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Developing a Vision for Land Use and Waterfront Access in Lancaster County

Lands End Planners

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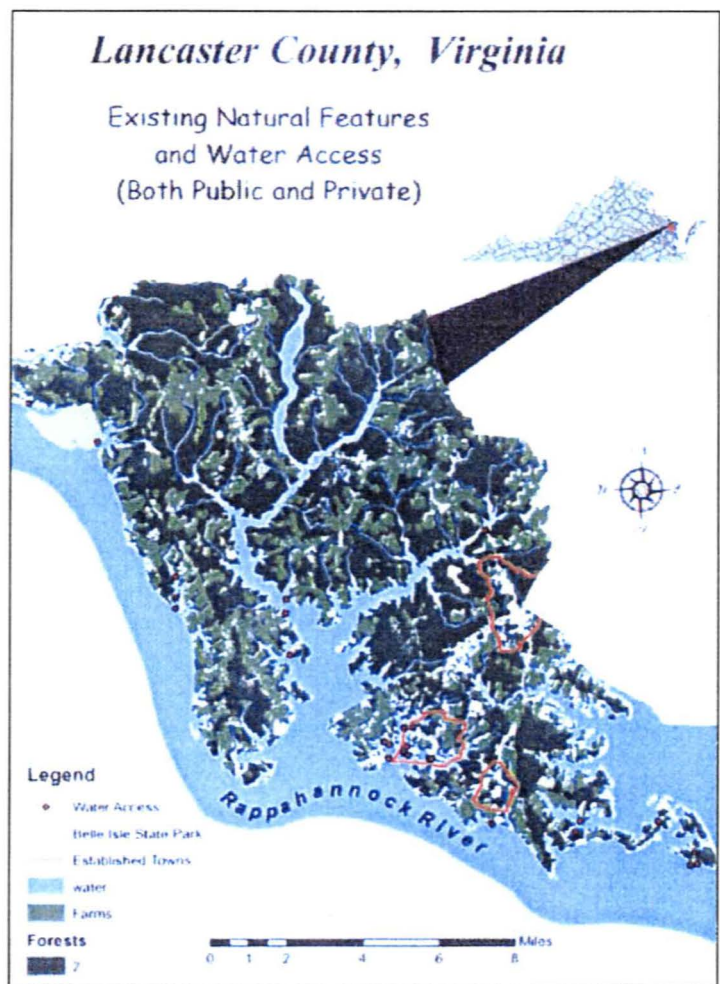
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Developing a Vision

for Land Use and Waterfront Access
in Lancaster County, Virginia



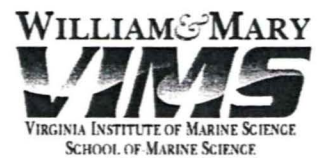
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Developing a Vision for Land Use and Waterfront Access in Lancaster County

For the past several years, zoning and land use issues have become some of the most important topics discussed throughout the Country and within the Commonwealth. Given the potential for growth within Lancaster County, it is important to provide a vision that transcends the existing five-year horizon of the comprehensive plan. The creation of a growth management plan could help to provide a blueprint for development that is acceptable to all citizens of the County.

Because residents often assume that their community's zoning regulations will protect them from inappropriate development, presentation of a graphical representation depicting how conventional zoning allows development on all buildable land would better help them understand the implications of existing policy. A build-out analysis allows a community to view its existing regulations, and to glimpse its future when all land is developed to the maximum extent allowed under law. Build-out is a tool that shows the consequences of not revising existing land-use regulations. At the very least, it helps a community to better view its future, and offers officials the opportunity to make better decisions in planning the future.



Lancaster County is located at the mouth of the Rappahannock River, at the southeastern corner of the Northern Neck of Virginia. It contains 133 square miles, and is bordered by 280 miles of shoreline, both on the Rappahannock River and Chesapeake Bay. One of the reasons people are moving to the county is its rural character. Access to the water is also an important component for both new and long time residents. Unfortunately, 97% of the of land adjacent to tidal shoreline is owned privately.

The County’s Comprehensive Plan, adopted in December of 2000, defines the vision of Lancaster as a residential and agricultural community with the Town of Kilmarnock serving as the commercial center and numerous villages as the growth centers. Throughout the Plan, the interconnections between the Town and Villages are recognized. The Plan sets the overall goal of preserving the natural beauty of Lancaster and its rural quality of life. It further identifies an inadequacy of public access sites when compared to other counties in the region. The Plan then sets specific goals for agriculture, residential growth, business development, recreation and open space, transportation, public facilities, and environmental protection. However, given the existing zoning regulations and the rate of growth between 2000 and 2005, the rural character will be lost if provisions are not made to accommodate open space.

The intent of this Build-out Analysis is to estimate the impact of growth upon Lancaster County once all developable land has been consumed and converted to uses permitted under the existing regulatory framework. To a lesser degree, the analysis may help to identify potential sites for recreational and commercial access to State waters.

LANCASTER COUNTY NEW RESIDENCES				
YEAR	SFR	MODULAR	MOBILE HOMES	TOTAL
2000	41	3	4	48
2001	73	9	16	98
2002	95	7	21	123
2003	109	4	4	117
2004	116	15	9	140
2005*	83	3	2	88

*January 1, 2005 thru May 24, 2005
 Source: Lancaster County

It is hoped that this analysis will provide the citizens of Lancaster County an opportunity to observe the consequences of the existing regulations by projecting its future when all land is developed to the maximum extent allowed under law. The analysis should be useful in the dialog regarding future land use recommendations when the Comprehensive Plan is reviewed later this year. Its intent, however is not to predict the time frame under which the final build-out will occur

Data used in the development of this project was analyzed with ESRI ARCMAP9, a Geographic Information Systems (GIS) and CommunityViz, a community modeling software designed to provide for quantitative impact analysis

The generalized steps are as follows

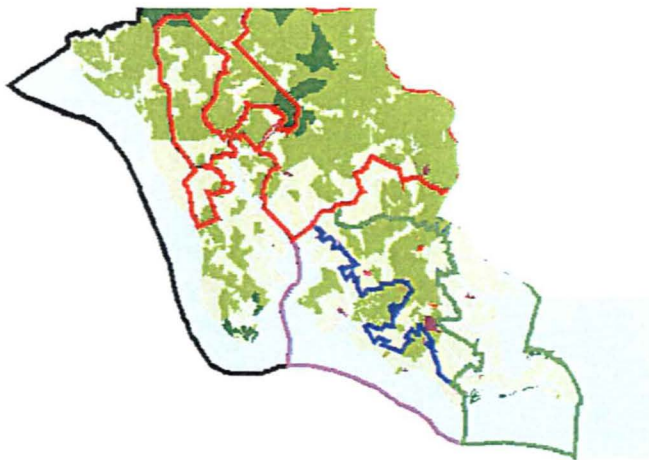
Phase I

For the initial phase, a base map of Lancaster County was created using the following layers:

Color Infrared DOQQs of Virginia
Digital Zoning Layer
Water and Streams
VDOT Digital Roads
Agricultural Fields
Forests
Magisterial Districts of Lancaster County
USDA Soil Survey Geographic (SSURGO)
Town Boundaries

It should be noted that several of the layers, most notably the DOQQ and magisterial districts are not current. However, the intent of this study is to determine potential build-out trends where absolute accuracy is not of paramount necessity.

Houses were identified and digitized from the Digital Ortho Quarter Quads. The digital town boundaries were placed over the layer in order to insure that only homes in the County were included. While the desire was to achieve a minimum accuracy of 80%, comparison of housing as provided by the 2000 Census, with those homes digitized, indicated an 86% rate. It should be noted that the photos used in this analysis were taken between 1997 and 1999. As previously noted, a more recent set is available through the Virginia Geographic Information Network. However, they are proprietary to the counties, and in the case of the Lancaster set, available to the commercial sector for a fee of \$4,226.



Five Magisterial Districts of Lancaster County

Given the immensity of the dataset, it was necessary to partition the county into units that would allow for easier analysis, with a more manageable presentation. This was accomplished through use of the five magisterial districts. Consequently each data set has been divided according to the magisterial district it represents.

Methodology and Assumptions of the Build-Out Analysis for Lancaster County

The intent of this report is to provide a snap shot of existing conditions, investigate any physical constraints to development, and apply the building potential for each area based upon its zoning designation. Given the build-out potential for this county and the considerable water frontage, additional information was provided as to existing water access, with hopes that consideration will be given to additional access as a legacy for future generations.

Several assumptions have been made that will affect the outcome of this process. They are described in the following paragraphs.

The Ssurgo soil layer provides a database with several possible constraints for development. The most notable attributes for this analysis are Poor Septic Suitability and slopes in excess of 15%. In many instances the soil designation does not coincide conveniently with the zoning line. In those cases, an area with poor septic suitability in excess of 50% was designated as not buildable. It is understood that poor septic suitability does not necessarily prohibit the construction of a home. But under most circumstances, the increased cost for the installation of an engineered septic system greatly reduces the number of homes constructed in such an area. With regard to slopes in excess of 15%, most are located in the western portion of the county. In a majority of the cases, both poor septic suitability and excessive slope were identical, and combined accordingly.

Lancaster County enacted a waterfront overlay district, in which all properties within 800 feet of tidal waterfront and wetlands recorded after 1988, must have a minimum of two acres. All attempts have been made to accommodate this regulation within the build-out scenario. However, the detail of this project is such that that several areas may have been overlooked. In all cases the intent has been to error on the side of conservative placement of additional homes within the overlay district.

Finally, serious conversations have taken place between representatives of the county and the three established towns, culminating with the creation of a lower county public sewer district. While the placement of the sewer lines has not been established, it is worthwhile to note the consequences of development once the constraints of poor septic suitability are removed. The two magisterial districts most profoundly affected will be White Stone and Christ Church. Consequently, an additional scenario has been included for those two districts.

A Brief Explanation of Community Viz

This is a program developed as an extension of ESRI ARCMAP 9. It is designed to estimate how many buildings could be built in the study area according to current land-use regulations. It is designed to place the estimated building points on a map view while taking into account the actual geometry of land-use, areas and existing buildings.

Two of the features that greatly influence the outcome of the product are Density and Efficiency factors. Density is an indication of the number of buildings per unit area. Attributes specifying land-use designations contain fields that describe the permitted densities in each polygon. For residential polygons, density is often provided in dwelling units per area, number of dwelling units, or minimum lot size per area. For nonresidential polygons, density is usually provided in floor area or by using a floor area ratio (FAR). The Lancaster County Zoning Ordinance has been identified as the source for information regarding density values for this analysis.

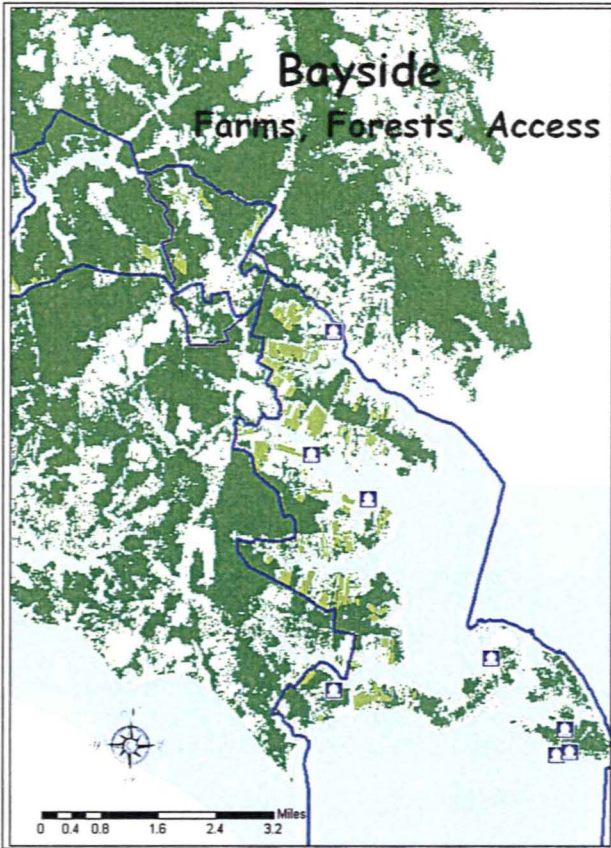
Efficiency factors adjust density values to reflect common density losses. They are entered as a percentage where 100 % means complete efficiency (no density lost), and 0% means no buildings will be estimated for that land use. In this analysis, the A1, A2, and W1 designations were estimated to lose 20% of the area as dedicated to homes, buildings and roads, with the remaining area as open space. Therefore, the efficiency information for these designations was 20%. The highest density value entered was 60%, as specified by the zoning ordinance for the R2 district.

The program is instructed to specify the building separation distances as well as a layout pattern. The building separation distances were applied based upon the Zoning Ordinance rules for the various land-use designations, and in most cases either a grid or random pattern was chosen for the layout.

After establishing the numerous physical constraints, density and efficiency factors, the program calculates the numeric build-out of allowable buildings. The spatial component then places building points on a 2D map. It converts the numeric building counts into points representing individual structures..

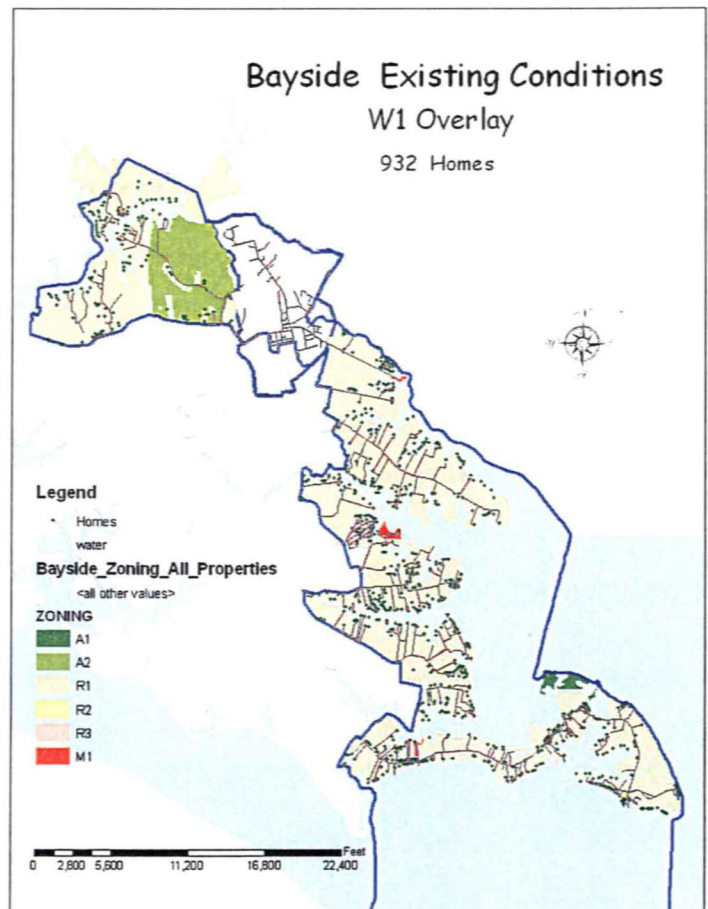
Magisterial Districts

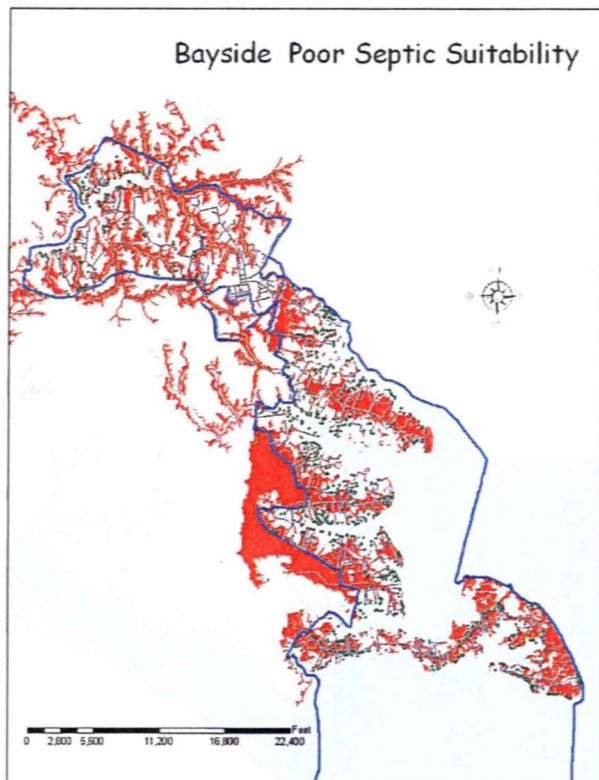
BAYSIDE



Bayside is in the southeastern portion of the county, bordered by the Chesapeake Bay and Rappahannock River. It is bisected to the north by the town of Kilmarnock. Bayside Magisterial District encompasses approximately 10,060 acres with 967 acres in farmland. There are eight identified water access points within the district, two of which are owned by Lancaster County. Westland, is a 50' section of beach located at the terminus of Highway 495, close to Windmill Point. On any given weekend in the summer the parking lot is full, as is the beach. The second parcel is a non motorized boat launching facility located ½ mile up the road from the beach site. The remaining access points are either private marinas or campgrounds.

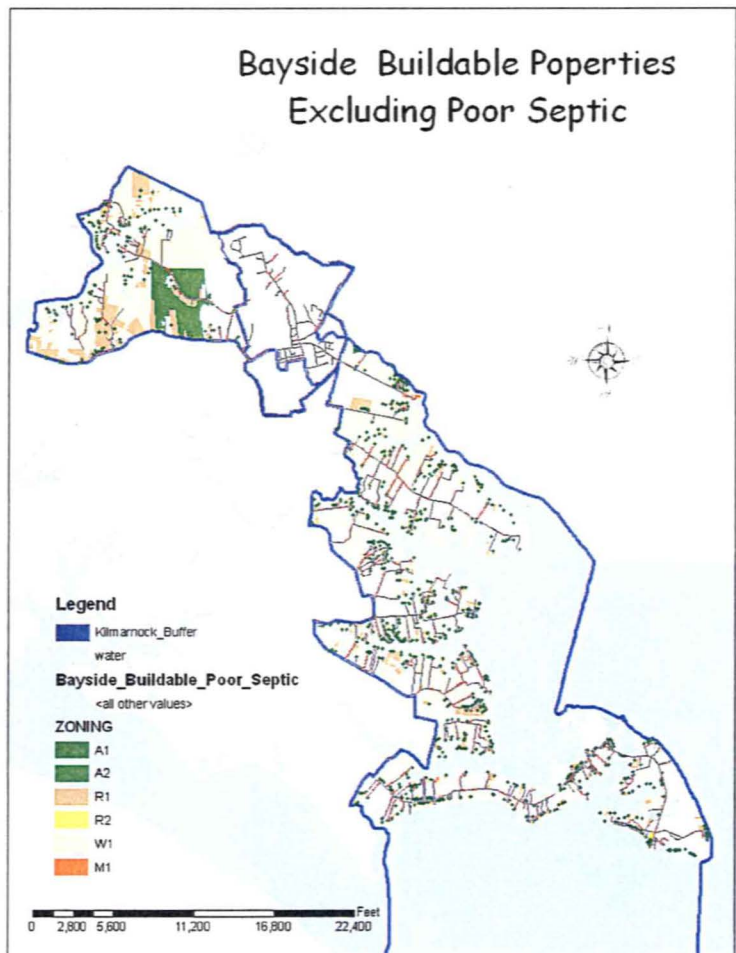
Most of this district is zoned R1 with the exception of a parcel adjacent to Kilmarnock which is zoned A2. Existing conditions indicate approximately 932 homes within the district, most of which are located along the waterfront. Given its proximity to the bay and river, a majority of the district falls within the W1 overlay. However, a considerable number of the lots have been subdivided prior to 1988.





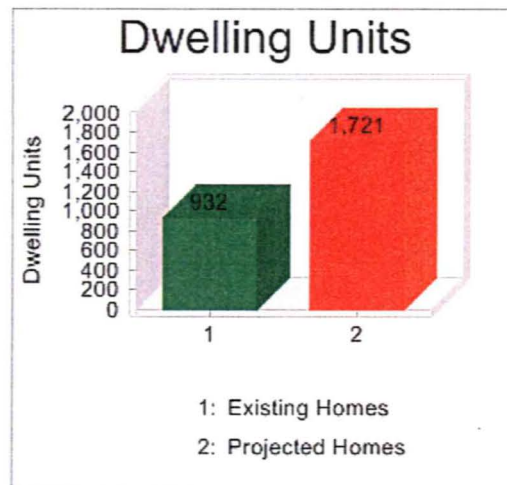
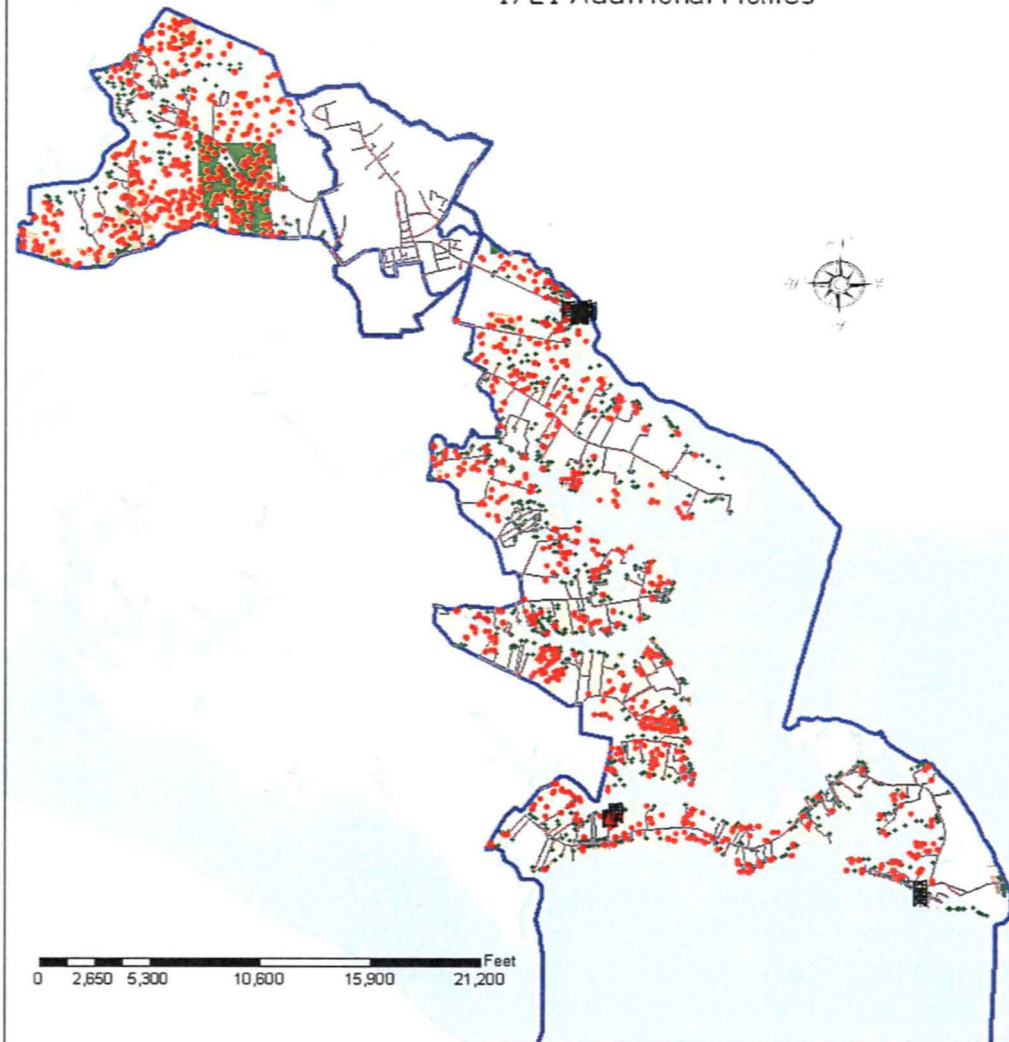
A significant proportion of the district has been designated as poor for septic suitability.

Consequently, the area of buildable properties has been greatly diminished. The resulting map of projected build-out allows for an additional 1721 homes. Due to the combined constraints imposed by the W1 overlay and poor septic suitability, a majority of the potential build-out will occur in the western region of the district.

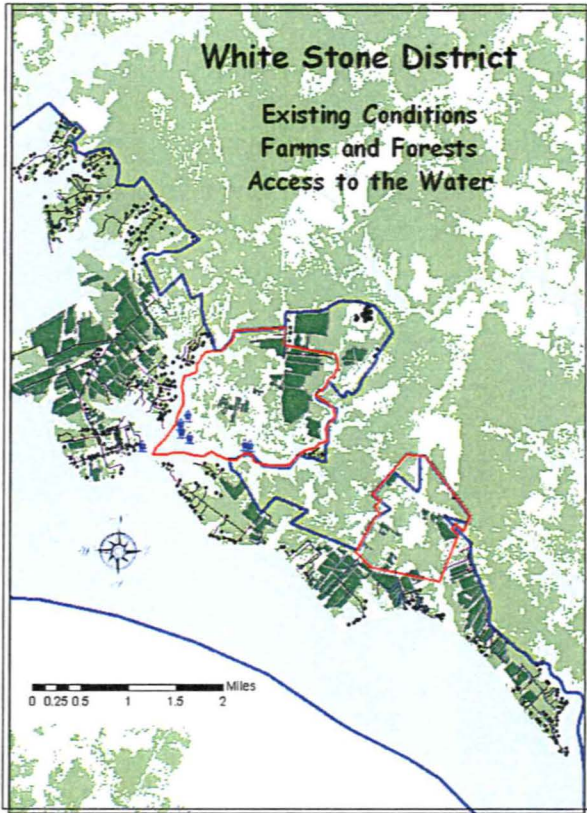


Bayside Projected Buildout

1721 Additional Homes

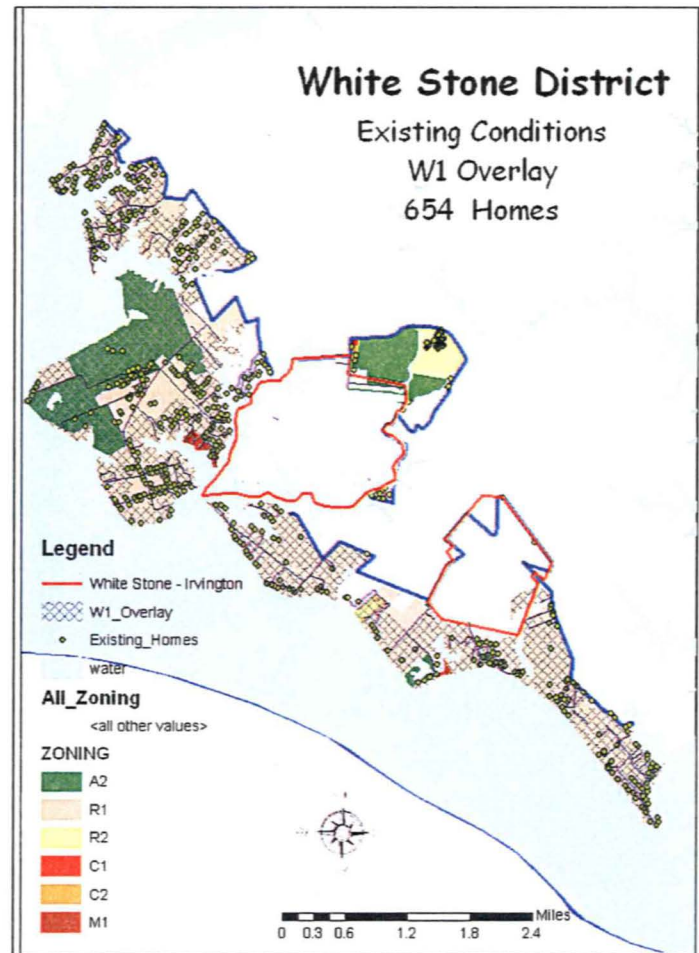


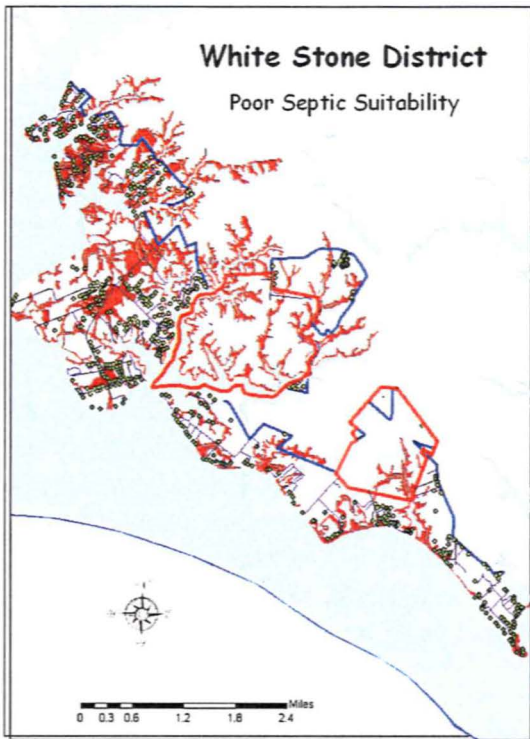
WHITE STONE



The White Stone District is flanked on the south by the Rappahannock River, and to the northwest by the Corrotoman River. This district encompasses both towns of White Stone and Irvington, and borders both branches of Carters Creek. White Stone Magisterial District encompasses approximately 4,613 acres, with 1,404 acres in farmland. There are seven identified access points within the district, all of which are located on Carter's Creek, and, with one exception, are either marinas or yacht repair facilities. There is one quasi public site which allows for boat launching with a requested donation. In addition, there are several operating commercial waterfront activities. Most are commercial seafood centers, and one operates as a shipyard, servicing vessels between 60 and 200 feet in length.

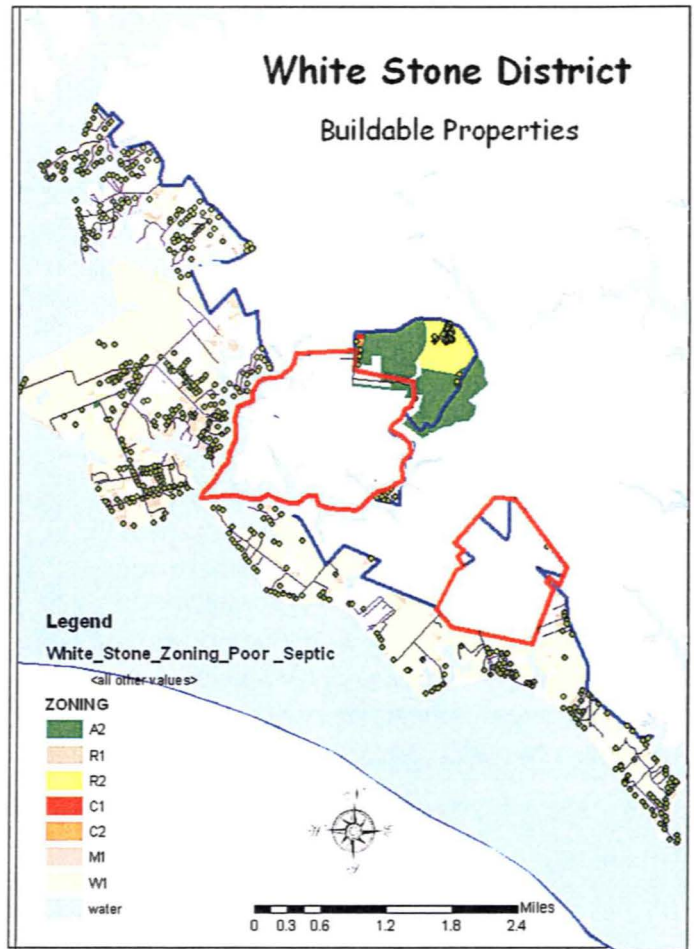
A majority of this district is zoned R1, with the exception of two parcels north of Irvington which are zoned A2 and R2, and one parcel to the west of Irvington which is zoned A2. Existing conditions indicate approximately 654 homes within the district, most of which are located along the waterfront. Like Bayside, a majority of the district falls within the W1 overlay. However, many of the lots have been subdivided prior to 1988. This district will be affected, to a certain degree, by the creation of the Public Sewer District. Consequently, an additional map has been attached to indicate the impact of public sewer installation.





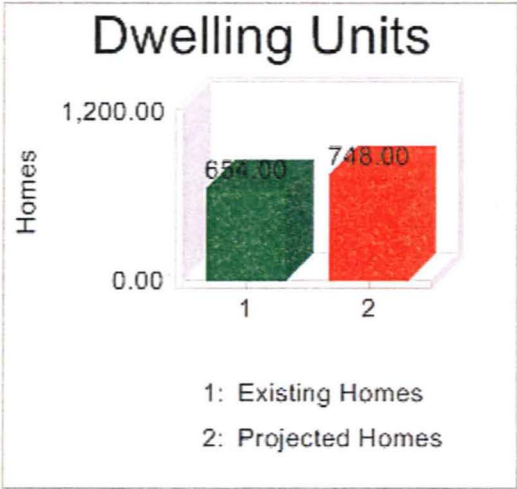
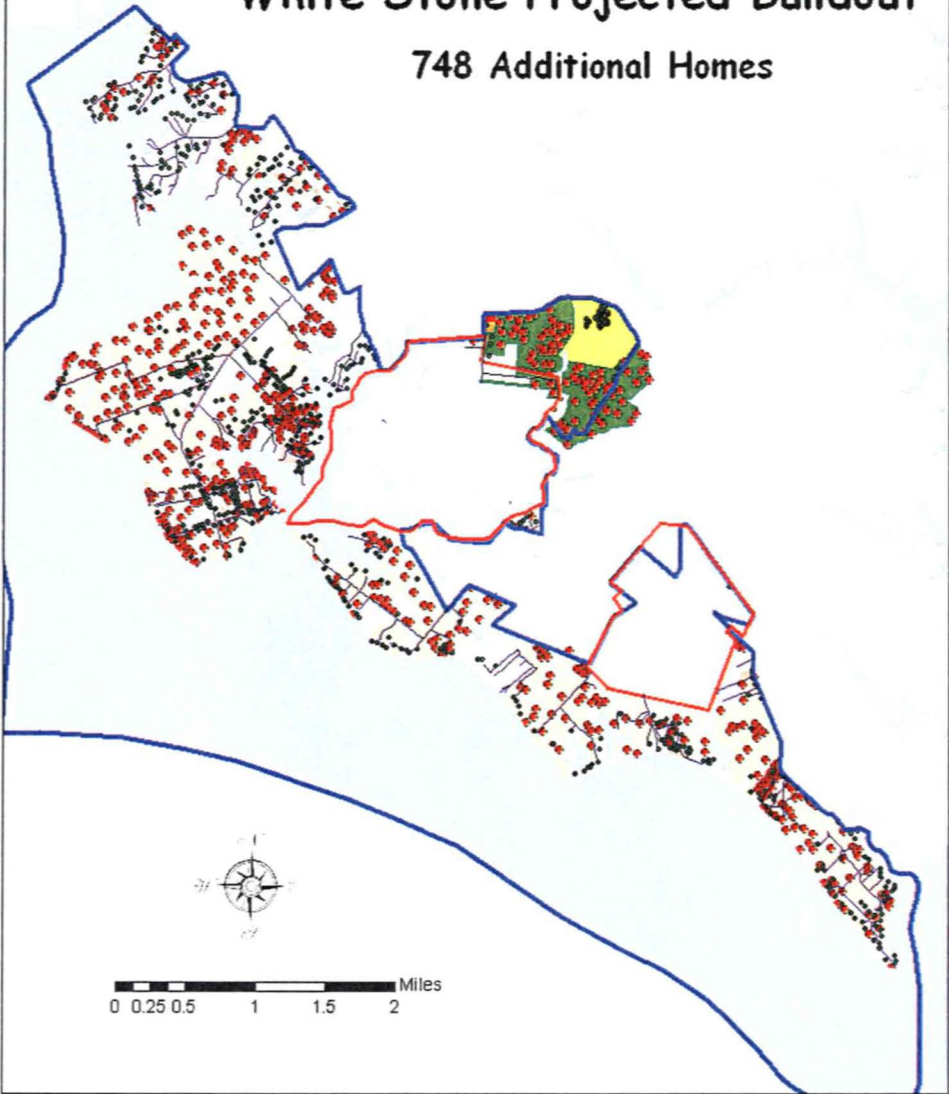
With exception of some blocks in the northwestern corner, this district is relatively unencumbered by natural constraints.

Consequently, the area of buildable properties is constrained by zoning designation, more than anything else. The resulting map of projected build-out allows for an additional 748 homes.



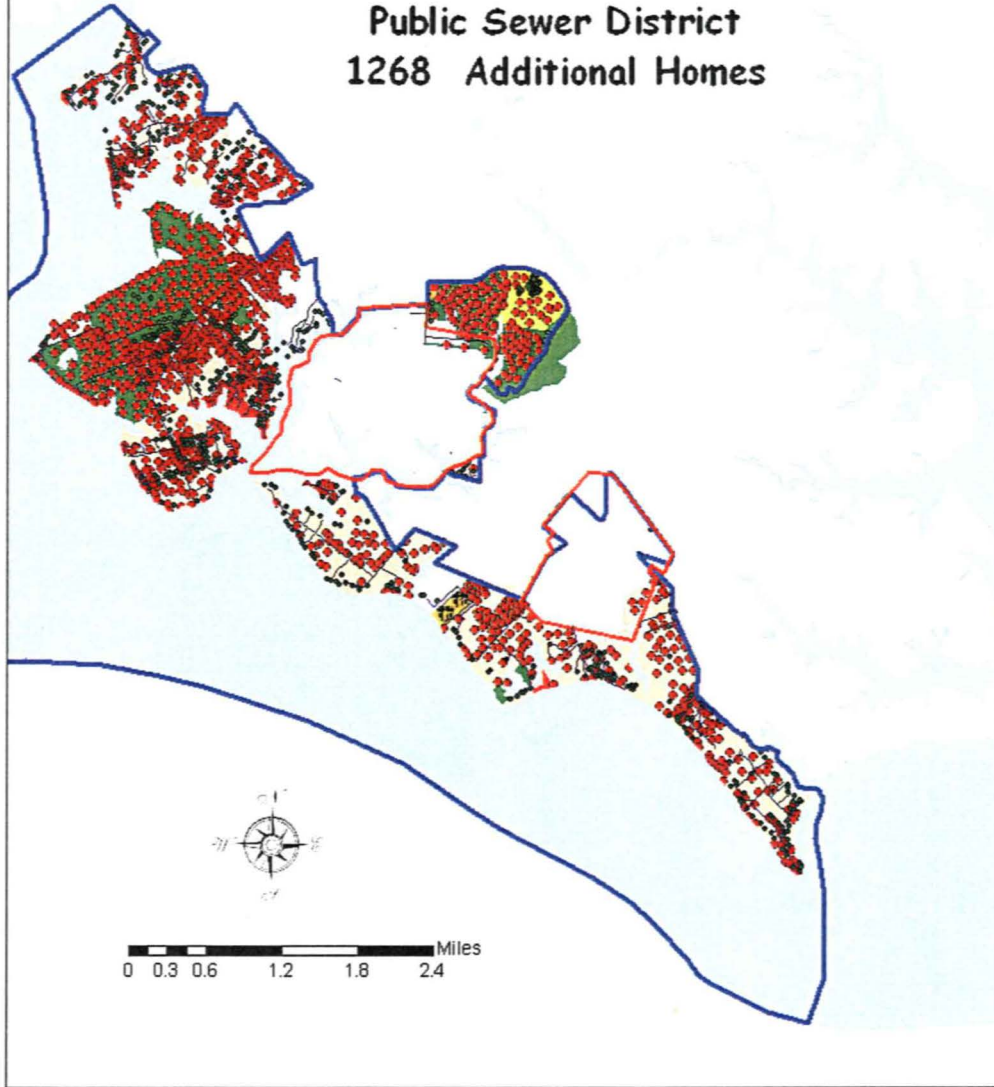
White Stone Projected Buildout

748 Additional Homes

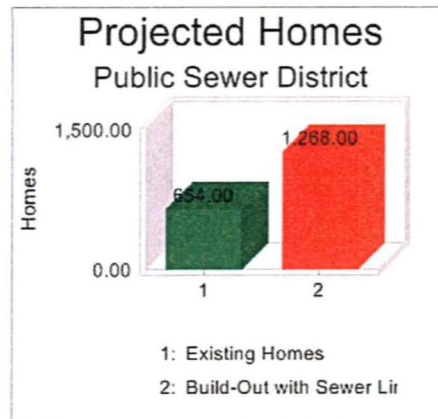


White Stone Projected Buildout

Public Sewer District
1268 Additional Homes



With the creation of the Public Sewer District, the minimum lot size for the R1 land use designation is decreased from .69 acres to .46 acres, resulting in the potential total increase of 1,268 homes. It is important to note that the W1 overly is applied to the first 800 feet from the waterline. The remainder of the parcel will be subdivided according to its zoning description.

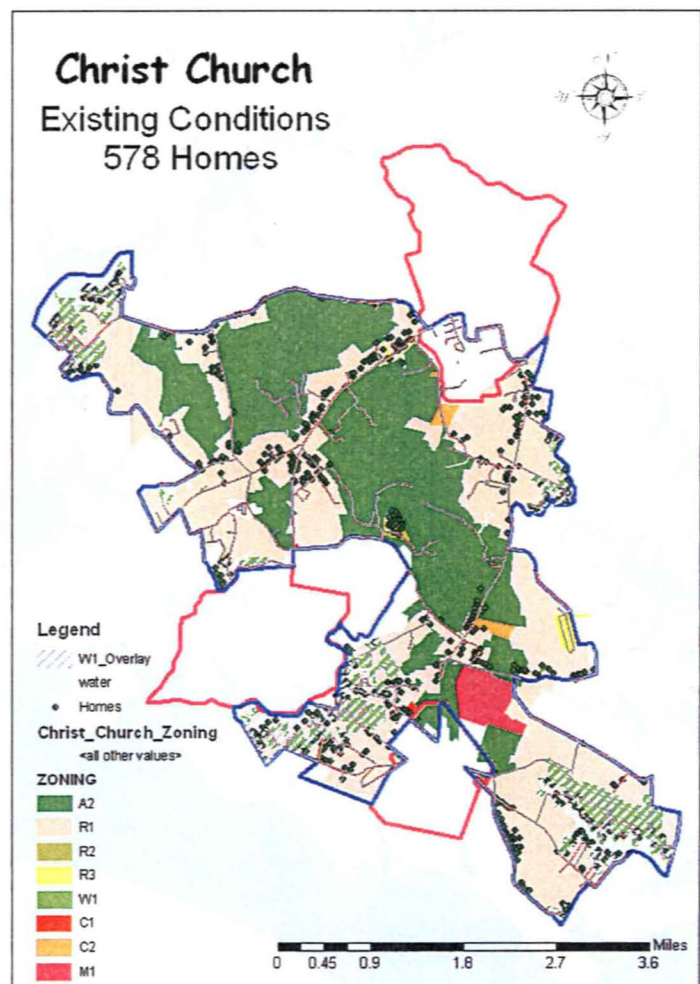


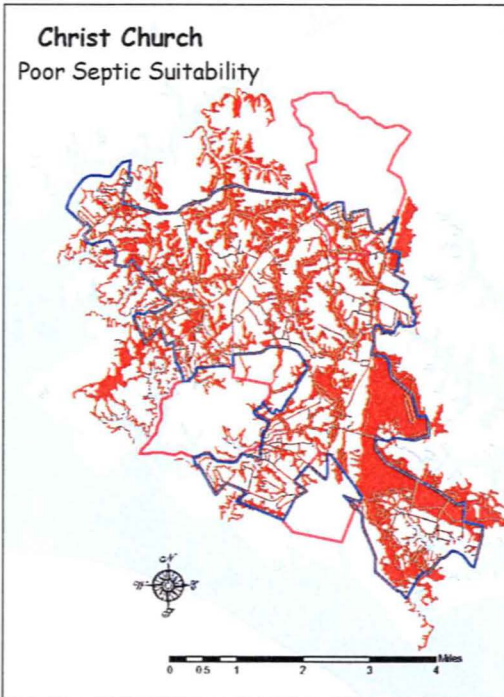
CHRIST CHURCH



The Christ Church District is, for all practical purposes, a land locked area. The exceptions are the western reaches of Antipoison Creek to the southeast, and a section of the eastern branch of the Corrotoman River to the west. This district borders all three established towns. Christ Church Magisterial District encompasses approximately 9,384 acres with 1,236 acres in farmland. There is one identified access point within the district, and it is a private boat launching facility located on Antipoison Creek. Also on Antipoison Creek are two commercial fishing operations.

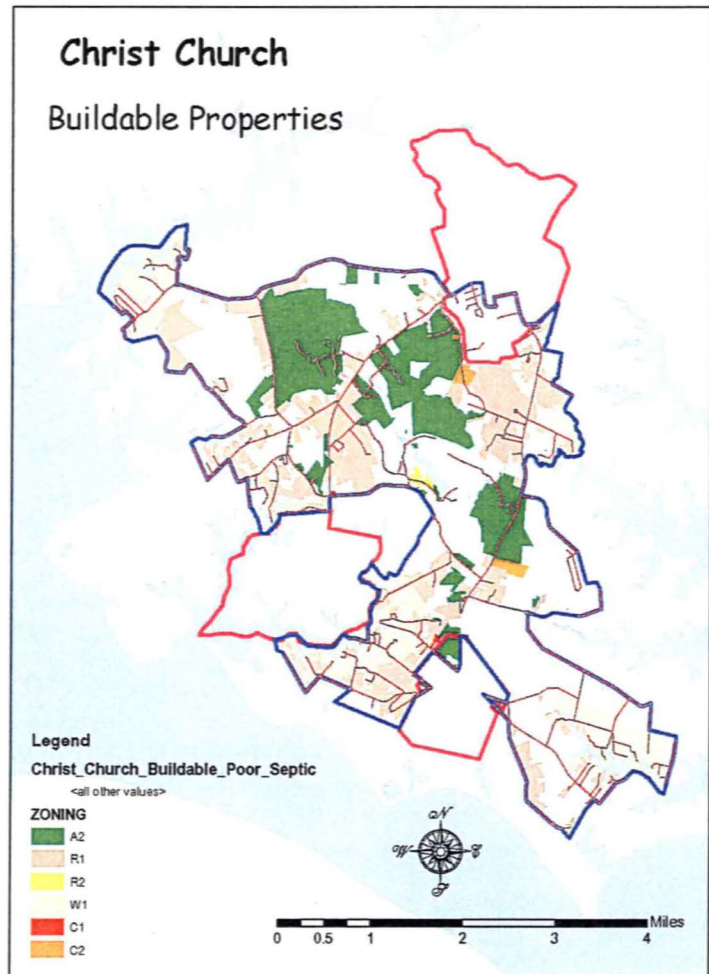
A majority of this district is zoned A2 and R1. Existing conditions indicate approximately 578 homes within the district, most of which are located along the waterfront and major corridors of State Route 3 and State Route 200. Unlike the previous two districts, a majority of this district falls outside of the W1 overlay. However, this district will be most dramatically affected by the creation of the Public Sewer District. Consequently, an additional map has been attached to indicate the impact of public sewer installation





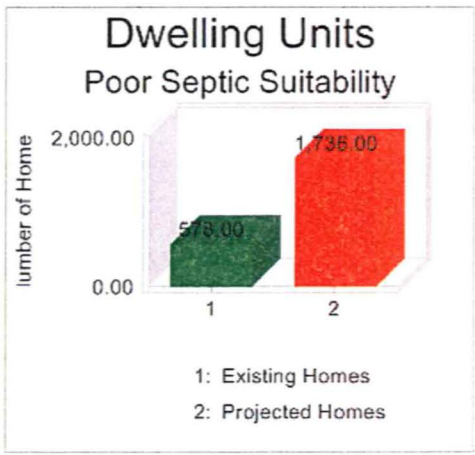
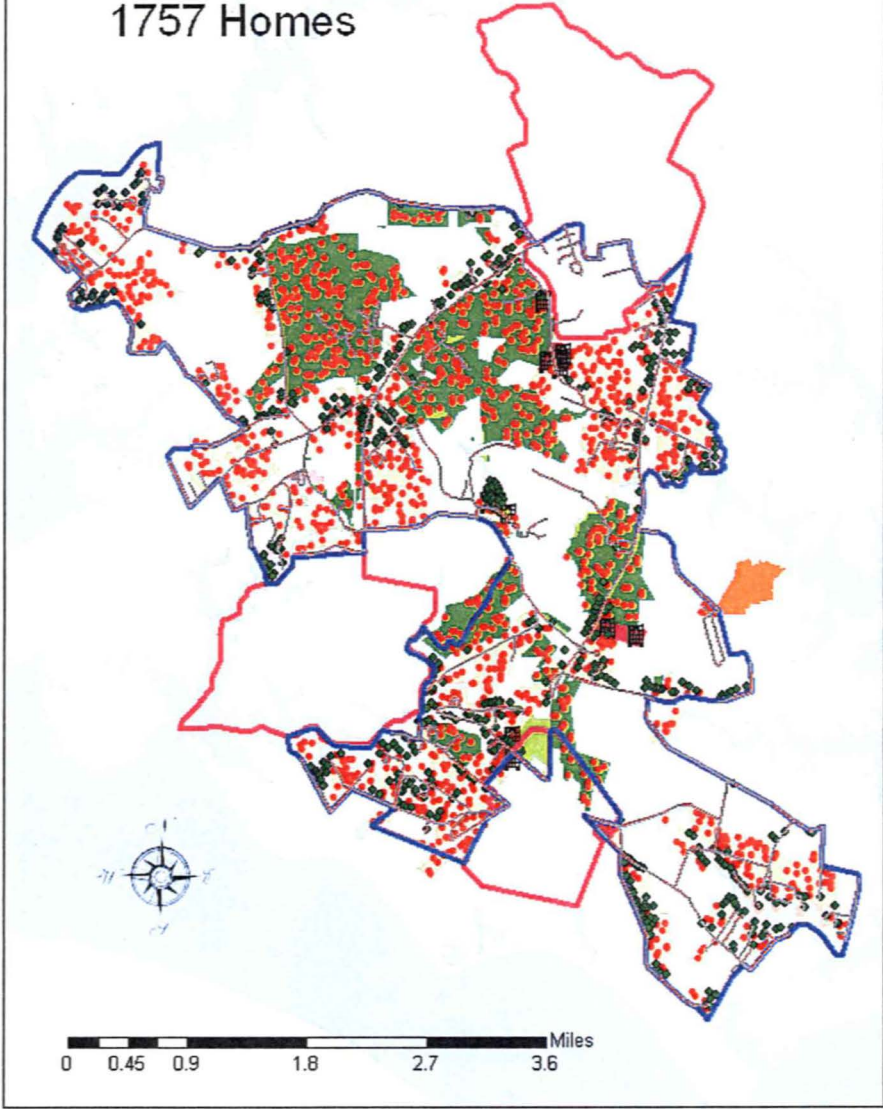
A large proportion of this district is subject to the constraint of poor septic suitability.

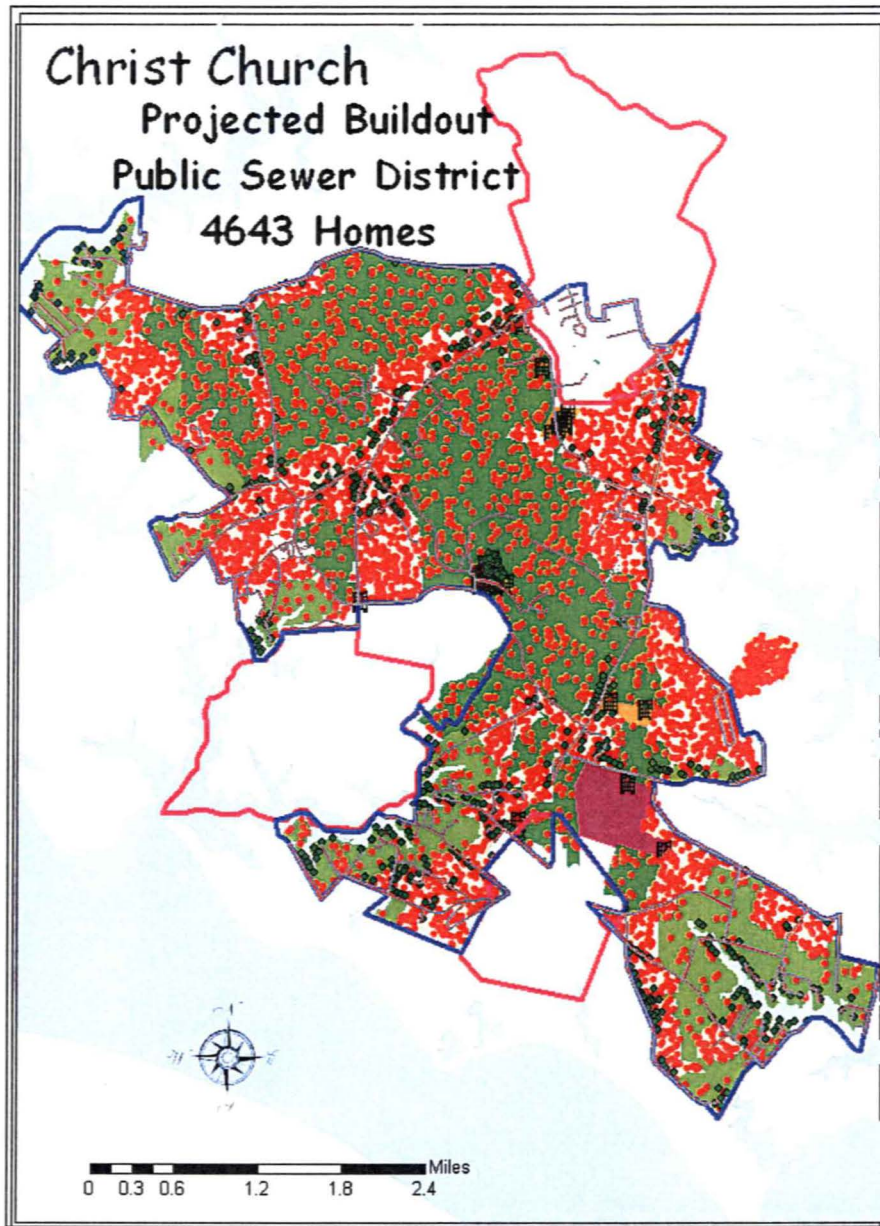
Accordingly, the area of buildable properties has been greatly diminished. The resulting map of projected build-out allows for an additional 1757 homes.



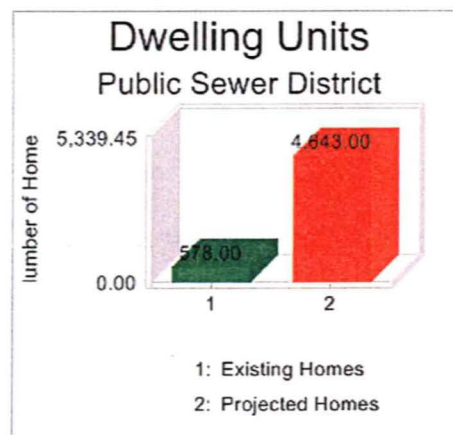
Christ Church

Projected Build Out
1757 Homes

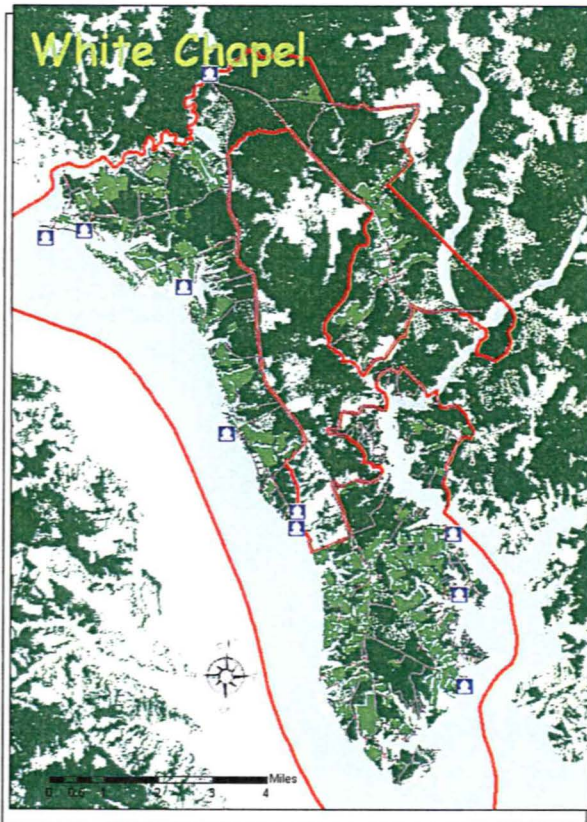




With the creation of the Public Sewer District, the constraints of poor septic suitability are relieved. In addition, the minimum lot size for the R1 land use designation is decreased from .69 acres to .46 acres, resulting in the potential total increase of 4,643 homes.

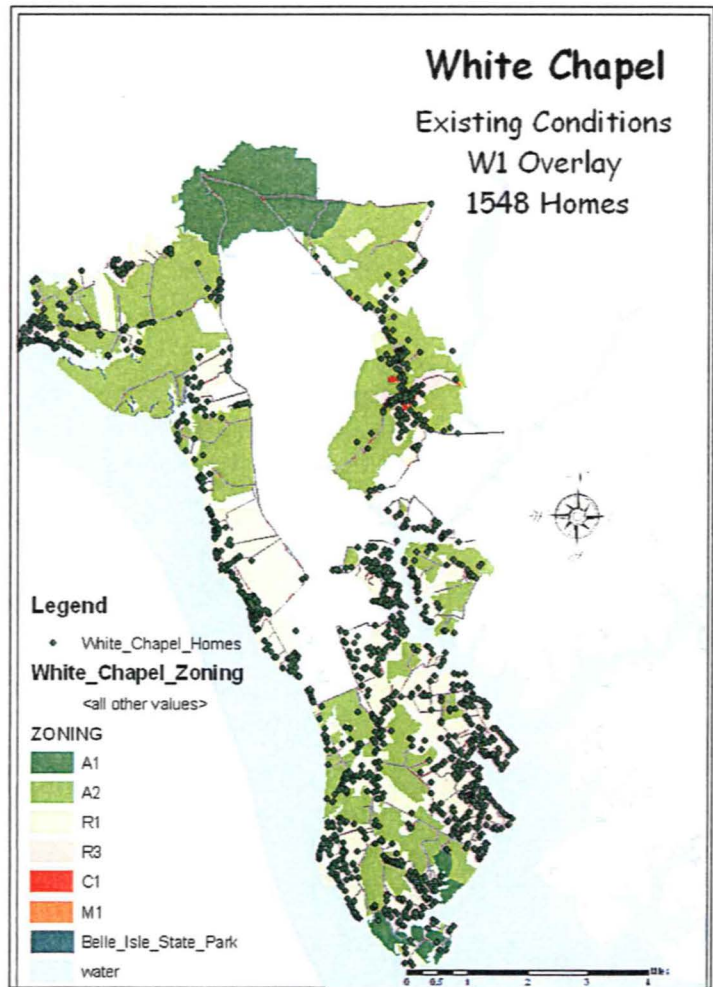


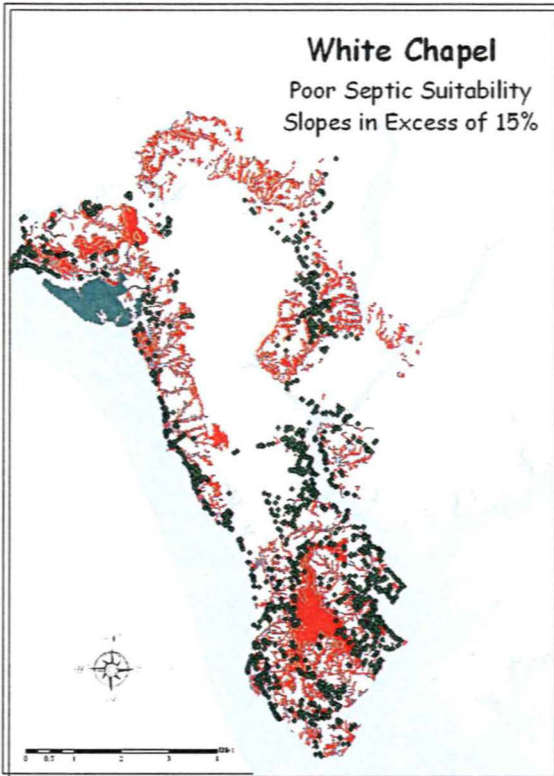
WHITE CHAPEL



The White Chapel District is flanked on the south by the Rappahannock River, and to the southeast by the western branch of the Corrotoman River. The White Chapel Magisterial District encompasses approximately 23,447 acres, with 5,053 acres in farmland. Belle Isle State Park is located on the Rappahannock River, in the northwestern section of the district. There are eight identified water access points within the district, two of which are marinas and yacht repair facilities. Two of the access points are public, one is Belle Isle State Park, the other is the south landing of the Merry Point Ferry, which is owned by VDOT.

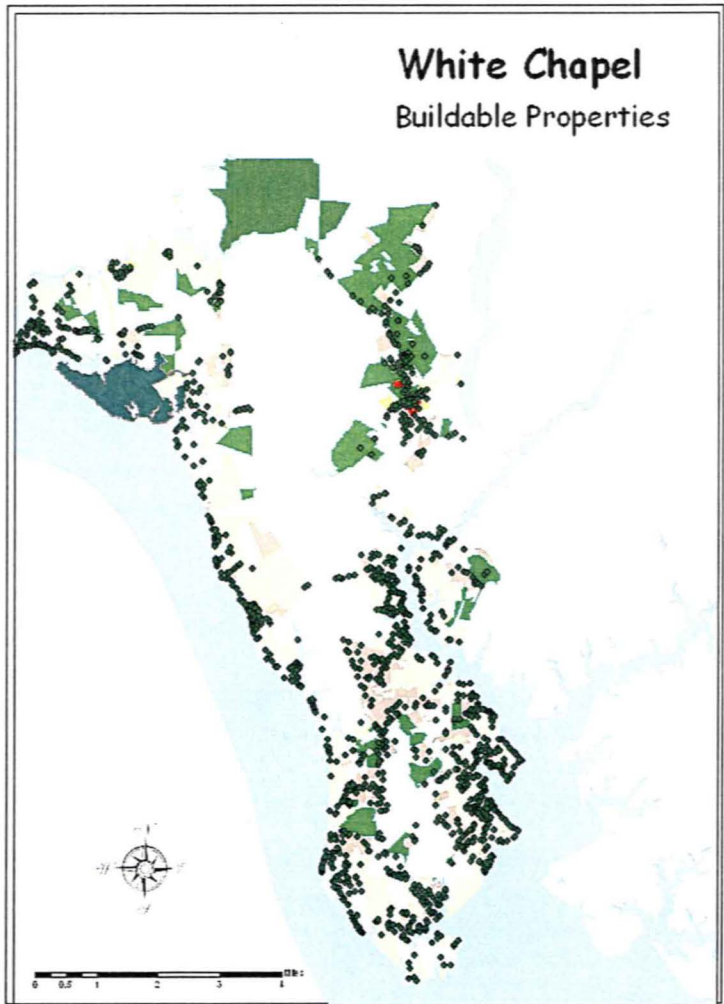
A majority of this district is zoned A2 and R1. Existing conditions indicate approximately 1,548 homes within the district, most of which are located along the waterfront and within the villages of Morattico and Lively. A large proportion of this district falls within of the W1 overlay

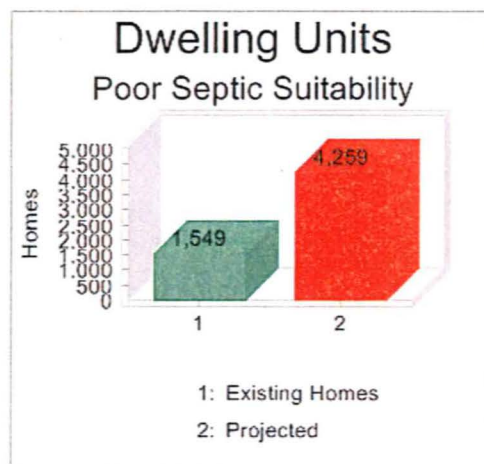
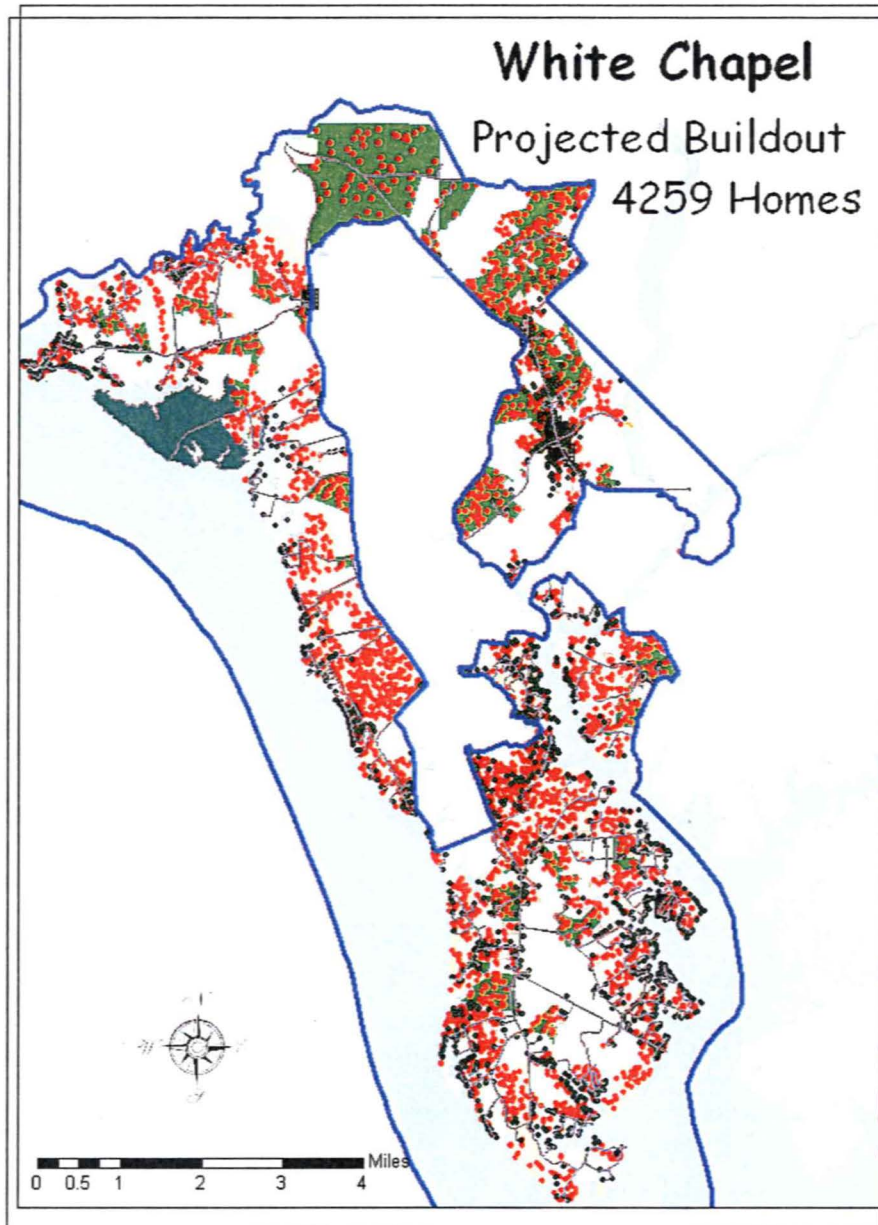




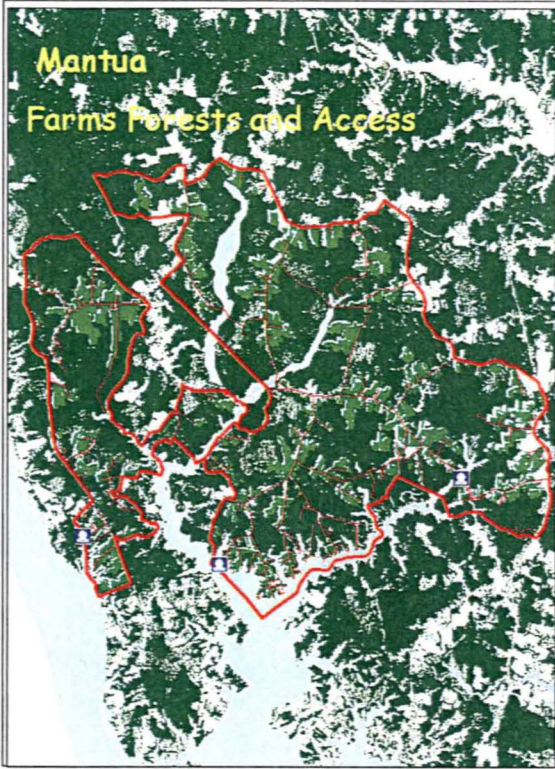
The physical constraints of poor septic suitability and slopes in excess of 15% have been combined, thereby creating a noteworthy area to the south, and to a lesser degree, in the northwest.

This is one of districts where it was difficult to designate the difference between buildable and non-buildable parcels, given the configuration of the physical constraints. Nevertheless, efforts were taken to identify those parcels with 50% or greater of poor septic suitability or steep slopes as not buildable. Due to the combined physical constraints and those imposed by the W1 overlay, a majority of the potential build-out will occur in middle section of the district. The resulting map of projected build-out allows for an additional 4,259 homes



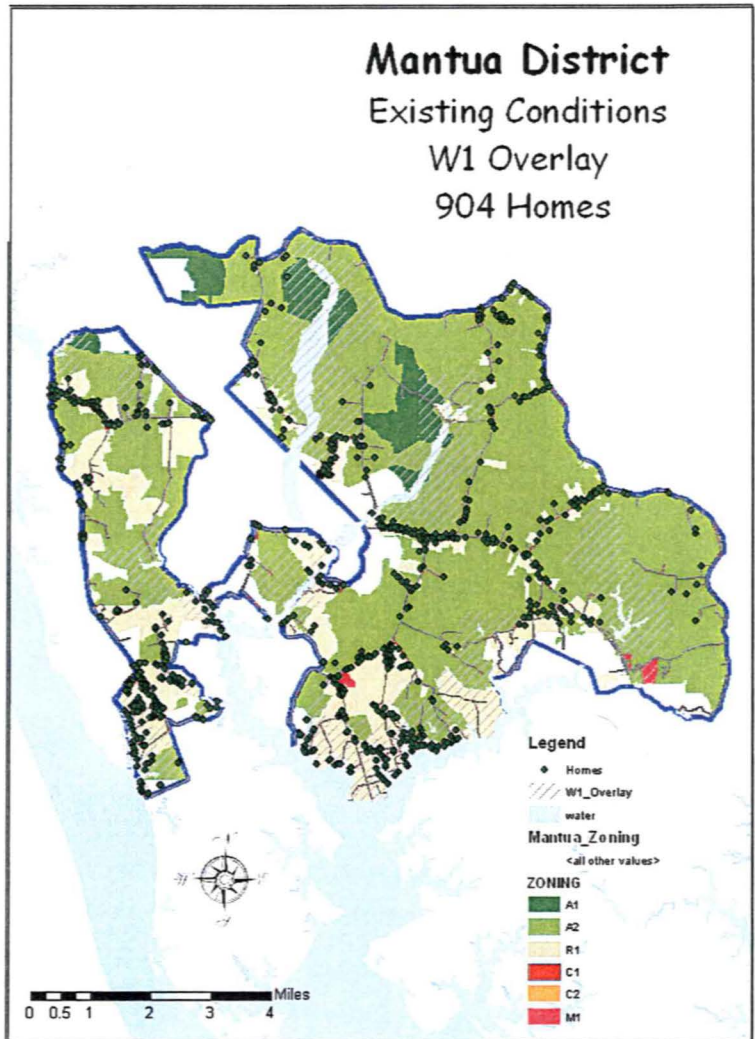


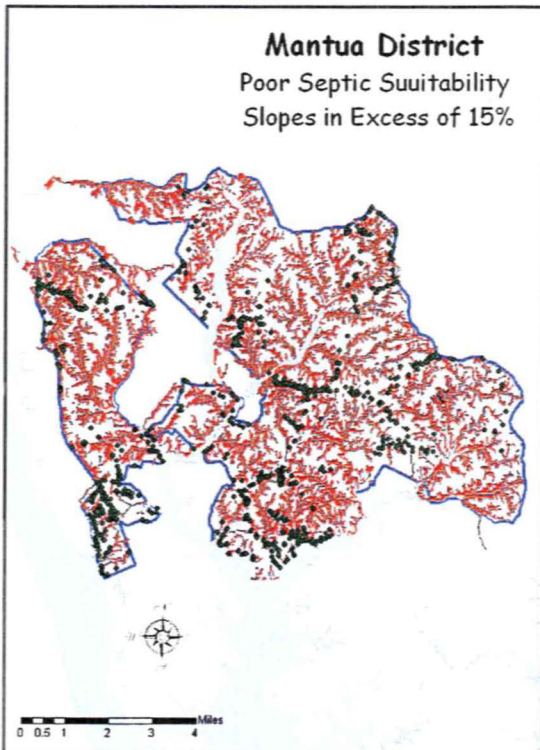
MANTUA



The Mantua District is bounded to the south by the shores of western and eastern branches of the Corrotoman River. The Mantua District Magisterial District encompasses approximately 37,036 acres, with 6,411 acres in farmland. There are three identified access points within the district,. Two of the access points are public. One is a public launching ramp located on Greenvale Creek, the other is the north landing of the Merry Point Ferry, which is owned by VDOT.

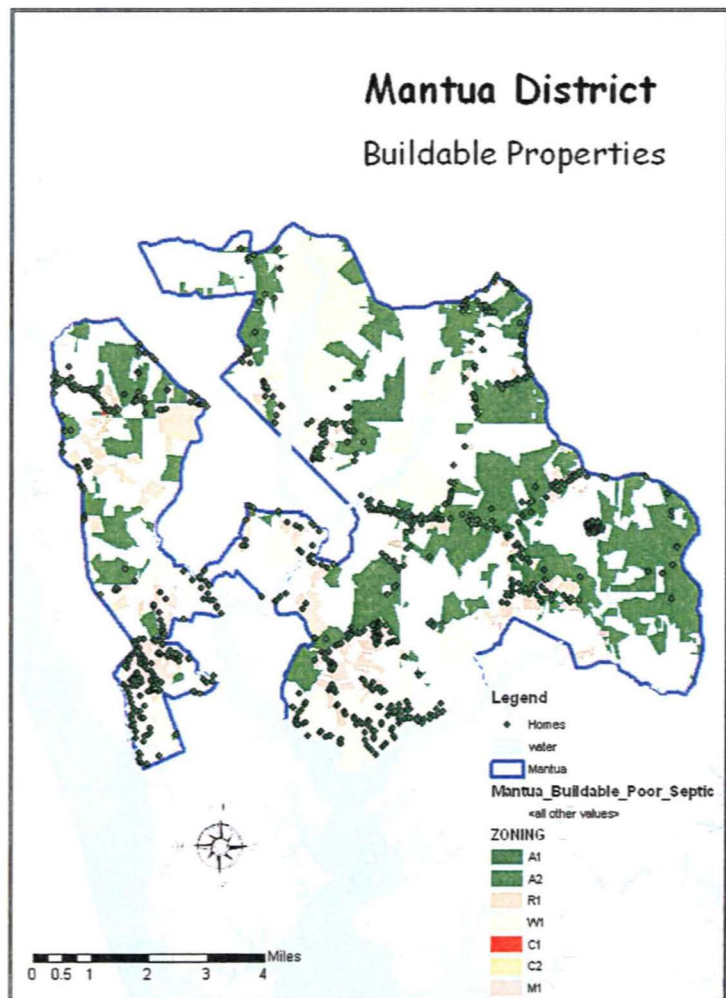
A majority of this district is zoned A2 and R1. Existing conditions indicate approximately 904 homes within the district, most of which are located along the waterfront and State Route 3 corridor. A minor portion of this district falls within of the W1 overlay





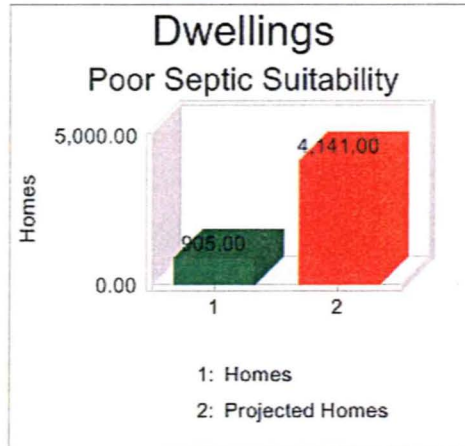
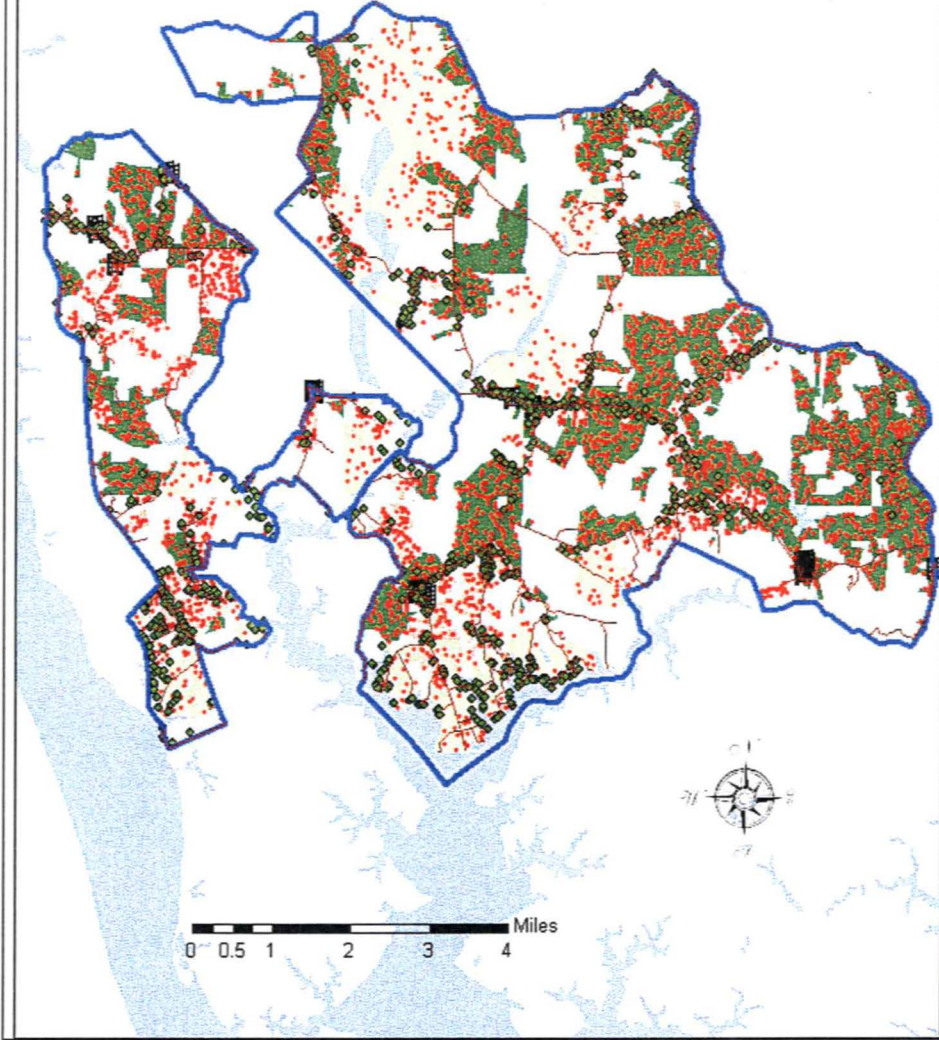
The physical constraints of poor septic suitability and slopes in excess of 15% have been combined.

This is also one of districts where it was difficult to designate the difference between buildable and non-buildable parcels, given the configuration of the physical constraints. Like the White Chapel District, efforts were taken to identify those parcels with 50% or greater of poor septic suitability or steep slopes as not buildable. Even with combined physical constraints and those imposed by the W1 overlay, the projected build-out allows for an additional 4,141 homes



Mantua Projected Buildout

4141 Additional Homes



Impacts of Future Development

Under current zoning regulations, the study area will eventually accommodate an additional 12,633 dwelling units. With an average household of 2.23 persons, this translates to an increase in population of roughly 28,171. This study clearly indicates that under current zoning, future development is likely to be characterized by large-lot, single family detached housing. This single phenomenon will have the greatest impact on the county's infrastructure. The perceived amenities of a countryside home are a powerful force indeed. Some of those single family homes will be in subdivisions with lots substantially less than an acre; others will be scattered on 2 acre parcels within the A1 and W1 overlay. People living in the countryside demand services that may not be available in the rural villages nearby. Unfortunately, there is seldom adequate infrastructure to handle the increased load; and costs for schools, roads, fire protection and other community services increase.

Lancaster County, like most local governments, depends upon property taxes for services, and in the existing climate of increased demand for dollars, will find it more difficult to balance the pressures and temptations of development with the more nebulous "quality of life". There are several friction points which bear further scrutiny.

Loss of Farm and Forest Land

There are no farms indicated on any of the build-out scenarios. This is simply because the existing zoning regulations make no accommodations for large tracts of open space. As a result, every farm and large tract of forest is vulnerable to subdivision. Moreover, it is important to note that the *American Farmland Trust* estimates that 70% of Virginia's farmland and forestland will change hands in the next 15 years. As the average age of our farmers increases, there are fewer young people to take their place. Given the gulf between commodity prices and the huge costs of farm machinery, the profit margin in farming is greatly diminished and many children have found better-paying and more secure jobs elsewhere. In numerous cases families are forced to sell some of their land to offset the cost of day

to day living. Like many farm families, their only significant assets are in land, and prime farm land is prime land for development. .

By its very nature, farmland produces services that people value and seek to secure through policy. One group's sense of well-being from knowing that there is adequate bird habitat, species diversity or groundwater recharge, should not reduce the value from those who own or maintain the land. . While direct exercise of effective demand for open space is generally not possible, all efforts should be taken to implement a growth strategy that will strike a balance between potential profit to the land owner, and open space preservation.

Transportation

The impacts of growth and development on the transportation system will be profound. Although it is beyond the scope of this study to predict all traffic impacts, it seems clear the problem of congestion will increase over time. . Not only will more people be living in the study area, but research suggests the number and length of trips each person takes will also increase. Using traffic generation figures from the I.T.E. Trip Generation Manual, , each new residential unit built in the rural areas adds roughly seven (7) to ten (10) vehicle trips per day to the roads that connect the household to the community. The more dispersed the development pattern, the more miles traveled per person by automobile.

Increases in residential traffic on rural roads will often result in intensified demands by residents for improvements to the conditions of such roads, many of which have historically consisted of narrow width. New trips may stress or exceed the designed capacity of rural roads thereby diminishing their safety and efficiency, especially as residential and agricultural traffic co-mingle. The roads also must accommodate school bus and emergency services traffic serving both established and new residences. However, more substantial improvement projects such as lane additions and road widening may be necessary on certain roads within the county in order to achieve improved level of service. Such improvements are expensive, and given the present economic climate at the state level, may not be possible as the need arises. Consequently, it is essential that development takes place with limited access to the state roads, and road linkage between projects.

Limited Water Access and Commercial Waterfront Activity

Chapter 5 of the Lancaster County Comprehensive Plan, as adapted in December 2000, makes reference to a “need to add 7 (public) access sites, for a total of 9, to reach an average of 1 access site per 31.5 miles of shoreline.” In order to address that need, the Planning Commission created a citizens advisory group to help identify additional sites for public access. In 2002 the group presented a report that recognized several potential sites. The report was forwarded to the Board of Supervisors, but to this date no action has been taken.

With 264 miles tidal shoreline, Lancaster County is all about water. However, 97% of that waterfront is privately owned. As the population of Lancaster County increases, it is imperative that present and future residents are provided with access to state waters. As previously noted, the one beachfront access owned by the county is heavily used throughout the summer. This photo identifies eight cars on a Sunday in late June 2005, with an unknown number of residents taking advantage of a 50’ wide section of beach.



With regard to commercial and industrial waterfront activities, there are varied uses throughout the county. They include marinas, repair facilities, resorts, restaurants, and seafood processing facilities. All recreationally oriented centers are in great demand by the public. On the other hand, the seafood facilities and commercial watermen are less understood and appreciated by the newer residents.

There are 134 licensed watermen in Lancaster County, who like the farmers, are threatened by a clash between the traditional way of life, and new residents with no appreciation of this time honored profession. However, both of these livelihoods represent the heritage of Lancaster County and the Chesapeake Bay. The watermen and their work activities allow for diversification of the local economy, and provide a window to the waterborne heritage of bay life. Consequently, the county should consider moving beyond the traditional "highest and best use" approach in their waterfront planning and utilize economic concepts and techniques that help to preserve water-dependent uses. By considering the value of intangibles like "quality of life" in assessing the benefit of a proposed waterfront use, the county will be better able to preserve and maintain water-dependent uses.

In the end, growth cannot be stopped. It need not, however, result in sprawling development. Growth can be planned for and managed. As this community becomes more fully developed, this pattern of land use may conflict with stated community development objectives as identified in the Comprehensive Plan. This build-out analysis can help the community determine whether its objectives, such as preserving rural character or maintaining natural resource-based industries are being accomplished via existing land protection efforts, or whether renewed efforts to target certain types of land use are appropriate.. Residents and policymakers are encouraged to use this study to evaluate current development regulations in order to guide growth in ways that are consistent with community goals and visions.

Donald McCann
Lands End Planners

Attachments: Magisterial Build-Out Reports

Build-Out Report - W1 Overlay

Analysis Name: Lancaster Bayside

Tuesday, June 07, 2005, 7:18 AM

Report Summary

This report gives details about a single run of the Build-Out Wizard for this scenario.

- Numeric Build-Out has been run
- Spatial Build-Out has been run
- Visual Build-Out has not been run

Numeric Build-Out Settings

Land Use Layer			
Layer containing land-use information	Bayside_Buildable_Poor_Septic		
Attribute specifying land-use designation	ZONING		
Attribute specifying unique identifier of each land-use area	ZONING		
Density Rules			
Land-Use Designation	Dwelling Units	Floor Area	Efficiency Factor (%)
A1	2 acre min. lot size		10
A2	0.75 acre min. lot size		20
M1		1.8 FAR	60
OUTCY			0
R1	0.69 acre min. lot size		30
R2	3 acre min. lot size	1.8 FAR	60
ROAD			0
W1	2 acre min. lot size		20
WATER			0
Building Information			
Land-Use Designation	DU per Building	Area (sq feet)	Floors
A1	1	0	1
A2	1	0	1
M1	1	0	1
OUTCY	0	0	0
R1	1	0	1
R2	6	0	3
ROAD	0	0	0
W1	1	0	1
WATER	0	0	0

Constraints to Development

Constraint Layer	Can density be transferred?
water	no
Bayside_Roads	no

Existing Buildings

Layer containing existing buildings	Value or attribute specifying DU/bldg	Value or attribute specifying floor area (sq feet)
Homes	1	0

Spatial Build-Out Settings

Settings

Land-Use Designation	Minimum Separation Distance (feet)	Layout Pattern	Road or Line Layer	Setback (feet)
A1	100	Random		200
A2	100	Random		75
M1	25	Grid		100
OUTCY	0	Random		0
R1	100	Random		75
R2	25	Grid		25
ROAD	0	Random		0
W1	100	Random		75
WATER	0	Random		0

Results

Dwelling Unit Quantities

Land-Use Designation	Numeric Build-Out	Spatial Build-Out	Difference	Existing Dwelling Units
A1	2	0	2	0
A2	95	80	15	5
M1	0	0	0	0
OUTCY	0	0	0	0
R1	1130	671	459	627
R2	0	0	0	18
ROAD	0	0	0	6
W1	494	462	32	380
WATER	0	0	0	62
Total	1721	1213	508	1098

Buildable Area			
Land-Use Designation	Gross Area (sq meters)	Net Buildable Area (sq meters)	Difference (sq meters)
A1	294116.841	622.621	293494.219
A2	1330254.32	1306439.956	23814.363
M1	60205.134	45879.127	14326.007
OUTCY	378494.163	113087.812	265406.351
R1	8481173.41	7169560.27	1311613.139
R2	68833.557	53319.028	15514.529
ROAD	168664.408	120954.583	47709.826
W1	24246616.542	21156540.649	3090075.893
WATER	78135921.017	2960260.349	75175660.668
Total	113164279.392	32926664.395	80237614.996

Exceptions			
Land-Use Designation	Number of dwelling units that couldn't be placed because of space constraints	Number of commercial buildings that couldn't be placed because of space constraints	Number of polygons where number of existing buildings exceeds build-out limit
A1	2	2	0
A2	15	15	0
M1	0	0	0
OUTCY	0	0	0
R1	459	459	0
R2	0	0	0
ROAD	0	0	0
W1	32	32	0
WATER	0	0	0
Total	508	508	0

Build-Out Report - W1 Overlay

Analysis Name: White Stone Magisterial

Saturday, June 18, 2005, 9:23 AM

Report Summary

This report gives details about a single run of the Build-Out Wizard for this scenario.

- Numeric Build-Out has been run
- Spatial Build-Out has been run
- Visual Build-Out has not been run

Numeric Build-Out Settings

Land Use Layer			
Layer containing land-use information	White_Stone_Zoning_Poor_Septic		
Attribute specifying land-use designation	ZONING		
Attribute specifying unique identifier of each land-use area	ZONING		
Density Rules			
Land-Use Designation	Dwelling Units	Floor Area	Efficiency Factor (%)
A2	0.75 acre min. lot size		20
C1		0.64 FAR	60
C2		0.55 FAR	60
M1		1.8 FAR	60
R1	0.69 acre min. lot size		30
R2		0.6 FAR	60
ROAD			0
W1	2 acre min. lot size		30
WATER			0
Building Information			
Land-Use Designation	DU per Building	Area (sq feet)	Floors
A2	1	0	1
C1	1	0	1
C2	1	0	1
M1	1	0	1
R1	1	0	1
R2	6	0	3
ROAD	0	0	0
W1	1	0	1
WATER	0	0	0
Constraints to Development			

Constraint Layer	Can density be transferred?
water	no
White_Stone_VDOT	no

Existing Buildings

Layer containing existing buildings	Value or attribute specifying DU/bldg	Value or attribute specifying floor area (sq feet)
Existing_Homes	1	0
Existing_Homes2	1	0

Spatial Build-Out Settings

Settings

Land-Use Designation	Minimum Separation Distance (feet)	Layout Pattern	Road or Line Layer	Setback (feet)
A2	100	Grid		75
C1	10	Grid		40
C2	10	Grid		60
M1	25	Grid		100
R1	50	Grid		75
R2	25	Grid		25
ROAD	0	Random		0
W1	50	Random		75
WATER	0	Random		0

Results

Dwelling Unit Quantities

Land-Use Designation	Numeric Build-Out	Spatial Build-Out	Difference	Existing Dwelling Units
A2	96	95	1	5
C1	0	0	0	0
C2	0	0	0	1
M1	0	0	0	1
R1	407	292	115	113
R2	0	0	0	81
ROAD	0	0	0	11
W1	245	244	1	193
WATER	0	0	0	2
Total	748	631	117	407

Buildable Area

Land-Use Designation	Gross Area (sq meters)	Net Buildable Area (sq meters)	Difference (sq meters)
A2	1572632.23	1524307.35	48324.881
C1	14316.477	7813.161	6503.315
C2	12066.684	8034.25	4032.434
M1	51384.16	30645.917	20738.244
R1	1711095.891	1350142.215	360953.676
R2	475030.234	465801.703	9228.532
ROAD	168793.371	71864.608	96928.763
W1	9533599.387	8381882.083	1151717.304
WATER	16372992.281	69580.245	16303412.036
Total	29911910.715	11910071.531	18001839.184

Exceptions

Land-Use Designation	Number of dwelling units that couldn't be placed because of space constraints	Number of commercial buildings that couldn't be placed because of space constraints	Number of polygons where number of existing buildings exceeds build-out limit
A2	1	1	0
C1	0	0	0
C2	0	0	0
M1	0	3	0
R1	115	115	0
R2	0	0	0
ROAD	0	0	0
W1	1	1	0
WATER	0	0	0
Total	117	120	0

Build-Out Report - Public Sewer District

Analysis Name: White Stone Magisterial

Tuesday, June 14, 2005, 4:23 PM

Report Summary

This report gives details about a single run of the Build-Out Wizard for this scenario.

Numeric Build-Out has been run

Spatial Build-Out has been run

Visual Build-Out has not been run

Numeric Build-Out Settings

Land Use Layer			
Layer containing land-use information	All_Zoning		
Attribute specifying land-use designation	ZONING		
Attribute specifying unique identifier of each land-use area	ZONING		
Density Rules			
Land-Use Designation	Dwelling Units	Floor Area	Efficiency Factor (%)
A2	0.75 acre min. lot size		20
C1		0.64 FAR	60
C2		0.55 FAR	60
M1		1.8 FAR	60
R1	0.46 acre min. lot size		50
R2	2 acre min. lot size	1.8 FAR	60
ROAD			0
W1	2 hectare min. lot size		20
WATER			0
Building Information			
Land-Use Designation	DU per Building	Area (sq feet)	Floors
A2	1	0	1
C1	1	0	1
C2	1	0	1
M1	1	0	1
R1	1	0	1
R2	6	0	3
ROAD	1	0	1
W1	1	0	1
WATER	1	0	1
Constraints to Development			

Constraint Layer	Can density be transferred?
water	no

Existing Buildings

Layer containing existing buildings	Value or attribute specifying DU/bldg	Value or attribute specifying floor area (sq feet)
Existing_Homes	1	0
Existing_Homes2	1	0

Spatial Build-Out Settings

Settings				
Land-Use Designation	Minimum Separation Distance (feet)	Layout Pattern	Road or Line Layer	Setback (feet)
A2	100	Grid		75
C1	10	Grid		40
C2	10	Grid		60
M1	25	Grid		100
R1	50	Grid		75
R2	25	Grid		25
ROAD	0	Random		0
W1	100	Random		75
WATER	0	Random		0

Results

Dwelling Unit Quantities				
Land-Use Designation	Numeric Build-Out	Spatial Build-Out	Difference	Existing Dwelling Units
A2	62	57	5	2
C1	0	0	0	0
C2	0	0	0	1
M1	0	0	0	7
R1	463	419	44	94
R2	8	8	0	81
ROAD	0	0	0	13
W1	735	544	191	395
WATER	0	0	0	3
Total	1268	1028	240	596

Buildable Area

Land-Use Designation	Gross Area (sq meters)	Net Buildable Area (sq meters)	Difference (sq meters)
A2	929756.496	914019.051	15737.445
C1	14316.477	14316.477	-0.001
C2	12066.684	12066.688	-0.005
M1	166151.297	133742.4	32408.897
R1	1869359.215	1869359.2	0.015
R2	591162.367	582344.523	8817.844
ROAD	187906.812	186934.389	972.423
W1	13698784.777	12712945.113	985839.664
WATER	2464208.18	92453.456	2371754.723
Total	19933712.305	16518181.299	3415531.006

Exceptions

Land-Use Designation	Number of dwelling units that couldn't be placed because of space constraints	Number of commercial buildings that couldn't be placed because of space constraints	Number of polygons where number of existing buildings exceeds build-out limit
A2	5	5	0
C1	0	0	0
C2	0	0	0
M1	0	2	0
R1	44	44	0
R2	0	0	0
ROAD	0	0	0
W1	191	191	0
WATER	0	0	0
Total	240	242	0

Build-Out Report - W1 Overlay

Analysis Name: Christ Church

Tuesday, June 07, 2005, 3:45 PM

Report Contents

[Numeric Build-Out Settings](#)

[Spatial Build-Out Settings](#)

[Results](#)

Report Summary

This report gives details about a single run of the Build-Out Wizard for this scenario.

- Numeric Build-Out has been run
- Spatial Build-Out has been run
- Visual Build-Out has not been run

Numeric Build-Out Settings

Land Use Layer			
Layer containing land-use information	Buildable_Poor_Septic		
Attribute specifying land-use designation	ZONING		
Attribute specifying unique Identifier of each land-use area	ZONING		
Density Rules			
Land-Use Designation	Dwelling Units	Floor Area	Efficiency Factor (%)
A2	0.75 acre min. lot size		20
C1		0.64 sq feet	60
C2		0.55 sq feet	60
H1			0
R1	0.69 acre min. lot size		30
R2	2 acre min. lot size	1.8 sq feet	60
ROAD			0
W1	2 acre min. lot size		20
WATER			0
Building Information			
Land-Use Designation	DU per Building	Area (sq feet)	Floors
A2	1	0	1
C1	1	0	1
C2	1	0	1
H1	1	0	1
R1	1	0	1
R2	6	0	3
ROAD	0	0	0
W1	1	0	1
WATER	0	0	0

Constraints to Development

Constraint Layer	Can density be transferred?
water	no
Christ_Church_Road_Buffer	no

Existing Buildings

Layer containing existing buildings	Value or attribute specifying DU/bldg	Value or attribute specifying floor area (sq feet)
Homes2	1	0
Homes	1	0

Spatial Build-Out Settings

Settings

Land-Use Designation	Minimum Separation Distance (feet)	Layout Pattern	Road or Line Layer	Setback (feet)
A2	100	Grid		75
C1	10	Grid		40
C2	10	Grid		60
H1	0	Random		0
R1	50	Grid		75
R2	25	Grid		25
ROAD	0	Random		0
W1	100	Grid		75
WATER	0	Random		0

Results

Dwelling Unit Quantities

Land-Use Designation	Numeric Build-Out	Spatial Build-Out	Difference	Existing Dwelling Units
A2	456	399	57	23
C1	0	0	0	1
C2	0	0	0	0
H1	0	0	0	0
R1	851	773	78	261
R2	6	5	1	9
ROAD	0	0	0	3
W1	67	63	4	51
WATER	0	0	0	0
Total	1380	1240	140	348

Land-Use Designation	Numeric Build-Out Units	Spatial Build-Out Units	Difference	Existing Buildings
A2	456	399	57	23
C1	2	2	0	1
C2	8	8	0	0
H1	0	0	0	0
R1	851	773	78	261
R2	16	14	2	9
ROAD	0	0	0	3
W1	67	63	4	51
WATER	0	0	0	0
Total	1400	1259	141	348

Buildable Area

Land-Use Designation	Gross Area (sq meters)	Net Buildable Area (sq meters)	Difference (sq meters)
A2	6893361.918	6624475.947	268885.971
C1	31625.613	29051.832	2573.782
C2	215345.262	206227.614	9117.647
H1	37479.969	31844.55	5635.419
R1	7788534.734	7204653.679	583881.055
R2	60552.41	54012.724	6539.686
ROAD	42763.855	30270.472	12493.383
W1	2911236.949	2602376.945	308860.004
WATER	4148.52	510.111	3638.408
Total	17985049.23	16783423.876	1201625.355

Exceptions

Land-Use Designation	Number of dwelling units that couldn't be placed because of space constraints	Number of commercial buildings that couldn't be placed because of space constraints	Number of polygons where number of existing buildings exceeds build-out limit
A2	57	57	0
C1	0	0	0
C2	0	0	0
H1	0	0	0
R1	78	78	0
R2	1	2	0
ROAD	0	0	0
W1	4	4	0
WATER	0	0	0
Total	140	141	0

Build-Out Report - Public Sewer District

Analysis Name: Christ Church

Tuesday, June 14, 2005, 7:07 AM

Report Contents

Report Contents

[Numeric Build-Out Settings](#)

[Spatial Build-Out Settings](#)

[Results](#)

Report Summary

This report gives details about a single run of the Build-Out Wizard for this scenario.

- Numeric Build-Out has been run
- Spatial Build-Out has been run
- Visual Build-Out has not been run

Numeric Build-Out Settings

Land Use Layer

Layer containing land-use information	Christ_Church_Zoning
Attribute specifying land-use designation	ZONING
Attribute specifying unique identifier of each land-use area	ZONING

Density Rules

Land-Use Designation	Dwelling Units	Floor Area	Efficiency Factor (%)
A2	0.75 acre min. lot size		20
C1		0.64 FAR	60
C2		0.55 FAR	60
H1			0
M1		1.8 FAR	60
R1	0.46 acre min. lot size		50
R2	2 hectare min. lot size	1.8 FAR	60
R3	0.27 acre min. lot size		60
ROAD			0
W1	2 acre min. lot size		20
WATER			0

Building Information

Land-Use Designation	DU per Building	Area (sq feet)	Floors
A2	1	0	1
C1	1	0	1
C2	1	0	1
H1	0	0	0
M1	1	0	1
R1	1	0	1
R2	6	0	3

R3	1	0	1
ROAD	0	0	0
W1	1	0	1
WATER	0	0	0

Constraints to Development

Constraint Layer	Can density be transferred?
Christ_Church_Road_Buffer	no
water	no

Existing Buildings

Layer containing existing buildings	Value or attribute specifying DU/bldg	Value or attribute specifying floor area (sq feet)
Homes	1	0
Homes2	1	0

Spatial Build-Out Settings

Land-Use Designation	Minimum Separation Distance (feet)	Layout Pattern	Road or Line Layer	Setback (feet)
A2	100	Grid		75
C1	10	Grid		40
C2	10	Grid		60
H1	0	Random		0
M1	100	Grid		100
R1	25	Grid		75
R2	25	Grid		50
R3	20	Grid		50
ROAD	0	Random		0
W1	100	Grid		75
WATER	0	Random		0

Results

Land-Use Designation	Numeric Build-Out	Spatial Build-Out	Difference	Existing Dwelling Units
A2	940	863	77	46
C1	0	0	0	1
C2	0	0	0	0
H1	0	0	0	0
M1	0	0	0	0
R1	3074	3044	30	320
R2	6	5	1	15
R3	281	281	0	0
ROAD	0	0	0	4
W1	342	208	134	151

WATER	0	0	0	0
Total	4643	4401	242	537

Buildable Area

Land-Use Designation	Gross Area (sq meters)	Net Buildable Area (sq meters)	Difference (sq meters)
A2	14880763.105	14219347.626	661415.48
C1	31625.613	29051.832	2573.782
C2	230449.48	221331.836	9117.645
H1	104065.781	86317.844	17747.937
M1	747142.551	736234.691	10907.86
R1	13753163.602	12848223.761	904939.841
R2	95522.637	88331.636	7191
R3	553184.93	514167.126	39017.804
ROAD	57651.914	36857.252	20794.662
W1	7502630.297	6795814.756	706815.541
WATER	20675.332	4831.963	15843.369
Total	37976875.242	35580510.323	2396364.919

Exceptions

Land-Use Designation	Number of dwelling units that couldn't be placed because of space constraints	Number of commercial buildings that couldn't be placed because of space constraints	Number of polygons where number of existing buildings exceeds build-out limit
A2	77	77	0
C1	0	0	0
C2	0	0	0
H1	0	0	0
M1	0	0	0
R1	30	30	0
R2	1	2	0
R3	0	0	0
ROAD	0	0	0
W1	134	134	0
WATER	0	0	0
Total	242	243	0

Build-Out Report - W1 Overlay

Analysis Name: White Chapel

Wednesday, June 08, 2005, 6:02 PM

Report Contents

[Numeric Build-Out Settings](#)

[Spatial Build-Out Settings](#)

[Results](#)

Report Summary

This report gives details about a single run of the Build-Out Wizard for this scenario.

Numeric Build-Out has been run

Spatial Build-Out has been run

Visual Build-Out has not been run

Numeric Build-Out Settings

Land Use Layer			
Layer containing land-use information	White_Chapel_Buildable_Poor_Septic		
Attribute specifying land-use designation	ZONING		
Attribute specifying unique identifier of each land-use area	ZONING		

Density Rules			
Land-Use Designation	Dwelling Units	Floor Area	Efficiency Factor (%)
A1	2 acre min. lot size		10
A2	0.75 acre min. lot size		20
C1		0.64 FAR	60
M1		1.8 FAR	60
OUTCY			0
R1	0.69 acre min. lot size		30
R3	0.57 acre min. lot size		50
ROAD			0
W1	2 acre min. lot size		20
WATER			0

Building Information

Land-Use Designation	DU per Building	Area (sq feet)	Floors
A1	1	0	1
A2	1	0	1
C1	1	0	1
M1	1	0	1
OUTCY	0	0	0
R1	1	0	1
R3	1	0	1
ROAD	0	0	0
W1	1	0	1
WATER	0	0	0

Constraints to Development

Constraint Layer	Can density be transferred?
water	no
White_Chapel_Road_Buffer	no

Existing Buildings

Layer containing existing buildings	Value or attribute specifying DU/bldg	Value or attribute specifying floor area (sq feet)
White_Chapel_Homes	1	0

Spatial Build-Out Settings

Settings

Land-Use Designation	Minimum Separation Distance (feet)	Layout Pattern	Road or Line Layer	Setback (feet)
A1	100	Random		100
A2	75	Grid		75
C1	10	Grid		40
M1	25	Grid		100
OUTCY	0	Random		0
R1	50	Grid		75
R3	25	Grid		50
ROAD	0	Random		0
W1	100	Grid		75
WATER	0	Random		0

Results

Dwelling Unit Quantities				
Land-Use Designation	Numeric Build-Out	Spatial Build-Out	Difference	Existing Dwelling Units
A1	69	69	0	2
A2	1143	1106	37	104
C1	0	0	0	25
M1	0	0	0	0
OUTCY	0	0	0	0
R1	2267	1981	286	814
R3	357	337	20	225
ROAD	0	0	0	39
W1	423	407	16	313
WATER	0	0	0	60
Total	4259	3900	359	1582

Exceptions			
Land-Use Designation	Number of dwelling units that couldn't be placed because of space constraints	Number of commercial buildings that couldn't be placed because of space constraints	Number of polygons where number of existing buildings exceeds build-out limit
A1	0	0	0
A2	37	37	0
C1	0	1	0
M1	0	0	0
OUTCY	0	0	0
R1	286	286	0
R3	20	20	0
ROAD	0	0	0
W1	16	16	0
WATER	0	0	0
Total	359	360	0

Build-Out Report - W1 Overlay

Analysis Name: Mantua Magisterial District

Wednesday, June 08, 2005, 6:44 PM

Report Contents

[Numeric Build-Out Settings](#)

[Spatial Build-Out Settings](#)

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Report Summary

This report gives details about a single run of the Build-Out Wizard for this scenario.

- Numeric Build-Out has been run
- Spatial Build-Out has been run
- Visual Build-Out has not been run

Numeric Build-Out Settings

Land Use Layer

Layer containing land-use information	Mantua_Buildable_Poor_Septic
Attribute specifying land-use designation	ZONING
Attribute specifying unique identifier of each land-use area	ZONING

Density Rules

Land-Use Designation	Dwelling Units	Floor Area	Efficiency Factor (%)
A1	2 acre min. lot size		10
A2	0.75 acre min. lot size		20
C1		0.64 FAR	60
C2		0.55 FAR	60
M1		1.8 FAR	60
OUTCY			0
R1	0.69 acre min. lot size		30
ROAD			0
W1	2 acre min. lot size		20
WATER			100

Building Information

Land-Use Designation	DU per Building	Area (sq feet)	Floors
A1	1	0	1
A2	1	0	1
C1	1	0	1
C2	1	0	1
M1	1	0	1
OUTCY	0	0	0
R1	1	0	1
ROAD	0	0	0
W1	1	0	1
WATER	0	0	0

Constraints to Development

Constraint Layer	Can density be transferred?
Mantua_Roads_Buffer	no
water	no

Existing Buildings

Layer containing existing buildings	Value or attribute specifying DU/bldg	Value or attribute specifying floor area (sq feet)
Homes	1	0

Spatial Build-Out Settings

Settings				
Land-Use Designation	Minimum Separation Distance (feet)	Layout Pattern	Road or Line Layer	Setback (feet)
A1	100	Random	Mantua_Roads	100
A2	100	Grid	Mantua_Roads	75
C1	10	Grid	Mantua_Roads	40
C2	10	Grid	Mantua_Roads	60
M1	35	Grid	Mantua_Roads	100
OUTCY	0	Random	Mantua_Roads	0
R1	50	Grid	Mantua_Roads	75
ROAD	0	Random	Mantua_Roads	0
W1	100	Random	Mantua_Roads	75
WATER	0	Random	Mantua_Roads	0

Results

Dwelling Unit Quantities

Land-Use Designation	Numeric Build-Out	Spatial Build-Out	Difference	Existing Dwelling Units
A1	20	20	0	0
A2	2457	2367	90	127
C1	0	0	0	3
C2	0	0	0	4
M1	0	0	0	6
OUTCY	0	0	0	0
R1	1257	1195	62	398
ROAD	0	0	0	0
W1	407	406	1	90
WATER	0	0	0	1
Total	4141	3988	153	629

Commercial Quantities - Buildings

Land-Use Designation	Numeric Build-Out Units	Spatial Build-Out Units	Difference	Existing Buildings
A1	20	20	0	0
A2	2457	2367	90	127
C1	4	4	0	3
C2	5	5	0	4
M1	109	14	95	6
OUTCY	0	0	0	0
R1	1257	1195	62	398
ROAD	0	0	0	0
W1	407	406	1	90
WATER	0	0	0	1
Total	4259	4011	248	629

Exceptions

Land-Use Designation	Number of dwelling units that couldn't be placed because of space constraints	Number of commercial buildings that couldn't be placed because of space constraints	Number of polygons where number of existing buildings exceeds build-out limit
A1	0	0	0
A2	90	90	0
C1	0	0	0
C2	0	0	0
M1	0	95	0
OUTCY	0	0	0
R1	62	62	0
ROAD	0	0	0
W1	1	1	0
WATER	0	0	0
Total	153	248	0