

**Westmoreland County  
Route 22 Improvement Project  
S.R. 0022, Sections B01 and B02  
Wetland Mitigation  
Murrysville Community Park**

Route 22 Project Description

- Route 22 improvement project within Murrysville divided into two construction sections: B01 and B02
- B01, which is under construction and is expected to be completed in April 2005, extends 2.8 miles from the Allegheny County line to the Cozy Inn Cutoff
- B02 extends 4.1 miles from the Cozy Inn Cutoff to the Route 66 interchange in Delmont
- Construction of B02 is expected to begin in spring 2005 and to be completed within 3 years

Wetland Impacts of the Route 22 Improvement Project

- Construction of B01 impacted 0.25 acres of wetlands
- Construction of B02 will impact 0.91 acres of wetland
- Construction of Route 22 project impacts 1.16 acres of wetlands originally existing within Murrysville
- The original environmental document, identifying the impacts associated with the Route 22 project and requiring the mitigation of impacted wetlands, was approved in 1997.

What is a Wetland?

- The U.S. Army Corps of Engineers defines wetlands as areas that are “inundated or saturated by surface or groundwater 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.”
- Wetlands are classified based on their water source and the movement of water through the system, which in turn affects the predominant vegetation and pH. Bogs, fens, carrs, marshes and swamps are types of wetlands. In Pennsylvania, wetlands are predominately marshes, which are characterized by low water levels, soft-stemmed plants, little open water, and small islands.

Why are wetlands valuable?

- Provide wildlife habitat to numerous species of animals, including many threatened and endangered species
- Many animal species rely on wetlands for their life cycle, including amphibians
- Estimated in North America 150 kinds of birds and 200 kinds of animals are wetland-dependent
- Provide food chain support
- Improve water quality by retaining pollutants and sediment from upslope runoff
- Provide ground water recharge areas
- Provide flood flow retention, reducing frequency and severity of downstream flooding
- Provide biological diversity within the landscape
- Provide active and passive recreation opportunities
- Provide education opportunities to learn about many types of plants, animals and the interconnectedness of life

## Regulations Protecting Wetlands

- Our federal, state, and local governments have recognized the importance of wetlands and enacted regulations and ordinances to protect them
- Federal—Clean Water Act, Section 404
- State—25 PA Code Chapter 105
- Municipality of Murrysville—Chapter 220, Article XV
- All of these regulations require permits to fill or destroy wetlands, even on private property. In addition, the nation's "No Net Loss Policy" regarding wetlands requires all but the smallest wetland impacts be mitigated.

## Mitigation Requirements

- Mitigation of wetlands follow a defined hierarchy:
  - Avoidance of wetlands
  - Minimization of impacts
  - Compensatory mitigation (Replacement)
    - On-site, in-kind restoration or creation
    - Off-site, in sub-watershed, in-kind restoration
    - Off-site, in watershed, in-kind restoration or creation
- Regulatory and resource agencies (e.g., PADEP, US Army Corps of Engineers, PA Fish and Boat Commission, US EPA, US Fish and Wildlife Service) must concur with the proposed mitigation prior to issuing a permit to destroy wetlands.

## Mitigation of the Route 22 Wetland Impacts

- An original wetland replacement site had been identified within Murrysville in 1996. However, in 2003 it became apparent that this site would not be feasible due to property ownership issues and other problems with the site.
- Using the mitigation hierarchy, Skelly and Loy began investigating for alternate wetland replacement locations in the summer of 2003.
- Using secondary sources, over 50 sites were initially identified within the watershed
- Skelly and Loy evaluated these sites through field views and property information, and eventually 8 sites were determined to be potentially feasible
- These 8 sites were further evaluated and ranked based on
  - Proximity to impacted wetlands
  - Usable size for wetland creation
  - Position in landscape
  - Adjacent land use
  - Hydrology
  - Vegetation
  - Soil characteristics
  - Extent of existing wetlands
- In September 2003, PennDOT, Skelly and Loy, and PADEP viewed the top three sites and, due to agency concerns regarding the extent of existing wetlands and subsurface conditions on the other two sites, the Murrysville Community Park Site was identified as the preferred mitigation site.
- In November 2003, the conceptual wetland mitigation plan was presented to Murrysville EAC and Parks (November 11, 2003) and Council (November 19, 2003). The use of the property for wetland construction was subsequently approved.
- Upon Murrysville's approval of the use of the property in 2003, Skelly and Loy and PennDOT began the environmental clearance process for the site. This includes wetland delineation, hazardous waste investigation, archaeology studies and regulatory

agency coordination. Once the environmental studies were complete, final design began on the site.

- The Department of Parks and Recreation and the Environmental Advisory Council reviewed the final design plan in August 2004. No objections to the plan were raised.

#### Project Location and Existing Conditions

- The 4-acre site is located along Wiestertown Road, north of Bollinger Road, east of the Community Park development
- Steels Run, a High-Quality Stream, managed for Cold Water Fishes, flows along the eastern border of the site
- The 100-year floodplain of Steels Run encompasses approximately 60% of the site
- Two unnamed tributaries are located just north and south of the site
- Three small wetlands, under 0.10 acre each, were identified on the site
- A fourth wetland, over 0.25 acre, was also identified
- In July 2004, PennDOT, Murrysville, Skelly and Loy, PADEP and the US Corps of Engineers viewed the proposed wetland site and delineated wetlands. The agencies noted that the site was particularly well suited for wetland mitigation due to the partnering opportunity between the state and local governments and the education opportunities that will arise with the development of the park

#### Proposed Wetland Plan

- Approximately 1.5 acres of wetland will be created
- A small gravel parking lot, with room for 6 cars, 1 handicapped vehicle, and a school bus is setback 50' from Wiestertown Road R/W
- A 20' x 36' pavilion with an enclosed storage area will be located within the site to provide educational opportunities for the school district and other groups
- A 2000' long crushed limestone walking trail encircles the site
- An overlook with a side-rail fence will be located at the upper basin
- Educational signs will be located along the trail
- A purple martin house will be erected

#### Monitoring of the Wetland Site

- PennDOT will monitor the site for 5 years as a condition of the permit
- Monitoring will be conducted semiannually for the first three years
- Annually for the last two years
- Site will be monitored for
  - Delineation of created wetland boundary
  - Presence of hydrology sources
  - Areas of erosion requiring corrective measures
  - Presence of invasive plant species
  - Stressed and dead vegetation
  - Presence of wetland soil indicators
  - Evidence of wildlife usage of the site
- PennDOT will report the results of the monitoring investigations to PADEP and US Corps of Engineers
- PennDOT will repair areas requiring corrective action during the five-year period

### Maintenance of the Wetland Site

- Routine maintenance required:
  - Pick up litter
  - Plow parking lot and drive in winter, as desired
  - Mow grass shoulders along parking and drive, weekly or as-needed
- Annual/occasional maintenance required:
  - Remove non-native and invasive plants
  - Remove accumulated debris on wetland weir and outlet structures
  - Inspect diversion ditch for erosion
  - Inspect wetland berms for erosion
  - Mow warm season grasses once between mid-July and mid-August
- Long-term maintenance required:
  - Maintain pavilion, including re-roofing, painting steel columns
  - Replace traffic signs (stop, restricted parking, one-way, and do-not enter signs)
  - Re-pave walking trail with crushed limestone
  - Re-pave gravel parking lot
  - Inspect/repair/replace overlook side rail fence
  - Inspect/adjust habitat structures as necessary

### West Nile Virus

- Research and studies into the spread of and transmission of West Nile virus remain ongoing.
- West Nile virus was first detected in North America in 1999 in New York, and in Pennsylvania in 2000. West Nile virus has been detected in nearly every state in the union.
- Due to the relative recent arrival of the West Nile Virus in the nation, few established and conclusive research works on the relationship between wetlands and West Nile virus are currently available
- The following information presented on West Nile virus is a brief summary of information from government agencies and educational institutions available to the general public. A list of references and informational handouts has been made available and are located on the table in the entryway.

### West Nile Virus Description/Effects

- West Nile virus is a mosquito-borne disease is known to affect people, birds, horses, and other animals.
- Human infection with West Nile virus can result in an unapparent, mild or severe response depending on the individual. Although there is no specific treatment or vaccine for human West Nile virus infection, most people fully recover from the virus. The elderly and persons with compromised immune systems are at most risk.
- Most people who are infected with the West Nile virus will not have any type of illness.
- Approximately 20% of the people who become infected will develop West Nile fever.
  - People with mild infections may experience fever, headache, body aches, skin rash and swollen lymph glands.
  - West Nile fever typically lasts only a few days and does not appear to cause any long-term health effects.
- It is estimated that 1 in 150 persons infected with the West Nile virus will develop a more severe form of disease.
  - The symptoms of severe infection (West Nile encephalitis or meningitis) include headache, high fever, disorientation, tremors, muscle weakness, and paralysis.

- Symptoms of severe disease may last several weeks, although neurological effects may be permanent.
- In more severe cases, intensive supportive therapy is indicated, often involving hospitalization and nursing care.

#### West Nile Virus Statistics

- The virus was detected in every county in PA in 2003. The PADEP identified 237 cases of West Nile virus in humans throughout the state, 8 of which resulted in death.
  - In Westmoreland County in 2003, 4 positives in humans were reported, one of which resulted in death.
- Within the state so far this year (September 9, 2004) 4 humans have tested positive for West Nile virus. One human case each in Lancaster, Erie, Bucks, and York counties.
- The virus has not been detected in Westmoreland County this year (September 9, 2004). That includes humans, dead birds, mosquito samples, sentinel samples, and veterinary samples.
- West Nile virus caused 284 deaths nationwide in 2002. For comparison, the flu kills about 36,000 Americans each year.

#### Vaccinations

- Human vaccines for West Nile virus are not currently available, although several are in the development process.
- The USDA has issued conditional approval for several horse vaccines (Fort Dodge Innovator, Merial Recombi).

#### Mosquitoes

- Mosquitoes are the primary vectors of West Nile Virus, carrying the virus from host to host.
- About 13 of the 60 adult mosquito species in PA are known to be able to carry the West Nile Virus.
- The active virus can carry through winter in dormant adult female mosquitoes and eggs.
- The most common mosquito carrier of West Nile virus in PA is the Northern House mosquito (*Culex pipiens*).
- *Pipiens* is active from late spring to fall, feeding primarily from dusk to dawn, and has an estimated flight range of 1/4 to 1 mile.
- *Pipiens* preferred habitat is small stagnant pools and containers associated with urban environs and other human developments.
  - In urban areas this would include: plastic containers, ceramic pots, tires, clogged roof gutters, wading pools, birdbaths, and swimming pools, where no natural predators occur. Even a small bucket of stagnant water can become home to up to 1,000 mosquitoes at a time, while a clogged gutter may produce 1 million over the course of a season.
  - On farms this includes: watering troughs, rain barrels, tire ruts, manure lagoons, ditches, and even hoof prints.
- Adapted to polluted habitats, *pipiens*, and other principal carriers, generally avoid and do not prefer most wetlands. However, contaminated or degraded wetlands may provide habitat for these species.
- The typical life cycle for *Culex* species (including *pipiens*) can be completed in as little as two weeks. (eggs laid on the surface of the water numbering 150-300 and taking 1-2 days to hatch, the larval stage lasts 8-12 days given summer temperatures, the larvae

then metamorphose into pupae, spending 2-3 days in this stage prior to emergence as winged adults)

- Common predators of mosquitoes, from larvae to adults, include: aquatic diving beetles; predatory larvae of several aquatic insects including dragonflies and damselflies; amphibians such as frogs and toads; a variety of birds such as swallows, swifts, purple martins, flycatchers; and bats.
  - Aquatic predators typically require habitats that have long-term inundation periods (several weeks up to a year) in order to complete their life cycle
  - Terrestrial and avian predators can be attracted using habitat structures such as bat boxes, purple martin houses, and swallow perches

#### Existing Site and Vicinity Conditions

- The site is an abandoned pasture and currently composed of herbaceous rangeland.
- Tile drains located at the site indicate that the soils are poorly drained and subject to seasonally high groundwater conditions. A large portion of the site was likely wetland at one time and later drained and converted to agricultural use.
- Four wetlands exist at the site.
  - Three of these wetlands currently support conditions favorable to mosquito breeding in the absence of predators (temporary inundation in the form of stagnant puddles) for a portion of the year.

#### Proposed Wetland

- The constructed wetland will incorporate one of the existing wetlands on site as an “enhancement “ of the existing wetland.
- The constructed wetland will attract and sustain numerous aquatic and terrestrial predators of mosquitoes thus aiding in control in the project area and vicinity.
- A purple martin house will be erected to encourage summer residency of these predators.

#### PADEP West Nile Virus Surveillance Program

- Pennsylvania's plan has three parts— education, surveillance and, if the surveillance program determines there is a risk, the control of mosquitoes.
  - Comprehensive surveillance and control network in conjunction with PA Dept. Health and PA Dept. Ag.
  - Network covers all 67 counties, includes trapping mosquitoes, collecting dead birds and monitoring horses, people and sentinel chickens.
  - PADEP directly funds the County West Nile Virus Surveillance Programs.
- The site will be added to the Westmoreland County West Nile Virus Surveillance Program
  - Surveillance typically begins in late March and continues into November
  - Surveillance entails determination of mosquito population through sampling of the site and determining if the sample number exceeds a predetermined threshold
  - If the threshold number is exceeded, the County will treat the site with larvicides such Bti (a bacterial control specific to mosquitoes and blackflies) or methoprene (a growth inhibitor) to kill mosquitoes prior to becoming airborne
  - Sampling may be conducted on a regular schedule or complaint basis depending on the site and conditions
  - This service is provided to municipalities and individuals at no cost

## Conclusions

- Wetland habitats are protected as a valuable resource under federal, state, and in Murrysville, municipal law
- By law, impacts to wetland habitats must be mitigated
- In order to meet federal and state mitigation requirements for construction of the Rt 22 B01 and B02 projects, PennDOT must provide compensatory mitigation in the form of 1.16 acres of created wetland habitat in the project vicinity
- Creation of the required mitigated wetland at the preferred site is supported by the USACOE, PADEP, Murrysville Parks and Recreation, and Murrysville Public Works based on site criteria and educational opportunity
- West Nile virus is a health concern throughout the state, including Westmoreland County
  - The overall risk of contracting West Nile virus is minimal, and the risk of serious illness or death attributed to West Nile virus even less
  - The species of mosquitoes most closely associated with West Nile virus transmission prefer small, stagnant, temporary pools or degraded wetlands for breeding and not functioning wetland systems
  - The conditions for mosquitoes associated with West Nile virus currently exist in the Murrysville and site vicinity
  - Four wetlands currently exist at the site, three of which meet the preferred habitat criteria, for at least a portion of the year, of the mosquitoes species most associated with West Nile virus in PA
  - Several wetlands also currently exist at the site of the adjacent Murrysville Community Park and have been protected throughout the park development process and afforded protected buffer zones in accordance with Murrysville ordinances
- West Nile virus risk can be reduced, and mosquitoes effectively controlled through natural means and human intervention
  - The constructed wetland will host a variety of natural aquatic, terrestrial, and avian mosquito predators
  - The site will be monitored with assistance from the state and county to determine if West Nile virus is present, or if overall mosquito numbers present a problem
  - The county will treat the site as needed to address any mosquito problems at not cost to the municipality
  - Further methods for reducing the risk of contracting West Nile virus and controlling mosquitoes around the home and farm are available by contacting your PADEP Regional West Nile Virus Coordinator and your West Nile Virus County Coordinator.
  - Please see the list of references and informational handouts made available and located on the table in the entryway.