

An aerial photograph of a residential development in a forested area. The houses are built on a hillside, surrounded by dense trees. A paved road winds through the property. The text 'Forest Friendly Development' is overlaid in white, bold font on the right side of the image.

Forest Friendly Development

**Chesapeake Bay Watershed Case Studies
2005**

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Builders/Developers

Applied Eco Service
Branca Development
Brownstone Realty
Classic Concept Builders
Desmond Development
Eco Site
HRG Inc.
Jesse Ziegler Development
Landmark Homes
Mitchell & Best Homes, Inc.
PennTerra Engineering
The Fortune Land Company
Toll Brothers
Winchester Homes

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Introduction

Throughout the Chesapeake Bay watershed, forests are being lost to development at a rate of approximately 100 acres per day. In terms of protecting water quality, this is a disastrous trend for the Bay. Forests retain and process 85 percent of airborne nitrogen, the Bay's number one pollutant. They capture and store rain and snow, allowing precipitation to slowly soak into the ground. Along streams, riparian forest buffers are particularly effective agents against water pollution, filtering runoff and serving as the last land barrier to water degradation.

In the 17th century, before settlers arrived, ninety-five percent of the Chesapeake Bay watershed was covered by forests. By 1850, fifty percent of previously forested land was converted for human use. Though the region has recovered forest lands lost in the agricultural boom of the 19th century, less than sixty percent of the region is forested today. With 300 families moving into the watershed each day and a population of 18 million expected by 2020, growth and its resultant development has become a pressing issue for Chesapeake Bay restoration efforts. If this trend continues, the Chesapeake watershed will see nearly two million acres of resource lands converted to development by 2030. Two-thirds of these lands are now forests.

Trends, however, can be changed. Development need not occur at the expense of our forest resources. In general, the Chesapeake Bay Program advocates sound land use planning and development practices that:

- avoid the fragmentation of forests and direct growth to sites away from large, ecologically intact forest lands;
- conserve or restore riparian or streamside forest buffers;
- encourage the connection of forested corridors for wildlife habitat and migration;
- limit the degree of clearing and grading to protect native vegetation and forest or tree cover while still providing for access and fire protection;
- promote the replanting of trees and forests on or near development sites;
- integrate trees and forests into development stormwater management strategies; and
- provide for the long term management of forested lands.

Much of this responsibility to direct growth wisely rests with local governments. But developers and builders must also step up to the plate and boldly protect the value that mature trees and woodlands provide. Collectively, these "forest-friendly" development practices can provide a win-win situation for the development community, local government and the natural environment.



Developers are increasingly using trees to sell houses. Wooded properties can increase home values by as much as 20 percent. Lots with mature trees or which back up to forested land have sold more than fifty percent faster than their grassy counterparts according to the builders interviewed in this report.

It is easy to understand why:

- Homebuyers appreciate the beauty of mature trees, their shade on hot summer days and their ability to buffer wind and noise.
- Shade provided by trees can reduce air-conditioning bills by as much as 30 percent.
- A dense grove of trees 50 feet wide can reduce noise levels by as much as 50 percent.
- Homeowners enjoy the opportunity to walk through wooded trails or along wooded streams close to their homes.

With the continuing education that builders and homeowner associations provide, homeowners are more aware of the reasons for conservation easements, covenants and the critical need for preserving mature trees and forested lands on their lot and within their development.

This report is intended to showcase a number of developments that make forests and trees part of development plans - whether it's protecting a stand of prized hundred year old sycamore trees, preserving a forested mountain ridge, or planting trees to reforest a former soybean field. Included are summaries of protection techniques along with costs and savings associated with the implementation of these techniques. Contact information is provided so that readers can make further inquiries about specific sites and techniques profiled.

Also included, in Appendix A, are brief profiles of recent winners of the Maryland Department of Natural Resources Forest Service's Excellence in Forest Conservation and Land Development Awards. Similar development designs in Pennsylvania and Virginia that are not profiled in the case studies but are worthy of mention for their adherence to forest, tree and natural areas conservation are listed in Appendix B.

The examples illustrated herein are testimony to the perseverance of forward-thinking developers, consulting engineers and supportive government agencies that have worked together to build homes in harmony with the natural terrain.

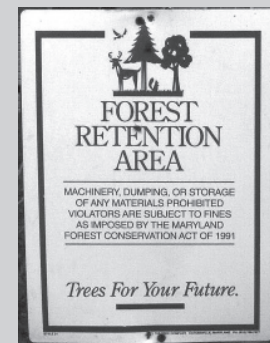
All over the watershed, pockets of trend-setting developments promising to preserve, protect and ensure the future of our forests and wildlife corridors are being built. In Forest Ridge, Pennsylvania, the view of the ridge from a distance belies the fact that below the unchanged canopy are 44 new homes. In Bancroft, Maryland, stream buffer widths as wide as six hundred feet protect water quality while preserving wildlife habitat and corridor connection. At Forest Brooke, Virginia, the developer prohibited mass clearing and individually cut down only the trees absolutely necessary to clear the home footprint. In Lenah Run, Virginia, 30 acres were reforested with thousands of native trees and its small clusters of hamlets preserved existing wildlife corridors.

Trends change. In 2030, perhaps the trend will read: *"In the Chesapeake Bay watershed, new development occurs outside of forested land considered priority conservation areas; tree-safe areas are the norm rather than the exception; new trees are planted at a rate far exceeding the number of trees cut; and streams are lined with forested buffers."*

Developers, builders and the governmental agencies responsible for the creative developments profiled in these case studies have shown that they are willing to take the necessary steps and work together to improve the ecological impact of development. By working with new designs and progressive new ordinances, they have begun the difficult task of balancing new growth and development with the preservation and enhancement of our remaining forest corridors and mature stands of trees.

An acre of mature trees can absorb as much carbon dioxide as that generated by a car driving 26,000 miles. Trees left on site significantly reduce storm water runoff and soil erosion as their leaves slow the fall of rain and allow it to soak into the soil.

As rules governing stormwater management require more infiltration and less of the conventional "pipe to pond" approach, developers are realizing that tree cover is an asset to every new development.



Preserving trees and forest cover is not always easy. It takes innovation in site planning and design, coordination between developers, builders, and permitting authorities, and forethought on the long-term management of a site's forested areas.

In some cases, conflicts arise with long-standing development regulations that were not designed with forested space in mind; acquiring waivers from outdated land development ordinances and restrictive utility requirements can sometimes add costly time delays for plan reviews.

Case Study Summary Highlights

Forest Ridge, Palmyra, PA

Forested site, existing trees preserved on forested lots except for house footprint, deed restrictions for tree protection, use of grassed swales. Mountainside forest corridors and tree canopy preserved, individual lot clearing, soil compaction avoided by temporarily moving soil off site. 69.8 acres, 70% preserved forest.

Millcreek, Lancaster, PA

Protection of existing trees using arborist, tree wells, tagging, builder education, homeowner education, aftercare, replanting of only native plants/trees in cul-de-sacs, landscaping and common spaces. Trees cleared used for on site mulch. Existing stream buffer protection and enhancement. 90 acres, 45% open space.

Pantops, State College, PA

Forest corridors and habitat preserved, natural stormwater control through bioretention areas and wetlands, lower than required housing density to preserve woodlands, native plants, signage and fencing used during construction for tree and soil preservation. 113 acres, 65% preserved forest.

Pennterra, Carlisle, PA

Use of stormwater treatment train, preservation of 2 miles of creekside buffer in excess of 100 feet, trees in bioretention areas, preservation of 200 acres of woodland and wetlands as wildlife preserve, interconnected rain gardens, short housing setbacks and narrower roads to minimize impervious cover. 503 acres, 50% open space.

Bancroft, Sandy Springs, MD

Site fingerprinting, forest and individual tree preservation, stream buffer preservation exceeds county requirements, forest corridor preservation, Rural Neighborhood Cluster design. 101 acres, 70% open space.

Endicott Hill, Bethesda, MD

Forest conservation, weir wall stormwater management, waivers for 6 lot common driveway for minimal impervious surfaces, existing slope protection, supplemental understory planting, conservation easements. 6 acres, 55% left wooded.

Pembroke, Emmittsburg, MD

Site fingerprinting, tree safe areas, original plan redesigned using low impact development techniques, preservation of wetlands, use of grassed bio-swales and timber wiers. 43 acres, 50% left undisturbed.

Dominion Valley, Haymarket, VA

On-site tree farm, buffer preservation and enhancement, wetland enhancement, wash-out areas, conservation signage. Transplanted large trees to supplement and create buffers, metal fences, signage used to keep machinery out of tree safe areas. Conservation easements. Clustering to reduce clearing and increase density. 2300 acres, 46% open space.

Forest Brooke, Manassas, VA

Wildlife habitat and forest corridor preservation, low density, natural stormwater management techniques, shared driveways, tree inventory and tagging, individual development lot clearing, deed restrictions mandating tree conservation. 62 acres, 60% left forested.

Lenah Run, Aldie, VA

Stormwater management using existing stands of trees, natural features, grassed swales in front of homes. No sidewalks, short driveways minimize impervious surfaces. Preserved trees using clustering and transplanting young trees in the path of construction. Reforested 30 acres along stream through mitigation, enhanced wooded perimeters. Hamlet design with forested corridors between villages. 460 acres, 70% wooded and open space.

Technique	Description of Forest Friendly Development Technique	Developments Using Technique
Site Fingerprinting	Placing development away from environmentally sensitive areas such as steep slopes, vegetated areas and wetlands while confining disturbance of the ground to just the areas where roads and buildings will exist.	FR M P PT B EH PB DV FB LR
Preservation of Natural Drainage	Using depressional storage areas, natural swales and existing drainage features to manage stormwater instead of filling in and grading these areas to use for roads or house sites.	FR M P PT B EH PB DV FB LR
Clustering	Grouping home sites closer together, on smaller lot sizes with lessened front and side setbacks to increase permeable surfaces, increase wooded or open space and lessen stormwater impact.	FR M P PT B EH PB DV FB LR
Homeowner Covenants for Tree Protection	Requiring trees larger than a certain diameter and or height be removed only with consent of the Homeowners or Community Association; no tree may be cut unless it is declared a hazard, trees approved for removal must be replaced on a 1:1 scale; prohibiting mowing into buffer areas to increase homeowner lawn size.	FR M P PT B EH PB DV FB LR
Protection of Forested Areas and Significant Trees	Utilizing site mapping to identify and tag significant trees; enclosing forested areas in fencing layers to protect from machinery; use of forestry professional to inventory and assess existing tree cover.	FR M P PT B EH PB DV FB LR
Conservation Easement	Use of legal agreement between the landowner and an agency or land trust that permanently limits uses of the property in order to conserve and protect its natural features and environmental value.	FR M P PT B EH PB DV FB LR
Forest Corridor Preservation	Preserving the connections of forested lands within and on perimeters of the development to ensure wildlife corridors remain in place.	FR M P PT B EH PB DV FB LR
Tree Conservation Plan	Designated plan to provide protective measures sheltering existing trees from construction damage including signage around root zones, use of smaller equipment, root pruning, topsoil protection, on-site tree farm, tree replanting and construction staging plans.	FR M P PT B EH PB DV FB LR
Buffer Preservation and Enhancement	Protection of existing forested buffer zones, creation of new buffers by planting native trees or enhancement of existing buffers by expanding buffer width and planting additional trees.	FR M P PT B EH PB DV FB LR
Selective Clearing and Minimization of Grading	Utilizing previously disturbed land for infrastructure and confining machinery to smaller perimeters around construction areas.	FR M P PT B EH PB DV FB LR
Bioretention using Trees	Use of native trees and shrubs in stormwater drainage areas in cul de sacs, lots and beside interior roads to naturally filter and treat runoff.	FR M P PT B EH PB DV FB LR
Contractor Education	Education of utility and building contractors on use of heavy machinery around tree safe areas.	FR M P PT B EH PB DV FB LR
Wash-out Areas	A preset area, designed with filtering beds to collect runoff, where construction vehicles can be hosed clean on-site without causing water or soil pollution.	FR M P PT B EH PB DV FB LR
Narrow Street Width	Narrower street width to reduce impermeable surfaces, preserve natural areas and reduce stormwater runoff.	FR M P PT B EH PB DV FB LR

FR – Forest Ridge M – Millcreek P – PanTops PT – Pennterra B – Bancroft
EH – Endicott Hill PB – Pembroke DV – Dominion Valley FB – Forest Brooke LR – Lenah Run

Forest Ridge

Residential Subdivision

Client: Jessie Ziegler Development, 717-838-5155

Builders: Landmark Design, SA Homes

Location: Palmyra, PA

Year Constructed: 2003 Size: 69.8 acres

Local Government: South Londonderry Township

Featured Techniques

Selective Clearing - Excavator permitted to clear very minimal area on each site to preserve existing trees and wildlife corridors. Developer has ties to the land and sought to preserve it.

Tree Conservation Plan - Developer walked each lot site to determine placement of home based on saving the most trees. The lot was walked again with homeowners. If prospective homeowners disagreed about the importance of preserving a lot's trees, they were shown a lot in a less wooded section and informed that deeds restricted tree removal.

Excavated soil was moved off site in order to protect tree roots and avoid soil compaction during construction. Soil was returned to site for backfilling.

Overview

Forest Ridge homes are hidden in 69 acres of lush, preserved forests in a rural setting. The developer who has strong ideals for maintaining the forested character of the land is also the excavator. He permitted only a narrow path cut in the trees around the house pad to accommodate building. Purchase of two pieces of smaller excavation equipment made accomplishing this goal easier. Phase one was a six month sellout, to the surprise of realtors who told the developer that the treed lots were overpriced for the area. Phase two has even heavier forest cover per homesite with just 10% of each lot cleared. Preserving the mountainous character of the land and preserving wildlife corridors and habitat were paramount in the design of this heavily forested subdivision.



Investment Highlights

Infrastructure

- Clearing and grading costs were \$6000 per acre.
- Sold as large lot sizes to offset loss of density due to developer's priority to preserve wildlife corridors, forest canopy and the forest setting.
- Value of each mature tree preserved was calculated at \$1000.
- Limiting sidewalks resulted in wider streets; utilities are contained in right of way.

Market Value

- Phase 1 sold out in 6 months, Phase 2 was a record sellout for area. Lots in Phase 3 are selling for a higher premium due to success of Phases 1 and 2.
- Homes sold 75 % faster than nearby homes in traditional developments.
- Lot prices were double that of nearby developments, due to additional cost of equipment and labor spent to preserve the trees.

Cost Considerations/Associated Risks

- Developer bought two pieces of equipment to maneuver in the tight areas around home and trees. Mini excavator and dozer allowed for trees to be saved in closer proximity to the foundations.
- The cost of moving 25 truckloads of soil temporarily off-site to avoid soil compaction around the preserved trees was offset by reduced clearing costs.



“The developer did not cut corners. He preserved the maximum amount of existing trees. People responded because he preserved the forest.”

Ruth Crownover, Ziegler accountant

“There is no new subdivision like Forest Ridge in South Londonderry Township. The forested sites are a record sellout.”

Brownstone Realty

“The best benefit is that when I am done, it still looks like a mountain.”

Jessie Ziegler, Developer

Maintenance & Compliance

- Deed restrictions imposed by developer to curtail the cutting of trees. If a tree is taken down on a lot, it must be replaced on the lot. Prospective homeowners are given a copy of the restrictions before purchase since it heavily governs property additions such as pools or outbuildings.
- Township holds the easement for 2 conserved areas: .9 acre was set aside for a park and 2.6 acres were preserved along the perimeter with a requirement that a minimum of 25% of entire site remains forested.

Millcreek

Residential Subdivision

Client: George Desmond, Developer; Charter Homes, Builder, 717-560-1400
Consultant: Pat Fasano, Forest Stewardship Professional
Location: Lancaster, PA
Year Constructed: 2003 Size: 90 acres
Local Government: West Lampeter Township

Featured Techniques

Site Fingerprinting - Consultant drew up forest stewardship plan 2 years before ground was broken. Thirty-one acres of wooded land set aside for open space. Homes are set at elevations dictated by landform, making for a visibly flowing landscape and limiting the need for grading. Narrow streets and very short driveways decreased impervious surfaces.

Tree Conservation Plan - Large sycamores were preserved using stone retaining walls around drip lines. Trees were marked individually with flagging and fencing. Contractor education was provided through a series of meetings and supervision during excavation. Trees in the path of excavation in Phase 1 were transplanted to supplement trees in Phase 2. Natural wildlife corridors along stream were maintained and additional native trees planted.

Bioretention using Trees - Used existing trees in bioretention areas and natural sediment basins. Native trees were transplanted to cul-de-sac islands designed to pretreat runoff.

Overview

Millcreek, awarded a 2003 Commonwealth Design Award as Pennsylvania's first Smart Growth community, was designed using the township's Neighborhood Design Option. The developer, wanting to pioneer environmentally friendly development techniques, spent 2 years working with the township to design a new ordinance option to "encourage development that compliments rather than eliminates the distinctive resources of the site." It was designed to preserve woodland while achieving higher density. The 4.5 acres of trails are mulched with the trees cut for home sites. No trees were cut in the woods set aside for preservation, except invasive non-natives marked by the consultant. Trees were transplanted from Phase 1 excavation sites to supplement Phase 2. Only native trees and plants were used for landscaping.



Investment Highlights

Infrastructure

- Clustering placed 230 homes with 45% of the site left open. Conventional design would have placed 225 homes using all the land with no open space remaining.
- Density increased from 2.9 to over 4 per acre under the new Neighborhood Design Ordinance.
- Reduced stormwater control costs by directing flow through several sediment basins before discharging into Mill Creek.
- Paving costs reduced by narrowing street width to 26 feet in outer areas and 18 feet in some interior areas.

Market Value

- Doubled the speed of home sales, selling more than 40 units per year.
- Reduced expense of land by building for allowable higher density.

Cost Considerations

- Clearing and grading costs were reduced on house pad sites but increased \$150,000, due to massive stone block walls built to accommodate elevation changes and preserve large trees.
- Large, signature sycamore trees were treated for anthracnose by arborist to preserve them, costing \$15,000.
- Spent 30% more in natural stone curbing to enhance the narrower streets.

“We have preserved more of what makes West Lampeter Township unique. Instead of using up our remaining parcels of land set aside for growth in 5-10 years, using these design methods, we will not run out of land for 10-20 years. The township is getting double the number of homes, yet preserving 15 times the amount of natural areas.”

Ray D’Agostino, Township Manager

“I sought to preserve and to accent the lay of the land. Championing the new design ordinance was a chance to pioneer new development techniques. The township has been great to work with and very supportive. As a result of our efforts, two new developments are being built by other developers using the NDO option and one is being retrofitted utilizing the design.”

George Desmond, Developer

Maintenance & Compliance

- Covenants in homeowner deeds restrict the cutting of any trees.
- Interpretive signage placed on preserved areas.
- Homeowner education through on site nature programs led by a forest professional.
- Easement given to township for a portion of open space.

PanTops

Residential Subdivision

Client: PennTerra Engineering, John Sepp, 814-231-8285

Consultant: RH Building, LLC 814-353-9044

Location: State College, PA

Year Constructed: 2000 Size: 113 acres

Local Government: Patton Township

Featured Techniques

Tree Conservation Plan - Treed lots were designed for house pad placement with minimal disturbance. Signage and fencing under driplines were used to keep machinery from compacting soil.

Forest Corridor Preservation - Low housing density and preservation of existing forest allowed contiguous forested areas to be protected. Eventual development of farm land adjacent to the property may impact this in the future.

Overview

PanTops, billed as a Rural Preservation Community, is a three phase development within the township's A-1 Agricultural zone . Lot sizes range from 1 to 3.7 acres. Phase 3 will include 60% of the land as open space. Of the combined 113 total acres in Phases 1 through 3, more than 65% will be left in open space, exceeding the Rural Preservation Design Standards adopted by Patton Township in 1996 which require that at least 50% of the tract remain in open space.

Open space was designed to be contiguous with adjacent agricultural and forested land so that natural corridors for wildlife were preserved. Homes were built to complement the natural features of the hill and valley with minimal tree disturbance and very limited grading. Cul de sac islands, planted with native trees and shrubs, were designed with depressions and no curbing to filter stormwater. Native plants were used for initial landscaping. Signage was placed to designate natural areas and for homeowner education.



Investment Highlights

Infrastructure

- Runoff on the sloped, hillside lots is directed to natural retention areas. Bioretention basins are used in place of cul de sac islands. Storm water management depressions next to the township road have transformed into wetlands.
- Though classified as rural, township sewer/water was available saving drilling, perk and sand mound costs.
- Minimum road width zoning within the A-1 development allows a width of 18 feet. PanTops road widths were set at 18 feet in Phase 1 and 2 saving paving costs. In 2004, on-site fire department passing/turning radius demonstrations and fire department requests caused Patton Township to reevaluate street widths and set minimum widths at 20 feet for Phase 3.
- Clearing and grading costs were lowered by 25%-30% through use of forested home site settings, ungraded natural yards and limited width roads without curbs.
- Thirty-two homes are placed on 43.2 acres with 69.8 acres in open space.

Market Value

- Wooded lots sold in early phases for \$100,000, a record high for area.
- Selling price of the PanTops wooded lots drove area developers to also quickly offer wooded home sites, beginning a trend in the State College area.
- Developer held down density purposefully, for aesthetic reasons and dedicated preservation goals.



“Pantops hit a market niche in being the first in the area to sell lots for \$100,000. The developer was the first to sell the concept of wooded lots with much lower than allowed densities. Emulators have abounded since then selling wooded lots at and above that price, but none have even considered lowering the density of homes within those developments.”

Doug Erickson, Patton Twp. Engineer

Maintenance & Compliance

- Pantops developers, concerned about farmland sales to land management companies and new growth beginning to surround their forested perimeters, are working to convince other area developers to preserve more forested land and to lower their allowable development densities to better protect the natural resources of the area and preserve forest corridors.
- The township parkland requirement for the development was met with a bike and nature path deeded to the township. The developers are seeking easements from neighboring lands to evolve the path into a connected greenway.

Pennterra

Residential Subdivision

Client: TerraVent Land Company, The Fortune Land Company

Consultants: HRG, Inc, Bob Shenk, R.L.A., 717-291-1783;

Applied Ecological Service, Steve Applegate, 609-897-8641

Location: Carlisle, PA

Year Constructed: 2004 Size: 503 acres

Local Government: Middlesex Township

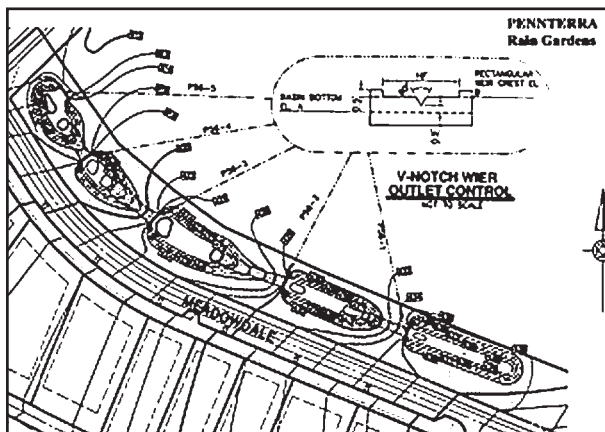
Featured Techniques

Bioretention using Trees - Applied Ecological Services, Inc of Wisconsin is championing the stormwater treatment train technique of a chain of multiple infiltration zones set up using natural swales and a series of wet/dry ponds. Site specs show less flow after development than pre-development. A series of interconnected rain gardens are designed to help manage all on-site stormwater naturally, in tandem with the treatment train.

Riparian Buffer Preservation - 35 to 100 foot wooded buffers are being preserved around the 2.5 mile creek frontage, adding supplemental trees, conservation areas and a trail system.

Overview

Pennterra, the area's first Master Planned Community, started construction in 2004 with 44 homes. Eventually, 1007 homes will be built in 7 villages. Existing forested land and hedgerows dividing the farmed fields and pasture land were designated for preservation. Half of the property or 252 acres will be left in open space, including 2.5 miles of meandering creekfront. More than 120 acres bordering Conodoguinet Creek is set aside as a wildlife and nature preserve. Street widths of 18 to 20 feet with a combination of no sidewalks and partial sidewalks, along with homefront setbacks of 7 feet will minimize impervious surfaces. A stormwater treatment train will be used to mirror the way nature handles runoff and overflow. Unique to this community will be a series of smaller footprint homes which are townhouse size in square footage. Ten foot side setbacks allow clustering adding to the open space. Trees over 30 inches in diameter are required to be inventoried and left in place.



Investment Highlights

Infrastructure

- Cost savings will be realized by minimal grading and use of natural swales for stormwater treatment using innovative design practice.
- Land company worked with the township to pioneer and develop the Unified Development Area, that allows for master planned development.
- Modifications were made to original plans, lowering development density to address new traffic study concerns on the existing road system usage.
- Reduced paving costs through reduction in interior street road widths and utilization of gently curving interior roads, designed to be pedestrian friendly and to calm traffic.

Market Value

- Added value of 2 miles of riparian areas for nature preserve and walking trails plus the growing interest in buyers for village community settings, netted high increase in buyer interest pre-development.
- With average of 7500 homes sold per year in surrounding metro area, the development is expected to sell out within 5 years.

Cost Considerations/Associated Risks

- Length of time for master plan approval due to innovative stormwater plans not used before in township, set project start date back 1 year. Fire department concern over minimal street setbacks and 20 foot street widths delayed approvals.



“Middlesex Township has fully embraced this exciting and challenging project on a former horse farm and is very supportive. Their Traditional Neighborhood Design ordinance option with its smaller lot size and increased preserved space requirements are the wave of the future.”

Bob Shenk, RLA, HRG, Inc.

Maintenance & Compliance

- Homeowner’s Association will be deeded the 252 acres of open space and 2.5 miles of creekfront with its 35 foot wide buffer. The open space will be protected by covenants and deed restrictions. Township laws required preservation of 25% of existing trees.
- Developers have given full permission to the local watershed association to do pre and post construction water quality monitoring on the creek that meanders for 2.5 miles throughout the property.

Bancroft

Residential Subdivision

Client: Mitchell & Best, Martin Mitchell, 301-762-9511
Location: Sandy Spring, MD
Year Constructed: 2003 Size: 101 acres
Local Government: Montgomery County

Featured Techniques

Site Fingerprinting - Developer and arborist walked the site tweaking the placement of homes to harmonize with the existing trees and the lay of the land. Narrower street width with no curbs or gutters reduced impervious cover and minimized clearing and grading.

Tree Conservation Plan - Used an arborist to deep root feed and root prune trees close to home sites to protect them. Used plastic fencing around drip lines to deter heavy machinery from damaging tree roots. Utilized tree flags to mark saved trees. Designed tree wells where final grade of home site would have disrupted existing soil line of trees.

Buffer Preservation - Exceeded county requirements for stream buffer width, measuring in places as wide as 600 feet.

Forest Corridor Preservation - Preserved existing forest corridors by carefully placing homes, maintaining forest setting and connection to natural areas surrounding this rural subdivision.

Overview

Bancroft of Sandy Spring features 44 homes on 101 acres. Designed within the concept of Smart Growth, the property was one of Montgomery County's first Rural Neighborhood Cluster designs featuring 70% open space. Its narrower streets minimized grading. A bike path required by the county was negotiated to be placed in the trees within the development in order to eliminate 12 feet of extra pavement required beside the existing roadway. Stream buffers along the west side of the property are as wide as 600 feet, preserving wildlife habitat and corridor connection. Homes are clustered to maximize forested setting and open space.



Investment Highlights

Infrastructure

- Savings of \$10 to \$12 per linear foot by eliminating curbs and gutters.
- Used hyperelevation of the internal roads to avoid extra costs and site damage from excessive road grading.
- Redesigned from RE2 zoning of one housing unit per two acres to cluster housing zoning, saving open space while creating a higher density.
- Reduced paving costs by 20% by negotiating with county for narrower road width. Road width varies from 18 to 20 feet.

Market Value

- \$100,000 premium added to price of the houses because of the unique wooded environment, the highly desirable location and the incorporation of natural designs into the setting.
- Value of lots sold increased in Phase 2 by 10%.
- Homes in Phase 2 sold twice as fast as Phase 1. Requests for homes in Phase 3, not yet started, exceed available lots.

Cost Considerations/Associated Risks

- Narrow street widths with no curbing posed a problem during the construction phases when large machinery passed each other on internal development roads and when turning around, resulting in shoulder damage and repairs. Developer anticipated this but opted for the temporary inconvenience and additional repair cost in order to preserve the site design.
- Final approval of the project took approximately 18-24 months.



“It took about 3 to 4 months negotiating with the county to get them to allow us to place the required biking lane off the side of the road and into the wooded area fronting the property. Moving the bike lane into our trees saved 12 feet of non-porous pavement being put down. It also saved the existing hedgerows that front the development and give it a desired rural appearance.”

Martin Mitchell, Mitchell & Best

Maintenance & Compliance

- Negotiated with county to save original hedgerows at entrance of development to preserve rural flavor. Hedgerows will be maintained by Homeowner’s Association.
- Homeowners Association will be deeded the conservancy lands when project is completed with restrictions governing the removal of any trees. No tree may be cut down, unless damaged or declared a hazard.

Endicott Hill

Residential Subdivision

Client: Mitchell & Best Homes, Inc. 301-762-9511

Location: Bethesda, MD

Year Constructed: 2002 Size: 6 acres

Local Government: Montgomery County

Featured Techniques

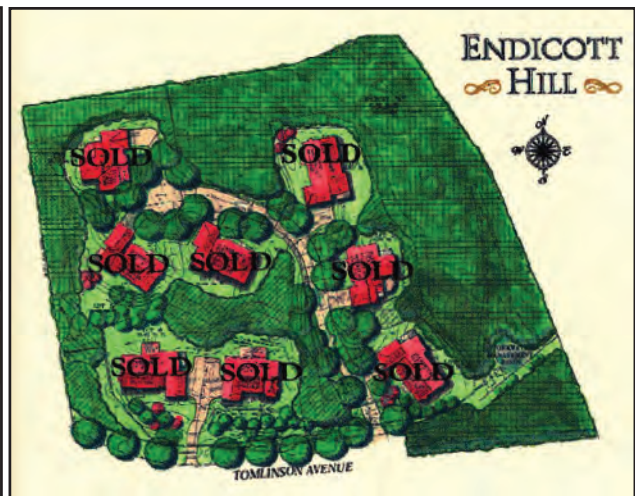
Site Fingerprinting - Strategic house placement permitted an existing forested slope to be preserved. Backwalls of some homes act as retaining walls to preserve slope. Site features unusual placement of homes to complement natural landforms and to preserve small forest.

Tree Conservation Plan - Minimized clearing and grading. Used signage and fencing to protect trees during construction. Erected permanent signage as a reminder to homeowners that the forest is preserved. Built retaining walls to preserve slope elevation near common driveway. Understory planting discourages homeowner mowing to increase lawn size.

Bioretention Using Trees - Constructed weir wall in existing ravine behind homes.

Overview

Endicott Hill, located inside the Capital Beltway, features eight homes clustered on six acres of trees on a sloping forested site. The eight homes are placed on 2.7 acres of the six acre wooded parcel, leaving the site 55% wooded. The homes are unusually placed to make use of the less forested sections of the property. Six homes share a common driveway; two homes share a single driveway. Montgomery County allows no more than 4 homes to share a common driveway, but the developer was able to receive a waiver because of the environmental aspects of the site plan. Site fingerprinting and strategic house placement adjustments permitted the existing slope to be preserved. Permanent signage is used in several spots along the common driveway and in the forested sections to designate the protected land.



Investment Highlights

Infrastructure

- Narrow driveway shared by 6 homes saved paving costs and lessened impact of impervious surfaces.
- Natural draw in a ravine behind the homes provided low cost stormwater control via a weir wall, treating more runoff than the property produces. County would have required building of stormwater ponds.

Market Value

- Market value of the homes exceeded one million dollars each. Since market price was not a limiting factor to potential homeowners, the value of living in a wooded setting was foremost. Site location in the forest added \$100,000 to the price of each home.

Cost Considerations/Associated Risks

Economic benefits of not grading the land except for the home pads and driveway were spent on retaining walls to protect the forest and slope.



“The people who bought these homes could have bought any home anywhere. But all of the homeowners said that the reason they decided to buy a home in Endicott Hill is because of the beautiful setting in this preserved forest.”

Martin Mitchell, Mitchell & Best

Maintenance & Compliance

- Homeowners Association restricts the cutting of any existing trees on the lots.
- Forested area is held in a conservation easement with the county.
- To prevent homeowners from increasing their grassed yard size by mowing into the trees, the understory of the forest was landscaped by supplemental native plants and shrubs, at the same time fulfilling County reforestation requirements.

Pembroke Woods

Residential Subdivision

Client: Buckeye Development Co./Edward Smariga, 301-696-0900

Consultant: Ecosite, Inc./Michael L. Clar, P.E., Columbia, MD, 410-730-5787

Location: Emmittsburg, MD

Year Constructed: 2002 Size: 43 acres

Local Government: Frederick County

Featured Techniques

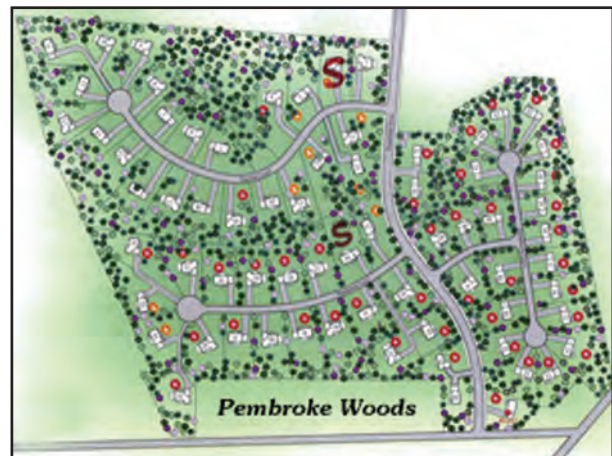
Site Fingerprinting - By strategic placement of the lots, 50% of the site was left in undisturbed woods, maintaining the pre-development hydrology. Site impact reductions were achieved by elimination of impervious curbs and gutters, reduced use of sidewalks, shared driveways and 100% disconnect of impervious areas.

Protection of Forested Areas - Residents are required to maintain the portion of the property designated as tree-safe in its natural state. This area includes the long natural strips left between the side and back of rows of homes as well as along the forested edges.

Bioretention Areas - Driveways and curb free streets drain to natural swales and weirs, leading to bioretention areas landscaped with native plants and existing forest.

Overview

Pembroke Woods was originally designed as a 1/4 acre lot conventional subdivision with 97 lots, two stormwater ponds and closed section streets. The original design also required that most of the wooded site would have been cleared. The site was redesigned using low impact development techniques. Extensive use of site fingerprinting techniques allowed the developer to preserve approximately 50% of the site in wooded condition. More than two acres of wetlands and open space were preserved by eliminating the stormwater ponds. Curbs and gutters were replaced with grass bioswales. Final design produced 70 half acre lots. Though existing trees in some areas bordering lawns and streets were not as aesthetically pleasing nor as valuable as the hardwood species in other densely wooded areas in the development, they were left in place.



Investment Highlights

Infrastructure

- Cost savings of roughly \$200,000 by eliminating two stormwater ponds.
- Savings in wetlands mitigation through preservation of 2.5 acres of undisturbed open space and wetlands for stormwater management.
- Saved \$60,000 in construction costs by using grass bioswales in place of curbs and gutters. Savings of \$24 per square foot.
- Reduced paving costs by 17% through reduction in road width from 36 feet to 30 feet.
- Clearing and grading costs were \$6,000 to \$8,000 per acre.

Market Value

- Added roughly \$90,000 in value to the project through addition of 2 lots, increasing the yield from 68 to 70 lots.
- Homes sold 60% faster than surrounding developments.

Cost Considerations

- Homeowners are concerned about eventual replacement costs for the timber weir stormwater management units in the swales fronting their property. Some homeowners and their mowing contractors have voiced concerns at homeowner association meetings with the extra time required to mow and trim in and around the grassed swales and weirs.



“Keeping 50% of site undeveloped by only disturbing the area for houses and driveways is easy to do and gives you the best bang for the buck. This design feature was essential for maintaining the pre-development hydrology [curve number], which is difficult to achieve on a wooded site.”

Michael Clar, PE Ecosite, Inc.

Maintenance & Compliance

- Of the preserved tree areas, 50% is designated as “tree-safe” areas, which homeowners are required to preserve.
- 70 to 80% of property owners comply with the maintenance responsibilities outlined in the deeds and Homeowner’s Association guidelines. This includes mowing inside and maintenance of the timber weirs in the roadside swales fronting the homes.

Dominion Valley

Residential Subdivision

Client: Toll Brothers, Mark Simms, 703-753-5663

Location: Haymarket, VA

Year Constructed: 2001 Size: 2300 acres

Local Government: Prince William County

Featured Techniques

Tree Conservation Plan - Large evergreens and trees in the path of construction were dug and transplanted immediately in buffer zones and common areas. Due to large size of the site and numerous transplantable sized trees, valuable species of young trees in the path of excavation were dug and held in on-site tree farms for future transplanting.

Wash-out Area - Restricted washing areas, for use by construction vehicles and concrete trucks, were designed with layers of sand and gravel to filter out building pollutants from vehicles which needed to be rinsed out on-site prior to next use.

Overview

By 2011, Dominion Valley will hold 800 homes on 2800 total acres, with 1040 of those acres protected as open space. The developers created an on-site tree farm for relocating trees until replanted in common areas and on home lots. Trees in the path of construction were also carefully dug and replanted to supplement and create buffers around existing wetland areas and streams. Conservation areas were designated along the wetlands and streams and marked with signage for homeowner education. Trees and areas slated for conservation were marked with fencing and signs during construction phases. Bioretention areas designed around natural wetlands help treat runoff. A concrete washout area was set up to filter washout runoff and eliminate soil pollution. Wildlife habitat is being protected and enhanced in thirteen ponds, lakes, wooded wetlands and streams on the property. Native grasses, shrubs and trees are used for landscaping.



Investment Highlights

Infrastructure

- Transplanted over 75,000 trees on the 2800 acres. Acreage includes an old tree nursery with many mature fruit and hardwood trees; healthy trees were transplanted on site. Cost savings was \$300-500 per mature tree.
- Planted 15,000-20,000 young trees in on-site tree farm that was created to grow out seedling trees, saving on tree purchasing costs for this and other Toll Brothers sites.
- High survival rates in transplanting up to ninety-six feet tall trees with up to eight foot rootballs led to aggressive saving of mature specimens.
- 860 acres were preserved as open space, 110 acres were conserved as buffers, 70 acres were donated to the county for parkland space, or a total of 40% of the acreage.

Market Value

- Developer created “wooded” lots in Sections 1 and 3, formerly soybean fields with no tree cover, by transplanting mature trees from other parts of the site. The newly wooded lots garnered premium prices.
- Buffer zone of 200 feet along Route 15 lessened the marketable acreage but added to home and lot value by buffering noise and creating a sense of place.

Cost Considerations

A poor quality emergent wetlands on the property was enhanced at a cost of \$75,000.



“Saving trees is pretty straightforward. This is Marketing 101 and very easy to do. The whole project was designed to save existing hedgerows and stream valleys. We transplanted mature trees to create wooded lots, creating forested sections in former soybean fields. We have an Integrated Pest Management plan and our transplanted tree survival rate is phenomenal. These things are good for the land, get positive feedback from the buyers and allow us to achieve a natural balance in communities.”

Mark Simms, Toll Brothers

Maintenance & Compliance

- Developer’s company manages the maintenance and upkeep of the common areas ensuring forest, tree and wetland protection.

Forest Brooke

Residential Subdivision

Client: Branca Development, Mark Branca, 703-794-9582;
Classic Concept Homes, Mark Grandville-Smith, 703-791-2885
Location: Manassas, VA
Year Constructed: 2003 Size: 62 acres
Local Government: Prince William County

Featured Techniques

Forest Corridor Preservation - Protected existing wildlife habitat and corridors by minimal clearing, low density and conservation of wide tracts of existing forest.

Site Fingerprinting - Land was walked and mapped so that home design would complement terrain and flow into the natural forest setting.

Tree Conservation Plan - Smaller equipment was used to clear home footprints one tree at a time, to avoid damage to trees inventoried for preservation and to eliminate excessive soil compaction. Used natural depressions and existing trees for runoff control.

Overview

Forest Brooke is designed for 18 lots on 62 acres with lot sizes varying from one to eight acres. The internal road flows with the land contours on a ridge and separates into two joint driveways with shared access. The staff engineer walked the site with a topographic map several times to design lots complementary to slope and ravine features. Lots were cleared individually after consultations with homeowners during site walks held before clearing and again before construction. Individual tree tagging, with color coded tags, was done to mark trees for cutting and for preservation. Homes were re-situated as needed to take optimal advantage of the existing trees. Developer prohibited mass clearing and grading which added to costs but was recouped by the increase in desirability and market value of homes. Sixty percent of the site was left in trees, maintaining the surrounding forested corridors.



Investment Highlights

Infrastructure

- Public sewer and water service was brought into Forest Brooke at an additional cost, to avoid the recurring septic problems in nearby developments.
- Reduced paving cost by using joint driveways, narrower roads and no sidewalks.

Market Value

- Overall extra site preparation costs were recouped in the value of each home. Market value increased substantially due to forest setting.
- Homes sold 30-50% faster than a traditional subdivision located less than a mile away.

Cost Considerations/Associated Risks

- Cost \$5800 - \$6000 more in time and equipment costs to clear for site fingerprinting, but costs were more than made up in selling points and overall owner satisfaction.
- Spent 30-60% more time in site preparation due to individual tree clearing.
- Clearing expenses were double of traditional clear cutting, due to extra engineering for less invasive activity.



“Owning a home built in the woods is a pride of ownership.”

“People do take care of their trees. They are receptive to a meaningful tree buffer.”

Mark Grandville-Smith
Classic Concept Homes

Maintenance & Compliance

- Restrictions set in individual deeds mandating tree conservation.
- Homeowner education on preservation of forested lots took place beginning with pre-building phase while builder/developer walked the site with new owners to determine the placement of home within the heavily treed lot.

Lenah Run

Residential Subdivision

Client: Winchester Homes, Mark Chadwick, 301-803-4800

Consultant: Patton, Harris, Rust and Associates; Rickmond Engineering

Location: Aldie, VA

Year Constructed: 2001 Size: 460 acres

Local Government: Loudoun County

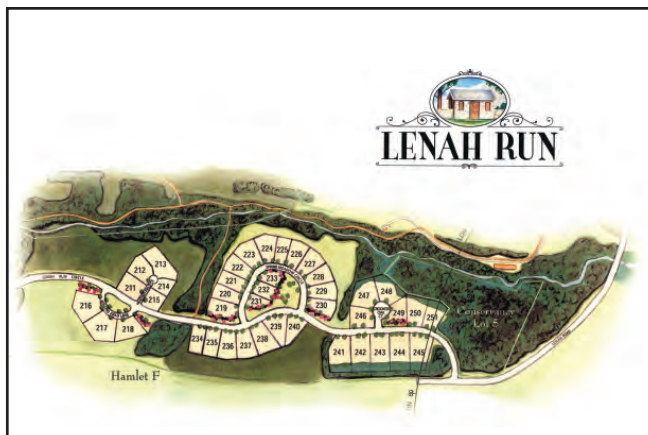
Featured Techniques

Protection of Forested Areas - The open space was designed as a permanent greenbelt around the community providing a wildlife and vegetative corridor as well as passive recreation. Virginia Department of Forestry supervised the voluntary reforestation of 30 acres of perimeter and open space areas with native plant materials. Oak, maple, ash, river birch and tulip poplar were planted to establish future forests.

Buffer Preservation - 1659 feet of Lenah Run was enhanced, restored and protected by a conservation easement. Where the 100 year floodplain was less than 50 feet, a 50 foot buffer was protected.

Overview

Lenah Run was designed using Loudoun County's Countryside Hamlet zoning and features six separate housing clusters for a total of 256 lots on 460 acres. Over 70%, or more than 340 acres, of the property was left in open space. The homes blend into the natural features of the land. There are no sidewalks, curbs or gutters. Driveways are short to lessen impervious surfaces. Trees were transplanted from woodlands on the property to enhance common areas and to supplement the 800 foot minimum buffer between hamlets. Wetlands were preserved and portions of the buffer were reforested along Lenah Run which bisects the property. The community won the 2004 Environmental Community of the Year award from the National Capital Building Industry Association.



Investment Highlights

Infrastructure

- Lot size of two-thirds of an acre increased hamlet density to meet developer needs, while allowing open space conservation.
- Costs for the thousands of trees planted in 30 acres of development perimeters to establish new forests were negated by utilizing mitigation for off-site impacts from a separate project.
- Cost savings were realized from a diminished need for removal, infill or transport of soil to or from the property. With the hamlet zoning utilizing the topography of the hills and valley, no soil was taken on or off-site.
- Earthwork cost approximately \$3000 per lot as opposed to the traditional \$5000 to \$6000.
- Street width of 20-22 feet with no sidewalks or curbs reduced paving costs. Loudoun County permits up to 24 feet for street width.

Market Value

- Added value of approximately \$10,000 on each lot was realized from the expanses of open space backing up to each property.
- Loudoun County is the fastest growing county in the United States. Homes in this very desirable area near Washington, D.C., sell in hours or days. Lenah Run homes are estimated to have sold 30% faster than more conventional designs.



“The hustle and bustle of this area seems very far away when I am walking along our development roads. Living in a metro area, yet being surrounded by preserved forests and streams is uplifting.”

Homeowner

“100% of the lots at Lenah Run back up to open space. Though the county has removed hamlet zoning as an option, it works beautifully here and what we’ve done is good for the bay.”

Mark Chadwick, Winchester Homes

Maintenance & Compliance

- Homeowner’s association was deeded the open space with provisions prohibiting removal of any tree over 4 inches in diameter.
- Five conservancy lots, larger than 10 acres, are deeded to allow traditional agricultural crop planting or equine use.

Conclusion

Population growth and the expansion of suburban communities in the Chesapeake Bay watershed is resulting in forest fragmentation and decreased tree canopy cover. Due to the increase in impervious surfaces of roads, driveways and buildings, stormwater runoff now accounts for 16% of phosphorus, 11% of nitrogen, and 9% of sediment loads to the Bay.

Though trees are a renewable resource, the remaining forests are nature's most protective and cost-effective land cover and can help reduce the impacts that growth has on both the quality and quantity of our water resources. Development patterns and design that reflect the intrinsic values of forests and trees should be the norm rather than the exception. It is a challenging issue, but one that can be solved with smart growth and low impact techniques, greater public awareness, improved regulations, recognition of good examples and regulatory incentives.

In preparing this report, finding examples of forest friendly developments was not easy. Little documentation exists of exemplary practices, nor is there a definitive compendium of local ordinances that support forest friendly design principles. Though far from inclusive, this collection of case study represents a slice of positive efforts that are taking place in the Bay watershed, offering a basis for additional research and dialogue regarding forest friendly development practices.

Growth is inevitable. How it will be managed becomes either the problem or the solution. Through hundreds of hours of interviews on this project, a theme clearly emerged — increasing numbers of new home buyers are seeking to purchase a house in a wooded setting and developers are responding to the call. The Chesapeake Bay watershed can benefit from development when it utilizes techniques designed to protect water quality, preserve corridors of forested land, conserve resources, educate home owners, and manage growth in a forest friendly manner.

Glossary

Bioretention Areas - Landscape feature adapted to treat stormwater runoff on site by directing it to a shallow, landscaped depression incorporating pollutant removal mechanisms.

Covenant - Formal, binding, written agreement between two or more parties for performance of an action.

Easement - Limited right to make use of a property owned by another, such as a right of way.

Emergent Wetland - A wetland dominated by nonwoody, soft-stemmed plants rooted in shallow water.

Erosion - Deterioration of soil by wind, water, or ice, either naturally or as a result of land use.

Impervious - Surface that will not allow liquid to pass through.

Integrated Pest Management (IPM) - Sustainable pest management approach utilizing biological and chemical methods to minimize environmental risk.

Low Impact Development (LID) - Comprehensive land planning and engineering design approach with the goal of maintaining and enhancing the pre-development hydrology while allowing development to occur.

Mitigation - Compensation for unavoidable habitat loss through creation, restoration or enhancement of a new area.

Open Space - Area of land valued for natural processes and wildlife, agricultural and sylvan production, active and passive recreation, and other public benefits.

Pervious - Porous, able to be penetrated by water.

Rain Gardens - Low-lying areas, planted with vegetation, created to retain water during storm events.

Riparian Area - Area of land adjacent to a body of water, stream, river, marsh, or shoreline.

Riparian Forest Buffers - Area of trees and other vegetation adjacent to a body of water and managed to maintain the integrity of stream channels and shorelines, reducing the impact of pollution by trapping or filtering, while supplying habitat and protection to wildlife and aquatic organisms.

Site Fingerprinting - Use of planning and engineering strategies to place development away from environmentally sensitive areas such as steep slopes, vegetated areas, wetlands, and confining disturbance of the ground to just the areas where roads and buildings will exist.

Stormwater Runoff - Unabsorbed water that rushes off land and other surfaces during rain events, carrying pollutants and sediments.

Swale - Low lying or naturally formed shallow depression often used to store or filter stormwater.

Tree Canopy - Layer of leaves, branches and stems of trees that cover the ground when viewed from above, serving as an overall indicator of forest quality and quantity.

Urban Forest - System of trees and plants that grow individually, in small groups or under forest conditions on public and private lands within cities, suburbs and towns.

Washout Area - Space set aside for filtering or collecting residue so that it will not alter soil chemistry.

Weir - structure constructed like a fence, with long narrow openings to slowly pass stormwater, placed in a swale or natural depression used for runoff management, act as check dams when placed in swales.

Appendix A

Maryland Department of Natural Resource Forest Service Excellence in Forest Conservation and Land Development Awards

The following summaries are of recent winners of the MD DNR Forest Service's Excellence in Forest Conservation and Land Development Award program, submitted by Marian Honeczy, State Forest Conservation Program Coordinator, MD DNR Forest Service, 580 Taylor Ave E-1, Annapolis, MD 21401. The Awards program was created to showcase forest conservation efforts that are taking place throughout Maryland and to reward projects that have gone beyond minimal compliance with the Maryland Forest Conservation Act. www.dnr.state.md.us/forests/progmapps/fclda.html

Amberly Acres, Dorchester, MD

Developer: Amberly Development, Inc.

Retained onsite forest adjacent to existing block of forest; combined forest in excess of 100 acres; forest retained near Cambridge's population center; tree protection devices, forest conservation plan, minimum front yard setbacks and combined adjacent lot driveways and utility access to homes; retained forest within Delmarva fox squirrel habitat. Mitigation protected by conservation easement.

Total acres of project - 39 acres, retained forest - 9.7 acres, disturbed forest - 5 acres, provided 9.7 acres of existing forest as mitigation.

Dellabrooke, Brookville, MD

Developer: Winchester Homes

Retention of existing forest, forest conservation plan, tree protection devices, signage, clustered subdivision, conservation easement, slope reduction and road width reduction, site fingerprinting.

Total tract area - 110 acres, retained forest - 41.3 acres, disturbed forest - 18.5 acres.

Rapley Preserve at Avenel, Montgomery, MD

Developer: Natelli Communities, Managing Partner of Rock Run Limited Partnership

Retention of existing forest, site fingerprinting, forest conservation plan, tree protection devices, reduced road radii, aeration pipes, geotech fabric, crown pruning, fertilizer/root stimulation, lightning protection installed, special road construction techniques, created and utilized a critical root zone map, selective removal by arborist, use of retaining walls, use of wood chips under temporary trailers adjacent to specimen trees, previously platted lots were redesigned to save maximum amount of trees, contractor education, conservation easement.

Total tract area - 68.58 acres, existing forest - 21.32 acres, retention of 9.69 acres, disturbed forest - 11.63 acres, mitigation required 6.49 acres.

Rivermere, Wicomico, MD

Developer: Trappe District Land Corp.

Retained 38 acres of existing forest in a large continuous block, site design minimized forest clearing, forest conservation plan, establishing an 8 acre wildlife corridor to connect existing forest onsite, tree protective devices, signage. Mitigation protected by conservation easement.

Total acres of project - 302.3 acres, retained forest 38 acres, disturbed forest - 6.7 acres.

Tim Plastics, North East, MD

Developer: Tim Plastics

Retention of existing forest, forest conservation plan, retained a block of forest that is contiguous to forest, buffer protection, tree protection devices, signage, conservation easement or restrictive covenants

Total tract area - 13.53 acres, existing forest - 9.65 acres, disturbed forest 3.12 acres, retained forest - 6.53 acres, provided 6.5 acres of forest as mitigation (2 acres more than required).

Rum Pointe Golf Club, Worcester, MD

Developer: Ruark Family Limited Partnership

Retention of existing forest, forest conservation plan, tree protection devices, conservation easement, buffer preservation, retained a 50 acre block of existing forest.

Total tract area - 372 acres, existing forest - 125.7 acres, retained forest - 97.1 acres, disturbed forest - 22 acres, provided 97.1 acres of mitigation.

United States Fidelity & Guaranty Company Headquarters, Baltimore City, MD

Developer: United States Fidelity & Guaranty Company

Retention of existing forest, forest conservation plan, green perimeter established, trail system through forested area that connect to nearby mass transit points, forest enhancement plantings, educational signage, selective clearing of exotic species, forest conservation plan, tree protection devices, mitigation protected by conservation easement.

Total tract area - 27 acres, 3.2 acres of existing forest, forest retention - 3.2 acres, mitigation - 1.8 acres of forest enhancement. Enhancement occurred within a forested stream buffer.

Villages at Elk Neck, Section II, Elk Neck, Cecil County, MD

Developer: York Building Products and Stewart Associates

Retention of existing forest onsite, curb and gutter reduction, reduction in road width, forest conservation plan, tree protection fences, open swales instead of storm drains, site fingerprinting, street and lot design to preserve natural spaces. Total project size - 37 lots, onsite forest - 102 acres, disturbed forest - 12 acres, required mitigation - 0.00 acres. Mitigation onsite protected either by restrictive covenant or easement.

Woods Landings on the Little Magothy, Anne Arundel, MD

Developer: Seawright Corporation

Retention of existing forest onsite, slope reduction, created trails overlaid over sediment and erosion control features instead of creating new clearings, created foot bridges and observation decks with piling construction to limit wetland disturbance, trails and observation decks used by local teachers, retaining walls. Restrictive covenant or easement.

Total acres - 25 acres (99 clustered town homes), existing forest 100%, retention 80% forest.

Wood Spring at New Market, Frederick, MD

Developer: Seawright Corporation

Retention of existing forest, clustered subdivision - retained 7.2 acres of open space, Restrictive Covenants, retained contiguous forest that connects to larger block of existing forest, site fingerprinting, conservation plan, tree protection devices, signage.

Total acres of project - 44 acres, existing forest - 39.3 acres, retained forest 16.7 acres, disturbed forest 12.6 acres.

Appendix B

While Pennsylvania and Virginia do not have state wide forest and tree conservation awards or recognition programs on the same scale as Maryland, the following facilities and residential areas have been formally recognized for their forest preservation, limited clearing, tree conservation efforts, or environmentally-friendly development and are worthy of mention.

Virginia

Carr at Cedar Lakes, Fairfax County, VA.

Issac Newton Square, Building E, Fairfax County, VA.

Cafferty at Popular Run, Fairfax County, VA

Governor's Grove Section , Fairfax County, VA

Classic Ridge and Classic Springs, Manassas, VA.

Kingsmill on the James, Williamsburg, VA

Stonebridge, Loudoun County, VA

Woodlake, Richmond, VA

Reserve at Martin's Point, Fairfax County, VA

Eco Village, Loudoun County, VA

The Preserve on the Elizabeth, Chesapeake, VA

Pennsylvania

Eagle View, Chester County, PA

Derry Woods, South Londonderry Township, PA

Hills of Waterford, Londonderry Township, PA

Florin Hills, Mt. Joy, PA

Echo Hill, State College, PA

Maryland

Moyaone Reserve, Accokeek, MD

Back Creek Landing, St. Michaels, MD

Northridge, Bowie, MD

Additional Reading Recommendations

Characteristics and location of the wildland-urban interface in the United States

Stewart, S.I., V.C. Radeloff, and R.B. Hammer.

2nd International Wildland Fire Ecology and Fire Management Congress. Nov. 19, 2003. Orlando, FL.
http://silvis.forest.wisc.edu/Library/WUI_region_download.asp?region=National&abbrev=us

Neo-Traditional Neighborhood Developments: You Can Go Home Again

Wells, Martin J. Wells & Associates, Arlington, VA. 1999

Building Greener Neighborhoods

American Forests & Home Builders Press of the National Association of Home Builders of the USA. 1995

Preserving Virginia's Forestland: Incentives for landowners

SJR75 Final Report. www.vanaturally.com/forests

Benefits of Urban Trees.

PA Bureau of Forestry, Rachel Carson State Office Bldg., 6th Floor
PO Box 8552, Harrisburg, PA 17105-8552 717-787-2703

The Maryland Forest Conservation Act

Natural Resources Article, Section 5-1601 through 5-1613.

U.S. Landscape Ordinances

D.G. Buck Abbey. 1998. John Wiley and Sons, Inc.

Green Laws, Landscape Codes in The Twenty-first Century,

Prof. Buck Abbey, ASLA, CELA. Louisiana State University, Baton Rouge, LA
www.greenlaws.lsu.edu/codes

Riparian Buffer Preservation

Alliance for the Chesapeake Bay, 2004
3310 Market Street, Harrisburg, PA 17011 717-737-8622
www.alliancechesbay.org/publications; www.buildersforthebay.net

Better Site Design: A Handbook for Changing Development Rules in Your Community, 1998

Center for Watershed Protection
8391 Main Street, Ellicott City, MD 21043
410-461-8323 www.cwp.org; www.buildersforthebay.net

Forest and Riparian Buffer Conservation

Forestry Workgroup Nutrient Subcommittee, August 1996
USDA Forest Service, Northeastern Area. NA-TP-07-96

A Guide To Preserving Trees in Development Projects

Penn State College of Agricultural Sciences Cooperative Extension, 1999
Pennsylvania State University, School of Forest resources, 108 Ferguson, University Park, PA 16802
814-863-7941

Tree Conservation Ordinances

Christopher J. Duerksen with Suzanne Richman. American Planning Association and Scenic America, 1993.

Forest Friendly Development Case Study Evaluation Form

Alliance for the Chesapeake Bay seeks your feedback on the Forest Friendly Development case studies and information contained in this new tool. Thank you for taking time to complete the evaluation form below. Mail completed form to:

Alliance for the Chesapeake Bay
Attention: D. Rudy
3310 Market Street, Suite A
Camp Hill, PA 17011

Did you find the development case studies useful? Yes _____ No _____

How will you use this tool?

Did the case studies described in this publication provide you with enough information on the topic?
Yes ___ No ___ If no, please describe the additional information you would have found helpful:

Are there additional resources that could have been listed? Yes _____ No _____ If yes, please describe or list the additional resources.

After reading the case studies, did you make contact with the builder/developer or visit any of the developments? Yes ___ No _____ If yes, which developments did you visit/contact?

Please evaluate the importance of the following items in the case studies using the numbered criteria below:

1. Very Important **2. Somewhat Important** **3. Nice to know but not necessary**

___ Development contact name/phone	___ Infrastructure cost data
___ Overview	___ Market value
___ Description of techniques	___ Year constructed
___ Site diagram	___ Site Photos
___ Appendix A&B additional site lists	___ Recommended reading list

Are you a: builder _____ developer _____ government agency _____
 citizen _____ non-profit _____ land planner _____
 home builder organization _____ other (describe) _____

Resource Lands Assessment

Chesapeake Bay Watershed

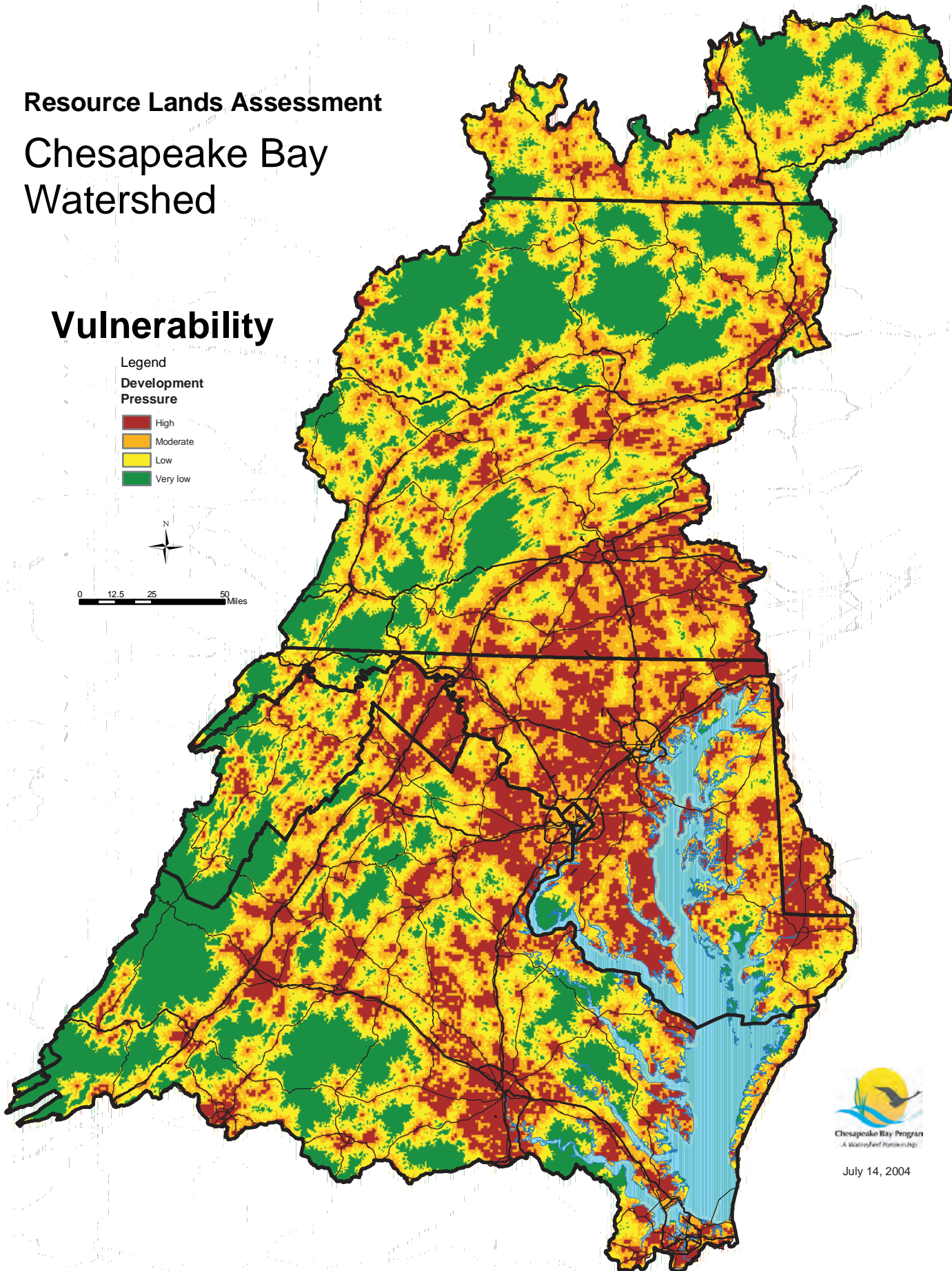
Vulnerability

Legend
Development
Pressure

- High
- Moderate
- Low
- Very low



0 12.5 25 50 Miles



Chesapeake Bay Program
A Watershed Partnership

July 14, 2004

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