



**PRINCE
WILLIAM
SOIL AND WATER
CONSERVATION DISTRICT**

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**Public and Private Partnerships for a cleaner Chesapeake Bay:
Horse Farm is under construction!**

Project Background:

More than 20 partners are assisting with the Chesapeake Bay-Friendly Horse Farm Project. The project proposal was developed by the [Prince William Soil and Water Conservation District \(PWSWCD\)](#) and submitted to the [Virginia Department of Conservation and Recreation](#) with a request for approximately \$125,000 in funding. An equal amount is being contributed by PWSWCD and its' partners in direct funding, staff and volunteer time, products, and services.

The goal of the Horse Farm Project is to address common environmental issues found on horse properties that contain waterways, wetlands, or soils that may leach pollutants into groundwater. Water pollution from horse operations can commonly come from the mismanagement of mud, manure and pastures. The project seeks to identify and utilize both tested and innovative management techniques that effectively decrease water pollution. An important goal of the project is to find solutions that not only work well but are also cost-effective. Horse operations in our area, and many parts of Virginia, are not eligible for the same financial incentives, for conservation-oriented improvements, that are available for production agriculture. The PWSWCD seeks to find both innovative and commonsense solutions and then to motivate horse-keepers to make positive changes to their land management without relying upon the government for financial assistance.

Horse operations in [Prince William County](#) are typically small in size often just five to ten acre properties with only a portion of that dedicated to horse-keeping. If allowed 24-hour access to pastures, horses will naturally graze 18 hours each day. Too many horses on too few acres can quickly denude green meadows. A high stocking rate, and its' affect on the land, can threaten the health of the horses and the environment and create aesthetics that strain relationships with neighbors.

In a rainstorm exposed soil, horse manure, fertilizers, and pesticides from mismanaged pastures can wash across the land, downhill, and into our waterways. All the local streams eventually lead to the Potomac River and downstream to the [Chesapeake Bay](#). Soil sediment and excess nutrients from fertilizers and animal manure harm the Chesapeake Bay. Sediment can make the water cloudy, appearing like chocolate milk rather than clear. The sediment prevents sunlight from reaching underwater grasses and can also clog fish gills. Excess nutrients over-feed algae causing algal blooms. When the algae naturally die back, the decomposition process steals oxygen away from fish and other living organisms in the water, suffocating them.

Horse-keepers can use basic principals called Best Management Practices (BMPs) so that they don't hurt the environment. Those BMPs will be installed and demonstrated by making improvements to a local horse operation that is currently in poor condition and may be a source of pollution. Planned improvements to this soon to be "model horse property " include the installation of fencing to exclude the horses from a 25 foot buffer/filter area alongside the stream, waterlines and troughs to provide an alternate source of drinking water for the horses, pasture seeding and renovation to discourage weed growth, interior fencing to allow for rotational grazing, manure storage that allows for properly timed application or removal for off-farm use, and the installation of confinement paddocks for non-pasture turnout.

Bluestone gravel dust will be used to create the confinement paddocks also known by the technical term "sacrifice area." A sacrifice area is one area of the pasture system on which groundcover or grass is sacrificed in order to keep the rest of the pastures healthy and green. One of multiple pastures may be grazed when grasses are at least 4 inches tall and the ground is dry. Rotational grazing allows non-grazed pastures time to rest and re-grow. During wet weather, periods of drought, the winter months, or any time all the pastures need to rest, the horses are moved, or rotated, into the sacrifice area.

A convenient location for the sacrifice area(s) is often right next to the barn. In the area adjacent to the barn, organic "muck" from manure, uneaten hay, or excess stall bedding can typically build up over time. The organic material acts as a sponge and holds water after a rain, often for an extended period of time. The wet area is slippery for the horses and the owners working in the paddock. Horses kept in muddy conditions can develop fungal and bacterial infections on their skin and in their feet. They can also slip, fall, or have their horseshoes pulled off by the suction, damaging their hooves. During the construction process the sacrifice area is prepared by first removing any organic material from the area.

After the muck is removed from the paddock it will be resurfaced with a few inches of bluestone dust gravel. The gravel dust becomes a clean, safe, all-weather footing. The horses can be confined as needed, especially in wet weather when their hooves would tear and damage the pasture grasses. The horse owner must regularly remove any new manure or other organic material from the paddock to keep it mud and muck-free.

Sacrifice areas are critical for proper land management on small acreage horse properties. Visually the improvement to the property aesthetics is very positive and when installed as part of a rotational grazing system it becomes very chore-efficient for the horse-keeper. The PWSWCD staff believes that if every horse-keeper installed, and properly utilized, a sacrifice area, the benefits to the environment would be substantial. Sacrifice areas allow horse operators to keep pastures green. Allowing pastures to grow tall, healthy grasses with deep root systems helps slow the downhill travel of rainwater and allows rainwater to soak into the ground rather than run off, potentially carrying pollutants. The grasses also form a dense sod that resists erosion.

The horse property selected to participate in the project is on a highly visible corner in Gainesville, VA at the intersection of Catharpin Road and Route 234/Sudley Road. The farm is privately owned. Construction to "remodel" Oakwood Farm will begin in March. After improvements have been completed the farm will be used for education, demonstration, and additional research for 10 years. The owner, Edith Kennedy, agrees to maintain the new practices and utilize the prescribed management techniques. The owner is also asked to share feedback with the PWSWCD and maintain ongoing communication with our conservationists. Tours of the model farm are available, by appointment only, through the Prince William SWCD. To learn more about the project or to schedule a tour, please contact [Kate Norris](#), District Manager with PWSWCD at (703) 594-3621.

This project received funding from the Virginia Water Quality Improvement Fund provided by the Virginia Department of Conservation and Recreation (DCR), via grant number 2007-WQIF-19.



Notes from the field

By Kate Norris

Prince William Soil & Water Conservation District

Construction begins:

Day 1

The week of March 23rd we broke ground on the project at last! On the morning of March 24th after months and months...and months of careful planning and preparations-- the dirt began to fly. As I arrived on-site our general contractor Ron Fowler of [B&R Contracting & Fencing](#), and team, were working on multiple areas of the farm. Oakwood Farm was a flurry of activity. I think that I speak for not only myself but also [Beata Coss](#), [Nicole Ethier](#), [Pete Shiner of Mistfield Farm](#), and [Robin Lancaster of Blue Top Farm](#) (our core grant team comprised of staff and farm operator cooperators) when I say I was initially a bit overwhelmed at the task of making sure everything was being installed to our plan. We would soon learn that the experience and professionalism of the construction team would make our oversight duties almost stress-free.

Chip Pennington and Matthew Wilson were already building the fence 25 feet from the edge of the stream that will become the new boundary for the horses in the streamside pasture. The buffer area between the horses and the stream will grow and function as a natural "speed bump" and filter, slowing and cleaning the rain water before it can reach the stream.

The fence type selected for this area was an electrified braid by [Gallagher USA fencing](#). The 2 strands of electric fencing are set on 5"x7' pressure treated, round, wooden posts that have a flatted surface on the face of the post. A top wooden board was included, at the property owner's request, for increased visibility. Unable to find the equipment to drive the posts, we added concrete to each post hole for long-term stability. A small, light weight, 4 foot gate was installed alongside a walk-through to accommodate people traffic in and out of the buffer. A walk-through is two fence posts set just far enough apart so that a person can slip through but not a horse. A good rule of thumb is to make the opening just wide enough to fit a water bucket through, if carrying anything wider and you'll likely use a gate anyway. We designed strategically placed walk-throughs throughout the farm to increase chore-efficiency.



Streamside buffer fence right after fencing

Our contractor referred us to Glen Covington, Manager, of the [CFC Farm and Home Center](#) (CFC) in Marshall, VA, for the wooden posts, boards, and all gates. Mario Oderda, Assistant Manager, worked with us to make the final selection on the products we purchased for all our permanent fencing needs. Mario also took the time to share his expertise, explaining for instance, the difference in costs and

durability of different gates. We selected heavy duty 14 foot tubular steel gates for several applications because they will allow for easy access of large trucks for gravel, fertilizer, and hay. We selected a few 8 foot gates of standard quality and weight to use to access the future manure storage facilities that will be adjacent to the sacrifice areas. As with many of the products selected for use on the property, we will be able to show visitors different options so that they can judge when a lower cost product functions as well as a more expensive option and when it's better to spend a bit more for the higher quality.



Barnyard Before



Trucking the topsoil away

Meanwhile Rusty Morgan (a horse owner himself) of Morgan Excavating was busy excavating the deep layers of organic "muck" adjacent to the back of the barn. His task was to remove enough of the organic material so that our bluestone dust would have a solid base and not disappear into the soil. The organic layers were deeper than we anticipated and we watched as Rusty continued to remove soil as needed, up to a foot deep in places! A by-product of the excavation was the growing pile of super topsoil being stockpiled in the nearby pasture. Nicole and Robin worked together to contact Premier Landscaping, just down the road, to see if they would take the topsoil away since we quickly determined that spreading the amount generated, as originally planned, would totally suffocate the grasses in the pasture. Premier Landscaping was presented with a topsoil sample via a visit from Nicole and soon arrived to begin collecting on their windfall.

As the construction settled into an easy rhythm we regrouped for the final discussion on the installation of gutters on the barn, where we wanted to outlet the roof water runoff, and if it was feasible to use a **rain barrel** for demonstration purposes on one corner of the barn. We concluded that our best option was to direct all the roof water runoff from the barn to the adjacent hayfield and to forego the rain barrel since calculations showed it would fill and overflow almost instantly in any rainstorm. We reluctantly agreed that a 50-gallon rain barrel, even if we had it overflow initially into another 50-gallon rain barrel, just wasn't going to be cost-effective because we'd still have to deal with the expense of managing overflow. Commonsense prevailed and the rain barrel demo was abandoned, at least for now.

Nicole filled me in on the early morning stream assessment I had missed. Zack Roehr, aquatic ecologist with [Virginia Waters and Wetlands](#), (another grant partner) stopped by to take some additional water samples before construction. The stream assessment will evaluate the condition of the stream before the improvements and again after the completion of the project.



Stream Assessment



Creating the sacrifice area

Day one concluded with an almost finished stream buffer fence line, one sacrifice area paddock successfully excavated to a suitable base layer and a plan of attack for the gutters. We were a bit cold, some were sunburned, but all were feeling the excitement of our progress.

Day 2

As I entered the front gate of the property at about 7:45 a.m. the next morning I was greeted by sub-contractors from [RDB Trucking Inc.](#) with our first two loads of gravel, donated by [Luck Stone Corporation](#). The drivers Norman Bush and "Sunshine" would continue to bring loads of gravel throughout the day, 24 loads in total, to surface the back paddock. Even though our drivers were excellent, we witnessed firsthand the importance of having gates of adequate width. Fourteen feet wide is what we recommend and have planned for in our improvements.

Rusty worked all day to keep up with the delivery of gravel, each truck brought a load about every 40 minutes, spreading and smoothing the gravel to create our mud-free paddock.

Inspired by our progress the Kennedy family began making some of their own improvements to the farm. Two old, dilapidated sheds were torn down and moved into a roll off dumpster. The buildings were once functional outbuildings on the property that was a grand plantation. The house, which unfortunately burned in the 1980's, was built in the 1700's. Edith and her family found time to share stories about the grand size of the original house that contained 21 rooms. They promised to show us pictures.

We re-measured the length of the barn and soon [Seamless Gutter Supply](#) arrived and formed and cut our gutters to a custom length right on-site. The process was fascinating. The metal was formed much like you might make a giant noodle or tube of pasta.



The fencing crew returned to install the insulators for the strands of braid on our streamside fencing. I caught them before they began to mount the first insulator in place. We raised the height of each strand a few inches to allow for ease of mowing underneath the fence row in the future. A higher bottom strand also means more time can elapse between mowing the fence line since the grasses will have to get taller before they reach and ground out the electric braid. The electric fencing components on the buffer, and soon to be installed interior fencing, were provided at significant discount from CFC Farm and Home Center in Warrenton, VA through another partnership.

CFC Warrenton's Manager, Roy Lambert, had been extremely helpful the week before when we went to purchase all the accessories for the Gallagher electric fencing. We also had the opportunity to meet other members of the CFC team in Warrenton including Nicky Shaffer who had helped me with numerous pricing inquiries over the recent weeks and Darlene Shaffer, Retail Department Manager, who Nicole would coordinate with on the delivery of additional electric fencing supplies we ordered.

I made a trip back to CFC in Marshall to pick up an additional 25 fence posts due to a miscalculation on our part. Mario helped me exchange a gate and then his employees in the warehouse loaded my truck with the posts. I highly recommended double and triple checking your order of heavy supplies like the posts, on behalf of my truck that had to work extra hard to carry the load back to the farm.



Day two concluded with the completion of the back sacrifice area paddock and the streamside fencing sans electricity. The two geldings who call the back acreage home were turned out and we watched them explore all the changes in their new mud less

turnout. We wondered if the mares up front were jealous as they waited for their remodel.

Rain was predicted for the next day or so meaning we'd be returning to the office to catch up on our other responsibilities and to look forward to our next day of construction.

Day 3

On the third day the gutters were installed on both sides of the barn. We chose seamless gutters from Seamless Gutter Supply in Manassas. The new dark green gutters look great on the old barn.

We knew we needed gutters but during the design process we also wondered if we needed a French drain, berm, or other means to redirect rainwater moving on the surface, across the front pasture, toward our sacrifice area. During the winter Timothy Dunaway, P.E. with [Angler Environmental](#)

visited the farm to assess stormwater flow. Angler Environmental is another grant partner, providing technical assistance to review our designs for the farm and make sure that our commonsense approach was still technically sound. Based on Timothy's assessment the mud and muck was not the result of stormwater flow from the pastures but strictly the result of roof water runoff from the barn pooling in the organic muck. His advice was to install the gutters and downspouts to direct the stormwater away from the front of the barn. He also said it was important to thoroughly remove the organic material from the future paddock site before installing gravel.



Timothy Dunaway, P.E. with Angler Environmental provided technical assistance in December 2008. A view of the front paddock "before"

The information

provided by Angler confirmed our belief that the installation of the gutters was an important part of our overall mud management plan. Instead of allowing the rainwater to wash through the paddock, pooling in some areas, and creating more mud and muck we are "keeping the clean water clean." The downspouts bring the rainwater into black corrugated piping that is buried underground. The rainwater is then carried to the adjacent hayfield where it returns to the surface through a heavier schedule 40 PVC pipe. We heavily seeded the area at the outlet and placed some



New gutters and downspouts redirect roof runoff to hayfield



Make your sacrifice area large enough so that you are comfortable "locking the gate"

VDOT #1-sized

stones to break up the force and velocity of the rainwater as it exits the pipe. The clean rainwater is kept clean, directed away from the new footing in our paddocks. This will reduce washout of our bluestone gravel dust in the paddocks. Gutters are also important to direct rainwater away from manure storage areas and any high traffic areas, whether or not they are surfaced with gravel. If rainwater is allowed to wash through areas with manure and bare soil,

the clean rainwater will become polluted by the animal waste and sediment.

It didn't take long to install the gutters but the improvement was an important one.

Days 4-6

Days four through six focused on the installation of the front sacrifice area paddock, fencing improvements, and the installation of one of the water troughs.

Prior to construction all of the perimeter fencing was multiple strands of barbed-wire left from a time when cows used to graze the fields. Barbed-wire is not generally accepted as a safe, suitable fencing for horses. Luckily Edith Kennedy's horses were smart enough to respect the fence and escape any injury.

Day 4

On day four the barbed-wire fencing around the perimeter of the back sacrifice area was taken down and replaced with the tried and true 3-board wood fencing often seen on horse farms.

We used ¾ round pressure treated posts set with concrete and oak boards. A nail gun was used to secure the boards. The boards were placed to the inside of the paddock so that if the horses pushed on the fence they would be pushing against the posts rather than the nails. New board fencing was installed to separate our paddock from the adjacent pasture. An automatic water trough will be installed in this fence line along with two gates and a walk-through. These design features support our rotational grazing system. Placement of the trough in the fence line will allow the trough to be accessed from three areas which is more economical than providing a separate water trough in each turnout area. There are many types of horse fencing available and several types will be shown on the farm.

We selected traditional 3-board fencing only for the sacrifice area paddocks. Board fencing tends to be more expensive, and labor intensive, to install and maintain but does make a safe, secure enclosure that is well-suited to our confinement/sacrifice area paddocks. We know from experience that confining the horses in a paddock, instead of allowing horses free-choice access to pastures daily, takes a period of adjustment—mostly I find for the horse owners rather than the horses.

The sacrifice area paddocks can be sized (and fenced) after considering a variety factors including the age, breed, number, and sex of the horses to be confined, how much exercise they receive, and the owner/managers budget. The owner/manager must also be willing to remove all the manure from the paddock daily. A large paddock could take longer to clean than a smaller one. Ultimately the paddock should be sized large enough to accommodate the horses comfortably throughout the winter months and other periods of pasture dormancy or wetness. The paddock must also be large enough and fenced safely so that the owner/manager is comfortable "locking the gate" and leaving the horses in the paddock.

The size of the back or south paddock is 60' x 125' or 7,500 square feet. This should provide enough space for the two geldings on the property to stretch their legs and eat hay comfortably without



Board fencing installation
around sacrifice area
paddocks

annoying each other terribly. Based on my experience, I would say a paddock of this size could easily accommodate another horse, though this is not planned on this farm.

Horses love routine and most will adapt to their new paddock turnout without much distress. I've witnessed this firsthand many times. We all know that some horses are kept in stalls 24 hours a day except when being ridden. While this extreme management is likely not best for the horses' physical and psychological health, these horses do adapt. I visited one farm where the horses were kept in the stalls for all but a couple of hours per day. As we were soil sampling the pastures the horses' turnout time expired and they all were clamoring at their gates to be led back to the barn.

My own horses spend as much time as needed in their sacrifice area depending on the pasture height, the weather, and the horses' body condition. When their grass turnout time increases they will often meet me back in their sacrifice area paddock as I come out to bring them in. They seem to be wondering "did you forget about us?" or "are you sure we should be grazing this long?" They have adapted to this management system and as a result enjoy wonderful pasture turnout, as appropriate. My boarders, whose two horses keep my pony comfortable, have also adapted to this management system very easily. I keep a calendar with turnout hours listed in the tackroom so my boarders know exactly how many hours of grass turnout the horses receive each day and month. I also note days that the horses don't go out on the pastures because of rain or wet conditions.

Horse operations, on small-acreage especially, can benefit greatly from a properly located, installed, maintained, and utilized sacrifice area/confinement paddock. Our model farm includes two sacrifice area paddocks, one for each turnout group, in this case mares and geldings. I can't wait for everyone to see them! Who would have imagined the absence of mud could be so exciting?

We chose a variety of gate sizes and levels of quality to showcase on the farm. Fourteen feet wide, heavy-duty gates were selected for sites that might need to accommodate fertilizer, feed, hay, or gravel trucks in the future. A small four foot, light weight gate was installed leading into our streamside buffer. The small, economical, gate will allow for people to access the buffer. Mowing of the buffer is discouraged. Horses are always excluded from a buffer unless simply riding through. We want our streamside buffer area to grow tall and thick with vegetation to slow down the flow of rainwater and filter it before it enters the stream. We purchased two medium quality, eight foot wide gates to use later when we install the manure storage/composting area adjacent to the back sacrifice area paddock. We upgraded the gate latches so they can easily be managed with one hand.



Walk-throughs are used to increase chore efficiency. This gate enters the buffer.

We designed and placed walk-throughs to accommodate people traffic at multiple locations. A walk-through is a narrow pass just wide enough to allow a person to slip through but not a horse. Two posts are placed about a water bucket width apart. I like to use a water bucket as a guide because a water bucket is about the widest thing you might be carrying through a walk-through on a regular basis—anything wider and you'll need to use the gate. The use of strategically placed walk-throughs will increase the chore efficiency of the design. For most tasks, you won't have to stop to open and close gates. A walk-through may not be an option if you have small ponies or foals.

Dr. Shea Porr, Superintendent of the [Middle Agricultural Research and Extension \(MARE\) Center](#) stopped by the farm to see the implementation of our design. Shea has been another key member of our grant team and provided input during the design process.

While the excavation, by Morgan Excavating, of the mud and muck from the front paddock was taking place today pasture renovation, began on the back pastures. The back pastures are adjacent to the stream on the south side and the new sacrifice area to northeast. We gave the farm owner Edith Kennedy the option of having us renovate all the pastures at one time or to renovate half this spring and the other half in August. We discussed the requirement that the renovated pastures must rest for approximately 120 days to allow for enough top growth and root development so that the grasses could tolerate grazing. Once renovated the pastures would never again be grazed below a minimum of four inches or in wet conditions. Edith opted to start with half the pastures this spring rather than to keep all the horses in 100% confinement for 120 days.

We decided to renovate the back pastures first because they are adjacent to the stream and present more of a water quality concern. We planned to fertilize and lime the pastures based on soil test results. We also consulted with an agronomist J.B Daniel with the [USDA Natural Resources Conservation Service](#) . J.B. traveled from Farmville to meet with Beata Coss and Nicole Ethier, conservation specialists at the farm, in early March to discuss a pasture renovation plan. Roy Lambert from CFC Farm and Home Center in Warrenton also attended the on-farm meeting. The final plan for renovation incorporated input from all the experts and some



The pasture before renovation

commonsense. A great suggestion from J.B. was to leave one area of the pasture system untouched with amendments to see what effect simple rest and proper grazing would have in restoring the area. We plan to select a 10x10 foot area in the front pasture to serve this purpose.

It was decided that the pastures would not need to be plowed or tilled prior to seeding and that a no-till drill could be used. A no-till drill has a roll of disks that cut slits into the soil. Seeds are then dropped into the slits. A flat wheel follows to close the opening in the soil. Seed to soil contact helps ensure better germination and is preferable to broadcast seeding over the surface. Access to and use of a no-till drill is not always possible on our small horse farms but it will be demonstrated on the model farm.



Jay Yankey's no-till drill

Jay Yankey, former Conservation Specialist with our agency and owner of [Yankey Farm Service](#) in Nokesville, is another grant partner. Jay donated his time and expertise to no-till seed the pastures. We also used Jay to fertilize the pasture and apply lime.

Originally we had planned to use one of the farm service providers such as [Southern States](#) or CFC Farm and Home Center to apply the needed 2 tons of lime per acre to the farm. We soon experienced



Broadcasting the fertilizer and lime

firsthand the frustration of finding a provider that could apply the lime anytime soon and in dry conditions so the pastures wouldn't be damaged or trucks stuck in mud. Roy from CFC Warrenton suggested we try a bagged, pelletized lime product called "Green n Grow." CFC donated several bags for the project. This bagged lime product was applied using the same equipment Jay had to broadcast spread the bagged fertilizer we purchased.

Jay spread the fertilizer and lime first then switched equipment and seeded the pasture. He first seeded in rows going around the pasture in the same pattern you would mow. Afterward he seeded coming back and forth across the pasture. This technique is more time consuming but ultimately the spacing between rows is half the distance and should result in a better, thicker, stand of grass. CFC donated the seed for the back pasture. The pasture mix included orchardgrass, perennial rye, bluegrass and clover. We added some annual rye for a quick cover and Kentucky 31 tall fescue, known for its vigor. The front fields will be seeded with only KY31 for the sake of comparison. The pastures were limed, fertilized, and seeded on March 31st directly in the middle of the spring seeding window as recommended by Virginia Tech. If you are going to rest the pastures for 120 days it's a good idea to pay careful attention to the timing, quality of seed, fertilizer and lime application, and seeding method so that you have the best possible result.

We were able to spread the seed, lime, and fertilizer on the back pasture only because we had finished the back sacrifice area so the geldings had a place for turnout.

The last item on day four of construction was the start of the installation of our freeze proof, automatic, non-electric, water trough in the fence line of the sacrifice area paddock as mentioned earlier. Before the installation of the new water troughs the horses were watered in quaint, functional, old bathtubs. A reliable, low maintenance water source is another asset in your sacrifice area. In the dead of winter it's great to not have to worry about carrying hot water, breaking ice, or running heaters on extension cords.



Water trough "before"

Let me tell you about the water troughs that we found! After some Internet research Beata came across the Bar-Bar-A brand water trough. The appearance is similar to Nelson brand water trough (tall, cylindrical fountain) but it doesn't require electricity. This was the largest selling point for us since the electrical access on the farm wasn't great according to Edith. The Bar-Bar-A has a tall, black plastic casing.

There's a drinking area on top. The horses trigger the flow of water into the drinking bowl by pushing a metal paddle. Fresh water pours into the bowl as long as the paddle is pressed. Any water left after the horses drink simply drains back down into a drain field installed under the trough. Each time the horses drink they get fresh water and there's no standing water left for mosquitoes or algae. It also means there's no standing water to freeze.



Learning about the Bar-Bar-A water trough

The product sounded great but before we decided if we would like to try the water troughs on the model farm I spoke to the manufacturer. Dave Anderson, Bar-Bar-A

Horse and Livestock Drinkers, put me in contact with a horse farm near Middleburg that is using them. We went to see the troughs and get a local horse owner's opinion on installation, use, and maintenance. The day we went was perfect—snowy and icy. I wondered if the paddles would be frozen in place by ice or if the weight of the snow would hold the paddle down. Would we see the water free flowing all over the place?

We braved the icy pastures to see the troughs and talk with Graham Alcock, the farm owner. He stated that of course they MUST be installed to the manufacturer's specifications which he had done himself. He also reminded us that like any automatic water trough you must check them daily to make sure they are functioning properly. When I asked about whether or not his horses, ponies actually, ever got their tongues stuck to the paddle in cold weather he said not that he had ever seen. The horses quickly learned to use the troughs. He also noted that there is a filter in the trough that needs to be cleaned or changed yearly and he learned from experience it is easier to do in nice weather. He recommended that we purchase a couple of extra filters to have on hand so you don't have to stop and wash one before reinstalling it.

I contacted the company and invited Bar-Bar-A to join our list of partners by donating the two water troughs. Bar-Bar-A accepted our offer. The last item for the day was to create the hole and drain field for the trough in the back paddock fence line. It wouldn't be completely installed for a couple days as the contractor focused on other areas of the project but we could see that it was placed in accordance with our design.



Site prep for our Bar-Bar-A water trough



A lot of organic material had to be removed before we could build our sacrifice areas

Day 5

Today the contractors continued work on the front paddock excavation. We also hand seeded and fertilized some of the areas disturbed during the construction process and, like many of the days, purchased some additional supplies.

The excavation of the deep layers of mud and muck continued into the first part of the day. The photos show how deeply we had to excavate to find a solid base for our gravel dust. The depth of excavation for a sacrifice area will vary depending on the soil types and conditions. For instance, my sacrifice area paddock did not require any excavation at all and therefore just enough gravel to give

the horses an all-weather footing about 4-5 inches deep, was needed.

Feeding the horses in the sacrifice area paddock requires the use of a feeder, stall mats, or other means to keep the hay up off the gravel dust as much as possible. Feeding directly on any dirt or gravel surface could lead to impaction colic if the horses ingest enough soil or stones. At my farm my horses have access to areas of the barn and an overhang. Their hay is fed on stall mats or in hay racks.

At our model farm they don't feed the hay in the barn unless the horses are kept in their individual stalls. We supplied empty water troughs, purchased at a discount from another grant partner Southern States Cooperative Inc., Manassas. We learned this trick from Robin Lancaster, of Blue Top Farm, a few years ago when she started using sacrifice areas to manage the turnout at her sport horse boarding facility. Robin was savvy enough to gather old, cracked Rubbermaid troughs when she traveled to different farms as a vet tech—for free. She liked the



Horses eating hay from a trough hay feeder

fact that more than one horse could eat out the trough if they chose to, the troughs are easy to move around, even on snow, and the troughs can become a safe toy for the horses after they finish their hay. Over the years she has experimented with a variety of solutions for feeding hay in the paddocks, most recently using hay nets with very tight mesh so the hay lasts longer.

As a side note, both CFC Farm and Home and Southern States were excited to learn about our project. They are frustrated when customers complain about their grass seed not growing only to learn that the customers have failed to let the grass seeds grow for 120 days and then to follow good pasture management practices to keep the plants healthy. No grasses will survive constant grazing pressure and trampling in wet weather, especially not young grasses that have not had the opportunity to grow a healthy root system.



Some trees might not survive the excavation for the paddock

Returning to the front sacrifice area paddock, we altered the existing fence line a bit and again replaced the barbed-wire with 3-board wood fencing. We also removed a few dead trees and small trees that would not survive the damage to their roots from the excavation of the paddock. We left some trees along the east perimeter between the sacrifice area and the hayfield hoping their roots will survive the trauma. It will be interesting to see how those trees do and we will share that information so that you can make an informed decision if that is an issue on your farm.

The new fence line made the paddock wider in the area closest to the barn, skirted around the canopy of a mature fruit tree so that its' roots weren't damaged, and finally moved a respectful distance away from an area with some old grave stones. The total square footage of the front paddock is 7,200. The paddock is 45' x 160'. This paddock will be used for the turnout of the two mares on the property.

On your property you should plan to have a sacrifice area paddock for each turnout group. Obviously it's more economical to have one turnout group on your farm with one sacrifice area. I recognize that this won't always work if you have multiple horses or groups that just can't be turned out together.

The last task for day five of construction was for us to layout the interior fencing in the front pasture. This fencing will subdivide the front pasture for rotational grazing. When deciding how to layout interior fencing it's important to note that livestock generally graze smaller areas more evenly than larger areas and square or rectangular areas more evenly than long narrow or odd shaped fields. You

will want to balance your desire for maximum utilization of the pasture with your desire to see your horses galloping in great wide open spaces when determining how large you want to make your fields. I strongly recommend the use of moveable or temporary electric fencing. An advantage of using moveable fencing is that you can experiment with different configurations and sizes to find the one that you like best. You may want to have smaller fields and a quick rotation through multiple fields when the grasses are growing more vigorously, in the spring and fall. You may not want any interior fencing over the winter months so the horses can enjoy a good gallop over the entire field on the occasional dry winter day when they get a break from confinement. Even if you know that ultimately you want all of your fencing and cross fencing to be a permanent type such as 3-board wood, consider starting with something moveable instead.



There are many types of temporary electric fencing to consider.



Cattle owners have been using intensive and rotational grazing practices for years.

A temporary electric fence can be installed using step-in posts made from fiberglass or plastic. These types of fences are very easy to install and move when the ground is soft. One drawback to the use of these types of posts is that it can be a little harder to have a nice, tight, aesthetically pleasing fence line. You can keep electric fence charged with a solar charger. Proper installation of the fencing, charger and ground rods is required. You must also keep weeds and tree limbs off the fence to avoid grounding out the charge.

An electric fence is a psychological barrier rather than a physical one. A poly-tape fence cannot physically hold a horse in the field. When the fence is properly

charged it acts as a psychological deterrent. Horses choose not to challenge the fence. The fence provides a visual marker of the boundaries of the field and the shock reminds the horses to respect that boundary. A fence that is an example of a physical barrier is a 3-board wood fence. If the horses run into the fence it will physically hold them in the field, to a certain point.

I cannot stress highly enough that an electric fence needs to be properly installed and charged to be effective. My fencing is all electric. The solar charger is located on my path to and from the barn. I turn the fence off as I walk into the field, going toward my barn, and turn it back on when I leave. When I turn the fence off or on I can monitor the output of electricity from the battery. If there is a break in the fence or a tree limb touching the fence I will see a decrease in the output on the voltage meter.



I use poly-tape fencing on my horse farm

The interior fencing we selected for Oakwood Farm's front pasture is 3-strands of 1 ½" electrified poly tape. The fencing is a Gallagher USA fencing product purchased from our grant partner CFC Farm and Home Center in Warrenton. We chose to use metal T-posts to mount the poly tape since we felt confident in our layout and wanted the aesthetics of a tight, straight fence line. This fencing will be electrified using the same solar charger that is used to keep the perimeter fencing "hot."

Even with metal T-posts you can remove the fencing and reposition it, though certainly not as easily as with step-in posts. You can purchase special tools and install this type of fencing on your own. On day six of construction our conservation specialists Beata Coss and Nicole Ethier would get to experience this firsthand.

So, at the close of day five, we use flags to mark our fence line across the front pasture. Even though we had discussed the layout many times before, nothing replaces standing in your field with flags and a measuring wheel or tape to make the final decisions. Beata Coss' suggestion to divide the existing field into two sections, 1/3 and 2/3, ultimately made most sense considering our longer term plan to bring an additional small section of open land into production and make the two fields equal in size.

Day 6

The placement of gravel dust in the front paddock continued, water trough installation began, and we helped remove some old fencing on day six.

The Oakwood Farm pasture layout allows two water troughs to serve six turnout areas. This isn't as difficult as it sounds and it can sure save you a lot of expense and time monitoring multiple troughs. We placed each of our troughs in the fence line of our sacrifice areas. This type of placement allows the horses to reach over and access the trough from two to three separate fields.

You can also put your trough anywhere in your sacrifice area paddock and plan to always allow the horses access back to the paddock for water. Depending on your layout you may need to use a travel lane to accomplish this. An alternative to placing your trough in your sacrifice area is to place the water in another centrally located paddock or corral just large enough to allow the horses to enter the paddock to access the trough without crowding each other. Radiate all the paddocks out from the water corral. Multiple gates in the fence of the corral will allow access to and from the pasture of your choice.

Centrally locate your sacrifice area. Offer free choice access to shelter and provide a clean, consistent, source of water in your sacrifice area paddock. Place the water trough in a fence line of the paddock to allow for additional flexibility under circumstances when a horse(s) needs paddock-only turnout and while other horses will be locked out in a pasture—both can access the same trough in the fence line. Design elements such as these will make your farm more chore-efficient.

The area around each water trough that extends beyond the sacrifice area and into the pasture is surfaced with gravel dust. It typically isn't realistic to think that you can keep grass growing in high-traffic areas such as the areas around troughs, travel lanes and gates. You may want to give up on keeping the grass growing in these constantly worn and compacted areas and just surface them with fine gravel or gravel dust so that you won't have bare soil or mud. We used the same bluestone dust that we used in the paddocks



Board fencing provides a safe access to the trough. You can check the water trough as you "walk-through"

to surface the water trough access points from the pastures at Oakwood.

The fencing adjacent to the water troughs is 3-board wood. Some of the boards are angled to allow easier access to the troughs. There are several options that I have seen to fence around your water trough to allow your horses access while discouraging them from thinking that they can get through the opening in the fence.

Edith Kennedy, owner of Oakwood, expressed concerns during the design process about the proximity of the interior electric fence in the front pasture to the water troughs. She was afraid that her mares would accidentally be shocked by the fence adjacent to the water trough and eventually refuse to drink. Although we had not seen this happen, commonsense told us this could be a legitimate concern. We decided to stop the interior electric fence one section before it intersects with the paddock and switch back to 3-board wood fencing. This really seems to make sense and I'm glad Edith suggested it. Ultimately you know your horses best so make sure if you receive planning assistance that you do take the time to consider how your horses may react to a proposed design and provide that invaluable input to whomever is helping you.



Example of walk-throughs adjacent to the auto water trough. The Rubbermaid trough in the foreground is actually used as a hay feeder.

We placed walk-throughs from the sacrifice area to the pastures near the troughs. As you travel through, you can quickly and efficiently check the water troughs to ensure that they are functioning properly.

While the water troughs were being installed and the gravel was still being added to the front sacrifice area paddock, I asked Nicole Ethier and Beata Coss to give me a hand pulling down some old barbed wire fencing in the back pasture. Since the back pasture was going to be resting for 120 days and we knew we were going to be increasing the size of the pasture to incorporate more lawn areas into the field, there was no reason not to start removing the old perimeter fencing.

We clipped the wire, coiled it up in sections and used my T-post puller to remove the posts. This process was extremely quick and in just a few minutes the old fence line was history. Rusty Morgan, Morgan Excavating, offered to pull up the posts with his machinery but honestly we were able to do it very easily by hand. So, if you don't have machinery you can install a lot of your own fencing using very basic equipment for setting and removing metal T-posts.

The last noteworthy event on day six was a visit from Peter Compher from Luck Stone Corporation. Luck Stone Corporation's partnership provides the largest single donation of services or products. Luck Stone generously agreed to provide us with up to 1,250 tons of bluestone dust gravel for the farm improvements. It was my pleasure to show Pete the farm in person, show him aspects of the current construction and pasture renovation efforts, and remind him of our final goals.

Front paddock "before" and "after"



Day 7

Day seven of construction was a very short day since we were dodging more April showers.

The installation of the water troughs was completed and we discussed the learning curve associated with

the horses' use of the new troughs. The geldings very quickly figured out how to push the paddle down to start the flow of water into the drinking bowl. We weren't sure how the mares were coming along until a couple of days later when they were actually observed using the trough. Something about leading a horse to water should go here...

Day 8

On day eight we laid out the back interior fencing and had the opportunity to show Bob Slusser, Virginia Department of Conservation and Recreation, our progress on the farm.

Bob Slusser, from the Virginia Department of Conservation and Recreation is my contact regarding the grant funding they are providing for this project. This project received funding from the Virginia Water Quality Improvement Fund provided by the Virginia Department of Conservation and

Recreation (DCR), via grant number 2007-WQIF-19. Bob had seen the farm in "before" condition a few months earlier. I invited him back to see the improvements. I was able to show him how our management of mud, manure, and pastures would benefit water quality in local streams and the Chesapeake Bay.



Bob Slusser (center) from DCR and Ben Thompson (right) PWSWCD Director and I discuss the design during a winter visit to the farm "before"

The back pasture is adjacent to the Lick Branch stream. We had already installed the fencing 25 feet from the stream to create a buffer strip to slow and filter rainwater runoff. Today we focused on the exact placement of the interior fencing to subdivide the field into two pastures about just under 1 acre each. The placement of the interior fencing will also facilitate travel in and out of the back sacrifice area paddock.



Interior fencing in back pasture is electrified braid

We chose another Gallagher USA electrified braid product Turbo EquiBraid purchased at discount from CFC Farm and Home Center in Warrenton for this interior fencing. We used 3-strands of braid mounted on a somewhat flexible fiberglass post. The fence would be charged with the Guardian solar fence charger, also a Gallagher product available at CFC.

We took a few minutes to hand seed a drainage area in the back pasture. The area was no-till seeded a few days before but we thought that it wouldn't hurt to spread some additional Kentucky 31 Tall Fescue on an area that obviously is subject to stormwater flows.

Day 9

On the ninth day the interior fence in the back pasture was actually installed and finishing touches were made to the gravel in both paddocks.



A rep from Gallagher fencing visits the farm

The installation of the back interior fencing was interesting. The flexibility of the fence posts that we were installing made hammering them in a challenge. They weren't rigid enough to really handle being installed with the T-post hammer that was used. It was also hard to keep the fence line straight. I'm not sure how we should have installed them or how easy it will be to remove them. As we would learn from a Gallagher USA fencing representative later, these posts weren't the 1" diameter fiberglass rods we thought we had requested. After the fence was installed it looked pretty good and should certainly function as intended. It will be interesting to see how these posts perform over time compared to other fencing products we used.

Throughout the farm we've tried to demonstrate a variety of options from different gates to fencing types to grass seed mixtures. Our goal is to be able to answer your questions about different products, their costs, and how well they function over time.

While the finishing touches were being made to the gravel in the paddocks, we spent some time hand seeding Kentucky 31 Tall Fescue along side the stream in the buffer area. KY31 is an aggressive grass that is often used for erosion control. We want our stream side buffer to be a tall and densely vegetated "speed bump" to slow and filter the water before it enters Lick Branch stream.



Overseeding the stream buffer

Day 10

The tenth day of construction we wrapped up and cleaned up.

It's important to remember that with most construction projects some collateral damage is possible. Several construction and personal vehicles were parked on the farm along with machinery. We dodged rainstorms as best we could and tried to confine construction to dry days. Construction began on March 24th and this phase completed on April 13th. It took us three weeks to find ten weekdays with weather suitable for construction. The only weather that stopped us was rain. You can see from

the photos that the cold didn't slow us down. On this last day we smoothed out the ruts and over seeded any areas we disturbed.

Coming Soon...

The next phase of the project will be assessing the wildlife habitat on the farm, looking for natural ways to control pests, designing and installing the manure storage/composting system, further fencing improvements to make the farm "model ready" and the development of permanent signage for the farm.

The first scheduled tour of the farm will be held in July exclusively for members of the [Nokesville Horse Society](#).



Above, streamside buffer just after fencing the horses away. To the right, the buffer after 5 weeks of rest and growth.





From left to right: Kate Norris, Beata Coss and Nicole Ethier of Prince William SWCD have been working on this project since inception.



From left to right: Pete Shiner, Mistfield Farm and Robin Lancaster, Blue Top Farm have volunteered numerous hours on the project and continue to do so.



From left to right: Beata Coss and Nicole Ethier share fencing layout ideas with Oakwood Farm owner Edith Kennedy



Pete Shiner, Associate Director, assisted in many aspects of the project