Process,
Design,
Comparison

## Site Planning Demonstration Project

# *A Sustainable Alternative*

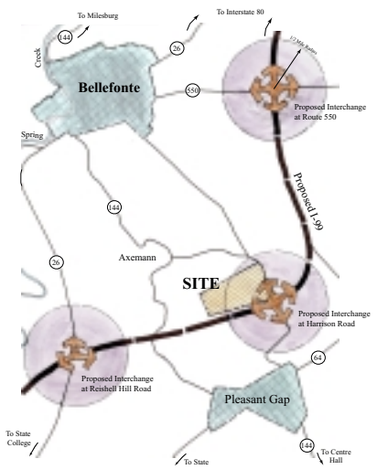
## Appendix B

# Elements of Sustainable Design

**The following illustrates and describes specific elements of the sustainable design, Concept B, as these elements relate to the original project principles as oulined in the previous appendix.**

## Regional Scale

### Smart Growth Location




The site is located within the development radius “node” of a major interstate connector road. Smart growth concentrates development and promotes transit oriented communities along transit corridors. “It’s pattern reminiscent of the eras when communities were built directly on commercially important roads, cross roads, railroads, and waterways” (A Better Way to Grow - for more livable communities and a healthier cheapeake bay) This pattern replicates historic patterns of growth within the ridge and valley province of Pennsylvania, making the demonstration site a logical location for sustainable, demand driven growth within the rural community.

### Rural Character

The character of the region is reflected in the layout which relies on hedgerows and rolling topography to buffer views of the development. These structural elements also create small neighborhoods within a larger neighborhood linked by open space and pedestrian ways. This pattern reflects the farms and crossroad developments characteristic of the region.

### Historical Influence

The Victorian influence of nearby Bellefonte is reflected in the neo-traditional design elements including architectural types, village center/green, grid layout and the promenade.

## Funding Supporters

**Funding for the Site Planning Demonstration Project, was provided by the U.S. EPA Sustainable Development Challenge Grants Program and the Chesapeake Bay Program. The Site Planning Demonstration Project was coordinated by staff at the Center for Chesapeake Communities (CCC) and utilized the assistance of Advisory and Technical Teams, Centre County Planning Commission and Spring Township staff. LandStudies, Inc. was the project consultant and designer. The Center for Chesapeake Communities would like to thank the valuable contributions made by each of these organizations and individuals in the completion of the project.**

*A Sustainable Alternative,* 1999
Kelly Gutshall, LandStudies, Inc

With contributions from David O'Neill, Urban Land Institute and Center for Chesapeake Communities, and Sue Hall, Center for Chesapeake Communities

Illustrations: David Hughes, LandStudies, Inc*
Photography: Brian Auman and Sue Hall*
*Unless othewise noted

## Project Participants

Core Design Team
Spring Township - Local Government Representative
S & A Homes, Inc. - Land Developer Representative
LandStudies, Inc. - Land Planning and Design - Professional Consultant
Center for Chesapeake Communities - Environmental Representative

Local Interest Groups
Centre County Planning Commission
Spring Creek Watershed Commission

Technical Team
Randall Arendt, Natural Lands Trust
Brian Auman, LandStudies, Inc.
Carl Bankert, S&A Homes
Michael Bauer, Virginia Tech University
Mark Bundy, Maryland Department of Natural Resources
Larry Coffman, Prince George's County, Maryland
Rich Collins, Institute for Environmental Negotiations, UVA
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Ken Johnson, Pennsylvania Department of Community and Economic
Walden Kerns, Virginia Polytech
Mindy Lemoine, U.S. EPA
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Bill McMath, Spring Township
Jim Noonan, Maryland Office of Planning
David O'Neill, Center for Chesapeake Communities
Daniel Slone, McGuire, Woods, Battle and Boothe

*This phase of the sustainable design process is invaluable in evaluating successful projects and learn from examples throughout the country. Reference information and web sites related to sustainable design are included in the Bibliography.*

# Research

## Technical Team

The research phase of the the Site Planning Demonstration Project gained strength and insight from a field of experts in land use, site planning, development, natural resource protection, and local government. The Project Principles developed by the Technical Team are included in the Appendix.

The Technical Team consisted of public and private sector representatives with expertise in sustainable and alternative development. A pre-charette was held in which team members were presented with the site and asked for input on the site design pinciples and design.

The following is an outline of the common themes and concerns brought out during the discussion.

### Common Themes

Elements of Good Neighborhood Design

Provide a mix of housing types and prices

Architecture should mimic local vernacular

Provide small commercial development

Streets should be narrow (18' max. width)

Seek reforestation opportunities

Cluster homes between existing hedgerows

Transportation (Regional)

Encourage links from the parcel to off-site recreational trails

Develop an interchange (I-99) overlay district which provides a mix of housing, recreation, commercial and light industrial development

Encourage Park and Ride facilities at each interchange

Create opportunities for access public transportation

Preserve Open Space

Provide pocket parks throughout the development

Provide interconnected paths/trails

Provide permanent open space (30% min)

Utilize Existing Site Features

Use existing barn as a community center

Maintain hedgerows

Use field rock piles for homes and landmarks

Replant nursery trees as buffer

Utilize the exiting topography to disperse stormwater thoughout the site

### Common Concerns

Geology

The limestone geology can casue serious problems in the developoment of the site. A careful anaylsis of the site's geology, including the identification of potential sinkholes, was highly recommended.

Parcel Configuration

The site has a rectangular configuration. Participants questioned the cost-effectiveness of developing the west end of the parcel. Extended water and sewer service to this part of the site may be cost prohibitive.

Location

The site is not located adjacent to an existing urban center.

Since the site is located adjacent to the I-99 Interstate, participants suggested that a noise study be completed.

Fiscal Impacts

A fiscal impact statement identifying the impact of this development on the local infrastructure should be completed by the Township. Adverse impacts to the school system and local transportation networks should be taken into consideration

***Arguably the greatest lesson learned from this project is the importance of bringing the key players to the table early in the design process. These meetings were successful in understanding the needs of each interest group and compromising on areas of anticpated conflict. As issues related to land development become more complex and the need to balance a multitude of interests, the core interest group meetings become crucial to the success of sustainable development.***

# Research

## Core Design Team

A core design team was organized to define the Project Parameters (see inset right) and to ensure that the project responded to the needs of the community and is feasible to develop. Representatives from the development community (S&A Homes Inc.), the municipality (Spring Township), smart growth and sustainable development interests (Center for Chesapeake Communities) and the project consultant (Land-Studies, Inc.) were involved in the core design team which met on two separate occasions. The first meeting was to address the needs and expectations from each of these interest groups up-front so time was not wasted on obsolete design suggestions. A detailed list of questions were prepared (see Design Parameters) to guide the meeting. The results of this meeting were vital to the success of the project and shed light on the entire process. By meeting before any pre-conceived ideas were generated and with a clear understanding of the site and its regional context, this group was able to reach consensus and prioritize issues that would be confrontational during the conventional municipal review process. This allowed the designer to consider each viewpoint and make viable decisions when planning the site. At the second meeting, the Synthesis Plan, described in the following sections, and related design concepts were presented to the core design team. With the interests of the four representative groups agreed to at the previous meeting and defined in the parameters used in the design, this meeting focused on big picture issues such as density and open space. Since the team was involved from the beginning and felt involved throughout the process, a consensus on the final process/design was achieved.

### Design Parameters

Site Demonstration Project
Spring Township, Centre County, PA

Municipal Requirements
The project used current Spring Township Ordinances and the Draft Land Conservation Ordinance Criteria and Standards to prepare concepts. To achieve the sustainable goals of the project, there will be items proposed as part of the design which do not meet the current ordinance requirements. Each of these items will be brought to the Township's attention for review and comment prior to preparation of the final concept plans. A pre-sketchplan submission review by the Spring Township Planning Commission is expected.
Response: *Spring Township is open to reasonable suggestions and alternatives to the existing zoning ordinances. A work session review of the alternatives prior to public presentation is important.*

**Permitted Uses**
It is anticipated that a mix of permitted uses (single family, duplex, triplex, quadplex, patio, townhouse, aprtament, daycare, church) will be proposed based on the developer's market driven needs.
Response: *Spring Township encourages a mix of uses and housing types on the site. The Developer would like the flexibility to change housing types as the site is developed.*

Type of Development
It is important to determine what type of development is envisioned along with the target market. This information dictates the design, as well as, the type fo units proposed.
Response: *The Developer sees a mix of retirement, empty nesters, yound families and single professionals.*

Utilites
Public sewer, water, cable, electric, and gas service is available for the site.
Response: *There is sufficient public sewer and water capacity to supply this development.*

Implementation
How will the site development be implemented.
Response: *The Developer will maintain the development during the first few years until the Homeowner's Association is well established. The units will be soild using models and the Develoiper will construct the homes and associate infrastructure.*

Housing Units
The number of units a site can feasibly support is a synergy of multiple constraints and needs.
Response: *It will help in the design process if there is a way of prioritizing the needs and constants.*

| | |
|---|---|
| *Municipal Requirements* | *Site Constraints*<br>*Access*<br>*Infrastructure* |
| *Developer Needs:* | *Size of Units*<br>*Type of units for market*<br>*Ability to phase*<br>*Profitablitiy*<br>*Reduced up-front costs* |
| *Sustainability:* | *Project Principles*<br>*- regional scale*<br>- neighborhood scale<br>- site scale<br>- buliding scale |

Circulation
Pedestrain and vehicular circulation constraints should be defined.
Response: *Limited Access Highway and Interchange I-99*
*- grading, drainage, landscape and noise study from PADOT*
*- Overlay District Ordinance*
*- parking 3 spaces per unit and 9'x18' spaces*
*Access*
*- agree to safest entrance locations*
*- potnetial for future access*
*- emergency access issues*
*Roadways within the development*
*- cartway without curb 16'*
*- cartway with curb 18'*

Public Transportation
Access by the public tranist bus system is encouraged and the street layout and dimensions should be designed accordingly. Bus stops within the site are encouraged.

Alternative Transportation
Link to future greenway corridor is to be considered.

***The project Parameters and Principles were then synthesized to determine how they could be applied to the site. Through this exercise, a framework for the project emerged. Strong features of the site are linked through patterns of pedestrian and vehicular circulation to create a unique sense of place. This was important since the site has few dramatic features and lacked protected conservation areas or primary conservation areas.***

# Synthesis

## Features

**Conservation Areas**
- hedgerows and Class 1 farm soils
- connection corridors (link to future greenway and future park)

**Unique Elements**
- hedgerows, farm building cluster, future park and greenway link

**Circulation**
- pedestrian circulation is dominant linking site features
- vehicular circulation is minimized and efficient

**Drainage**
- follows natural existing drainage patterns
- infiltration is spread and kept close to the source

**Views**
- maintains farm character views from Harrison Road and future I-99
- buffer undesirable views w/ reforestation
- frame views within neighborhood "rooms"

**Solar Orientation**
- south facing lots wherever possible

## Concerns

The true test of the Synthesis/Framework Plan is how it addresses the concerns raised about the development site by the planning experts. The following identifies the major concerns raised during the pre-charette and how the proposed plan addresses these issues.

*Issue Concern*

**Site Access**

There is only one viable access point to the site from N. Harrison Road. This access is narrow and limits emergency access and a clear sense of entry for the development.

*Response*

Design the development as pedestrian oriented by decreasing the prominence of the automobile throughout the development and emphasizing the pedestrian path system. The pedestrian way could accomodate emergency vehicles and act as the "entrance" to the site at the existing farm buildings. This location is also the most visible to the neighboring community.

*Issue Concern*

**Interstate Highway I-99**

Noise and visibility of the proposed interstate highway directly adjacent to the site.

*Response*

The entire development is focused toward the site features and pedestrian way in the northern third of the site. Reforestation is proposed as a visual and sound buffer and an opportunity to restore natural resources.

*Issue Concern*

**Limestone Geology**

The limestone geology can cause serious problems in the development of the site. Team participants cautioned that development of the site should occur only after a careful analysis of the site's geology, including the identification of possible sinkholes, is completed.

*Response*

Stormwater infiltration is promoted close to the source and spread over the site reducing the need for storing large quantities of water. Drainage patterns mimic pre-development patterns.

*Issue Concern*

**Location**

Several Team participants questioned the value of developing a site not located within or adjacent to an existing village. They also questioned the rectangular shape of the lot and extending water and sewer service to the western end of the site.

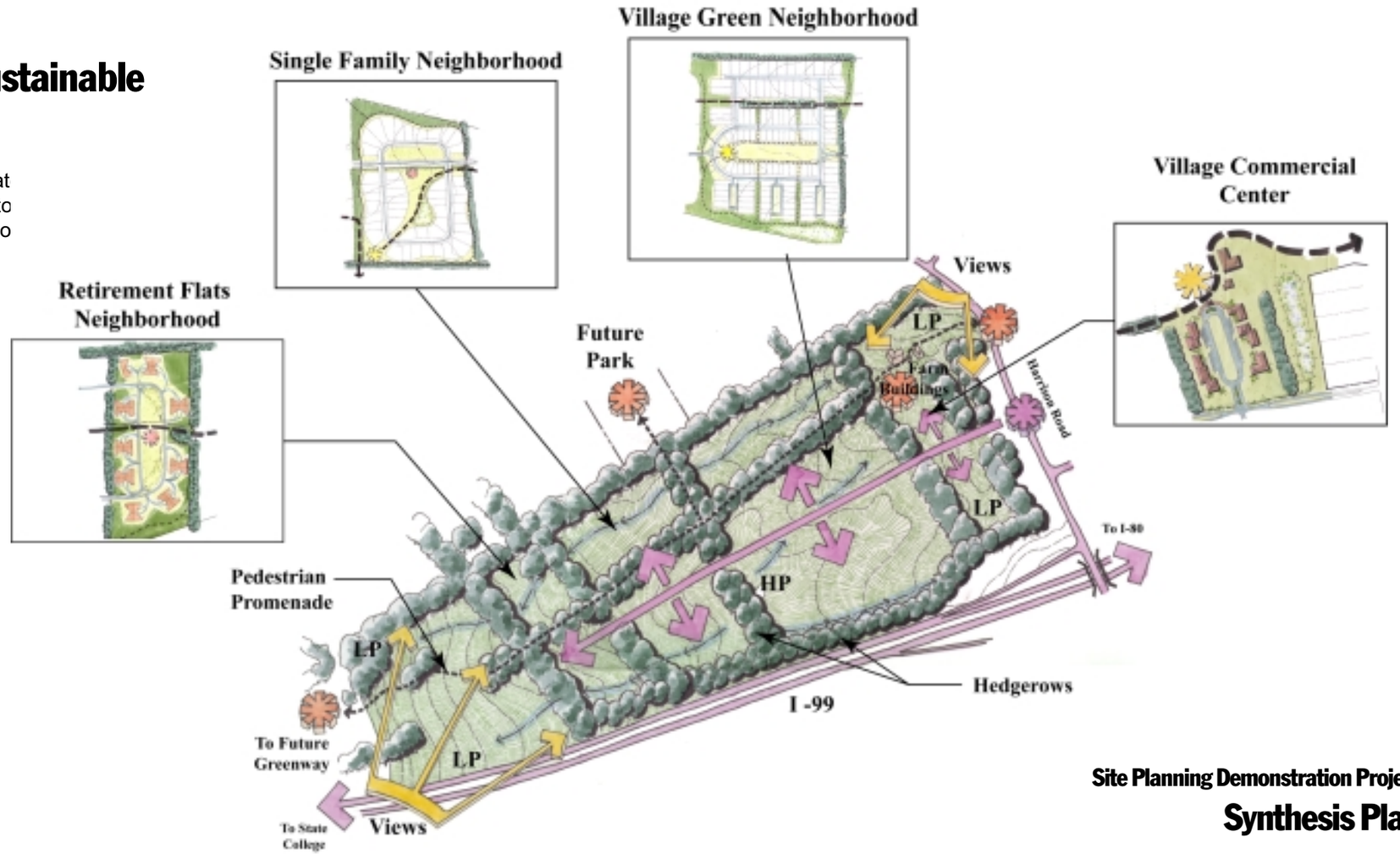
*Response*

The site is located in a smart growth interchange node. The density of the development is kept higher toward the access point and within the 1 mile radius of the interchange. This leaves the western "room" of the site and most visible from I-99, as public open space.

*What we found, was that the framework defined by the Synthesis and Research steps described in the preceeding sections could be used to create different layouts with varying densities and housing types in each hedgerow defined "room". The diagram below illustrates how various interchangable neighborhoods could be applied to the "rooms" on the site to create various overall site plans or concepts. This techinque is how the alternative sustainable concept plans for the site, one of which is described in the following sections, were designed.*

# Planning the Site - Sustainable

**A pedestrian oriented community** combines the sense of place associat traditional neighborhoods and small to nearby Bellefonte, with the preservatio that retain the site's rural character.




**Site Planning Demonstration Project**

**Synthesis Plan**

*The project parameters are applied in developing a site plan which best meets the needs of the community and developer. The following is a description and analysis of the sustainable concept plan. We have listed and illustrated the Features of the plan and analyzed the design with respect to sustainability, just as we did previously for Concept Plan A, the Conventional Approach.*

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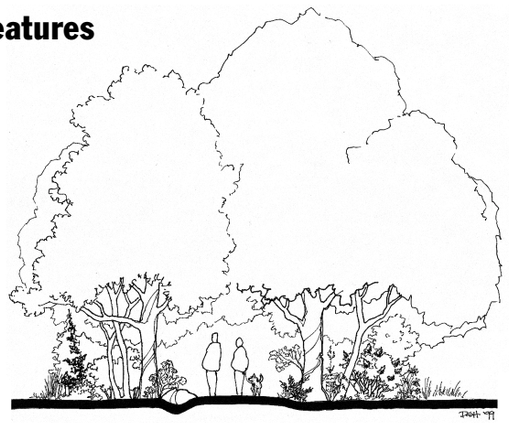
# Sustainable Approach - Concept Plan B

## Features

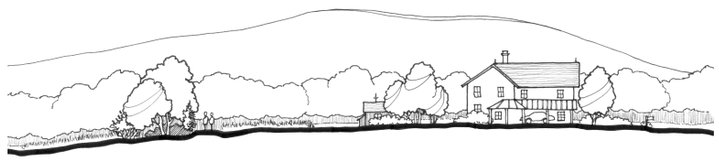


### Circulation

- Primary Pedestrian “Promenade” is the central feature, functioning as the gathering space for the community.
- each home has direct access to the pedestrian path system.
- the path system provides links to neighboring communities

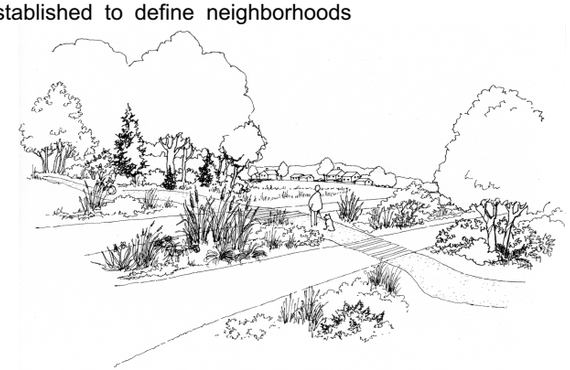
### Deemphasis the Automobile

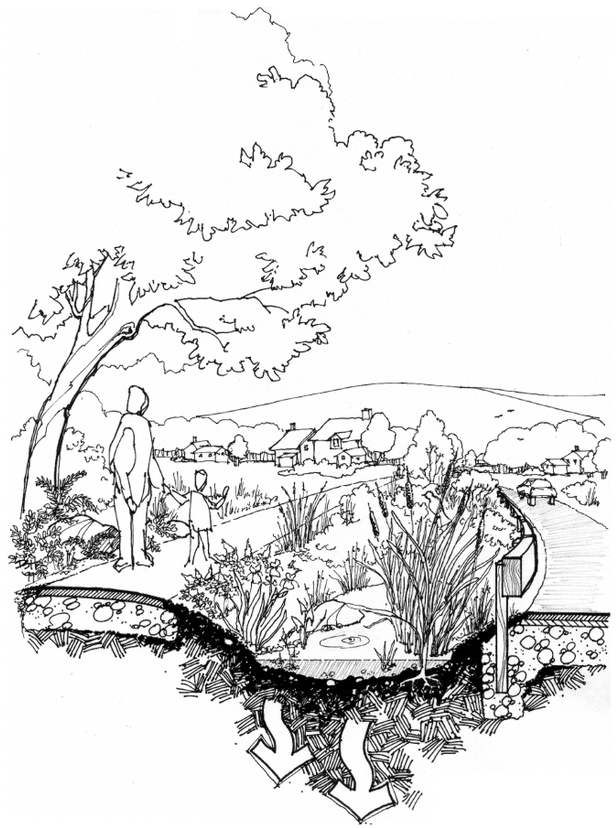
- simple and efficient loop road layout
- max roadway width 20'
- roadways are for access and service to lots only
- hammerhead end roads provide open space terminal views, snow removal storage, and access to flag lots
- parking is limited to driveways at the sides of houses to decrease visual impacts of cars from the street
- garages are side loaded wherever possible



### Lots

- lots have rear “living yards” adjacent to open space
- every lot has access to a common pedestrian path linked to the “main street” pedestrian prominade
- each “room” has a cluster of housing with a common neighborhood center which provides a shared location for car washing, garden plots, alternative energy source (windmill), mail, recycling, storage, etc.
- lots are zero lot line and share walls and garages wherever possible
- hedgerows and rock walls existing on site are reused or re-established to define neighborhoods





### Stormwater Management

-drainage swales and patterns mimic pre-development topography
-shallow wetland systems are proposed to cleanse and infiltrate run-off close to its source
-no subsurface inlet/storm sewer system is proposed

# Sustainable Approach - Concept Plan B

## Features (cont.)

**Open Space**

- hedgerows are preserved and established to create “rooms” and a natural circulation system for pedestrian and wildlife corridors.
-open space views that preserve the sites rural character are preserved from major roadways
-stormwater basins are proposed as shallow, natural wetland facilties
-an interconnected system of open space permeates the development

## Sustainability Analysis

The design links the community with its surroundings both visually and with public pedestrian paths

A minimum of 50% open space is provided

The plans are easily phased and flexible. Open lots designed into the layout allows the developer to acheive the proposed lot yield even with unforseen site limitations such as exposed bedrock.

Proposed natural SWM systems promotes groundwater recharge and improves water quality

Front end costs are reduced since construction can be phased and infrastructure is reduced.

Sinkhole potential is minimized by using pre-existing drainage patterns and keeping volume storage of stormwater to a minimum

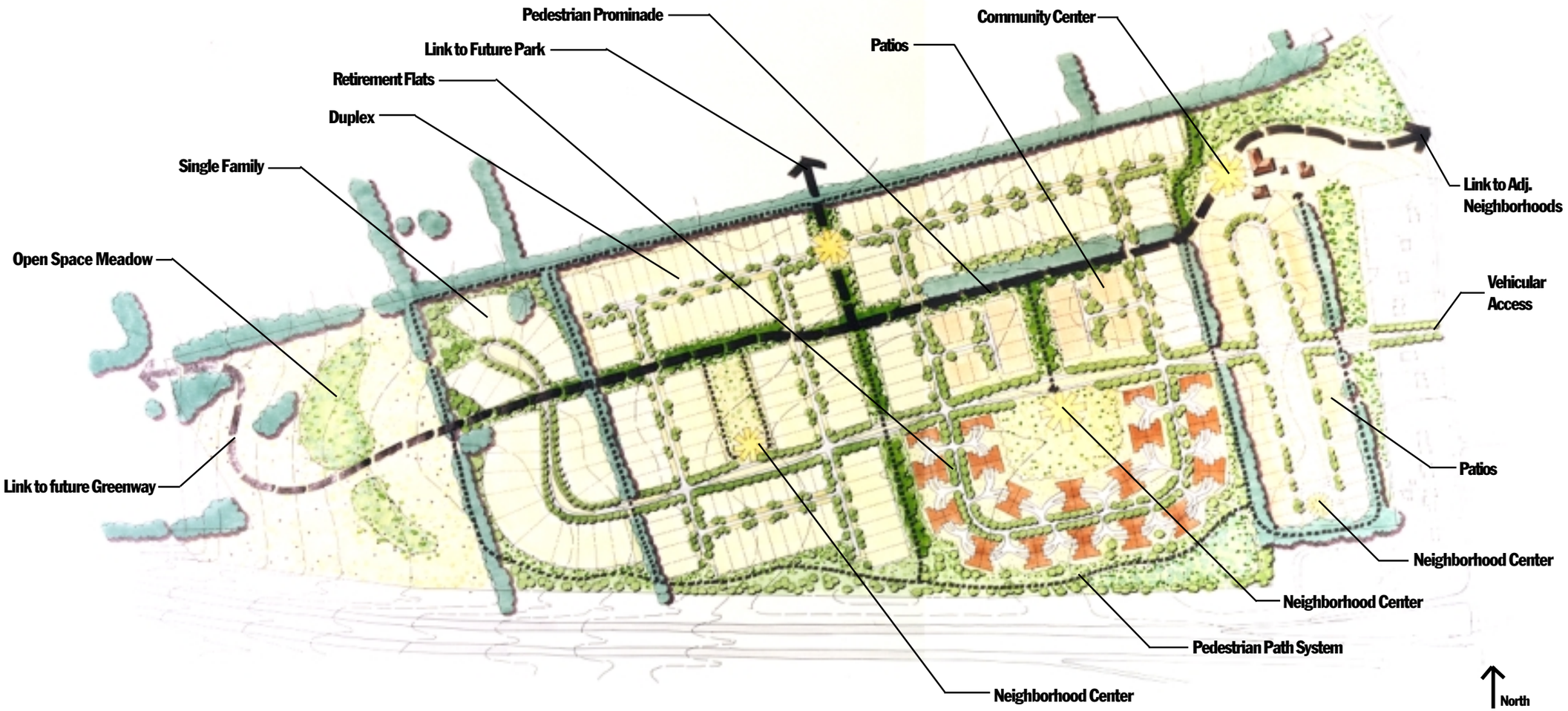
Homeowner interaction is encourage through neighborhood centers which provide common locations for recycling, car washing, gardening, mail, etc.

Hedgerows and rock walls existing on site are re-used to define neighborhoods.

## Concept B - Site Data

| | | | |
|---|---|---|---|
| **Site Acreage** | | 123 acres (approx.) | |
| **Units** | | | |
| | Single Family | 26 | > 7,000 s.f. lots |
| | Duplex | 144 | 7,000 s.f. lots |
| | Patios | 66 | 5,000 s.f. lots |
| | Retirement Flats | 64 | Quad Units |
| **Total Units** | | 300 | |
| **Open Space** | | 53% | |
| **Density** | | 2.4 du/ac | |

# Sustainable Approach - Concept Plan B




LandStudies

# Economic Comparison of Development Costs

## Construction Cost Comparison

### Planning and Engineering Costs

| Item | Conventional Concept A | Sustainable Concept B |
|---|---|---|
| Survey (topographic and outbound) | $15,000 | $15,000 |
| Permits (HOP, NPDES, E&S, sewer, etc.) | $20,000 | $20,000 |
| Design | $3,000 | $5,000 |
| Traffic Study | $7,000 | $7,000 |
| Preliminary/Final Plan Documentation | $10,000 | $10,000 |
| Stormwater Management | $3,000 | $5,500 |
| Grading and Drainage Plan | $11,000 | $6,111 |
| Final Road Design (.75/ linear foot) | $8,000 | $7,027 |
| Municipal Review and Approval | $5,000 | $5,000* |
| Pre-submission Meetings (Core Design Team, Township, etc) | $0 | $2,000 |
| **Total** | **$82,000** | **$82,138** |

### Infrastructure Construction Costs

| Item | Conventional Concept A | Sustainable Concept B |
|---|---|---|
| Monumentation of Lots (.42 / l.f.) | $28,350 | $24,157 |
| Road Construction ($2.20/ s.f.) | $829,488 | $546,480 |
| Public Sewer and Water Lines ($97/ l.f.) | $1,523,870 | $1,338,600 |
| Storm Sewers for SWM ($50/ l.f.) | $785,500 | |
| Site Grading for SWM ($45/ l.f.) | | $540,000 |
| Electric Phone and Cable ($15/ l.f.) | $235,650 | $207,000 |
| **Total** | **$3,402,858** | **$2,656,237** |

*Ideally the sustainable development plans should become “by-right” so review and approval are expedited. Realistically, the first sustainable developments reviewed by a municipality will take the same amount of review time as a conventional development and longer if the municipality has no alternative development zoning in place.

Cost Sources:

Actual bids received from subcontractors for work related to this project along with data from Remlik Hall Farm Development Costs, by Land Ethics, Inc printed in “A Better Way to Grow”, Chesapeake Bay Foundation, George Maurer, 1996; Bill MacMath, Building Inspector, Spring Township, PA and LandStudies, Inc.

## Landscape Installation Comparison

### Conventional Development - Concept A

| Item/ Qty. | Cost |
|---|---|
| Street Trees<br>(485 Deciduous Shade Trees -1 °" min. cal.) | $97,000 |
| Lawn<br>(107 acres of lawn @ $350/ acre) | $37,450 |
| **Total** | **$134,450** |

### Sustainable Development - Concept B

| | |
|---|---|
| Street Trees<br>(400 Deciduous Shade Trees - 1 °" minimum cal.) | $80,000 |
| Reforestation**<br>(10 ac. 2,500 Seedling Deciduous Trees and understory establishment)<br>** reforestation is based on 250 (5-6' ht.) containerized seedlings/acre and understory established with grass seed | $64,886 |
| Lawn<br>(49.5 acres of lawn @ $350/acre) | $17,325 |
| Meadow/ Wet Meadow<br>(43 acres of meadow/ wet meadow) | $111,800 |
| **Total** | **$274,011** |

## Landscape Maintenance Comparison

All costs are estimated for a period of one year.

### Conventional Development - Concept A

| Item/ Qty. | Cost |
|---|---|
| Lawn Mowing<br>107 acres | $130,647 |
| Trees Pruning and Maintenance<br>485 trees | $3,637 |
| **Total** | **$134,284** |

### Sustainable Development - Concept B

| | |
|---|---|
| Lawn Mowing<br>49.5 acres | $60,439 |
| Reforestation pruning, clean-up, etc.<br>10 acres | $3,000 |
| Meadow Mowing<br>43 acres | $4,680 |
| **Total** | **$68,119** |

Source for Costs:
Octoraro Native Plant Nursery, Inc. Kirkwood, PA; LandStudies, Inc., Bellefonte, PA; Arbor Glen Nursery, Cochranville, PA; and Redesigning the American Lawn by Bormann Balmoi & Geballe

*How can we take the results of the sustainable development process applied to this project and improve the current process so it responds to the land and needs of the community?*

# Lessons Learned

## 1. Sustainable Approaches Can Work

Concept B demonstrates that sustainable site planning and development is feasible. The concept prepared using the sustainable approach shows that more open space can be protected, pedestrian trails and parks can be incorporated throughout the site, and more units can be built on the site than could be supplied using conventional development approaches.

## 2. The Process is as Important as the Policies and Practices

Collaboration, compromise and flexibility are fundamental to the sustainable site planning process. Collaboration enables stakeholders of the development process to come together to define the principles and parameters of development that achieve community, economic and environmental objectives. This approach eliminates the pro-growth vs. no-growth debate and creates an environment where a more enlightened discussion about how best to grow can be forged.

## 3. Local Codes and Ordinances are Often a Barrier

As we discovered and most already know, local codes and ordinances often discourage sustainable site planning approaches. Road standards, density and setback requirements and even environmental regulations can impede sustainable development practices from ever getting in-the-ground. Again, developing models and conducting a collaborative process, can help to overcome these local regulatory barriers.

## 4. Education is Necessary at all Levels

Sustainable development is a complex concept. It requires local governments, the development community, and land use planning professionals to consider new approaches to development. Therefore, educating various stakeholders on the principles of sustainable development, as well as the policies and practices, is critically important.

## Implementation

From the model and public process described in this report, community leaders and developers throughout the watershed can:

1. **Implement a less adversarial and interac tive plan approval process.**
2. **Encourage sustainable site planning techniques.**
3. **Incorporate sustainable development principles into municipal comprehensive plans.**
4. **Allow flexibility in codes and ordinances.**

## 5. Sustainable Development is Cost Efficient

The economic comparison shows that the upfront planning and engineering costs, and infrastructure costs for the sustainable development are less then that for conventional development. The initial landscape costs for the sustainable development are greater but six times the number of trees are proposed. The yearly maintenance costs are greatly reduced making the long term costs of the development lower. Profits should increase with 25% more living units proposed.

***To alleviate the impediments and the oppostition to development that incorporates sustainable principles, designer/developers, local government, and the community should consider and integrate where possible the following:***

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# Promoting Sustainable Development

## The Designer/ Developer Role

1. Look beyond the site's boundary to be sure the site responds to the character of the region and adjacent neighborhoods;
2. Participate in community planning processes;
3. Communicate openly and often with public and local officials, citizens and envionrmental representatives in a collaborative, as opposed to adversarial, manner;
4. Preserve and protect the site's cultural and natural features, including historic buildings, trees, hedgerows, wetlands, and other natural features;
5. Develop goals for the project which are unchangeable and act as the framework for a flexible design;
6. Design with phasing that allows neighborhoods which can work independent of the entire development;
7. Work together to prioritze needs and be willing to compromise.

## The Local Government Role

1. Use a collaborative, comprehensive and integrated process to establish a long range growth and development land use plan for the community;
2. Prepare user friendly maps showing important open space areas and linkages. Prominently display these maps in public buildings, schools, libraries, municipal buildings, etc.;
3. Provide an open forum for discussion of community needs. Also, have a clear understanding of the communities desires via surveys, round-table discussions, etc.;
4. Encourage open dialogue with developers, landowners, environmental organizations, etc, so plans represent the community's vision when they are made public;
5. Work together to prioritze needs and be willing to compromise.

## The Community Role

1. Participate in the process to create a long-range land use plan for county and municipal governments;
2. Attend local municipal review meetings;
3. Become familiar with research, reports and maps prepared of the region and how they relate to proposed development;
4. Understand the responsibilities of the land development team;
5. Encourage broader public involvement in the process an be willing to consider the big picture when addressing issues on your doorstep.

# Appendix

## Appendix A

***Goal of the Site Plan Demonstration Project: To create a living model of sustainable development by maximizing ecosystem protection while meeting economic and community needs through sustainable site planning and development. To achieve this goal, the Site Planning Demonstration Project's Advisory and Technical Teams have prepared the following principles of sustainable design. These principles are organized on four different scales: regional, neighborhood, site and building.***

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# Site Planning Demonstration Project Principles

These four scales represent an overall context in which the benefits of sustainable site planning and development are maximized. For instance, sustainable site planning is enhanced when the development is located in a designated smart growth area, its design complements the surrounding community, the lay-out of the site protects open space, and its on-lot landscapes serve to manage stormwater and protect habitat. Therefore, sustainable site planning is really about both good design and good planning which requires architects, engineers, planners, local government officials and developers to consider the region, neighborhood, site and buildings to ensure its overall contribution to a community.

The following site planning principles take into account the importance of each of these four scales to grow and develop in an efficient, prosperous and sustainable manner. The principles will be used to guide the preparation and analysis of the sustainable site plans for the demonstration project

### *Regional Scale*

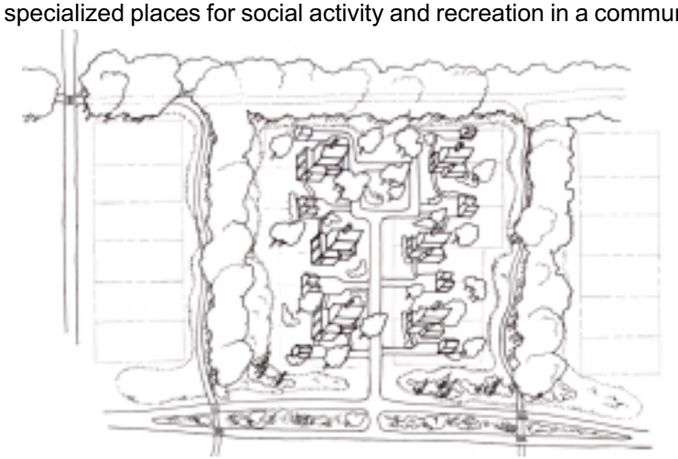
*The regional scale is the surrounding vicinity influencing the project site. This may be a 10 to 20 mile radius defined by specific development hubs or larger depending on the influences.*

- *Establish a Collaborative Vision* - Collaborate with adjacent municipal and county governments to establish a vision for the region that plans for a sensible balance between jobs, shopping, and housing in each community.
- *Prepare a Plan or Strategy* - Prepare a community supported comprehensive plan that designates areas appropriate for development including existing urban centers and lands located in a reasonable designated growth region.
- *Seek Transportation Alternatives* - Plan on a regional scale with a mix of transportation opportunities that promote community continuity and helps protect the environment including transit facilities and bikeways/greenways.

### *Neighborhood Scale*

*"Neigh bor hood - a district or an area with distinctive characteristics; the people who live near one another or in a particular deistrict or area." With this in mind, we define Neighborhood Scale as the area within the site development that creates a sense of community.*

- *Ensure a Mix of Land Uses and Housing* - Promote a mix of land uses in a neighborhood to promote walkability and community strength.
- *Minimize Automobile Dependence* - Locate buildings to provide access to public transportation, bicycle paths and walking access to basic services
- *Ensure Consistent Neighborhood Design* - Relate the form of the site design and its architectural design of its buildings to those neighboring residential communities and commercial and public buildings.
- *Create Neighborhood Greens* - Greens, squares and parks are distributed and designed as specialized places for social activity and recreation in a community.



## *Site Scale*

- *Promote Conservation or Open Space Design* - Promote conservation or open space design to maximize preservation of existing natural areas, provide community open space and reduce the percentage of impervious surface.
- *Carefully Assess Site Conditions* - Collect information about existing features and conditions so that potential impacts from development can be understood and examined throughout the development process. This includes an assessment of natural features, built environment and the project's impact on the character of the surrounding area.
- *Utilize the Land's Potential* - Preserve the lands existing view sheds, solar access, natural drainage, natural vegetation, and prevailing winds.
- *Protect and Restore Valuable Site Features* - Preservation of valuable site features, including natural resources and historical and/or cultural resources is critical to the site design. Quality design, minimizing construction impacts, and restoring degraded areas are essential elements to the protection and restoration of key site features.
- *Reduce Street Imperviousness* - Design residential streets for the minimum required pavement width needed to support travel lanes, on street parking and emergency maintenance and service vehicle access.
- *Promote Reduced Buildable Areas* - Contain the development and promote a contiguous open space by reducing front and side yard setbacks, roadways and impervious cover, and buliding envelopes.
- *Utilize Low Impact Development Technology* - Utilize bioretention areas to manage stormwater to protect water quality and peak volume.
- *Minimize Clearing and Grading Practices* - Reduce all clearing and grading activities to conserve natural vegetation, slopes, trees and living resource habitats. Integrate these natural features into the design of the site.

## *Building Scale*

- *Locate Homes Strategically* - Locate homes and other buildings to take advantage of passive solar heating, daylighting and natural cooling. In addition, utilize existing on-lot vegetation to reduce cooling loads and help manage stormwater.
- *On-lot Water Management* - Design on-site water management systems for individual landscapes to absorb and filter stormwater.
- *Use Building Materials to Conserve Energy* - Utilize a high level of insulation, high performance windows and tight construction.
- *Promote Alternative Energy Sources* - Research and incorporate, when feasible, alternative energy systems (i.e., geothermal, wind, solar, etc.)
- *Promote Flexible Design Standards* - Use flexible design standards that promote a

Town Planning Collaborative, Traditional Neighborhood Design, TND Series, Vol. 1 1997

# Spring Township Land Conservation Ordinance

## R-1 Land Conservation: Criteria and Standards R-1

| Permitted Uses | Lot Regulations | | | Building Setback | | | Max Bldg Hgt. | Max. Bldg. Cov. | Max Imper Cov. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | Open Space Prvd. | Liv. Unit Desnity Per Acre | Min. Width | Front | Rear | Side | | | | |
| **Single Family Houses Cluster Option** | 50% | 1.36 | 100' | 35' | 20' | 15' | 35' | 30% | 40% | See Land Conservation Requirements and Septic Options |
| **Single Family Homes Estate Option** | 10% | 0.43 | 150' | 50' | 50' | 30' | 35' | 15% | 20% | See Land Conservation Requirements and Septic Options |
| **Existing Permitted Uses** | | | | | | | | | | |

## R-2 Land Conservation: Criteria and Standards R-2

| Permitted Uses | Lot Regulations | | | Setback | | | Max Bldg Hgt. | Max. Bldg. Cov. | Max Imper Cov. | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| | Open Space Required | Liv. Unit Density Per Acre | Min. Lot Width | Front | Rear | Side | | | | |
| **Single Family Houses** | 50%<br>40%<br>30%<br>20%<br>10%<br>0% | 2.82<br>2.77<br>2.72<br>2.67<br>2.62<br>1.48 | 75' at building setback line, 50' at street line | 25'<br>35' | 20'<br>30' | 10'<br>15' | 30' | 30% | 40% | Garage Setbac 10' minimum from front of house |
| **Duplex Triplex Quadplex** | Same as Above | Same as Above | 100' | 25' | 20' | 15' | 30' | 30% | 40% | Minimum Distance between buildings -- 20' |
| **Patio** | Same as Above | Same as Above | 50' | 20' | 20' | 0'-15' | 30' | 40% | 50% | |
| **Townhouse** | Same as Above | Same as Above | Function of Unit Design | 30' | 25' | 15' | 30' | 30% | 40% | Minimum Distance between buildings -- 25' |
| **Apartments** | Same as Above | Same as Above | Function of Unit Design | 30' | 25' | 15' | 45' | 30% | 40% | Minimum Distance between buildings<br>20' 1-2 Story Building<br>30' 3 Story Building<br>40' 4 Story Building |
| | | **Min. Lot Size** | | | | | | | | |
| **Child Day Care Centers** | | 1 Acre | Function of Unit Design | 50' | 30' | 20' | 35' | 25% | 40% | |
| **Churchs & Other Places of Worship, Parish House and Convents** | | 2 Acres | Function of Unit Design | 50' | 75' | 30' | 35' | 30% | 50% | |
| **Farm Use, Golf Cours, C.C.** | | 10 Acres | Function of Unit Design | 50' | 100' | 30' | 35' | 10% | 20% | |
| **Public Nursery, Kindergarten, Elementary & Secondary Schools** | | 1 Acre | Function of Unit Design | 50' | 75' | 30' | 35' | 30% | 40% | |

# Pre-Charette Agenda

**Site Planning Demonstration Project**
**Pre-Charette**
***December 21, 1998***
**National Aquarium at Baltimore**

*Pre-Charette Objectives:*
1) To identify specific sustainable site planning guidelines that can be used to develop a sustainable site plan. Such guidelines may include mix of housing types, width of streets, setback standards, conservation practices;
2) To consider specific site planning design concepts that could be included in sustainable site plans; for instance, traditional neighborhood development or conservation design techniques.

*Anticipated Pre-Charette Outcomes:*
A set of site planning guidelines and design concepts that could be utilized to prepare sketch sustainable site plans for use during a charette in Spring Township.

**Agenda**

**9:15 a.m.** **Welcome and Introductions**
In addition to the introductions, a short presentation of the goals of the Site Planning Demonstration Project and the pre-charette will be made.

**9:30 a.m.** **Sustainable Site Planning Options**
Randall Arendt, Natural Lands Trust, will highlight sustainable site planning practices, describe the benefits of these practices and demonstrate their use through case study examples.

**10:15 a.m.** **Site Characterization, Regulatory Analysis and Market Opportunities**
Understanding the site and its surroundings, as well as regulatory issues and market opportunities, is critical if participants of the charette are to develop sustainable site planning concepts. During this agenda period, a characterization of the site and its surroundings will be provided to participants.

- Landstudies, Inc: A visual characterization of the site and its surroundings including a description of any physical constraints to sustainable development. (35 minutes)
- Dan Sloan of McGuire, Woods, Battle, and Boothe: Potential regulatory barriers to innovative site design. (20 minutes)
- Carl Barkert, S&A Homes: A description of market issues and how they may influence a sustainable site design. (20 minutes)

**11:30** **Break-out Session**
The morning break-out session will focus on regional and neighborhood issues as they pertain to developing a sustainable site plan. Issues to consider during this discussion include evaluating regional transportation opportunities, considering a mix of land use and housing types, and consistent development design.

**12:30 p.m.** **Lunch**

**1:30 p.m.** **Continue Break-outs**
If necessary, time to conclude discussions from the morning break-out will be provided. However, the afternoon session will primarily focus on sustainable guidelines and design techniques that *could* be used on the site, including "green" structural approaches.

**3:00 p.m.** **Group Presentations**
Each group will present their sustainable site planning guidelines and design concepts that could be considered for this project.

**4:00 p.m.** **Concluding General Discussion**

**4:30 p.m.** **Adjourn**
All Participants are guests of the Aquarium for the day and are encouraged to visit the exhibitions during lunch or after the meeting.

**GROUP LISTS**

| Discipline | Group 1 | Group 2 | Group 3 |
|---|---|---|---|
| *Community Representative* | William McMath*, Spring Township | Roxanne Sheils, Spring Creek Committee | John Bies, Centre County Planning Office |
| *Landscape Architect* | Ken Tanninga, PSU | Tom Comita*, Thomas Comitta Associates | Kelly Gutshall*, LandStudies, Inc |
| *Architect/Green Building* | Ralph Bennett, UMD and/or Mark Bundy*, MD DNR | Julie Gabrielli*, Gabrielli Architecture | Martin Kimmel*, PA AIA |
| *Planner/Attorney* | Dan Sloan*, McGuire, Woods, Battle and Boothe | Jim Noonan*, MD Office of Planning | Randall Arendt*, Natural Lands Trust |
| *Developer* | Bob McNamara, National Home Builders Association | Carl Barkert*, S&A Homes | Bob Kauffman*, Michael T. Rose Company |
| *Economist/Economic Development* | Beth Hickey*, Environmental Finance Center | Lori Lynch*, UMD | Ken Johnson*, PA DCED |
| *Natural Resource Expert* | Larry Coffman*, Prince Georges County | Brian Auman*, LandStudies, Inc. | Rick Cooksey*, U.S. Forest Service/CBPO |
| *Facilitators* | Dave O'Neill*, Center for Chesapeake Communities | Rich Collins , Institute for Environmental Negotiations, UVA | Frank Dukes*, Institute for Environmental Negotiations, UVA |

* - Confirmed Group Participants

# Spring Creek Watershed Design Charette

## Sustainable Site Planning for the Spring Creek Watershed
### *A Design Charette*

**Charrette Objectives:** To learn about the fundamental principles of sustainable site planning and to lend your voice to the preparation of a "model" sustainable site plan for use throughout the Spring Creek watershed.

**Who Should Attend**: Spring Creek Watershed Commission members, planners, engineers, and managers, non-profit organization representatives, realtors, developers and the academic community.

**When: Thursday, April 29, 1999**

**Where:** Afternoon Session - Spring Township Building.
Site Visit - Central PA Institute of Science and Technology (Formerly Centre Co. Vo-Tech)
Evening Session - Central PA Institute of

### *Charrette Agenda*

*April 29*, 1999

**Afternoon Session**

*12:00pm* **Site Characterizations for Sustainable Design -** Representatives of LandStudies, Inc and Spring Township will describe how a comprehensive site characterization is completed using a real parcel in Spring Township. This program topic is targeted for township staff, land use and engineering professionals. Lunch will be provided.

*2:00* **Principles of Sustainable Site Planning and Design for the Professional -** Randall Arendt will take professional planners, engineers and township staff through a site design technique process. This exercise will help familiarize professionals with the "how to" information necessary to utilize and/or promote innovative site design.

*4:00* **Site Visit -** To illustrate the characterization process and complement the evening program, LandStudies, Inc. and Spring Township representatives will provide a site tour for professionals, interested public and elected officials. (Starts at the Township Bldg.)

**Evening Session**

*5:00* **Light Supper, Introductions and Presentation -** Join us a light supper and a presentation. Randall Arendt, Natural Lands Trust, will present the latest in sustainable site planning techniques.

*6:30* **Project Overview -** LandStudies Inc. will present an overview of the site planning demonstration project, a brief site characterization and sketch plans of sustainable site plan of the demonstration site.

*7:00* **Break-Out Session -** During facilitated break-out group discussions, participants will be asked to lend their input to the preparation of a "model" sustainable site plan. The Institute for Environmental Negotiations and local officials will facilitate the break-out sessions.

*8:30* **Summation of Break-out Groups -** Each group will make a brief summary of their thoughts and comments.

*9:00pm* **Adjourn**

**Sponsored By:** Spring Creek Watershed Commission, Spring Township, Centre County Planning, Center for Chesapeake Communities, LandStudies, Inc and the Chesapeake Bay Program.

**Registration:** For more information or to register for the Charrette, please call the Centre County Planning Office at 814.355.6791, no later than April 23, 1999. Directions to meeting locations attached.

**Appendix F**

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*Water in the Nittany Valley*, IV. The Role of Climate, August 1, 1996
Robert F Schmalz PhD

*Water Resources and Hyrogeology of the Centre Region*. A Non Technical Summary
August 1, 1996, Robert F. Schmalz, PhD

## Appendix G

# Links

| Organization/Agency/Community | World Wide Web Address | Phone |
|---|---|---|
| American Farmland Trust | www.farmland.org | 202-331-7300 |
| American Institute of Architects - Center for Livable Communities | www.e-architect.com | 202-626-7406 |
| American Planning Association | www.planning.org | 312-431-9100 |
| Bank of America - Environmental Programs | www.bankamerica.com/environment | 650-615-4700 |
| Center for Livable Communities | www.lgc.org/clc | 800-290-8202 |
| Center for Neighborhood Technology | www.cnt.org | 773-278-4800 |
| Chesapeake Bay Foundation | www.chesapeake@cbf.org | 410-268-7742 |
| Chesapeake Bay Program | www.chesapeakebay.net | 800-your-bay |
| Congress for the New Urbanism | www.cnu.org | 415-495-2255 |
| The Conservation Fund | www.conservationfund.org | 703-525-6300 |
| U.S. Environmental Protection Agency | www.epa.gov | 202-260-4048 |
| International City/County Management Association | www.icma.org | 202-289-4262 |
| LandStudies, Inc. | www.landstudies.com | 814-353-0377 |
| Local Government Commission | www.lgc.org | 916-448-1198 |
| Natural Lands Trust | | 610-353-5587 |
| National Association of Counties | www.naco.org | 202-393-6226 |
| National Association of Home Builders | www.nahb.com | 800-368-5242 |
| National Association of Local Government Environmental Professionals | www.nalgep.org | 202-638-6254 |
| National Trust for Historic Preservation | www.nthp.org | 202-588-6000 |
| Pennsylvania Department of Environmental Protection | www.dep.state.pa.us | 717-772-4018 |
| Smart Growth Network | www.smartgrowth.org | 202-260-2750 |
| State of Maryland - Smart Growth and Neighborhood Conservation | www.op.state.md.us/smartgrowth/index.html | 410-260-8112 |
| Surface Transportation Policy Project | www.transact.org | 202-466-2636 |
| Sustainable Communities Network | www.sustainable.org | |
| The Trust for Public Land | www.tpl.org | 415-495-4014 |
| U.S. Conference of Mayors and National Association of Counties Joint Center for Sustainable Communities | www.usmayors.org/USCM/sustainable/ | 202-861-6773 |
| Urban Land Institute | www.uli.org | 202-624-7000 |

**Source:**
Sustainability Resource Guide 1999

# Contents

# Summary

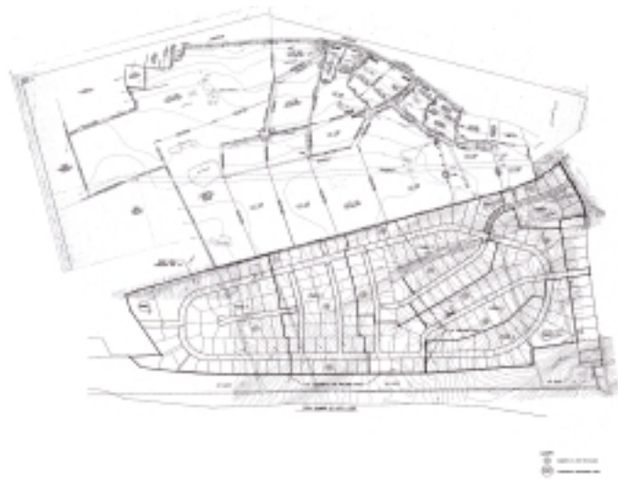
## The Project

Efforts to preserve the Cheseapeake Bay have targeted sprawl as a primary threat to the health of the watershed. The Site Planning Demonstration Project was proposed to provide a living example of sustainable development in the Cheasapeake Bay watershed. This project would demonstrate how land development can balance economic, environmental, and quality of life objectives simultaneously. Funded through grants made by the U.S. EPA and the Cheseapeake Bay Program, and coordinated by the staff at the Center for Chesapeake Communities (CCC); a land planner was selected, LandStudies, Inc., to develop plans which compare conventional development and sustainable development alternatives of a typical site in central Pennsylvania.

## The Report

This report summarizes the process and findings associated with the Site Planning Demonstration Project. The report is organized to allow the reader to understand the site and the process used as a model for developers and municipalities.

**The Community** - Spring Township and their current efforts to preserve open space
**The Process** - that used for the Site Planning Demonstration Project
**A Comparison** - conventional verses sustainable development processes and concepts
**Lessons Learned** - methods of promoting and implementing sustainable design
**Reference** - educational resources



**Conventional Development**

**verses**

**Sustainable Development**

## The Issue

One of the greatest challenges facing this prosperous country is uncontroled development .....sprawl. A new approach is necessary which balances growth while preserving the quality of life and natural environment we cherish. Americans consider “the rate at which land is being developed and places in nature....being lost” as one of the most serious environmental problems in the country. (Beldon & Russonello and R/S/M) Alternative methods of condensing development and preserving open space to slow this increasingly urgent threat are necessary. *Every 3 minutes 10000 acres of open space is being changed forever. (Need stat)* For this reason alternative methods of development, which can be understood and easily applied in a timely manner, are critical.

## What was Learned

The biggest lesson learned from this project was that current zoning constraints and a linear planning and design process are the fundamental forces that drive current development. If we are to change current trends in land development and work toward a sustainable future, we must first address the force behind how land is developed.

From the model and process presented, community leaders and developers throughout the watershed can:

1. Mimic the interactive planning process
2. Incorporate the principles into comprehensive plans
3. Allow flexibility in codes and ordinances
4. Encourage elements of sustainable design

***As with many communities throughout the Chesapeake watershed, Spring Township has found that the existing process and their current zoning requirements are not resulting in developments which benefit the community outside of an increased tax base. Sprawl is devouring farmland along with the rural character so important to its residents. If Township's want to foster a sustainable attitude toward development, now is the time to lay the foundation for the future. The following is what has been implemented in Spring Township to preserve open space.***

# A Community's Response - Spring Township Case Study

### Public Input

The first step was to receive input from residents in the form of a public opinion survey. The results of the survey made it clear that the residents want alternatives to existing patterns of growth (77% of respondents) and see the need to preserve open space and rural character (93% of respondents).

### Mapping

The second step was to develop maps of the Township in relationship to the region to develop an understanding of the large scale influences. These maps identify unique features, patterns, and conservation areas within the Township and ultimately the resulting primary and secondary conservation areas. These conservation areas are those which *must* (primary) be preserved and those which are *recommended* (secondary) to be preserved. Once these maps are completed, they give the review body a tool to foresee and preserve potential open space links, corridors and sensitive land areas by just having them compiled and available as public reference.

### Ordinance

A model Land Conservation Ordinance (see appendix) currently being developed will utilize these maps as a key to encouragine innovative site design and the preservation of open space. A key aspect of this new ordinance is that it will provide flexibility and bonuses for open space preservation. The ordinance will be further refined as the Site Planning Demonstration Project advances. Ideas and thoughts from participants of the charrette are already being considered. Flexibility in development phasing and a maximum density at build-out are two examples.

### Collaboration

The key component of the proposed zoning ordinance improvements is the Township's committment to working with land owner's, developers and designers early and often in the development process. Developer's and land owners are encouraged to meet with Township officials at informal meetings to discuss ideas and stakeholders needs, similar to the process described in this report. The Township sees this as an opportunity to expedite the review process while protecting the communities interests in an informal and less adversary setting.

### Intended Results of the Model Ordinance

1. Improve the overall land use development process
2. Encourage sustainable development rather than resource-consumptive development that is dominating the region today;
3. Promote collaborative processes so that environmentalists, citizens, developers and others have a say in the land use process.
4. Serve as a model to the communities in the Spring Creek Watershed so that they to can develop in a manner that will protect the natural resources of Spring Creek, promote economic development and preserve the character of the region.

*"Local governments in the Chesapeake Bay watershed provide unique contributions and resources to the protection of the Bay and will contribute even more given the tools to do so"*

David O'Neill
Center for Chesapeake Communities

***In order to achieve smart growth and sustainable development objectives in the Chesapeake Bay region, we must have on the books, and in-the-ground, examples of innovative sustainable development policies and practices that local governments and the development and financial community can embrace. These sustainable policies and practices must demonstrate their economic, environmental and quality of life benefits to each of these diverse stakeholder groups in order to be successful.***

---

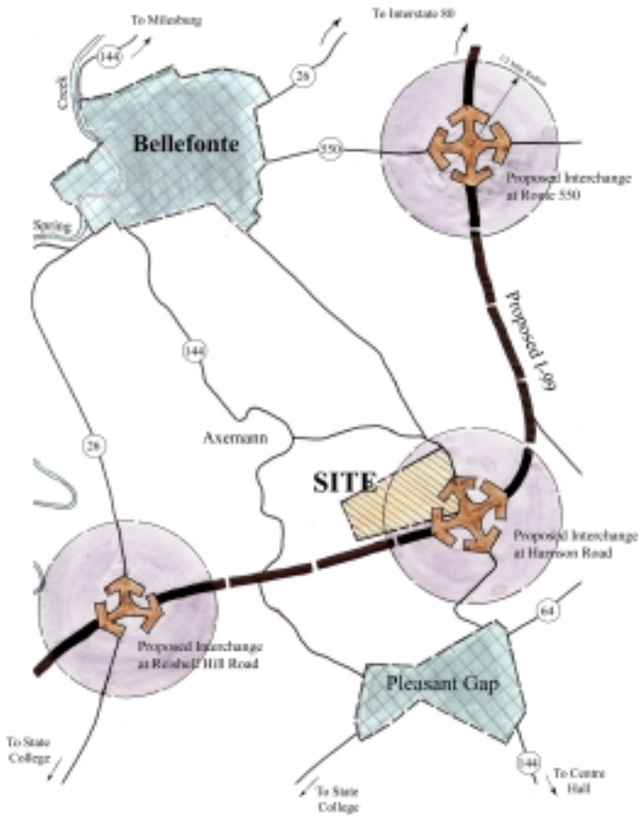
# Project Goals

The Site Planning Demonstration Project's goal was to create a living example of sustainable development in the Chesapeake Bay watershed that demonstrates how development can achieve economic, environmental and quality of life objectives simulaneously. The objectives of the project were to:

- educate the public and private sector with respect to the principles of sustainable site planning and development;
- show local governments, developers, and others, that sustainable development projects can be successful; and,
- outline a process that can help other communities implement policies/ordinances that encourage sustainable site planning.

To achieve these goals, the Center for Chesapeake Communities (CCC) and its project partners selected a parcel of land in the Chesapeake Bay watershed and applied both conventional site planning approaches (status quo) and sustainable site planning approaches to the site. Various site planning scenarios were used to demonstrate that principles of sustainable development can be used to acheive economic, environmental and quality of life objectives simultaneously.

The following report outlines the challenge of protecting the environment in light of growth pressure; characterizes the site planning demonstration project process; lists the project's sustainable site planning principles; compares conventional vs. sustainable development approaches; and demonstrates how communities can achieve sustainable development objectives. The report concludes with a list of outcomes and lessons learned that will help local governments and the development community achieve their goals of sustainability.



***One of the greatest threats to the long-term health and prosperity of the Chesapeake Bay and its communities is ill-managed, resource consumptive, growth and development. It is now broadly recognized that rapid residential and commercial growth threatens the progress made to restore the Bay's ecosystem and can compromise the heritage, values and economies of its communities. Yet, it is also recognized that, at a relatively rapid pace, residential and commercial development will continue throughout the Chesapeake Bay watershed.***

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# Addressing the Land Use Challenge

Growth in the Chesapeake Bay watershed is inevitable. The population in the Bay region is predicted to reach nearly 17 million by 2010 - an increase of 10 percent since 1997. But population growth is only part of the story. A combination of factors have contributed to the watershed's current pattern of development. For instance, the average size of a household has decreased in size while the average size of a housing lot has increased. In Maryland the average lot size has increased by 50 percent in less than 10 years. Since more people are moving into the watershed and many of the people in the Bay region are moving away from traditional population centers such as cities and towns, the overall number of new homes being built is on the rise. Between 1960 and 1990, the population of Pennsylvania's largest metropolitan areas grew by 13 percent, but the developed land area in these areas grew by 81 percent — illustrating the resource consumptive land use trend.

The result of these patterns of growth on the environment is that forest and farmlands, wetlands and habitat corridors are being consumed rapidly. Accompanying the growth is greater expanses of impervious surface (roads, roof tops, driveways, ect.) that increase the amount of polluted runoff that enters streams, lakes and rivers of the Bay's watershed. More impervious surfacealso reduces the recharge of important underwater streams and aquifers. Ultimately, these patterns of growth affect the health of the local environment and the long-term health of the Chesapeake Bay.

The challenge facing environmentalists today revolve around land use issues. Unfortunately, the solutions to this challenge are extremely complicated. The market, consumer preferences, government policies, and other issues control where and how development occurs. For the past 50 years, local government land use policies, including single-use zoning, have actually encouraged sprawl patterns of growth. Federal, state and local subsidies have encouraged these patterns further.

To change these "institutionalized" polices and therefore combat current patterns of growth, models that demonstrate that there are better approaches to growth are necessary. These models provide assurances to public officials, the development community and financial interests that innovative and sustainable development can indeed be successful. The Site Planning Demonstration Project was initiated to provide such a model.

***Two elements of the Site Planning demonstration project distinguish it from traditional planning processes. First, the entire process was a collaborative effort among a broad selection of interest groups that are often not part of the development of a community's comprehensive plans or a developer's site planning efforts. Second, as a result of this public participation process, a set of principles were established to guide the site designs to meet the needs and goals of the Township, a local developer, and the health and protection of the Bay watershed.***

# Site Planning Demonstration Project - The Process

## Advisory Team Meetings

Goal: Determine project objectives and select project consultant

To effectively identify key objectives and address community development issues, the CCC first formed an advisory team that brought together local, state and federal government representatives, developers, consultants and members of the academic community. This group was responsible for determining the project objectives, selection of the site on which sustainable site planning principles would be applied, and selection of the project consultant.

The Team first selected a parcel of land in Spring Township, Centre County, Pennsylvania. The 130-acre parcel was planned for development and located adjacent to a future Interstate 99 interchange.

Meeting several times in the fall of 1998, the Advisory Team then initiated a list of guidelines that describe measures of sustainability. This list was used to help facilitate future design charrette discussions. CCC staff also consulted with Spring Township and Spring Creek Watershed Commission to ensure that these guidelines were consistent with local land use, economic and environmental objectives.

In developing guidelines to direct the site planning work, the Team concluded that regional planning was crucial in a community's efforts to prevent sprawl and protect water quality. The Team also acknowledged that while the site chosen is not located in an ideal location, within walking distance of public transportation or directly adjacent to an existing town or city, the site does reflect the current growth and rural development trends occurring in Centre County and throughout the Chesapeake watershed. Many rural communities, Spring Township included, target designated growth areas at major highway interchanges.

### Site Selection Criteria

1) The region is under great development pressure;

2) it is within a smart growth node at a future inter change of Interstate 99;

3) it is typical of the farmland development occurring throughout rural areas of the Chesapeake drainage area;

4) an intermunicipal effort to protect the local watershed was well under way; and

5) there was tremendous political support through-out the region for the project.

## Technical Team Pre-Charrette

Goal: Identify site planning principles

The pre-Charrette event, held on December 21, 1998 at the Baltimore National Aquarium, brought together a second group - The Technical Team. This meeting sought input and involvement from land use and site planning experts, the development community, natural resource specialists, local government and community representatives in the development of a model sustainable site plan. Representing the second phase in the process, the pre-Charrette provided an opportunity to refine the Advisory Team's guidelines into a draft of sustainable development principles and an initial list of specific site design concepts for the 130 acre site in Spring Township.

The suggestions, guidelines and design concepts generated by Technical Team participants were used to develop sketch sustainable site plans. The pre-charrette included a general presentation on sustainable site planning, a characterization of the selected site, and an overview of the Township's current regulations. The second half of the pre-charrette was dedicated to obtaining the input of the Technical Team members in the development of principles and specific design concepts.

## Core Design Team Meetings

Goal: Develop project parameters and reach a consensus on priorities

The third phase included meetings of the core design team, which included representatives from Spring Township, S & A Homes, LandStudies, Inc. and the Center for Chesapeake Communities. The team identified specific design parameters that further refined the principles. The result of these steps established a set of principles that guided the development of the model site plans. The principles were developed in order to consider community, environmental and economic objectives in the context of the region, neighborhood, site and building scales. Consideration of each of these scales is critical to successfully developing a sustainable site plan and development approach. Accordingly, the principles were organized into the following four categories: Regional Scale, Neighborhood Scale, Site Scale, and the Building Scale.

## Spring Creek Watershed Interests

Goal: Local public input and feasibility of ideas

The Spring Creek Watershed Charrette, held March 12, 1999 in Spring Township, was the final opportunity to receive local public input and provide the opportunity for discussions on the feasibility of the site planning process and scenarios developed for the Spring Township parcel. The Charrette provided participants, who included local planning and engineering professionals and local government staff and members of the Spring Creek Watershed Commission, information on the fundamental principles of sustainable site planning and asked for their input on the site planning process proposed. Later in the day, the community was asked to determine the political feasibility of the principles and the site planning scenarios.

The day's event concluded with a general discussion about the value of sustainable site planning in the region and the Spring Township design scenarios specifically. Both the land use planning professionals and public officials agreed that the sustainable site planning approaches presented were valuable and necessary for mitigating the impacts of development on natural resources in the Spring Creek watershed. Moreover, participants felt that the sustainable design approaches presented were feasible for implementation in their community.

***Few members of the general public have ever made the mental connection between their diminishing sense of place and the land-use regulations that govern growth in their communities. Still fewer realize that the, conversion of farmland and woods to an unrelenting blanket of houselots is not inevitable it is really a matter of choice."***

Randall Arendt, Rural by Design

# Conventional verses Sustainable Approaches

Pennsylvania's historical patterns of growth emulate those throughout the Chesapeake drainage basin. "Once a patchwork of cities and boroughs surrounded by rural, usually agricultural, townships, Pennsylvania has transformed itself as its people have altered their attitudes toward the land and its use." *(PA 21st Century Environmental Commission)*. For this reason, most of the sprawl related problems facing Pennsylvania are also found throughout the Chesapeake Bay watershed. To prepare a transferable model, it was essential to select a parcel of land in the Chesapeake Bay watershed that met several important criteria including: the parcel is planned for development and, has similar characteristics to the majority of land under development.

With 2,571 municipalities in Pennsylvania, land use decisions are made on a very local scale and individualized manner. Answers to sprawl which involve massive ordinances and cumbersome reviews can only be considered in the wealthier and more sophisticated municipalities -- typically those closer to affluent urban centers. These ordinances are often a response to a history of uncontrolled development when the municipality is approaching built-out. This leaves the majority of land within the watershed, the rural agricultural communities on the frontier of growth grappling for less complex answers.

## Conventional Development

In an effort to address these issues, we first looked at the conventional development process typical of Pennsylvania. Some generalizations are made as to how each step of the process ultimately relates to the final product. Then, using the demonstration project site, we describe components of the design and analyze the "by-right" plan with respect to sustainability.

## Sustainable Development

The proposed sustainable development process is in response to the needs of the rural "frontier" communities. It is a way of looking at current land development and the local government review process to try and find simple answers which respond to the land and community as opposed to each individual site. Through this project, we had the unique opportunity to gain insight and analyze the relationship of the key players of a development team. The resulting process is in response to feedback from these key players, as well as, local citizens, national experts, and government officials at all levels. It is an idealized response and not a perfect answer. The hope though is that this process sheds light on aspects of the current system which deter a collaborative process to development and offers some unique ideas which could be applied at a local level.

*"What will this place require us to do?*
*Permit us to do?*
*Help us to do?"*

Wendell Berry (1992)

*In order to present a viable sustainable alternative, it is important to first understand what influences a typical conventional development process. The following linear approach is a typical process in central Pennsylvania.*

# Conventional Development Process

**Site**

A site is selected which has site and zoning conditions suitable for efficient development with a marketable housing type. Favorable site conditions are those with minimal environmental constraints, relatively level terrain, and easy access. Favorable zoning by-right land use requiring the shortest review process.

**Survey/ Base Plan**

A surveyor is then hired to prepare a survey of the parcel boundary. To keep costs to a minimum a USGS datum topography is applied to a survey to begin feasibility studies.

**Sketch Plan**

The surveyor/engineer sometimes prepares a sketch plan to determine the number of lots the site will yield based on the "by-right" zoning requirements and minimum lot size. The configuration of the layout is efficiency oriented and a function of roadway circulation and the minimum width and depth of each lot as specified in the ordinance.

**Municipal Review**

Ideally, the sketch plan is reviewed at this stage by the local municipality. This is the first time members of the local government will see the proposed plan for a property. In many municipalities, this initial sketch plan review is not required. It is at this point that an adversary relationship begins to develop between the developer and the reviewing body. The developer has already spent a great deal of time and energy determining what is in the developments best interest while the municipality is left with compromising to "band-aid" fix the plan to meet their overall vision for the community.

**Construction Documentation**

Unless there are inherent violations to the existing zoning ordinance, most sketch plans are approved with minor revisions. With tentative sketch plan approval, the developer/builder moves ahead with preparing plans in accordance with the Subdivision and Land development ordinance for review by various municipal and government agencies. This is a complex process which includes plans which show how the developer will build the site, where the houses will be located, how the utilities will be provided, how roadways and stormwater facilities are constructed, what will be done to respond to various regulations regarding earth disturbance, stormwater management, environmental impacts, etc. It is during this submission process that a lack of foresight in the sketch plan creates a snowball effect in which detail oriented compromises and decisions takes precedence over the overall design of the development.

**Construction**

This is the phase where budget and schedule drives the design decisions. Lack of foresight and planning can result in unbuildable lots, as well as, a loss of character and natural resources so vital to the community. For example, if the geology of the site is not well documented, shallow bedrock or sinkholes will increase costs and could result in unbuildable lots.

**Finished Homes**

A successful finished product is one that sells on the short term.....and is what the community has to live with for generations.

*The following is a description and analysis of a plan prepared for the site using the conventional subdivision design approach. A local engineering firm used "by-right" zoning and a 10,000 sf. minimum lot size to subdivide the site in an effort to achieve the highest yield. This plan was used for "sketch plan" review by the planning commission. The "Features" of this development are listed below along with an analysis of its sustainability.*

# Conventional Approach - Concept Plan A

## Features

**Lots**
- all lots are easily accessible from the roadway

**Circulation**
- a loop road system is proposed for efficient yield
- vehicular access located at the logical locations

**Stormwater Management**
- detention basins are located at low points on the
- site inlet/storm sewer system is proposed to convey all run-off to the detention basins

**Open Space**
- detention basins unbuildable land and only requested by the Township
- hedgerow preservation is hit or miss depending on the lot configuration
- 10' path system requested by the Township

## Sustainability Analysis

The plan is auto dependent in which the future park and greenway are shown to be accessed by roads

The majority of the 10% open space includes stormwater management basins as "usable" open space.

High up-front infrastructure costs including the storm sewer system, curbs and roadways.

The plan does not allow for self sufficient phasing.

Yield will be reduced if shallow bedrock conditions make a lot unbuildable.

Reduced groundwater recharge and changes in the pre-development hydrologic conditions are proposed since most of the stormwater will be conveyed via a sewer system.

Concentrated storage of water in traditional detention basins increase the risk of sinkhole development.

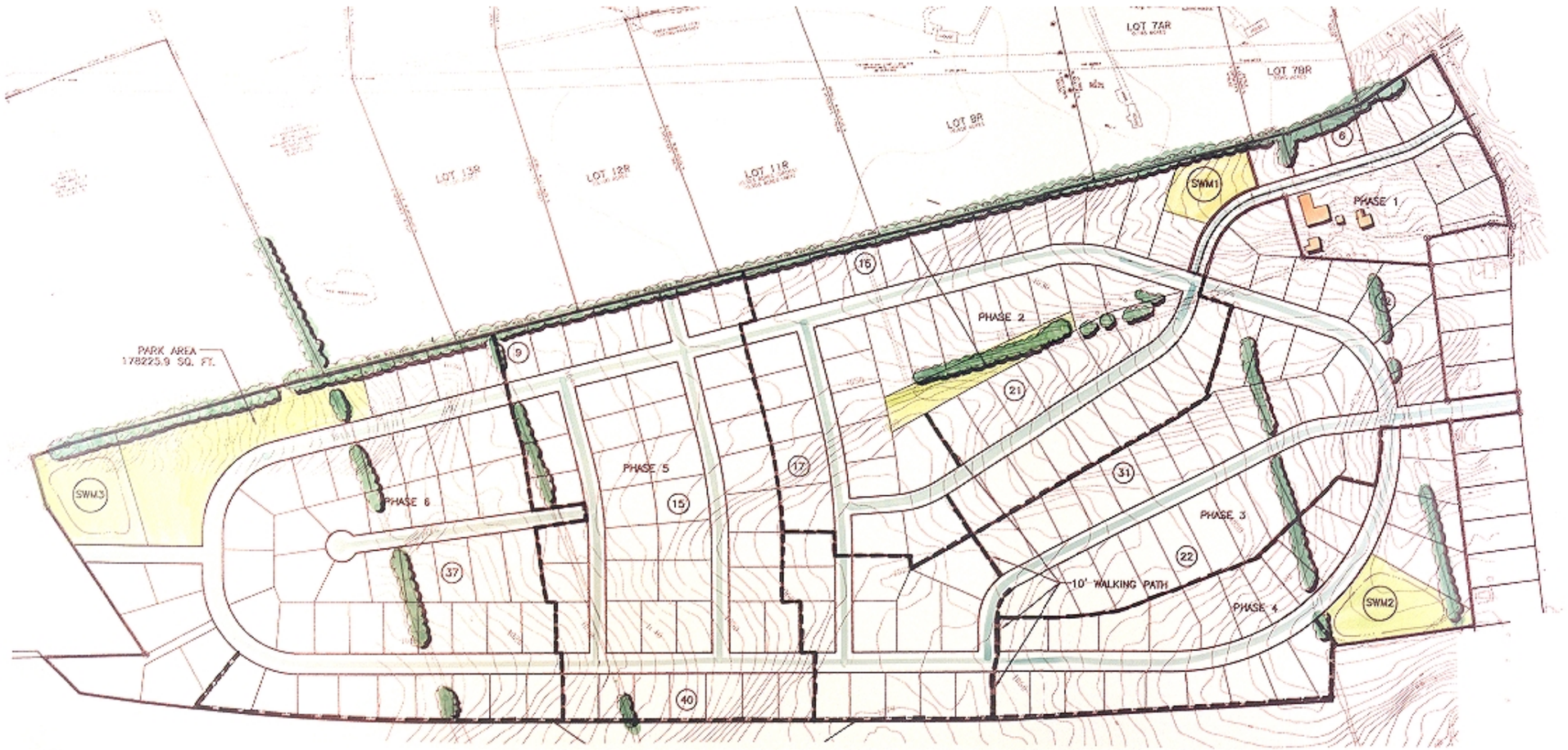
The layout provides no sense of community or unique sense of place.

The placement of homes and open space does not preserve viewsheds altering the rural character viewsheds from Harrison Road and I-99.

## Site Data

| | |
|---|---|
| **Site Acreage** | 123 Acres (approx) |
| **Single Family** | 225 units (> 10,000 s.f.) |
| **Total Units** | 225 |
| **Open Space** | 10 % |
| **Density** | 1.83 du/ac |

# Conventional Approach - Concept Plan A



*The challenge in creating a sustainable alternative was balancing the different interests within the development team and responding to the broad needs of the community and watershed. To meet that challenge, we not only compared plans and data, but more importantly, the process used to achieve those results.*

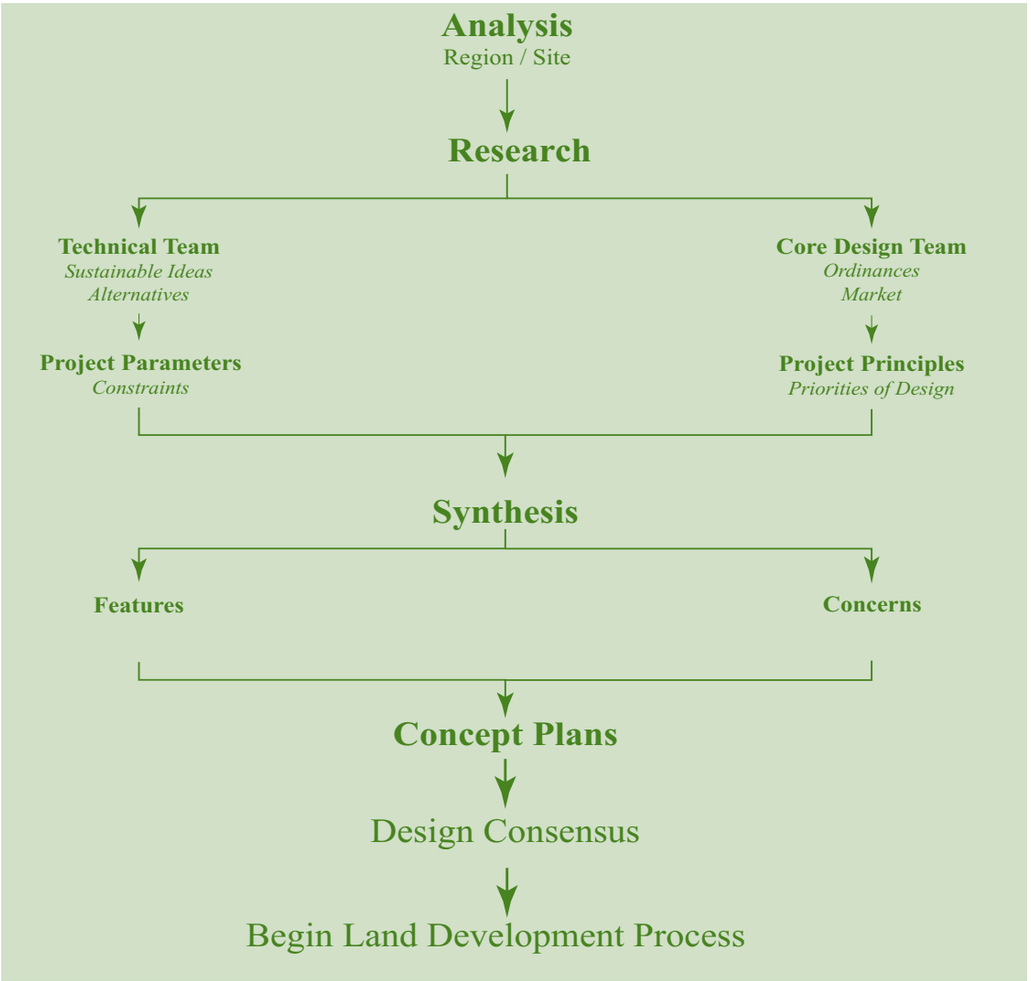
## Sustainable Development Process

To meet the challenge, the following shows what was done to achieve a sustainable site plan for the demonstration project. It was not enough to reduce impervious and lot sizes by laying out an alternative development type (cluster, neo-traditional, TDR's, etc.), adding some stormwater BMP's and label it as "sustainable". The definition of Sustainable had to pervade the site and lifestyle of future homeowners in a viable manner. But, how do we make it viable? How can we make it a way of life? How can we make it profitable and marketable? How can we make it so that the average rural municipality within the watershed can apply the ideas and the average subdivision developer embrace them? Words like "compromise", "collaboration", and "flexibility" were used by both experts and local planning officials as a means to answer some of these questions.

The flowchart on the right illustrates the process used in developing the alternative approach to development for the demonstration project. This process and each of the components are described in more detail on the following pages.

*"Sustainable design is not a reworking of conventional approaches and technologies, but a funamental change in thinking and in ways of operating.....you can't put spots on an elephant and call it a cheetah"*

Carol Franklin
Guiding Principles of Sustainable Design, 1993



***An extensive analysis of the region and site is probably the most important phase of a sustainable development process. This analysis allows the designer and developer to understand how the proposed development relates to the surrounding region and community. The following describes the analysis completed for the site planning demonstration project.***

# Analysis

## Region

In order to understand an individual site, you must understand its context. The region in which the site is located is growing at a dramatic rate. In fact, between 1980 and 1990, the population increased by 13 percent while building permits during the same period increased even more dramatically. The region is representative of similar growth trends throughout the Chesapeake Bay Watershed. In the 21st Century, the rate of growth is expected to accelerate as 50 miles of interstate highway are constructed in Centre County. A portion of the highway will be directly adjacent to the site selected for the demonstration project. Additionally, the parcel is locate at one of eight planned interchanges within the Spring Creek watershed. Each interchange is being targeted for development.

The demonstration site is located approximately 2 miles south of Bellefonte Borough, a vibrant small town with an active commercial center and famed Victorian architecture. Upon completion of I-99, the site will be a 10 minute drive from downtown State College, the home of the Pennsylvania State University. The area is also rich in natural and recreational resources associated with the Ridge and Valley Province physiography of Pennsylvania. The Province is characterized by broad, fertile limestone valleys, high forested ridges drained by productive cold water stream systems. The demonstration site is located within the Logan Branch subwatershed of Spring Creek.

### Regional Influences

Natural Resources
- Geology
- Soils
- Mineral Resources
- Groundwater Resources

Growth and Regional Influences
- History
- Current Trends .
- Economy
- Recreation
- Education/ Arts

Transportation
- Major Roadways
- Rail Transportation
- Air Transportation
- Bus Routes

Agriculture
- Preservation Programs

Public Services

Public Schools

Fire/ Emergency

Recreation and Parks

Public Services
- Schools
- Fire/Emergency
- Park and Recreation

*"...When you build a thing you cannot merely build that thing in isolation, but must also repair the world around it, and within it...then the thing which you make takes its place in the web of nature."*

Christopher Alexander, 1977

*A detailed site analysis allows the designer to prioritize the opportunities/ constraints and develop a framework from which the site design takes shape. For the site demonstration project, layers of information were studied and the special features of the site and inherent constraints were incorporated into the design.*

# Analysis

## Site

### Character

The site is characterized by rolling agricultural fields framed by hedgerows and with mountain views typical of the region.

### Features

The hedgerows and existing barn are the most visual features of the site.

### Topography

The site is gently rollings with an average slope of 5%. Slopes greater then 15% occur in a few small isolated areas of the site.

### Solar Orientation

Southern solar orientation occurs on 75% of the site.

### Hydrology

The majority of the site drains as sheet flow to the low points on the site following defined swales. No wetlands, watercourses or floodplain occur on the site.

### Soils

The soils include Prime Farmland Soils, Class I soil types and Subclass II-E soils. Shallow depth to bedrock is the primary constraint.

### Utilities

The site has access to public sewer, water, electric, telephone, cable and trash/recycling services.

### Access

Access to the site is limited to one point along the eastern property line from a Township road.

### Vegetation

The majority of the site is retired agricultural fields. The trees are limited to the hedgerows which consist of oaks, maples, and mock orange with a shrubby understory.

### Views

Views to the site are framed and limited by the mature hedgerows. Views from the site of Nittany Mountain are very dramatic.

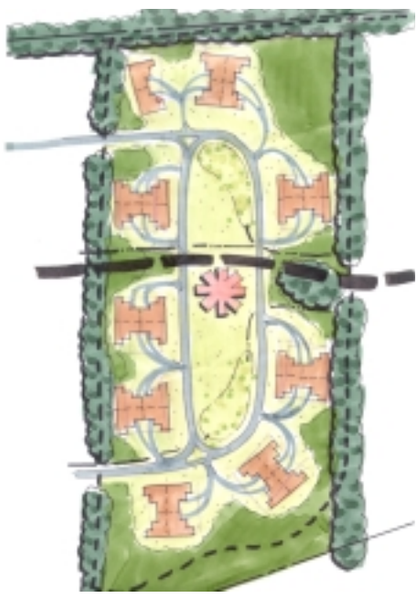
### Geology

The limestone geology, characterized by shallow bedrock and the potential for sinkholes, is typical of the region.

## Transportation Alternatives

*Off-road Walking and Biking Trails*
A grid network of pedestrian and bicycle-friendly pathways faciltitates access to the community core.
*Public Transportation*
A bus stop servicing local towns at the community center provides convenient pedestrian and bicycle access. The transit stop location includes destination uses and services for residents.
*Park and Ride*
The location next to a major interstate highway increases the opportunity for residents to car pool.

## Community Centered

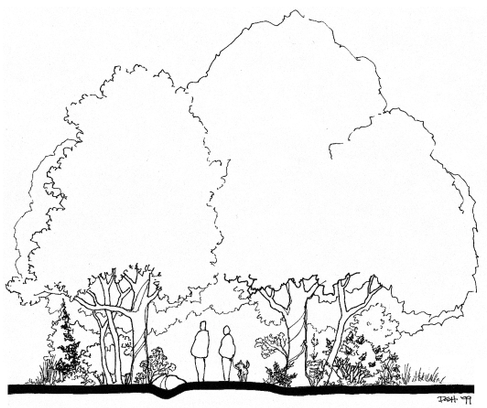


The community links adjacent neighborhoods and is outreaching as opposed to internally oriented. This outreaching community concept relies on a pedestrian Promenade designed to link the proposed development to the surrounding neighborhood.

The framework defines neighborhood “rooms” using hedgerows and the path system as the dividers. Housing types, style and sizes may vary within each room. Various lot sizes and layouts may be explored as part of the interchangeable neighborhood format

## Neighborhood Scale

### Minimize the Automobile



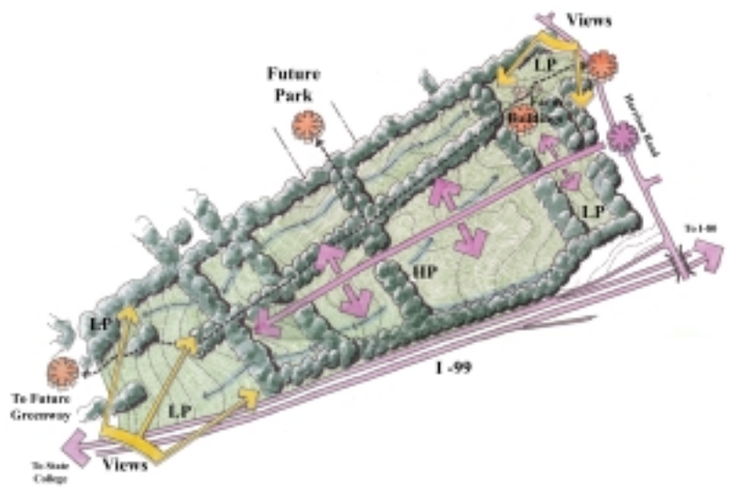
Primary - a “Promenade” is the dominant feature of the site plan. It links all open space, neighborhoods and centers. It is accessible directly from each lot via the path system. The proposed “Promenade” is to be approx. 10' wide of a compacted, pervious surface. Where the “promenade” crosses a roadway, it is prioritized with well defined markings and features to slow vehicles.

Path System - the path system, minimum width of 3', will be located either between the “living yards” of each lot and the natural open space. The path will create a transition between the minimally maintained natural open space communities (meadow, forest, wetland, bio-swale, etc.).

Service - all services requiring truck access will be centralized at the neighborhood center. This includes trash, mail, recycling, etc. Public Transportation -a public bus stop will be located at the Community Center and easily accessible by the “promenade”.

Automobile - the auto is de-emphasized throughout the development. Roadways are narrow (20' max) and as required to access the garage and parking areas for each lot/unit. Parking for each unit (2.5 spaces) is provided within the garage/car port or the driveway. No on-street parking is permitted except as may be required at each of the “centers”.

### Mix of Uses

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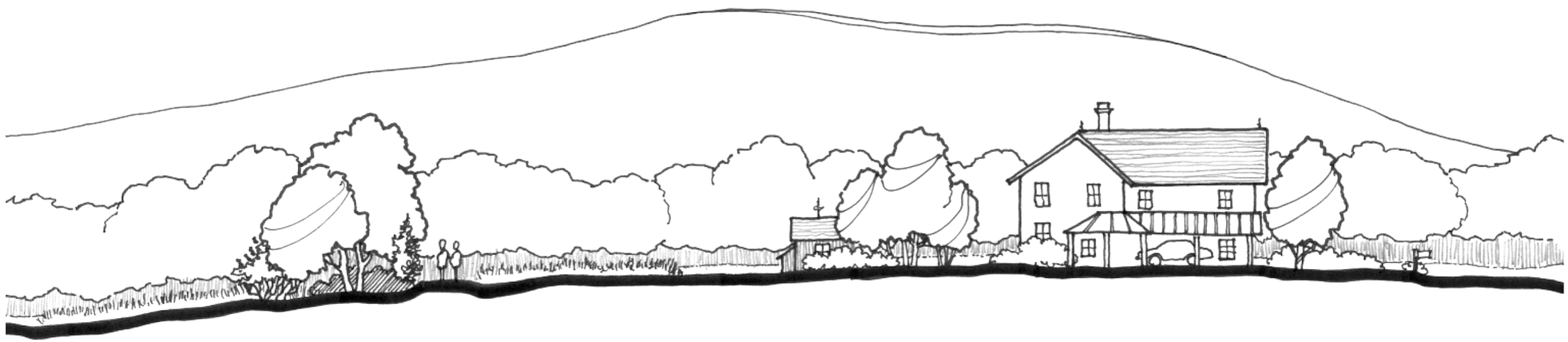
## Create Neighborhood Greens



Central open spaces are a feature of each community and its related neighborhood center. Service and activity centers are destinations easily accessed by the pedestrian walkway system.

Neighborhoods - small neighborhood communities framed by hedgerows, paths and open space are linked to the entire development and community by a well defined pedestrian promenade.

Recreation Center - an active recreation center is provided where the promenade accesses the future Township Park. This center will provide active recreational uses related to the future park.

Neighborhood Centers - each neighborhood has its own "Neighborhood Center" for shared activities (garden plots, activity/meeting space, recycling center, common car washing, mail, etc.). The "center" will reflect the agrarian roots of the region in it's architecture. A windmill will provide a vertical defining feature while providing a potential energy source for the neighborhood.

Community Center - this is the primary center for the community. Features include storage, meeting/occasion rooms, fitness center, day care facility, educational information, sales office, bus stop (varies between schemes), farmer's market, organic farm, youth center, etc.

## Site Scale

### Promote Open Space

The design emphasizes open space linkages and preserves and enhances wildlife corridors using existing hedgerows. Impervious surface is minimized by limiting parking lots, rear alleys and overall dependence on the auto.

### Natural Resource Protection

Low maintenance land management strategies are proposed for open space areas throughout the site including: reforestation, hedgerow establishment, meadows and bioretention areas.

Prioritize regional native plant species planted in endemic patterns to preserve local character of the site.

### Agricultural Elements

*Agrarian elements* - will be used to create the sustainable image for the development and reflect the rural character of its surroundings, including windmills, architectural elements, etc.

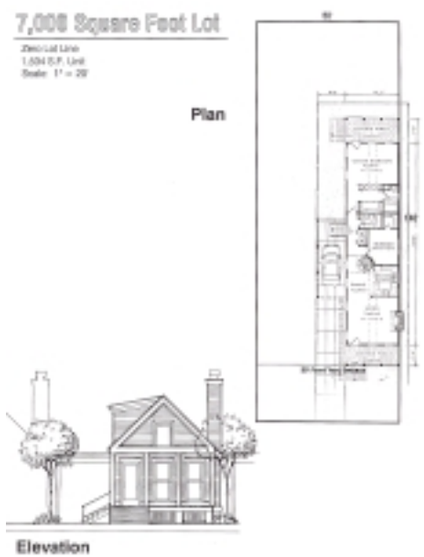
*Neighborhood Gardens* - will be located in central open areas adjacent to the neighborhood center.

*Buffers* - open space buffers are proposed adjacent to agricultural uses

*Views* - rural open space views are preserved and all new development is contained within the hedgerow "rooms"

*Preservation* - the existing house and barn will be preserved and restored to a suitable use for the community.....protecting the existing view from Harrison Road.

## Shallow Setbacks

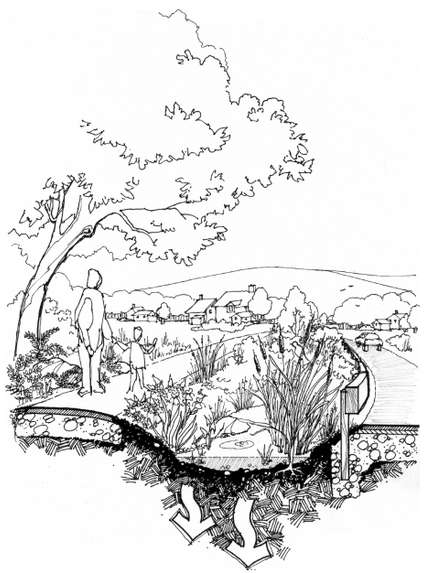



*Sideyards* - 0 lot line layouts to share walls on houses and garages

*Frontyards* - minimal

*Rear "living yards"* - large rear "living yards" front open space and pedestrian corridors

## Low Impact Development Techniques



*Bio-retention* - in green spaces between houses

*Bio-swales* - along hedgerows and main roadways

*Water quality improvement* - wetland stormwater retention areas at low points

*Infiltration at the source* - gutter/downspout recharge

## Street Impervious Reduction

*Width* - 18' (max. 20') wide roadways with splits at pedestrian crossings

*Parking* - parking restricted to driveways

*Efficiency* - shared driveways and fewer cul-de-sacs

## Minimal Clearing and Grading

*Woodland preservation* - all existing trees preserved except at road crossings

*Minimal grading* - layout follows topography

## Energy Conservation

*Wind Energy* - windmills located at neighborhood centers could generate energy for the adjacent homes

*Passive Energy* - layout takes advantage of southern exposure for passive energy gains

*Wind Breaks* - hedgerows protect homes from cold winter winds and shade homes in summer.