



I-81 Corridor Improvement Study
Tier 2 – I-77/I-81 Overlap

Natural Resources Technical Report

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1

Surface Waters

The Tier 2 – I-77/I-81 Overlap study area lies within the 200+ square mile Reed Creek watershed. It is located in part of the Ridge and Valley Physiographic Province which consists of mountain peaks among broad valleys. Land use in the immediate study area consists mostly of pastures with patches of forested wood lots and residential lots. Numerous first, second, and third order tributary streams are present throughout, flowing from west to east to Reed Creek, a tributary of the New River. Most streams within pastures occur as incised channels that are disconnected from their historic floodplains. They typically possess mud or gravel beds. Several channels within the I-81 right of way have been modified and re-routed using concrete V-shaped channels.

Reed Creek bisects the two study corridors just east of Wytheville, continues on the north side of the study corridors flowing east, meanders back into the study corridors at the far eastern end of the study area, and crosses I-81 approximately 1.2 miles east of the interchange between I-77 and I-81. This river maintains riffle/pool morphology with a channel width ranging between 50 to 90 feet. Several named perennial channels serve as tributaries to Reed Creek, including Muskrat Branch, Cove Creek, McGavok Creek, and Miller Creek. No streams are listed as cold water trout streams by the Virginia Department of Game and Inland Fisheries (VDGIF).

Wetlands include “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (U.S. Army Corps of Engineers 1987). Wetlands within the study area are few, scattered, and relatively small in size. They include small groundwater seeps, wet banks of stream channels, or man-made

ditches dominated by emergent vegetation. Soft rush (*Juncus effusus*), cattails (*Typha latifolia*), spotted jewelweed (*Impatiens capensis*), and reed canary grass (*Phalaris arundinacea*) are the most commonly found wetland plants. These systems are classified as palustrine emergent (PEM) in accordance with Cowardin et al. (1979) and provide groundwater discharge, water quality filtration, and limited stormwater retention functions. Farm ponds with open water classified as palustrine unconsolidated bottom (PUB) are also present within valleys as watering holes for livestock. Some ponds are diked systems fed by stream channels, while other ponds were created as isolated pits excavated in uplands. These ponds provide wildlife habitat for resident and migrating waterfowl, watering sources for mammals, and serve as breeding habitat for amphibians.

Impacts to Jurisdictional Streams and Wetlands

For the purpose of this assessment, the degree of stream and wetland impact associated with either candidate build alternative was estimated in conservative fashion. Specifically, any stream or wetland found within the boundaries of the alternative was considered impacted. An inventory approach is appropriate for this level of assessment as it provides a relative degree of impact between alternatives. Once a preferred alternative is identified, exact boundaries of jurisdictional areas will be delineated, surveyed, and agency confirmed within the chosen alignment based on the *U.S. Army Corps of Engineers Wetland Delineation Manual* (1987) and current regulatory guidance regarding Section 404 jurisdiction. Precise impact figures for the chosen alternative will be determined once the delineation work is completed and a more detailed roadway design plan is drafted. Through the submittal of a Joint Permit Application (JPA), VDOT will ensure that all necessary permits are secured from the U.S. Army Corps of Engineers, Virginia Department of Environmental Quality, and Virginia Marine Resources Commission for any proposed impacts to surface waters.

■ Stream Impacts

Stream impacts for the two alternatives are presented in Table 1 and shown on Figures 1A through 1D. The construction of the new alignment (Candidate Build Alternative A) would result in the impact of approximately 5,130 linear feet of intermittent stream channel and 5,500 linear feet of perennial channel. A portion of the impacts would be attributable to bridges built over Reed Creek. Three bridges would be needed at meander bends of Reed Creek just north of the easternmost I-77/I-81 interchange, and another bridge would be installed at Reed Creek just east of Wytheville. Pipe culverts would be installed at all other



stream crossings. Detailed hydraulic studies have not been performed at this early stage of conceptual design to determine the exact size of each culvert. Culverts would be adequately sized to accommodate flood flows in accordance with state and federal standards.

Widening of Interstate 81 (Candidate Build Alternative B) would impact approximately 3,350 linear feet of intermittent stream channel and 13,500 linear feet of perennial stream channel at 24 different locations. Of the 13,500 linear feet of perennial impacts, 6,700 linear feet of impacts would occur to existing concrete-lined channels adjacent and parallel to the interstate roadway. It may be possible to relocate these channels to new concrete-lined channels to make room for roadway improvements. Such a relocation would typically be considered a no-impact scenario. The existing I-81 bridge at Reed Creek just west of Wytheville would be widened, and remaining stream impacts would be from piped culverts. All culverts would be extensions of existing culverts and sized to match existing culverts.

Table 1 Tier 2, I-77/I-81 Overlap Stream Impacts

STREAM TYPE	IMPACTS (Linear Feet)	
	Alternative A	Alternative B
Intermittent	5,130	3,350
Perennial	5,500	13,500
Total	10,630	16,850

■ Wetland Impacts

Wetland impacts associated with the two alternatives are presented in Table 2 and displayed in Figures 1A through 1D. Impacts for both alternatives would result from the placement of fill material to create the roadbed, and impacts to wetlands resulting from stormwater management features would be avoided as much to extent practicable.

The conceptual design of a new alignment Alternative A bisects mostly pastureland where approximately 1.84 acres of emergent (PEM), along with 3.98 acres of farm ponds (PUB wetlands) may be impacted for a total of 5.82 acres. These impact figures are reflective of mostly new interstate right of way and connecting on/off ramps. Wetland impacts may be fewer once the roadway and interchange designs are more refined to exact dimensions and locations within the study corridor.



The boundary for Alternative B contains 1.97 acres of emergent (PEM) wetlands, 0.04 acre of emergent/scrub shrub (PSS) wetlands, and 2.30 acres of farm ponds (PUB wetlands) for a total of 4.31 acres that could potentially be impacted. Impacts would depend on the final design of this alternative and the exact location of on/off ramps.

Table 2 Tier 2, I-77/I-81 Overlap Wetland Impacts

WETLAND IMPACT TYPE	IMPACTS (Acres)	
	Alternative A	Alternative B
Palustrine Emergent (PEM)	1.84	1.97
Palustrine Emergent/ Scrub-Shrub (PEM/PSS)	0.04	--
Palustrine Unconsolidated Bottom (PUB)	3.98	2.30
Total	5.86	4.27

Stream/Wetland Permit Determination

Both the state and federal permits will be required for both candidate alternatives to encroach into wetlands and streams. More specifically, permits will be required from the following agencies.

- U.S. Army Corps of Engineers (COE) (Section 404 of the Clean Water Act)

The Corps of Engineers maintains jurisdiction over all Waters of the United States including wetlands. Permitting options available to the Virginia Department of Transportation include a Letter of Permission (LOP) and an Individual Permit (IP). The Nationwide Permit 14 (Linear Transportation Projects) has been suspended in Virginia for non-tidal wetland/steam impacts.

The Norfolk District of the COE provides a Letter of Permission (LOP) specifically for the Virginia Department of Transportation that allows the impact of up to 2 acres of wetlands and 1,000 linear feet of stream channel per crossing. Impacts exceeding these amounts would require an Individual Permit (IP). In addition, the COE can use discretionary authority to elevate a project that otherwise would qualify for an LOP to an IP if the project proposes impacts to listed species, wetlands, streams, or cultural resources determined by the COE to be significant.

For purposes of this assessment, a preliminary impact analysis indicates that Alternative A may result in each stream crossing being less than 1,000 linear feet

and each wetland impact may be less than 2.0 acres. At these levels, Alternative A would qualify for an LOP. On the other hand, Alternative B appears to require the relocation of over 1,000 linear feet of perennial stream channel, which would require an IP from the COE.

■ Virginia Department of Environmental Quality (DEQ) (§62.1-44.15.5)

The Commonwealth of Virginia oversees Section 401 of the Clean Water Act by issuing water quality certification (Water Protection Permits) to landowners for impacts to waters of the state, to include isolated and connected wetlands and streams. The DEQ maintains a general Water Protection Permit 3 (WP3) for transportation projects allowing cumulatively up to 2 acres of non-tidal wetland impacts and 1,500 of stream bed for a single and complete project. Beyond these impact amounts, an Individual Permit (IP) would be required from DEQ.

It appears both candidate alternatives would exceed the impact thresholds for the WP3, thus requiring a separate IP from DEQ.

■ Virginia Marine Resources Commission (VMRC) (4 VAC 20-333-10 et seq.)

VMRC maintains jurisdiction over all streams and rivers at the point that the average volume of flow does not exceed 5 cubic feet per second or the upstream watershed is below 5 square miles. The only VMRC jurisdictional waterbody within the project study area is Reed Creek. Both candidate alternatives require the construction of bridge structures over Reed Creek that would be permitted by the VMRC.

Stream/Wetland Compensation

Engineers and roadway designers will attempt to avoid and minimize stream and wetland impacts where feasible in compliance with Section 404(b)(1) guidelines. For those impacts that are absolutely necessary, a mitigation plan will be developed to compensate for stream/wetland losses. The degree and amount of compensation would be determined for each surface water feature on a case-by-case basis using agency-approved assessments to qualify functional values. One such method is the Unified Stream Methodology (USM) jointly approved by the COE and DEQ to determine the amount of mitigation for stream loss. With regard to wetlands, palustrine emergent (PEM) and open water ponds (POW) (Cowardin et al. 1979) comprise almost all of the wetland types that would be lost.

Once the amount of mitigation is determined, a mitigation plan would be proposed to offset project losses. A mitigation plan may include:

- On-site opportunities to restore surface water systems where available, such as stream restoration using natural channel design;
- Off-site compensation either through a project-specific restoration plan or the purchase of mitigation credits from a local, private mitigation bank or the Virginia Aquatic Restoration Trust Fund;
- A combination of on-site and off-site restoration; or
- A project specific negotiated compensation package to offset stream and wetland losses that meets regulatory requirements.

Floodplains

Executive Order 11988: *Floodplain Management* requires the protection of floodplains for the purpose of preventing adverse impacts associated with the occupancy and modification of floodplains, and to ensure that work within the 100-year floodplain will not increase downstream flooding. Floodplains are regulated by the Federal Emergency Management Agency (FEMA) and administered by local floodplain management ordinances within individual localities. Potential effects on floodplains for the two alternatives were completed at a level appropriate for this EA.

FEMA has been tasked with mapping those areas within the country at risk of inundation resulting from a 100-year storm event. Data available from FEMA for the study area have been transferred into GIS, and were found to be associated primarily with floodplains to Reed Creek and several tributaries. Acreage impacts to floodplains were determined by overlaying the study corridors for each alternative over the 100-year floodplain. Potential direct impacts to floodplains were assessed as the potential loss of floodplain area. Other impacts include the loss of flood storage or new obstructions within the floodplain and could include an increase in depth or duration of flooding, or an increase in the lateral extent of flooding.

The Candidate Build Alternative A contains an estimated total of 39 acres of floodplains (Figures 3A and 3B). These include the Reed Creek floodplain at four separate locations and the crossing of Muskrat Run. Encroachments into Reed Creek floodplains would occur at the far eastern end of the project area just east and north of the existing I-77/I-81 interchange. This alignment would require bridges that would cross the meandering channel of Reed Creek at this location. Another bridge would be required at Reed Creek at the western end of the project area. Bridge pilings may be required in floodplains, but these structures



are expected to be so small as to not impair floodflow storage or create downstream flood hazards. Where possible, bridge designs would attempt to span the entire floodplain without the need for foundational footings in floodplains or channels. Alternative A will also bisect the floodplain associated with Muskrat Run immediately upstream from the confluence with Reed Creek. The design concept may include wide structures such as box culverts at Muskrat Run to accommodate storm flow volumes in accordance with state design standards. Overall, impacts to floodplains are unavoidable, and will be mitigated through the design of bridges and culverts properly sized so as not to impede storm flows or decrease flood storage capacity.

The Candidate Build Alternative B contains an estimated 47 acres of identified floodplains at several locations (Figures 3A and 3B). This alternative would impact the Reed Creek floodplain at one location at the western end of the alignment, although this impact would be minimal as it would involve the extension of an existing bridge. The bridge extension at this location may require one or more concrete pilings or similar bridge foundation within the floodplain, but these structures are not anticipated to remove sufficient flood storage capacity to cause downstream flooding or impede floodflows. Other impacts associated with Alternative B are minimal and include expansion into the floodplain associated with Muskrat Branch and other unnamed tributaries to Reed Creek, most having already been modified with concrete-line channels in association with the existing I-81 alignment. Floodplain impacts at channel crossings would result from the extension of existing culverts. Culvert extensions would be sized to match existing culverts, and are not anticipated to create flood hazards. The greatest potential for impacts are anticipated where streams parallel the road and the widening would encroach into floodplain areas. These impacts are associated with existing concrete-lined channels, and would be mitigated by the proper engineering of new channels designed to handle flood volumes per state requirements.

Water Quality and Stormwater Management

Water Quality Impacts - Surface Waters

The water quality of existing surface water features in the project study area is reflective of livestock management as the dominant land use. Farmers currently provide cattle direct access to ponds and stream channels resulting in soil disturbance along stream banks, sediment and erosion, and deposition/runoff of animal waste into surface waters. The Virginia Department of Environmental Quality (DEQ) has classified sections of Reed Creek and Muskrat Branch as state



impaired waters due to the presence of *Escherichia coli* bacteria resulting from livestock access to surface waters (Virginia Department of Environmental Quality 2008).

The two proposed alternative roadway alignments would both result in an increase in impervious surface area and stormwater runoff. Pollutants from such runoff may include grease, oils, metals, de-icing salts, and nutrients. Both alternatives may include a stormwater engineering plan to contain and/or treat runoff and control flooding through a series of stormwater basins, vegetated swales, and other proven design concepts before runoff is allowed to discharge into natural systems. Such stormwater management features would reduce stormwater volumes, remove pollutants, and/or attenuate stormflow. Immediate impacts to surface water quality related to construction would be temporary and low for both alternatives. The project is not expected to result in impacts to drinking water supplies or impair the health of the general public.

To the degree that engineers can reasonably design stormwater management features, detention ponds would be located in upland areas to avoid direct encroachment into existing jurisdictional surface water systems. If impacts are absolutely necessary, justification for encroaching into natural surface waters would be provided as part of the permit application package.

Construction of the final alignment would comply with applicable federal and state water quality control measures. Engineers will prepare a sediment and erosion (E & S) control plan to be implemented before, during, and after construction. Specific actions may include the installation of silt fencing and/or enhanced water filtering devices such as hay bales, temporary sediment basins and fore bays, and/or temporary energy dissipaters such as rip rap.

A stormwater management plan may be prepared to handle the additional stormwater volumes created by the roads impervious area. In accordance with the Virginia Stormwater Management Program, the plan will specifically address the prevention of post-construction stormflows that could impair downstream channel capacity and create flood hazards. These measures will insure that flow velocities and stormwater inputs into downstream systems do not cause channel destruction and flooding of receiving parcels beyond pre-construction levels.

Water Quality Impacts - Groundwater

The I-81/77 study area lies within the Valley and Ridge Physiographic Province, where folded Paleozoic strata typically dominate the topography. The eastern and western limits of the study area, coincident with the existing I-81/I-77



interchange and the Town of Wytheville, are floored by Cambrian carbonaceous rocks: dolostone and limestone (Figures 2A and 2B). The intervening corridor is largely underlain by Cambrian shale, within occasional outcroppings of Cambrian and Ordovician carbonates and Ordovician shales and mudstones.

Carbonate rocks within the valleys of the Valley and Ridge Province generally represent the most productive aquifers, yielding from 150 to 1,000 gallons per minute (USGS 1997). However, localized occurrences of fractured shale beds can also be significant sources. Because strata are typically thick and steeply tilted, water wells usually terminate in the rock unit that is exposed at surface, making geologic maps a good indicator of the aquifer an existing well is tapping. Wythe County operates four public water supply wells, located in Fort Chiswell and Max Meadows (WCWD 2008). All of these wells lie outside the study area. Based on available GIS data, six other public water supply wells are present just south of the existing I-81/77 alignment near the center of the study area (Figure 2A). Only one of these wells actually lies within the study area. It is located in the grassy median between the I-81N / I-77S off ramp at Exit 77 and Chapman Road, very near the intersection with Ready Mix Road (Figure 2A). The operator of this well and its capacity are unknown. It lies within an area of mapped dolostones and limestones.

Sinkholes can occur where carbonaceous rocks outcrop. These closed depressions in the land surface (i.e., karst topography) indicate the collapse of an underground void such as a cave or large dissolution fissure or cavity, and sinkholes thus represent focused points for aquifer recharge. Because carbonaceous rocks are relatively porous and have high permeability, water supplies developed in the regional aquifer systems of the Valley and Ridge Province are susceptible to contamination from near-surface sources (Nelms et al. 2003).

Sinkholes are present within the study area, corresponding to outcroppings of carbonaceous rock. They are particularly concentrated in two areas (Figures 2A and 2B): at the eastern end of the study area within the I-81/77 interchange, and east of the community of Kent and north of the current I-81/77 alignment near the center of the study area. Smaller and more disseminated sinkholes also occur just northeast of Wytheville in the vicinity of I-81/77 interchange 72.

Springs are also common in the Valley and Ridge Province. Though none are mapped within the study area on either the 7.5-minute USGS quadrangle maps or the County soil survey (USDA 1992), field reconnaissance identified two springs. Both of these features are located just south of Chapman Road near the center of the study area (Figures 2A and 2B) and sustain jurisdictional emergent

wetland features. The west spring discharges to a trough that may have been used in the past for livestock watering.

■ Impacts to Sink Holes

Highway improvements in areas of karst topography have the potential to threaten subsurface groundwater resources in two chief ways. First, stormwater runoff from road surfaces may contain heavy metals, road salts, nutrients, and hydrocarbons (DMME 2001). Should this water be routed in unmediated fashion into a sinkhole, aquifer contamination may occur and may threaten public drinking water resources and ecologic habitat within caves. Accidental releases of chemical materials in transport may also result in aquifer contamination; with long-term consequences should the chemicals be immiscible with water (DMME 2006). Second, because areas of karst topography are underlain by void spaces in the rock structure, the additional weight imposed by road surfaces, fill material, and bridges and overpasses may result in a collapse of the rock unit. Such an outcome can be localized or extend for considerable distance, and may have implications for aquifer health, cave ecology, highway infrastructure, and traffic congestion. I-81 has been damaged previously by such collapses. In June, 2009, a small sinkhole developed in the northbound lane of I-81 near mile marker 85, resulting in lane closures and delays at the I-81N / I-77N interchange (The Roanoke Times 2009).

Both Candidate Build Alternatives A and B intersect mapped sinkholes (Figures 2A and 2B). Candidate Build Alternative A encompasses 11.32 acres of sinkholes, whereas Alternative B intersects 9.5 acres. The larger number attributed to Alternative A is a result of its relatively large footprint in the vicinity of the eastern interchange where I-77 diverges southerly. Sinkholes are particularly concentrated in this area, with one particularly large occurrence (4.1 acres) mapped in the southeast quadrant of the interchange. This large sinkhole lies within the Alternative A footprint but is partially outside Alternative B. Alternative A intersects two other clusters of sinkholes that Alternative B avoids altogether. The first is located near the center of the study area, where the Alternative A footprint overlies three sinkholes in an area of karst terrain northeast of Kent. The second area is north and east of the US-11 interchange (Figure 2A).

Any proposed roadway improvement would require the implementation of best management practices (BMP's) to attenuate stormflow from road surfaces and to mediate pollutant loads. Under the provisions of the Safe Drinking Water Act, the EPA regulates the discharge of stormwater runoff to "improved" sinkholes through the Underground Injection Control (UIC) Program. Any routing of stormwater to a sinkhole may require a permit from the EPA. If a build



alternative is selected, the final design of the roadway would be carried out in accordance with VDOT Instructional and Information Memorandum LD-228.1, entitled *Guidelines for the Discharge of Stormwater at Sinkholes* (VDOT 2008).

■ Impacts to Springs

Based on a windshield survey of the proposed alignments, two springs lie within the footprint of Alternative A. These springs appear to have limited to no function as sources of drinking water, though they do help sustain emergent wetlands downgradient of where they discharge. These springs have been improved by the construction of springhouses and lie very near other manmade infrastructure, including residences (Figures 2A and 2B).

■ Impacts to Drinking Water Supplies

Because groundwater is an important source of drinking water for Wythe County residents, the potential impacts on groundwater aquifers noted in the preceding sections apply. With respect to public supply wells, just one such well is intersected by Alternative A (Figure 2A).

There are no sole source aquifers present within the study area. The public water supply is sustained by more than one source of water, including both ground and surface waters. Public supply wells near Fort Chiswell and Max Meadows intersect different aquifers, and the Ivanhoe Water Treatment Plant provides drinking water by treating surface water from Powder Mill Branch.

2

Wildlife and Fisheries

Wildlife habitats in this vicinity of Wythe County range between various successional stages of vegetative development depending on the intensity of land use. Most of the habitats consist of pastures or open grassland communities occupied by livestock, while fence lines, steep hillsides and stream corridors may contain dense shrubs and thickets. Included also are scattered fragments of deciduous hardwood forests, some of which are associated with the larger riparian corridors. The Virginia Department of Game and Inland Fisheries on-line database (VDGIF 2009) lists 428 potential wildlife and fish inhabitants in the local region (Appendix A). The Virginia Department of Conservation and Recreation, Division of Natural Heritage indicates that no State Natural Area Preserves are documented as occurring near the project vicinity.

Wildlife

Vegetation along Candidate Build Alternative B is characterized by grass on road shoulders and medians, with shrub thickets and scattered trees occurring on steeper roadside slopes within the highway right of way. Candidate Build Alternative B would impact those habitats found within the existing right of way, coupled with pastures and small woodlots on adjacent properties where on/off ramps would be built. Wildlife usage within the highway right of way is less common than neighboring parcels due to the noise and disturbance created by interstate traffic. Wildlife species that may be observed utilizing the Alternative B alignment include the woodchuck (*Marmota monax monax*), eastern cottontail rabbit (*Sylvilagus floridanus mallurus*), eastern meadowlark (*Sturnella magna*), song sparrow (*Melospiza melodia*), brown thrasher (*Toxostoma rufum*), and northern mockingbird (*Mimus polyglottos*). While there would be some direct and permanent loss of habitat caused by this alternative, temporary impacts to wildlife habitats from equipment access, materials stockpiling, and earthworking would be stabilized and re-vegetated once construction is completed. Overall,

this alternative would have a low degree of permanent impact to wildlife, and would not affect overall wildlife population levels.

Candidate Build Alternative A would require a new alignment and thus a higher degree of wildlife habitat loss compared to Alternative B. Alternative A would primarily impact early successional habitats associated with pastures and meadows commonly used by such species as the woodchuck (*Marmota monax monax*), eastern cottontail rabbit (*Sylvilagus floridanus mallurus*), eastern meadowlark (*Sturnella magna*), field sparrow (*Spizella pusilla*), red fox (*Vulpes vulpes fulva*), and chipping sparrow (*Spizella passerine*). In addition, patches of deciduous forest would also be impacted that may be utilized by white-tailed deer (*Odocoileus virginianus*), gray fox (*Urocyon cinereoargenteus cinereoargenteus*), opossum (*Didelphis virginiana virginiana*), raccoon (*Procyon lotor*), northern gray squirrel (*Sciurus carolinensis pennsylvanicus*), southern flying squirrel (*Glaucomys volans volans*), striped skunk (*Mephitis mephitis*), red-eyed vireo (*Vireo olivaceus*), Carolina wren (*Thryothorus ludovicianus*), downy woodpecker (*Picoides pubescens medianus*), tufted titmouse (*Baeolophus bicolor*), and eastern rat snake (*Pantherophis alleghaniensis*). Wildlife species utilizing these habitats occur in sustainable and stable numbers, such that the loss of habitat for this alternative would have very minimal impacts to wildlife population levels.

Fisheries

Reed Creek and perennial tributaries within the study area are aquatic habitats for a variety of fish and mollusk species to include the New River shiner (*Notropis scabriceps*), bluehead chub (*Nocomis leptocephalus*), creek chub (*Semotilus atromaculatus*), fantail darter (*Etheostoma flabellare*), bluntnose minnow (*Pimephales notatus*), silver shiner (*Notropis photogenis*), redbreast sunfish (*Lepomis auritus*), spike mussel (*Elliptio dilatata*), crested mudalia snail (*Leptoxis carinata*), and crayfish (*Orconectes spinosus*). Reed Creek is not listed as a cold water trout stream by the Virginia Department of Game and Inland Fisheries.

Potential impacts to aquatic habitats associated with Alternative B would be fewer compared with Alternative A, mainly due to a lower number of crossings of Reed Creek. Impacts to aquatic habitats would occur for both alternatives because of the need to place culverts in stream channels. Alternative B is expected to have fewer culverts.

Although both alternatives would incorporate bridges at Reed Creek, the potential for impacts to fisheries habitat and water quality due to siltation and discharges of suspended solids during construction are greater with the



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construction of three bridges for Alternative A compared to the one crossing for the Alternative B. For both alternatives, oversight during construction would be implemented to insure compliance with federal, state, and local permit conditions protecting water quality. Sediment and erosion control devices would be properly designed, installed, and maintained. Construction crews would be properly trained with the handling of equipment, fuels, and oils to prevent inadvertent impacts to water quality. Bridge impacts to aquatic species populations associated with both alternatives are expected to be temporary and low.

3

Threatened and Endangered Species

Prior to any field studies, the U.S. Fish and Wildlife Service (USFWS) and the Virginia Department of Natural Heritage (DNH) were consulted regarding the potential presence of listed plant and animal species in the immediate vicinity of the project area. A literature review of each species was performed to determine specific habitat requirements. In addition, the Virginia Department of Game and Inland Fisheries (VDGIF 2009) maintains a database of documented sightings of listed animal species throughout the state. The database, made available on-line and known as the Fish and Wildlife Information Service (FWIS), provides a list of species known to occur within each county. If a particular species is documented as occurring within a 2 mile radius of the target project area, the database will identify that species as “confirmed.” The combination of these available agency resources were used as the basis for determining if impacts may occur to listed species resulting from either of the candidate build alternatives.

Once a preferred alternative is identified, VDOT would initiate the consultation process with the USFWS pursuant to Section 7 of the federal Endangered Species Act.

Listed Plants

The Virginia Department of Conservation and Recreation Division of Natural Heritage (DNH) indicated the potential presence of two listed plants within the study area. These include the smooth coneflower (*Echinacea laevigata*) and the Virginia spiraea (*Spiraea virginiana*). These two species of rare plants have specific habitat needs. An investigation into the presence of these habitats within the study area was performed by Douglas A. DeBerry, Ph.D., who is recognized

by the U.S. Fish and Wildlife Service (USFWS) as a survey contact for all rare plant species in Virginia.

■ Smooth Coneflower (*Echinacea laevigata*)

Smooth coneflower is listed by USFWS as federally endangered, and by the Virginia Department of Agriculture and Consumer Services (VDACS) as state threatened (Townsend 2009). It is a medium to tall (up to 1.5 m) perennial forb of the aster family (*Asteraceae*), producing a single, smooth stem from a short rootstock (Radford et al. 1968, Gleason and Cronquist 1991) with a single flower per stem usually from May to July (Radford et al. 1968, Wofford 1989). The flowers heads are characterized by long rays (5-8 cm) that are generally pale purplish to pink in color (Gleason and Cronquist 1991, Ludwig 1991). Disk flowers are purplish in color and approximately 5 mm long (U.S. Fish and Wildlife Service 1995).

This species is native to the southeastern United States, specifically occurring in the upper Piedmont/lower Appalachian foothills of Virginia, North Carolina, South Carolina, and Georgia (Alley and Affolter 2004, Alley et al. 2005), although the historic range of the plant is thought to have extended northward through Maryland to Pennsylvania (Fernald 1950). In Virginia, its distribution overreaches the Ridge and Valley Physiographic Province as far west as Wythe County (Virginia Botanical Associates 2008). Apsit and Dixon (2001) note 24 known populations throughout the plant's southeastern range, with seven extant in Virginia. The plant seems to grow best in areas exposed to sunlight, and on magnesium- and calcium-rich soils over limestone or diabase bedrock such as Elbrook Dolomite (Apsit and Dixon 2001, Alley et al. 2005, Fleming et al. 2006). In Virginia, such habitats emerge in thin, dry woodlands, cleared or disturbed areas, and along road cuts (Ludwig 1991). Major threats include the loss of naturally open habitats, and the suppression of natural disturbances such as fire (Ludwig 1991, U.S. Fish and Wildlife Service 1995).

A habitat evaluation for smooth coneflower was conducted within the corridors of the two candidate build alternatives. The evaluation included a screening-level review based on a compilation of offsite reference materials and onsite reconnaissance. In general, the corridors lack potential habitat for smooth coneflower. Anthropogenic disturbance within the existing Alternative B corridor, particularly industrial, commercial, and residential development, as well as ROW clearing and maintenance surrounding the Interstate and secondary roads, renders this area generally unsuitable for smooth coneflower (U.S. Fish and Wildlife Service 1995). In addition, the proposed route for the Alternative A exists almost exclusively within agricultural fields maintained for

either commodity crops (tilling and planting) or livestock pasture (mowing/hay production). This type of management regime does not emulate a natural stress-disturbance condition (e.g., fire) and is therefore not conducive to smooth coneflower colonization (Ludwig 1991, U.S. Fish and Wildlife Service 1995).

Within the corridor encompassing the build alternatives, a few small forest stands remain. At best, these are highly modified enclaves within the matrix of development and agricultural land described above. Vegetation is characterized by an amalgam of native and exotic species, including Virginia pine (*Pinus virginiana*), tulip tree (*Liriodendron tulipifera*), black locust (*Robinia pseudoacacia*), tree of heaven (*Ailanthus altissima*), mimosa (*Albizia julibrissin*), multiflora rose (*Rosa multiflora*), autumn olive (*Elaeagnus umbellata*), and a host of native and exotic herbaceous species. Throughout, vegetation assemblages are mixed mesophytic in character and do not exemplify the montane dry calcareous woodland and forest assemblage that typically accompanies smooth coneflower in Virginia (Fleming et al. 2006). With the absence of preferred habitat within the study area, the potential risk for impacts to smooth coneflower would be very low for both alternatives.

■ Virginia Spiraea (*Spiraea virginiana*)

Virginia spiraea is listed by USFWS as federally threatened, and by the VDACS as state endangered (Townsend 2009). Virginia spiraea is a medium to tall (up to 3m) shrub of the rose family (Rosaceae). Though there is much phenotypic plasticity in expression of characters (Ogle 1991b, USFWS 1992), Virginia spiraea plants generally produce sparse to moderately dense, upright, arching branches (Radford et al. 1968, Strausbaugh and Core 1978, Gleason and Cronquist 1991, NatureServe 2008). Flowering structure is a dense corymb that terminates the branches, and the flower has a small (ca. 6mm), whitish, 5-parted corolla (Fernald 1950, Gleason and Cronquist 1991, NatureServe 2008).

This species is found in the physiographic provinces of the southern Blue Ridge and Appalachian Plateau, almost exclusively in streams and rivers of the Ohio River drainage basin (NatureServe 2008). In Virginia, the plant is only known from 4 counties (Wise, Dickenson, Carroll, Grayson) (Virginia Botanical Associates 2008). In addition, FWS records, as well as the Digital Atlas of the Virginia Flora (Virginia Botanical Associates 2008), indicate that Virginia spiraea has never been documented in Wythe County.

Virginia spiraea inhabits higher-order streams and rivers with a channel gradient sufficient to produce high flows under appropriate conditions (Clarkson 1959, USFWS 1992, Weakley 2008). Plants become established in new locations from erosion – a clonal segment can become separated from a location due to scouring

from high-velocity flows, eventually getting deposited at a downstream location. In this manner, clonal modules can colonize new substrates (Ogle 1991b, USFWS 1992). Ogle (1991b, USFWS 1992) suggests that the preferred habitat is frequently disturbed, early-successional habitats on gravel outwashes, bars, debris dams, and river banks, in areas where flood-induced disturbance maintains a sparsely vegetated substrate. Virginia spiraea is intolerant of competition from trees and aggressive colonizers, the most significant effect of which is shading from canopy closure (USFWS 1992).

In general, Reed Creek is the only major tributary stream in the corridors of the two build alternatives that would satisfy any of the habitat criteria described above. At best, Reed Creek must be considered marginal habitat for Virginia spiraea due to 1) the adjacent floodplain vegetation is dominated by canopy trees such as sycamore (*Platanus occidentalis*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), box elder (*Acer negundo*), and tulip tree (*Liriodendron tulipifera*), which often shade the banks and much of the wetted perimeter of the channel; 2) in several reaches, Reed Creek is over-widened with vertical banks that do not provide sufficient substrate to develop toe structures such as point-bar formations or debris dams; and 3) the channel slope cannot be characterized as 'high-gradient' per the typical habitat descriptions provided above. The remaining portions of the corridor are unsuitable for Virginia spiraea due to an overall lack of habitat factors. Although the Candidate Build Alternative A crosses several other stream channels, these streams are in extreme headwater positions within the Reed Creek watershed, and therefore do not represent viable habitat for the species.

Given the lack of habitat for Virginia spiraea and the fact that no recordings of the species exist in Wythe County, the probability of impacts to this species of plant is very low.

Listed Animals

The VDGIF (2009) cites five listed species as occurring in Wythe County. These include the big sandy crayfish (*Cambarus veteranus*), peregrine falcon (*Falco peregrinus*), loggerhead shrike (*Lanius ludovicianus*), bald eagle (*Haliaeetus leucocephalus*), and green floater (*Lasmigona subviridis*). Of this list, there have been no confirmed sightings within a 2-mile radius of the project study area (Appendix A). In addition, the USFWS indicates the potential presence of the endangered Indiana bat (*Myotis sodalist*) due to the confirmed sighting of bats in the neighboring county. A brief overview of these six species is provided below.

Across all of Virginia, the VDGIF designates certain waters as Threatened and Endangered (T & E) Waters based on the presence of known listed aquatic animals. The VDGIF lists no T & E Waters within both study corridors.

■ **Big Sandy Crayfish (*Cambarus veteranus*)**

The big sandy crayfish, listed as a state endangered species, inhabits unpolluted streams of moderate width and permanent, fast-flowing pools at elevations above 457 meters on the Allegheny Plateau (Terwilliger 1991, VDGIF 2009). This species is sensitive to water quality, and cannot tolerate poor or impaired waters. Optimal in-stream habitat features include large, flat rocks lying atop unconsolidated gravel and sand.

Several streams of adequate size for the big sandy crayfish occur within the study area. However, no sightings of the big sandy crayfish have been recorded. The absence of the species is most likely due to poor water quality resulting from impervious surface runoff and siltation caused by access to channels by livestock. It appears, therefore, that no impacts to this species would occur from either alternative.

■ **Peregrine Falcon (*Falco peregrinus*)**

The peregrine falcon is a bird of prey listed as state threatened. It is found in terrestrial inland and coastal areas where they nest on bridges/underpasses, utility poles, buildings, rocky outcrops, cliffs/ledges, and artificial platforms (Terwilliger 1991, White et al. 2002, VDGIF 2009). Migrant and wintering falcons are well known for frequenting coastal estuaries and intertidal mudflats. Birds feed mainly on doves, pigeons, songbirds, and occasionally on small mammals (Terwilliger 1991).

The VDGIF (2009) does not confirm the presence of the peregrine falcon in the vicinity of the project area. Likewise, the DNH and USFWS did not indicate the peregrine falcon as a potential species that could be impacted. No known nest sites occur in the project area; therefore, no impacts are expected to occur to this species due to either alternative.

■ **Loggerhead Shrike (*Lanius ludovicianus*)**

The loggerhead shrike is a passerine bird listed by the VDGIF as threatened. This species prefers areas of mowed or grazed grassland for hunting small prey such as grasshoppers and lizards (Via and Lindzey 1979, Alderfer 2006, VDGIF 2009). They can often be seen utilize neighboring fences, woody vegetation or

hedgerows for perching. Nest sites are commonly found in eastern red cedar (*Juniperus virginiana*) or hawthorne (*Crataegus* spp.) shrubs.

Habitat for the species is common among both alternative alignments. Alternative A has a higher amount of shrike habitat where the roadway would bisect existing farms and pastures, whereas the Alternative B would impact mowed clearings and shrubby side slopes found within the existing right of way.

The decline of the species responsible for triggering its protected status is not clearly understood, as it appears that an abundance of preferred habitat is available. Habitat removal would occur for both alternatives, but the amount of habitat lost would be but a very small portion of available habitat regionally. As such, impacts to the loggerhead shrike resulting from either alternative would be permanent, but small. Impacts are not expected to cause a decline in the population of loggerhead shrikes.

■ Bald eagle (*Haliaeetus leucocephalus*)

The bald eagle was recently delisted by the USFWS, but remains listed as threatened by the VDGIF. This species prefers open water habitats and shorelines to include coastal estuaries, lakes and rivers for feeding on fish, perching, and nesting (Andrew and Mosher 1982, USFWS 1982). Most nest sites are found within large wooded tracts adjacent to water, or in isolated trees located in marshes, on farmland, or in logged areas where scattered seed trees remain. Large pines are preferred for nesting. Most eagle nests are less than 1.6 km from feeding areas, but some nests are between 1.6 and 3.2 km from the primary food sources (Andrew and Mosher 1982). Wintering areas have many of the same characteristics as the nest sites. Their habitat usually occurs in undeveloped areas with little human activity. Birds are sometimes viewed in the mountain region passing through during migration.

Habitat for the bald eagle is not present within the study area due to a lack of expansive open water and shoreline habitat that could be used for hunting fish and nesting. Scattered farm ponds are present with small streams and creeks, but these areas are poor habitat for bald eagles because of the small size. Therefore, the construction of either alternative would not impact bald eagles.

■ Green Floater (*Lasmigona subviridis*)

The green floater, listed as state threatened, is a freshwater mussel usually found in fast-flowing, clean water streams embedded in substrates that contain relatively firm rubble, gravel, and sand substrates swept free from siltation (VDGIF 2009). They are typically buried in the substrate in shallow riffle and



shoal areas, and are able to occupy very small creeks and streams, places where other mussels are not often found. The closest sighting of the green floater according to the FWIS database was in southern Wythe County near Jackson Ferry in the New River.

The streams that bisect the candidate alternative corridors occur in a section of Wythe County where industrial facilities, single-family residences, grain agricultural, and pasture for cattle are the primary uses. These land uses typically contribute sediment, nutrients, and suspended solids within area streams from runoff, and would appear to render habitat unusable for the green floater. Nevertheless, the presence of the green floater cannot be ruled out within Reed Creek since this channel is part of the New River watershed. For purposes of this EA, comparative impacts to potential green floater habitat between alternatives relate to proposed work in area channels.

Reed Creek appears to offer the best habitat for the green floater within the study area. Both alternatives call for the crossing of Reed Creek using bridges, and no direct loss of Reed Creek would occur. Alternative A would cross Reed Creek at three locations, whereas Alternative B calls for the widening of the existing roadway bridges at one location. Decreases in water quality could negatively affect the green floater within and downstream of the project area for both alternatives due to increased sediment, oil spills, and soil destabilization (see Water Quality section). Chances of these impacts are higher for Alternative A with the three crossings compared to the one crossing for Alternative B. Impacts to water quality would be mitigated through the implementation of an erosion and sedimentation plan in compliance with local and state regulations. Impacts to habitat are considered to be temporary and low. Once VDOT moves forward with permitting the selected alternative, VDOT will coordinate with VDGIF to insure protection of the species.

■ **Indiana Bat (*Myotis sodalis*)**

The Indiana bat is listed as endangered by the USFWS and VDGIF. This species is medium sized, dark gray or brown, with dull fur and short ears. The fur appears tricolored on dorsal part. Other distinguishing characteristics include a keeled calcar and short toe hairs that barely reach the base of the claw (Terwilliger 1991).

Indiana bats migrate up to 300 miles into Virginia from northern areas when they return to hibernation caves in August just before the breeding season. They enter in hibernation in mid-October within caves with high humidity/water bodies. Summer habitat is mostly in riparian and floodplain areas of small to



medium size streams (Humphrey et al. 1977). Optimum foraging habitat is usually with mature trees that overhang the water by more than 3 meters. In Virginia, foraging occurs most frequently in canopies of riparian forests, along upland slopes and ridgetops, and along edges of forests and croplands. They may also be found in bridges, underpasses, buildings, ditches, culverts, tree cavities, standing snags, tunnels and shafts. The bats emerge at night to feed on moths, mayflies, and other insects in treetops and over streams (VDGIF 2009).

No documented evidence of Indiana bats has been recorded in the project study area. It is possible bats may use the area during the summer for foraging, particularly the riparian corridor and shoreline of Reed Creek. Other features that may be used by Indiana bats include area road bridges and forests with mature hardwoods for daytime roosting.

Both candidate roadway alternatives are not expected to impact the Indiana bat. There are some habitat features in the area that could be used by Indiana bats, but the use of these areas for a roadway would not jeopardize the continued existence of the species. For instance, Alternative A would result in more impacts to Reed Creek due to new bridge crossings. These areas of Reed Creek could be used by foraging bats. The bridge expansion over Reed Creek associated with Alternative B would impact a shorter section of river riparian habitat for the bat, although the noise associated with traffic may cause bats to avoid this area. No caves or underground features would be impacted by either roadway alternative that could be used by bats. Overall, the potential for impacts to the Indiana bat is very low.



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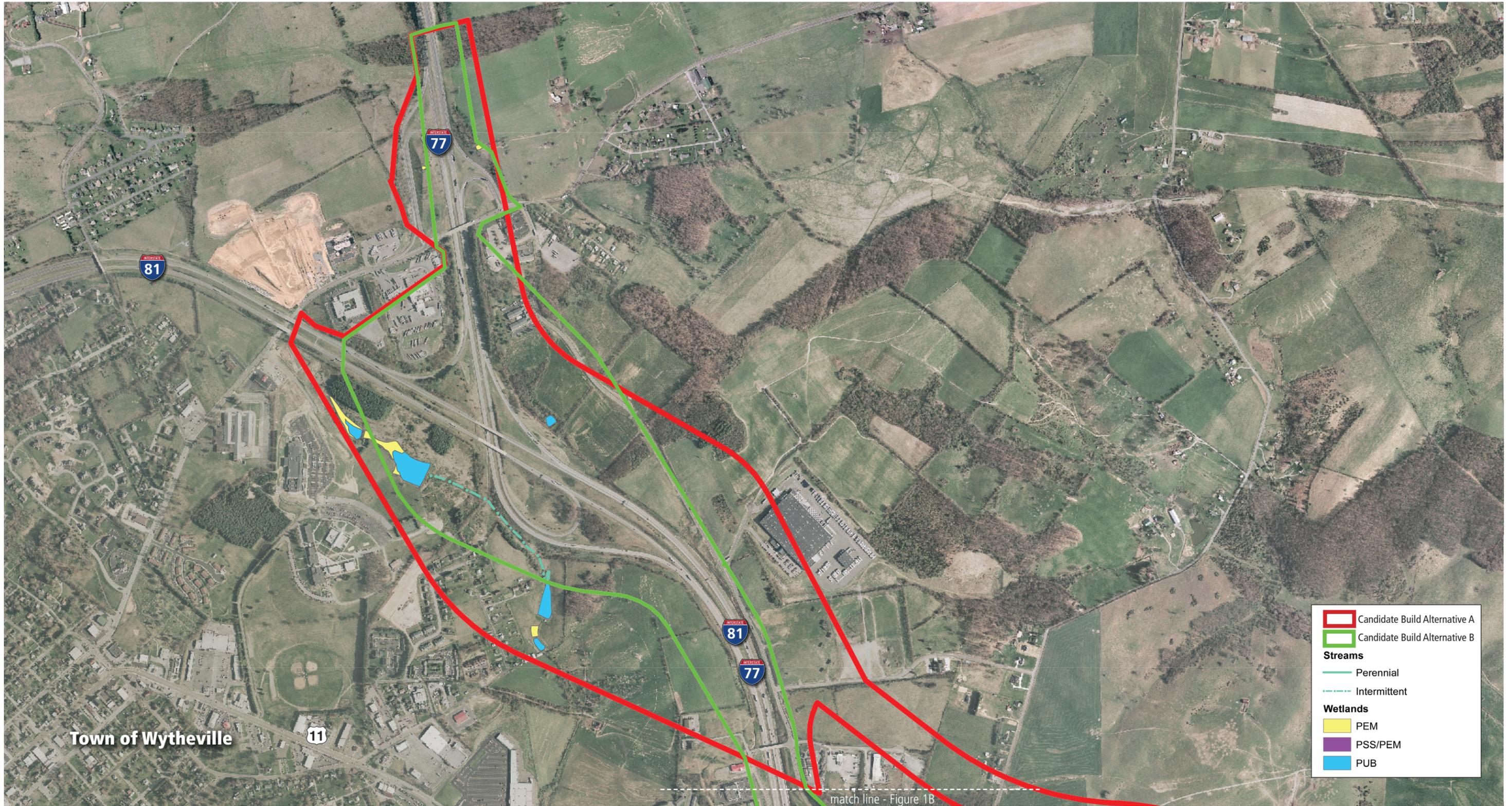
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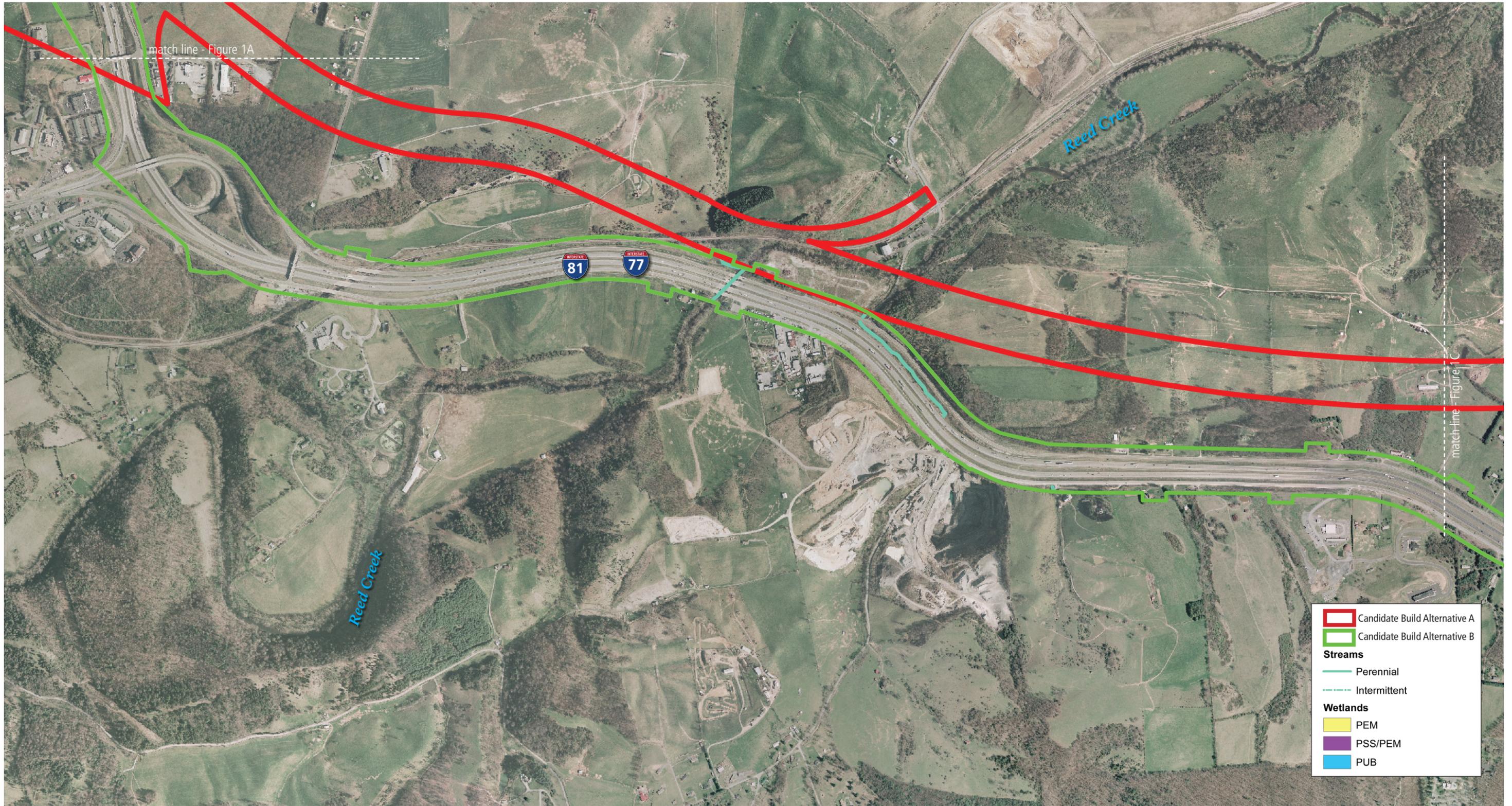


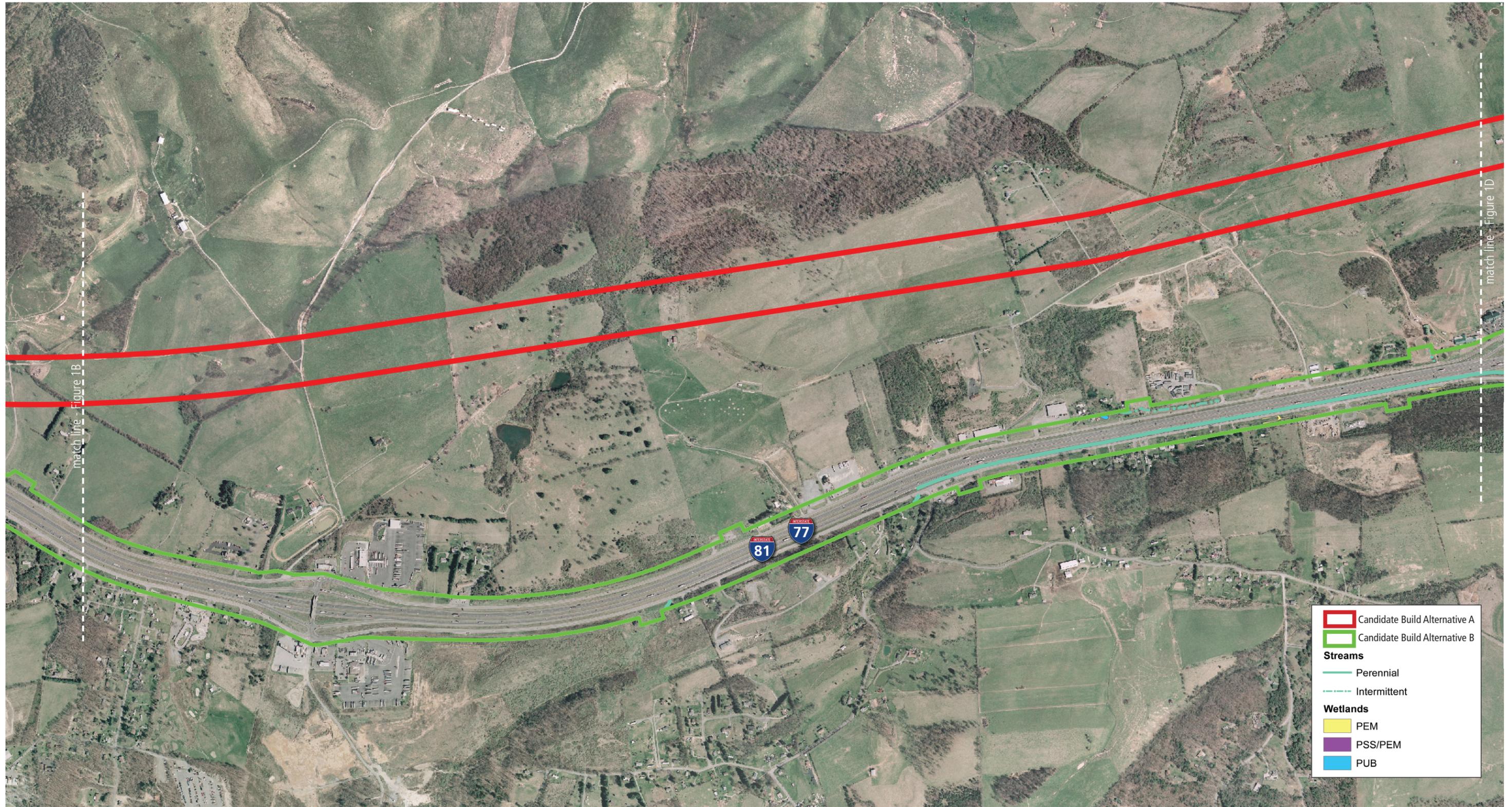
	Candidate Build Alternative A
	Candidate Build Alternative B
Streams	
	Perennial
	Intermittent
Wetlands	
	PEM
	PSS/PEM
	PUB

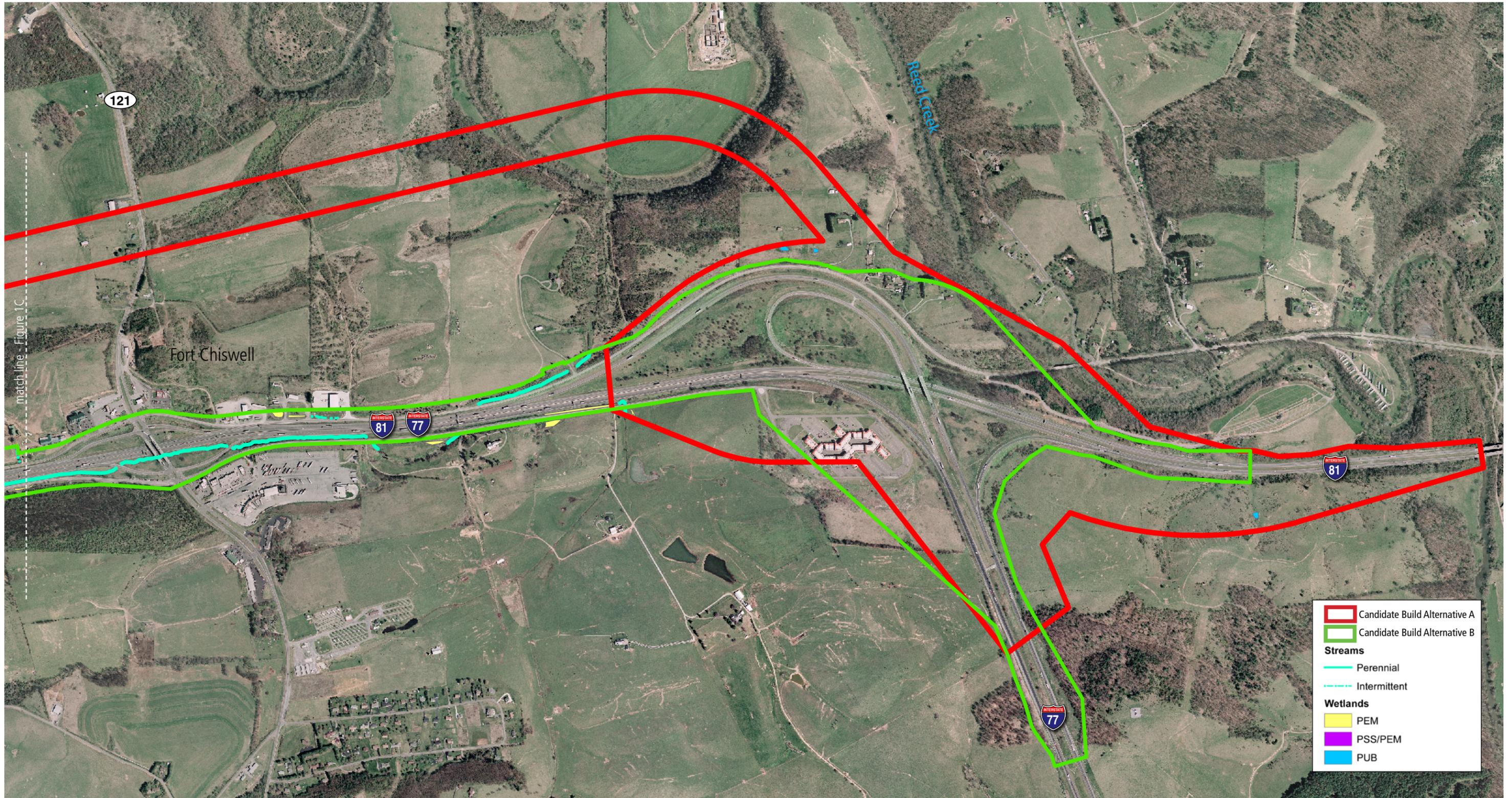
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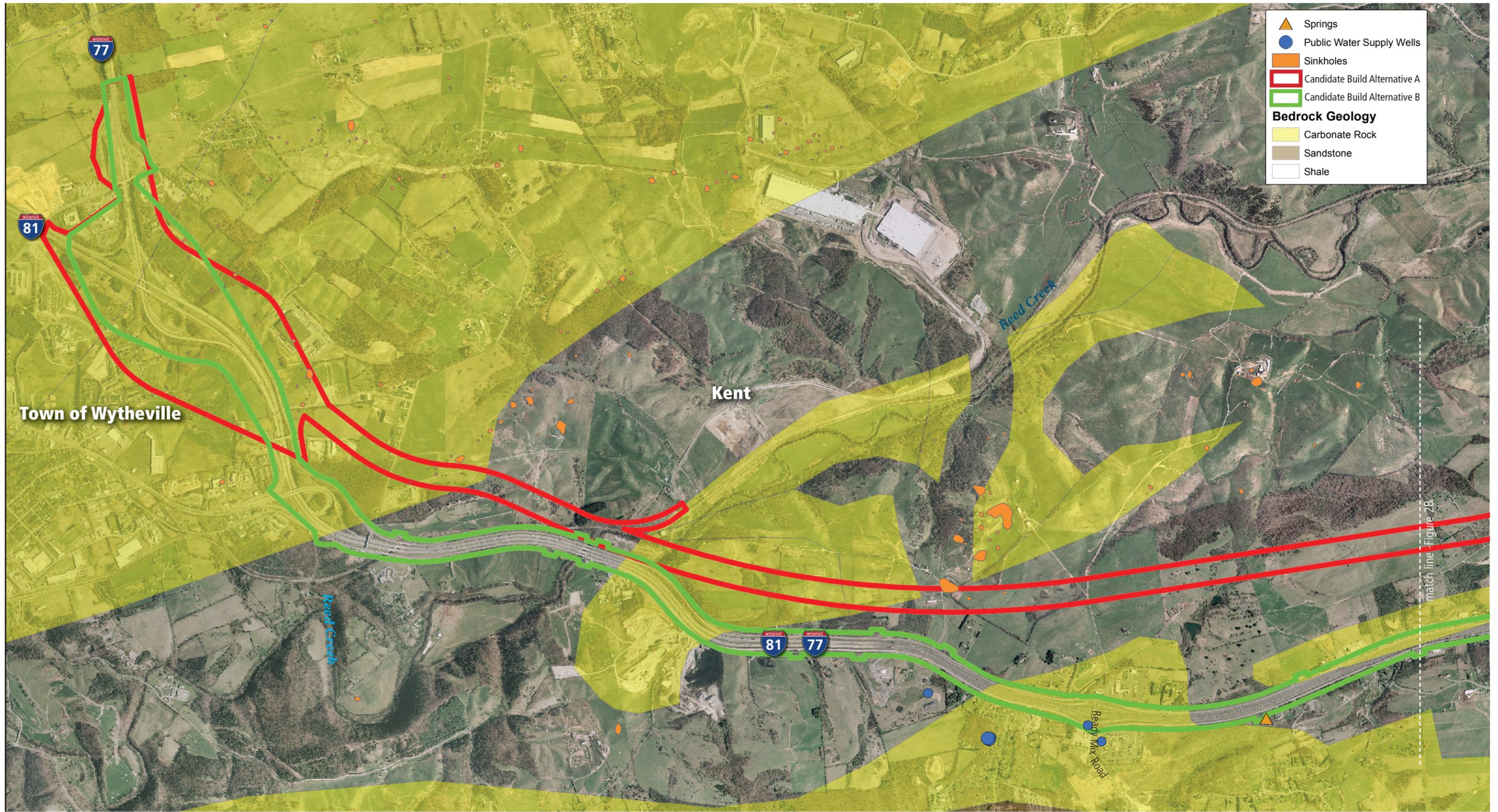
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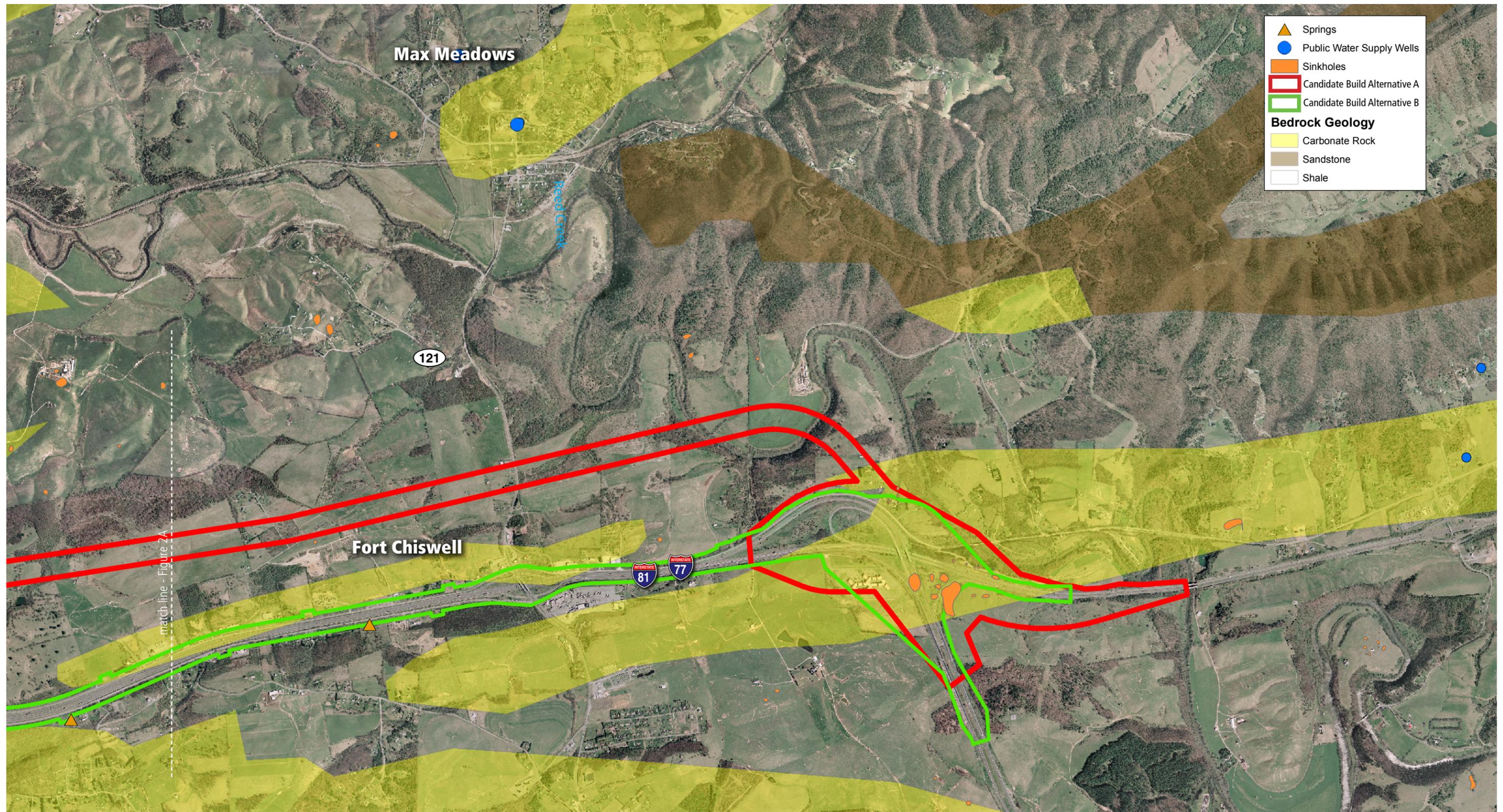


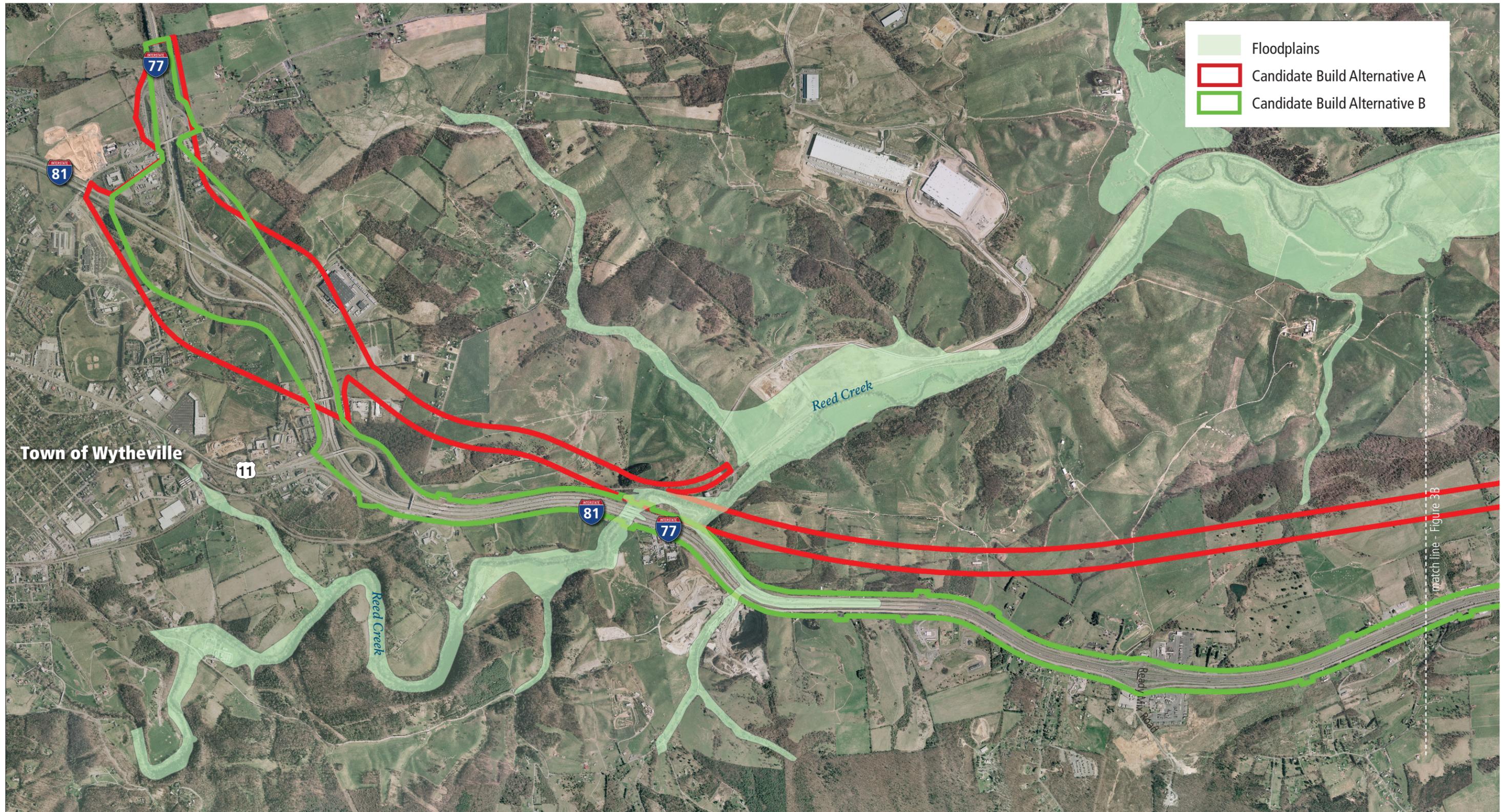


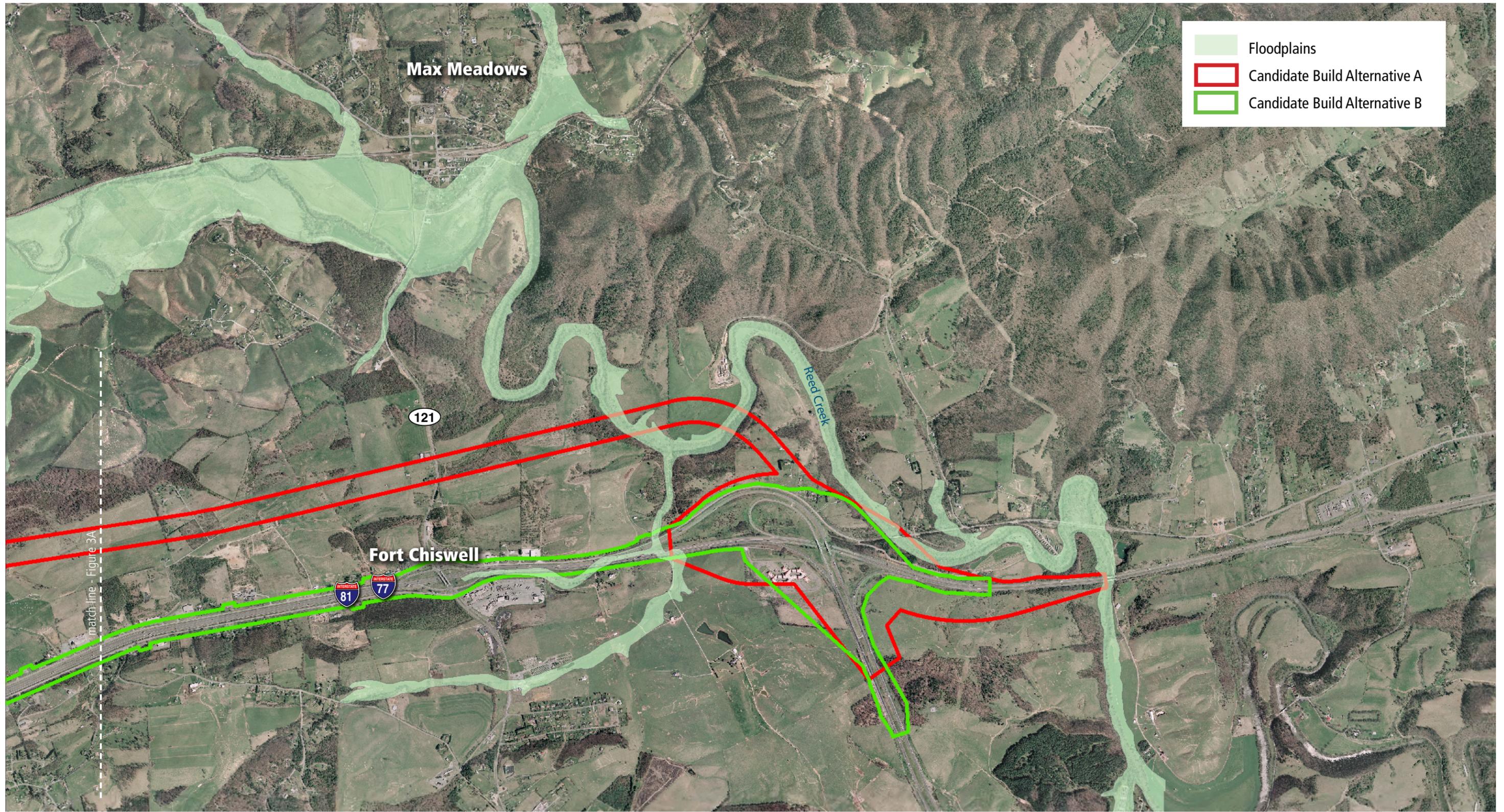












	Floodplains
	Candidate Build Alternative A
	Candidate Build Alternative B



**Virginia Department of Game and Inland
Fisheries, Fish and Wildlife Information Service Report**



Virginia Department of Game and Inland Fisheries

8/17/2009 2:10:02 PM

Fish and Wildlife Information Service

VaFWIS Search Report Compiled on 8/17/2009, 2:10:02 PM

[Help](#)

Known or likely to occur within a **2 mile radius of 36,57,08.7 - 81,00,12.7**
in **197 Wythe County, VA**

428 Known or Likely Species ordered by Status Concern for Conservation

BOVA Code	Status*	Tier**	Common Name	Scientific Name	Confirmed	Database(s)
070118	FSSE	II	Crayfish, Big Sandy	Cambarus veteranus		BOVA
040096	ST	I	Falcon, peregrine	Falco peregrinus		BOVA
040293	ST	I	Shrike, loggerhead	Lanius ludovicianus		BOVA
040093	FSST	II	Eagle, bald	Haliaeetus leucocephalus		BOVA
060081	ST	II	Floater, green	Lasmigona subviridis		BOVA
040292	ST		Shrike, migrant loggerhead	Lanius ludovicianus migrans		BOVA
100248	FS	I	Fritillary, regal	Speyeria idalia idalia		BOVA
070010	FS	III	Amphipod, James Cave	Stygobromus abditus		BOVA
100001	FS	IV	fritillary, Diana	Speyeria diana		BOVA
040372	SS	I	Crossbill, red	Loxia curvirostra		BOVA
040306	SS	I	Warbler, golden-winged	Vermivora chrysoptera		BOVA
010199	SS	II	Darter, candy	Etheostoma osburni		BOVA
020020	SS	II	Hellbender, eastern	Cryptobranchus alleganiensis alleganiensis		BOVA
040213	SS	II	Owl, northern saw-whet	Aegolius acadicus		BOVA
040304	SS	II	Warbler, Swainson's	Limnothlypis swainsonii		BOVA
040266	SS	II	Wren, winter	Troglodytes troglodytes		BOVA
040094	SS	III	Harrier, northern	Circus cyaneus		BOVA
040204	SS	III	Owl, barn	Tyto alba pratincola		BOVA
010215	SS	IV	Sauger	Sander canadensis		BOVA

030012	CC	IV	Rattlesnake, timber	Crotalus horridus	BOVA
040264	SS	IV	Creeper, brown	Certhia americana	BOVA
040364	SS		Dickcissel	Spiza americana	BOVA
040366	SS		Finch, purple	Carpodacus purpureus	BOVA
040241	SS		Flycatcher, alder	Empidonax alnorum	BOVA
040285	SS		Kinglet, golden-crowned	Regulus satrapa	BOVA
040112	SS		Moorhen, common	Gallinula chloropus cachinnans	BOVA
040262	SS		Nuthatch, red-breasted	Sitta canadensis	BOVA
040278	SS		Thrush, hermit	Catharus guttatus	BOVA
040314	SS		Warbler, magnolia	Dendroica magnolia	BOVA
050110	SS		Mole, star-nosed	Condylura cristata parva	BOVA
050045	SS		Otter, northern river	Lontra canadensis lataxina	BOVA
040225		I	Sapsucker, yellow-bellied	Sphyrapicus varius	BOVA
040319		I	Warbler, black-throated green	Dendroica virens	BOVA
020011		II	Frog, mountain chorus	Pseudacris brachyphona	BOVA
040052		II	Duck, American black	Anas rubripes	BOVA
040320		II	Warbler, cerulean	Dendroica cerulea	BOVA
010195		III	Darter, Kanawha	Etheostoma kanawhae	BOVA
010097		III	Minnow, Kanawha	Phenacobius teretulus	BOVA
030068		III	Turtle, eastern box	Terrapene carolina carolina	BOVA
050024		III	Myotis, eastern small-footed	Myotis leibii	BOVA
100150		III	Butterfly, mottled duskywing	Erynnis martialis	BOVA
010363		IV	Darter, Appalachia	Percina gymnocephala	BOVA
010212		IV	Darter, sharpnose	Percina oxyrhynchus	BOVA
010207		IV	Logperch	Percina caprodes	BOVA

010089		IV	Shiner, New River	Notropis scabriceps	Yes	Collections,BOVA
010376		IV	Shiner, redlip	Notropis chiliticus		BOVA
020085		IV	Salamander, Blue Ridge dusky	Desmognathus orestes		BOVA
020031		IV	Salamander, Jefferson	Ambystoma jeffersonianum		BOVA
020057		IV	Salamander, Yonahlossee	Plethodon yonahlossee		BOVA
030024		IV	Snake, eastern hog-nosed	Heterodon platirhinos		BOVA
030033		IV	Snake, queen	Regina septemvittata		BOVA
040100		IV	Bobwhite, northern	Colinus virginianus		BOVA
040272		IV	Catbird, gray	Dumetella carolinensis		BOVA
040337		IV	Chat, yellow-breasted	Icteria virens virens		BOVA
040202		IV	Cuckoo, yellow-billed	Coccyzus americanus		BOVA
040142		IV	Dowitcher, short-billed	Limnodromus griseus		BOVA
040240		IV	Flycatcher, willow	Empidonax traillii		BOVA
040358		IV	Grosbeak, rose-breasted	Pheucticus ludovicianus		BOVA
040028		IV	Heron, green	Butorides virescens		BOVA
040229		IV	Kingbird, eastern	Tyrannus tyrannus	Yes	BBA,BOVA
040344		IV	Meadowlark, eastern	Sturnella magna	Yes	BBA,BOVA
040330		IV	Ovenbird	Seiurus aurocapilla		BOVA
040312		IV	Parula, northern	Parula americana		BOVA
040243		IV	Pewee, eastern wood	Contopus virens	Yes	BBA,BOVA
040391		IV	Sparrow, field	Spizella pusilla	Yes	BBA,BOVA
040378		IV	Sparrow, grasshopper	Ammodramus savannarum pratensis		BOVA
040248		IV	Swallow, northern rough-winged	Stelgidopteryx serripennis		BOVA
040217		IV	Swift, chimney	Chaetura pelagica	Yes	BBA,BOVA
040355		IV	Tanager, scarlet	Piranga olivacea	Yes	BBA,BOVA
040273		IV	Thrasher, brown	Toxostoma rufum	Yes	BBA,BOVA
040277		IV	Thrush, wood	Hylocichla mustelina		BOVA

040375		IV	Towhee, eastern	Pipilo erythrophthalmus		BOVA
040297		IV	Vireo, yellow-throated	Vireo flavifrons		BOVA
040302		IV	Warbler, black-and-white	Mniotilta varia		BOVA
040307		IV	Warbler, blue-winged	Vermivora pinus		BOVA
040340		IV	Warbler, Canada	Wilsonia canadensis		BOVA
040333		IV	Warbler, Kentucky	Oporornis formosus		BOVA
040328		IV	Warbler, prairie	Dendroica discolor		BOVA
040303		IV	Warbler, prothonotary	Protonotaria citrea		BOVA
040305		IV	Warbler, worm-eating	Helmitheros vermivorus	Yes	BBA,BOVA
040313		IV	Warbler, yellow	Dendroica petechia		BOVA
040332		IV	Waterthrush, Louisiana	Seiurus motacilla		BOVA
040215		IV	Whip-poor-will	Caprimulgus vociferus		BOVA
040140		IV	Woodcock, American	Scolopax minor		BOVA
050106		IV	Cottontail, Appalachian	Sylvilagus obscurus		BOVA
050006		IV	Shrew, long-tailed (= rock)	Sorex dispar dispar		BOVA
050046		IV	Skunk, eastern spotted	Spilogale putorius putorius		BOVA
050040		IV	Weasel, least	Mustela nivalis allegheniensis		BOVA
050081		IV	Woodrat, Allegheny	Neotoma magister		BOVA
070124		IV	CRAYFISH	Cambarus buntingi		BOVA
070128		IV	CRAYFISH	Orconectes cristavarius		BOVA
070116		IV	Crayfish, Clinch River	Cambarus angularis		BOVA
070090		IV	Crayfish, New River	Cambarus chasmodactylus	Yes	Collections,BOVA
070091		IV	Crayfish, no common name	Cambarus longirostris		BOVA
070100		IV	Crayfish, no	Cambarus sciotensis		BOVA

		common name			
010175		Bass, rock	Ambloplites rupestris	Yes	Collections,BOVA
010186		Bass, smallmouth	Micropterus dolomieu	Yes	Collections,BOVA
010187		Bass, spotted	Micropterus punctulatus		BOVA
010167		Bass, white	Morone chrysops		BOVA
010183		Bluegill	Lepomis macrochirus		BOVA
010062		Carp, common	Cyprinus carpio		BOVA
010125		Catfish, channel	Ictalurus punctatus		BOVA
010130		Catfish, flathead	Pylodictis olivaris		BOVA
010372		Chub, bigmouth	Nocomis platyrhynchus		BOVA
010066		Chub, bluehead	Nocomis leptocephalus	Yes	Collections,BOVA
010103		Chub, creek	Semotilus atromaculatus	Yes	Collections,BOVA
010101		Dace, blacknose	Rhinichthys atratulus	Yes	Collections,BOVA
010102		Dace, longnose	Rhinichthys cataractae	Yes	Collections,BOVA
010060		Dace, mountain redbelly	Phoxinus oreas	Yes	Collections,BOVA
010193		Darter, fantail	Etheostoma flabellare	Yes	Collections,BOVA
010191		Darter, greenside	Etheostoma blennioides	Yes	Collections,BOVA
010202		Darter, Snubnose	Etheostoma simoterum		BOVA
010129		Madtom, margined	Noturus insignis	Yes	Collections,BOVA
010099		Minnow, bluntnose	Pimephales notatus	Yes	Collections,BOVA
010096		Minnow, tonguetied	Exoglossum laurae	Yes	Collections,BOVA
010206		Perch, yellow	Perca flavescens		BOVA
010182		Pumpkinseed	Lepomis gibbosus		BOVA
010418		Sculpin, Carolinae ssp.	Cottus carolinae ssp.	Yes	Collections
010283		Sculpin, mottled	Cottus bairdi	Yes	Collections,BOVA
010078		Shiner, crescent	Luxilus cerasinus	Yes	Collections,BOVA
		Shiner, highland (=			

010087		southern rosyface; = redface)	Notropis micropteryx	Yes	Collections,BOVA
010094		Shiner, mimic	Notropis volucellus	Yes	Collections,BOVA
010074		Shiner, rosefin	Lythrurus ardens		BOVA
010088		Shiner, saffron	Notropis rubricroceus	Yes	Collections,BOVA
010085		Shiner, silver	Notropis photogenis	Yes	Collections,BOVA
010091		Shiner, spotfin	Cyprinella spiloptera	Yes	Collections,BOVA
010082		Shiner, spottail	Notropis hudsonius		BOVA
010383		Shiner, telescope	Notropis telescopus		BOVA
010069		Shiner, white	Luxilus albeolus	Yes	Collections,BOVA
010058		Stoneroller, central	Campostoma anomalum	Yes	Collections,BOVA
010108		Sucker, northern hog	Hypentelium nigricans	Yes	Collections,BOVA
010105		Sucker, white	Catostomus commersoni	Yes	Collections,BOVA
010181		Sunfish, green	Lepomis cyanellus		BOVA
010184		Sunfish, longear	Lepomis megalotis		BOVA
010180		Sunfish, redbreast	Lepomis auritus	Yes	Collections,BOVA
010052		Trout, brook	Salvelinus fontinalis		BOVA
010051		Trout, brown	Salmo trutta		BOVA
010050		Trout, rainbow	Oncorhynchus mykiss	Yes	Collections,BOVA
010216		Walleye	Sander vitreus vitreus		BOVA
020004		Bullfrog, American	Lithobates catesbeianus		BOVA
020008		Frog, northern green	Lithobates clamitans melanota		BOVA
020013		Frog, pickerel	Lithobates palustris		BOVA
020018		Frog, upland chorus	Pseudacris feriarum feriarum		BOVA
020019		Frog, wood	Lithobates sylvaticus		BOVA
020065		Newt, red-spotted	Notophthalmus viridescens viridescens		BOVA
020071		Peeper, northern spring	Pseudacris crucifer crucifer		BOVA
020036		Salamander, Allegheny mountain dusky	Desmognathus ochrophaeus		BOVA

020025		Salamander, black-bellied	Desmognathus quadramaculatus	BOVA
020043		Salamander, eastern red-backed	Plethodon cinereus	BOVA
020029		Salamander, four-toed	Hemidactylum scutatum	BOVA
020033		Salamander, long-tailed	Eurycea longicauda longicauda	BOVA
020079		Salamander, midland mud	Pseudotriton montanus diastictus	BOVA
020038		Salamander, northern dusky	Desmognathus fuscus	BOVA
020070		Salamander, northern red	Pseudotriton ruber ruber	BOVA
020047		Salamander, northern slimy	Plethodon glutinosus	BOVA
020077		Salamander, northern spring	Gyrinophilus porphyriticus porphyriticus	BOVA
020075		Salamander, seal	Desmognathus monticola	BOVA
020041		Salamander, southern ravine	Plethodon richmondi	BOVA
020050		Salamander, southern two-lined	Eurycea cirrigera	BOVA
020049		Salamander, spotted	Ambystoma maculatum	BOVA
020080		Salamander, white-spotted slimy	Plethodon cylindraceus	BOVA
020059		Toad, eastern American	Anaxyrus americanus americanus	BOVA
020062		Toad, Fowler's	Anaxyrus fowleri	BOVA
030016		Copperhead, northern	Agkistrodon contortrix mokasen	BOVA
030044		Gartersnake, eastern	Thamnophis sirtalis sirtalis	BOVA
030038		Greensnake, northern rough	Opheodrys aestivus aestivus	BOVA
030002		Lizard, eastern fence	Sceloporus undulatus	BOVA
030029		Milksnake, eastern	Lampropeltis triangulum triangulum	BOVA

030018		Racer, northern black	Coluber constrictor constrictor		BOVA
030023		Ratsnake, eastern	Pantherophis alleghaniensis		BOVA
030004		Skink, common five-lined	Plestiodon fasciatus		BOVA
030020		Snake, northern ring-necked	Diadophis punctatus edwardsii		BOVA
030052		Stinkpot	Sternotherus odoratus	Yes	Collections,BOVA
030060		Turtle, eastern painted	Chrysemys picta picta	Yes	Collections,BOVA
030050		Turtle, eastern snapping	Chelydra serpentina serpentina		BOVA
030034		Watersnake, northern	Nerodia sipedon sipedon		BOVA
030019		Wormsnake, eastern	Carphophis amoenus amoenus		BOVA
040346		Blackbird, red-winged	Agelaius phoeniceus		BOVA
040282		Bluebird, eastern	Sialia sialis		BOVA
040343		Bobolink	Dolichonyx oryzivorus		BOVA
040068		Bufflehead	Bucephala albeola		BOVA
040361		Bunting, indigo	Passerina cyanea	Yes	BBA,BOVA
040064		Canvasback	Aythya valisineria		BOVA
040357		Cardinal, northern	Cardinalis cardinalis		BOVA
040257		Chickadee, black-capped	Poecile atricapillus		BOVA
040258		Chickadee, Carolina	Poecile carolinensis	Yes	BBA,BOVA
040113		Coot, American	Fulica americana		BOVA
040024		Cormorant, double-crested	Phalacrocorax auritus		BOVA
040353		Cowbird, brown-headed	Molothrus ater		BOVA
040373		Crossbill, white-winged	Loxia leucoptera		BOVA
040255		Crow, American	Corvus brachyrhynchos	Yes	BBA,BOVA
040203		Cuckoo, black-billed	Coccyzus erythrophthalmus		BOVA

040198		Dove, mourning	Zenaida macroura carolinensis		BOVA
040061		Duck, wood	Aix sponsa		BOVA
040367		Finch, house	Carpodacus mexicanus		BOVA
040221		Flicker, northern	Colaptes auratus		BOVA
040239		Flycatcher, Acadian	Empidonax virescens	Yes	BBA,BOVA
040234		Flycatcher, great crested	Myiarchus crinitus		BOVA
040242		Flycatcher, least	Empidonax minimus		BOVA
040284		Gnatcatcher, blue-gray	Polioptila caerulea		BOVA
040371		Goldfinch, American	Carduelis tristis		BOVA
040045		Goose, Canada	Branta canadensis		BOVA
040352		Grackle, common	Quiscalus quiscula	Yes	BBA,BOVA
040008		Grebe, pied-billed	Podilymbus podiceps		BOVA
040360		Grosbeak, blue	Guiraca caerulea caerulea		BOVA
040365		Grosbeak, evening	Coccothraustes vespertinus		BOVA
040099		Grouse, ruffed	Bonasa umbellus		BOVA
040089		Hawk, broad-winged	Buteo platypterus		BOVA
040086		Hawk, Cooper's	Accipiter cooperii		BOVA
040088		Hawk, red-shouldered	Buteo lineatus lineatus		BOVA
040087		Hawk, red-tailed	Buteo jamaicensis		BOVA
040090		Hawk, rough-legged	Buteo lagopus johannis		BOVA
040085		Hawk, sharp-shinned	Accipiter striatus velox		BOVA
040027		Heron, great blue	Ardea herodias herodias		BOVA
040218		Hummingbird, ruby-throated	Archilochus colubris		BOVA
040252		Jay, blue	Cyanocitta cristata		BOVA
040387		Junco, dark-eyed	Junco hyemalis		BOVA
040098		Kestrel, American	Falco sparverius sparverius		BOVA
040119		Killdeer	Charadrius vociferus	Yes	BBA,BOVA

040220		Kingfisher, belted	Ceryle alcyon	Yes	BBA,BOVA
040286		Kinglet, ruby-crowned	Regulus calendula		BOVA
040245		Lark, horned	Eremophila alpestris		BOVA
040051		Mallard	Anas platyrhynchos		BOVA
040251		Martin, purple	Progne subis		BOVA
040271		Mockingbird, northern	Mimus polyglottos	Yes	BBA,BOVA
040216		Nighthawk, common	Chordeiles minor		BOVA
040261		Nuthatch, white-breasted	Sitta carolinensis		BOVA
040348		Oriole, Baltimore	Icterus galbula		BOVA
040347		Oriole, orchard	Icterus spurius		BOVA
040209		Owl, barred	Strix varia		BOVA
040206		Owl, great horned	Bubo virginianus		BOVA
040211		Owl, short-eared	Asio flammeus		BOVA
040101		Pheasant, ring-necked	Phasianus colchicus		BOVA
040236		Phoebe, eastern	Sayornis phoebe		BOVA
040197		Pigeon, rock	Columba livia		BOVA
040254		Raven, common	Corvus corax		BOVA
040341		Redstart, American	Setophaga ruticilla		BOVA
040275		Robin, American	Turdus migratorius	Yes	BBA,BOVA
040132		Sandpiper, solitary	Tringa solitaria		BOVA
040134		Sandpiper, spotted	Actitis macularia		BOVA
040205		Screech-owl, eastern	Megascops asio		BOVA
040370		Siskin, pine	Carduelis pinus		BOVA
040141		Snipe, common	Gallinago gallinago		BOVA
040108		Sora	Porzana carolina		BOVA
040389		Sparrow, chipping	Spizella passerina	Yes	BBA,BOVA
040395		Sparrow, fox	Passerella iliaca		BOVA
040342		Sparrow, house	Passer domesticus	Yes	BBA,BOVA
040377		Sparrow, savannah	Passerculus sandwichensis		BOVA
040398		Sparrow, song	Melospiza melodia	Yes	BBA,BOVA
040397		Sparrow, swamp	Melospiza georgiana		BOVA
040383		Sparrow, vesper	Poocetes gramineus		BOVA

040393		Sparrow, white-crowned	Zonotrichia leucophrys		BOVA
040394		Sparrow, white-throated	Zonotrichia albicollis		BOVA
040294		Starling, European	Sturnus vulgaris	Yes	BBA,BOVA
040249		Swallow, barn	Hirundo rustica	Yes	BBA,BOVA
040250		Swallow, cliff	Petrochelidon pyrrhonota pyrrhonota		BOVA
040246		Swallow, tree	Tachycineta bicolor		BOVA
040356		Tanager, summer	Piranga rubra		BOVA
040260		Titmouse, tufted	Baeolophus bicolor	Yes	BBA,BOVA
040102		Turkey, wild	Meleagris gallopavo silvestris		BOVA
040281		Veery	Catharus fuscescens		BOVA
040298		Vireo, blue-headed	Vireo solitarius		BOVA
040299		Vireo, red-eyed	Vireo olivaceus	Yes	BBA,BOVA
040301		Vireo, warbling	Vireo gilvus gilvus		BOVA
040295		Vireo, white-eyed	Vireo griseus		BOVA
040081		Vulture, black	Coragyps atratus		BOVA
040080		Vulture, turkey	Cathartes aura	Yes	BBA,BOVA
040316		Warbler, black-throated blue	Dendroica caerulescens		BOVA
040321		Warbler, blackburnian	Dendroica fusca		BOVA
040325		Warbler, blackpoll	Dendroica striata		BOVA
040315		Warbler, Cape May	Dendroica tigrina		BOVA
040323		Warbler, chestnut-sided	Dendroica pensylvanica		BOVA
040338		Warbler, hooded	Wilsonia citrina		BOVA
040311		Warbler, Nashville	Vermivora ruficapilla		BOVA
040329		Warbler, palm	Dendroica palmarum		BOVA
040326		Warbler, pine	Dendroica pinus	Yes	BBA,BOVA
040317		Warbler, yellow-rumped	Dendroica coronata cornata		BOVA
040331		Waterthrush, northern	Seiurus noveboracensis		BOVA
040290		Waxwing, cedar	Bombycilla cedrorum		BOVA

040227		Woodpecker, downy	Picoides pubescens medianus	Yes	BBA,BOVA
040226		Woodpecker, hairy	Picoides villosus		BOVA
040222		Woodpecker, pileated	Dryocopus pileatus		BOVA
040223		Woodpecker, red-bellied	Melanerpes carolinus		BOVA
040224		Woodpecker, red-headed	Melanerpes erythrocephalus		BOVA
040268		Wren, Carolina	Thryothorus ludovicianus	Yes	BBA,BOVA
040265		Wren, house	Troglodytes aedon	Yes	BBA,BOVA
040336		Yellowthroat, common	Geothlypis trichas	Yes	BBA,BOVA
050028		Bat, big brown	Eptesicus fuscus fuscus		BOVA
050029		Bat, eastern red	Lasiurus borealis borealis		BOVA
050030		Bat, hoary	Lasiurus cinereus cinereus		BOVA
050020		Bat, little brown	Myotis lucifugus lucifugus		BOVA
050025		Bat, silver-haired	Lasionycteris noctivagans		BOVA
050037		Bear, black	Ursus americanus americanus		BOVA
050069		Beaver, American	Castor canadensis		BOVA
050051		Bobcat	Lynx rufus rufus		BOVA
050056		Chipmunk, common eastern	Tamias striatus striatus		BOVA
050103		Cottontail, eastern	Sylvilagus floridanus mallurus		BOVA
050105		Cottontail, Mearn's eastern	Sylvilagus floridanus mearnsii		BOVA
050125		Coyote	Canis latrans		BOVA
050108		Deer, white-tailed	Odocoileus virginianus		BOVA
050050		Fox, common gray	Urocyon cinereoargenteus cinereoargenteus		BOVA
050049		Fox, red	Vulpes vulpes fulva		BOVA
050085		Lemming, Stone's southern bog	Synaptomys cooperi stonei		BOVA

050043		Mink, southwestern	Mustela vison vison	BOVA
050017		Mole, eastern	Scalopus aquaticus aquaticus	BOVA
050016		Mole, hairy-tailed	Parascalops breweri	BOVA
050077		Mouse, common golden	Ochrotomys nuttalli aureolus	BOVA
050072		Mouse, deer	Peromyscus maniculatus nubiterrae	BOVA
050098		Mouse, house	Mus musculus musculus	BOVA
050099		Mouse, meadow jumping	Zapus hudsonius americanus	BOVA
050073		Mouse, northern white-footed	Peromyscus leucopus noveboracensis	BOVA
050100		Mouse, woodland jumping	Napaeozapus insignis roanensis	BOVA
050092		Muskrat, common	Ondatra zibethicus zibethicus	BOVA
050022		Myotis, northern	Myotis septentrionalis septentrionalis	BOVA
050001		Opossum, Virginia	Didelphis virginiana virginiana	BOVA
050027		Pipistrelle, eastern	Pipistrellus subflavus subflavus	BOVA
050038		Raccoon	Procyon lotor lotor	BOVA
050095		Rat, Norway	Rattus norvegicus norvegicus	BOVA
050002		Shrew, ashen masked	Sorex cinereus cinereus	BOVA
050013		Shrew, Kirtland's short-tailed	Blarina brevicauda kirtlandi	BOVA
050015		Shrew, least	Cryptotis parva parva	BOVA
050010		Shrew, pygmy	Sorex hoyi winnemana	BOVA
050004		Shrew, smoky	Sorex fumeus fumeus	BOVA
050048		Skunk, striped	Mephitis mephitis mephitis	BOVA

050063		Squirrel, eastern fox	Sciurus niger vulpinus		BOVA
050058		Squirrel, northern gray	Sciurus carolinensis pennsylvanicus		BOVA
050060		Squirrel, red	Tamiasciurus hudsonicus abieticola		BOVA
050065		Squirrel, southern flying	Glaucomys volans volans		BOVA
050088		vole, Carolina Gapper's red-backed	Clethrionomys gapperi carolinensis		BOVA
050091		Vole, pine	Microtus pinetorum scalopsoides		BOVA
050041		Weasel, long-tailed	Mustela frenata noveboracensis		BOVA
050054		Woodchuck	Marmota monax monax		BOVA
060177		Clam, Asian	Corbicula fluminea	Yes	Collections
060028		Mussel, spike	Elliptio dilatata	Yes	Collections
060134		Snail, crested mudalia	Leptoxis carinata	Yes	Collections
060064		Snail, two-ridge rams-horn	Helisoma anceps	Yes	Collections
070103		Crayfish	Orconectes spinosus	Yes	Collections,BOVA
070101		Crayfish, Appalachian brook	Cambarus bartonii cavatus		BOVA
070102		Crayfish, Appalachian brook	Cambarus bartonii bartonii		BOVA
070092		Crayfish, no common name	Cambarus dubius		BOVA
070088		Crayfish, no common name	Cambarus robustus		BOVA
100043		Armyworm	Pseudaletia unipuncta		BOVA
100041		Borer, European corn	Ostrinia nubilatis		BOVA
100220		Butterfly, American copper	Lycaena phlaeas		BOVA
100262		Butterfly, American lady	Vanessa virginiensis		BOVA
100245		Butterfly, American snout	Libytheana carinenta		BOVA

100274		Butterfly, Appalachian brown	Satyroides appalachia	BOVA
100250		Butterfly, Aphrodite fritillary	Speyeria aphrodite	BOVA
100254		Butterfly, Baltimore checkerspot	Euphydryas phaeton	BOVA
100232		Butterfly, banded hairstreak	Satyrium calanus	BOVA
100092		Butterfly, black swallowtail	Papilio polyxenes asterius	BOVA
100137		Butterfly, brown elfin	Callophrys augustinus	BOVA
100205		Butterfly, cabbage white	Pieris rapae	BOVA
100167		Butterfly, carus skipper	Polites carus	BOVA
100206		Butterfly, checkered white	Pontia protodice	BOVA
100159		Butterfly, clouded skipper	Lerema accius	BOVA
100094		Butterfly, clouded sulphur	Colias philodice	BOVA
100165		Butterfly, cobweb skipper	Hesperia metea	BOVA
100265		Butterfly, common buckeye	Junonia coenia	BOVA
100156		Butterfly, common checkered-skipper	Pyrgus communis	BOVA
100157		Butterfly, common sootywing	Pholisora catullus	BOVA
100277		Butterfly, common wood-nymph	Cercyonis pegala	BOVA
100144		Butterfly, confused cloudywing	Thorybes confusis	BOVA
100230		Butterfly, coral hairstreak	Satyrium titus	BOVA
100168		Butterfly, crossline skipper	Polites origenes	BOVA
100147		Butterfly, dreamy duskywing	Erynnis icelus	BOVA
100258		Butterfly, eastern comma	Polygonia comma	BOVA

100225		Butterfly, eastern pine elfin	Callophrys niphon	BOVA
100093		Butterfly, eastern tiger swallowtail	Papilio glaucus	BOVA
100161		Butterfly, European skipper	Thymelicus lineola	BOVA
100209		Butterfly, falcate orangetip	Anthocharis midea	BOVA
100162		Butterfly, fiery skipper	Hylephila phyleus	BOVA
100139		Butterfly, golden-banded skipper	Autochton cellus	BOVA
100228		Butterfly, gray hairstreak	Strymon melinus	BOVA
100249		Butterfly, great spangled fritillary	Speyeria cybele	BOVA
100270		Butterfly, hackberry emperor	Asterocampa celtis	BOVA
100219		Butterfly, harvester	Feniseca tarquinius	BOVA
100224		Butterfly, Henry's elfin	Callophrys henrici	BOVA
100141		Butterfly, hoary edge	Achalarus lyciades	BOVA
100178		Butterfly, Hobomok skipper	Poanes hobomok	BOVA
100149		Butterfly, Horace's duskywing	Erynnis horatius	BOVA
100164		Butterfly, Indian skipper	Hesperia sassacus	BOVA
100148		Butterfly, Juvenal's duskywing	Erynnis juvenalis	BOVA
100160		Butterfly, least skipper	Ancyloxypha numitor	BOVA
100175		Butterfly, little glassywing	Pompeius verna	BOVA
100217		Butterfly, little yellow	Eurema lisa	BOVA
100252		Butterfly, meadow fritillary	Boloria bellona	BOVA
100079		Butterfly, monarch	Danaus plexippus	BOVA
100090		Butterfly, mourning cloak	Nymphalis antiopa	BOVA

100173		Butterfly, northern broken dash	Wallengrenia egeremet	BOVA
100143		Butterfly, northern cloudywing	Thorybes pylades	BOVA
100272		Butterfly, northern pearly-eye	Enodia anhedon	BOVA
100197		Butterfly, Ocola skipper	Panoquina ocola	BOVA
100236		Butterfly, olive juniper hairstreak	Callophrys gryneus gryneus	BOVA
100211		Butterfly, orange sulphur	Colias eurytheme	BOVA
100263		Butterfly, painted lady	Vanessa cardui	BOVA
100257		Butterfly, pearl crescent	Phyciodes tharos	BOVA
100359		Butterfly, Peck's skipper	Polites peckius	BOVA
100200		Butterfly, pipevine swallowtail	Battus philenor	BOVA
100259		Butterfly, question mark	Polygonia interrogationis	BOVA
100264		Butterfly, red admiral	Vanessa atalanta	BOVA
100235		Butterfly, red-banded hairstreak	Calycopis cecrops	BOVA
100268		Butterfly, red-spotted purple	Limenitis arthemis astyanax	BOVA
100174		Butterfly, sachem	Atalopedes campestris	BOVA
100082		Butterfly, silver-spotted skipper	Epargyreus clarus	BOVA
100255		Butterfly, silvery checkerspot	Chlosyne nycteis	BOVA
100146		Butterfly, sleepy duskywing	Erynnis brizo	BOVA
100216		Butterfly, sleepy orange	Eurema nicippe	BOVA
100142		Butterfly, southern cloudywing	Thorybes bathyllus	BOVA
100202		Butterfly, spicebush swallowtail	Papilio troilus	BOVA

100239		Butterfly, spring azure	Celastrina ladon	BOVA
100234		Butterfly, striped hairstreak	Satyrrium liparops	BOVA
100269		Butterfly, tawny emperor	Asterocampa clyton	BOVA
100207		Butterfly, West Virginia white	Pieris virginiensis	BOVA
100227		Butterfly, white M hairstreak	Parrhasius m-album	BOVA
100153		Butterfly, wild indigo duskywing	Erynnis baptisiae	BOVA
100204		Butterfly, zebra swallowtail	Eurytides marcellus	BOVA
100012		Dipluran	Plusiocampa c	BOVA
100042		Earworm, corn	Heliathis zea	BOVA
100015		Gnat	Culicoides villosipennis	BOVA
100016		Gnat	Culicoides stellifer	BOVA
100030		Gnat	Culicoides arboricola	BOVA
100032		Gnat	Culicoides guttipennis	BOVA
100040		Moth, codling	Cydia pomonella	BOVA
110230		Tick, American dog	Dermacentor variabilis	BOVA
110232		Tick, brown dog	Rhipicephalus sanguineus	BOVA
110231		Tick, rabbit	Haemaphysalis leporispalustris	BOVA
110229		Tick, winter	Dermacentor albipictus	BOVA

* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; FS=Federal Species of Concern; SC=State Candidate; CC=Collection Concern; SS=State Special Concern

** I=VA Wildlife Action Plan - Tier I - Critical Conservation Need; II=VA Wildlife Action Plan - Tier II - Very High Conservation Need; III=VA Wildlife Action Plan - Tier III - High Conservation Need; IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

audit no. 254040 8/17/2009 2:10:02 PM Virginia Fish and Wildlife Information Service
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**Correspondence from Listed Plant and
Wildlife Protection Agencies**

L. Preston Bryant, Jr.
Secretary of Natural Resources



Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951 FAX (804) 371-2674

August 7, 2008

Karin Ertl
Vanasse, Hangin, Brustlin, Inc.
115 South 15th Street, Suite 200
Richmond, VA 23219

Re: VHB #31698.02, VDOT I-81 Corridor Improvement Study, Tier 2—I-77/I81 Overlap

Dear Ms. Ertl:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the following natural heritage resources have been documented within 2 miles of the study area:

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Etheostoma osburni	Candy Darter	G3	S1	NL	SC
Carex vesicaria	Inflated Sedge	G5	S1S2	NL	NL
Paxistima canbyi	Canby's Mountain-lover	G2	S2	SOC	NL
Phlox buckleyi	Sword-leaved Phlox	G2	S2	SOC	NL
Sabatia campanulata	Slender Marsh Pink	G5	S2	NL	NL
Spartina pectinata	Freshwater Cordgrass	G5	S2	NL	NL
Catocala herodias gerhardi	Pine Barrens Underwing	G3T3	S2S3	NL	NL
Napaea dioica	Glade Mallow	G4	S1?	NL	NL
Quercus prinoides	Dwarf Chinquapin	G5	S1	NL	NL
Lasmigona subviridis	Oak	G5	S1	NL	NL
Echinacea laevigata	Green Floater	G3	S2	NL	LT
Caecidotea incurva	Smooth Coneflower	G2G3	S2	LE	LT
Stygobromus abditus	Incurved Cave Isopod	G2G4	S2	NL	NL
Speyeria idalia	James Cave Amphipod	G2G3	S2	SOC	NL
	Regal Fritillary	G3	S1	NL	NL

Because of the legal status of many of these species, DCR recommends coordination with the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries

*State Parks • Soil and Water Conservation • Natural Heritage • Outdoor Recreation Planning
Chesapeake Bay Local Assistance • Dam Safety and Floodplain Management • Land Conservation*

(VDGIF), to ensure compliance with protected species legislation. DCR also requests an opportunity for further review and comment as additional details for this project become available.

In addition, this project either overlies or is adjacent to a karst landscape characterized by sinkholes, caves, disappearing streams, and large springs. If such features are encountered during the project, please coordinate with Wil Orndorff (540-394-2552, Wil.Orndorff@dcr.virginia.gov) to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or "improvement" of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

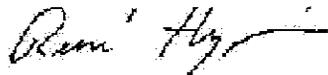
Our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters, that may contain information not documented in this letter. Their database may be accessed from www.dgif.virginia.gov/wildlife/info_map/index.html, or contact Shirl Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,



S. Rene' Hypes
Project Review Coordinator

CC: Tyland Dean, USFWS
Amy Ewing, VDGIF
Wil Orndorff, DCR-KARST
Geraldine Jones, VDOT
Robbie Rhur, DCR-DPRR

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United States Department of the Interior



FISH AND WILDLIFE SERVICE

Ecological Services
6669 Short Lane
Gloucester, VA 23061

August 21, 2008

Mr. Nicholas M. Nies
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219-2000

Re: I-81 Corridor Improvement Study
Tier 2 – I-77/I-81 Overlap

Dear Mr. Nies:

The U.S. Fish and Wildlife Service (Service) has reviewed your letter dated July 7, 2008 regarding the initiation of an Environmental Assessment for the I-81 Corridor Improvement Study Tier 2 – I-77/I-81 Overlap. The subject section of roadway improvement would be approximately nine miles in length and would be located in Wythe County, Virginia. This letter constitutes the preliminary report of the Service and is submitted in accordance with provisions of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

The Service has enclosed a list of federally-listed species found in Wythe County, Virginia. Upon receipt of additional information, we will provide more detailed information regarding the potential effects of this project on federally-listed species, and any surveys or further coordination that may be required.

We appreciate the opportunity to comment on this reevaluation. If you have questions, please contact Mr. William Hester of this office at (804) 693-6694, extension 134.

Sincerely,

 Karen L. Mayne
Supervisor
Virginia Field Office

Enclosure

cc: Alice Allen-Grimes, Norfolk District Corps of Engineers, Norfolk, VA
Ed Sundra, FHWA, Richmond, VA

WYTHE COUNTY, VIRGINIA
Federally Listed, Proposed, and Candidate Species

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>	<u>STATUS</u>
<u>MAMMALS</u>		
Myotis sodalis ¹	Indiana bat	LE
<u>VASCULAR PLANTS</u>		
Echinacea laevigata	Smooth coneflower	LE
Spiraea virginiana ¹	Virginia spiraea	LT

Species of Concern (No official Federal status)

<u>INVERTEBRATES</u>		
Foveacheles parallelseta	A cave mite	G1
Litocampa sp. 3	A cave dipluran	G2
Pseudanophthalmus sp. 6	A cave beetle	G1
Stygobromus abditus	James Cave amphipod	G2G3
<u>VASCULAR PLANTS</u>		
Paxistima canbyi	Canby's mountain-lover	G2
Phlox buckleyi	Sword-leaved phlox	G2
Saxifrage carolinana	Carolina saxifrage	G2

¹This species has been documented in an adjacent county and may occur in this county.