
Protecting Natural and Historic Resources through Conservation Design

by Randall Arendt

Using Aerial Photos in Site Design: Aerial photos can be extremely useful in helping to locate site features such as individual trees, hedgerows, or deciduous or coniferous stands within mixed forests. Historical aerials, taken in the late 1930s by USDA's Soil Conservation Service (renamed the Natural Resources Conservation Service several decades ago) can be helpful in identifying the oldest specimens today, as most trees visible on 1930's era photos of farmland would be a century old today. Because less land was typically under trees back then, those earlier woodlands would be older than other, younger forests appearing on contemporary aerial photos. This is a simple and effective technique which is not as widely used as it should be.

On open farmland, the wettest soils can easily be spotted as dark areas on aerial photos, which are usually taken before trees have leafed out, and when water tables are still relatively high. When the tile drains underlying these soils become overwhelmed by high springtime water tables, the ground can become saturated right up to its surface, causing this tell-tale coloration. Such soils can be engineered for construction, but why incur that expense when these areas can very easily become parklands graced with water features, enhancing project value? Instead of "designing with nature", as Ian McHarg urged forty years ago, many engineers and developers today continue to rearrange nature, draining hydric soils to enable construction, while spending even more money creating open space areas in other parts of their property.

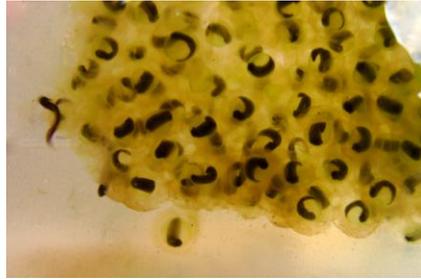
I designed the layout shown here at the request of an Indiana developer who ultimately opted for a more familiar, conventional approach that paid little attention to the darker soils appearing on the aerial photo. When I visited the development several years later, I was not entirely surprised to see a number of new houselots for sale with extensive ponding on the ground surface (photographed below).



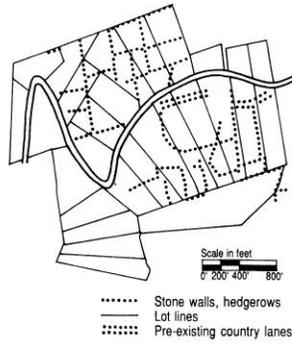
An engineer on a project team with me in Delaware several years ago discounted the wetness of similarly dark-colored soils I had identified on aerial photos of the development site, until I photographed large flocks of Snow geese landing exactly there.



Conserving Ephemeral Wetlands – Vernal Pools: Vernal pools occur on land that ponds during the late winter and spring, drying up by midsummer. The fact that these ponds do not remain wet year-round makes them environmentally very special, because they do not support fish populations which would otherwise devour the egg masses (pictured here, with tadpoles emerging) that have been deposited in vernal pools by woodland amphibians such as salamanders, frogs, and some toads. It is important to protect not only these sanctuary pools, but also the surrounding woodlands constituting the terrestrial habitat of such species which begin their life cycles in these shallow waters. (Recommended setbacks for clearing and disturbance vary from state to state.) Experts with trained eyes should be engaged to identify pool locations, and to estimate biological activity levels by counting the springtime egg masses of certain indicator species, or adult specimens later on the year (site visits shown here in both late summer and late fall). Without thorough site investigations, conducted by experienced biologists equipped with GPS technology to locate such environmental features precisely, these ephemeral wetlands (dry for half the year) can end up being offered as houselots.



Conserving Historic and Cultural Features: A wide variety of site features involve historical uses, including farmhouses, barns, country lanes, stone walls, wells, cellarholes, hedgerows, etc. Incorporating them into site design can add significant interest value to the neighborhood, improving marketing possibilities and enhancing the quality of life of residents in the development and the surrounding community. From long experience, I can say that designing around stone walls and hedgerows (or fencerows) is not difficult to do when one is given flexibility in lot size, lot width, and street geometry. All too often these features are blithely ignored by site planners who either have not walked the property to locate them, or who demonstrate no care or reverence for these artifacts from earlier eras. (Quoting Daniel Webster: “The man who feels no sentiment or veneration for the memory of his forefathers is himself unworthy of kindred regard or remembrance.”) To the extent that these *value-adding* aspects of the property are not retained, when it is relatively easy to do so, site designers are not serving either their clients or the community very well. The line drawing pictured here illustrates the total lack of regard for historical resources characterizing the vast majority of site plans I have reviewed over the last 30 years. While not every wall could have been incorporated along lot lines, quite a few of them could have, with conservation design flexibility.



The other photos tell happier stories, when developers and their site designers have clearly paid greater attention to these value-adding details of the cultural landscape, profitably incorporating barns, country lanes, and hedegrows into their layouts..



Conserving Orchards: The entire orchard operation shown here was designed around and conserved as “non-common” open space in this conservation subdivision in Kennett Twp., Chester County PA., where the overall density is one dwelling per two acres, but where the development footprint has been minimized by trimming

lot sizes to ½ acre and developing 40% of the units as attached condos. Note that all ten acres of original woodland habitat were also preserved. Another notable feature is the long “single-loaded” street in the lower left portion of the sketch. Developers often claim these streets cost more to build, as they have homes on one side only, opening views of the open space to all street users: drivers, cyclists, joggers, and pedestrians. But in conservation subdivisions, street costs do not rise, as more efficiency can be gained through slimmer lots with reduced frontages. In this instance, about 40% of the total street length that would have been required in a large-lot subdivision has been trimmed away, cutting street construction costs by a similar percentage. (The conservation design eliminated the street that would have arced through the orchard, plus the cul-de-sac that would have serviced the lots in the northern point of land.)



Conserving Meadows and Restoring Prairies: Although the former farmland in this Pennsylvania development was too small and fragmented to remain in production, its conversion to meadow use has improved wildlife habitat and offers residents attractive views that change with the season. In addition, this open space provides ideal areas for off-lot septic drainfields and also for community wells. This technique is worthwhile proposing even if health officials are unfamiliar with it, because they frequently agree, after careful consideration, that it is an acceptable – if not superior – alternative. This is because conservation design enables drainfields to be sited on the *best* soils available on the entire property, rather than having to be spaced at regular intervals within the confines of individual lots, some of which might consist of mediocre soils at best. (Ringfield, Chadds Ford Twp., Chester County PA). As with the orchard example above, the overall density is one dwelling per two



acres.



In the Midwest, a growing number of conservation subdivision developers have been restoring prairies (from former farmland) for several decades with considerable success. One of the first examples occurred at The Fields at Long Grove, in Long Grove, Illinois (previously described in *Rural by Design*). However, one of best-known examples can be seen at Prairie Crossing, 15 miles to the north, in Grayslake, where the restored grasslands are managed professionally through annual “controlled burns” that maintain their ecological integrity, as pictured here.



Conserving Cropland: During the first five years after adopting its new ordinance, more than 500 acres of prime farmland were preserved in Lower Makefield Township in Bucks County PA by applying conservation design principles to new subdivisions such as Farmview, pictured here. This farmland has been deeded to a local land trust which leases the fields to local farmers under long-term arrangements. In return for reduced lease payments, farmers agree not to spread manure at times that would cause abutters to object, such as before holiday weekends. Conservation of the cropland was accomplished by reducing lot sizes from one acre to ½ acre, an approach that also significantly reduced street and utility installation costs.



As of 2009, as many as 200 residential developments have incorporated active cropland into their plans, according to the Urban Land Institute. From Serenbe near Atlanta to Hidden Springs near Boise, developers are learning that the lot premiums usually associated with golf course developments can be achieved with farmland views instead. And at a fraction of the expense, as farmland costs nothing leave as is, whereas converting farmland to 18 holes of fairways typically sets developers back by \$10-12m. And, unlike golf courses, farmland does not require conversion costs in the range of \$ 10m, as is typically for golf courses. So many savvy developers are getting the message that density-neutral conservation design pays excellent dividends, and that when woodlands are conserved, money really does grow on trees. As ULIs Ed McMahon has noted, “living with a farm can bring a buyer permanent views, wholesome activities for children, access to walking and riding trails and inclusion in an epicurean club.” And for the residents there’s an added bonus, as the rental income

from farmers' leases, which at first goes to the developer, is paid to the homeowners' association when the project is complete.

Creating Vineyards, Almond Groves, and Edible Landscaping: One of the most remarkable conservation subdivisions ever built is Village Homes in Davis, CA. Designers Michael and Judy Corbett view open space as serving four key functions. First, it must be beautiful so that (secondly) it will encourage residents to use it frequently, thereby increasing social interaction. Third, it should handle all the stormwater gracefully through infiltration and recharge. And, finally, it should be planted with edible landscaping. In this case, figs, citrus, cherries, pears, and peaches have been supplemented by a small vineyard and many almond trees. Impressively, the revenue generated by the annual almond harvest (pictured here) covers the entire maintenance budget of the homeowner association. And not a single curb or gutter was needed, as all water flows from the very modest, nearly imperceptible, "ridges" created for homes and streets with the earth removed from the broad swales in the greenways behind those homes, where stormwater is directed and infiltrates, irrigating the lush plantings there. A density of slightly more than four dwellings/acre was achieved by trimming lot sizes from the usual 9,000 sq. ft. to about 4500 sq. ft.



Pictured here in late May are young figs, a mature lemon, and two teenage residents picking luscious ripe cherries. Located within easy biking distance of UC Davis and neighborhood shops, who would not want to live in such an Eden?

Creating Community Gardens, Community-Supported Agriculture, and Foraging Opportunities: Another healthy aspect of conservation neighborhoods is the opportunity to provide community gardens where residents may plant specific plots or "allotments" with fruits, herbs, and vegetables of their choice. Alternatively, the farmland can be managed as a CSA (community-supported agriculture) operation where the land is typically planted and tended by a couple who rents the land from the HOA for a nominal sum. The CSA then offers produce for sale to residents and neighbors who join the co-operative, pay monthly dues, and receive fresh food weekly during the growing season. CSA's supply members with farm-fresh fruit, vegetables, herbs, flowers, and/or organic produce not always available in standard grocery stores. Begun in western Massachusetts in 1985, the CSA movement now boasts more than 100 farms, a number that increases every

year. When one considers that half the milk, two-thirds the vegetables, and four-fifths of the fruit produced in our country come from “metro-farms” located in counties near our largest cities – exactly where development pressures are greatest – the advantage of creating CSAs within new conservation subdivisions becomes apparent. As Bill McKibben has noted in *Deep Economy*, “as the number of old-style farmers in rural areas has dwindled, the total number of farms has stabilized, thanks to new small growers.” Pictured here are allotments at Village Homes and Prairie Crossing (Grayslake, IL) and a CSA farmstand at the Fields of St. Croix (Lake Elmo, MN). The white barn and organic chickens and hogs are also from the CSA farm at Prairie Crossing.



Credit: Michael Sands



Credit: Robert Engstrom



Another productive use of conservation land is foraging for wild crops. Pictured here is Russ Cohen, who leads “edible walks” in New England, in addition to writing and speaking on the subject. His wife Ellen holds two stalks of Indian Cucumber harvested on such forays. The dishes that can be prepared from many wild plants (leaves, berries, roots, stalks, flowers, etc.) are truly amazing and delicious.



Credit: Elizabeth Rankin

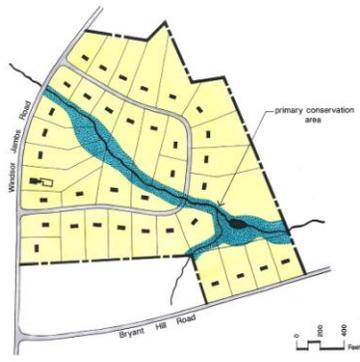


Credit: Russ Cohen

Conserving Woodland Habitat: Homes abutting the woodland preserve in this development sold faster and at premium prices because buyers recognized the value added by proximity to protected lands. Installing the trail system *before* sales began, and making it a special marketing feature (with trail maps given to all prospective purchasers), enhanced the development's financial success. (Garnet Oaks, Bethel Twp., Delaware County PA). Project density stands at two dwellings/acre, but lots were designed at 12,000 sq. ft, instead of the usual 20,000 sq. ft. Trimming them by 40% made all the difference.



Conserving Public Viewsheds and Scenic Character: In some communities, protecting rural character is one of the principal planning objectives. Conservation subdivision design can be used very effectively for this purpose as well, whether it is applied generally throughout rural zoning districts, or whether it is the principal tool for implementing viewshed protection policies along officially designated "scenic roads", as is done in New Castle County DE. Locating new homes away from public viewsheds is often very easy to accomplish using conservation subdivision design principles, as illustrated in this pair of sketches.



Credit: Island Press



Credit: Island Press



The kinds of results achievable even at the one-acre density are depicted above, in roadside photos taken at Farmview (Lower Makefield Twp., Bucks Co. PA) and Trim's Ridge (New Shoreham RI).

Creating Footpaths, Bikeways, and Greenways: Increasing interest in walking and cycling can easily be accommodated by providing trails and bikepaths in the abundant open space that is part of every good conservation subdivision. Such amenities also help to counteract the sedentary lifestyles and nature-deficit disorders that have unfortunately become a way of life for many Americans, especially children, today. In Cary, NC, the greenway network or footpaths and trails is now so extensive that schoolchildren can buy a loaf of bread and stop in at their dentist's office on their way home from school. The photo of the woodland trail is from Hamburg Twp., Livingston County, MI, which has preserved more than 2000 acres of farmland and forest simply by adopting conservation subdivision design requirements in its zoning and subdivision ordinances. Developers have become the largest conservationists in the township, doing (very) well by doing good.



Creating a Nursery Business: A wholesale tree nursery occupies most of the open space in this conservation subdivision, where the original stone farmhouse was preserved within the context of productive lands. The community’s rural character was also maintained by situating the nursery within the public viewshed. (Indian Walk and Winfield, Doylestown Twp., Bucks County PA) Lot sizes are about ½ acre in an overall density of two acres/dwelling.



Creating an Equestrian Business: Converting cornfields to horse pastures has proven to be a very workable solution, with a commercial equestrian facility owning and managing most of this subdivision’s open space, relieving the HOA of that responsibility. In addition, residents, enjoy a large central recreation area, complete with ballfields and playground equipment, catering to their active recreation needs. Livability is enhanced by the location next to an existing post office at the edge of the village, and the provision of a new neighborhood corner store, day care facility, and offices. A variety of housing types, appealing to a broad range of buyers, boosted sales velocity (Summerfield, Elverson Borough, Chester County PA). These results were achieved at an overall density of 2.3 dwellings/acre.



Restoring Wetlands and Fisheries: Beyond conservation lies the realm of restoration, and restoring lost resources is often even more impressive than saving existing ones. The “prairie potholes” restored at Tryon Farm in Lake County, IN had been drained eighty years ago to “improve” the land for cultivation, before such drainage became illegal. Bringing back the original hydrology is far easier (and usually more successful) than attempting to create wetlands where none had previously existed. At the Ranch at Roaring Fork, in Carbon County Colorado, the developer restored a fishery with the assistance of Trout Unlimited. They rescued a once-productive creek from the ravages of unfettered agriculture, where water quality had been severely degraded by decades of livestock trampling the banks and creek bed, destroying the fishery that had once existed there.



Another notable success story involves five threatened or endangered fish species in Illinois, which are thriving in a “sanctuary pond” at the Prairie Crossing conservation community in Grayslake, where their numbers are increasing and their young are repopulating other waterways downstream, including the Des Plaines River.