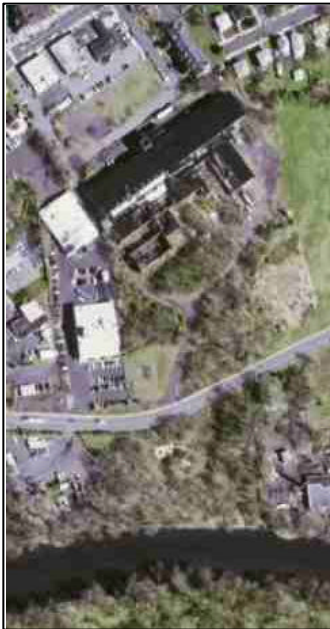

Development, Redevelopment and the Protection of Critical Environmental Areas

Opportunities for Watershed Protection and Economic Growth in
New Jersey's Urban and Suburban Watersheds



New Jersey Water Supply Authority
(under DEP contract # RP01-042)

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Site designs by the Louis Berger Group assisted by Ammann & Whitney

On the Cover

“River Park at Raritan is being constructed on an expansive 15-acre site of historic and economic significance to both Raritan Borough and its surrounding municipalities. The property is that of the former Woolen Mills building, a once-impressive 74,000 square foot structure that employed more than 400 people in the late 1800s. The mill produced uniforms for soldiers during the Civil War and, later, blankets for the American soldiers fighting in the first and second World Wars. The southerly 5-acre portion overlooks the Duke Estate abutting the Raritan River and serves with a pedestrian walkway as a passive recreation area including a children’s tot lot.”

(See: <http://riverparkatraritan.com>)

Table of Contents

Table of Contents	3
List of Maps and Tables	4
Acknowledgements	5
Executive Summary	6
Background	6
Environmental Factors that Protect Water Resources in the Lower Raritan Watershed	10
Methodology to Identify Undeveloped and Underutilized Properties that Contain both Environmental and Economic Value	12
Application of the Results.....	23
Conceptual Site Plan Design Alternatives	25
Conclusions, Lessons Learned and Implications to New Jersey’s Urban and Suburban Watersheds	41
References.....	43
Sources of Financial Assistance	44
New Jersey Department of Environmental Protection	44
New Jersey Redevelopment Authority	45
New Jersey Economic Development Authority	45
New Jersey Commerce, Economic Growth & Tourism Commission	46

List of Maps and Tables

Map 1 a –	2002 Land Use / Land Cover, WMA 9	11
Map 1 b -	Critical Areas of the Lower Raritan River, WMA 9	11
Map 2 –	Somerset Regional Center Study Area	13
Map 3 –	Economic Value Criteria	14
Map 4 –	Critical Areas of the Somerset Regional Center	16
Map 5–	Somerset Regional Center Undeveloped and Underutilized Areas	18
Map 6 –	Recommended Uses for Target Sites	20
Map 7 –	Somerset Regional Center Concept Plan Site Alternatives	22
Map 8 –	Site B Location Map	23
Map 9 –	Site D Location Map	23
	Design Alternatives - Site “B” (Peter’s Brook Site)	30-33
	Design Alternatives – Site “D” (Regional Athletic field Site	34-36
	Conventional Site Build-Out on Site “D”	38
Table A –	Initial Criteria “Brainstormed” by the Millstone Watershed Open Space and Riparian Area Committee	7
Table B –	Undeveloped and Underutilized Sites in the Somerset Regional Center	19
Table C –	Recommended Uses for Undeveloped and Underutilized Sites in the Somerset Regional Center	21

Acknowledgements

We would like to thank the Regional Center Partnership of Somerset County, Inc. for their valuable input, knowledge, and assistance during the course of this project. We would also like to extend our gratitude to the Somerset County Planning Division, especially its Director, Robert P. Bzik, AICP/PP and the Somerset County Park Commission, especially its Director, Raymond A. Brown, AICP/PP for their assistance and support.

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This project is identified in the RARITAN BASIN WMA #8, #9 AND #10 SCOPE OF WORK, Phase 2 Memorandum of Agreement, June 2003, Task 2 - Lower Raritan WMA, Open Space and Redevelopment prepared for the NJ Department of Environmental Protection under Contract RP01-042 to the NJ Water Supply Authority. This project was funded by a Clean Water Act, Section 604(b) Pass-through Grant. Although the information in this document has been funded wholly or in part by the United States Environmental Protection Agency and the NJ Department of Environmental Protection, it has not been subject to the publication review process of either agency and, therefore, may not necessarily reflect either agency's views and no official endorsement should be inferred.

Executive Summary

The purpose of this study is to create a GIS based approach for identifying undeveloped and underutilized non-residential sites near critical water resources (such as drinking water) and determining whether such sites are more appropriate for economic development, open space preservation or a combination of both. In doing so, the study seeks to develop a model that protects water resources while improving local economies. Base maps of critical areas in the Lower Raritan Watershed Management Area are presented, as is a comprehensive inventory of priority sites in the Somerset Regional Center. Case studies are offered which illustrate design alternatives on two high priority sites within the study area.

The Somerset Regional Center was chosen to test the methodology and criteria due to its existing land use patterns, highly organized regional partnerships, availability of current GIS data, proximity to a significant freshwater intake (NJ American Water Company-Elizabethtown), and its location between the Raritan North and South Branch confluence and the Raritan-Millstone confluence.

The Somerset Regional Center is comprised of part or all of Bridgewater Township, Raritan Borough and Somerville Borough, and was the first regional Center approved by the State Planning Commission. The three municipalities contain a total of 21,436 acres and 21,723 parcels of land. The methodology employed by this study has revealed that 5,431 (25%) of those parcels contain at least some environmentally critical land. Within this subset, 4,607 properties were occupied by existing buildings and uses that support the tax base of their host community. The remaining 824 parcels were found to be either undeveloped or underutilized. The hypothesis of this study is that some of these parcels are best suited for resource protection while others are suitable for some level of development. During the course of the study, several properties identified as suitable for development were indeed developed. The “River Park at Raritan” project depicted on the cover of this report is one example. Other properties, which met the criteria for protection, were found to be equally attractive to area open space and recreation interests and were purchased for preservation. This dynamic served, in a small way, to initially validate the methodology and criteria developed by the New Jersey Water Supply Authority (NJWSA).

To test the practical application of the methodology and criteria, conceptual site plans were developed for two sites. The project staff initially identified four locations and requested the Somerset Regional Partnership to assist by narrowing the selection to the two highest priority sites. The Partnership quickly came to a consensus on the sites since both had been previously identified as key links in the region’s greenway plans.

Background

Evaluating the environmental factors that protect water resources was a key component of the Raritan Basin Watershed Management Project (2002). That initial work influenced the Spruce Run Initiative, which prepared a plan for preservation of critical areas in the watersheds feeding the Spruce Run Reservoir. More recently, the Manasquan River Watershed Critical Areas Committee was organized to evaluate critical areas for preservation in that watershed. Each project used similar base data, tailored to meet local needs. The original work from the Raritan Basin Watershed Management Project is used in this study to identify environmentally sensitive areas that protect water resources.

The Raritan Basin Watershed Management Project’s Water Resources Protection Model

In 1999, the New Jersey Water Supply Authority, New Jersey Department of Environmental Protection, and Raritan Basin stakeholders formed a partnership to develop a watershed management plan for the Raritan Basin. The Raritan Basin’s water resources provide drinking water for 1.5 million people from its surface waters, habitat for wildlife and plants, and large amounts of drinking, irrigation, and process water from its underlying aquifers. The intent of the partnership and watershed management plan is to manage the use of the basin’s water resources and protect and preserve those resources for the future. Through the Raritan Basin Project, a subcommittee of interested stakeholders from the Millstone Watershed Management Area (WMA 10) Committee developed a list of criterion to be used for identifying open space that protects water resources. To avoid the duplication of work and rather than forming additional committees for the other Watershed Management Areas within the basin, stakeholders from the North and South Branch WMA and the Lower Raritan WMA participated in the criteria development process. Since the criteria were most likely to be similar for each WMA, one set of criteria would be developed for the basin and later tailored to each WMA as necessary. The subcommittee and project staff began meeting in the fall of 2001 to brainstorm and then narrow watershed properties that protect water resources. The subcommittee brainstormed a list of 20 criteria that protect water resources. Because this list focuses primarily on water resources it may not address all of a land conservation entity’s goals. (see: http://www.raritanbasin.org/RBWMP_CD/RBWMPlan/Links/WRPOS_Criteria.pdf)

Table A.
Initial Criteria “Brainstormed” by the Millstone Watershed
Open Space and Riparian Area Subcommittee

A. Recharge Areas	K. Threatened or Endangered Species
B. Wellhead Protection Areas	L. Contamination and Previous Use
C. Drinking Water Source Areas	M. Size of Parcel
D. Headwaters	N. Length of Stream
E. Water Pollution Hazard Areas	O. Trout Production Streams
F. Areas with Steep Slopes	P. Vegetative Cover
G. Lakes and Ponds	Q. Soil Type
H. Floodplains and Riparian Corridors	R. Proximity to Water Body
I. Wetlands	S. Land Use/Land Cover
J. Mature Forest	T. % Impervious Surface
Criteria are listed in no particular order. These criteria were specifically included for their protection of water resources.	

The open space group consolidated the 20 initial criteria into four GIS coverages that encompass water resources protection criteria. These include:

Wellhead Protection Areas: Wellhead Protection Areas show the spatial extent from where ground water flows into a well for a specific time period. A Wellhead Protection Area is divided by multiple times of travel: Tier 1 (2 years), Tier 2 (5 years), Tier 3 (12 years). Tier 1 and Tier 2 are used in this open space model to indicate the spatial extent in which ground water pollution, if it occurs, poses a significant threat to the water quality of the well. Tier 3 was not included in this model because it allows a longer time frame in which to manage a threat to water quality. To focus attention on

potentially available open space, developed lands within a Wellhead Protection Area were excluded from this coverage. Of note, this GIS coverage, available from NJDEP, only includes wellhead protection areas for public community supply wells. Individual home or property owner wells are excluded;

Ground Water Recharge Rates: Ground water recharge rates were calculated using NJGS Method GSR-32, which estimates ground water recharge below the plant root zone using municipality-based climatic, soil type, and land use/land cover information. (Note: only a portion of ground water recharge becomes aquifer recharge.) For the Raritan Basin, ground water recharge rates were developed from the NJDEP's 1995/1997 land use/land cover data. Both the volume and the rate of recharge were used to develop this criterion. The goal of the criterion is to protect areas that contribute the largest amount of recharge in the shortest amount of time. The subcommittee determined that the area that contributes 25 percent of the recharge should be preserved. The analyses were performed by HUC 11 watershed to minimize the effects of local climatic and geologic conditions within the Raritan Basin and ensure that areas determined to be protective of ground water recharge were not concentrated in one area or one WMA. To determine the area that preserves the top 25 percent of volume, the volumes for each land use polygon were ranked by recharge rate then cumulatively summed to equal 25 percent of the annual recharge volume. This ensures that properties desirable to be preserved recharge the quickest. In doing so, large slowly recharging areas will not be selected over quickly recharging areas based on volume alone;

Riparian Areas: The Raritan Project methodology defines riparian areas as the undeveloped areas adjacent to streams that either are within the 100-year flood prone areas, contain hydric soils, contain streamside wetlands and associated transition areas, or are within a 150-foot or 300-foot wildlife passage corridor on both sides of a stream (with the width dependent on stream order). The riparian areas coverage used in the model addresses the following criteria listed in the above Table: Headwaters (D), Floodplains (H), Lakes and Ponds (G), Wetlands (I), Length of Stream (N), Proximity to Water body (R), Soil Type (Q) and Trout Production Streams (O). Data to develop the riparian areas coverage were obtained from FEMA (floodplains), NRCS (hydric soils) and the NJDEP hydrography (wetlands, lakes and ponds, stream information). The Upper Raritan Watershed Association performed the analyses to create a riparian area coverage for the entire Raritan Basin; and

(Threatened and Endangered) Wildlife Species Habitat: Threatened and endangered wildlife species habitat information was derived from the New Jersey DEP Division of Fish and Wildlife's Landscape Project data (Version 2) This data source was included in the model to represent high quality vegetated areas, which are beneficial to and protective of water resources. The habitat coverage addresses the following criteria shown in Table 1: Threatened and Endangered Species (K), Mature Forests (J), Vegetative Cover (P), and Wetlands (I). The Landscape Project has developed GIS coverages for several types of habitat, including grasslands, forested wetlands and emergent wetlands. The subcommittee chose to concentrate on forested and emergent wetlands. Each habitat can be broken into five levels: that which harbors Federal T&E species, those which harbor State Endangered species, State Threatened species or Species of Special Concern, and that which may provide Suitable Habitat for T&E species. In addition, a "dense forest" layer was incorporated into the wildlife species habitat coverage. The Spruce Run Initiative defined dense forests as woodlands in which core areas exist beyond a 400-foot buffer from the forest edges. By definition, all of the areas in the wildlife species habitat coverage are non-urban. The dense forest coverage was created using NJDEP 1995/97 land use land cover data.

Caveats/ Omissions

Some of the 20 criteria originally brainstormed are not explicitly represented. For instance, Drinking Water Source Areas (C) are not specifically mapped; however, surface water intakes are located within the Riparian Area coverage, and community ground water wells are located within the Wellhead Protection Area coverage. Soil Type (Q) was used to estimate recharge potential in the Ground Water Recharge coverage. Steep Slopes (F) were not included because available digital elevation models are not of sufficient detail. Size of Parcel (M) and Length of Stream (N) are criteria that need to be determined when a specific piece of property is under consideration. Most counties lacked digitized parcel data, making a basin-wide analysis of target parcels impossible at the time of the initial analysis.

GIS Model Form

The GIS model aggregates the first four water resources protection open space criteria into a single coverage. Each criterion of the model was given the same weight. For an area of land, the number of criteria met was calculated resulting in each area receiving a tally from 0-4. The database file associated with the final GIS coverage contains the information about which criteria were met for any area. Also contained in the coverage's database are whether or not an area of land is urban or preserved open space. These were added to the database so that developed land and preserved open space would not be included as desirable even if some criteria were met. Parcel data were available for only a portion of the basin and were not used to develop the water resources protection open space (WRPOS) criteria. Parcel data in GIS can be plotted over the WRPOS criteria to obtain the actual number of criteria the parcel meets, and for what percentage of the total parcel. Without parcel data or access to GIS, the WRPOS criteria map can be used to approximate the number of criteria met.

Water Resources Protection Open Space Criteria Incorporation

The Water Resources Protection Open Space Criteria are presented as indicators for determining if a piece of property targeted for open space acquisition is protective of water resources. Land preservation organizations may have their own goals and objectives for the acquisition of open spaces and the Raritan Project encourages them to include the protection of water resources as a special criterion in their decision to purchase or protect land. The New Jersey Green Acres Program, a primary source of funding for open space acquisition, gives special weight to the protection of water resources in its scoring system (see: N.J.A.C. 7:36 referenced @ <http://www.nj.gov/dep/greenacres/regs.pdf>).

NOTE: Because these areas are important for water resources protection, they are NOT generally suitable for active recreational facilities; rather, the natural resources of these lands should be protected from harm. Land preservation organizations can incorporate the WRPOS criteria into their existing criteria in many ways depending on their current scoring or ranking system and what criteria are already used in that scoring or ranking system. As always, users should be aware of issues regarding data resolution – the model helps provide targets, but only site-specific assessments can verify the model.

Environmental Factors that Protect Water Resources in the Lower Raritan Watershed

Description of the Lower Raritan Watershed Management Area (WMA 9)

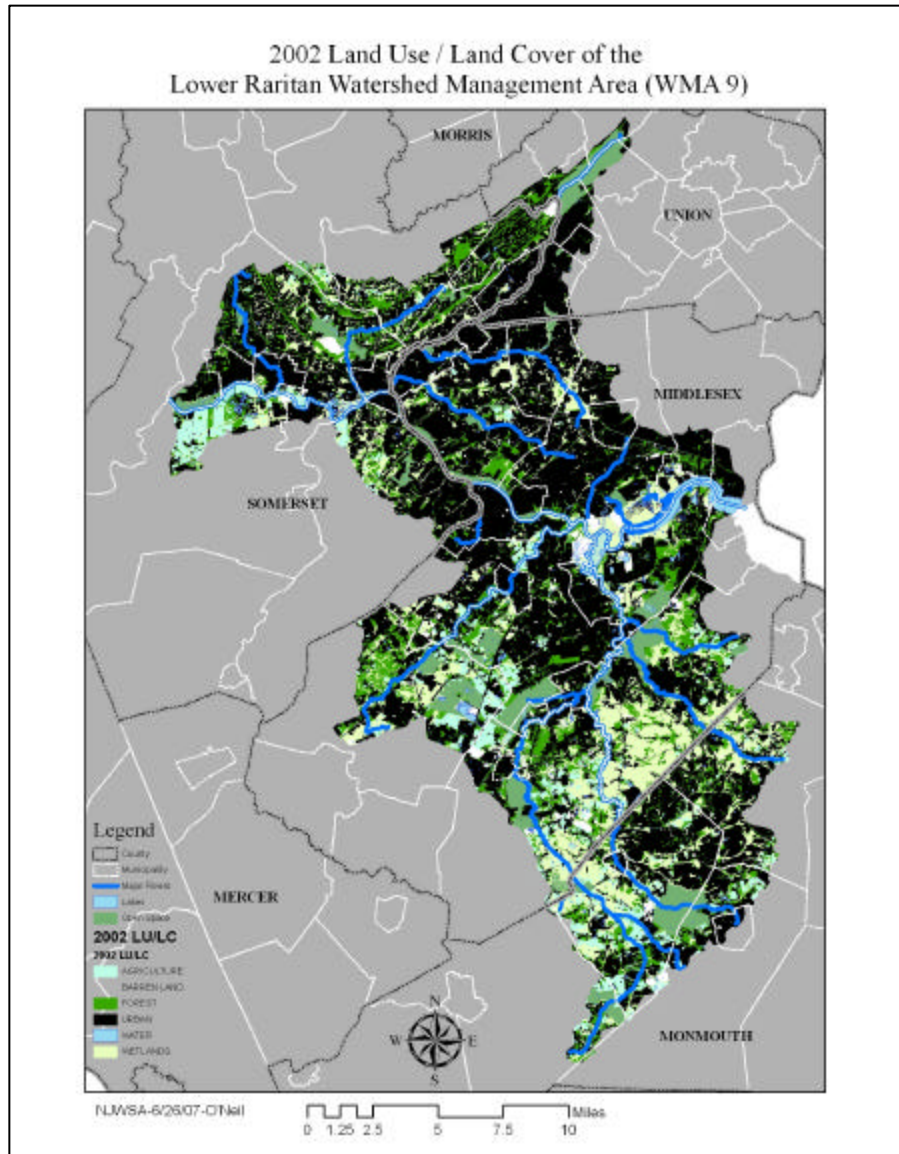
According to LANDSCAPE OF THE RARITAN RIVER BASIN, A Technical Report for the Raritan Basin Watershed Management Project:

“By 1995, the increasing urban landscape accounted for approximately 36% of the Raritan Basin. Of the Upper Raritan, Lower Raritan and Millstone WMAs, the Lower Raritan WMA contains the highest percentage of urban land uses. Of the watersheds in the Lower Raritan WMA, the Lower Raritan (between the Lawrence Brook and Millstone River) watershed contains the most urban land area, much of which was developed prior to 1986...A band of dense urban land stretches from Union County through northern Middlesex County and into central Somerset County. Plainfield City and the surrounding towns within Union County are almost entirely urban. In Middlesex County, Woodbridge, Edison, Piscataway and Old Bridge Townships are mostly developed communities with high populations. This high-density residential development spills into Somerset County at Franklin and Bridgewater townships. High and medium density development stretches into the communities located in central Middlesex and western Monmouth counties. Commercial development is inter-dispersed within the high and medium density residential areas throughout the Lower Raritan WMA. Industrial land uses are evident in the vicinity of Franklin Township, Piscataway and South Plainfield, along the I-287 corridor. Raritan Center is a large industrial complex adjacent to the Raritan River in Edison Township. Other industrial land uses can also be found along the highway corridors (US 1, New Jersey Turnpike) and rail hubs (Jersey Avenue).”

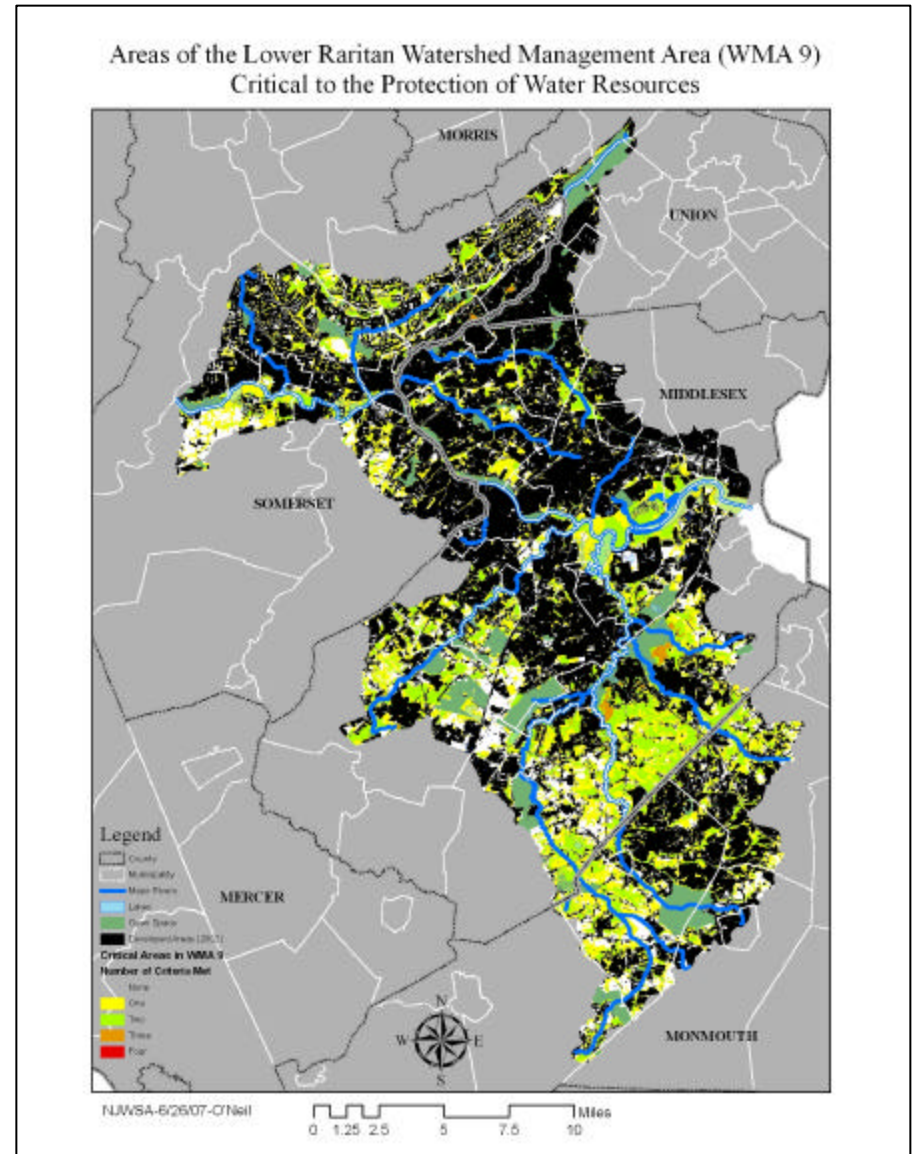
“The Lower Raritan Watershed Management Area contains the lowest elevations of the Basin (often less than 100 feet and close to sea level in some areas), particularly in the area surrounding Raritan Bay. This WMA is characterized by a significant amount of development and large streams that result in high flows during periods of extended rainfall. Soils of the northern half of this WMA are somewhat poorly drained and have low infiltration rates, while soils of the southern half of the WMA have high recharge capabilities as compared with the rest of the Basin. The Lower Raritan WMA includes many of the larger streams of the Basin that exhibit much higher flows than streams located to the north and west.” (see: <http://www.raritanbasin.org/landscape.htm>)

Scanning the map on the adjacent page (Map 1) one notices a significant concentration of environmentally sensitive area in the south central portion of the watershed. While Old Bridge Township is largely developed in the east and along the major highways, the western portion contains a considerable amount of undeveloped sensitive area. The western portions of South Brunswick Township in Middlesex County and Manalapan Township in Monmouth County also have considerable lands that meet at least two of the four water protection criteria. There are also pockets of critical areas along the Watchung Ridge in Somerset and Union Counties. Conversely, there remain large farms in the eastern portion of South Brunswick Township and northern Monroe Township that have limited water resource protection value. As these areas are within the New Jersey Turnpike/I-95 corridor, mid-way between Trenton and New Brunswick, they offer a high economic development value. No parcel data are available for Middlesex County. Therefore, a more in-depth analysis of these areas is beyond the scope of this study. Municipal and county planners are encouraged to expand on this initial assessment as future land use decisions are contemplated

Map 1 a



Map 1 b



Methodology to Identify Undeveloped and Underutilized Properties that Contain both Environmental and Economic Value

As stated in the Executive Summary, the purpose of this study is to create an approach for identifying undeveloped and underutilized non-residential sites near critical water resources (such as drinking water) and determine whether such sites are more appropriate for economic development, open space preservation or a combination of both.

After applying the Raritan Basin Watershed Management Project's WRPOS model for identifying critical environmental areas to the entire Lower Raritan Watershed Management Area, the study turned its attention to developing a methodology to identify individual undeveloped and underdeveloped parcels with both environmental and economic development value.

The Somerset Regional Center was chosen as the area to test the methodology due to its existing land use patterns, highly organized regional partnerships, availability of current GIS data, proximity to a significant freshwater intake (NJ American Water Company-Elizabethtown), and its location between the Raritan North and South Branch confluence and the Raritan-Millstone confluence.

According to the Regional Center Partnership:

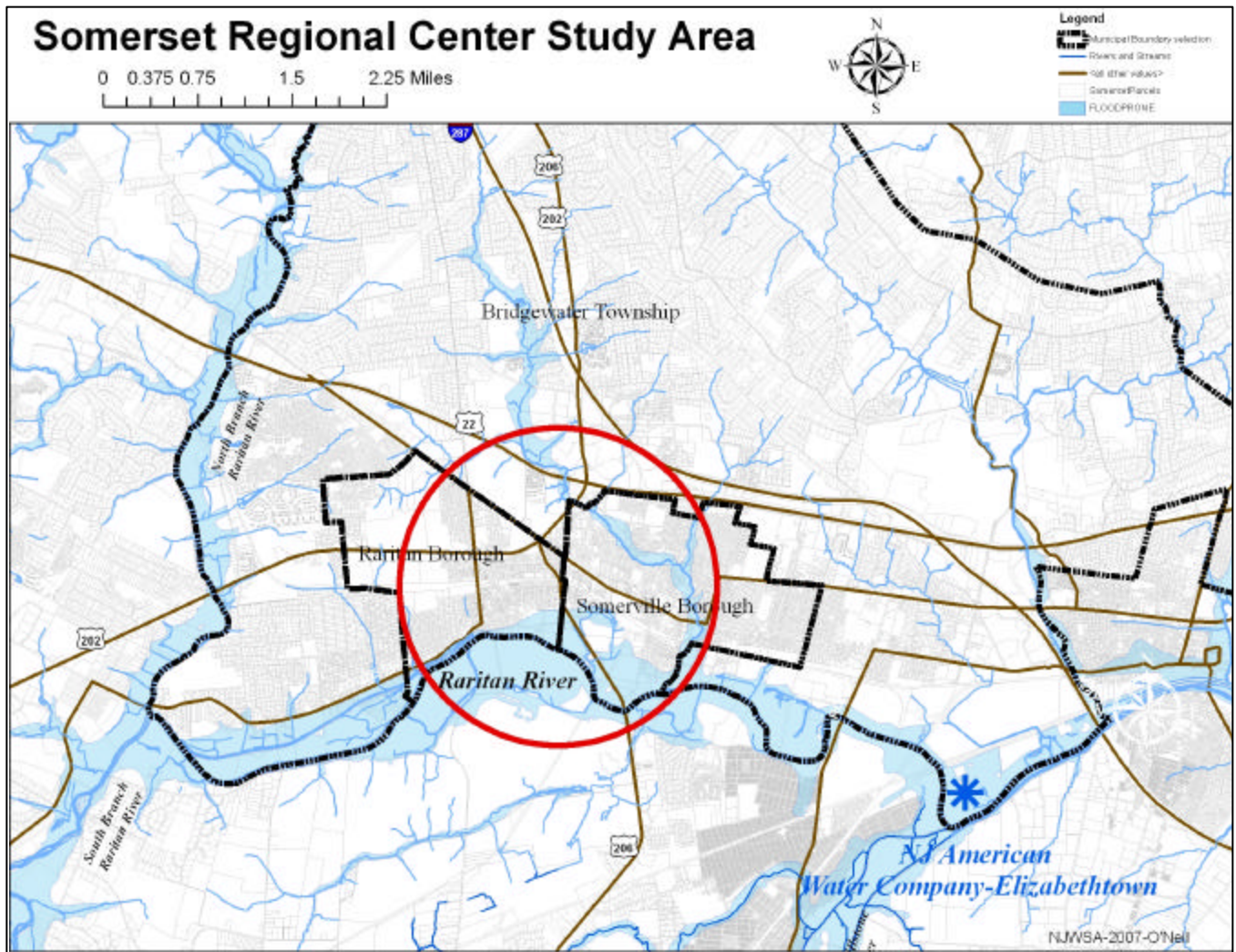
“In 1996, the Boroughs of Somerville and Raritan, the Township of Bridgewater, Somerset County, the Somerset Alliance for the Future and the Somerset County Chamber of Commerce came together to craft an application to the NJ State Planning Commission to become New Jersey's first multiple-municipality Regional Center.

In May of 1996, in accordance with the State Planning Rules, N.J.A.C. 17:32-8.6(a), the NJ State Planning Commission designated the Boroughs of Somerville and Raritan and an adjacent portion of Bridgewater Township as an official Regional Center. The State's approval of this application means that the 11.5 square mile district will be the focal point of enhanced planning and expedited public approvals which will benefit the 25,000 residents and 40,000 workers who live or work in the area.

As a condition of designation, the State Planning Commission required the creation of an organization to ensure the successful implementation of these goals and objectives. The Regional Center Partnership of Somerset County was created in 1998 to spearhead this planning and implementation effort. This non-profit group's task is to provide the coordinated planning framework and effort that is needed to achieve the goal of improving the identity and functionality of the Regional Center, the quality of life for its residents and a favorable environment for business. The Partnership is made up of representatives from the three communities, Somerset County, Somerset County Chamber of Commerce, Somerset Alliance for the Future, Somerset Coalition for Smart Growth, Somerset County Coalition on Affordable Housing and members of the private sector.

The ultimate goal of the Regional Center Partnership is to provide the leadership, technical support and assistance to the county and three municipalities to shape planning policies to ensure that the Regional Center area continues to be the premier place in Somerset County to live, work and recreate. By focusing development/redevelopment and investment in the Regional Center area, the open spaces and farms that give Somerset County its unique character and charm can be protected and preserved.” (see: <http://www.regionalcenterpartnership.org/whatis.html>).

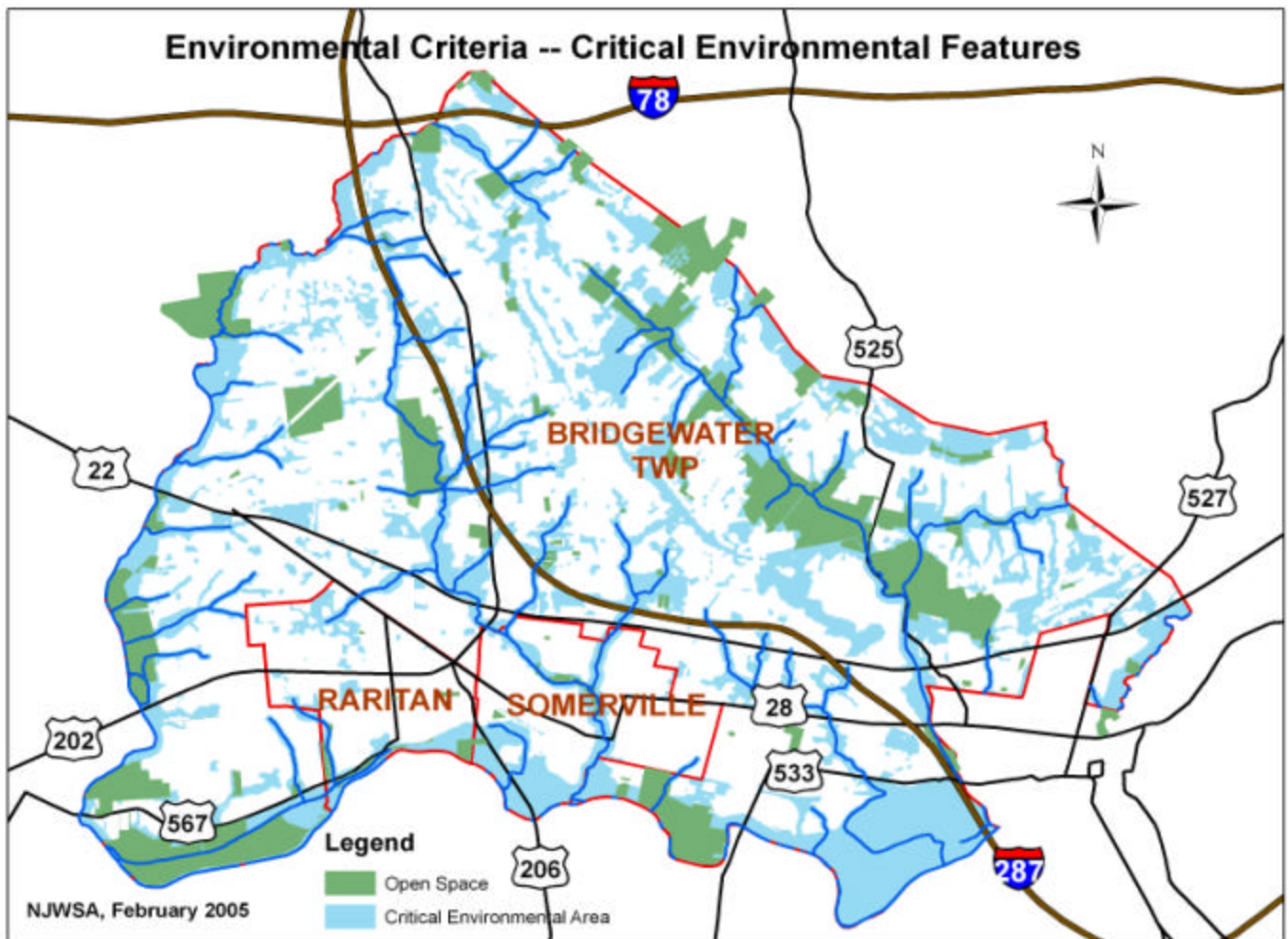
Map 2



Environmental Value Criteria

Undeveloped and underutilized parcels that contain a high percentage of critical area are best suited for open space preservation or resource protection while those with a low percentage may be more suited for development/redevelopment. Accordingly, an evaluation of environmental features was performed on each parcel to estimate its environmental value. Parcels found to be occupied by greater than 90 percent of critical environmental areas and those that contained at least 50 percent regulated land (e.g. floodprone, wetlands, etc.) or riparian zones, as well as those parcels located adjacent to these core areas or existing open space are assigned a high environmental value.

Map 3



Required GIS Layers / GIS Coverages:

///	Wellhead Protection Areas – NJ Department of Environmental Protection (NJDEP)
///	Emergent Wetlands – NJDEP Division of Fish and Wildlife Landscape Project Version 2
///	Forested Wetlands – NJDEP Division of Fish and Wildlife Landscape Project Version 2
///	Primary Ground Water Recharge – Raritan Basin Watershed Management Project
///	Riparian Area – Raritan Basin Watershed Management Project
///	1995/97 Land Use Land Cover – NJDEP OIRM BGIA
///	2002 Green Acres Preserved Open Space – NJDEP Green Acres Program
///	Watershed Management Areas – NJDEP OIRM BGIA
///	Watersheds (Hydrologic Unit Code 11) – NJDEP GIS

GIS Procedure:

Step 1. Calculate % Critical Area -- Overlay the critical area coverage with parcel data to calculate the % of critical area in all parcels. The critical area GIS data coverage comes from the Raritan Basin Watershed Open Space Criteria Model created by New Jersey Water Supply Authority in 2002. The critical area is defined to include “riparian area” (flood hazard and flood prone area, streams, lakes, wetlands, wetland transitional area, wildlife corridors, alluvial and hydric soil), Landscape Project emergent and forested wetlands habitat, prime ground water recharge, and wellhead protection areas. Add a column in the attribute table called (CA_Percent) where value = % critical area.

(since the regulated CA is extracted from the Riparian area dataset, everything is already covered by Riparian area, so there is no need to put this as one separate criteria)

Step 2. Calculate % Riparian Area - Overlay the riparian area coverage with parcel data to calculate the % of parcels in riparian area. The Riparian area GIS data coverage comes from the Raritan Basin Watershed Open Space Criteria Model created by Upper Raritan Watershed Association in 2002. Add a column in the attribute table called (Ripari_Perc) where value = % riparian area.

Step 3. Identify parcels in or adjacent to “Core Critical Areas” which is defined as “Properties that have $\geq 90\%$ in Critical Area or $\geq 50\%$ of riparian area”. Add a column in the attribute table called (Adja_CA) where value = “Yes” or “No”.

Step 4. Identify parcels in or adjacent to “Existing Open Space.” Add a column in the attribute table called (Adja_OS) where value = “Yes” or “No”.

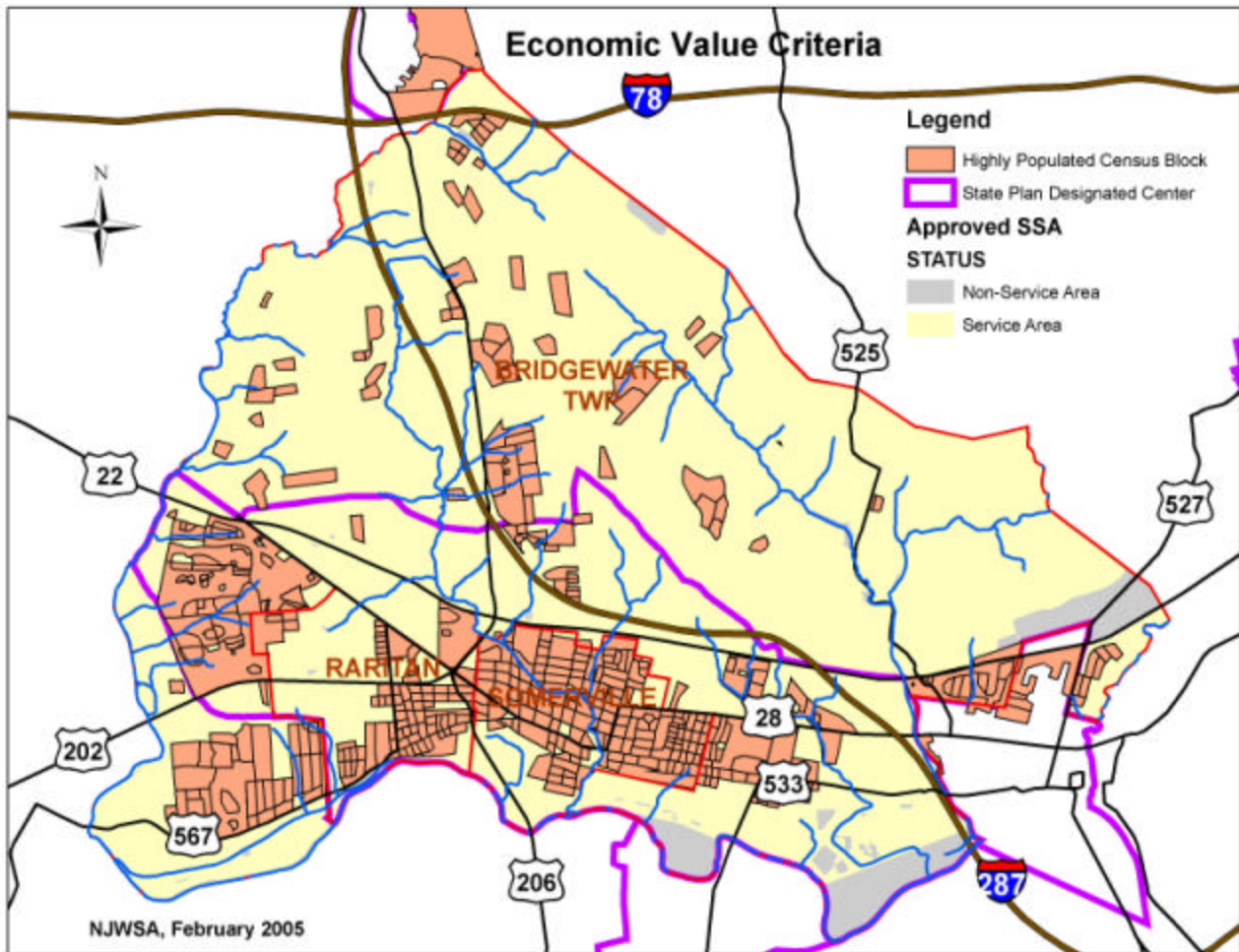
Step 5. Add a column in the attribute table called “Environment” where:

- Value “Vo” = vacant sites that have 100% critical area,
- Value “Yes” = properties (other than the “Vo” sites) that have the greatest environmental protection value – properties that have more than 90% of critical area, or more than 50% of riparian area, or adjacent to the above “core” critical area or adjacent to existing open space.
- Value “No” = properties that have lesser critical environmental value.

Economic Value Criteria

The State of New Jersey has made it a priority to encourage economic growth in existing urban centers. Proximity to markets, access to labor, availability of water, sewer and other infrastructure, and business incentives that promote economic growth are factors to be considered when locating or expanding a business. A methodology for identifying parcels with these location factors was therefore developed. Undeveloped and underutilized parcels that are located within walking distance (1/4 mile) to population centers, are supported by existing infrastructure, are within an Enterprise Zone or Designated Center in the State Plan and have a low environmental value are considered best suited for development / redevelopment.

Map 4



Required GIS Layers / GIS Coverages:

- ~~///~~ 2000 Census Block Population Data – Census Bureau
- ~~///~~ Zoning – Somerset County
- ~~///~~ NJ Roadway Network – NJDOT
- ~~///~~ Approved Sewer Service Area – NJDEP
- ~~///~~ Urban Enterprise Zones (UEZ) of New Jersey - New Jersey Commerce and Economic Growth Commission
- ~~///~~ NJ State Development and Redevelopment Plan - NJ Department of Community Affairs, Office of Smart Growth

GIS Procedure:

- ~~///~~ Step 1. “Pop_Center” – “Yes” or “No” – To analyze whether one property is within ¼ mile of the highly populated area. The highly populated area is defined as census block population density ≥ 2000 /sq mile using the census bureau block level data.
- ~~///~~ Step 2. “Des_Center” – “Yes” or “No” – To analyze whether one property is located within the designated center of state plan
- ~~///~~ Step 3. “Major_RD” – “Yes” or “No” – To analyze whether one property is located within ¼ mile of major roads (interstate highways, US or county routes)
- ~~///~~ Step 4. “SSA” – “Yes” or “No” – To analyze whether one property is within approved sewer service area defined by NJDEP.
- ~~///~~ Step 5. “Zone” – “Enterprise_Zone” or “None_Enterprise_Zone” – To analyze whether one property is located within the enterprise zone or not.
- ~~///~~ Step 6. Add a column in the attribute table called “Economic” – “Yes” means all the properties that have the greatest development or redevelopment value – properties that have met all the above criteria (“Yes” for all column), not only one criteria. “No” means the properties that don’t have greatest development or redevelopment value.

Identifying Targeted Sites

Using parcel based data; all properties are overlaid on the critical areas coverage. All parcels that contain critical areas are inventoried and existing preserved open space is removed resulting in a pool of target sites. Undeveloped sites are identified as those parcels which have a “0” improvement value. Underutilized sites are identified as those parcels with an improvement value of less than 33 percent of land value. Finally, the target sites should be transposed on aerial photographs and spot checked and suspected inaccuracies should be field verified.

We note that a land:improvement ratio is only an indicator of areas in need of redevelopment under N.J.S.A. 40A:12A-5(e) “A growing lack or total lack of proper utilization of areas caused by the condition of the title, diverse ownership of the real property therein or other conditions, resulting in a stagnant or not fully productive condition of land potentially useful and viable for contributing to and serving the public health, safety, and welfare.” The improvement value of less than 33 percent of land value was determined to be appropriate for this study after consulting with the Somerset County Planning Board staff, which had recently conducted a study entitled Transit-Oriented Development Opportunities in Somerset County New Jersey, that suggested “Under-utilized parcels include properties with vacant buildings or buildings that are assessed at a significantly lower value than the value of their location would suggest.” (p. 10 and p. 124).

According to The Redevelopment Handbook: A Guide to Rebuilding New Jersey’s Communities, “Developed properties in areas that are economically viable typically have improvement-to-land ratios of 2:1 or greater. Ratios of less than 2:1 may offer evidence of underutilization.” (p.53). However, N.J.S.A. 40A:12A gives no guidance on specific land:improvement ratios. The New Jersey Supreme Court, in Gallenthin Realty Development, Inc. v. Borough of Paulsboro, A-51-2006 (New Jersey Supreme Court, June 13, 2007), decided that underutilization should not be used as a sole determinant in declaring a property “in need of redevelopment”.

Map 5

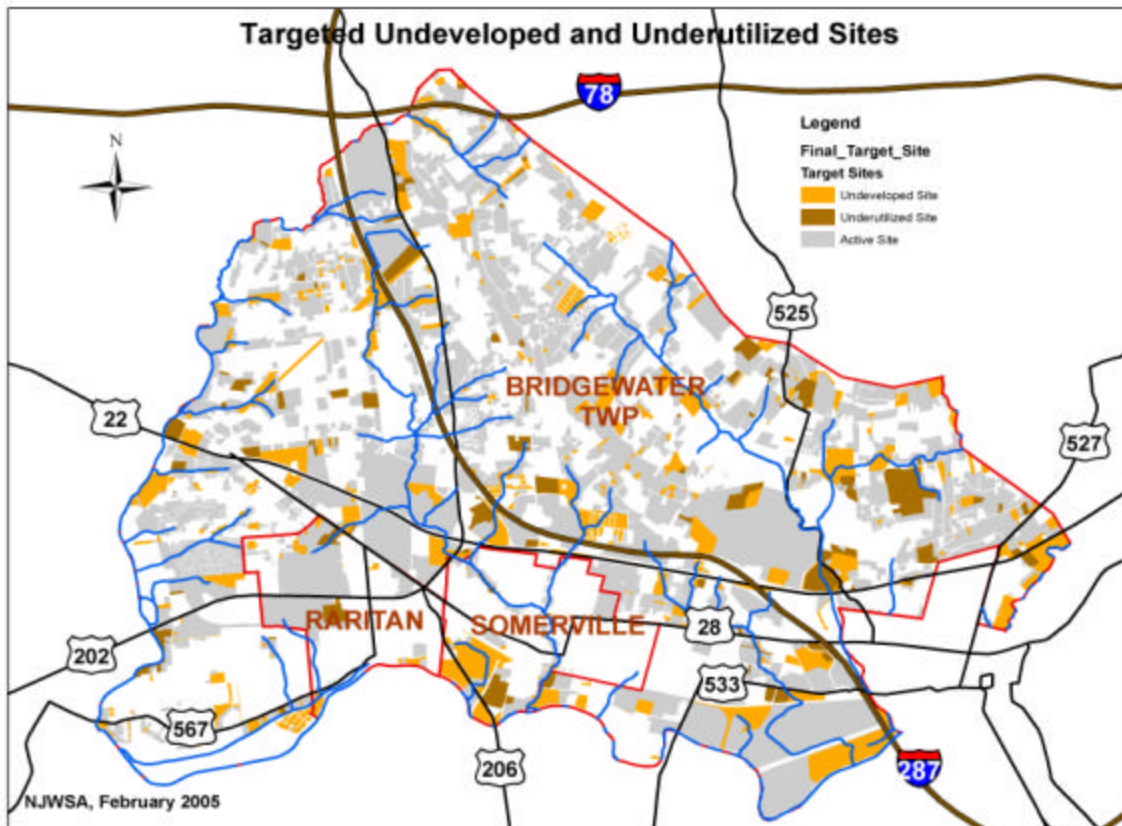


Table B. Undeveloped and Underutilized Sites in the Somerset Regional Center

Total parcels in the study area	21,723
Parcels containing environmental features	<u>5431</u>
Economically Viable Parcels	(4607)
Total Targeted parcels	= 824
Undeveloped Sites (Improvement value =0)	724
Underutilized Sites (Improvement value <33% of land value)	100

Required GIS Layers / GIS Coverages:

- ~~///~~ Mod4 Parcel - Somerset County
- ~~///~~ Property Tax - Somerset County
- ~~///~~ Open Space – Somerset County
- ~~///~~ Open Space – New Jersey Green Acres Programs
- ~~///~~ 2002 Orthophotography – NJDEP
- ~~///~~ Critical Area – Raritan Basin Watershed Management Project
- ~~///~~ Municipality Boundary - NJDEP

GIS Procedure:

- Step 1. Clip parcel data into Somerville, Raritan and Bridgewater Township boundary.
- Step 2. Identify all the parcels with some kind of environmental critical features (urban area are still included if they have critical areas for the chance of redevelopment)
- Step 3. Exclude existing open space, and we get the first preliminary targeted 5431 parcels.
- Step 4. Farmland preservation GIS data were not available at this point from Somerset County. The State Agriculture Development Committee (SADC, , from the 2001 State Development and Redevelopment Plan) GIS data showed only one small area designated as SADC, but not within the critical area.
- Step 5. Exclude the active sites by comparing land value and improvement value (from the property tax data). “Active sites” is defined as “Improvement value $\geq 33\%$ Land value and Improvement value ≥ 0 ” (total 4395 parcels), which leaves --
- Step 6. Undeveloped Sites – “Improvement value = 0” – 927 parcels, narrowed down to 724 final targeted vacant sites by overlaying with 2002 aerial photos and local knowledge to exclude recently developed sites, and
- Step 7. Underutilized Sites – “Improvement value $< 33\%$ Land value and Improvement value ≥ 0 ” – 109 Underutilized sites, narrowed down to 100 parcels by overlaying with 2002 aerial photos and local knowledge to exclude recently developed sites.

Recommended Use Criteria

Predicated on the site characteristics of the target properties, a final step in the study offers a set of recommendations on future use including full resource protection, full development / redevelopment, and some development / redevelopment with resource protection (either regulatory controls or clustering of developed features) to protect critical areas. The full resource protection recommendation is appropriate to undeveloped sites located entirely in critical areas and underutilized sites with a high environmental value and low economic value. The development / redevelopment with resource protection recommendation is appropriate to undeveloped and underutilized sites that have significant measure of both environmental and economic value. The full development recommendation is appropriate to sites that have a high economic value and a low environmental value. Lastly, sites found to have low environmental value and low economic value were inventoried but no recommendation for reuse is offered.

On undeveloped sites, environmental value was considered the primary variable. Conversely, on underutilized sites economic value was considered before environmental value. Compliance with local land use codes is not considered at this stage in the study, and the reader is cautioned to more thoroughly investigate individual properties before drawing final conclusions on the recommendations.

Map 6

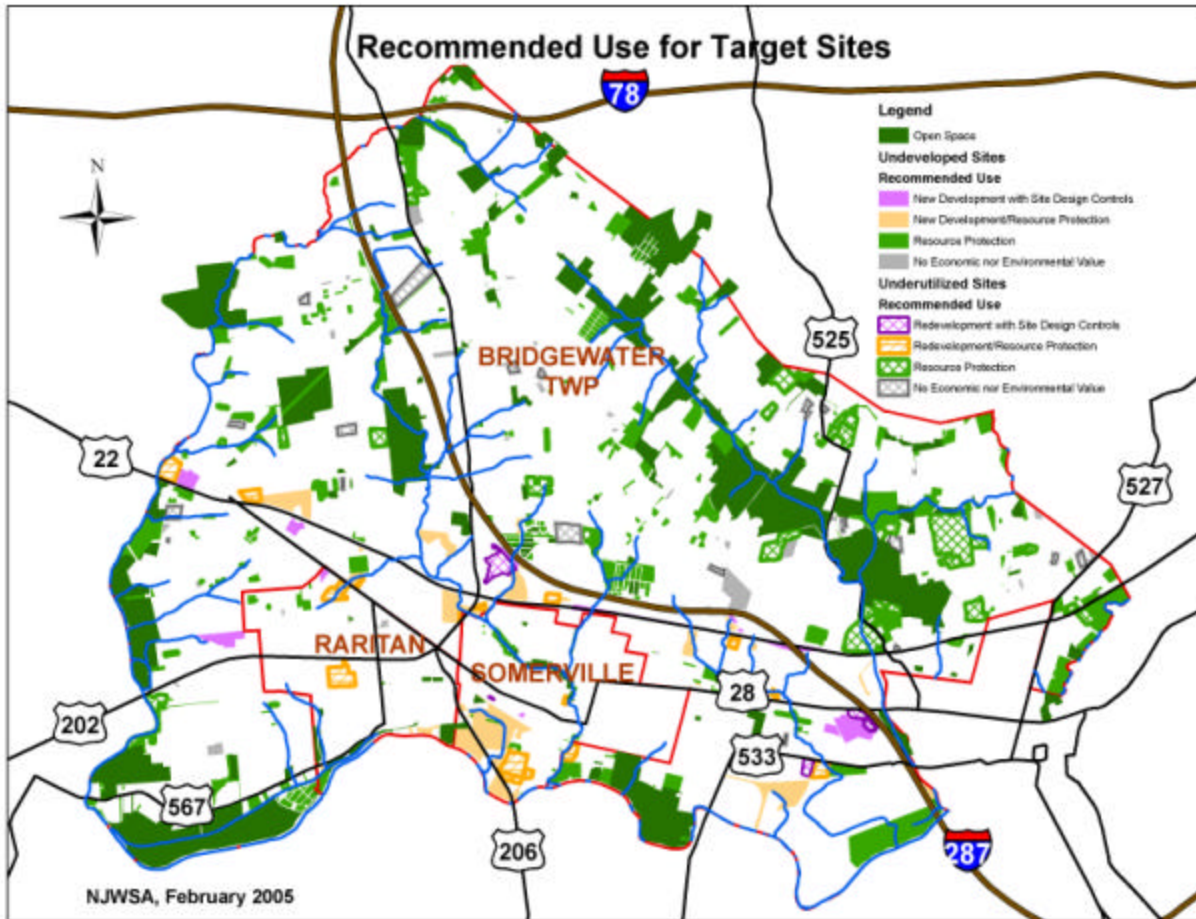


Table C. Recommended Uses for Targeted Sites in the Somerset Regional Center

RECOMMENDED USE	Undeveloped Sites	Undeveloped Acres	Underutilized Sites	Underutilized Acres
Development with Site Design Controls (some environmental value and high economic value)	12	128	4	19
Development / Resource Protection (some environmental value and some economic value)	54	389	14	103
Resource Protection (high environmental value and some economic value)	616	1435	64	338
Little Environmental / Economic Value	42	115	18	60
Total	724	2067	100	520

GIS Procedure:

Add a column in the attribute table called “PlanRecomm” – Plan Recommendation for the target vacant and brownfield sites.

For Undeveloped Sites –

- ~~///~~ “Vacant_Protection” – Environmental Value “Environment = V0” (vacant properties that have 100% critical area, which are recommended for protection no matter what status regarding their economic value) or Environmental Value “Environment = Yes” and Economic Value “Economic = No”.
- ~~///~~ “Vacant_PartiaDevelop_PartiaProtection” – Environmental Value “Environment = Yes” (exclude the properties that have 100% critical area) and Economic Value “Economic = Yes”
- ~~///~~ “Vacant_DevelopwithDesignRestriction” -- Environmental Value “Environment = No” and Economic Value “Economic = Yes”
- ~~///~~ “Vacant_NoEco_NoEnviron” -- Environmental Value “Environment = No” and Economic Value “Economic = No”

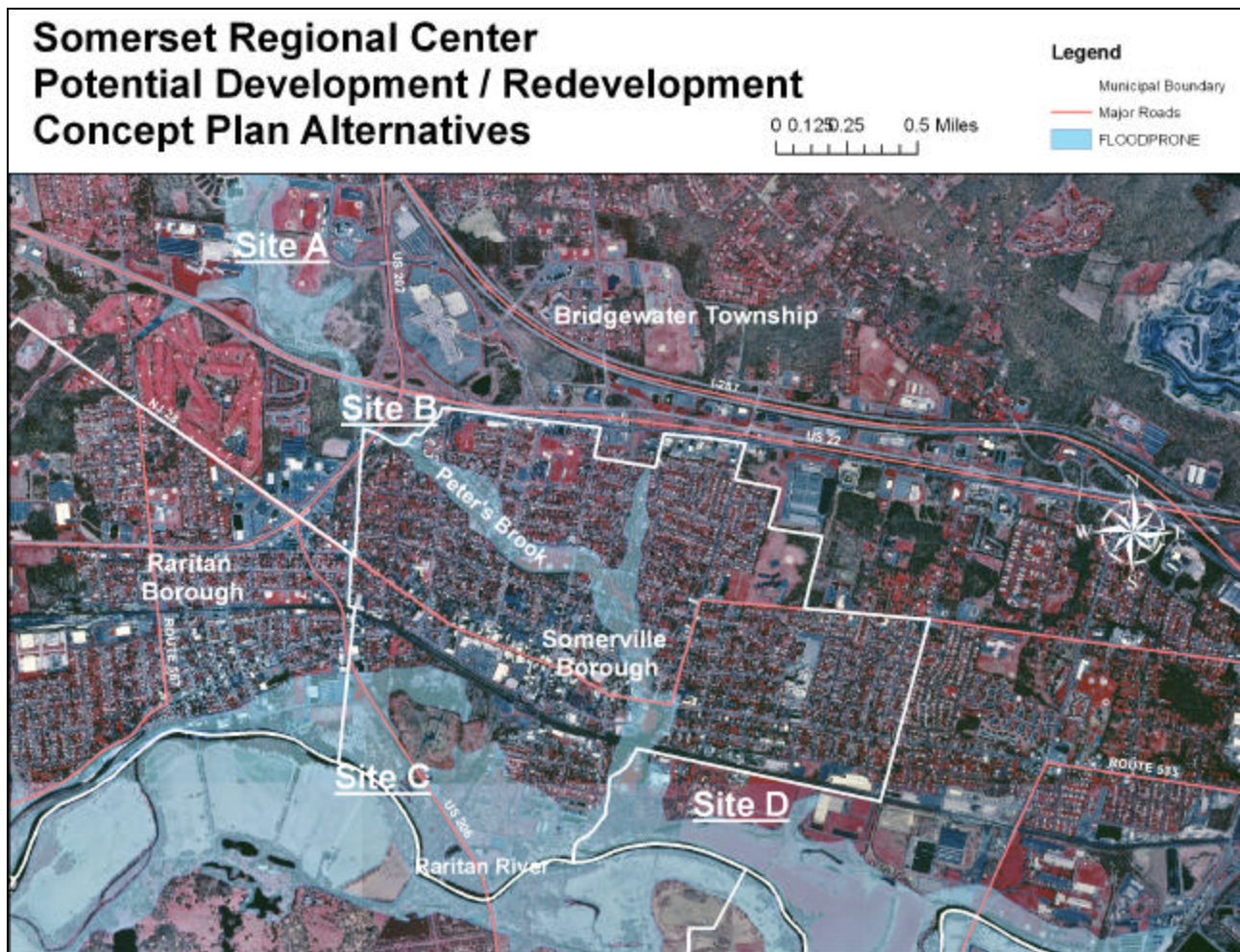
For Underutilized Sites –

- ~~///~~ “Brownfield_Protection” -- Environmental Value “Environment = Yes” and Economic Value “Economic = No” (potential “brownfields to greenfields sites)
- ~~///~~ “Brownfield_PartiaDevelop_PartiaProtection” -- Environmental Value “Environment = Yes” and Economic Value “Economic = Yes”
- ~~///~~ “Brownfield_DevelopwithDesignRestrictions” -- Environmental Value “Environment = No” and Economic Value “Economic = Yes”
- ~~///~~ “Brownfield_NoEco_NoEnvi_Value” -- Environmental Value “Environment = No” and Economic Value “Economic = No”

Application of the Results

In order to illustrate the practical application of the methodologies suggested by this study, site plan design alternatives on two high priority sites within the study area have been developed. The selected parcels were chosen from a candidate list of four sites (Map ?). The first potential site (A) was located along the Peter's Brook and adjacent to the Bridgewater-Raritan High School. The second site (B) was also located along the Peter's Brook at the border of Somerville Borough and Bridgewater Township, southeast of the Route 22 and Route 202/206 cloverleaf. The third site (C) was located between the Raritan River and Route 206 near the Somerville Landfill Redevelopment project. The fourth site (D) was also located along the Raritan River near Somerset County's Frank "Nap" Torpey Athletic Complex. Each candidate site contained some critical environmental areas. Each site also offered a unique development potential.

Map 7



The pros and cons of each site were discussed by the Somerset Regional Partnership at their March, 2006 meeting and consensus was quickly achieved on sites B and D. Follow-up meetings were held with county staff to confirm that any conceptual site plans developed as part of the study would be useful to Somerset County, the Regional Center Partnership, and the host communities.

Map 8

Site B, the Peter's Brook Site, is comprised of several vacant parcels and is anticipated to be at the eastern terminus of a proposed pedestrian bridge over Route 202/206. This is a critical link in the Peter's Brook Greenway Plan and will provide direct access to regional recreation facilities from residential neighborhoods to the south and east.



Map 9

Site D, the Regional Athletic Site, is an underutilized parcel of adequate size to accommodate uses complementary to the existing athletic complex. It is located in the Raritan River Greenway and would be a desirable addition to the Somerset County open space and recreation inventory.

Conceptual Site Plan Design Alternatives

The New Jersey Water Supply Authority contracted the design services of The Louis Berger Group with assistance from Ammann & Whitney to develop a series of conceptual site plans for each of the two targeted sites, showing how the criteria developed by this study was used to optimize economic, social, recreational and environmental value of redevelopment and open space preservation near surface waters.

Site Plan Design Goals

An initial examination of both sites concluded that each could support some level of new development while protecting existing environmental features. Three goals were promoted at the development site level: to reduce the amount of impervious cover, to increase natural lands set aside for conservation, and to use pervious areas for more effective stormwater treatment, all while improving local economic opportunity.

These site designs have considerable potential to reduce the environmental impacts of new development in these fragile areas. These design strategies must be combined and integrated with other watershed protection tools, such as watershed planning, land conservation, erosion and sediment control. Streets, parking spaces, setbacks, lot sizes, driveways, and sidewalks have been reduced in scale. At the same time, creative grading and drainage techniques will reduce stormwater runoff and encourage more infiltration.

The following are guiding principles used in the selection of the land uses and creation of site plans:

- ☞ Increase future commercial and residential property values
- ☞ Increase local job creation through economic activity
- ☞ Support community planning goals such as the expansion of recreational facilities, increase in regional economic activity, and the creation of a public greenbelt along the course of the Raritan River
- ☞ Reduce negative impacts to surrounding properties
- ☞ Reduce site and watershed imperviousness
- ☞ Reduce stormwater runoff and pollutant loads
- ☞ Reduce pressure to encroach on resource and buffer areas
- ☞ Reduce potential for soil erosion
- ☞ Reserve site green space that would not otherwise exist
- ☞ Reserve site open space dedicated to passive or active recreation
- ☞ Provide partial or total compensation for lots that would be lost for resource protection areas and stream buffers
- ☞ Reduce capital cost of development
- ☞ Reduce the cost of future public services
- ☞ Reduce the size of stormwater quantity and quality controls
- ☞ Provide a wider range of possible sites to locate stormwater practices
- ☞ Concentrate runoff where it can be most effectively treated
- ☞ Create urban wildlife habitat islands
- ☞ Increase sense of community and make development more pedestrian and bicycle friendly
- ☞ Incorporate regional greenway linkages

Environmental Constraints

An environmental constraints evaluation was performed to determine the developable area of each site and to ensure that development plans were protective of natural resources. The evaluation relied primarily on publicly available maps and Geographic Information System (GIS) files. These data were supplemented by observations made during site visits.

Wetlands

Wetlands are areas that experience inundation (i.e., ponded water above ground surface) or soils that are saturated long enough during the year to support hydrophytic vegetation, which are plants adapted for life in wet conditions. Some common types of wetlands are marshes, swamps, and bogs. Wetlands provide a number of valuable ecological functions, such as water quality improvement, flood control, and provision of wildlife habitat. In New Jersey, wetlands are protected by the New Jersey Department of Environmental Protection (NJDEP) under the Freshwater Wetlands Protection Act (FWPA) and associated rules. These rules prohibit certain activities within wetlands and require permits for regulated activities, such as road and building construction.

Wetlands within the project areas were mapped by applying a GIS file of the New Jersey Wetlands Maps (available from NJDEP website). These maps were produced by NJDEP from aerial photograph interpretation. However, during the visit to the North site, it was observed that historic fill or grading had made the NJDEP wetland map inaccurate. To obtain a more accurate representation of the wetland area on the North site, a preliminary field mapping was performed based on topography and vegetation characteristics. Though this was not an official wetland delineation, the field mapping provides a more accurate depiction of what portion of the site is potentially developable. To conserve these valuable resources, wetland areas were generally excluded from the developable area of each site. Certain low impact uses of wetland areas on the South site should be permitted, such as athletic fields or pasture (the current use).

Wetland Transition Areas

Wetland transition areas are defined in the FWPA Rules as upland areas adjacent to wetlands that help prevent impacts to the wetlands. The width of a transition area depends upon the “resource value classification” of the wetland. Based on guidelines in the FWPA Rules, wetlands within the project areas would be either “high” or “intermediate” resource value. “Low” resource value is attributed only to poor quality wetlands, such as drainage ditches. Thus, if the wetlands onsite contained habitat for threatened or endangered species or were adjacent to trout waters, they would be high resource value; otherwise, they would be intermediate value. NJDEP’s online GIS mapping system (i-mapNJ DEP) was used to evaluate the resource value of onsite wetlands. Landscape Project layers show various habitat types and associated threatened or endangered species. Landscape Project layers overlaid on the project areas showed no documented habitat for threatened or endangered species. The Surface Water Quality Standards layer indicated that the Raritan River (adjacent to South site), Peter’s Brook, and Mac’s Brook were non-trout waters. Thus, the wetlands in both project areas should be intermediate resource value. The transition area for such wetlands is 50 feet. This 50-foot buffer was applied to the wetland boundaries described above. Although Transition Area Waivers can be obtained to perform some regulated activities within transition areas (e.g., trails, outfall/intake structures, utility lines), the transition areas were excluded from the developable area of each site so these wetland buffers remain intact.

Flood-Prone Areas

Flood-prone areas are regulated in New Jersey by the Flood Hazard Area Control Act and associated rules (typically referred to as the Stream Encroachment Rules). These rules place restrictions on what development and activities can occur within the Floodway and within the Flood Hazard Area. These two areas are different sections of the floodplain, delineated based on the hydrology of the associated stream or river. Generally, the Floodway is the stream channel and adjacent areas reasonably required to carry flood flow, and the Flood Hazard Area is approximately the 100-year flood area.

The NJDEP flood maps were obtained for both project areas, and the Floodway and Flood Hazard Area boundaries were transposed onto aerial photographs of the sites. In the interest of preserving water quality and maintaining flood areas, structures or fill have not been proposed within the Floodway or Flood Hazard Area. Certain low impact uses, such as athletic fields or gardens should be permitted within these areas at the South site through either a waiver or minor Stream Encroachment permit.

In addition, the proposed revisions to the Stream Encroachment Rules (expected adoption in 2007) require protection of stream buffers (i.e., no vegetation disturbance) for all waters. Based on the proposed revisions, streams within the project areas would require a 50-foot buffer. To be environmentally conservative, this buffer was observed in the development plans.

Developable Area

The developable area, for the purpose of this exercise, was considered the portion of each site that does not contain environmentally constrained areas. Channeling development away from sensitive ecological areas reduces overall environmental impacts.

To determine the developable area at each site, the environmental constraints were incorporated into a GIS system and overlaid on an aerial photograph of the site that included the site boundary. The site boundary was drawn based on municipal tax maps. Environmentally constrained areas include Wetland Area, Wetland Transition Area, NJDEP Floodway, and NJDEP Flood Hazard Area.

Site Design Principles

Street Widths. Residential streets are designed for the minimum required pavement width needed to support travel lanes, on-street parking, and emergency, maintenance, and service vehicle access. Street widths are based on traffic volume. Several national engineering organizations have recommended residential streets as narrow as 22 feet in width (ASSHTO, 1994 and ASCE, 1990).

Street Lengths. Street lengths have been reduced through alternative street layouts—increasing the number of homes per unit length. This shorter street network produces less impervious cover and reduces development costs.

ROW Widths. Street right-of-way widths reflect the minimum required to accommodate the travel-way, the sidewalk, and vegetated open channels. Utilities and storm drains are located within the pavement section of the right-of-way wherever feasible. By redesigning each of the main components of the right of-way (ROW), the total width of the ROW has been

reduced.

Cul-de-Sacs. The number of residential street cul-de-sacs has been reduced and landscaped areas have been incorporated to reduce their impervious cover. The radius of cul-de-sacs is the minimum required to accommodate emergency and maintenance vehicles.

Shared Parking / Parking Ratios. Reducing the size of parking stall dimensions and providing compact car spaces reduce impervious cover. Shared parking is implemented on the site when two or more land uses have different parking demand requirements, such as different peak parking characteristics that vary by time of day, day of week, and/or season of the year, and are able to use the same parking spaces throughout the day.

Structured parking / garages are expensive solutions, but can be made more affordable by incorporating them on the first floor of buildings, thereby reducing the structural cost for parking. Shared driveways are used to reduce impervious cover. Other reductions are obtained by specifying narrower driveways, promoting permeable paving materials, and allowing two-track driveways or gravel and grass.

Sidewalks. Sidewalks are located on only one side of the street and common walkways linking pedestrian areas have been provided. Sidewalks have been narrowed or restricted to one side. Utilities are installed beneath street pavement. Combined, these techniques will narrow the ROW by 10 to 25 feet.

Pervious Pavement and Porous Pavers

Road and Driveway Design. Impervious pavement (concrete and asphalt) is only used where regular car, bus, or truck traffic is expected. Wherever traffic requirements allow, pervious materials are used that allow stormwater infiltration.

Pervious Surfaces. Pervious materials are used in the spillover parking areas and through alternative driveway surfaces. There are a variety of pervious materials used including: porous asphalt, porous paver blocks, porous concrete, lattice blocks that permit grass growth, and crushed stone or brick.

Stormwater Treatment. Stormwater Treatment

Stormwater treatment is provided for parking lot runoff using bioretention areas, filter strips, and/or other practices that can be integrated into required landscaping areas and traffic islands. New stormwater outfalls should not discharge unmanaged stormwater into sensitive areas. Bioretention areas, dry swales, perimeter sand filters, and filter strips are all effective at treating stormwater within the parking lot.

Water Pollution Source Control

Vegetated Open Channels. Vegetated open channels are used in the street right-of-way to convey and treat stormwater runoff. These open channels remove pollutants by infiltration and filtering, and are also often less expensive than curb and gutter systems. One alternative is dry swales, which are designed both to convey the 10 year storm and treat a water quality stream through a sandy loam filter along the roadway.

Ecological Connectivity and Habitat

Vegetated Buffer System. A variable width, naturally vegetated buffer system has been

developed along all perennial streams that also encompasses critical environmental features such as the 100-year floodplain, steep slopes and freshwater wetlands. This technique establishes a three-zone buffer system to protect streams, shorelines and wetlands at the development site. These three zones are distinguished by the types of allowable uses unique to each zone. In addition, the buffer should incorporate the 100-year floodplain, steep slopes, and freshwater wetlands to fully protect the water quality of streams, help treat stormwater, and enhance the quality of life for residents.

Native Vegetation Restoration

The riparian stream buffer has been preserved and restored with native vegetation. The buffer system is maintained through the plan review delineation, construction, and post-development stages.

Tree and Vegetation Conservation

Trees and other vegetation at each site have been preserved by planting additional vegetation, clustering trees, and conserving native vegetation. Trees have been incorporated into community open space, street rights-of-way, parking lot islands, and other landscaped areas.

Construction Site Mitigation Strategies

Clearing and Grading. Clearing and grading of forests and native vegetation is limited to the minimum amount needed to build lots, allow access, and provide fire protection. A fixed portion of the open space will be managed as protected green space in a consolidated manner. Since areas that are conserved in their natural state retain their natural hydrology and are not exposed to erosion during construction, it is desirable to conserve as much original soil at the site as possible. Clearing should be limited to the minimum area required for building footprints, construction access, and safety setbacks.

Construction Stormwater Runoff

The construction period is particularly important because disturbed soil, concrete fines, fertilizer, oils and other wastes from construction are produced and run off the site. This is minimized through the use of siltation fences, swales, planting vegetation to prevent soil loss, diversion ditches, and stormwater treatment devices such as dry wells and sediment control ponds.

Clustered Development with Shared Open Space

Smaller Lot Size. Side yard setbacks and frontages have been narrowed to reduce total road length in the community and overall site imperviousness. This also minimizes driveway lengths and reduces overall lot imperviousness. For example, side yard setbacks can be as close as five feet from detached housing without specific fire protection measures. The residential development is clustered into a smaller portion of the development site, leaving more of the site as natural open space.

Open Space Management

Clearly specify how community open space will be managed and designate a sustainable legal entity responsible for managing both natural and recreational open space.

Vegetated Roof and Runoff Capture Strategies

Green Roofs. Green roofs absorb rainfall, therefore reducing runoff. These roofs can absorb a full inch of rainfall during a summer rain event (when the soil starts out fairly dry) before

any water runs off it. Rainwater contaminated with a wide range of airborne pollutants and heavy metals typically settle onto rooftops to be washed into the waterways. A green roof can filter particulates out of the rainwater falling on it. Microorganisms living in association with the vegetation can break down many types of pollutants by binding to soil particles.

Building Rooftop Runoff

Rooftop runoff is directed to pervious areas such as yards, open channels, or vegetated areas and avoids routing rooftop runoff to the roadway and the stormwater conveyance system. Roof-top slopes help move runoff away from the home to prevent nuisance ponding, basement flooding, or ice formation on driveways or sidewalks. However, these concerns are only significant within 10 or 15 feet from the home foundation. Rooftop runoff is sent over a pervious surface before it reaches an impervious. Rooftop runoff is treated on-site, including directing flow into small bioretention areas that encourage sheet flow across vegetated areas or infiltrate runoff in trenches, dry wells, or french drains.

Landscape Xeriscape

Drought-Tolerant Vegetation. Outdoor water accounts for a significant percentage of overall water consumption. Specific practices are used to conserve water and improve water quality. Planting drought-tolerant vegetation, minimizing lawn areas, and using drip irrigation are some of the techniques used reduce overall water consumption. There are a variety of drought-tolerant native trees, shrubs, groundcovers and perennials that can replace non-native ornamental plants to achieve the same objectives of shade, texture, color and seasonal interest.

Landscape Design

Driveways and walkways slope towards landscaped areas to encourage water infiltration and reduce the need for irrigation.

Daylighting / Solar Energy

Daylighting Design. Daylight creates a high-quality living and working environment while reducing energy use of lighting. The orientation and massing of buildings maximize the potential for daylighting. The distribution of windows and their light transmission are designed to maximize daylight. In addition, natural top-lighting is incorporated through skylights.

Photovoltaic Electricity Generation. Photovoltaic (PV) electricity generation is incorporated into building design. PV collectors are integrated with building claddings, roofs, and canopies.

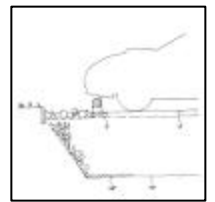
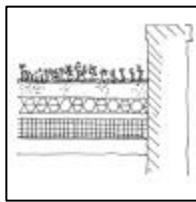
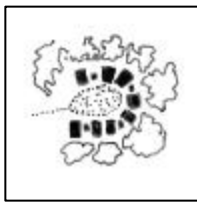
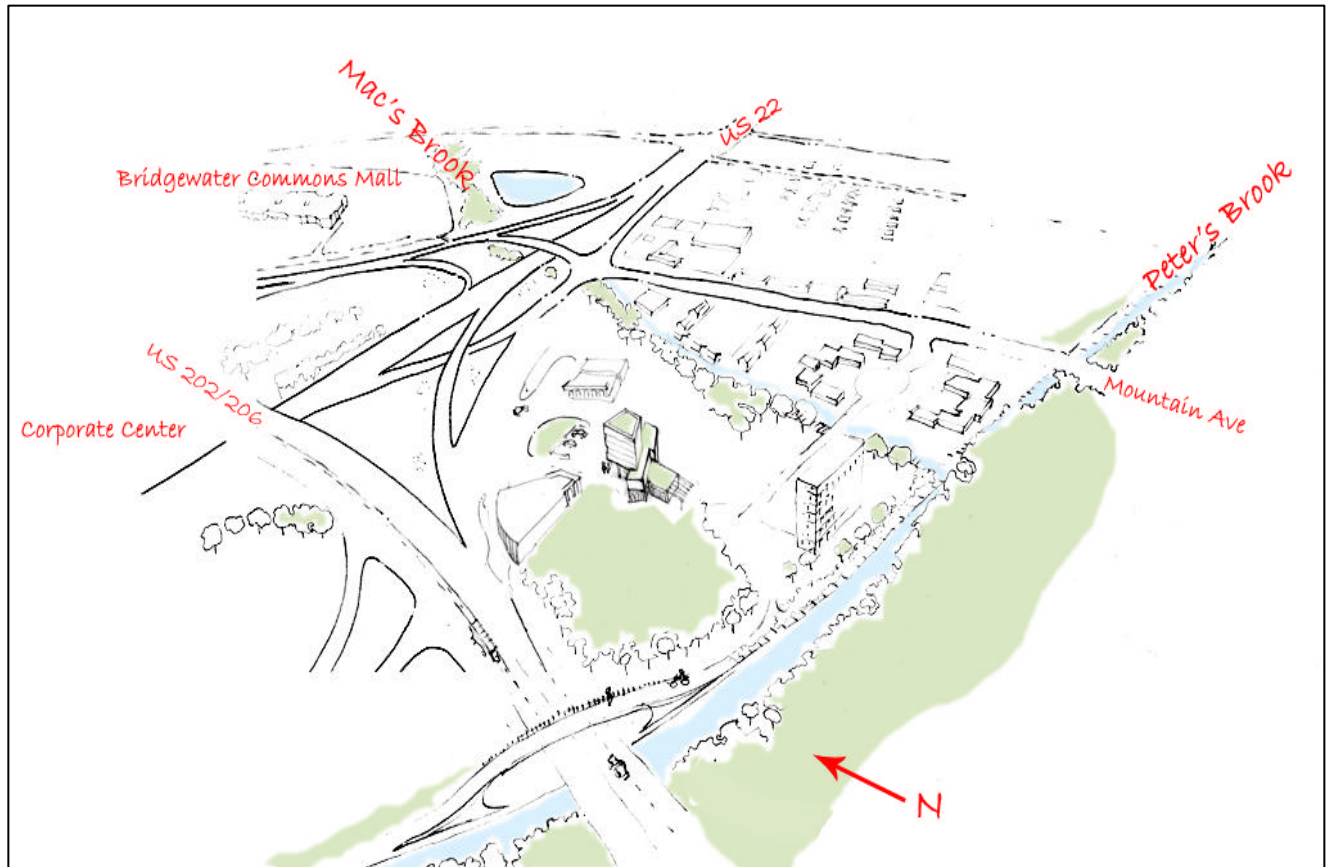
Solar Control. Solar control is achieved through the appropriate design of windows. Windows should be designed to admit sun when heat is required and block midday summer sun. Solar control is accomplished with high-performance glazing or exterior solar controls such as overhangs.

Solar Heating. Passive solar heating is an effective method for controlling energy costs. Building orientation is the primary method for solar heating. Buildings are oriented with the long side east-west for highest winter gains and lowest summer gains. Southeast/southwest orientation can capitalize on morning / afternoon solar gains without major performance losses.

Design Alternatives – Site “B” (Peter’s Brook Site)

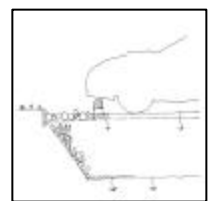
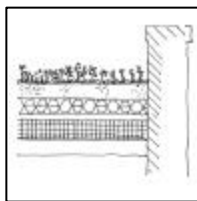
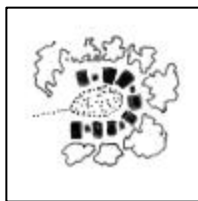
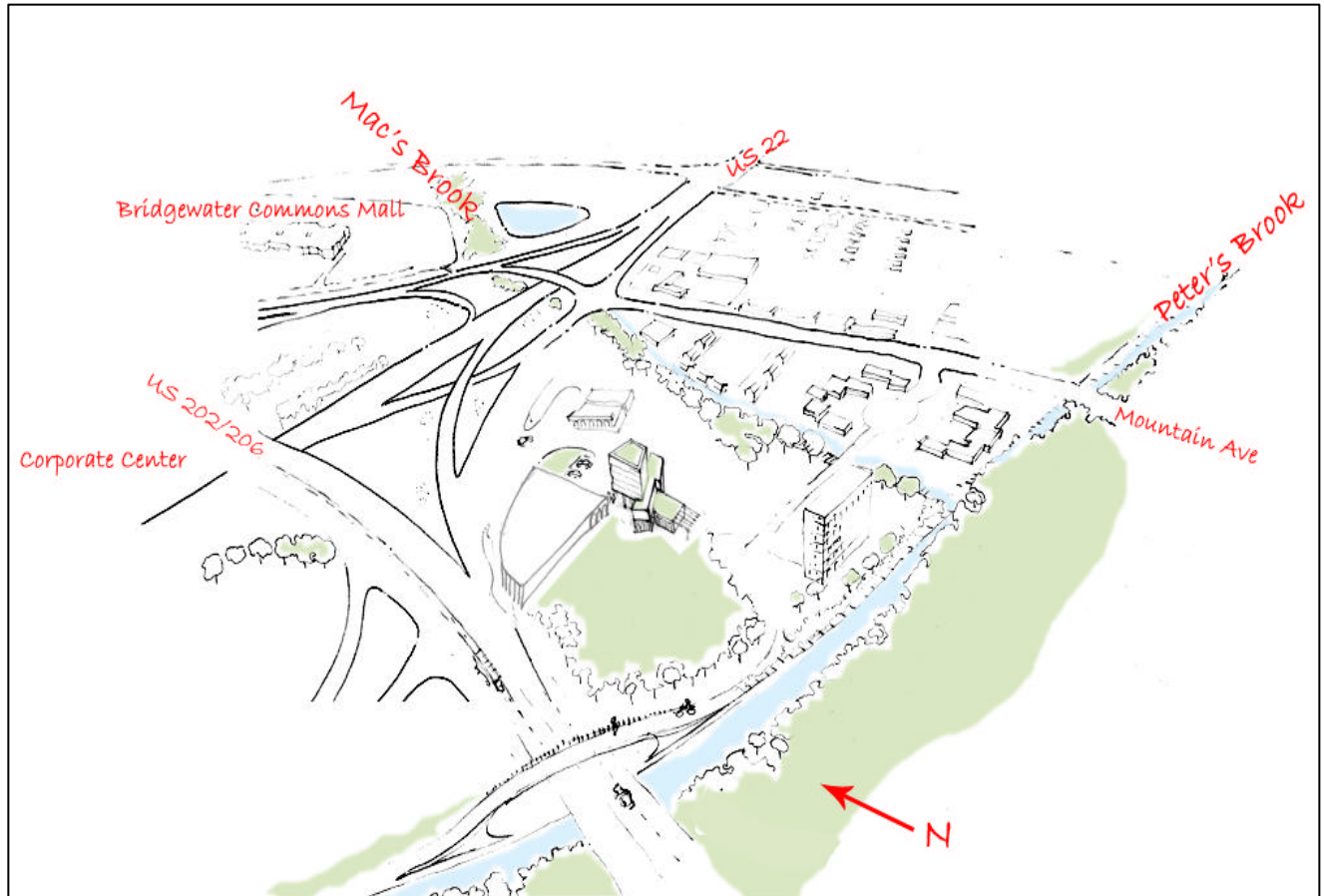
North Site Scenario #1: Commercial Cluster Development along Highway
Serving the automobile-oriented Rt. 202/22 Interchange on the north side, with pedestrian access to the adjacent residential communities on the south side, this scenario works at different scales for different user groups.

The commercial development adjoining a common space is comprised of two intersecting buildings, with ground floor retail below and office space above. Parking will be shared with the adjoining roadway properties.

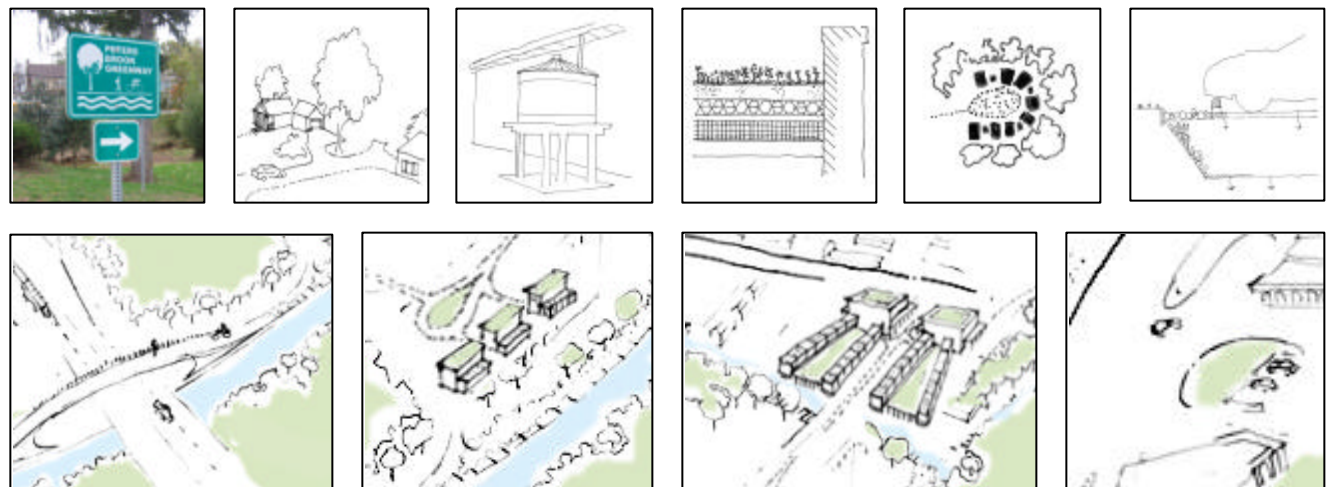
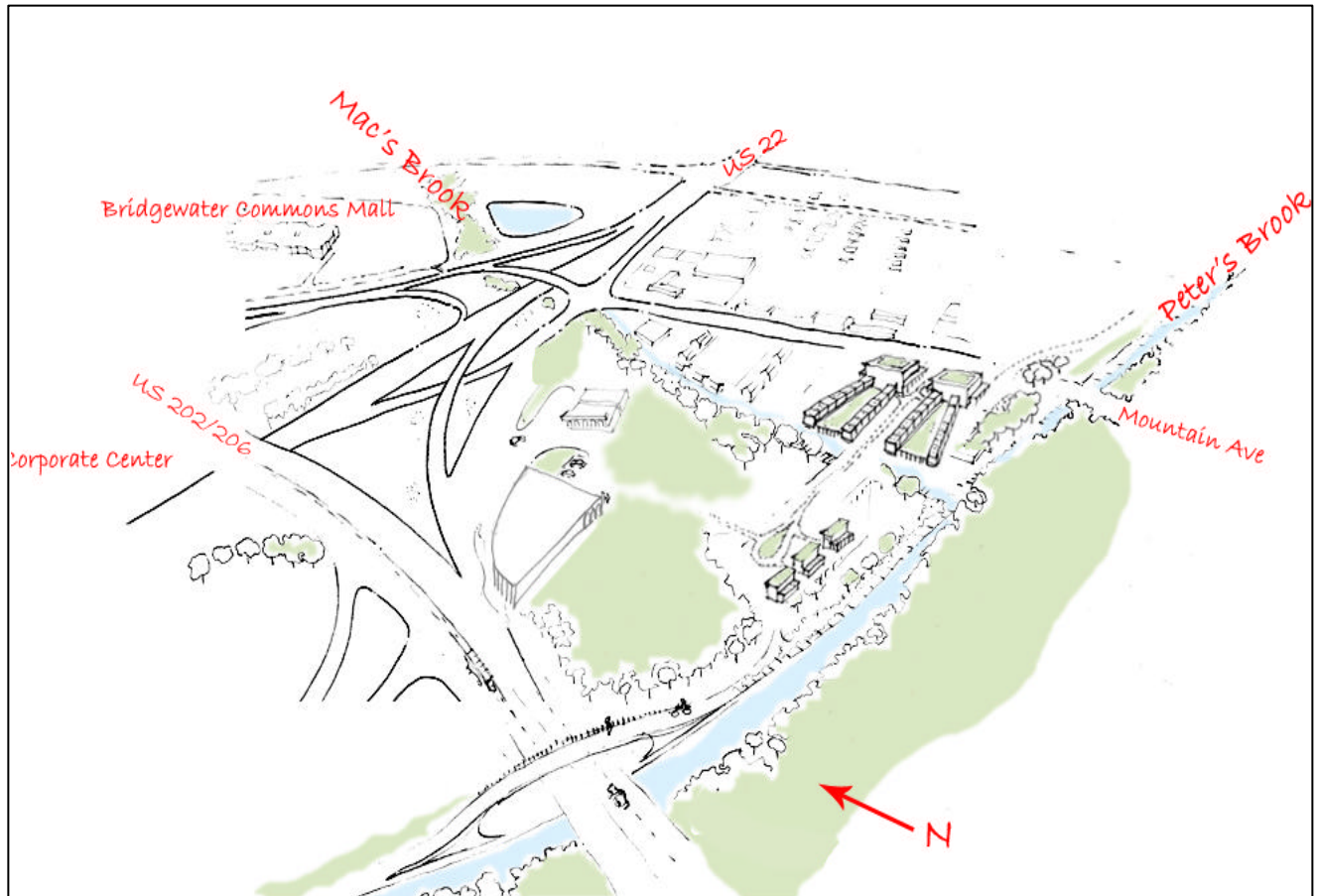


North Site Scenario #2: Development / Preservation within Site Boundaries

Adjoining commercial developments serve the automobile-oriented Rt. 202/22 Interchange on the north side, with pedestrian access to the adjacent residential communities on the south side. A small store, serves both the residential community and highway user groups.



North Site Scenario #3: Clustering adjacent MF residential lots as single project using TDR
 Coordinated redevelopment plan outside North Site, with opportunities for denser development away from sensitive watershed areas, especially along Mountain Avenue. Incorporates adjoining residential lots, including mansion across Peter's Brook into one overall development plan.
 Adjoining commercial developments serve the automobile-oriented Rt. 202/22 Interchange on the north side, with pedestrian access to the adjacent residential communities on the south side. There is no building development specific to North Site, only a scenic pathway through the property.



Advantages and Disadvantages

North Site

Highway clustering

Advantage

- Provides an extension of the Peters Brook Greenway
- Increases property values
- Revitalization of the commercial strip
- Reinforcement of commercial activity surrounding Route 202/206 and 22 intersection
- Provides commercial services to two different users (highway and residential) at two different scales (car-oriented and pedestrian-oriented)
- Provision of neighborhood retail to adjacent multi-family neighborhood
- Creation of a walkable built environment

Disadvantage

- Additional offloading from Route 202/206
- Additional stormwater runoff

Development/preservation within site boundaries

Advantage

- Extends the Peters Brook Greenway
- Provides commercial services to two different users (highway and residential) at two different scales (car-oriented and pedestrian-oriented)
- Increases property values
- Reinforcement of commercial activity surrounding Route 202/206 and 22 intersection

Disadvantage

- Increases offloading from Route 202/206
- Additional stormwater runoff

Clustering adjacent MF residential lots as single project using TDR

Advantage

- Extends the Peters Brook Greenway
- Full preservation of sensitive environmental areas and buffer areas
- Provides an opportunity for a larger, more coordinated redevelopment plan with opportunities for denser development
- Trail provides pedestrian connection through site

Disadvantage

- Complexity of the redevelopment project
- Environmental and financial costs associated with demolition of existing structure
- Displacement of existing residential units

Design Alternatives – Site “D” (Regional Athletic Field Site)

South Site Scenario #1: Indoor Recreational / Mixed-Use and Clustered Housing

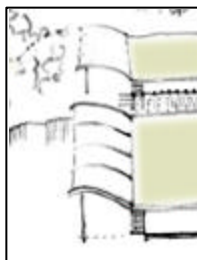
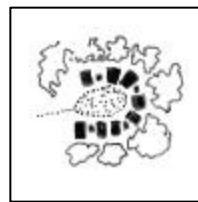
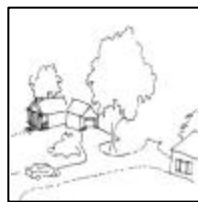
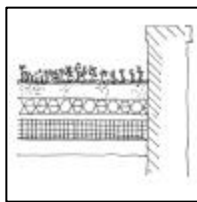
The expansion of the Torpey Athletic Complex, to address Regional Center needs

Two full-size indoor soccer fields

Common indoor space, including lounge area and groceries

Outdoor terrace overlook and three full-size outdoor soccer fields

A residential “cluster development” hamlet design of single-family homes around a common green space



South Site Scenario #2: Farming Heritage Center

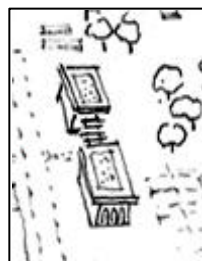
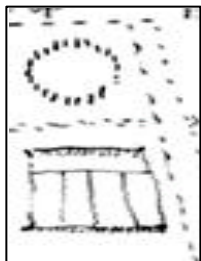
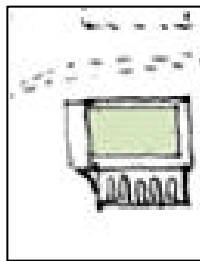
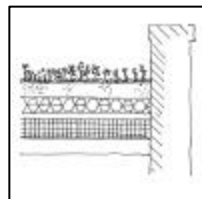
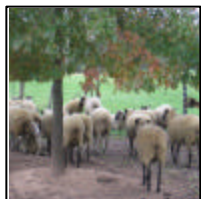
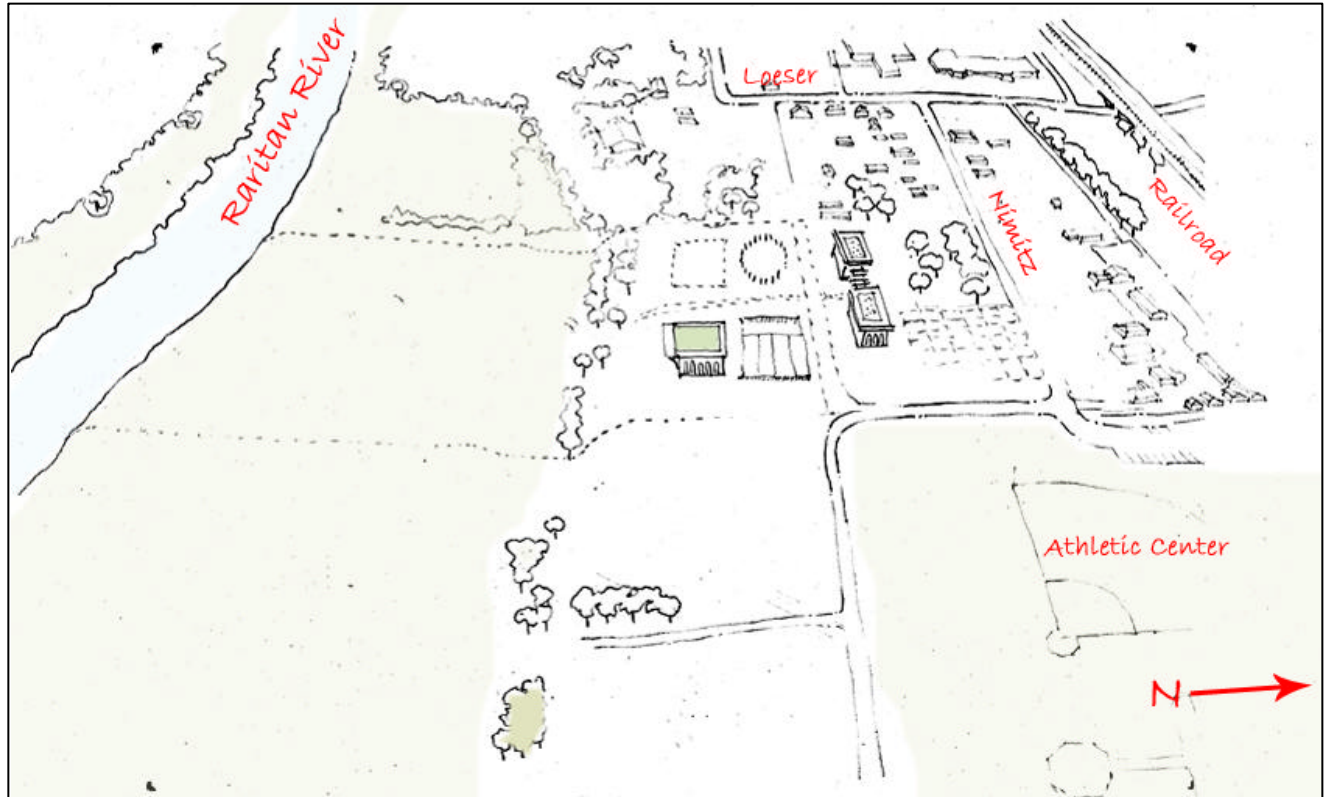
The site remains a farm and pasture, with emphasis on education and outreach to deepen public understanding of the Regional Center's farming heritage.

Educational Facility and Working Barn

Horse Stables and Equestrian Ring.

Petting pens

Pastures



South Site Scenario #3: Clustered Eco-Housing

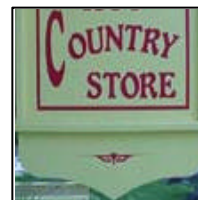
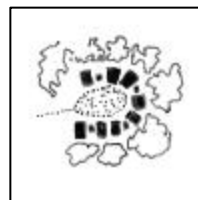
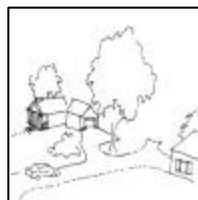
The residential development is been clustered into a smaller portion of the development site, leaving more of the site as natural open space.

Single-family homes on small lot sizes with narrow setbacks

Shared common green open space

Preserved open space surrounding development

Pedestrian-oriented community center for shopping and activities, shared with adjoining communities



Advantages and Disadvantages

South Site

Indoor recreation

Advantage

- Extends the Raritan River Greenway
- Provides indoor and outdoor recreation facilities
- Development of an official gateway to the Torpey Athletic Complex
- Reduces negative impacts to the residential neighborhood on Nimitz Street (i.e., traffic)
- Expands affordable housing

Disadvantage

- Loss of existing farmland
- Increases parking demand on athletic complex
- Additional traffic on surrounding roads
- Additional stormwater runoff

Farming heritage center

Advantage

- Extends Raritan River Greenway
- Provides an education and cultural facility on farming
- Development of an official gateway to the Torpey Athletic Complex

Disadvantage

- Increases parking demand on athletic complex
- Additional traffic on surrounding roads
- Potential negative impacts on adjacent residences from farming operation

Multi-family residential

Advantage

- Extends the Raritan River Greenway
- Increases property values
- Expands supply of multi-family housing in region
- Provides additional playing fields
- Introduction of a neighborhood oriented retail store

Disadvantage

- Additional stormwater runoff
- Reduced community use at site
- Increases traffic on surrounding roads

Conventional Build-Out Alternatives – Site “D” (Regional Athletic Field Site)

South Site Conventional Subdivision Design

The scenario displays the typical development that would most likely occur with the existing zoning.

- 16 single family housing units

- Large lots that consume the total developable area

- Wide paved driveways and streets which increase the amount of impervious surface

- No integration with surrounding recreation uses

- Increased traffic on Nimitz Street—a small local street



Concept Plans: Land Use Data (The Louis Berger Group - Ammann & Whitney)

Parcel Information Summary

Parcel Name	Municipality	Block; Lot	Property Address	Owner Name	Owner Address	Acreage	Land Value	Improvement Value	Total Value	Property Type	Taxes (2006 Total)	Zoning
Peter's Brook Site	Bridgewater Township	407; 4	Exempted - Borough of Somerville, Parkland - addition to Block 402; Lot 3			1.24						C1 - Neighborhood Business
		407; 5	Mountain Avenue	C & S Special L.L.C.	165 Mountain Ave, Box 617 Somerville, NJ 08876	1.19	\$59,700	\$0	\$59,700	Vacant Land	\$1,194	C1 - Neighborhood Business
	153; 4.18	Near Oak Terrace	C & S Jefferson, L.L.C.	same as above	1.5	\$90,000	\$0	\$90,000	Vacant Land	\$4,068	Garden Apt.	
	153; 4.19	Near Oak Terrace	C & S Jefferson, L.L.C.	same as above	1.5	\$90,000	\$0	\$90,000	Vacant Land	\$4,068	Garden Apt.	
					TOTAL		5.43	\$239,700	\$0	\$239,700	--	\$9,330
Regional Athletic Site	Bridgewater Township	300; 18	Meyer Street	Rosania & Meyer	167 Nimitz Lane Bridgewater, NJ 08807	2.98	\$300	\$0	\$300	Farm Qualified	\$5	R-10
		300; 19	Watson Street	Rosania & Meyer	same as above	3.3	\$300	\$0	\$300	Farm Qualified	\$5	R-10
	300; 20	Elizabeth Street	Rosania & Meyer	same as above	2.45	\$200	\$0	\$200	Farm Qualified	\$3	R-10	
	300; 21	Nimitz Street	Rosania & Meyer	same as above	0.46	\$143,100	\$60,800	\$203,900	Residential	\$5,078	R-10	
	300; 22	Meyer Street	Rosania & Meyer	same as above	1.6	\$100	\$0	\$100	Farm Qualified	\$2	R-10	
				TOTAL		10.79	\$144,000	\$60,800	\$204,800	--	\$5,093	

Source: Somerset County, 2006; Township of Bridgewater Tax Map and Zoning Map; Borough of Somerville Tax Map and Zoning Map.

Conclusions, Lessons Learned and Implications to New Jersey's Urban and Suburban Watersheds

The focus of development/redevelopment in specific areas in New Jersey has considerable importance to the northern and western part of the Lower Raritan Watershed Management Area (WMA9), a more populated area with a number of brownfield sites. Although many criteria have been developed with regard to development or open space in pristine or environmentally sensitive areas, there is a major need to address opportunities for and watershed protection implications of redevelopment within urban and suburban areas. In more urbanized areas, a critical need exists to tie water quality to socio-economics. Impervious cover is of concern in this area. Research has demonstrated that $\geq 30\%$ impervious surface levels leads to severely impaired waterbodies. This requires investigation into and promotion of ways to reduce impervious cover or the impact of such cover in planning new development projects, but also possible options for the decrease of impervious cover or their impacts in existing development. Greenway corridors and small “pocket parks” are also options to alleviate impervious cover, while increasing the economic value of a parcel and protecting water resources and promoting healthier air quality.

The New Jersey Water Supply Authority has created an approach for identifying undeveloped and underdeveloped properties near surface waters. The Authority has also developed a methodology that ascertains whether such properties are more appropriate for development or open space preservation (or a combination), in a manner that better protects water resources (such as drinking water) while improving local economic opportunity. This method has been applied to the river and stream corridors in the Somerset Regional Center (Somerville, Raritan Borough and Bridgewater Township).

The Authority has also developed GIS based mapping of the Lower Raritan WMA on a localized scale, identifying potential target sites. This will provide invaluable information for municipalities, especially where they have digitized parcel data available to complete the model.

Utilizing this information and applying the Raritan Basin Critical Open Space criteria, this project has developed a ranking methodology to identify the more desirable areas for redevelopment and related open space priorities. To test the methodology, conceptual site layouts were developed for two high priority areas in the Somerset County urban municipalities, illustrating how the criteria can be used to optimize economic, social, recreational and environmental value of redevelopment and open space preservation near surface waters.

The Regional Center Partnership of Somerset County, Inc., was a critical partner in this study. The RCP “is a unique public/private partnership, which brings together three communities [Bridgewater, Raritan and Somerville], the County, various non-profit agencies and the private sector to collaboratively work together to guide development and investment in the [Somerset] Regional Center.” (see:<http://www.regionalcenterpartnership.org/whoweare.html>).

Through their guidance two sites were identified to test the NJWSA methodology. Site one is located in Somerville Borough, southeast of Rts.206/202 and Rt.22 at the boarder of Bridgewater Township (Block 407 / Lots 4 and 5 and Block 153 / Lots 4.18 and 4.19). Site two is located in Bridgewater Township, adjacent to Somerset County's Riverside Park and immediately southwest of the Frank "Nap" Torpey athletic complex (Block 300 / Lots 18, 19, 20, 21, and 22). Both of these sites are privately owned, with no public rights of access. The use of these sites is for case study purposes only, and should not be considered as an indication of proposed public action.

Development opportunities and environmental constraints were analyzed for each site and three concept plans were developed for each. The concept plans were presented to the Somerset Regional Partnership in March 2007 and copies of the report were made available to support other County planning initiatives.

During the course of the study several problems were encountered which influenced the direction of the effort. The parcel based data, so crucial to the study, was being updated by Somerset County in the early phases of the study. Even with the update there was a two to three year reporting delay of land use data and many properties, initially identified as potential redevelopment site, had in fact been developed. It was observed however that this might have, in an anecdotal way, offered credibility to the employed criteria. Establishing a valid methodology for defining "underutilized" was a trial and refine endeavor. The County Planning staff recommended the use of the one-third improvement to land value ratio, since such was recognized by the State as a criterion for establishing areas in need of redevelopment. It is acknowledged that other criteria must be satisfied before redevelopment plans can advance.

Small non-residential lots (<5000 sq. ft.) in an urbanized setting play an important role in local economic development strategies. Accordingly, the study did not set a minimum lot size for inclusion in the inventory. The inventory of potential development / redevelopment sites was found to be useful to the local municipalities in the Somerset Regional Center. Economic development professionals (both public and private) typically maintain an inventory of actively marketed sites and vacant properties. The inventory of underutilized properties added another source of information for use by these professionals. It should be noted that inventories such as these must be periodically updated and key properties should be field verified to maintain accuracy. Last, a thorough record search should be preformed on any property to identify any restrictions of record beyond local land use regulations and state and federal permitting requirements.

References

Bridgewater Township 2005 Master Plan Amendment and Reexamination Report
<http://www.bridgewaternj.gov/masterplan.htm>

Bridgewater Township Land Use Regulations http://www.e-codes.generalcode.com/codebook_frameset.asp?ep=fs&t=ws&cb=0606_A)

New Jersey Water Supply Authority. (September 2005). *Preservation of Critical Areas in the Manasquan River Watershed, A Technical Report to identify sensitive natural resources in need of protection in the Manasquan River Watershed*. Somerville, NJ: Zhang, Jen (Yongzhen) and Van Abs, Daniel J.

NJWSA. (August 2002). *Preservation of Critical Areas in the Spruce Run Reservoir Watersheds, A Report of the Spruce Run Initiative*. Somerville, NJ: Van Abs, Daniel J., et al.

NJWSA. (December 2002). *Raritan Basin Watershed Management Project, Watershed Management Plan*. Somerville, NJ: Van Abs, Daniel J., et al.

Water Resources Protection Open Space Criteria. (January 2003).
http://www.raritanbasin.org/RBWMP_CD/RBWMPlan/Links/WRPOS_Criteria.pdf
Landscape of the Raritan River Basin Report. (August 2002)
<http://www.raritanbasin.org/landscape.html>

Somerset County Regional Center Vision Initiative
<http://www.regionalcenterpartnership.org/vision.pdf>

Somerset County Parks, Recreation and Open Space Plan
<http://www.somersetcountyparks.org/>

Somerville Borough Land Use Regulations <http://www.somervillenj.org/code.html>

Sources of Financial Assistance

New Jersey Department of Environmental Protection

<http://www.nj.gov/dep/grantandloanprograms/>

Environmental Regulation

- ?? [Combined Sewer Overflow Planning & Design Grants](#)
- ?? [Pinelands Infrastructure Trust Financing Program](#)
- ?? [Environmental Infrastructure Financing Program \(Clean Water Financing\)](#)
- ?? [Solid Waste Services Grants](#)
- ?? [Local Tire Management Fund Grants](#)
- ?? [Municipal Recycling Tonnage Grants](#)
- ?? [Diesel Risk Reduction](#)

Land Use Management

- ?? [Environmental Infrastructure Financing Program \(Drinking Water State Revolving Fund\)](#)
- ?? [Nonpoint Source Pollution Control and Management Implementation Grants \(319 Grants\)](#)
- ?? [Water Quality Management Planning - Pass-Through Grant \(604 grants\)](#)

Natural and Historic Resources

- ?? [Dam Restoration & Inland Water Projects Loan Program](#)
- ?? [Shore Protection Grants & Loans](#)
- ?? [Green Acres Grants & Loans](#)
- ?? [Green Acres Nonprofit Acquisition Grants](#)
- ?? [Coastal Blue Acres Grants and Loans](#)
- ?? [Landowners Incentive Program](#)
- ?? [Historic Preservation Certified Local Government Grants](#)
- ?? [Green Communities Challenge Grant 2000 \(Urban and Community Forestry Program\)](#)
- ?? [Community Stewardship Incentive Program Grant](#)
- ?? [National Recreational Trails Program](#)

Compliance and Enforcement

- ?? [County Environmental Health Act Grants \(CEHA\)](#)

Office of Local Government Assistance

?? [Matching Grants for Local Environmental Agencies \(ESP Matching Grants\)](#)

Site Remediation

?? [Hazardous Discharge Site Remediation Fund](#)

?? [Petroleum Underground Storage Tank Remediation, Upgrade and Closure Fund](#)

New Jersey Redevelopment Authority

<http://www.njra.us/njra/cwp/view.asp?a=3&Q=453526&njraNav=|27894|>

“Financing is key when structuring your redevelopment project. The NJRA knows and understands the obstacles that often present themselves during the urban redevelopment process.

“In response to these challenges, the NJRA offers flexible financial solutions to address your redevelopment needs. Financing is structured on a project-by-project basis to ensure that the needs of your project are met.

“The NJRA is able to leverage its own investments to bring projects to completion by partnering with various organizations committed to the revitalization efforts in urban New Jersey.

“We Offer Financing For:

Predevelopment
Site Preparation
Site Acquisition

Other Resources:

Debt & Equity Financing
Loans & Guarantees
Credit Enhancements
Bridge Financing
Bond Financing”

New Jersey Economic Development Authority

<http://www.njeda.com/>

Low-Cost Bond Financing

[For Manufacturing](#)

[For Nonprofits](#)

[For Municipalities](#)

Loans and Guarantees

Business Development

[Small, Mid-Size Business](#)

[High-Tech Growth Funding](#)

Community Development

[Brownfields Redevelopment](#)

[Smart Growth Funding](#)

[New Markets Loans for Development and Communities](#)

[New Jersey's Clean Energy Program](#)

[Film Production Assistance Program](#)

Incentive Grants

[Business Employment Incentive Grants](#)

Tax Credits

[Technology Tax Certificate Program](#)

[New Jersey Commerce, Economic Growth & Tourism Commission](#)

http://www.newjerseycommerce.org/econ_programs.shtml

The New Jersey Commerce, Economic Growth & Tourism Commission administers these highly successful programs that directly contribute to economic development:

- ?? [**The Business Employment Incentive Program \(BEIP\)**](#)
- ?? [**Business Retention and Relocation Assistance Grant \(BRRAG\)**](#)
- ?? [**BRRAG Tax Credit Certificate Transfer Program**](#)
- ?? [**Sales and Use Tax Exemption Program**](#)
- ?? [**Urban Enterprise Zone Program**](#)
- ?? [**Energy Sales Tax Exemption Program for Salem County**](#)

In addition, the Commission helps businesses receive other incentive programs that are offered by different agencies within the state:

- ?? [**Brownfields Redevelopment Program**](#)
- ?? [**Technology Business Tax Certificate Program**](#)
- ?? [**Sustainable Development Loan Fund**](#)
- ?? [**Workforce Training**](#)
- ?? [**Technium: Customized, Streamlined, Long-Term Assistance**](#)