soils Prime farmland soils Forest	+33.7 ac +0.1 ac +151.6 lf +151.6 lf +6.3 ac +4.6 ac +0.7 ac
1 (4)	Hyetts Corner Road Closure during Construction of US 301 Bridges over Scott Run and Hyetts Corner Road Bridges over Scott Run and US 301	Close Hyetts Corner Road to traffic and use as haul road during construction to improve safety; avoid temporary haul road impacts on sensitive Scott Run area; reduce construction cost and time and reduce project financing cost	No	Presented preferred final design & construction details	Feb 19, 2009; Mar 5, 2009 (F); Mar 26, 2009; Jun 24, 2010; Jun 9, 2011	Concurrence/no objection to incorporate into design – Jun 9, 2011.	Semi-final: Mar/Apr 2011 Final: Aug 2011	Total LOD Total Wetlands Total Streams & Ditches Subaqueous Lands Hydric Soils Prime Farmland Soils Forest	+28.1 ac +0.6 ac +412.2 lf +412.2 lf 1.0 ac -0.5 ac +0.6 ac
1 (5)	Jamison Corner Road Interchange Roundabouts	Roundabouts provide for continuous flow at the intersection and reduce delays; reduce costs, improve safety, accommodate future development	Yes[1]	Presented final design & construction details	Feb 19, 2009; Mar 26, 2009; Aug 25, 2009; Sept 15, 2009	Concurrence/no objection to incorporate into design – Mar 26, 2009; reiterate Sep 15, 2009	Semi-final: Mar/Apr 2011 Final: Aug 2011	Total LOD Prime Farmland Soils Forest	+5.2 ac +0.2 ac -0.1 ac
1 (6)	US 301 Bridges over Drawyer Creek Tributary	Lowers impact to stream and wetlands; eliminates impact to seep – result of field review with agencies	No	Presented final design & construction details	Mar 5, 2009 (F); Mar 26, 2009; Jul 7, 2009 (F); Aug 25, 2009; Sep 15, 2009	Concurrence/no objection to incorporate into design – Sep 15, 2009	Semi-final: Mar/Apr 2011 Final: Aug 2011	Total LOD Total Wetlands Total Streams & Ditches Subaqueous Lands Hydric Soils Forest	+0.6 ac +0.1 ac +30.0 lf +30.0 lf +0.6 ac +0.3 ac
2 (7)	Reconfigure the New US 301/Existing US 301 Interchange	Improved operation & safety; single access point at existing US 301 (Summit Bridge Road); reduced widening and single signal on existing US 301	Yes[1]	Presented final design & construction details	Dec 2, 2008; Feb 19, 2009; Mar 26, 2009; Aug 25, 2009; Sep 15, 2009	Concurrence/no objection to incorporate into design – Sep 15, 2009	Semi-final: Mar/Apr 2011 Final: Dec 2011	Total LOD Total Wetlands Total Streams & Ditches Subaqueous Lands Hydric Soils Prime Farmland Soils Forest	+22.3 ac -0.1 ac +417.8 lf -741.0 lf +0.9 ac +12.8 ac +0.6 ac

Table 2: US 301 Design Refinements Summary

Design Section (Refinement Number)	Refinement	Rationale	Public Involvement		Resource Agencies Consultation			Resource Impacts Change	
			March 2009 Workshop	September 2011 Workshop	Dates Presented to Agencies	Agency Actions	Agencies Receive Design Plans	Resource	Impacts Change
2 (8)	Northbound US 301 to the Northbound Spur Road Right Side Exit, rather than Median Exit	Improved operation & safety; driver expectation; shorter span, reduced construction costs	Yes[1]	Presented final design & construction details	Feb 19, 2009; Mar 26, 2009; May 25, 2009; Aug 25, 2009; Sep 15, 2009; May 25, 2010; Sep 23, 2010	Conditional concurrence – Sep 15, 2009; concurrence/no objection - Sep 23, 2010	Semi-final: Mar/Apr 2011 Final: Dec 2011	Total LOD Total Wetlands Total Ditches Hydric Soils Prime Farmland Soils Forest	+9.2 ac -0.2 ac +48.6 lf +0.4 ac +9.0 ac +1.1 ac
2 (9)	Levels Road Interchange Shift 125 Feet to the South to Minimize Impacts (also Section 3)	Decreases resource impacts on Sandy Branch – result of field review with agencies	Yes[1]	Presented final design & construction details	Dec 2, 2008; Dec 17, 2008 (F); Jan 13, 2009; Jan 29, 2009; Feb 19, 2009; Mar 26, 2009; Aug 25, 2009; Sep 15, 2009	Concurrence/no objection to incorporate into design – Mar 26, 2009; reiterate Sep 15, 2009	Semi-final: Mar/Apr 2011 Final: Dec 2011	Total LOD Total Wetlands Total Streams & Ditches Subaqueous Lands Hydric Soils Prime Farmland Soils Forest	+29.3 ac +0.3 ac +167.7 lf +167.7 lf -0.4 ac +26.9 ac -0.1 ac
3 (10)	Levels Road South-Serving Ramps and Toll Plaza Ramps Operational Improvements	Allows weigh station trucks, traffic entering US 301 at Levels Road, and traffic exiting at Levels Road to use highway speed EZ-Pass™ Lanes	Yes[1]	Presented final design & construction details	Dec 2, 2008; Feb 19, 2009; Mar 26, 2009; Aug 25, 2009; Sep 15, 2009	Concurrence/no objection to incorporate into design – Mar 26, 2009; reiterate Sep 15, 2009	Semi-final: Jun 2010 Final: Mar/ Apr 2011	Total LOD Total Wetlands Hydric Soils Agricultural Easements Prime Farmland Soils Forest	+79.8 ac +0.4 ac +5.8 ac +1 easement/0.55 ac +53.7 ac +1.1 ac
3 (11)	Strawberry Lane Local Connector to Existing US 301	Slight alignment modifications to minimize impacts	Yes[1]	Presented final design & construction details	Dec 2, 2008; Feb 19, 2009 Sep 15, 2009	Concurrence/no objection to incorporate into design – Sep 15, 2009	Semi-final: Jun 2010 Final: Mar/ Apr 2011	Total LOD Total Wetlands Total Streams & Ditches Hydric Soils Agricultural Districts Forest	+0.4 ac -0.6 ac -57.7 lf +0.1 ac -0.3 ac +0.37 ac
3 (12)	Eastward Shift of US 301 Mainline at the State Line	Avoids major electric transmission towers – reduces cost & time to relocate towers	Yes	Presented final design & construction details	Feb 19, 2009; Mar 26, 2009; Aug 25, 2009; Sept 15, 2009	Concurrence/no objection to incorporate into design – Mar 26, 2009; reiterate Sep 15, 2009	Semi-final: Jun 2010 Final: Mar/ Apr 2011	Total LOD Total Wetlands Total Streams & Ditches Subaqueous Lands Hydric Soils Prime Farmland Soils Forest	+1.29 ac -0.7 ac +129.4 lf -157.8 lf -3.7 ac -6.1 ac -3.0 ac
4 (13)	SR 896/Bethel Church Road Interchange	Minimal reconstruction of Choptank Road/Bethel Church Road roundabout; minimizes right-of-way (ROW)	Yes[1]	Presented as Selected Option preliminary plans	Feb 19, 2009; Aug 25, 2009; Sep 15, 2009; May 25, 2010 Sep 19, 2011 Oct 20, 2011	Concurrence/no objection to incorporate Option B into design - Sep 19, 2011	Semi-final: Dec 2011 Final: Jun 2012	Total LOD Total Wetlands Total Streams & Ditches Subaqueous Lands Hydric Soils Prime Farmland Soils Forest	+33.9 ac +1.4 ac -70.8 lf -163.5 lf +11.3 ac -0.3 ac +0.2 ac
4 (14)	Spur Road Alignment Refinements to Minimize Impacts[3]	Minimizes impacts to agricultural preserve (Steele Farm), Yaiser, Rhoadesdale and Zapata properties; decreases distance to Chesapeake Meadow at northeast corner of community and increases distance at south end	Yes[3]	Presented as Selected Alignment Option	Feb 19, 2009; Aug 25, 2009; Sep 15, 2009; May 25, 2010; Jun 9, 2011 Sep 19, 201	Concurrence/no objection to incorporate Option 3 Modified into design – Sep 19, 2011	Semi-final: Jun 2012 Final: Dec 2013	Total LOD Total Wetlands Total Streams & Ditches Subaqueous Lands Hydric Soils Prime Farmland Soils Agricultural Easements Forest	-0.7 ac +0.3 ac +409.6 lf +389.9 lf +0.32 ac -2.12 ac -2.1 ac +1.2 ac

Table 2: US 301 Design Refinements Summary

Design Section (Refinement Number)	Refinement	Rationale	Public Involvement		Resource Agencies Consultation			Resource Impacts Change	
			March 2009 Workshop	September 2011 Workshop	Dates Presented to Agencies	Agency Actions	Agencies Receive Design Plans	Resource	Impacts Change
4 (15)	Churchtown Road Overpass of Spur Road/ Tidewater Utilities Access	Moves Tidewater access driveway to north of Churchtown Road overpass	No	Presented Preferred Option	Jun 9, 2011	Concurrence/no objection to incorporate into design – Sep 19, 2011	Semi-final: Jun 2012 Final: Dec 2012	Total LOD Total Wetlands Total Streams & Ditches Hydric Soils Prime Farmland Soils Forest	-4.0 ac +0.02 ac +148.3 lf -0.02 ac -2.1 ac -0.1 ac
2,3 (16)	Emergency Access Ramps for Incident Management	Provides adequate access for emergency response through (1) median crossovers between the four mainline interchanges and (2) mainline access ramps at SR 896 (Boyds Corner Road) and Bunker Hill Road	No	Presented final design and construction plans/options	Jun 9, 2011	Concurrence/no objection to incorporate into design – Sep 19, 2011	[with each section]	Total LOD Total Streams & Ditches Hydric Soils Prime Farmland Soils	+3.2 ac 0.0 lf +0.01 ac +1.6 ac

Notes:
[1] Presented to the public at the March 23, 2009 Workshop, concurred in by the agencies, stakeholders advised by August 3, 2009 letter of decision on design refinements (see Appendix F). Also noted on Project Website, then incorporated into final design.
[2] The refinement concept presented at the March 23, 2009 Public Workshop differed from the current design refinement presented at the September 6, 2011 Public Workshop in that the March 2009 refinement relocated Port Penn Road north of the existing intersection location. The September 6, 2011 refinement maintains the current US 13/Port Penn Road intersection and relocates the toll free ramp further to the south creating a single four-legged intersection of US 13/Port Penn Road and the toll free ramp.
[4] DelDOT presented three alignment options for the Spur Road in March 2009 (Alignments 1, 2, and 3). Alignment 3 Modified, a slight modification to Alignment 3 to further reduce impacts, was presented at the September 6, 2011 Public Workshop as the Selected Alignment Option.

N

Section		Design Refinement
All	1	Narrow Median Width to 54 Feet
1	2	Design of Bridges over Scott Run and Scott Run Tributary at SR 1 Interchange
	3	Relocation of US 13 to Northbound SR 1 Toll-Free Ramp at Port Penn Road to the South
	4	Hyetts Corner Road Closure during Construction of US 301 Bridges over Scott Run and Hyetts Corner Road Bridges over Scott Run and US 301
	5	Jamison Corner Road Interchange Roundabouts
	6	US 301 Bridges over Drawyer Creek
2	7	Reconfigure the New US 301/Existing US 301 Interchange
	8	Northbound US 301 Exit to the Northbound Spur Road, Right Side rather than Median Side
	9	Levels Road Interchange Shift 125 Feet to the South to Minimize Impacts (also Section 3)
3	10	Levels Road South-Serving Ramps and Toll Plaza Ramps Operational Adjustments
	11	Strawberry Lane Local Connector to Existing US 301
	12	Eastward Shift of US 301 Mainline at the State Line
4	13	SR 896/Bethel Church Road Interchange
	14	Spur Road Alignment Refinements to Minimize Impacts
	15	Churchtown Road Overpass/Tidewater Utilities Access
1,2,4	16	Emergency Access Ramps for Incident Management

Figure 4:
Design Refinements

Legend

- Design Refinement Clip Lines
- Refined Design - Limit of Disturbance
- ROD Alignment - Limit of Disturbance
- Wetlands
- Waters of the U.S.

0.7 0.35 0 0.7

Miles

1 inch equals 0.7 miles

October 3, 2011

Summary of Impacts and Mitigation

Impacts Summary

The recommended refinements to the Selected Alternative would have relatively minor changes in the overall impacts to the environment when compared to the 2008 ROD impacts. ***Table 3*** summarizes the environmental impacts identified in the 2008 ROD, ROD impacts based upon 2011 updated information or changes in regulations since the ROD, and compares the impacts of the 2008 ROD design to the 2011 Refined Design incorporating the design refinements.

Table 3: Summary Comparison of Resource Impacts – Selected Alternative vs. Refined Design

Resource	2008 ROD Selected Alternative[1]	2008 ROD Selected Alternative with Updated 2011 Features[2,3,4]	2011 Refined Design[2]
Alignment Length (mi.)	17.5	17.5	17.5
Natural Resources			
Wetlands (acres)[5]	35.4	34.0	36.7
Wetlands (No.)	63	44	51
Tidal Wetlands (acres)	0	0	0.01
Waters of the US – Ditches and Streams (linear feet)	17,883	10,337	12,181
100-Year Floodplain (acres)	0.7	0.7	1.1
Prime Farmland Soils (acres)	616	428.9	550.5
Hydric Soils (acres)	166	159.9	204.8
Upland Forested Land (acres)	61	62.2	64.3
Cultural Resources			
National Register Properties: Physical Impacts (No.)	0	0	0
National Register Properties: Visual or Noise Impacts (No.)[6]	15	15	15
Socioeconomic Resources			
Affected Parcels (No.)	143	143	218
Total Relocations (No.)	21	21	19
Agricultural Districts (number)	1	1	1
Agricultural Districts (acres)	32.6	0.37	0.1
Agricultural Easements (number)	1	1	2
Agricultural Easements (acres)	1.8	5.3	3.8
Communities/Properties with Visual Impacts and Berms (No.)	6	6	7
Residential Noise Impacts (No.)[7]	133	135	135/77
Residential Noise Impacts after Proposed Visual Berms (No.)[7]	46	34	34/28
Capital Cost ($M) (2011 dollars)[8]	$704	$746	$746

[1] *Record of Decision, April 30, 2008, page 79.*
[2] *Impact Matrix prepared September 9, 2011.*
[3] *See explanation detailing updated features on pages 13 through 35.*
[4] *Roadway supporting areas discussed in the ROD, but calculated figures not presented in the ROD (see Pages 26 - 29)*
[5] *Total area of potential wetlands acres impacted. Includes DNREC tidal wetlands impacted.*
[6] *Includes properties having an Adverse Effect (12) and a No Adverse Effect (3) determination.*
[7] *2008 DelDOT Noise Policy/2011 DelDOT Noise Policy*
[8] *The cost is estimated at $746M (in year of expenditure $ including inflation).*

When compared to the 2008 ROD Selected Alternative with Updated 2011 Features, as shown in ***Table 3***, the Refined Design has small increases in impacts associated with natural resources; cultural resources impacts have not changed, and noise impacts have been reduced. The number of

affected parcels has increased, and the number of relocations has decreased. Impacts to agricultural preservation parcels have decreased. These differences are summarized in this Report on pages 13 through 36.

Summary of Proposed Mitigation

Impacts to natural resources will be mitigated through natural resource preservation, enhancement and creation at 26 sites in the US 301 project area (see ***Table 4***). The mitigation package includes wetland/waters/upland forest preservation (114 acres), wetland enhancement/restoration (8.4 acres), wetland creation (68+ acres) and reforestation/riparian buffer enhancement (221 acres). In addition, all significant stream crossings will be bridged to minimize impacts, a wildlife crossing will be included north of SR 896 (Boyds Corner Road) and impacts to ditches will be mitigated through in-kind ditch replacement and creation.

Table 4. Natural Resources Mitigation Summary

Mitigation Type	Total Mitigation Extent
Wetland Mitigation	
Wetland Creation	68+ acres
Wetland Enhancement	7 acres
Wetland/Waters/Upland Forest Preservation	75 acres
Upland Buffer Reforestation	66 acres
Other Waters of the US Mitigation	
Stream Restoration	550 linear feet
Wetland/Riparian Buffer Restoration	1.4 acres
Riparian Buffer Enhancement	59 acres
Wetland/Waters Preservation	19 acres
Bridges at Significant Stream Crossings	8 bridges
Wildlife Crossing	1 wildlife crossing
In-kind Ditch Mitigation	Replacement & Creation
Coastal Zone Management Mitigation	
Reforestation	28 acres
Wetland/Waters Preservation	4 acres
Forest Mitigation	
Reforestation	68 acres
Forest Preservation	16 acres

Visual impacts to communities adjacent to the new US 301 would be mitigated through the construction of landscaped visual earthen screening berms. Berms are proposed for the communities of Airmont, Summit Bridge Farms, Chesapeake Meadow, Springmill, Middletown Village, and Spring Arbor. A visual screening berm is proposed for the Middletown Veterinary Hospital.

Visual and/or noise impacts to cultural resources may include landscaping and plantings adjacent to the new US 301, based upon consultation (in accordance with Section 106) with the property owners and the Delaware State Historic Preservation Office (SHPO). Conditions for mitigation are itemized in the Memorandum of Agreement (MOA) included in the 2008 ROD as Attachment D.

Proposed mitigation elements are discussed in detail in the **Environmental Impacts and Mitigation** section which follows.

ENVIRONMENTAL IMPACTS AND MITIGATION

Environmental impacts associated with the proposed Refined Design are evaluated and compared to those identified in the 2008 ROD Selected Alternative with Updated 2011 Features. An expanded matrix of impacts is included as **Appendix A**. The impacts are compared by resource.

Natural Resources

Table 5 summarizes and compares the natural resources impacts of the Refined Design to those of the 2008 ROD Selected Alternative. The sections following identify the potential impacts and proposed mitigation for each of the natural resources affected by the US 301 project.

Table 5: Comparison of Natural Resource Impacts

Resource	2008 ROD Selected Alternative[1]	2008 ROD Selected Alternative with Updated 2011 Features[2,3,4]	Refined Design[2]
Wetlands (acres)[5]	35.4	34.0	36.7
Wetlands (No.)	63	44	51
Tidal Wetlands (acres)	0	0	0.01
Waters of the US – Ditches and Streams (linear feet)	17,883	10,337	12,180.8
100-Year Floodplain (acres)	0.7	0.7	1.1
Prime Farmland Soils (acres)	616	428.9	550.5
Hydric Soils (acres)	166	159.9	204.8
Upland Forested Land (acres)	61	62.2	64.1

Notes:
1 *Record of Decision, April 30, 2008, page 79.*
2 *Impact Matrix prepared September 9, 2011.*
3 *See explanation below detailing updated features.*
4 *Roadway supporting areas discussed in the ROD, but calculated figures not presented in the ROD.*
5 *Total area of potential wetlands acres impacted. Includes DNREC tidal wetlands impacted.*

Wetlands

Impacts
The 2008 ROD Selected Alternative with Updated 2011 Features would impact a total of 34.0 acres of wetlands. Impacts would include permanent impacts, including displacing or filling the wetland systems or causing interruption to wetland or stream hydrology, as well as shading impacts for wetlands that would be bridged and temporary impacts for construction access.

Implementation of the design refinements would increase total wetland impacts from 33.9 acres to 36.7 acres, an increase of 2.8 acres. Included in this total is 0.01 acre of impact to Delaware Department of Natural Resources and Environmental Control (DNREC) tidal wetlands near the US 301/SR 1 interchange.

Impacts to wetlands were calculated by measuring the total wetland area within the limits of construction. Therefore, the impacts shown in this Report include not only fill/cut for roadway construction and the direct impacts of construction of bridge abutments and piers in wetlands, but also the wetland area adjacent to fill, under and adjacent to the bridge decks and along temporary haul roads that will be used for erosion and sediment control (ESC) measures and construction access.

Mitigation
Impacts to wetlands will be mitigated through wetland creation at Levels and Pleasanton and wetland enhancement and preservation at Ratledge Road

Levels Wetland Mitigation Site
The Levels wetland mitigation is a proposed 58+ acre, perennially-saturated, forested wetland creation project. The location of the site is shown on ***Figure 5***. This mitigation site is currently in the final design process. The resource agencies have been involved with the mitigation site selection and have provided input throughout the design process.

The mitigation site design was discussed at a resource agency meeting on December 2, 2008. The resource agencies visited the Levels wetland mitigation site on December 17, 2008 to view the area and provide input on key design elements. The results of the site visit were discussed at the agency coordination meeting on January 13, 2009. A meeting was held with DNREC and United States Environmental Protection Agency (EPA) representatives on January 29, 2009 to discuss DNREC's concerns about the effects of the created wetland on surrounding groundwater. Based on that discussion an additional groundwater analysis was conducted and presented at the agency coordination meeting on July 23, 2009. During the July 23, 2009 meeting the agencies agreed to the following aspects of the mitigation site design:

1. The site shall be graded flat and shall meet the groundwater table on the west side of the site.
2. The site shall have a long flat weir structure with small armored notches as the primary outlet.
3. The site shall have three beaver levelers as a secondary outlet. The site shall be harrowed.
4. The site shall have a T-shaped ditch to carry excess water from the east side of the site to the outlet; the ditch shall be sinuous and small enough for the tree canopy to close over it.
5. The entire parcel west of proposed US 301 will be forested.
6. Vernal pools shall not be included in the design.

The preliminary design plans were presented to the Resource Agencies at the May 25, 2010 Agency Meeting. During that meeting the resource agencies did not object to the preliminary mitigation site design, but stressed that there should be provisions for monitoring and adaptive management during borrow operations and mitigation site construction. Soils removed from the site to create appropriate grading and drainage would be used as borrow material for the construction of Section 2 and Section 3 roadway segments. The semi-final design was presented at the June 9, 2011 agency meeting.

Pleasanton Wetland Mitigation Site
The Pleasanton wetland mitigation is a proposed 10 acre seasonally saturated, forested wetland creation project and includes 18 acres of upland buffer restoration. The location of the site is shown on ***Figure 5***. The final design for the site is complete and DelDOT has acquired the property. The

resource agencies approved the selection of this mitigation site and have provided feedback on the site design.

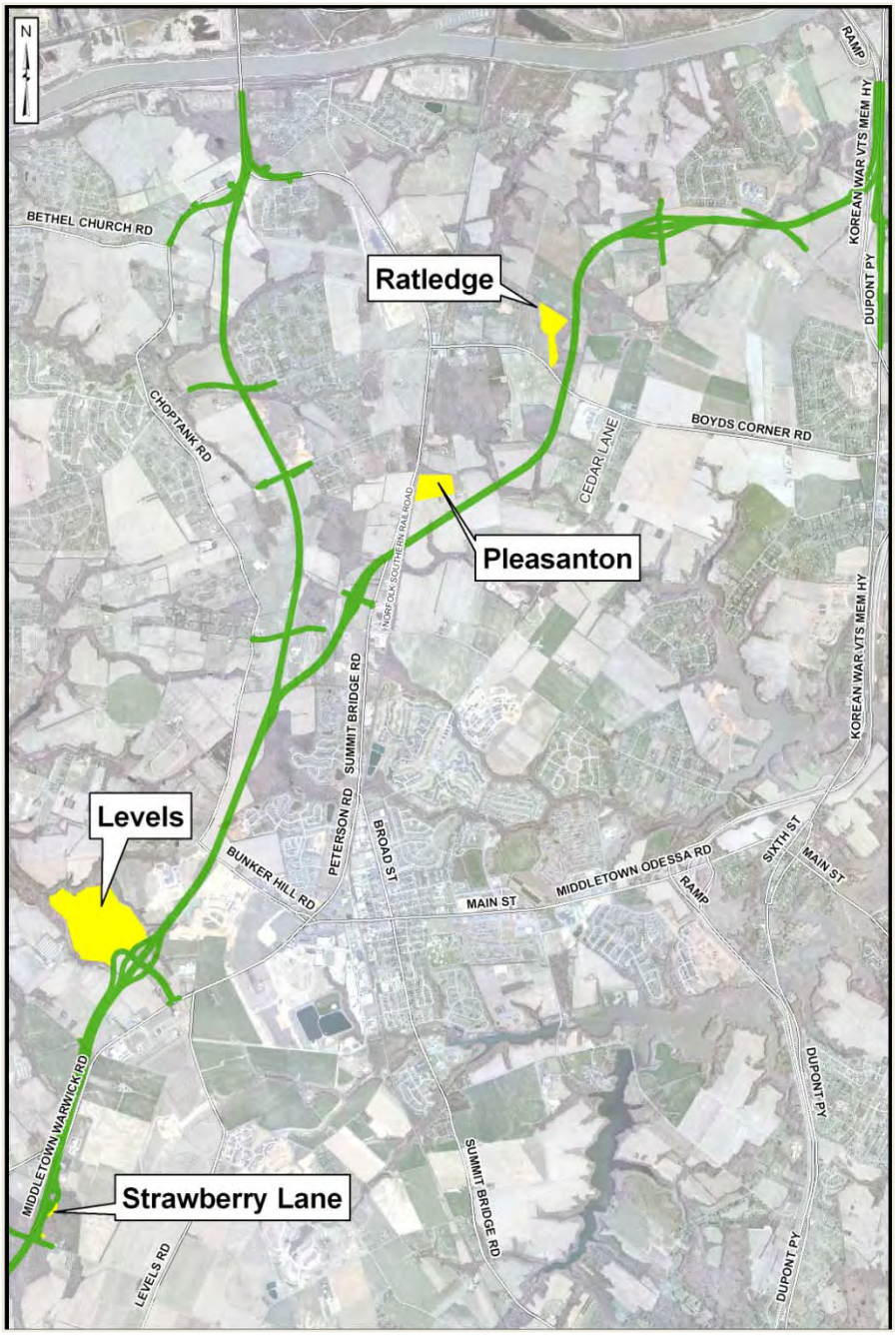

Figure 5: Wetland Mitigation Sites

The mitigation site design was discussed at the December 2, 2008 resource agency meeting. The mitigation design was discussed in depth during the September 24, 2009 resource agency meeting. Since two-thirds of the site has hydric soils, the mitigation site design focuses on restoring wetland

hydrology and wetland vegetation. Wetland hydrology would be reestablished by plugging the ditches that currently drain the site and constructing berms to capture and detain surface runoff on site. During the September 24, 2009 meeting the resource agencies agreed to the following aspects of the mitigation site design:

1. The site design will utilize three berms to create three separate seasonally ponded areas.
2. Berms will be constructed in September to leave time for adjustments to be made prior to planting of site.
3. A warm season conservation seed mix will be used throughout the site except for on the berms, where a cool season conservation seed mix will be applied.
4. The site will need to provide at least 10 acres of forested wetland to be considered successful.
5. The site will be planted at a rate of 2,000 stems/acre.
6. In order for the site to be considered successful, tree establishment must meet a minimum of 400 stems per acre by the end of the monitoring period.

The resource agencies visited the Pleasanton mitigation site on February 2, 2010 to discuss the site design. During the February 2, 2010 field visit, the resource agencies recommended shifting the location and lengthening the east berm in order to trap more water. The agencies also recommended using herbicides to control the *Phragmites* along the northern boundary of the site. The agencies did not object to the semi-final design presented at the June 9, 2011 agency meeting.

Ratledge Road Wetland Preservation and Enhancement Sites
The Ratledge Road sites would preserve 20 acres of high quality wetland and upland forest and enhance seven acres of low quality farmed wetlands on the Wooleyhan property north of Boyds Corner Road. The seven-acre wetland enhancement area is currently farmed and restoration would involve permanently protecting the site, ceasing the farm operations, and reforesting the site.

The Ratledge Road mitigation sites were discussed at the December 2, 2008 resource agency meeting. The Wooleyhan property will not be purchased by DelDOT as a part of the US 301 project; instead, DelDOT will purchase a conservation easement on the mitigation site. A three party conservation easement agreement has been drafted, reviewed with the Unites States Army Corps of Engineers (ACOE) and the appraisal of the value has been approved. DelDOT anticipates making an offer by the end of 2011.

Other Waters of the US

Impacts
The 2008 ROD Selected Alternative with Updated 2011 Features would impact a total of 10,337 linear feet of streams and ditches, 8,516 linear feet of DNREC subaqueous lands, and 1,582 linear feet of tax ditches. Impacts would include permanent impacts, including stream/ditch grading, stream/ditch filling or interrupting stream/ditch hydrology as well as shading impacts for streams that would be bridged, and temporary impacts associated with construction access. Impacts were calculated by measuring the total area of waters of the US within the limit of construction (LOC) including at bridge crossings.

The sizeable decrease in the impacts to waters of the U.S. (17,883 linear feet on the 2008 ROD Selected Alternative decreased to 10,336.6 linear feet in the 2008 ROD Selected Alternative with Updated 2011 Features) can be explained by the reassessment of jurisdictional waters as affected by

the Supreme Court Decision in Rapanos v. U.S. and Carabell v. U.S. (December 2, 2008) and the ACOE/ EPA joint guidance memoranda. The guidance resulted in the elimination of swales, small washes, and many ditches previously determined jurisdictional.

The design refinements would increase the total impacts to waters of the U.S. (streams and ditches) from 10,337 linear feet to 12,181 linear feet, an increase of 1,844 linear feet. This would be the result of a decrease in impacts to streams (-513.1 linear feet, resulting in a total impact of 4,611.5 linear feet) and an increase in impacts to ditches (+2,357.3 linear feet). Impacts to subaqueous lands would decrease by -7.7 linear feet to 8,508 linear feet. There would be a decrease in impacts to tax ditches of -864 linear feet, resulting in a total impact of 718 linear feet.

Mitigation
Impacts to other waters of the U.S. will be minimized through the construction of bridges and mitigated through stream restoration and in-kind ditch replacement.

Bridges over Streams
The following significant stream systems will be bridged: Scott Run (3 locations), Drawyer Creek, Sandy Branch and tributary (3 locations), and Back Creek (2 locations). As a result, streams in these locations will not be permanently impacted. In addition, bottomless arch culverts will be placed over a tributary to Scott Run and Sandy Branch to minimize stream impacts. The resource agencies were involved in determining which stream systems needed to be bridged and provided recommendations on the location of bridge piers and abutments.

Scott Run Stream Restoration
The Scott Run Stream Restoration site, shown on ***Figure 6***, is located at Hyetts Corner Road in the vicinity of the proposed bridge crossings [Bridge 1-6 (Hyetts Corner Road) and Bridge 1-7 (US 301)] over Scott Run (refer to Design Refinement 4 on pages 42 through 46 of this Report). The final design of the Scott Run Stream Restoration has been completed. The preliminary stream restoration plans were presented to the resource agencies at the June 24, 2010 agency meeting. The mitigation will include 550 linear feet of stream restoration along Scott Run and 1.4 acres of wetland/riparian buffer restoration adjacent to the stream restoration site.

Ditch Replacement
A significant portion of the other waters of the U.S. impacts are to ditches with minor ecological significance beyond water conveyance. These features will be replaced with a new network of ditches and swales designed to continue water conveyance throughout the alignment.

Subaqueous Lands Mitigation
DNREC regulates impacts to subaqueous lands (a subset of Waters of the U.S.) and state jurisdictional tidal wetlands. The mitigation for impacts to DNREC subaqueous lands will include 59 acres of riparian buffer enhancement and 19 acres of wetland/waters preservation at Pleasanton East, Pleasanton South and Village of Scott Run, in addition to the Scott Run Stream Restoration.

Coastal Zone Management Mitigation
Additional mitigation has been included in the project to satisfy Special Condition 3 of the Project's Coastal Zone Management (CZM) Consistency Certification. The mitigation for DNREC Coastal Zone Management would include 28 acres of reforestation and four acres of wetland/waters preservation at Pleasanton Southeast.

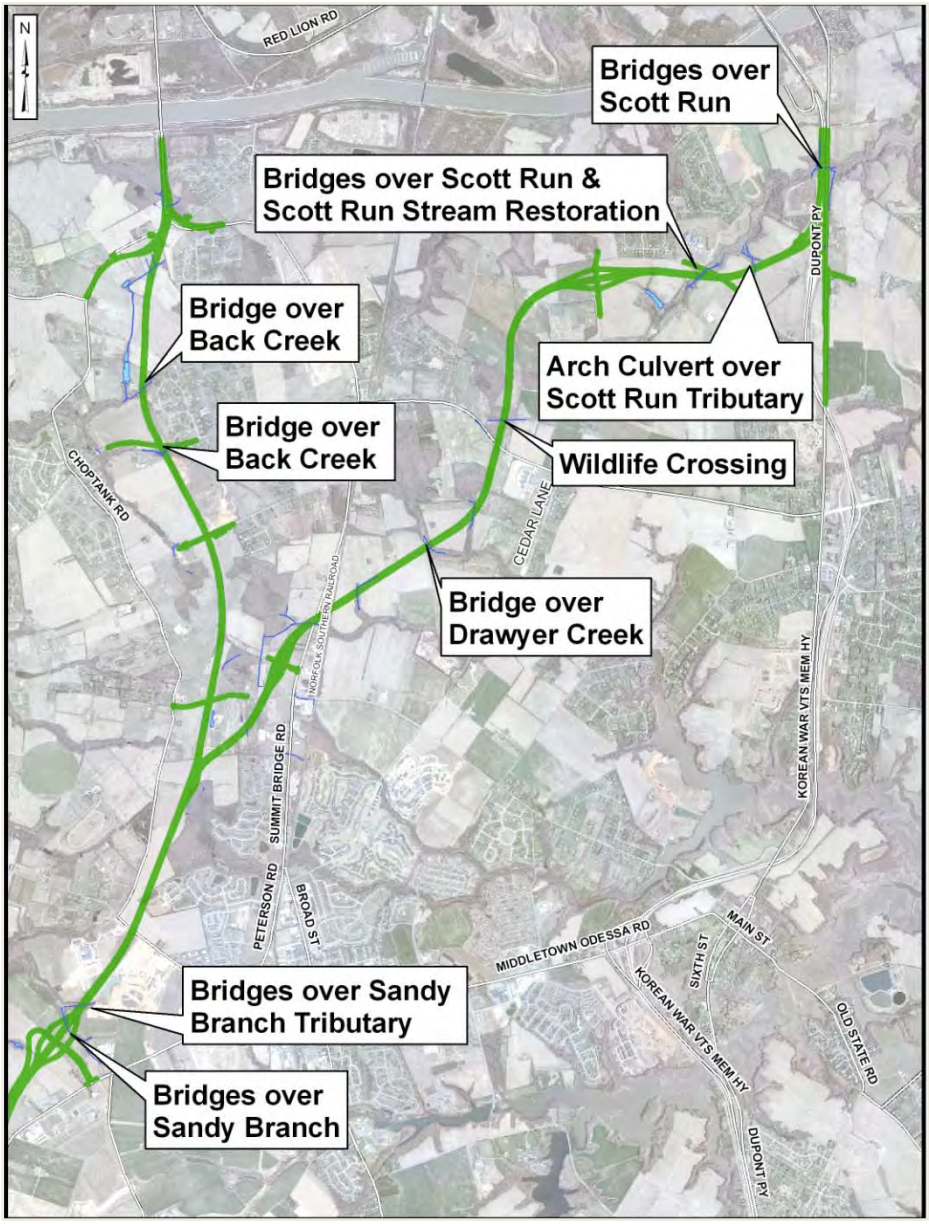

Figure 6: Waters of the US Mitigation Sites and Wildlife Crossing

Riparian Buffer Enhancement along Back Creek

DelDOT has committed to providing riparian buffer enhancement along the north branch of Back Creek to compensate for the additional impacts associated with the longer bridges over Back Creek due to the refined US 301 Spur Road alignment. Riparian buffer enhancement would be provided on severed parcels north of the north branch of Back Creek and east of the Spur Road alignment.

Floodplains

Impacts
The 2008 ROD Selected Alternative with Updated 2011 Features would construct bridges over 0.70 acre of 100-year floodplains associated with the SR 1 and US 301 ramps over Scott Run. The Design Refinements would construct bridges over 1.14 acre of floodplain, an increase of 0.44 acre. Bridges will be designed to ensure that there is no increase in the 100-year floodplain, resulting in no impact.

Mitigation
No mitigation is required, since there will be no direct impact to the 100-year floodplain. Floodplain permits from New Castle County and the Town of Middletown (based on jurisdiction) will be required for construction in the 100-year floodplain, as well as for each blue line stream shown on United States Geologic Survey (USGS) quad maps, to confirm flooding potential will not be increased as a result of the project.

Water Quality/Stormwater Management

Impacts and Mitigation
Minimal impacts to stream and surface water quality would result from construction of the design refinements. The use of ESC would minimize adverse effects during construction. Stormwater management (SWM) design, which would include the use of retention/detention ponds and roadside swales in accordance with best management practices (BMPs), was updated using surveyed and calculated hydrologic and hydraulic data. Potential negative effects to surface and groundwater quality would be offset by properly designed and operating SWM facilities.

The SWM design for the US 301 project implemented the recently-introduced DNREC SWM regulations. These new rules will be promulgated in Delaware by January 2012. The new rules and guidelines, which fall in line with the recent EPA mandated criteria, emphasize exploring "at-source" groundwater recharge, infiltration opportunities, water quality volume detention for the one-year storm as well as volume management for the 10- and 100- year storms based on the "Unit-Discharge-per-Acre" criteria which was agreed upon earlier between DNREC and DelDOT. SWM design throughout the US 301 corridor would also incorporate innovative Low Impact Development (LID)/Green Technology techniques such as disconnection of impervious areas through vegetative filter strips for pre-treatment, roadside bioengineered swales, infiltration ditches to enhance groundwater recharge wherever feasible, and other methods such as wet ponds and wetlands to treat for water quality and quantity while reducing impacts to the natural resources to the maximum extent practicable.

All existing outfalls and respective drainage areas within the US 301 project corridor were identified. These also included culverts, tax ditches, swales, streams and other water bodies. Extreme care was taken to assure drainage area boundaries remain similar between existing and proposed conditions. Any unavoidable drainage boundary diversions were minimized and mitigated through additional SWM quality and quantity measures. Flows through new impervious areas would be collected through roadside/median ditches and properly and safely conveyed to various SWM facilities. Approximately 140 SWM best BMP facilities were designed throughout the corridor. Infiltration practices were maximized wherever geotechnical investigation proved the feasibility of such practices. Proposed SWM facilities have been located to minimize impacts to

environmental resources. SWM facilities in the vicinity of the Summit Airport were discussed and coordinated with the Summit Airport officials. As result of this discussion, SWM facilities were reduced, relocated, and/or otherwise converted to dry ponds as needed. Summit Airport has approved our latest SWM plans.

All major cross culverts would be depressed adequately to allow a "natural bottom" for habitat passage. Culverts crossing US 301 roadways were placed perpendicular to roadway alignment and minimized in length. Unavoidable stream impacts would be minimized and mitigated through "Natural Channel Design" practices.

ESC measures were designed to avoid and minimize the potential for sediment-laden runoff into natural resources. Furthermore, ESC would include phased measures for interim construction and various major construction phases as needed. All non-infiltration SWM practices are proposed to be utilized as sediment traps/basins to avoid any additions to the project's footprint and respective impacts. These facilities are sequenced to be built as one of the first construction items to maximize capture of construction related sediments.

Soils

Impacts
The 2008 ROD Selected Alternative with Updated 2011 Features would impact 428.9 acres of prime farmland soils and 159.9 acres of hydric soils. For prime farmland soils, an error was discovered when the area of prime farmland soils (previously 616 acres for the 2008 ROD Selected Alternative) was re-measured during design. Previously, some of the areas used in the calculation of prime farmland soils were found to overlap, or were identified in more than one category (such as prime farmland soil as well as agricultural easement), resulting in double counting in some locations. This error has been corrected, and the updated value of 429 acres is confirmed as correct for the 2008 ROD Selected Alternative with Updated 2011 Features.

Although this correction reduced the ROD identified 616 acres to 429 acres, there is an overall increase of approximately 121.6 acres of impact in the Refined Design, resulting in a total impact of 550.0 acres. Of the 121.6 additional acres, most (110.5 acres) are due to the inclusion of parcels identified for mitigation/borrow sites, land-locked parcels used for borrow, and temporary construction easements used for staging or stockpiling areas within the limit of disturbance (LOD) for the Refined Design, as reported in ***Table 7*** in the Socioeconomic Resources section that follows. Only 11.1 additional acres of prime farmland soils would be impacted by the Design Refinements.

As with prime farmland soils, the 2008 ROD Selected Alternative with Updated 2011 Features would impact 204.8 acres of hydric soils, and the Refined Design would impact 44.96 acres. As with prime farmland soils, some of the area of impact to hydric soils (32.6 acres) would be due to the inclusion of non-roadway acres. Therefore, the Design Refinements would result in an increase of 12.4 acres in impacts to hydric soils.

Forests

Impacts
The 2008 ROD Selected Alternative with Updated 2011 Features would impact 62.2 acres of forest; the majority of the impacted forest is deciduous (54.6 acres), with a small amount of mixed forest (7.6 acres). The Design Refinements would impact 64.3 acres of forest, an increase of 2.1 acres.

Mitigation
Several potential reforestation sites, mainly land-locked parcels anticipated to be purchased by DelDOT, have been identified to accommodate the project's reforestation needs. Reforestation would occur on an acre-for-acre basis and would be distributed throughout the length of the project. The parcels would be planted with native tree seedlings. The following sites, shown in **Figure 7,** will be used for reforestation: Summit Bridge Farms, Churchtown (North and South), and Village of Scott Run. In addition, 16 acres of existing forest will be preserved at these sites and at the Pleasanton sites.

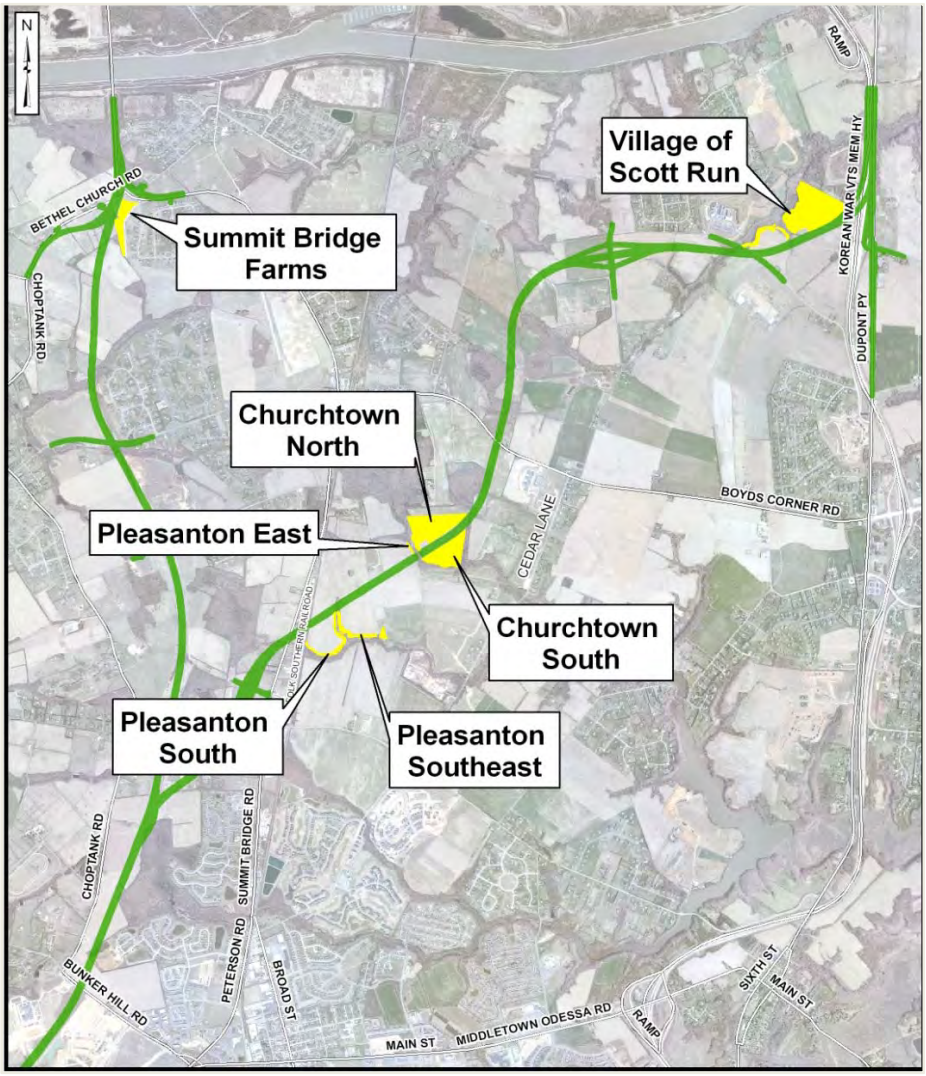

Figure 7: Potential Forest Mitigation Sites

Cultural Resources

Impacts and Mitigation
There would be no change in the number of historic properties affected by the Design Refinements when compared to the ROD Alternative. There would be minor changes in the intensity of the visual and/or audible effects to the Armstrong-Walker House (N-5146), S. Holton Farm (N-0107), and the Rumsey Farm (N-0113). The relocation of the toll-free ramp to SR 1 resulted in the expansion of the Area of Potential Effects (APE) and the evaluation of additional resources.

Design Refinement 3 - Relocation of US 13 to Northbound SR 1 Toll-Free Ramp to the South at Port Penn Road resulted in the expansion of the Section 106 Area of Potential Effect (APE) east of US 13. Two additional resources within the expanded APE were evaluated and concurred as not eligible for listing in the National Register of Historic Places. Two National Register eligible resources, the Biddle Property (N-3935) and Retirement Farm (N-5201) were consulted with the SHPO, who concurred that there is no adverse effect to either resource. The Mondamin Farm (N-5253), also eligible, continues to be outside of the APE. Additional archeological investigations were also undertaken and the results submitted and reviewed by the SHPO as a part of ongoing Section 106 consultation.

Design Refinement 7 - Reconfigure The New US 301/Existing US 301 Interchange (pages 49 through 53) - would continue to have an adverse effect on the Armstrong-Walker House. The revised East Diamond interchange design would continue to have a visual impact on the resource that will be similar to that of the ROD design. Proposed widening of existing US 301 (Summit Bridge Road) along the eastern side as it passes the Armstrong-Walker House would also have a visual effect. During an October 4, 2010 meeting among DelDOT, the Delaware SHPO, and the owners, mitigation opportunities were discussed (see **Appendix C**). As a result, some landscaping, including around the SWM facility in the southwest corner of the new/existing US 301 interchange ramps intersection with Summit Bridge Road and along the east side of new US 301, is being designed and coordinated with the owners and SHPO.

Design Refinement 8 - Northbound US 301to the Northbound Spur Road Right Side Exit, rather than Median Side (pages 53 and 54) – would continue to have an adverse effect on the S. Holton Farm. The right-hand exit ramp to the US 301 Spur Road would be approximately 100 feet further away from the resource; however, the visual and audible impacts of the US 301 Spur Road and US 301 mainline would be slightly greater than the ROD design. Mitigation was discussed during the September 22, 2010 meeting between the owners, DelDOT and SHPO; however, no decisions were reached (see **Appendix C**).

Design Refinement 10 - Levels Road South-Serving Ramps and Toll Plaza Ramps Operational Improvements (pages 58 through 60) – would continue to have an adverse effect on the Rumsey Farm. The visual impact of Levels Road extended and the ramps from US 301 mainline to Levels Road Extended would be similar to that of the ROD design.

Refer to these specific design refinements in this Report for detailed information. Coordination with the SHPO and property owners has and will continue to be the basis for the design and treatment of audible/visual minimization and mitigation. All property owners have been apprised of the conditions included in the MOA (ROD Attachment D) and all owners have been contacted regarding visual mitigation. A summary of consultation with property owners is also included in **Appendix C**)

Among the owners with whom mitigation has been discussed are the owners of The Maples on Bunker Hill Road, where much of the property adjoining the historic boundary would be acquired for the construction of new US 301. Although several options for visual mitigation were reviewed with the owners at an October 22, 2010 meeting with the SHPO and DelDOT, no decisions were reached. Follow up meetings are continuing with owners.

Archaeological investigations of the project's area of disturbance are continuing. Sixty-one sites have been identified within the limits of disturbance of the project, and approximately 26 sites are currently undergoing Phase II surveys to determine eligibility for the National Register.

Phase I investigations are completed in Design Sections 1, 2 and 3 and are ongoing for Design Section 4. The Phase II program is complete in Design Sections 1 and 3 and is ongoing in Design Section 2 and the Port Penn area (Design Refinement 3) of Design Section 1. Phase II investigations have not begun in Design Section 4, and Phase III has not begun in any area of the project.

The Section 106 MOA, included as Appendix D in the 2008 ROD, provides for archaeological surveys (Phase I and II) and for the treatment of any identified archaeological sites that would be deemed eligible for listing in the National Register of Historic Places (including determinations of eligibility, public outreach, discovery of and treatment of human remains and burials, and curation). As noted, Phase I testing has been completed for Design Sections 1, 2 and 3 and is ongoing for Design Section 4; Phase II is completed or ongoing wherever warranted as a result of the Phase I evaluations.

The MOA also provides that DelDOT shall seek ways to avoid or minimize adverse effects to each individual property through consultation. All adverse effects are limited to audible and visual impacts; there are no physical acquisitions of property from any historic property. All property owners of affected historic resources have been notified of the commitment in the MOA. Meetings with property owners are continuing, and mitigation in the form of landscaping or other visual screening construction is being developed in consultation with FHWA and the SHPO for inclusion in the final design. **Appendix C** includes copies of DelDOT's letters to property owners requesting meetings to discuss potential mitigation for visual impacts as well as responses describing the results of each meeting.

Section 4(f)

Section 4(f) of the U.S. Department of Transportation Act of 1966, 49 USC 303(c), as implemented through 23 CFR 774 by the FHWA requires that the proposed use of land from any publicly-owned public park, recreation area, wildlife and/or waterfowl refuge, or any significant historic site, as part of a federally funded or approved transportation project may not be approved unless:

(a) The Administration determines that there is no feasible and prudent avoidance alternative to the use of land from the property, and the action includes all possible planning to minimize harm to the property resulting from such use (23 CFR 774.3(a)); or
(b) The Administration determines the use of the Section 4(f) property, including any measures to minimize harm (such as avoidance, minimization, mitigation or enhancement measures) committed to by the applicant will have a *de minimis* impact on the property (23 CFR 774.3(b)).

Further, 23 CFR 774 defines the use of property as:

- Land from a 4(f) resource is permanently incorporated into a transportation facility;
- A temporary occupancy of land that is adverse in terms of the Section 4(f) statute's preservationist purposes (23 CFR 774.13(d));
- A constructive use (23 CFR 774.15);
- A *de minimis* impact on the property, as defined in 23 CFR 774.17.3(b).

The 2007 FEIS and 2008 ROD concluded the US 301 Selected Alternative would not require use of Section 4(f) protected properties. As a result of continued efforts to avoid and minimize the potential use of Section 4(f) resources since issuance of the 2008 ROD, this evaluation report documents the subsequent Section 4(f) coordination that has occurred resulting in no use of Section 4(f) resources by any of the Design Refinements. This coordination includes the C&D Canal Wildlife Refuge (Design Section 4) and the historic Armstrong-Walker House (N-5146) located at 5036 Summit Bridge Road near Armstrong Corner Road (Design Section 2).

C&D Canal Wildlife Refuge

Consultation with the ACOE and DNREC was conducted to determine whether the proposed strip take of land adjacent to the existing Summit Bridge approach roadway (SR 896) constitutes a Section 4(f) use under 23 CRF 774. The 1.1-acre of land from the C&D Canal property would be used for improvements associated with Design Refinement 13 – SR 896/Bethel Church Road Interchange. The ACOE has indicated that this area adjacent to the roadway is not considered as a part of the refuge. The ACOE indicated the areas in question are considered for their general maintenance of the Canal, notably for disposal of dredge material. The ACOE does not provide recreational opportunities in this area and there are no plans, leases or management programs to change the land use in this area (see **Appendix H** for notes of the October 20, 2011 meeting with the ACOE). Therefore, the C&D Canal property required for the SR 896/Bethel Church Road Interchange is not Section 4(f) property.

Armstrong-Walker House

DelDOT is requesting FHWA concur with an exception from Section 4(f) use in connection with improvements proposed for Summit Bridge Road in the vicinity of Armstrong Corner Road and the proposed US 301 interchange ramp intersection/tie in with Summit Bridge Road. As proposed in Design Refinement 7 – Reconfigure the New US 301/Existing US 301 Interchange, improvements would be made to existing US 301 (Summit Bridge Road) to provide two through lanes in each direction as well as turn lanes and other improvements to facilitate users access from Summit Bridge Road to the new US 301. The design of improvements to Summit Bridge Road is based upon DelDOT's established and understood 85-foot roadway width.

As part of the Section 106 MOA and 2008 ROD issued by FHWA, an adverse effect applied to the historic property based on visual impacts of the proposed interchange construction within the viewshed of the property.

Since the issuance of the ROD and independent of the US 301 project, the owners of the Armstrong-Walker House have pursued the subdivision of the property (Parcel 178) into two lots, with the historic house remaining on proposed Lot 1 to the south, and Lot 2 to the north and abutting Armstrong Corner Road being proposed for future commercial development. In mid-2008,

as part of that subdivision process, an additional 15 feet of right-of-way was required and dedicated to the state for purposes of the subdivision review and approval process. The intent of this action was to unify Summit Bridge Road as a uniform 85-foot width throughout the existing corridor. An additional 25 feet of right-of-way was also required and dedicated along Armstrong Corner Road. The understood 85-foot roadway right-of-way lies within the initially dedicated 15 feet.

The improvements along Summit Bridge Road are proposed on both the east and west sides of the roadway, except in front of the Armstrong-Walker House historic property boundary, where DelDOT is proposing to maintain the existing edge of roadway with a closed curb. Beyond the edge of roadway to the west, a clear zone with a stormwater bioswale is proposed within the remaining 15 feet of existing DelDOT right-of-way. This area currently serves as a drainage area for roadway runoff. Improvements would include minor regrading, clearing of scrub vegetation, and relocation of three utility poles. The duration of the construction of these improvements would be temporary, short-term, and shorter than the construction period for the roadway improvements themselves; there would be no change of ownership of the area; there will be no change of use; and the result would not change or interfere with the protected activities of the 4(f) resource.

Thus, determining the proposed use of this 4(f) land as temporary occupancy only, and as the SHPO has agreed that is a temporary occupancy only, DelDOT is requesting an exception under CFR 774.13(d), a temporary occupancy so minimal so as not to constitute a use within the meaning of Section 4(f), as:

(1) The duration of the use is temporary, i.e., less than the project's construction time, and with no change in ownership;
(2) The scope of the use is minor and the nature and magnitude of the changes are minimal;
(3) There are no anticipated permanent adverse physical impacts or interference with the protected activities, features or attributes, either temporary or permanent, of the resource;
(4) The land used will be fully restored to a condition at least as good as prior to construction; and
(5) There is documented agreement of officials with jurisdiction over the 4(f) resource regarding the above conditions.

DelDOT's evaluation of the temporary occupancy and the SHPO's concurrence can be reviewed in **Appendix C**.

Mitigation strategies have been discussed with the owners of the property and include landscaping adjacent to the interchange as it crosses to the west of the Armstrong-Walker House. No additional mitigation is proposed along the frontage within the historic boundary. Additional mitigation landscaping is proposed for roadway improvements adjacent to the proposed SWM pond located to the north of the historic boundary.

Socioeconomic Resources

Table 6: Comparison of Socioeconomic Resource Impacts

Resource	2008 ROD Selected Alternative[1]	2008 ROD Selected Alternative with Updated 2011 Features[2,3]	2011 Refined Design[2]
Alignment Length (mi.)	17.5	17.5	17.5
Total Area, Roadway and SWM LOD (acres)	941	926.4	1,043.9
Total Area Roadway Supporting Areas Limit of Disturbance (acres)[4]	--	--	323.1
Total Area Roadway Limit of Construction (acres)	941	926.4	1,367.0
Affected Parcels (No.)	143	143	218
Total Relocations (No.)	21	21	19
Agricultural Districts (number)	1	1	1
Agricultural Districts (acres)	32.6	0.37	0.1
Agricultural Easements (number)	1	1	2
Agricultural Easements (acres)	1.8	5.3	3.8
Community/Property Visual Impacts with Mitigating Berm (No.)	6	6	7

Notes:
[1] *Record of Decision, 4/30/08, page 79.*
[2] *Impact Matrix prepared 9/9/11.*
[3] *See explanation below detailing updated features.*
[4] *Roadway supporting areas discussed in the ROD, but calculated figures not presented in the ROD (see Pages 26-29).*

As shown in ***Table 6***, a number of the impacts have changed from the 2008 ROD Selected Alternative to the 2008 ROD Selected Alternative with Updated 2011 Features to the current Refined Design. The differences identified in Table 3 are discussed in the following sections detailing the impacts of the Refined Design and proposed mitigation for those impacts. ***Table 6*** shows a greater LOD for the Refined Design than was previously indicated for either the ROD Selected Alternative or the 2008 ROD Selected Alternative with Updated 2011 Features. Other differences are identified in impacts associated with agricultural districts and agricultural easements

Right-of-Way

Impacts
The LOC for the roadway and SWM has changed from the 926.4 acres noted in the 2008 ROD Selected Alternative with Updated 2011 Features to a total of 1,043.9 acres, an increase of 117.5 acres resulting from the design refinements and the SWM design that is based on current requirements.

The LOD originally reported in the ROD (941 acres) did not include roadway supporting areas that would be used for mitigation, borrow, staging and/or stockpiling. Although these elements were discussed in the ROD and presented to the Agencies and the public prior to the ROD, these roadway supporting areas were not included in the LOD reported in the ROD. The roadway supporting areas, mitigation sites or landlocked remnant parcels (also identified as 'remainder' parcels, or those portions of a property or parcel no longer accessible to the property owners) include: (1) two major mitigation/borrow sites at Levels Road and at Pleasanton and (2) landlocked remnant parcels used for borrow, many of which will be planted as forestation mitigation, and (3) temporary construction easements (TCEs) located along the US 301 Mainline and the Spur Road that would be used for

staging areas and/or stockpiling materials. TCEs are generally restored to their prior condition upon completion of construction. These roadway supporting areas are identified on ***Figure 8***, and the acreages and impacts are summarized in ***Table 7***.

Table 7: Roadway Supporting Areas and Impacts

Resource	Selected Alternative –Updated Features[1]	Roadway Supporting Areas				Total Roadway Supporting Areas	Design Refinements[2]
		Levels Road Mitigation Site	Pleasanton Mitigation Site	Borrow Sites	Staging and Stockpile Areas		
Total Limit of Construction, acres	926.4	103.69	31.88	136.01	51.51	323.09	117.5
Wetlands Impacts, acres	34.0	0.41	0	0.56	0	0.97	1.8
Streams Impacts, linear feet	10,337	0	0	0	0	0	1,844
Subaqueous Lands, linear feet	8,516	0	0	0	0	0	-7.7
Hydric Soils, acres	159.9	5.00	17.81	5.40	4.35	32.57	12.4
Agricultural Districts, acres	0.37	0	0	0	0	0	-0.28
Agricultural Easements, acres	5.31	0.55	0	0	0	0	-1.0
Prime Farmland Soils, acres	428.9	78.87	0.17	8.83	22.65	110.53	11.10
Forest, acres	62.2	0.90	0	0.38	0.37	1.64	0.23

Notes:
[1] *Refers to 2008 ROD Selected Alternative with Updated 2011 Features LOC from* ***Table 3****.*
[2] *The total roadway supporting areas (323.09 acres), when added to the 2008 ROD with Updated 2011 Features LOC (924.6 acres), totals 1,249.5 acres. The 117.5-acre difference between 1,249.5 and the total LOD of 1,367.0 is attributed to the Design Refinements.*

While the roadway supporting areas, shown in ***Table 7***, were not included in the LOD figures noted in the ROD, the acquisition or temporary use of most of these landlocked parcels would be for mitigation, borrow, and reforestation. Use of these parcels was discussed with the resource agencies and presented to the public, prior to the ROD, and discussed in the ROD, although the calculated impacts of these parcels were not provided. In early discussions of the mitigation package at the August 15, 2006 Resource Agency meeting, DelDOT indicated that public lands, right-of-way acquisitions or landlocked parcels would be given first priority as mitigation sites.

Mitigation
The compensatory mitigation package that was presented to the resource agencies on January 24, 2008 included 318 acres of land. Areas identified as wetland, riparian buffer and forest mitigation were not included in the ROD roadway LOC, but these areas are included in the Refined Design LOD as mitigation sites, temporary construction easements used for stockpile and staging areas, or landlocked parcels used for borrow. The borrow sites (landlocked remnant parcels) at Pleasanton East and at Pleasanton Southeast (see ***Figure 8***) were not included in the original 318-acre mitigation package. These two sites have been incorporated into the Refined Design and would add over 30 acres of riparian buffer enhancement, reforestation and preservation to the mitigation package.

All of the TCE sites used for stockpile and staging areas will be restored, upon completion of the construction of US 301, using appropriate vegetation. Some may be proposed as reforestation areas, and those not utilized for mitigation will be planted with appropriate DelDOT seeding mixes.

N

St. Georges Borrow Site: 11.2 Acres

Village of Scott Run East Borrow Site: 33.6 Acres

Village of Scott Run West Borrow Site: 8.3 Acres

Churchtown North Borrow Site: 20.5 Acres

Pleasanton East Borrow Site: 11.4 Acres

Pleasanton Mitigation Site: 31.9 Acres

Churchtown South Borrow Site: 10.9 Acres

Pleasanton Southeast Borrow Site: 23.2 Acres

Pleasanton South Borrow Site: 16.9 Acres

Levels Road Mitigation Site: 103.7 Acres

Figure 8

Roadway Supporting Areas

Legend

- Alignment
- Potential Reforestation & Riparian Buffer Enhancement
- Limit of Disturbance
- Waters of the U.S.
- Wetlands

Roadway Supporting Areas

- Borrow
- Mitigation
- Stockpile/Staging

0 0.3 0.6 1.2 Miles

1 inch equals 0.6 miles

October 3, 2011

Previously mowed areas will be replanted with the DelDOT standard seed mix; a DelDOT seeding mix specified for steep slopes will be planted in areas of steep slopes; and flat upland areas outside of the roadway clear zone will be planted with a "no-mow mix" of native warm-season grasses.

Acquisitions and Relocations

Impacts
As reported in the ROD, the Selected Alternative would require 21 relocations and affect a total of 143 properties through total or partial acquisition. The Refined Design would affect a total of 218 parcels and require relocation of the occupants of 19 businesses or residences. The increase in the number of properties potentially affected would result mainly from partial acquisitions for roadway widening along existing US 301 (Summit Bridge Road) to accommodate the refined interchange with new US 301; the tie into existing dual US 301 at the Maryland line; the inclusion of parcels identified as roadway support areas, including mitigation sites, borrow sites, and staging and stockpile areas; and in the improvements along US 301 at the Port Penn/Toll-Free Ramp intersection. In addition, a number of properties (counted as a single property in the FEIS/ROD) were subsequently determined to be multiple parcels. Thirty-one parcels have already been purchased by DelDOT.

The difference in the number of relocations (21 identified in the ROD reduced to 19 in the Refined Design) can be attributed to the proposed design refinements. One additional relocation would be required on Summit Bridge Road to accommodate improvements needed for the intersection of new/existing US 301; one relocation would be avoided by the proposed design refinement of the new/existing US 301 interchange (Design Refinement 7; see pages 49-53). Two additional relocations would be avoided through proposed adjustments of the Mainline and Spur Road alignments. Ten relocations remain, and nine relocations have been completed (see **Appendix D**).

Mitigation
Owners of affected properties would be fairly compensated for the acreage required based on assessment of property value and the size of the acquisition. In addition to just monetary compensation for the assessed value, owners whose residences or business properties would be acquired in whole, requiring relocation, would be provided relocation assistance in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended by the Uniform Relocation Act Amendments of 1987.

Farms and Agricultural Preservation Areas

Impacts
The ROD Selected Alternative would require the conversion of 752 acres of land used for agricultural purposes to transportation use. Approximately 50 percent of those acres were slated for development. Although some of the planned and approved development has proceeded as scheduled, the economic recession has delayed others. The ROD Selected Alternative potentially impacted 26 active farm parcels not planned for development through partial or total acquisition of right-of-way.

The 2008 ROD Selected Alternative with Updated 2011 Features would impact one permanent agricultural preservation easement (5.3 acre) and one ten-year preservation district (0.37 acre). The Refined Design will impact two preservation easements (3.8 acres) and 0.09 acre in one ten-year

preservation district. The amount of preserved farmland impacted has decreased by a total of 1.8 acres.

Agricultural Districts
The agricultural district impact reported in the ROD would be the impact to the Maples property, located on the north side of Bunker Hill Road, east of Choptank Road (Design Section 3). The Maples property was entered into the state's 10-year preservation program in 1998. However, the owners did not extend their involvement in the program when the agreement expired in 2008. Therefore, the 32.6 acre agricultural district impact reported in the ROD no longer exists, since the Maples property is no longer an agricultural district. In addition, it was determined after publication of the ROD that the Strawberry Lane Connector to US 301 would impact portions of the Clay Farms, a part of the Baker Farms Agricultural District. With the elimination of the Maples as an agricultural district and the addition of the Clay Farms impact, the number of agricultural districts impacted by the Selected Alternative remains at one. The 2008 ROD Selected Alternative with Updated 2011 Features column correctly reports the impact to the Clay Farms agricultural district land as 0.37 acre. The 2011 Refined Design would reduce the impact to the Clay Farms to 0.09 acre.

Agricultural Easements
Throughout the development of the design for the FEIS and ROD, the impacts to agricultural easements would result from the US 301 Spur Road alignment (Design Section 4) crossing the Steele Farm, located to the northwest of Chesapeake Meadow. The acreage of the impact did not substantially change from the Draft Environmental Impact Statement (DEIS) (6.0 acres) to the FEIS (6.0 acres), but was incorrectly reported in the ROD as 1.8 acres. The 2008 ROD Selected Alternative with Updated 2011 Features shows the correct acreage that would be impacted by the ROD design as 5.3 acres. The 2011 Refined Design would reduce the impact to the Steele farm to 3.2 acres. In addition, the Levels Road Mitigation Site would entail an approximately 0.6-acre impact that would be considered as a permanent conservation easement on an agricultural easement in the Baker Farms District. Construction of the mitigation site would require the permanent easement to access the wetland's outlet structure for maintenance. This permanent easement would not affect the farm operations or preservation of the nearby wetland area. This results in impacts to two agricultural districts totaling 3.8 acres.

Mitigation
In response to DNREC comments on the alignment of the Selected Alternative in the Ratledge Road area, DelDOT committed to make a good faith effort to secure an agricultural conservation easement on the Wooleyhan farm, with the understanding that condemnation would not/could not be used to secure such a voluntary easement from the property owner. DelDOT approached the landowner, who refused to join the State's voluntary agricultural conservation easement program. The owner was also unwilling to allow DelDOT to purchase development rights on the property in order to secure the easement. DelDOT then proposed the following additional mitigation to DNREC in lieu of the agricultural easement on the Wooleyhan property: preservation of five acres of riparian forest and seven acres of wetlands and reforesting 28 acres at the Pleasanton Southeast site. DNREC agreed with the additional mitigation in lieu of the agricultural conservation easement on the Wooleyhan property.

Communities and Community Facilities

Impacts

There are no substantial changes in impacts to communities associated with the Design Refinements when compared to the ROD Alternative. In three locations, shifts of alignment have caused the US 301 Spur Road to be somewhat closer to three communities.

- The US 301 right-hand exit ramp from the US 301 mainline to the US 301 Spur Road is approximately 100 feet closer to the community of Springmill (1,600 feet away) than the left-hand exit ramp design shown in the ROD (1,700 feet away).
- The refined alignment of the US 301 Spur Road is approximately 73 feet closer to the community of Chesapeake Meadow (221 feet away) at closest point on the northwestern edge of the community than the ROD alignment of the Spur Road (294 feet away).
- The Refined Design of the US 301 Spur Road is approximately 74 feet closer to the northern edge of the community of Summit Bridge Farms (368 feet away) than the ROD design (442 feet away).

One factor that influences community impacts is the continued progress of residential development within the project area. One community, Southridge, now called Spring Arbor, did not exist at the time of the ROD (April 2008); many of its new residents attended the March 23, 2009 Public Workshop to gather information about the project and inquire about the efficacy of the visual earthen berm proposed to minimize roadway noise impacts. A pre-workshop meeting was held with the Spring Arbor community on August 23, 2011 and residents requested that the height of the proposed visual earth berm along the community be increased from 10 feet to 16 feet. DelDOT has agreed to provide a 16 foot high berm for 2,600 feet along the community and a 10 foot high berm for 400 feet along the south end of the community. A 16 foot high berm for the full 3,000 foot length is precluded by a utility conflict. The south end of the berm is limited by existing wetlands.

There are no changes in impacts to community facilities. Tidewater Utilities drinking water facility, located close to the proposed US 301 Spur Road alignment on Churchtown Road, will be provided with an access driveway (Design Refinement 15), and the eastward shift of the alignment near the DE/MD state line (Design Refinement 12) has avoided impacts to the utility towers.

Mitigation

Proposed visual mitigation for communities in the form of landscaped earthen screening berms has been modified slightly during design to increase the benefits. The opportunity for additional visual screening for the affected communities is primarily due to the availability of excess borrow material resulting in a project cost saving when compared to soil disposal costs. For the communities of Southridge/Spring Arbor, Middletown Village and Airmont, berm lengths were extended. Berm heights have been increased for the communities of Airmont and Spring Arbor. The berm length for Springmill would be reduced by 400 feet as a result of Design Refinement 8, which would provide a right exit from the northbound US 301 Mainline to the Northbound Spur Road. The right exit ramp would directly impact 400 feet of the proposed berm; however, the ramp itself would provide a berm that would effectively retain the full 2,200-foot visual barrier. An additional screening berm is proposed for the west side of Summit Bridge Farms. Further details about the modifications of the visual berms for Airmont, Middletown Village, Spring Arbor and Summit Bridge Farms are included in **Appendix E**. A comparison of the length and height of the screening

earth berms proposed in the ROD versus the Refined Design is presented in ***Table 8***. Also, see **Appendix E** for additional details.

Table 8: Proposed Visual Screening Earth Berms

Community	Proposed Berm (2008 ROD)	Proposed Bern (2011 Refined Design)
Airmont	6' x 1,670'	12' x 2,000'
Chesapeake Meadow	11' x 1,600'	11' x 1,800'
Middletown Village	16' x 2,000'	16' x 2,700'
Southridge/Spring Arbor	10' x 2,840'	16' x 2,600'; 10' x 400'
Springmill	6' x 2,200'	6' x 1,800'
Summit Bridge Farms	None proposed	11' x 1,840'
Middletown Veterinary Hospital	6' x 900'	No change

Economic Benefits

The Design Refinements do not alter the anticipated economic benefits that accrue from the completion of the US 301 project, i.e., reduced congestion on local roadways, decreases in accidents on local roadways and better accessibility to businesses located in the project area.

Secondary/Indirect and Cumulative Effects Analysis

The 2007 FEIS Secondary and Cumulative Effects Analysis (SCEA) (pages III-212 to III-233) concluded that the construction of the US 301 project would not directly influence the amount or location of development anticipated to occur within the SCEA boundary. The transportation and traffic benefits forecast as a result of the implementation of a build alternative would provide adequate public roadway capacity for permitting purposes, thus allowing approval of development that may have been disallowed under existing or No-Build conditions. The improved transportation facility may result in future zoning change requests for higher density developments in areas not currently zoned for such development. Among the effects of this project, therefore, is the potential for secondary development that would not occur without the construction of a new four-lane limited access roadway to relieve existing and future traffic volumes on existing roads, especially in areas easily served by access ramps. The Design Refinements developed during the design of the US 301 Selected Alternative would not alter the typical design of the roadway (four-lanes, tolled, limited access) from the design identified in the 2007 FEIS/2008 ROD, and therefore the conclusions of the SCEA would not change.

Development pressures that may be associated with a new direct US301 roadway are recognized in both Cecil and Kent Counties in Maryland, according to the *Kent County Comprehensive Plan* (Adopted May 2006) and the *2010 Cecil County Comprehensive Plan* (Adopted April 2010). These plans also recognize and provide for designated growth areas and rural preservation areas. In New Castle County, the *Unified Development Code* (most recently amended 7/28/11) and the *State Strategies for Policies and Spending* (2010 Update, approved 4/1/11) provide for designated growth areas and areas to be protected and preserved.

The extent, pace, and location of development within the SCEA boundary will primarily be influenced by state, county, and local land use regulations as well as the current (2011) state of the economy. Planned growth is anticipated to occur regardless of the construction of US 301. *Secondary/indirect effects* could include growth-inducing effects and changes in land use, zoning,

population, or growth rate that would only occur when the US301 project is completed or if the project changes the rate of the development. The US 301 Selected Alternative could potentially increase the rate of current private development within the framework of the existing pattern of land use that may occur because less congestion and ease of travel would encourage people and businesses to move to designated growth areas within the SCEA boundary. Thus, the US 301 project may induce secondary effects caused by changes to the rate of development. These potential secondary effects caused by a change in development rate are expected to be minimal.

Secondary/indirect effects could be caused by a change in travel patterns and increase in traffic volumes on the regional roadway network, resulting in indirect effects to communities and historic resources. For example, the area around Warwick, Maryland near the southern portion of the SCEA Boundary could experience an increase in automobile traffic from travelers avoiding the US 301 northbound toll plaza.

Cumulative effects include impacts on the environmental resources which will result from incremental impacts of the Selected Alternative when added with other past, present, and reasonably foreseeable actions. Cumulative impacts would result from any public or private development that may or may not be associated with the US 301 project. If the US 301 project directly or secondarily affects the resource, then cumulative effects would occur if another development affects the same resource. The project would directly affect floodplains, waters of the US including wetlands, agricultural districts and preservation easements, prime farmland soils and farmland, forests, proposed State Resource Areas, property (residences and businesses) and historic properties. However, DelDOT's commitment to avoidance, minimization and mitigation of these impacts would continue to be an integral part of the implementation of US 301 in southern New Castle County. Through wetlands creation and enhancement, stream restoration and stream bank enhancement, reforestation, visual earthen berm construction, and development of visual mitigation for historic properties, the US 301 project would lessen or negate its contribution to cumulative effects.

Noise

Impacts and Mitigation

As identified in the 2008 ROD, 133 residences would experience noise impacts as a result of the implementation of the Selected Alternative. Impacts were defined as noise levels of 66 decibels (dBA) or greater, or an increase of 10 dBA or greater. Noise mitigation was not considered reasonable and/or feasible in accordance with the DelDOT noise policy effective in 2008 for all locations except the newly-constructed Southridge/Spring Arbor community. However, proposed visual screening landscaped earth berms adjacent to a number of communities would provide beneficial noise effects, and reduce Selected Alternative noise impacts to 46 residences.

The Refined Design would extend the length and increase the height of a number of visual earth berms from those indicated in the ROD, and construct a new visual screening berm on the west side of the Summit Bridge Farms community (refer to ***Table 8***). Under DelDOT's 2008 noise policy, the Refined Design would also lower the number of noise impacts at various locations throughout the alignment. With the Refined Design, 135 residences would experience noise impacts without visual screening berms. Noise impacts are reduced to 34 with the construction of the refined visual earth berms.

FHWA recently amended their Noise Standard. Implementation of DelDOT's new noise policy, which complies with these amendments, became effective on July 13, 2011. Following a sample analysis of noise mitigation under new policy guidance, the details of which are included in **Appendix E**, it was determined that, while noise abatement was found feasible and reasonable only for the Southridge/Spring Arbor community under the 2008 DelDOT noise policy, noise mitigation would not meet such criteria under the new policy.

The FEIS/ROD mitigation analysis was undertaken for only the north section of the Southridge/ Spring Arbor community as a best effort to achieve cost-reasonableness. Subsequently, it was deemed appropriate to provide visual mitigation for the entire community, using a longer and higher visual earthen berm that would also provide beneficial noise effects and would be consistent in the treatment of visual effects throughout the project corridor.

DelDOT concluded that no new noise analyses would be undertaken using the updated noise policy, and that visual earth berms offering varying degrees of noise benefits would continue to be provided for communities adjacent to the new US 301 corridor. In accordance with policy guidance, DelDOT consulted with FHWA on this recommendation and FHWA determined that no further reanalysis under the revised policy was required.

A complete reanalysis of noise mitigation was not performed using the updated noise policy; however, the Refined Design was evaluated for noise impacts with the updated policy for no-berm and with-berm conditions, using the refined visual earth berm dimensions.

Table 9 summarizes noise impacts, with and without visual earth berms, for the ROD and Refined Designs, using the previous noise policy effective in 2008, as well as the Refined Design with DelDOT's current noise policy. Differences between number of impacts under the FEIS/ROD and the Refined Design (2008 noise policy) are due to slight adjustments in roadway geometry, updated topography, and/or refined berm dimensions. Differences in impacts for the Refined Design, between the 2008 and 2011 noise policies, are the result of different impact criteria applied to the same conditions.

The addition of a visual screening earth berm on the west side of Summit Bridge Farms would visually shield the community from a portion of the US 301 Spur Road. However, a berm is not feasible on the north side adjacent to SR 896, and 12 residences would remain impacted by SR 896 on the north side of the community.

The visual screening berm recommended for Southridge/Spring Arbor would provide significant noise reductions for the community and eliminate all but three residential impacts (applying the 2008 noise policy) or one residential impact (applying the 2011 noise policy) at the southern end of the community. These impacts involve planned residential sites, not existing residential sites. Existing wetlands precluded extending the visual earth berm further to the south to benefit the impacted sites.

Table 9. Noise Impact Comparison - ROD versus Refined Design

Community	FEIS/ROD Noise Impacts 2008 Noise Policy		Refined Design Noise Impacts 2008 Noise Policy		Refined Design Noise Impacts 2011 Noise Policy	
	no Berm	with Berm	no Berm	with Berm	no Berm	with Berm
Airmont 6' x 1,670' berm refined to 12' x 2,000'	0	0	0	0	0	0
Chesapeake Meadow 11' x 1,600' berm refined to 11' x 1,800'	11	0	7	0	2	0
Middletown Village 16' x 2,000' berm refined to 16' x 2,700'	15	0	16	0	10	0
Southridge/Spring Arbor 10' x 2,840' berm refined to 16'/10' x 2,600'/400'	75	14	81	3	38	1
Springmill 6' x 2,200' berm refined to 6' x 1,800'	0	0	0	0	0	0
Summit Bridge Farms [1] 11' x 1,840' berm added to west of community	12	12	12	12	12	12
Individual Residences Visual berms not feasible nor reasonable	20	20	19	19	15	15
TOTAL IMPACTS	**133**	**46**	**135**	**34**	**77**	**28**

1. Twelve (12) properties are impacted in the existing condition by traffic on SR 896, not the proposed US 301 Spur Road.

Notable Refinements to Visual Screening Berms

Airmont: The original landscaped visual earth berm, as proposed in the FEIS/ROD, was 6 feet high and 1,670 feet long. The community requested a 16-foot high, 2,000-foot long earth berm at the August 24, 2011 pre-workshop community meeting to help break the line-of-sight between large trucks on US 301 and the community. DelDOT has agreed to provide a 12-foot high, 2,000-foot long berm which will run the entire length of the community. The 12-foot high berm will address the issue with visual screening, almost entirely provide the noise reduction benefit of a 16-foot high berm, would fully utilize the excess topsoil generated by Construction Contract 1A, and not increase construction costs.

Middletown Village: A 16-foot high, 2,000-foot long landscaped visual earthen berm was originally proposed in the FEIS/ROD. DelDOT has decided to lengthen the berm to 2,700 feet. The recommended 16-foot high, 2,700 foot long berm would provide up to 12 dBA total noise reduction, and provide complete visual screening. The recommended berm would not increase construction cost for the Section 2A contract.

Spring Arbor: A 10-foot high, 2,840-foot long landscaped visual earth berm was originally proposed in the FEIS/ROD. The community proposed a 16-foot high, 3,000-foot berm at the August 23, 2011 pre-workshop community meeting to provide greater noise attenuation. DelDOT has agreed to provide a variable height 3,000-foot long berm which is 16 feet high for a length of 2,600 feet and 10 feet high for 400 feet. The lower section is required to address a utility conflict. The recommended 16-foot variable height berm would increase noise attenuation by up to 5 dBA over the 10-foot high berm, provide up to 14 dBA total noise reduction, and provide complete visual screening. The recommended berm would not increase construction costs for the Section 2A contract.

Summit Bridge Farms: No landscaped visual earth berm was originally proposed for this community in the FEIS/ROD. However, the interchange between Bethel Church Road and the Spur Road extending to SR 896 shown in the ROD was subsequently refined after being presented at the March 2009 Public Workshop to provide a simpler, more direct interchange option (refer to Design Refinement 13 on pages 63 through 67). The Refined Design shifted the interchange closer to the community and raised the elevation of the roadway along the west side of the community. As a result, DelDOT committed to provide a visual earth berm between the community and the US 301 Spur Road, similar to those being provided at Airmont, Spring Arbor, Middletown Village and Springmill. At the August 22, 2011 pre-workshop community meeting, the community requested a 15-foot high, 2,000-foot long berm on existing DelDOT property to the west of the community, which is not impacted by noise, that would visually shield the residences from the Spur Road but avoid an existing line of trees. DelDOT has agreed to provide an 11-foot high, 1,840-foot visual berm, shifted to the west, but retaining an existing row of mature trees. Analysis of taller berms showed little or no perceptible improvement in noise reduction. The recommended 11-foot high berm would incur minimal additional cost to the project. Mitigation was found to be neither feasible nor reasonable for the impacted residences adjacent to SR 896 along the north side of the community.

More detailed information of the refinements to landscaped visual earth berms can be found in **Appendix E**.

Air Quality

The US 301 project is a DelDOT priority and construction funding is included in the fiscally constrained Capital Transportation Program (CTP) FY 2011-FY 2016 and the Statewide Transportation Improvement Program (STIP) FY 2009-FY 2014 for regional air quality. The US 301 project is identified in the Wilmington Area Planning Council's (WILMAPCO's) current 2040 Regional Transportation Plan Update (October 2010) for in-service 2017 and in WILMAPCO's FY 2012-2015 TIP approved March 2011 amended September 2011. There would be no substantial change in local air quality impacts due to the Design Refinements. No additional analysis is warranted at this time.

Commitments Monitoring

A compensatory mitigation package was proposed in the 2008 ROD that included wetlands mitigation, reforestation, riparian buffer enhancement, and other features. DelDOT remains firmly committed to all of the elements of the environmental mitigation package as well as to the additional commitments to the public included in the ROD (ROD Attachments A and B, included in **Appendix B**). Based upon the adoption of all of the proposed changes, all of the elements of the mitigation package will continue to fulfill the requirements for mitigation of resource impacts.

The commitments made by DelDOT during the planning process are being tracked to assure that each is followed through. In two instances, however, the ROD commitments would not be met exactly as presented – at the Hyetts Corner Road overpass of new US 301 and limiting construction to daylight hours.

ROD Commitment C-8 that would have crossroads remain open to traffic during overpass construction was made during the planning process. The design team has identified substantial

benefits to closing Hyetts Corner Road during construction, and would provide a detour route and local access through the improvement of Jamison Corner Road, Hyetts Corner Road and Road 412A prior to the closure. Refer to ***Figure 12*** and the discussion of Design Refinement 4 on pages 42 through 46 of this Report. Closing Hyetts Corner Road during construction of the overpass and modification of the Hyetts Corner Road bridge over Scott Run will allow the minimization of impacts to Scott Run and its associated wetlands that are identified as potential bog turtle habitat. The closure allows the contractor to safely use Hyetts Corner Road as an efficient construction haul road and eliminates the need to build and maintain a temporary road crossing of this sensitive waterway/wetland habitat. Closing Hyetts Corner Road during US 301 construction will facilitate: 1) the removal of culverts carrying Scott Run under Hyetts Corner Road, which currently provides an undesirable restriction to Scott Run, 2.) the construction of the US 301 structures over Scott Run and 3.) the construction of the Hyetts Corner Road Bridges over Scott Run and US 301. Closing Hyetts Corner Road will improve safety by avoiding the mixing of public and construction vehicles, will reduce construction time by 15 months, reduce construction costs and reduce project financing costs by approximately $20 million. DelDOT has committed to widening Jamison Corner Road and Hyetts Corner Road west of the high school, along with improvements to Road 412A to provide an alternate detour route prior to closing Hyetts Corner Road. During the construction of the Jamison Corner Road interchange, a temporary runaround road will be provided for traffic along Jamison Corner Road that will accommodate buses as well as automobiles.

Commitment C-38 was made to limit construction activities to weekday daylight hours in accordance with local ordinances. In order to minimize impacts to traffic and ensure the safety of motorists, some activities, such as the installation of overhead beams across high-volume roadways, are designed to take place at night. DelDOT will coordinate with the public to provide adequate and appropriate notices of such events.

Throughout the US 301 planning and design process, mitigation commitments and design have been discussed during meetings and field views with the resource and regulatory agencies. The following presents an update to the status of the mitigation efforts and other commitments.

INDIVIDUAL DESIGN REFINEMENTS

Eleven of the design refinements and the results of the US 301 Spur Road studies were presented at the Public Workshop on March 23, 2009 and all 16 refinements were presented at the September 6, 2011 Public Workshop. The following identifies the 16 design refinements by Design Section, the advantages and disadvantages of each relative to the ROD Selected Alternative, and the identification of resource impact changes associated with each refinement. Agency comments and public input to date, regarding each refinement, is followed by a discussion of including the refinement in the final design. Further information about DelDOT's coordination with the various resource and regulatory agencies is discussed in the Agency Coordination section of this Report. **Appendix H** contains the minutes, handouts, presentations and other information from each of the US 301 agency meetings held since the 2008 ROD. ***Table 10*** lists, in north to south order by design section, the refinements that have been developed for the US 301 project.

Table 10: Design Refinements

Design Section	Refinement
All Sections	(1) Narrow Median Width to 54 Feet
1	(2) Design of Bridges over Scott Run and Scott Run Tributary at SR 1 Interchange (3) Relocation of US 13 to Northbound SR 1 Toll-Free Ramp to the South at Port Penn Road (4) Hyetts Corner Road Closure during Construction of US 301 Bridges over Scott Run and Hyetts Corner Road Bridges over Scott Run and US 301 (5) Jamison Corner Road Interchange Roundabouts (6) US 301 Bridges over Drawyer Creek Tributary
2	(7) Reconfigure the New US 301/Existing US 301 Interchange (8) Northbound US 301 to the Northbound Spur Road Right Side Exit, rather than Median Exit (9) Levels Road Interchange Shift 125 Feet to the South to Minimize Impacts (also Section 3)
3	(10) Levels Road South-Serving Ramps and Toll Plaza Ramps Operational Improvements (11) Strawberry Lane Local Connector to Existing US 301 (12) Eastward Shift of US 301 Mainline at the State Line
4	(13) SR 896/Bethel Church Road Interchange (14) Spur Road Alignment Refinements to Minimize Impacts (15) Churchtown Road Overpass of Spur Road/Tidewater Utilities Access
1,2,4	(16) Emergency Access Ramps for Incident Management

All Sections

Design Refinement 1 – Narrow Median Width to 54 Feet

Narrowing of the proposed median width to 54 feet is common to all design sections. The refinement would narrow the US 301 mainline median from 66 feet and the US 301 Spur Road median from 62 feet. Changes in impacts associated with this narrowing are minor and are not individually detailed. The agencies approved this refinement. There were no public comments at the March 23, 2009 workshop opposing this change, and it has been incorporated into the project design.

Section 1: US 301-Mainline, East of Norfolk Southern Railroad to SR 1, South of the C&D Canal

Refinements for Design Section 1 of the US 301 Mainline include:

(2) Design of Bridges over Scott Run and Scott Run Tributary at SR 1 Interchange;
(3) Shift of US 13 to Northbound SR 1 Toll-Free Ramp to the South at Port Penn Road;
(4) Hyetts Corner Road Closure during Construction of US 301 Bridges over Scott Run and the Hyetts Corner Road Bridges over Scott Run and US 301;
(5) Jamison Corner Road Interchange Roundabouts; and
(6) US 301 Bridges over Drawyer Creek Tributary.

Table 11 presents a summary of the changes in impacts to resources. The design refinements and advancement in the design of section 1 has resulted in increased impacts to wetlands (+2.0 acres), waters of the US (+651 linear feet), floodplains (+0.2 acres), prime farmland soils (+13.6 acres), and hydric soils (+27.1 acres). The refined design has resulted in decreased impacts to upland forest (-0.1 acre).

Table 11. Comparison of Resource Impacts for Design Section 1

Resource	2008 ROD with Updated 2011 Features	Design Refinements	Difference
Wetlands (acres)	11.7	13.7	2.0
Wetlands (No.)	11	14	3
DNREC Tidal Wetlands (acres)[1]	0.01	0.01	0
Waters of the US (linear feet)	3,349	4,000.6	651.3
100-Year Floodplain (acres)	0.7	1.14	0.2
Agricultural Districts (number/acres)	0/0	0/0	0
Agricultural Easements (number/acres)	0/0	0/0	0
Prime Farmland Soils (acres)	49.5	68.55	13.6
Hydric Soils (acres)	37.5	69.06	27.1
Upland Forested Land (acres)	12.7	14.06	-0.1
Total Area Limit of Disturbance (acres)[2]	257.3	514.5	257.2
Total Roadway Area (acres)	257.3	318.9	61.6
Total Roadway Supporting Area (acres)	--	195.6	195.6

[1] *DNREC tidal wetlands are included in the total wetlands acres.*
[2] *Increase in total limit of disturbance for the refined design is due to the inclusion of staging/stockpile areas (landlocked parcels), borrow sites and the Pleasanton mitigation site.*

The total area of Design Section 1 LOD, 514.5 acres, has approximately doubled in size from 257.3 acres in the ROD alignment, adding 257.2 acres to the limit of construction. This increase results from changes due to the individual design refinements (61.6 acres) and the inclusion of 195.6 acres of roadway supporting areas in the calculation for the Refined Design (refer to ***Figure 8***). The roadway supporting areas include three landlocked parcels to be used for stockpile or staging areas (27.7 acres), eight landlocked parcels to be used for borrow totaling 136.0 acres, and 31.9 acres for the Pleasanton mitigation site.

Design Refinement 2 – Design of Bridges over Scott Run and Scott Run Tributary at SR 1 Interchange

The directional ramp between US 301 and SR 1, just north of the Biddles Toll Plaza, and the northbound flyover ramp bridge (Bridge 1-2) would be modified to accommodate southbound SR 1 widening over Scott Run (Bridge 1-1S). These modifications would include extensions to existing abutments and piers on SR 1 and adjusting the locations of abutments for the flyover ramp and retaining walls. ***Figure 9A***, excerpted from the Section 1 Roll Plan displayed at the September 6, 2011 Public Workshop, shows the refined bridges.

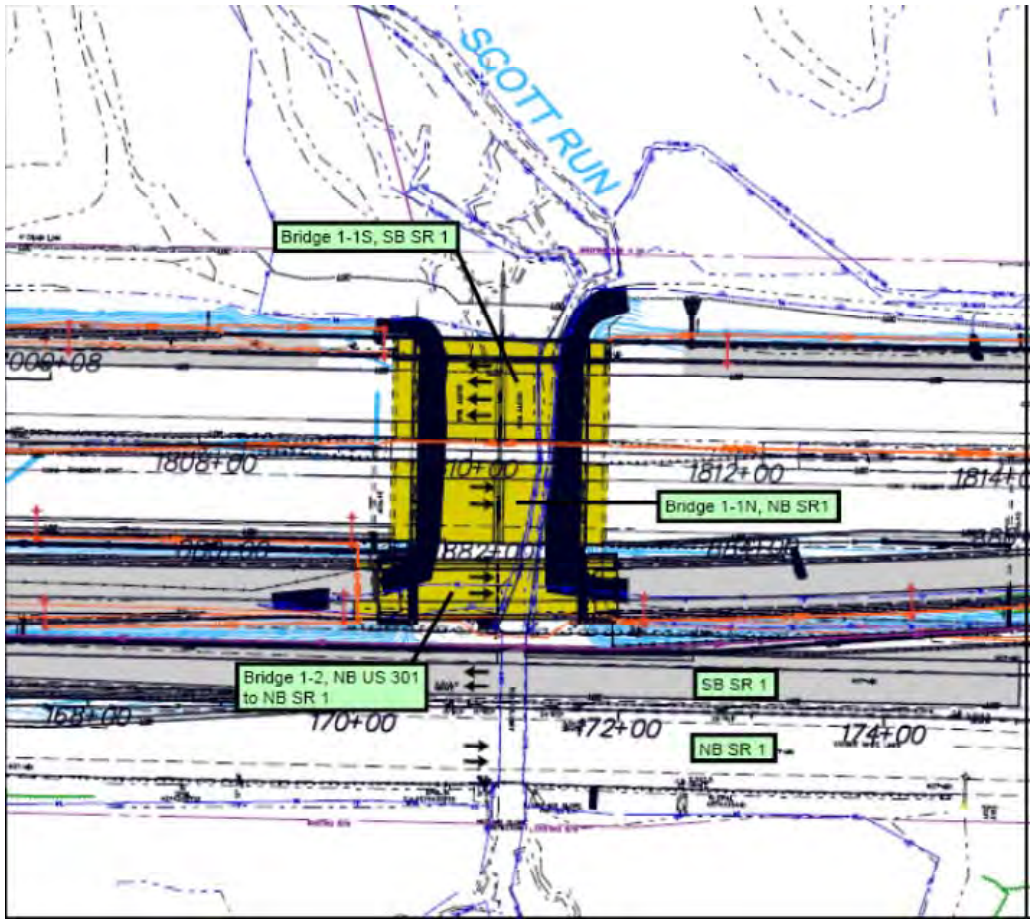

Figure 9A: Design Refinement 2- Modification of Bridges 1-1S and Bridge 1-2

The design of Bridges 1-4N and 1-4S that would carry new US 301 over a tributary of Scott Run south of the SR 1 Interchange (***Figure 9B,*** following page) would be refined, based on agency comments during the March 5, 2009 field visit that an arch culvert could be considered at this location, as the wetlands are low quality and provide poor habitat. The bridges would be replaced with an arch culvert that would carry both the northbound and southbound lanes of US 301 over the stream, with abutments located within the wetland boundaries. ***Figure 9B*** can be seen as a full sized figure in the Agency Meeting information from the March 5, 2009, September 15, 2009 and July 7, 2009 meetings in **Appendix H**.

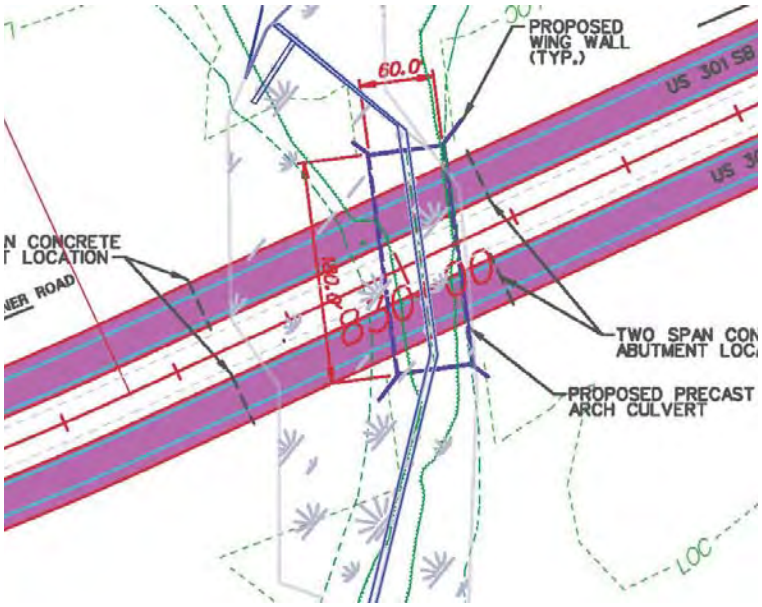

Figure 9B: Design Refinement 2– Modification of Bridges 1-4N and 1-4S

Advantages/Disadvantages and Impacts

The US 301 northbound flyover ramp to SR 1 northbound bridge over Scott Run (Bridge 1-2) would be modified to further minimize disturbance to the wetlands. Although abutments associated with Bridges 1-4N and 1-4S (over a tributary of Scott Run) would be located within the wetland boundaries, there would be no direct impacts to the stream. As noted during the March 5, 2009 resource agency field review, the wetlands in this location are not considered bog turtle habitat and are considered poor habitat for reptiles and amphibians.

The refinements, including temporary construction easements and borrow sites (landlocked parcels) as shown on ***Figure 4***, have decreased impacts to streams (-172.3 linear feet) and subaqueous lands (-172.3 linear feet), The refinements would increase impacts to wetlands by 1.1 acres, forests by 0.3 acres, prime farmland soils by 8.5 acres, and hydric soils by 3.3 acres. This design refinement would construct bridges over 1.14 acres of the 100-year floodplain associated with Scott Run at the SR1 and US 301 ramps. The total limit of disturbance would increase by 63.7 acres, largely due to the potential Scott Run and St. Georges borrow sites (48.7 acres), located in this general area but not the result of this design refinement, being included within the calculation. An expanded matrix of impacts for this Design Refinement is included in **Appendix A**.

Agency Coordination, Public Input and Decision

The proposed engineering modifications for the flyover ramp (Bridge 1-2) and southbound SR 1 widening (Bridge 1-1S) were initiated by the agencies in an effort to lower stream impacts at this location. The designs were presented during the February 19, 2009 Interagency Meeting and reviewed during the March 5, 2009 field visit and at the March 26, 2009 and September 15, 2009 agency meetings. The design refinements for Bridges 1-4N and 1-4S, which also resulted from agency efforts to reduce impacts to streams, were presented to and discussed with the agencies during the March 5, 2009 and July 7, 2009 field reviews and during the September 15, 2009 agency meeting.

Figure 10: Design Refinement 3- Relocation of US 13 to NB SR 1 Toll-Free Ramp at Port Penn Road

During the September 15, 2009 agency meeting, the refinements were recommended by DelDOT for inclusion into the project design. The agencies raised no objections to their inclusion, and, therefore, the refinements are included in the Refined Design.

These bridge refinements were presented to the public at the workshop held September 6, 2011 as part of the "plans available" review. There were no public comments objecting to the refinements to these structures.

Design Refinement 3 – Shift of US 13 to Northbound SR 1 Toll-Free Ramp to the South at Port Penn Road

DelDOT would relocate the existing toll-free ramp (from US 13 to northbound SR 1) 4,600 feet to the south of the ROD design to intersect US 13 at the existing Port Penn Road intersection. ***Figure 10*** shows the current alignment for this refinement.

This relocation would provide for a single, consolidated signalized intersection with Port Penn Road and US 13. The toll-free ramp movement will remain a single lane. A new ramp access storage lane would be constructed in the median of US 13, south of the intersection, to accommodate northbound US 13 vehicles wishing to access northbound SR 1. A portion of the ramp lane would be curb-separated from northbound US 13 through traffic. The installation of a curb would eliminate traffic cutting in and out of the queue, increasing safety for waiting vehicles, but allow access for emergency vehicles in case of incidents. Additional improvements would include widening US 13 in both directions to provide left turn lanes at the intersection.

<u>Advantages/Disadvantages and Impacts</u>
This refinement would improve traffic operations and safety for motorists using the toll-free ramp from US 13 to northbound SR 1 and would increase visibility for traffic entering US 13 from Port Penn Road by providing a 90-degree intersection. Because the length of the ramp is increased, vehicle speeds on the toll-free ramp would be closer to US 301 flyover ramp speeds at the end of the toll-free ramp, and the single-lane ramp would facilitate traffic merging into the US 301 ramp. Northbound traffic on US 13 waiting to enter the toll-free ramp at the signalized intersection would have improved storage in the left-turn lane, and traffic from Port Penn Road

wishing to enter the toll-free ramp would have direct access at the new intersection with the toll-free ramp entrance. A single traffic signal is expected to decrease overall delay.

The disadvantages would be an increased LOD of 33.7 acres, increased right-of-way requirements of 5.7 acres, and a new traffic signal that would be added on US 13 to control the intersection. There would also be increased resource impacts to wetlands (+0.1 acre), ditches (+151.6 linear feet), subaqueous lands (+151.6 linear feet), hydric soils (6.3 acres) and prime farmland soils (4.6 acres), and forest (0.7 acre). The impacted wetlands, ditches, and trees are located mainly in the area between SR 1 and US 13, north of the Biddles Toll Plaza.

Agency Coordination, Public Input and Decision

The initial refinement, as presented at the March 23, 2009 Public Workshop, was presented to the agencies at the February 19, 2009 meeting (see figure in **Appendix H** on page 25 of the Agency Meeting PowerPoint). The initial refinement proposed a four-way intersection with a relocated Port Penn Road approximately 1,150 feet south of the ROD location. Most of the public comments favored the relocation of the toll-free ramp and Port Penn Road to a single, signalized intersection with US 13. One comment suggested a flyover ramp between northbound US 13 and the northbound toll-free ramp, and one suggested DelDOT barrier-separate the turning lane to the ramp from US 13 to prevent weaving. The public clearly favored the single intersection. Further traffic studies indicated that the modification would result in backups on northbound US 13 that would extend through the Port Penn Road intersection. Consultation with the SHPO indicated that the relocation of Port Penn Road may affect additional historic resources, resulting in an expanded APE to the east of US 13.

A second modification, which provided a single intersection at the existing US 13/Port Penn Road intersection, displayed in ***Figure 10*** and shown on the additional PowerPoint information slides 40-41 in the September 19, 2011 Agency Meeting in **Appendix H**, was proposed at the June 9, 2011 Interagency Meeting, presented at the September 6, 2011, Public Workshop, and reviewed at the September 19, 2011 Agency Meeting. Two public comments received at the September 6, 2011 Workshop were concerned with the relocated toll-free access road: one favored the four-way intersection plan, and one opined that the new location to the south might increase traffic on St. Georges Bridge (US 13). The advantages of this refined design and a comparison of impacts as compared to the initial refinement was discussed at the June 19, 2011 Agency meeting. Consultation with the SHPO resulted in concurrence that the current modification would not have an effect on two additional historic resources within the expanded APE. Information regarding this consultation is included in **Appendix C**. At the September 19, 2011 meeting, the agencies did not object to the second modification, and DelDOT has included the refinement into the project design.

Design Refinement 4 – Hyetts Corner Road Closure during Construction of the US 301 Bridges over Scott Run and the Hyetts Corner Road Bridges over Scott Run and US 301

Refinements have been proposed for the design of the existing Hyetts Corner Road bridge over Scott Run (Bridge 1-6), the new US 301 bridges over Scott Run (Bridges 1-7N and 1-7S) in the vicinity of Hyetts Corner Road, and the design of the Hyetts Corner Road overpass of US 301 (Bridge 1-5). The Scott Run bridge refinements are shown in ***Figure 11***, excerpted from the Section 1 Roll Plan displayed at the September 6, 2011 Public Workshop.

The Hyetts Corner Road and US 301 bridges over Scott Run were evaluated to determine optimal placements of piers and abutments as well as to determine the optimal type of bridges or culverts that would minimize impacts to Scott Run and the surrounding wetlands.

The Hyetts Corner Road bridge over Scott Run (Bridge 1-6) is proposed to be reconstructed in the exact location of the present roadway, thus requiring the closure of Hyetts Corner Road during construction. Although there is a ROD commitment to keep the roadway open, DelDOT proposes the closure to enhance safety, reduce environmental impacts, facilitate timely construction, and reduce costs.

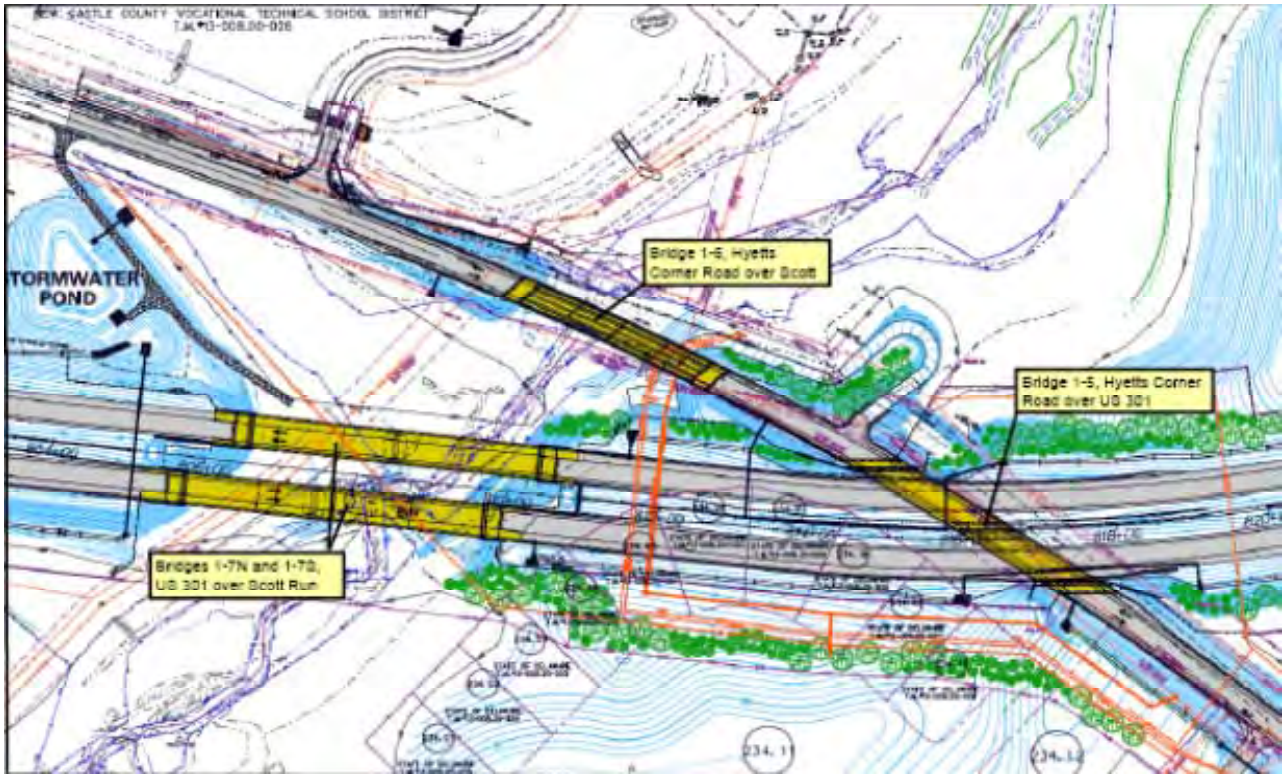

Figure 11: Design Refinement 4- Modification of Bridges 1-5, Hyetts Corner Road over US 301, and Bridges 1-6 and 1-7, Hyetts Corner Road and US 301 over Scott Run

Advantages/Disadvantages and Impacts

Closing Hyetts Corner Road during construction would eliminate the need to construct a temporary haul road through the wetlands associated with Scott Run, avoiding substantial impacts to this important habitat area. Creating and maintaining a temporary road through the wetland, which is opposed by the resource agencies, would not only cause temporary damage, but could cause permanent damage to the wetland system. Hyetts Corner Road is a critical component of US 301 mainline construction and would be used for a major earth hauling effort, which includes having a continual stream of off-road large haul vehicles carry approximately 740,000 cubic yards (CY) of material from borrow sites on the east side of Scott Run to the west side.

The disadvantage to this refinement is that users of Hyetts Corner Road would be required to detour around the closure for the duration of construction, about three years. DelDOT is committed to providing improvements to Jamison Corner Road, Road 412A, and a section of Hyetts Corner Road between Jamison Corner Road and St. Georges Technical High School, to provide a suitable detour route for school buses and the public, prior to closing Hyetts Corner Road. ***Figure 12*** shows the proposed detour route. Emergency response officials did not express objection to the proposed detour route.

Closing Hyetts Corner Road to passenger traffic would eliminate safety conflicts between construction vehicles and passenger vehicles, reduce construction costs, reduce construction time by approximately 15 months and reduce project financing costs (capitalized interest) by approximately $20 million.

Regardless of the haul route, closing Hyetts Corner Road would be necessary to construct the Hyetts Corner Road overpass embankments, retaining walls, and bridges over Scott Run and the new US 301 Mainline. Concurrent construction would provide expedited construction times.

As there is anticipated to be considerable construction disturbance of the area surrounding the stream and embankments during construction, wetland and stream channel restoration is proposed for this area. The existing culvert under Hyetts Corner Road has affected the stream's location, and DelDOT would replace the culvert with a bridge and restore the channel to a more natural location (stream restoration of Scott Run is part of the mitigation package). Extensive channel reconstruction is anticipated, and, during the March 9, 2009 field review, the agencies expressed a desire to remove an old upstream dam during the restoration to open up the valley floor and floodplain.

The refinement of the design of the Hyetts Corner Road bridge over Scott Run (Bridge 1-6) and the new US 301 bridges over Scott Run (Bridges 1-7N and 1-7S) would minimize the increase in impacts to wetlands to 0.6 acre and to streams to 412.2 linear feet; increase impacts to hydric soils (+0.95 acre) and forest (+0.55 acre); and reduce impacts to prime farmland soils (-0.5 acre). The total limit of disturbance would increase by 28.1 acres, largely due to a portion of the potential Scott Run borrow site and the staging area south of US 301, which are located in this general area but not the result of this design refinement, being included in this calculation. The design refinement itself (not including the roadway supporting areas) would result in an increase in the total limit of disturbance of 4.56 acres.

<u>Agency Coordination, Public Input and Decision</u>
This refinement was not presented at the March 23, 2009 workshop. The agencies were first apprised of the benefits of closing Hyetts Corner Road during the February 19, 2009 agency meeting. Closure was again discussed during the field review on March 5, 2009. Elements of the bridge refinements and the stream restoration project were discussed at agency meetings on March 26, 2009, July 7, 2009, June 24, 2010, and June 9, 2011. The agencies concurred/did not object to the inclusion of this design refinement at the September 19, 2011 agency meeting.

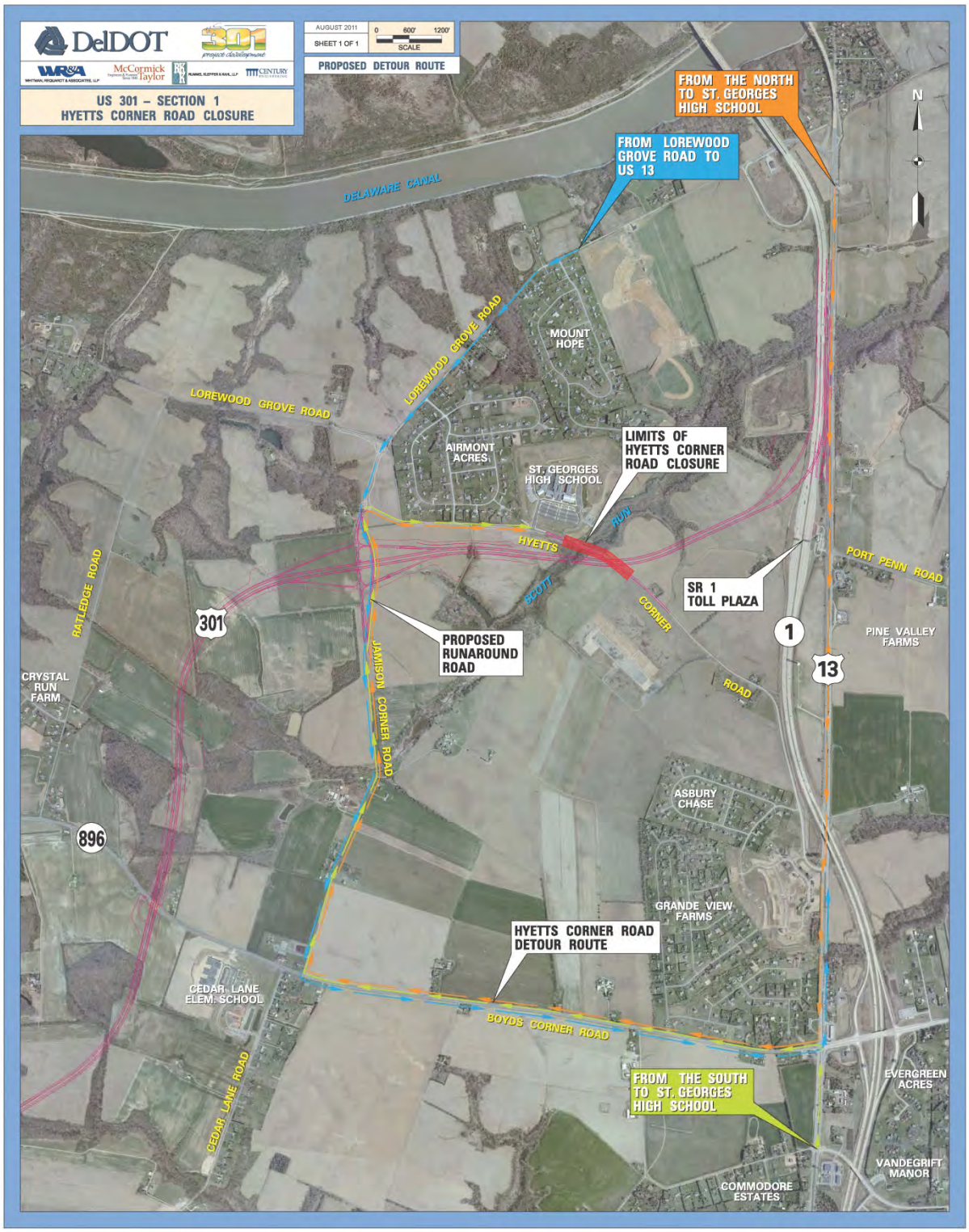

Figure 12: Proposed Hyetts Corner Road Detour Route

This refinement was presented at the Airmont/Mount Hope pre-workshop community meeting as well as to the public at the September 6, 2011 Public Workshop. Citizens at the Airmont/Mount Hope community meeting raised concerns about potential additional neighborhood cut-through traffic while the detour is in place, and requested that the duration of the detour be minimized. The same comment was received during the Public Workshop. DelDOT is continuing to work with the community to address this issue. The residents of the community have been provided ballots. Assuming 2/3 of the responding residents vote "yes," DelDOT will take appropriate action, coordinated with emergency management services providers, to close Airmont Drive at Hyetts Corner Road during US 301 construction in the area.

Design Refinement 5 – Jamison Corner Road Interchange Roundabouts

At the proposed diamond interchange at Jamison Corner Road, the ROD proposed stop-controlled intersections would be replaced with roundabouts (see ***Figure 13***). A larger figure showing the roundabouts and the Jamison Corner Road interchange may be found in **Appendix H** on page 21 of the PowerPoint of the February 19, 2009 Agency Meeting.

Advantages/Disadvantages and Impacts

Including roundabouts rather than stop-controlled intersections would provide several advantages including providing continuous flow of traffic at the ramp intersections and reducing delays to the traveling public. The design would reduce the width of the proposed Jamison Corner Road bridge over US 301, thus reducing costs; easily accommodate traffic growth as surrounding parcels are developed; improve safety through reduced speeds and the elimination of left turn and right angle conflicts; and be more convenient for drivers during off-peak hours. The interchange would be designed to accommodate future widening of Jamison Corner Road from new US 301 to north of Boyds Corner Road (a separate DelDOT project that would include bicycle lanes that would be part of Delaware Greenways; see http://www.delawaregreenways.org/index.html). The refined design with roundabouts would increase the LOD by 5.2 acres and result in impacts to an additional 0.2 acre of prime farmland soil; forest impacts would decrease by -0.06 acre.

Agency Coordination, Public Input and Decision

This refinement was first presented at the February 19, 2009 agency meeting and presented to the public at the March 23, 2009 Workshop. The design was reviewed again and recommended by DelDOT to be included in the Refined Design at the March 26, 2009 agency meeting. In their August 9, 2009 letter to the US 301 project stakeholders (included in **Appendix F**), DelDOT advised the public that this refinement would be incorporated into the final design for the new US 301. At the September 15, 2009 agency meeting, the agencies reiterated their acceptance of this refinement. The refinement is included in the Refined Design. There were no comments received from the public during the March 2009 or September 2011 Public Workshops objecting to the design of roundabouts for the Jamison Corner Road Interchange.

Figure 13: Design Refinement 5- Jamison Corner Road Interchange Refinements

Design Refinement 6 – US 301 Bridges over Drawyer Creek

The proposed design of US 301 northbound and southbound bridges over Drawyer Creek (Bridges 1-10N and 1-10S) between the Norfolk Southern Railroad and SR 896 (Boyds Corner Road) would be refined to minimize impacts. ***Figure 14*** shows the refinement; a full-size figure showing the potential bridge alignments is included in the March 5, 2009 Agency Meeting information in **Appendix H**. The bridges would be modified to provide two single span bridges over Drawyer Creek, eliminating the center pier from within the stream. The location of the bridges would be shifted slightly south to cross the narrowest point of the wetland, and bridge abutments would then be shifted to the outside edges of the wetland.

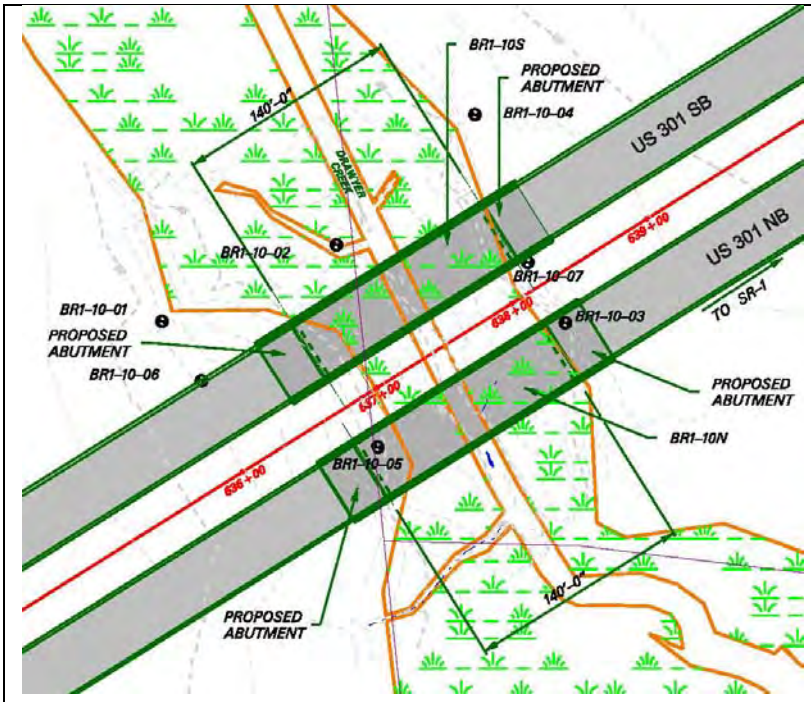

Figure 14: Design Refinement 6-
Modification of Bridges 1-10N and 1-10S

Advantages/Disadvantages and Impacts

By modifying the design to single span bridges, the qualitative impact to Drawyer Creek is minimized, and impacts to the surrounding wetlands are located at the edge of the wetlands where the quality of the wetland is lower. The refined design avoids impacts to a seep, but increases the LOD by 0.6 acre. There would also be increases in impacts to wetlands (+0.1 acre), streams (+30.0 linear feet), subaqueous lands (+30.0 linear feet), hydric soils (+0.6 acre), and forest (+0.28 acre).

Agency Coordination, Public Input and Decision

Design changes to the bridges were requested by the agencies and presented by the SDC at the March 5, 2009 agency meeting and field review. This refinement was field reviewed again on July 7, 2009, and discussed at the August 25, 2009 agency meeting. DelDOT requested and received concurrence for inclusion in the project design at the September 15, 2009 agency meeting. DelDOT has included the refinements to the US 301 Mainline bridges over Drawyer Creek in the Refined Design. This design refinement was presented at the September 6, 2011 Public Workshop as part of the "plans available" review for Design Section 1. No public objections to this refinement were received.

Section 2: US 301 Mainline, Levels Road to East of Norfolk Southern Railroad

Design refinements included in Section 2 of the US 301 Mainline include:

(7) Reconfigure the New US 301/Existing US 301 Interchange;
(8) Northbound US 301 Exit to the Northbound Spur Road, Right Side Exit rather than Median Side;
(9) Levels Road Interchange Shift 125 Feet to the South to Minimize Impacts (also Section 3).

The details of the changes in impacts associated with the design refinements in Section 2 are shown in ***Table 12***. The refined design would result in decreases in impacts to wetlands (-0.1 acres) and hydric soils (-0.5 acres), but would increase in impacts to waters of the U.S. (+634 linear feet), prime farmland soils (+59.4 acres) and upland forest (+1.0 acre).

Table 12. Comparison of Resource Impacts for Design Section 2

Resource	2008 ROD with Updated 2011 Features	Design Refinements	Difference
Wetlands (acres)	10.4	10.3	-0.1
Wetlands (No.)	9	13	4
Waters of the US (linear feet)	2,515	3,149.6	634.1
100-Year Floodplain (acres)	0	0	0
Agricultural Districts (number/acres)	0/0	0/0	0
Agricultural Easements (number/acres)	0/0	0/0	0
Prime Farmland Soils (acres)	124.5	183.8	59.4
Hydric Soils (acres)	39.1	38.6	-0.5
Upland Forested Land (acres)	10.7	11.7	1.0
Total Area Limit of Disturbance (LOD) (acres)*	238.4	310.6	72.2
Total Roadway Areas (acres)	238.4	266.8	28.4
Total Roadway Supporting Areas (acres)	--	43.8	43.8

** Increase in total limit of disturbance for the refined design is due to the inclusion of stockpile/staging sites and a portion of the Levels mitigation site.*

The total area within the LOD, 310.6 acres, has increased by 72.2 acres over the 2008 ROD alignment LOC (238.4 acres). The 72.2-acre increase in the Refined Design would result from changes in individual refinements (28.4 acres) and the addition of 43.8 acres of roadway supporting areas. The roadway supporting areas include eight stockpile/staging areas (TCEs totaling 15.2 acres) and 28.6 acres of the 103.7 acres purchased for the Levels Road mitigation site. Refer to ***Table 7*** and the discussion about LOD/LOC on pages 26 through 29.

Design Refinement 7 – Reconfigure the New US 301/Existing US 301 Interchange

DelDOT would replace the ROD-proposed partial split cloverleaf interchange configuration at new US 301/existing US 301, north of Armstrong Corner Road, with a diamond interchange configuration with roundabouts (referred to as East Diamond). ***Figure 15*** shows the proposed refined interchange (East Diamond – green) and the ROD (partial split cloverleaf – red). The figure may also be found in **Appendix H** in the PowerPoint of the August 25, 2009 FHWA Briefing (page 7) and the September 15, 2009 Agency Meeting (page 10). Refinements would also be made to the improvements along Summit Bridge Road to facilitate turning movements at the ramp

intersection with Summit Bridge Road and at the intersection of Armstrong Corner Road, Marl Pit Road, and Summit Bridge Road.

Advantages/Disadvantages and Impacts

The diamond interchange configuration is more familiar to motorists than the split partial cloverleaf configuration proposed in the ROD. By replacing the ROD design with the east diamond interchange, this design refinement would provide a single point of access with existing US 301 (Summit Bridge Road), improve the geometry of the US 301 bridges over existing US 301 and the NSRR, provide tangent sections along on- and off-ramps to facilitate tolling operations, and separate the interchange ramp movements from intersecting with existing US 301.

Including roundabouts in the interchange design at the ramp intersections would have several advantages over signal-controlled or stop-controlled intersections (as described previously for the Jamison Corner Road Interchange). Roundabouts would provide full movements, including U-turns; would easily accommodate traffic should parcels to the west be developed; would reduce speeds and eliminate left turn and right angle conflicts, thus improving safety; would be more flexible for traffic growth; would be more convenient for drivers during off-peak hours; and would not require signal maintenance. Although roundabouts have these advantages, there is a mixed perception/acceptance among motorists and they are more circuitous for some movements.

The East Diamond interchange configuration would reduce impacts to wetlands (-0.08 acre), streams (-282.9 linear feet), and subaqueous lands (-741.0 linear feet); however, there would be increased impacts to ditches (+700.7 linear feet), hydric soils (+0.9 acre), prime farmland soil (+12.8 acres) and forest (+0.6 acre). The East Diamond configuration cost would be similar to that of the ROD interchange. The refinement would continue to impact (visual) the Middletown Baptist Church and the historic Armstrong-Walker House.

- Middletown Baptist Church: The distance between the entrance ramp to southbound US 301 and the Middletown Baptist Church would be reduced, although the distance from the Middletown Baptist Church to the US 301 mainline lanes would be the same as the 2008 ROD alignment.
- Armstrong-Walker House: The East Diamond interchange would continue to adversely affect the historic Armstrong-Walker House visually. As measured for the determination of adverse effects report (*Documentation in Support of a Finding of Adverse Effect and Memorandum of Agreement,* 2007), there would be no change in the distance between the historic resource and the US 301 Mainline at its closest point. The elevation of new US 301 over Armstrong Corner Road would be less than 0.5 foot higher than the ROD design and at the same distance for the East Diamond. Although the differences between the ROD interchange design and the revised East Diamond design would not be noticeable, roadway widening improvements along existing US 301 will occur in front of the Armstrong-Walker House. Visual changes along existing US 301 would not cause an adverse effect, as widening in this location would occur along the east side of the roadway. Noise levels were reanalyzed, and the predicted future (2030) noise levels for Armstrong-Walker House remain the same at 66 dBA.

Figure 15: Design Refinement 7- East Diamond Alternative Interchange

The East Diamond interchange (agreed upon as a result of discussions detailed below) would increase the limit of disturbance by 22.3 acres. The increase in LOD would be due to the addition of two staging/stockpile areas (4.5 acres and 1.0 acres) and extended roadway widening along existing US 301 to accommodate added turn lanes and traffic lanes approaching the new intersection with existing US 301.

Agency Coordination, Public Input and Decision

The diamond interchange was first presented to the agencies at the December 2, 2008 meeting and presented to the public at the March 23, 2009 Workshop. In their August 9, 2009 letter to the US 301 project stakeholders (included in **Appendix F**), DelDOT advised the public that a refined interchange alignment would be incorporated into the final design for the new US 301. Following the Workshop, the East Diamond Interchange alignment (a version of the Public Workshop Diamond refined as a result of comments from the public) was presented to the agencies at the August 25, 2009 and September 15, 2009 meetings. At the latter meeting, DelDOT recommended the East Diamond for inclusion in the Refined Design; the agencies did not object.

There were two public comments received regarding the new interchange configuration from the Pastor, Edward Lasko, and a member of the Middletown Baptist Church. Both noted the potential for greater pollution and higher noise levels that would be borne by the church due to the refinement's moving the US 301 mainline closer to the church property, greater height and visual intrusion of the diamond interchange and impairment of the Church's intended mission for their adjoining property. DelDOT responded to the comments through a series of consultations with Pastor Lasko, elected officials and the agencies. Because of the operational advantages of the diamond interchange alignment over the split cloverleaf design shown in the ROD, DelDOT met with the section designers to develop a diamond design that would minimize impacts to the church and church property. The Public Workshop diamond interchange (called the West Diamond) was refined by moving it to the east. DelDOT met with Pastor Lasko on several occasions and provided concept drawings with elevation, right-of-way and distance calculations as well as noise data comparing the original ROD design with the West Diamond and East Diamond interchanges. ***Table 13*** provides a summary of the differences among the three interchange configurations.

Table 13. Comparison of the ROD, West Diamond and East Diamond Interchanges

New/Existing US 301 Interchange	**2008 ROD Interchange**		**Proposed West Diamond Interchange**		**Proposed East Diamond Interchange**	
Distance from church to nearest edge of pavement (ft.):						
Southeast corner (parking lot)	257		201		242	
Adjacent to church building	418		283		398	
Adjacent to conservation area	647		278		540	
Northeast corner of church property	800		378		646	
Elevation of closest roadway element (ft.):						
Southeast corner (parking lot)	30.2		33.8		Not	
Adjacent to church building	24.0		27.8		available	
Adjacent to conservation area	19.9		24.7			
Existing and Projected Noise (dBA):	Existing	Projected	Existing	Projected	Existing	Projected
Southeast corner (parking lot)	54	62	54	64	54	63
Adjacent to church building		60		62		61
Adjacent to conservation area	51	57	51	61	51	58

As ***Table 13*** shows, the East Diamond Interchange would be somewhat closer to the Middletown Baptist Church and church property than the split cloverleaf interchange presented in the ROD, but not as close as the West Diamond (Public Workshop) Interchange would be. There would be slightly higher future noise levels with the East Diamond Interchange than with the ROD design, but the difference (1 dBA) would not be perceptible. There would be no noise impacts (defined in accordance with DelDOT's July 13, 2011 noise policy as levels greater than 66 dBA or 12 dBA greater than existing with respect to noise sensitive areas) with the East Diamond Interchange. When the data were presented to Pastor Lasko, he agreed that the East Diamond would provide an acceptable alternative. In addition, DelDOT would provide planted landscaping screening that would help visually shield the church and church property from the East Diamond improvements.

As a result of the continued consultation between DelDOT, Pastor Lasko, the resource agencies and elected officials, the East Diamond Interchange was selected by DelDOT for inclusion in the Refined Design. The East Diamond Interchange was presented to the agencies at the September 15, 2009 agency meeting. There were no objections; therefore it was included in the Refined Design.

Design Refinement 8 – Northbound US 301 Mainline Exit to the Northbound Spur Road, Right Side rather than Median Side

The proposed left (median side) exit ramp from the northbound US 301 Mainline to the northbound US 301 Spur Road, as shown in the 2008 ROD, would be replaced with a more traditional right exit ramp. Figures showing the ROD left side exit ramp and the proposed right side exit ramp may be found in **Appendix H** in the PowerPoint of the September 15, 2009 Agency Meeting on page 7. ***Figure 16*** shows the refinement.

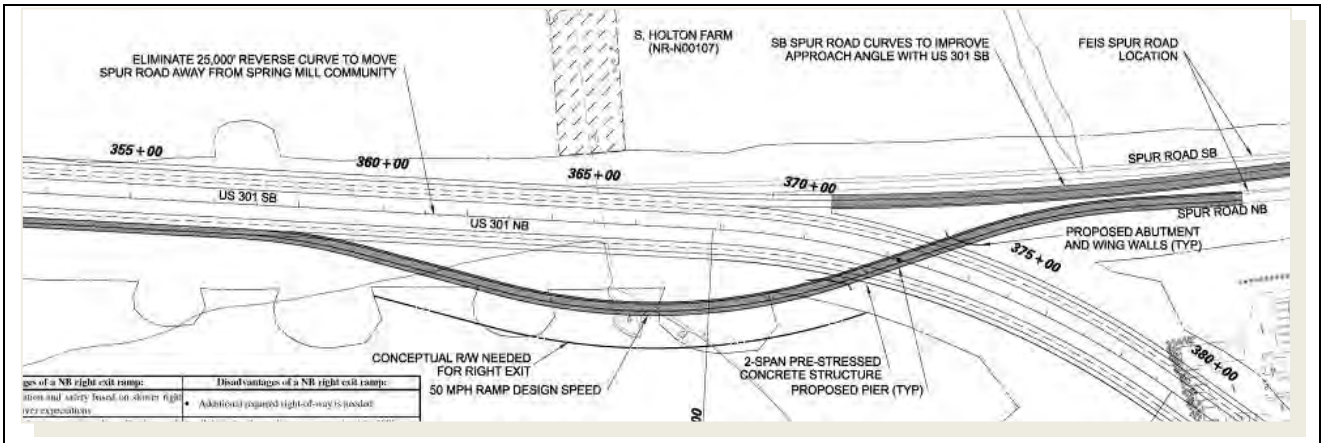

Figure 16: Design Refinement 8- Spur Road Right Exit Ramp

Advantages/Disadvantages/Impacts

The proposed right exit ramp would provide improved operation and safety based on slower right lane speeds and driver expectations. Design of the right exit and ramp over the US 301 mainline would be simplified as compared to the left exit (ROD option), with an improved skew and a shorter two-span structure (approximately 300 feet, reduced from approximately 700 feet for the left exit) that reduces construction costs and eliminates the need for extensive retaining walls. The resulting cost saving is estimated at $5.2 million. The right exit would require 9.19 acres of

additional right-of-way and would result in an increase in impacts to ditches (+48.6 linear feet), hydric soils (+0.4 acre), prime farmland soils (+9.0 acres) and forest (+1.1 acre). There would be a decrease in impacts to wetlands (-0.2 acre). The right exit ramp would be approximately 100 feet closer (1,700 feet for left exit versus 1,600 feet for right exit) to the Springmill Community, and approximately 100 feet further distant from the S. Holton Farm (N-0107). There will continue to be an adverse effect (visual and audible) to the S. Holton Farm. The US 301 Mainline is between the resource and the ramp to the Spur Road, and the distance from the US 301 Mainline would not change. The projected future (2030) noise at the S. Holton Farm would continue to be an increase of 12 dBA from the existing 46 dBA to 58 dBA.

Agency Coordination, Public Input and Decision

This refinement was initially presented to the agencies at the February 19, 2009 meeting and provided for public review at the March 23, 2009 Workshop. There was no public opposition to the proposed design refinement. DelDOT requested concurrence on inclusion of the refinement into the current design at the March 26, 2009 agency meeting. The agencies indicated preliminary agreement with the refinement. In their August 9, 2009 letter to the US 301 project stakeholders (included in **Appendix F**), DelDOT advised the public that this refinement would be incorporated into the final design for the new US 301. When discussed again at the September 15, 2009 agency meeting, the agencies requested that DelDOT attempt to further minimize the impacts to forest and high quality forested wetlands before continuing with final design. After further studies, DelDOT expressed concern that costs associated with further minimization would be substantial ($2.54M vs. $5.1M). At the agency meeting on May 25, 2010, DelDOT expressed a desire to maintain the right exit design and proposed mitigating the wetland impacts at the Levels Road site. Additional options to reduce wetland impacts were suggested by the agencies, such as relocating the stormwater management ponds by shifting them out of the forest, closer to the roadway, or between the ramp and Mainline. At the September 23, 2010 agency meeting, DelDOT provided a refined design that incorporated, to the extent practical, each of the agencies' suggestions. Discussions held at the September 23, 2010 meeting resulted in the agencies not objecting to incorporating this most recent design into the Refined Design.

Design Refinement 9 – Levels Road Interchange Shift 125 Feet to the South to Minimize Impacts (also Section 3)

The location of the Levels Road Interchange would be shifted approximately 125 feet south of the 2008 ROD location. Figures showing the bridges over Sandy Branch and the proposed temporary haul road may be found in the December 2, 2008 (PowerPoint, page 7) and the December 17, 2009 Agency Meetings information in **Appendix H**. ***Figure 17*** provides an overview of the interchange refinements. The Levels Road Interchange is constructed in both Design Section 2 (mainline and intersection ramps north of Levels Road) and Design Section 3 (Levels Road Extended and connecting mainline and ramps to the south).

The following ramps/bridges on the north side of the interchange would be refined:

- *Ramp C and Northbound Mainline over Tributary of Sandy Branch (Bridge 2-5N)* – the merge area where Ramp C and the northbound US 301 Mainline join would be shifted south, resulting in a narrower structure crossing the tributary to Sandy Branch. Due to the impacts associated with utilizing a single span structure, the bridge remains a two-span structure approximately 190 feet long.

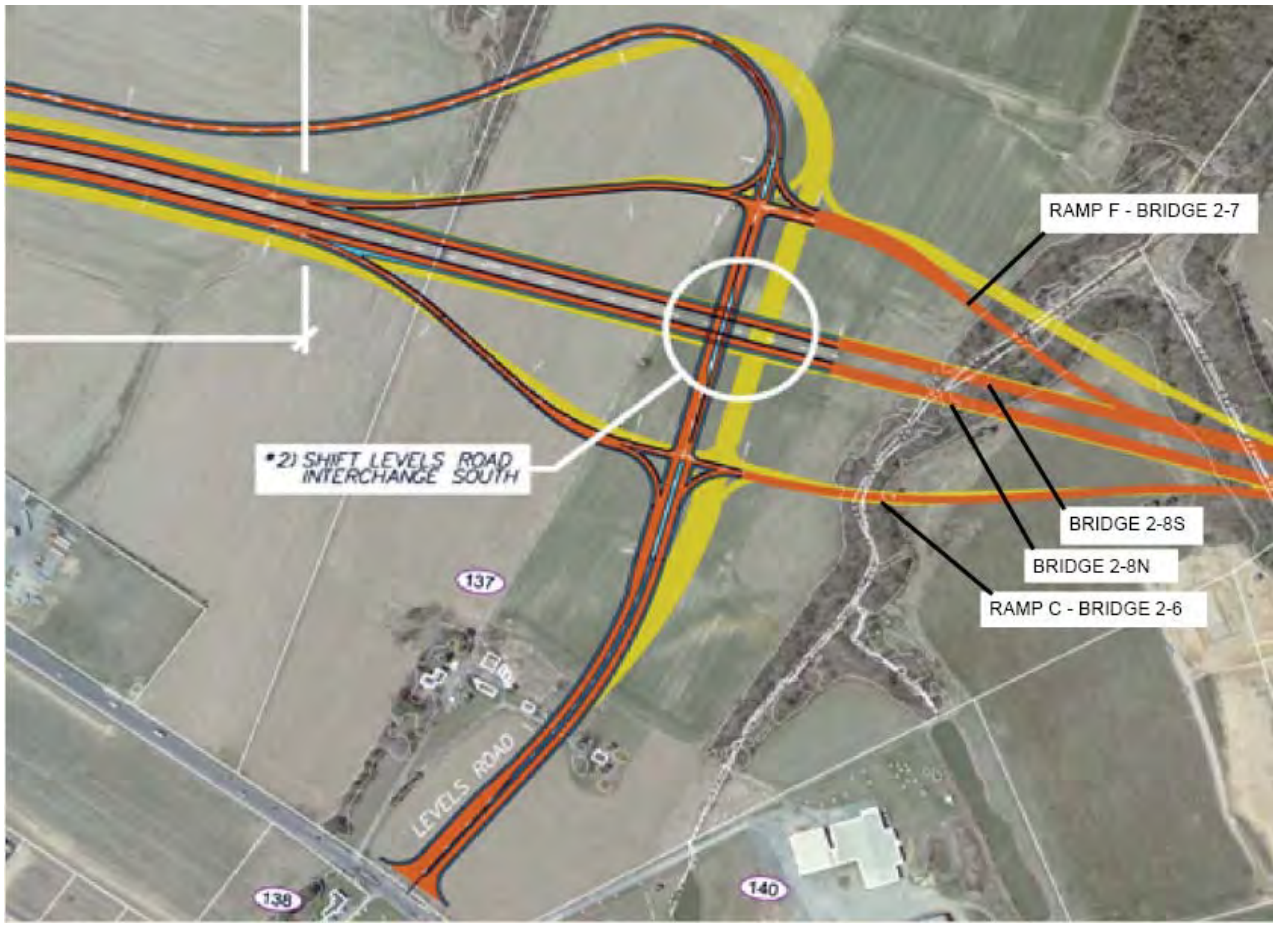

Figure 17: Design Refinement 9-
Levels Road Interchange Shift

- *Southbound Mainline over Tributary of Sandy Branch (Bridge 2-5S)* – this bridge has a short span, and the mainline profile would be at-grade or on a slight fill. By shifting this bridge to the east, a narrower section of the wetland would be spanned and the separate bridge for Ramp F is eliminated.
- *Ramp F over Sandy Branch (Bridge 2-7)* – Ramp F would be moved east approximately 30 feet to allow a narrower span bridge over the wetland. The bridge for Ramp F will provide a 150-foot span with no center pier.
- *Southbound Mainline over Sandy Branch (Bridge 2-8S)* – The southbound mainline crossing of Sandy Branch would be a steel span approximately 300 feet long with a center pier on the north side of the stream.
- *Northbound Mainline over Sandy Branch (Bridge 2-8N)* – The bridge carrying the northbound mainline over Sandy Branch will be similar to the bridge carrying the southbound mainline.
- *Ramp C over Sandy Branch (Bridge 2-6)* – This crossing location would not change, as shifts in either direction would increase impacts. This short crossing would be accomplished using a bottomless arch culvert design.

- *Temporary Haul Road (not shown)* – Although temporary, the Haul Road, needed to transfer borrow (fill) taken from the Levels Road mitigation site excavation to construct ramps and bridge abutments, would impact both Sandy Branch and the Tributary of Sandy Branch. Temporary impacts would be minimized to the extent possible while allowing the crossing of construction vehicles to and from the Levels Road mitigation site during excavation and grading operations. The temporary haul road would impact forest, wetland and streams. DelDOT will provide restoration upon completion of construction. Final location of the temporary road crossings of Sandy Branch and the Tributary will be shown on the final plans.

Advantages/Disadvantages/Impacts

Overall, the southward shift of the interchange places the roadway slightly closer to the Rumsey Farm, an historic property that is visually adversely affected by the project. Shifting Levels Road 125 feet to the south allows the bridge crossings of Sandy Branch to be shifted further upstream and closer together, thus minimizing impacts to wetlands that the agencies identified as higher quality. The modifications do not reduce the overall quantity of wetland impacts or lower impacts to high quality wetlands, but do reduce impacts to the highest quality wetlands. Impacts to medium quality wetlands would be reduced by 0.07 acre, and impacts to high quality wetlands would increase by 0.34 acre. Total wetlands impacts would increase by 0.28 acre. The refinements would result in a cost savings for bridge construction of $726,000.

Agency Coordination, Public Input and Decision

This shift was first introduced at the December 2, 2008 agency meeting, and presented to the public at the March 23, 2009 Workshop. There were no comments received from the public. At the March 26, 2009 agency meeting, DelDOT requested concurrence from the agencies to move forward with the refined design. There were no objections. In their August 9, 2009 letter to the US 301 project stakeholders (included in **Appendix F**), DelDOT advised the public that this refinement would be incorporated into the final design for the new US 301. The agencies completed a field review of the design for the mainline bridges (Bridges 2-8N and 2-8S) over Sandy Branch on September 15, 2009, and reiterated their support for this refinement. Therefore, the refined structures over Sandy Branch and Sandy Branch Tributary are included in the refined design.

Section 3: US 301 Mainline, Delaware/Maryland State Line to Levels Road

Design refinements included in Section 3 are:

(10) Levels Road South-Serving Ramps and Toll Plaza Ramps Operational Improvements;
(11) Strawberry Lane Local Connector to Existing US 301; and
(12) Eastward Shift of US 301 Mainline at the State Line.

A summary of the combined changes in impacts to resources in Section 3 is provided in ***Table 14***. The refined design would result in decreases in impacts to wetlands (-0.8 acres), agricultural districts (-0.3 acres), and upland forest (-1.6 acres). The refinements would result in increases in impacts to waters of the U.S. (+71.7 acres), agricultural easements (+0.6 acres), prime farmland soils (+47.6 acres) and hydric soils (+2.3 acres). ***Figure 18*** shows all of the refinements included in Design Section 3.

Figure 18: Design Refinements 10, 11, and 12- Overall Modifications for Design Section 3

Table 14. Comparison of Resource Impacts for Design Section 3

Resource	2008 ROD Selected Alternative with Updated 2011 Features	Refined Design	Difference
Wetlands (acres)	4.9	4.1	-0.8
Wetlands (No.)	13	13	0
Tidal Wetlands (acres)	0	0	0
Waters of the US (streams & ditches - linear feet)	1,394	1465.9	71.7
100-Year Floodplain (acres)	0	0	0
Agricultural Districts (number)	1	1	1
Agricultural Districts (acres)	0.4	0.1	-0.3
Agricultural Easements (number)	0	1	1
Agricultural Easements (acres)	0	0.6	0.6
Prime Farmland Soils (acres)	102.7	150.2	47.6
Hydric Soils (acres)	41.3	43.6	2.3
Upland Forested Land (acres)	22.3	20.7	-1.6
Total Area Limit of Disturbance (acres)	205.4	286.8	81.4
Total Roadway Areas (acres)	205.4	203.2	-2.2
Total Roadway Supporting Areas (acres)*	--	83.6	83.6

** Roadway supporting areas included in the total limit of disturbance for the refined design are two stockpile/staging TCEs and 75.1 acres of the 103.7acres purchased for the Levels Road mitigation site.*

The difference in the LOD between the ROD Design and the Refined Design (81.43 acres) can be attributed to the inclusion of 75.1 acres of the 103.7-acre parcel acquired for the Levels mitigation site and three TCE staging/stockpile parcels totaling 8.6 acres. Overall, the design refinements in Section 3 show a net decrease of -2.2 acres in total roadway area required.

Design Refinement 10 – Levels Road South-Serving Ramps and Toll Plaza Ramps Operational Improvements

The Levels Road Interchange is constructed in both Design Section 2 (Mainline and intersection ramps north of Levels Road) and Design Section 3 (Levels Road Extended and Mainline and ramps to the south). Refinements in the design of the Mainline Toll Plaza would provide for simpler construction and accommodate improved traffic operations through the weigh station, toll plaza and the Levels Road Interchange area, by providing the ability for all traffic to utilize the highway-speed E-ZPass™ toll lanes. ***Figure 19*** shows the Levels Road Shift and Toll Plaza Ramps; this figure is also found in **Appendix H** in the February 19, 2009 Agency Meeting PowerPoint on page 5.

Figure 19: Design Refinement 10 – Levels Road South-Serving Ramps and Toll Plaza Ramps

Advantages/Disadvantages and Impacts

In the ROD design for the US 301 Mainline Toll Plaza, south of Levels Road, barrier separations included at three locations required that all trucks exiting the weigh station, all northbound traffic exiting US 301 at Levels Road, and all traffic entering southbound US 301 from Levels Road were restricted from using the highway speed E-ZPass™ toll lanes and were required to use the cash lanes. The ROD design added delay for these users of the new US 301 facility and could even discourage local traffic from using the roadway to access Levels Road. The ROD design also resulted in larger volumes of vehicles accelerating and decelerating at the mainline toll plaza, increasing noise, emissions, and fuel consumption.

Removing the barriers in the refined design allows truck traffic entering northbound US 301 from the weigh station the option to use the highway speed E-ZPass™ toll lanes as well as the cash lanes, eliminating the restriction to the cash lanes in the ROD design. Removing barriers would also allow northbound US 301 traffic using the highway speed E-ZPass™ toll lanes the opportunity to exit at Levels Road, and traffic using the southbound Levels Road on-ramp to new US 301 to use the highway speed EZ-Pass™ lanes.

Primary concerns were traffic safety and operations, as removal of the barriers would create new weaving sections approaching the mainline toll plaza (two northbound and one southbound). Two options were developed and evaluated to determine if safe and efficient traffic operations would be attained:

- In Option 1, the two mainline lanes of US 301 entering the toll plaza in each direction would become three lanes before splitting into two highway speed E-ZPass™ lanes and one cash lane that would flare to provide three toll booths.
- In Option 2, the two mainline lanes in each direction entering the toll plaza would become three lanes before splitting into two highway speed E-ZPass™ lanes and two cash lanes that would flare to provide three toll booths.

Subsequent to the 2008 ROD, traffic capacity analyses and traffic simulations were conducted for each of the weaving options. The capacity analyses indicated that these low-volume weaving

segments would all operate acceptably, having very low vehicle densities. The traffic simulations were used to evaluate the likely vehicle speeds through the weaving section; in particular, the simulations were used to determine if a substantial difference in vehicle speeds would occur between any of the mainline lanes, thus creating unsafe weave conditions. The simulations indicated that minimal speed differentials would occur under either option. Further, an evaluation of approach signage concluded that the proposed toll plaza approaches could be signed in accordance with federal and state guidelines with either of the proposed designs. The traffic analyses indicated that either option for the weaving sections would operate acceptably. Both options would have very similar measures of effectiveness. Option 1 was selected for design due to lower costs, reduced right-of-way impacts, reduced pavement, and reduced impacts to wetlands, as compared to Option 2.

Resource impacts of the refinements would include an increase in impacts to wetlands (+0.41 acre), hydric soils (+5.8 acres), prime farmland soils (53.7 acres) and forest (1.1 acres). The overall LOD would be increased by 79.8 acres, mainly due to the inclusion of 75.1 acres for the Levels Road mitigation site.

There would continue to be an adverse effect (visual) to the historic Rumsey Farm (N-0113), as the interchange would be 40 feet closer to the building at its highest elevation. There is no noise impact.

Agency Coordination, Public Input and Decision

This refinement was introduced to the agencies at the February 19, 2009 meeting and was presented to the public at the March 23, 2009 Public Workshop. There were no public comments provided concerning the refinements in Design Section 3. At the March 26, 2009 meeting, the agencies offered no objections to including this refinement in the current design. In their August 9, 2009 letter to the US 301 project stakeholders (included in **Appendix F**), DelDOT advised the public that this refinement would be incorporated into the final design for the new US 301. The agencies' agreement was reiterated at the September 15, 2009 agency meeting. DelDOT has included the toll plaza modifications in the Refined Design.

Design Refinement 11 – Strawberry Lane Local Connector to Existing US 301

A minor modification in the design of the Strawberry Lane overpass and local connection to existing US 301 would decrease some impacts, including those to a major utility corridor. The overpass alignment would be shifted to the east, and the connection to existing US 301 would be slightly further to the south than the ROD alignment. A figure showing the Strawberry Lane Local Connector refinement is provided in the December 2, 2009 (PowerPoint page 6) Agency Meeting information in **Appendix H** and in ***Figure 20***.

Advantages/Disadvantages/Impacts

By bringing the Strawberry Lane Connector roadway as close to the new US 301 as possible, impacts to the Clay Farm properties that it crosses would be minimized. There would be minimal differences in impacts to natural resources. Resource impacts for the refined design would be decreased for wetlands (-0.6 acre), ditches (-57.7 linear feet), prime farmland soils (-0.03 acre) and agricultural districts (-0.3 acre). There would be an increase in the LOD of 0.4 acre and increased impacts to hydric soils (+0.1 acre) and forest (+0.4 acre).

Agency Coordination, Public Input and Decision

A figure showing the change in this alignment was distributed during the December 2, 2008 agency meeting (**Appendix H**) and included in the design presented at the March 23, 2009 Public Workshop. No public comments were received regarding this refinement. This refinement involves only a slight alignment modification of the alignment concurred upon by the agencies prior to the ROD, and, as such, is included in the Refined Design.

Figure 20: Design Refinement 11- Strawberry Lane Local Connector

Design Refinement 12 – Eastward Shift of US 301 Mainline at the State Line

The alignment of new US 301 at the state line would be shifted to the east, from just south of the Maryland state line for approximately 3,500 feet northward, returning to the ROD alignment south of the weigh station location. The shift would align new US 301 60 feet to the east (towards Middletown) at the widest point near the Strawberry Lane overpass. ***Figure 21*** shows the proposed eastward shift of the US 301 Mainline; this figure is also found in **Appendix H** in the February 19, 2009 Agency Meeting PowerPoint on page 5.

Advantages/Disadvantages and Impacts

The shift of the alignment of new US 301 to the east would reduce the amount of new pavement and required right-of-way and avoids impacting the overhead electrical transmission towers in this area. Avoiding relocating the transmission towers would result in a cost saving of $1.5 to $2 million. The modification would result in decreases in impacts to wetlands of -0.7 acre, hydric soils (-3.7 acres), subaqueous lands (-157.8 linear feet), and forest (-3.0 acres) and an increase in impacts to streams and ditches of 129.4 linear feet. The shift would also reduce maintenance of traffic complications during the construction of the Strawberry Lane overpass.

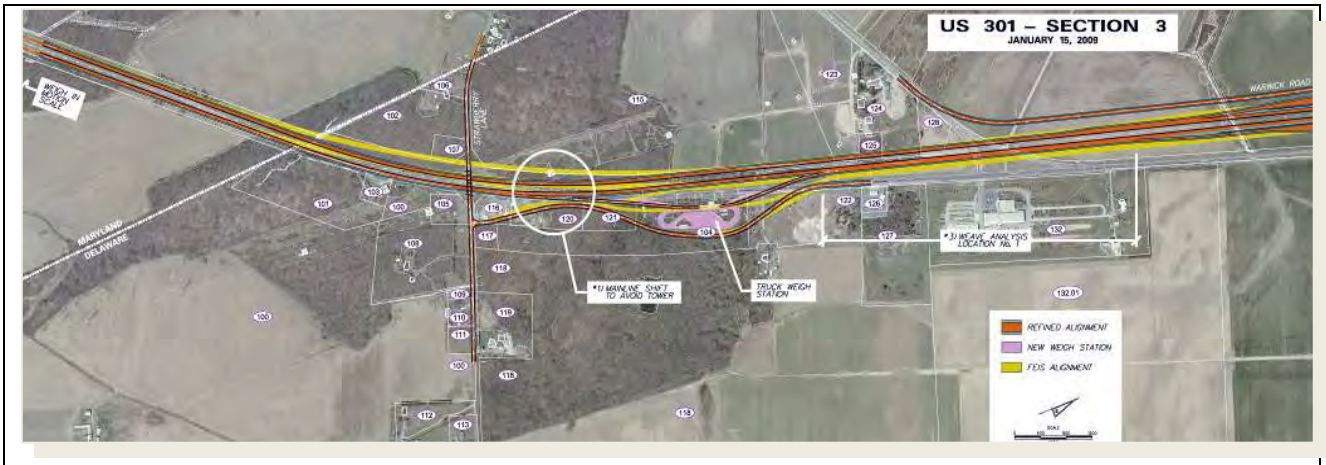

Figure 21: Design Refinement 12 - Eastward Shift at the MD/DE Line

Agency Coordination, Public Input and Decision

This refinement was initially presented to the agencies at the February 19, 2009 meeting, and was presented to the public at the March 23, 2009 Workshop. No comments were received from the public on this refinement. At the March 26, 2009 agency meeting, DelDOT requested concurrence from the agencies to move forward with the refined design. There were no objections. In their August 9, 2009 letter to the US 301 Project Stakeholders (included in **Appendix F**), DelDOT advised the public that the eastward shift of the US 301 Mainline at the State line would be incorporated into the final design. At the September 15, 2009, the agencies reiterated no objection to the design refinement, and therefore, the shift of the US 301 Mainline to the east to avoid impacting the electric transmission towers is included in the Refined Design.

Section 4: US 301 Spur Road

Design refinements options for the US 301 Spur Road portion of the project were initially previewed with the agencies at the February 19, 2009 agency meeting and were presented to the public at the March 23, 2009 Public Workshop. Following the workshop, DelDOT considered all comments received before making recommendations to the agencies at subsequent meetings. Design refinements include:

(13) SR 896/Bethel Church Road Interchange;
(14) Spur Road Alignment Refinements to Minimize Impacts; and
(15) Churchtown Road Overpass of Spur Road/Tidewater Utilities Access.

A summary of the changes in impacts to resources in this section is provided in ***Table 15***. The refined design of the Spur Road would result in decreases in impacts to streams (-573 feet), but increases in impacts to ditches (+1,060 feet), resulting in a net increase in impacts to waters of the US (487.1 feet). The design refinements would result in decreases in impacts to agricultural easements (-2.10 acres) and prime farmland soils (-4.4 acres), and increases in impacts to wetlands (1.6 acres), hydric soils (11.7) and upland forest (1.4). The 29.7 acre difference in the total LOD is due to the refinements.

Table 15. Comparison of Resource Impacts for Design Section 4

Resource	2008 ROD Selected Alternative with Updated 2011 Features	Current Design	Difference
Wetlands (acres)	6.9	8.5	1.6
Wetlands (No.)	11	12	1
Waters of the US (streams & ditches - linear feet)	3,078	3,565	487.1
100-Year Floodplain (acres)	0	0	0
Agricultural Districts (number)	0	0	0
Agricultural Districts (acres)	0	0	0
Agricultural Easements (number)	1	1	0
Agricultural Easements (acres)	5.3	3.2	-2.1
Prime Farmland Soils (acres)	152.3	147.9	-4.4
Hydric Soils (acres)	41.9	53.7	11.7
Upland Forested Land (acres)	16.5	17.9	1.4
Total Area Limit of Disturbance (acres)	225.4	255.1	29.7
Total Roadway Areas (acres)	225.4	255.1	29.7
Total Roadway Supporting Areas (acres)	--	--	--

Design Refinement 13 –SR 896/Bethel Church Road Interchange

The 2008 ROD Interchange configuration would provide access from SR 15 (Bethel Church Road) to northbound SR 896 via an east/west extension of Bethel Church Road from Choptank Road to the US 301 Spur Road. Two options to fix the sharp curve at the intersection of Bethel Church

Road and SR 896 at the base of Summit Bridge were presented at the March 23, 2009 Public Workshop.

Interchange Option A would shift the trumpet interchange, shown in the ROD, to the north to accommodate the Bethel Church Road roundabout with minimal reconstruction. Interchange Option B would provide a more direct connection between Bethel Church Road and SR 896.

Figures 22A and 22B depict the ROD configuration along with Options A and B. Option A was not selected as it has greater impacts when compared to Option B. Figures of Option A and B can be found in **Appendix H** on pages 32 and 33 of the PowerPoint presented at the February 19, 2009 agency meeting. ***Table 16*** compares the advantages and disadvantages of the ROD interchange configuration and Options A and B, as presented at the March 23, 2009 Public Workshop.

Figure 22A: Option A

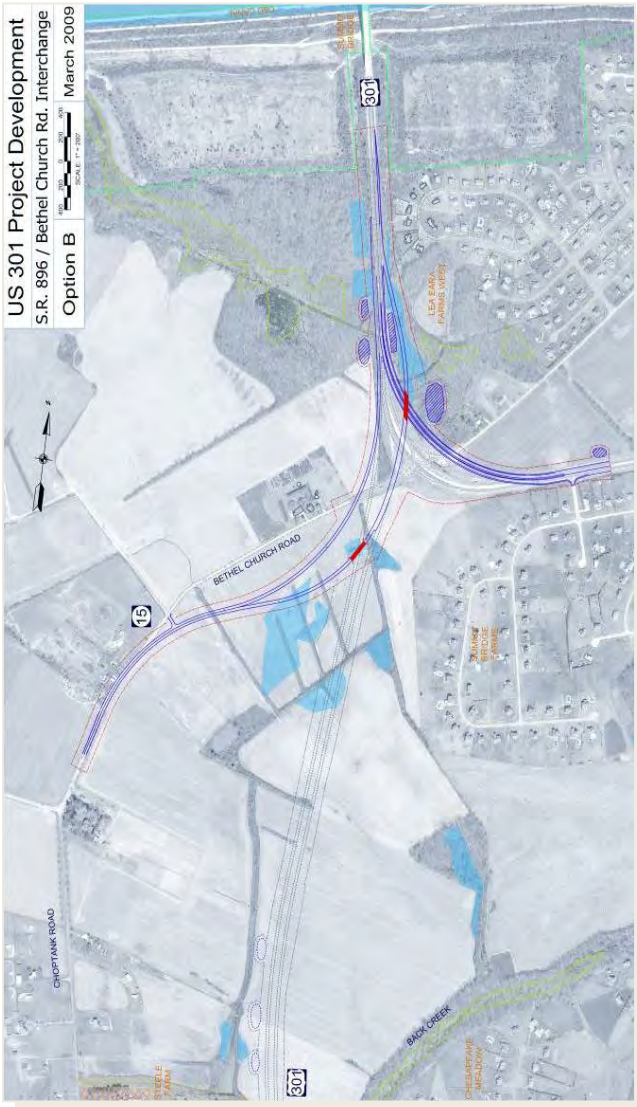

Figure 22B: Option B

Table 16: Comparison of SR 869/Bethel Church Road Options

Option	Advantages	Disadvantages
2008 ROD	• Provides free-flow of traffic from Choptank and Bethel Church Roads • Lower wetland impacts (5.91 acres) than Option A	• Proximity to Summit Bridge Farms community • Greater ROW impacts (79.1 acres) than Options A or B • Greater wetland impacts (5.91 acres) than Option B (4.41 acre)
2009 Option A	• Provides an improved connection with Choptank Road roundabout with minimal reconstruction of the roundabout • Moves the interchange closer to Summit Bridge Road, lowering cost.	• Requires longer length of Bethel Church Road and Spur Road construction when compared to Option B • Greater wetland impacts (6.21 acres) than ROD or Option B • Closer to Summit Bridge Farms community
2009 Option B	• Provides more direct connection with Choptank Road roundabout with minimal reconstruction of the roundabout • Reduces ROW costs associated with relocated Bethel Church Road • Reduces construction and right-of-way (ROW) costs by reducing length of roadway • Lowest ROW impacts (65.8 acres) • Fewer wetland impacts (4.41 acres) than Option A or ROD design	• Additional retaining wall costs • Closer to Summit Bridge Farms community

Note: Comparison of Options A versus B as of March 29, 2009.

Figure 22C: Design Refinement 13- SR 896/Bethel Church Road Interchange Option B

Interchange Option B would provide a more direct connection to Bethel Church Road, minimize reconstruction of the roundabout and reduce right-of-way impacts associated with the ROD design. Option B would lower natural resources impacts as ***c***ompared to Option A (see ***Table 16***) and would have a shorter length of roadway when compared to Option A. This option, however, would increase retaining wall costs and is somewhat closer to the Summit Bridge Farms community. Additional figures are shown on pages 32 and 33 in the Agency Meeting PowerPoint for the February 19, 2009 meeting in **Appendix H**. Based upon the comparisons presented at the March 2009 Public Workshop and shown in ***Table 17***, DelDOT determined that Option B would be incorporated into the Refined Design.

Advantages/Disadvantages and Impacts

When comparing Options A and B with the ROD design for the interchange, all of the options presented would improve the design speed on the sharp curve on SR 896 from 50 miles per hour (MPH) to 60 mph and eliminate the signalized intersection on the curve. Posted speed on the curve is likely to be 55 mph. As the design has progressed and the impacts of the ROD alignment were updated, Option B has been further modified into the current refinement Option B, depicted in ***Figure 22C***. A comparison of the current impacts to resources (current Option B versus 2011 Updated ROD) is shown in ***Table 17***.

Table 17: Comparison of 2011 US 301 Spur Road/SR 896/Bethel Church Road Interchange Option B Impacts

Resource	ROD Selected Alternative with Updated 2011 Features	2011 Refined Option B	Difference
Total Area ACOE Wetlands, acres	5.80	7.2	1.4
Total Streams and Ditches, linear feet	2,593	2,522	-71
DNREC Subaqueous Lands, linear feet	1,916.1	1,752.6	-163.5
Hydric Soils, acres	33.0	44.4	11.3
Prime Farmland Soils, acres	52.2	52.0	-0.3
Forest, acres[1]	9.64	9.6	0.22
C&D Canal Wildlife Management Area, acres[2]	0	1.1	1.1
State Resource Area, acres[3]	0	1.1	1.1
Total Area, Limit of Construction, acres[4]	89.7	123.6	33.9
Total Roadway Areas (acres)	89.69	123.6	33.9
Total Non-Roadway Areas (acres)	0	0	0

NOTES:

1. Includes both deciduous and mixed forest.

2. The ACOE, who own and maintain the C&D Canal Wildlife Management Area, does not include this area as a part of the wildlife preservation area that would be subject to Section 4(f) requirements.

3. Parcel is owned by DelDOT.

4. The actual increased LOC for Option B would be 33.9 acres greater than for the 2008 ROD Selected Alternative with Updated 2011 Features Option B (89.7 acres) and can be attributed to the acreage needed for fill slopes adjacent to the roadway as it rises to the Summit Bridge and the area that would be needed to construct the visual earth berm along the western edge of Summit Bridge Farms.

Agency Coordination, Public Input and Decision

The interchange options were initially presented to the agencies at the February 19, 2009 meeting, and were presented to the public at the March 23, 2009 Workshop. Public comments about the interchange were mainly focused on favoring an alternative that would eliminate the existing sharp curve and signal-controlled intersection as a safety improvement. In their August 9, 2009 letter to the US 301 Project Stakeholders (included in **Appendix F**), DelDOT advised the public that Interchange Option B was the Selected Option and would be incorporated into the final design.

DelDOT included a review of Option B at their August 25, 2009 briefing to FHWA and at the September 15, 2009 agency meeting. Option B was reviewed again during the May 25, 2010 agency meeting, shown with Spur Road realignment Option 3. The agencies offered no objection to including Option B in the refined design. Option B was presented at the September 6, 2011 Public Workshop as part of the "plans available" review. One comment was received concerning possible elevated noise levels in Lea Eara Farms adjacent to the ramp to Summit Bridge.

On October 20, 2011, DelDOT met with FHWA and members of the ACOE who hold jurisdiction over the C&D Canal Wildlife Refuge. ACOE indicated that the land adjacent to the refined roadway is not a part of the wildlife area but is a Canal maintenance area and not subject to regulation under Section 4(f). Refer to the Section 4(f) text on page 24 for further information.

Design Refinement 14 – Spur Road Alignment Refinements to Minimize Impacts

Subsequent to the 2008 ROD, alignment studies were completed that would shift the alignment of the US 301 Spur Road in the vicinity of the Rhoadesdale Farm, Chesapeake Meadow, and Steele Farm to minimize overall community impacts. Three options were considered and presented to the public at the March 23, 2009 Public Workshop:

- Option 1 would shift the ROD alignment to the west to increase the distance between the US 301 Spur Road and the entire Chesapeake Meadow community.
- Option 2 would shift the alignment to the east to minimize impacts to the Steele Farm structures and reduce impacts to the Rhoadesdale Farm.
- Option 3 would shift the alignment to the east slightly to avoid impacts to structures on the Steele Farm, reduce impacts to the existing hedgerow and berm along the Rhoadesdale Farm, and slightly reduce impacts to the Zapata property. This option would increase the distance between the Spur Road and Chesapeake Meadow for most of the alignment, except at the northwest corner of the community.

Advantages/Disadvantages and Impacts

The advantages and disadvantages of each of the three options for the US 301 Spur Road alignment, presented at the March 23, 2009 Workshop, are compared to each other and the ROD alignment in ***Table 18***.

Table 18: Comparison of the 2009 US 301 Spur Road Alignment Options

Option	Advantages	Disadvantages
2008 ROD Alignment	• Reduces projected traffic on Choptank Road and existing US 301/SR 896 • Improves safety for traffic travelling to/from Summit Bridge • Provides a 3rd route to Summit Bridge (Choptank Road, existing US 301/ SR 896, and Spur Road) • Provides an alternate route should an incident close the SR 1 Roth Bridge over the Canal.	• Located within 600 feet of existing communities of Chesapeake Meadow (between 294 feet at the south end and 233 feet at the north end*) and Summit Bridge Farms (between 837 feet at the south end and 442 feet at the north end*) • Impacts agricultural properties • Impacts natural resources
2009 Alignment Option 1	• Same as ROD alignment, plus: • Increases the distance between the Spur Road and Chesapeake Meadow over the ROD alignment from 294 feet to 387 feet* at the south end and from 233 feet to 319 feet* at the north end (no property impacts to homes in Chesapeake Meadow) • Increases the distance from the south end of Summit Bridge Farms over the ROD alignment from 837 feet to 877 feet*	• Increases impacts to the Steele Farm (agricultural easement) by about 2.5 acres and impacts four farm buildings • Increases impacts to the Rhoadesdale Farm by almost 3 acres • Increases impacts to the Yaiser property by approximately 4 acres • Increases impacts to the Zapata property by approximately 0.25 acres.

Table 18: Comparison of the 2009 US 301 Spur Road Alignment Options

Option	Advantages	Disadvantages
2009 Alignment Option 2	• Same as ROD alignment, plus: • Reduces impacts to Steele Farm (agricultural easement) by approximately 4 acres; avoids impacts to buildings • Reduces impacts to Yaiser property by approximately 1 acre • Reduces impacts to low quality wetlands and other Waters of the US	• Decreases distance between Spur Road and Chesapeake Meadow community over the ROD alignment at the north end (from 294 feet to 163 feet*) while maintaining the visual earth berm • Alignment is closer to Summit Bridge Farms (from 442 feet to 399 feet* at north end and from 837 feet to 691 feet* at the south end) than the ROD alignment • Increases structure length over Back Creek • Increases total wetland impacts at Back creek • Increases impacts on subaqueous lands and forest
2009 Alignment Option 3	• Same as ROD alignment, plus: • Reduces impacts to Steele Farm (agricultural easement) by approximately 4 acres; avoids impacts to buildings • Decreases impacts to the Rhoadesdale Farm by approximately 4 acres and preserves a major portion of the natural hedgerow boundary and berm • Slightly reduces impacts to Zapata property • Reduces stream, agricultural preservation and farmland impacts	• Decreases distance between Spur Road and Chesapeake Meadow community over the ROD alignment at the north end (from 294 feet to 208 feet*) while maintaining the visual earth berm • Alignment is closer than the ROD alignment to Summit Bridge Farms (from 442 feet to 368 feet* at north end and from 837 feet to 623 feet* at south end) • Increases structure length over Back Creek and high quality wetland impacts • Increases Yaiser property impacts by approximately 0.7 acres • Shifts Old Schoolhouse Road overpass approximately 65 feet to the east and increases elevation at future driveway entrances • Increases length of Churchtown Road overpass structure • Increases Spur Road costs • Increases wetland and forest impacts

** Measurements added; determined from US 301 Spur Road edge of paving of nearest roadway lane to property line.*

Option 1 was not preferred because of increased impacts to properties on the west side of the Spur Road and to the Steele Farm agricultural easement. Option 2 was not preferred because it has the greatest increases in impacts to natural resources of the three options. Option 3 was preferred by DelDOT because it provides the best overall minimization of impacts to natural resources and several properties. A summary comparison of the 2009 resource impacts for the three options (in combination with SR 896/Bethel Church Road Interchange Option B) is provided in ***Table 19***.

Table 19: Comparison of Impacts for the 2009 Spur Road Alignment Options

Resource		2008 ROD Alignment	2009 Option 1	2009 Option 2	2009 Option 3
Total Area ACOE Wetlands, acres		1.23	2.91	1.99	1.89
Total Streams and Ditches, linear feet		784.1	1,663.5	1,271.3	1,199.4
DNREC Subaqueous Lands, linear feet		1,363.6	1,196.9	1,617.0	1,552.9
Hydric Soils, acres		13.35	21.14	15.81	14.64
Agricultural Easement, acres		5.31	6.20	4.08	4.85
Prime Farmland Soils, acres		11.32	11.08	10.28	10.17
Forest, acres		6.75	6.95	7.26	7.24
State Resource Areas, acres		0	0	0	0
Distance between US 301 Spur Road and Chesapeake Meadow community[1], feet	North end	233	319	163	208
	South end	294	387	--	--
Distance between US 301 Spur Road and Summit Bridge Farms community[1], feet	North end	442	--	399	368
	South end	837	877	691	623
Total Area Limit of Construction, acres		158.2	163.0	161.2	165.8

Summary based on impacts calculated in March, 2009, prior to the incorporation of the Rapanos guidelines, LOD increases due to the addition of landlocked parcels, temporary construction easements and mitigation acreages, or other LOD differences. All measurements include Interchange Option B.

[1] *Measured as the distance from edge of closest roadway lane to property line.*

Figure 23: Design Refinement 14- US 301 Spur Road Alignment Option 3 Modified

DelDOT has modified and will continue to modify the alignment of Option 3 in an effort to further minimize impacts to natural resources and communities adjacent to the alignment. ***Figure 23*** presents a view of the currently modified Option 3. Additional figures have been presented at the interagency meetings as refinements were modified; the current alignment of modified Option 3 can be found on page 19 in the Agency Meeting PowerPoint for the September 19, 2011 meeting in **Appendix H**.

Table 20 summarizes the impacts of the most current design of the refined US 301 Spur Road as compared to the 2008 ROD Selected Alternative with Updated 2011 Features. Natural resource impacts of the modified Option 3 alignment would include increases in impacts to wetlands (0.25 acre), streams and ditches (409.6 acres), subaqueous lands (389.9 linear feet), hydric soils (0.3 acre), and forest (1.2 acres). There would also be decreases in impacts to agricultural easements (-2.1 acres) and prime farmland soils (-2.1 acres).

As noted in ***Table 20***, the distance between the US 301 Spur Road and the communities of Chesapeake Meadow and Summit Bridge Farms would be increased further than in the 2008 ROD alignment: at the north end of Chesapeake Meadow the edge of roadway would be 221 feet from the property line, and at Summit Bridge Farms the edge of roadway would be 407 feet at the northern end and 853 feet at the southern end. However, the alignment would be closer to the south end of Chesapeake Meadow (239 feet) in order to reduce impacts to the Rhoadesdale property.

Table 20: Comparison of Current US 301 Spur Road Alignment Option 3 Impacts

Resource		2008 ROD Selected Alternative with Updated 2011 Features	2011 Refined Option 3	Difference
Total Area ACOE Wetlands, acres		1.1	1.3	0.3
Total Streams and Ditches, linear feet		389	798	410
DNREC Subaqueous Lands, linear feet		389	779	390
Hydric Soils, acres		4.0	4.3	0.3
Prime Farmland Soils, acres		97.3	95.2	-2.1
Forest, acres[1]		6.7	7.9	1.2
Agricultural Easements (permanent), number		1	1	0
Agricultural Easements (permanent), acres		5.3	3.2	-2.1
Distance between US 301 Spur Road and Chesapeake Meadow community[2], feet	North end	233	221	-12
	South end	294	239	-55
Distance between US 301 Spur Road and Summit Bridge Farms community[2], feet	North end	442	407	-35
	South end	837	853	+18
Total Area, Limit of Construction, acres[3]		122.4	121.7	-0.7
Total Roadway Areas (acres)		122.4	121.7	1.99
Total Roadway Supporting Areas (acres)		0	0	8.2

[1] *Includes both deciduous and mixed forest.*
[2] *Measured as the distance from edge of closest roadway lane to property line.*
[3] *Includes approximately 8.2 acres of landlocked parcels to be used as potential mitigation sites; actual increase due to refinements = 1.99 acres.*

During the September 15, 2009 meeting, the resource agencies requested that DelDOT (1) provide acreage savings and comparison of impervious surfaces; (2) identify wetland creation or reforestation opportunities within Back Creek watershed as mitigation; (3) identify stream stabilization or restoration opportunities on Back Creek as mitigation; and (4) review the design of Bridge 4-3 and adjust the design to minimize impacts to stream banks and seeps within wetlands. Using the design associated with Spur Road alignment Option 3, the configurations of the US 301 Spur Road bridges that cross Back Creek at Churchtown Road (Bridges 4-5N and 4-5S) and that cross the tributary of Back Creek at the northern border of Chesapeake Meadow (Bridges 4-3N and 4-3S) were refined to avoid or minimize impacts to streams and the highest quality wetland areas.

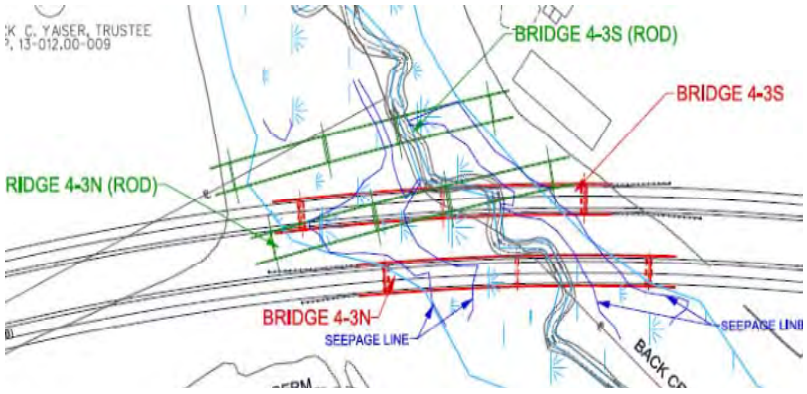

Figure 24A: Design Refinement 14- Modified Bridge 4-3

For Bridge 4-5 over Back Creek, the agencies expressed a preference for a single-span bridge for the northbound US 301 Spur Road lane to eliminate a pier adjacent to the stream channel, and a preference for a two-span bridge for the southbound Spur Road lane, with the center pier located away from the stream channel. Bridges 4-3 over the Back Creek tributary were also refined to avoid the stream and seeps.

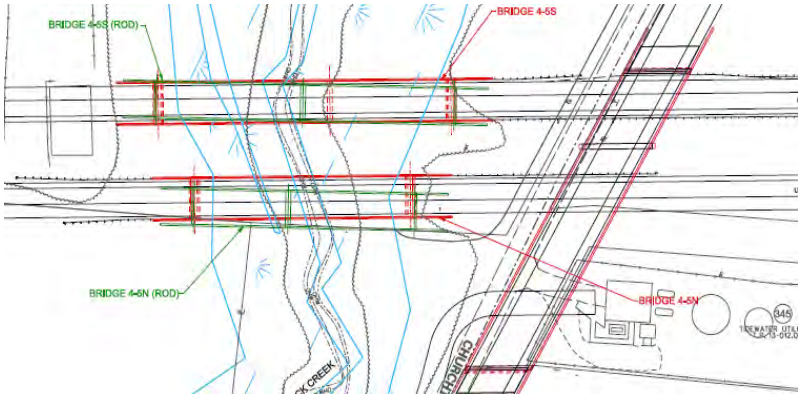

Figure 24B: Design Refinement 14- Modified Bridge 4-5 with Churchtown Road Overpass

Figures 24A and 24B show the modifications to the bridges; additional information and full-sized figures can be found in **Appendix H** in the field tour preview on pages 25 - 29 in the Agency Meeting PowerPoint and additional sketches for the September 15, 2009 meeting. The design was refined and included again in the PowerPoint for the May 25, 2010 meeting as well, pages 18 and 19.

Agency Coordination, Public Input and Decision

The US 301 Spur Road Alignment Options were previewed by the agencies at the February 19, 2009 meeting prior to the March 23, 2009 Public Workshop, where they were presented for public review and comment. The Spur Road options were again reviewed at the June 9, 2011 meeting. The designs of the bridges over Back Creek (Bridge 4-5) and over the tributary of Back Creek (Bridge 4-3) north of Chesapeake Meadow were reviewed with FHWA on August 25, 2009, field reviewed during the September 15, 2009 meeting, and revisited at the May 25, 2010 and during the June 9, 2011 agency meetings. Because the refinement of the design of Bridges 4-3 and 4-5 was requested by the agencies, the refined structures are included in the Refined Design.

Among the approximately 280 comments submitted at the March 23, 2009 Workshop or during the comment period that followed, 235 were about the Spur Road. Most (196) were for or against the inclusion of the Spur Road in the project and did not focus on alternative alignments. DelDOT presented the refined Option 3 (that increases the distance between the US 301 Spur Road and Summit Bridge Farms community) as their selected alignment for Option 3 at the June 9, 2011 agency meeting and at the September 6, 2011 Public Workshop. No public comments were received regarding the modified Option 3 alignment. When presented for review at the September 19, 2011 agency meeting, the agencies concurred/did not object to including Option 3 modified in the Refined Design.

Design Refinement 15 – Churchtown Road Overpass Alignment and Tidewater Utilities Access

Alignment studies were performed to refine the proposed Churchtown Road overpass of the US 301 Spur Road and Tidewater Utilities access drive to reduce impacts, improve constructability and reduce costs during the construction. The 2008 ROD alternative constructed the Churchtown Road overpass slightly to the north of its existing location, with existing Churchtown Road serving as Tidewater Utilities access during construction. An access driveway for Tidewater Utilities was proposed on the south side of the new overpass that would extend under the Churchtown Road overpass into the Tidewater facility.

Figure 25: Design Refinement 15- Churchtown Road Overpass/Tidewater Utilities Access

The refined alignment, shown in ***Figure 25*** and full-sized in **Appendix H**, would construct the Churchtown Road overpass slightly to the south of the existing roadway location, with the Tidewater Utilities access drive located to the north of the new overpass. A temporary extension of this access drive would provide through access during construction (for emergency services only) and be removed, east of the Tidewater access drive, after the overpass is completed. Permanent emergency services access (also shown in ***Figure 25***) would be provided in this location for both the northbound and southbound US 301 Spur Road.

The difference in impacts between the refined design and the ROD design would be minimal. The refined design would reduce the area required by four acres; reduce impacts to forest (-0.1 acre), hydric soils (-0.02 acre), and prime farmland soils (-2.1 acres); and increase impacts to wetlands (0.02 acre) and ditches (148.3 linear feet).

<u>Agency Coordination, Public Input and Decision</u>
The ROD design in this area resulted from comments received on the DEIS from Tidewater Utilities at the January 2007 Combined Public Hearings. The drawings in the DEIS did not show a proposed access. DelDOT met with the utility on April 16, 2007 to exchange information about the overpass and Tidewater's requirements (vehicle traffic and access needs), which led to the ROD Alternative. The ROD alternative was shown to the public during the March 23, 2009 Public Workshop. The refinement options were developed during preliminary design, and were presented to the agencies at the June 9, 2011 meeting and to the public at the September 3, 2011, Public Workshop. No comments were received from the public concerning this refinement. When presented at the September 19, 2011 agency meeting, the agencies concurred/did not object to its inclusion in the final design.

Sections 1, 2 and 4: US 301 Mainline From Norfolk-Southern Railroad to SR 1 and US 301 Spur Road

Design Refinement 16 – Emergency Access Ramps for Incident Control

DelDOT has met with emergency providers in southern New Castle County in the design and inclusion of emergency access for incident management on the new US 301. With the goal to provide adequate access for rapid emergency response while maintaining safety for the traveling public, access points were identified. Emergency access can be gained at the Levels Road, new/existing US 301, and Jamison Corner Road interchanges. DelDOT would add median crossovers in two locations: between the Levels Road and new/existing US 301 interchanges and between the new/existing US 301 and Jamison Corner Road interchanges; crossovers already exist at Sassafras Road in Maryland and in the median of SR 1. DelDOT's current design proposes emergency access ramps to southbound and northbound US 301 at SR 896 (Boyds Corner Road), access ramps on the US 301 Spur Road at Churchtown Road, and an access ramp on the south side of Bunker Hill Road to northbound US 301. The access ramps to the northbound and southbound US 301 Spur Road are identified on the previous ***Figure 25***. The proposed ramps at Bunker Hill Road and SR 896/Boyds Corner Road are shown on ***Figure 26A*** and ***Figure 26B*** and can be viewed in **Appendix H** in the PowerPoint and Additional Information PowerPoint for the September 19, 2011 Agency Meeting.

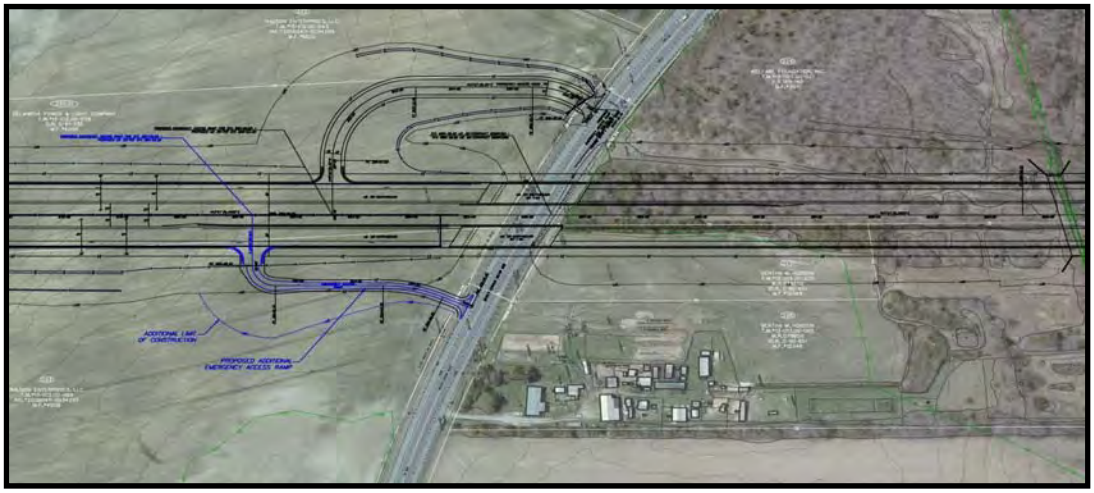

Figure 26A: Design Refinement 16- Emergency Access Ramps at SR 896

Figure 26B: Design Refinement 16- Emergency Access Ramp at Bunker Hill Road

Advantages/Disadvantages and Impacts

The proposed plan provides a level of emergency access to the US 301 Mainline that is comparable to similar Delaware highways such as SR 1 and is consistent with the initiative of DelDOT's Strategic Highway Safety Plan to enhance emergency response. The emergency access ramps would impact an additional 1.6 acres of prime farmland soil and increase the LOD by 3.2 acres (for the construction of ramps; median crossovers would not cause additional impacts. The ramp access from Bunker Hill Road to northbound US 301 would require a break in the proposed visual earth berm at the northern edge of the community of Spring Arbor that would not affect the noise abatement features of the berm.

Agency Coordination, Public Input and Decision

Members of the Project Team met with emergency services providers and coordinators on several occasions to determine adequate emergency access. An early meeting with the Volunteer Hose Company (VHC) on March 23, 2009 provided a baseline of recommendations for the Section Designers. Additional meetings were held with Southern New Castle County's Transportation Management Team on February 8, 2011; VHC on March 4, 2011, and the Odessa Fire Company on April 4, 2011. The Project Team met with DelDOT's Environmental Section, FHWA and the SHPO to present concepts for the emergency access ramp at Bunker Hill Road, and the proposed refinements were presented at the June 9, 2011 Agency Meeting. The proposed overall plan was presented to the fire companies and state legislators on June 27, 2011. The proposed ramp at Bunker Hill Road was presented at the pre-workshop meeting with the community of Spring Arbor and at the Public Workshop on September 6, 2011. There were no comments received regarding the emergency access refinements.

PUBLIC INVOLVEMENT

Public Workshops

Two Public Workshops have been held since publication of the ROD in 2008. The first, held on March 23, 2009, was convened in response to the Delaware General Assembly's direction to DelDOT, through the Fiscal Year 2009 Bond Bill, to consider alternatives to the US 301 Spur Road portion of the project. The 2009 Workshop provided attendees with options to construction of the Spur Road, options for the alignment of the Spur Road, and introduced proposed preliminary plans for eleven of the design refinements. The second workshop was held on September 6, 2011. The 2011 Workshop provided the public an opportunity to review all 16 design refinements to the 2008 ROD design. DelDOT provided an opportunity to view final design plans for Design Sections 1, 2, and 3 and preliminary plans for Design Section 4 and to comment on all refinements developed since the April 2008 Record of Decision.

March 23, 2009 – Spur Road Options, Traffic Data and Design Refinements

The Department developed, evaluated and presented, at the March 23, 2009 Public Workshop, refinements to the US 301 Spur Road as detailed in the ROD and alternatives to the Spur Road itself, including the upgrade of existing US 301, and current traffic data. This information was also presented at several pre-workshop community and stakeholder meetings. The pre-workshop meetings and the workshop also provided the Department with the opportunity to present to the public preliminary design plans for 11 of the 15 design refinements. ***Table 21*** lists the refinements that were presented at the workshop.

Table 21: Design Refinements Presented at the March 23, 2009 Public Workshop

Design Section	Refinement Number	Refinement Description
All	1	Narrow Median Width to 54 Feet
1	3	Relocation of US 13 to Northbound SR 1 Toll-Free Ramp at Port Penn Road to the South
1	5	Jamison Corner Road Interchange Roundabouts
2	7	Reconfigure the New US 301/Existing US 301 Interchange
2	8	Northbound US 301 Exit to the Northbound Spur Road, Right Side rather than Median Side
2/3	9 & 10	Levels Road Interchange Shift 125 Feet to the South to Minimize Impacts and Levels Road South-Serving Ramps and Toll Plaza Ramps Operational Adjustments
3	11	Strawberry Lane Local Connector to Existing US 301
3	12	Eastward Shift of US 301 Mainline at the State Line
4	13	SR 896/Bethel Church Road Interchange
4	14	Spur Road Alignment Refinements to Minimize Impacts

On August 3, 2009, DelDOT forwarded an update of project activities to project stakeholders, including a link (www.us301.com) to the April 30, 2009 DelDOT report on the Public Workshop sent to the General Assembly. Included with the letter was a map showing the Design Sections and a list of the Design Refinements that were presented at the March 23, 2009 Public Workshop. The letter identified 9 of the 11 Refinements that were being incorporated into the project design; two remaining refinements (3 and 14) were still being evaluated. The August 3, 2009 letter concluded with instructions on how set up an account to receive project updates by email (see **Appendix F**).

September 6, 2011 – Updates on the US 301 Design and Additional Refinements

As the design of US 301 Mainline advanced to the final phase, and as the Spur Road plans approached the preliminary phase, a second round of pre-workshop community meetings, elected official briefings and a second Public Workshop were held to update and inform the public of the status of the US 301 project and to secure additional public input.

Pre-workshop community meetings were held with residents of Airmont and Mount Hope, Spring Arbor, Springmill, and Summit Bridge Farms, where the current design refinements affecting each respective community were presented and residents' comments were heard and addressed. Notes of each meeting and responses to comments received at the meeting were posted on the project website following each meeting. Several issues raised at the community meetings have been addressed by refinements in design.

Attendees at the September 6, 2011 Public Workshop were given an opportunity to view and comment on the four Section Designs as well as all 16 of the Design Refinements that are included in the final design plans. A PowerPoint presentation, previewing the workshop and discussing the materials to be found on the displays, was given hourly beginning at 3:15 PM. A summary of the workshop is presented in **Appendix G**. Electronic versions of the roll maps for each Section Design, displayed at the workshop, are included on the electronic (CD) version of the document.

AGENCY COORDINATION

Throughout the US 301 design process, DelDOT has continued coordination with the resource and regulatory agencies through regular quarterly meetings, special meetings and field views. Representatives from the following agencies generally participate in these meetings: ACOE, EPA, US Fish and Wildlife Service (FWS), FHWA, SHPO, Delaware Department of Agriculture (DDA), and DNREC (Divisions of Coastal Management Program, Fish and Wildlife, and Wetlands and Subaqueous Lands). ***Table 22*** presents a list of agency meetings that have occurred since the ROD approval and commencement of design, with a brief summary of topics discussed at each meeting.

Table 22: Agency Coordination Meetings

Date	Topics Discussed
October 23, 2008	Overview and status; Spur Road status; GEC responsibilities; section designers; permits submission and compliance tracking; updates on mitigation and archaeology
December 2, 2008	Initial view of Refinements: 7-New/Existing US 301 Interchange; 11-Strawberry Lane Local Connector; 9-Levels Road Interchange shift with temporary haul road over Sandy Branch. Initial review of Pleasanton & Ratledge Road mitigation sites: Basic Design and elements of the Levels Road Mitigation site
December 17, 2008	**Field Review** of Refinements: 9-Temporary haul road over Sandy Branch and Levels Road Interchange bridges over Sandy Branch. Review of Levels Road mitigation site design
January 13, 2009	Discussion of 12/17 field review Refinements: 9-Levels Road Interchange, temporary haul road. Discussed field review of Levels Road mitigation site. Introduced median width narrowing to 54 feet (Refinement 1).

Table 22: Agency Coordination Meetings

Date	Topics Discussed
January 29, 2009	Discussion of concerns about Levels Road mitigation site design and Refinement 9-Levels Road Interchange ramps/bridges over Sandy Branch.
February 19, 2009	Preview of upcoming Public Workshop refinements to be presented and draft of impact matrices.
March 5, 2009	**Field Review** of Section 1 (East of NSRR to SR 1) to evaluate elements of bridge design refinements: 2-US 301 bridges over Scott Run, 6-US 301 bridges over Drawyer Creek; and 4-Hyetts Corner Road overpass.
March 26, 2009	Update of December 17, 2008 field review action items and review of March 5, 2009 field review and discussion and action items. Results of the community meetings and Public Workshop and actions to be taken as a result comments received; review of impact matrices distributed at the Public Workshop. Review and request for concurrence to move forward with refinements that did not receive major public comment: 12-eastward shift of Mainline at State Line; 9-Levels Rd interchange shift south, and 10-toll plaza ramps; 8-right exit to Spur Rd; and 5-Jamison Corner Rd Roundabouts. Agencies had no objections.
July 7, 2009	**Field Review** of bridges Refinement 2-Bridges 1-4 (US 301 over Scott Run Tributary) and Refinement 6-Bridges 1-10 (US 301 over Drawyer Creek)
July 23, 2009	Discussion of ongoing efforts at Levels Road mitigation site and review of hydrology report.
August 25, 2009	DelDOT briefing for FHWA to cover ongoing design refinements (including Refinements 12, 10, 8, 7, 6, 5, 2, 14, 13) and their impacts; Preview of upcoming field view of bridges over Back Creek (Spur Road alignment – 14) and over Sandy Branch (Levels Road Interchange refinement – 9)
September 15, 2009	Review of design refinements and impacts to date; recommended inclusions in the final design, and requested concurrence from agencies. Design Refinements concurred/no objections: 5, 2, 6, 7, 9 & 10, 12, and 8 (general concurrence with additional evaluation of SWM). Refinements that did not receive concurrence at this time: 3 (Toll-Free Ramp to SR 1), 14 (Spur Road Option 3 alignment, including bridge 4-5 over Back Creek), 13 (Option B). FHWA had no objection to all refinements in Design Sections 1-3. **Field Review** of bridges over Back Creek (Refinement 14) and Levels Rd bridges (Refinement 9)
September 24, 2009	Discussion of design options at the Pleasanton mitigation site and hydrology study
December 10, 2009	Discussion of new Toll-free Ramp design at Port Penn Road (Refinement 3)
February 2, 2010	**Field Review** of Pleasanton mitigation site and review of designs for various culvert locations and structures, including animal crossing culvert north of Boyds Corner Road.
February 22, 2010	DNREC/RKK **Field Review** of DNREC jurisdiction of subaqueous lands along the alignment and various culverts.
May 25, 2010	Review of GEC activities – wetlands delineation, geotechnical investigations, archeology; design review of culverts and restoration of temporary impacts. Reviewed refinements 14 (Spur Road, including bridges over Back Creek), 13 (SR 896/Bethel Church Road Interchange), and 8 (Spur Road right side exit ramp from Mainline. Reviewed mitigation site design status for Levels Road, Pleasanton & Ratledge Road.
June 24, 2010	Distribution of Section 3 (DE/MD line to Levels Road) Semi-Final Plans to agencies for review. Discussion of Section 3 impacts, culvert backfill, and Scott Run stream restoration project
September 23, 2010	Review of minimization efforts for right Spur Road exit (Refinement 8 in Design Section 2) and design of culvert at Churchtown Manor (Station 660 in Design Section 1)

Table 22: Agency Coordination Meetings

Date	Topics Discussed
June 9, 2011	Introduced the Design Refinements Report/Reevaluation. Reviewed new refinement 16 (Emergency Access Ramps) and continued review of refinements 3 (Toll-Free Ramp at Port Penn Road), 4 (Closure of Hyetts Corner Road during construction), 14 (Spur Road Alignments), and 15 (Churchtown Rd Overpass/Tidewater Access). Other topics: SWM overview, pursuit of Ratledge Road agricultural easement, ROD commitment and impacts tracking, wetland mitigation design overview
September 19, 2011	Reviewed pre-workshop and Public Workshop comments and potential actions. Cultural resources consultation updating mitigation efforts. Review of mitigation package for natural resources including wetlands, waters, wildlife crossing, subaqueous lands, coastal zone, and forest, plus potential additional reforestation of landlocked parcels. Refinements reviewed and concurred/not objected to for inclusion in final design: 3, 4, 14, 15, 16; also reviewed balance of 11 refinements previously concurred/not objected to by agencies. Reviewed next steps, submission of this report to FHWA in October, permit status and mitigation site protection.
October 20, 2011	Discussed maintenance agreements for Summit Bridge and approaches and land required for interchange Option B. Determined land required by DelDOT is not Section 4(f).

An important outcome of the consistent and frequent involvement with the resource agencies is that, of the 16 design refinements that have been presented to and evaluated with the agencies, all 16 have been concurred in/not objected to or approved for incorporation into the final design. Some of the refinements, notably Design Refinement 2 (Design of Bridges over Scott Run and Scott Run Tributary at SR 1 Interchange) and Design Refinement 6 (US 301 Bridges over Drawyer Creek) were incorporated in response to resource agency field views and their suggestions to minimize impacts. Continued development of two refinements initially presented at the March 2009 Workshop, the Relocation of US 13 to Northbound SR 1 Toll-Free Ramp to the South at Port Penn and the Spur Road Alignment Refinements to Minimize Impacts, were presented again for review at the June 9, 2011 agency meeting, the September 6, 2011 Public Workshop, and the September 19, 2011 agency meeting. Two refinements not presented at the March 2009 Workshop, Refinement 15, the Churchtown Road Overpass/Tidewater Utilities Access, a part of the US 301 Spur Road Alignment Refinements, and Refinement 16, Emergency Access Ramps for Incident Management, were also reviewed by the agencies at the June 9, 2011 and September 19, 2011 agency meetings and presented at the September 6, 2011 Workshop. Very few minor modifications, if any, are anticipated as the US 301 mainline design reaches final construction contract document status.

Copies of the agency meeting notes, PowerPoint™ presentations and handouts are included in chronological order in **Appendix H**.

Permits

The US 301 project requires federal, state and county permits and approvals prior to construction. Delaware Coastal Management Federal Consistency Certification from the Delaware Coastal Management Program was granted on September 14, 2007, and an ACOE Provisional Permit was issued on August 18, 2009. A Permit modification request will be submitted upon receipt of the DNREC permit approval for Design Section 3. A final ACOE construction approval will be issued with the first Delaware 401 Water Quality Certification approval for each design section.

Maryland Department of the Environment (MDE) Non-tidal wetlands and waterways and Maryland 401 Water Quality Certification was applied for on March 22, 2010, and a field site visit was conducted on April 27, 2010. On May 6, 2010, MDE requested additional information to approve the permit, including full-size detailed plans that include approved ESC plans. MDE SWM and ESC plan approval was granted on January 13, 2011, and design plans were submitted to MDE on September 22, 2011. The Maryland National Pollutant Discharge Elimination System (NPDES) Permit for US 301 was granted on May 31, 2011.

The US 301 Project Section 3 application for DNREC Subaqueous Lands, Tidal Wetlands, and Delaware 401 Water Quality Certification was submitted on July 29, 2011. The applications for the other US 301 mainline design sections are anticipated to be submitted in December 2011 for Section 1 and January 2012 for Section 2. County floodplain approvals for each United States Geological Society (USGS) Blue Line Stream will be applied for following submission of final design plans for each stream.

CONCLUSION

This report has updated the status of the US 301 project since the FHWA issued the ROD on April 30, 2008. The report describes the changes to the 2008 ROD Selected Alternative design for the US 301 Mainline and US 301 Spur Road; identifies the rationale for the changes and presents advantages and disadvantages of each refinement; and details the impacts that would be associated with the refinements. The report also describes the continuous involvement of the resource and regulatory agencies in the decisions made concerning the refinements and the public input received through the project website updates, letters, pre-workshop community meetings, elected official briefings and public workshops. The Resource Agencies have concurred in/not objected to all 16 design refinements, and all 16 design refinements have been presented to the project stakeholders with comments received and considered in the finalization of the design refinements for incorporation into the project.

The purpose of this Design Refinements Report is to provide a reevaluation report to FHWA in accordance with 23 CFR 771.129 – Reevaluations. This Report documents that the impacts associated with the post-ROD Design Refinements to date for the US 301 project are not significantly different from those impacts detailed in the 2007 FEIS and ROD issued by FHWA on April 30, 2008 and that the ROD remains valid and that no other supplemental environmental documentation is required.