



Natural Treatment System

48-acre engineered wetlands harnessing nature to reduce nutrient discharge

Natural Treatment System By the Numbers

The six wetland cells comprise **48 acres**.

The entire natural treatment system site (including dry areas) is nearly **70 acres**.

Designed to process up to **2.0 million gallons per day**.

More than **150,000 native plants** were planted in the six cells of the Natural Treatment System, including bullrush, pickleweed, woolgrass, spikerush, arrow arum, duck potato, sweetflag and blueflag Iris.

In the uplands, there are approximately **945 plants**, including more than **350 trees** such as Maple, Redbud, Dogwood, Cypress, Crabapple and others.

Since May 2008, more than **70 species** have been sighted, including deer, squirrels, groundhogs, raccoons, and many varieties of birds, toads and frogs.

The project took about **one year** to complete - from July 2007 - July 2008.

The total project cost was approximately **\$7 million**.

Today, there is an expectation that responsible companies will work to reduce the environmental impact of their business and promote the sustainability of the natural resources on which we all depend.

At Philip Morris USA, water is an important part of our environmental footprint. Our Park 500 tobacco processing facility in Chesterfield County, Va., withdraws about 1.8 million gallons of water directly from the James River each day. Water is used in our manufacturing processes and then treated in an on-site treatment plant before it is returned to the river. That treated wastewater contains substances like nitrogen and phosphorus that are present in agricultural products like tobacco.

The James River is a vital asset for our community and a major tributary to the Chesapeake Bay. Because high levels of nutrients can have an adverse impact on aquatic life, Park 500 has worked to voluntarily reduce its nitrogen loadings to the James River by 46 percent between 2001 and 2006 - though our nutrient discharges were well within state-permitted levels. Then we learned about engineered wetlands and saw an opportunity to do more.

When our Natural Treatment System is fully established - as early as the summer of 2009 - we expect to further reduce Park 500's nitrogen output by about 13 percent and phosphorus output by 34 percent. Thus far, we are really pleased with the water quality results we have seen and the new wildlife habitats that have been created right here in our backyard.

Our Natural Treatment System is believed to be the largest of its kind in Virginia, and it was made possible through the leadership and support of the Commonwealth of Virginia and the Virginia Department of Environmental Quality.

On behalf of all the employees of Philip Morris USA, I am proud to share with you this information about our project - an investment in the environment we all share.



Craig Johnson
President, Philip Morris USA



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What is the Natural Treatment System?

A 48-acre engineered wetlands that uses natural physical, chemical and biological processes to further reduce nutrients from treated water before it is returned to the environment.



CH2MHill, a Denver-based construction and engineering firm, constructed the natural treatment system and has been retained to assist in the operations, maintenance and optimization of the system.

“These treatment wetlands are actually restoring wetland functions in a society where those are being lost year by year through development. And, one of the very interesting things is that you can use the problem of waste water disposal as a method of creating new wetlands that are as functional as natural wetlands.”

James Bays
Principal Scientist for Natural
Treatment Systems CH2M Hill

How it works:

1. Treated wastewater (already meeting permitted levels) is pumped from Park 500 to the highest point in the Natural Treatment System.
2. Water is diverted into one of two “trains” – each consisting of three cells. Over the next 9-12 days, gravity will move the water through the system.
3. Water enters a cell’s deep zone. Up to 6’ deep, these zones occur at the beginning, middle and end of each cell and ensure even water distribution. Plants in deep zones include water lilies and water lotuses.
4. Water passes through a marsh zone containing grasses and plants that thrive in shallow water (less than 6” deep). Plants in marsh zones include duck potato, bull rush, pickleweed and many others.
5. After passing through the various zones within a cell, water flows from an outlet structure into the next cell.
6. After completing its three-cell journey, water from both trains flows into a holding well and is then gravity fed through an effluent pipe line to the river.