



July 10, 2008

Mr. Roy A. Simonson
Water and Wastewater Director
City of Newark
220 Elkton Road
Newark, DE 19711

RE: Report on source water protection in the City of Newark, New Castle County, Delaware

Dear Mr. Simonson:

Enclosed is our report summarizing the natural resources that may be protected by Newark's municipal code for areas upstream of the drinking water intakes on the White Clay/Red Clay Creeks above Stanton and on the Christina River at Smalley's Pond.

Should you have any questions, please do not hesitate to contact our office at 302-831-4932.

Warmly;

A handwritten signature in blue ink, appearing to read "Andrew Homsey".

Andrew Homsey

A handwritten signature in blue ink, appearing to read "Gerald Kauffman".

Gerald Kauffman

**Report on Source Water Protection
in the City of Newark, Delaware**
July, 2008

Summary

This report summarizes the natural resources protected by the City of Newark's municipal code in the source waters (Levels 1A, 1B, and 2) upstream from the drinking water intakes along the White Clay/Red Clay Creeks above Stanton and the Christina River at Smalley's Pond. This GIS analysis tabulates the area already protected by code as part of Newark's approach to meet the Delaware Source Water Protection Law of 2001.

Level 1A areas are defined as 100-year floodplains and/or erosion-prone slopes, and Level 1B areas as buffer areas 200 feet from each side of streams. For the purposes of this study Level 2 areas are areas of the watersheds which lie within the corporate limits of Newark.

Approach

The purpose of this GIS analysis is both to assess land use within Newark and its protected areas, and to quantify the amount of protected natural areas which lie in Level 1A, Level 1B, and Level 2 source water areas.

Land use/land cover information in Newark was summarized using the following categories:

- Single Family Residential
- Multi - Family Residential
- Mobile Home Parks
- Retail
- Other Commercial
- Industrial
- Transportation/Communication
- Utilities
- Urban/Built-up
- Institutional/Government
- Recreational
- Agricultural
- Forest
- Wetlands
- Water
- Extraction
- Transition

Those areas of natural resources protected by Article 10 of the New Castle County Unified Development Code and used in this analysis, as well as certain other, sensitive areas, are specified in the following list:

- Class A Wellheads
- Class B Wellheads
- Class C Wellheads

- Recharge Area Water Resource Protection Area (WRPA)
- Erosion Prone Slopes
- Steep Slopes (slopes $\geq 15\%$ and $< 25\%$)
- Steep Slopes (slopes $\geq 25\%$)
- Forests (as designated by DNREC's Green Infrastructure program)
- Floodplain (100 year floodplain)
- Wetlands (as designated by DNREC)
- Riparian Buffer (50 ft. from floodplains and wetlands, 100 ft. from streams)
- Public/Private Open Space
- Newark Reservoir WRPA

Results

Table 1 summarizes the land use classes found both within Level 1A only, Level 1B only, either Level 1A or Level 1B (i.e. all Level 1 areas), and Level 2 areas in Newark. Since Level 1A and 1B areas overlap in places, the area of Level 1 is less than the sum of the areas of Levels 1A and 1B. Note that Level 2 areas are conterminous with the corporate boundary of Newark, since by definition, Level 2 areas comprise all land upstream from drinking water intakes.

Table 1 – Land use in Newark within Level 1A, 1B, and Level 2 areas.

Land Use	Level 1A	Level 1B	All Level 1	All Level 2 (City of Newark)
Single Family Residential	193.7	144.4	276.0	1954.1
Multi-Family Residential	41.1	19.9	44.3	235.9
Mobile Home Parks	0.0	0.0	0.0	0.0
Retail	14.5	22.9	29.0	654.8
Other Commercial	0.0	0.0	0.0	0.0
Industrial	34.7	20.2	46.4	419.0
Transportation/Communication	7.7	8.9	12.0	141.6
Utilities	0.0	0.0	0.0	4.0
Urban/Built-up	32.6	40.8	56.0	291.4
Institutional/Governmental	3.5	23.5	26.1	521.6
Recreational	26.5	44.4	51.9	183.8
Agricultural	12.2	51.5	57.1	357.8
Forestland	403.2	400.6	506.4	914.1
Wetlands	10.0	8.6	15.1	28.8
Water	19.0	20.3	21.7	31.3
Extraction	0.0	0.0	0.0	0.0
Transition	3.1	10.0	13.1	135.1
Total, Acres	801.6	815.8	1154.9	5873.3
Total, Square Miles	1.25	1.27	1.80	9.18

Table 2 summarizes the areas of Levels 1A and 1B in Newark, and shows the areas of each as percentage of the total area of the city.

Table 2 – Areas within Level 1A (100-year floodplains, and/or erosion-prone slopes), and Level 1B (buffer areas 200 feet from each side of streams), for the City of Newark, Delaware

	Acres	Square Miles
City of Newark	5872.52	9.18
Area of Level 1A in Newark	801.36	1.25
Area of Level 1B in Newark	815.68	1.27
Areas in both Levels 1A and 1B	461.71	.72
Areas in either Levels 1A or 1B	1154.32	1.80
% of Newark in Level 1A areas	13.6%	
% of Newark in Level 1B areas	13.9%	
% of Newark in Level 1A or 1B areas	19.7%	

Table 3 shows the areas of each of the specified natural resources within the Level 1B buffer in Newark, and indicates the percentage of land within this zone protected, or potentially protected, by code. Since many of these layers may overlap, both the total areas, including those that overlap, as well as the exclusive areas, are shown. Since the Level 1A zones are, by definition, identical to the combination of the floodplain and erosion-prone slopes as specified in the UDC, the areas of Level 1A zones are not enumerated by type. The fact that they are identical is indicated by the fact that in the table, they are listed as being protected 100%. The final row of the table indicates the aggregate protection afforded by the specified protection layers within all Level 1 (Level 1A plus Level 1B) areas.

Table 3 – Summary of significant natural resources in Levels 1A, 1B, and Level 2 source water protection areas within Newark, Delaware.

	City of Newark, Level 1A and 1B	City of Newark, Level 2
Class A Wellheads	16.23	32.45
Class B Wellheads	0	0
Class C Wellheads	269.51	861.98
Cockeysville Formation	0	0
Cockeysville Drainage Area	0	0
Recharge Areas	6.55	44.23
Erosion Prone Slopes	286.98	286.98
Slopes >=15% to <25%	67.53	163.28
Slopes >=25%	11.24	17.25
Forests	263.93	495.39
Floodplains	513.75	513.75
Wetlands	14.65	31.06
Riparian Buffers	751.73	870.09
Public/Private Open Space	299.11	435.24
Newark Reservoir	33.61	110.90
Non-exclusive Total, Acres	2563.06	3862.61
Exclusive Total, Acres	727.44	2066.92

Exclusive Total, Sq. Miles	1.14	3.23
% of Level 1B Protected	89.2%	--
% of Level 1A Protected	100.0%	--
% of Level 1A & 1B Protected	91.2%	--
% of Level 2 Protected	--	35.2%

Table 4 summarizes the land uses in Newark based on the following generalized classes:

- Built—areas which are already developed,
- Unbuilt—areas such as vacant or transitional lands which may be developed in the near future, or areas in a land use not currently developed, such as agriculture. Includes areas of natural lands, such as forestland, wetlands, parks, etc.

The “Built” class includes the following land use categories based on the 2002 state-wide land use data: Single Family Residential, Multi-Family Residential, Mobile Home Parks, Retail, Other Commercial, Industrial, Transportation/ Communication, Utilities, Urban/Built-up, and Institutional/Governmental.

The “Unbuilt” class includes: Extraction and Transition, Agricultural, Recreational, Forestland, Wetlands, and Water.

The land in each category is subdivided into those areas which contain significant natural resources, as defined in Table 3, and those which do not. Those areas which contain significant natural resources are designated “Protected”, while those that do not are designated “Not Protected”.

Table 4—Built/unbuilt land uses in Newark which contain and do not contain significant natural resources.

Land Use Class	Natural Resources (Protected)	No Natural Resources (Not Protected)
Built	872.3 (15%)	3353.9 (57%)
Unbuilt	1194.7 (20%)	452.5 (8%)
Total, Acres	2066.9 (35%)	3806.4 (65%)
Total, Square Miles	3.23	5.95

Figure 1, below, illustrates the proportion of built and unbuilt land uses within the corporate limits of Newark which contain significant natural resources and are therefore protected, and those that do not contain significant natural resources, and are therefore not protected.

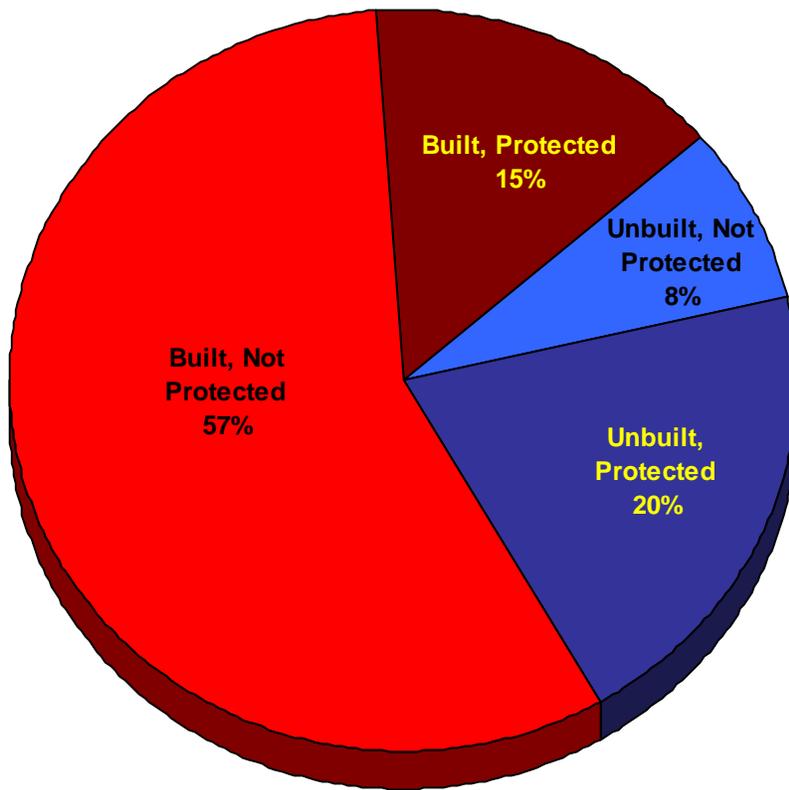
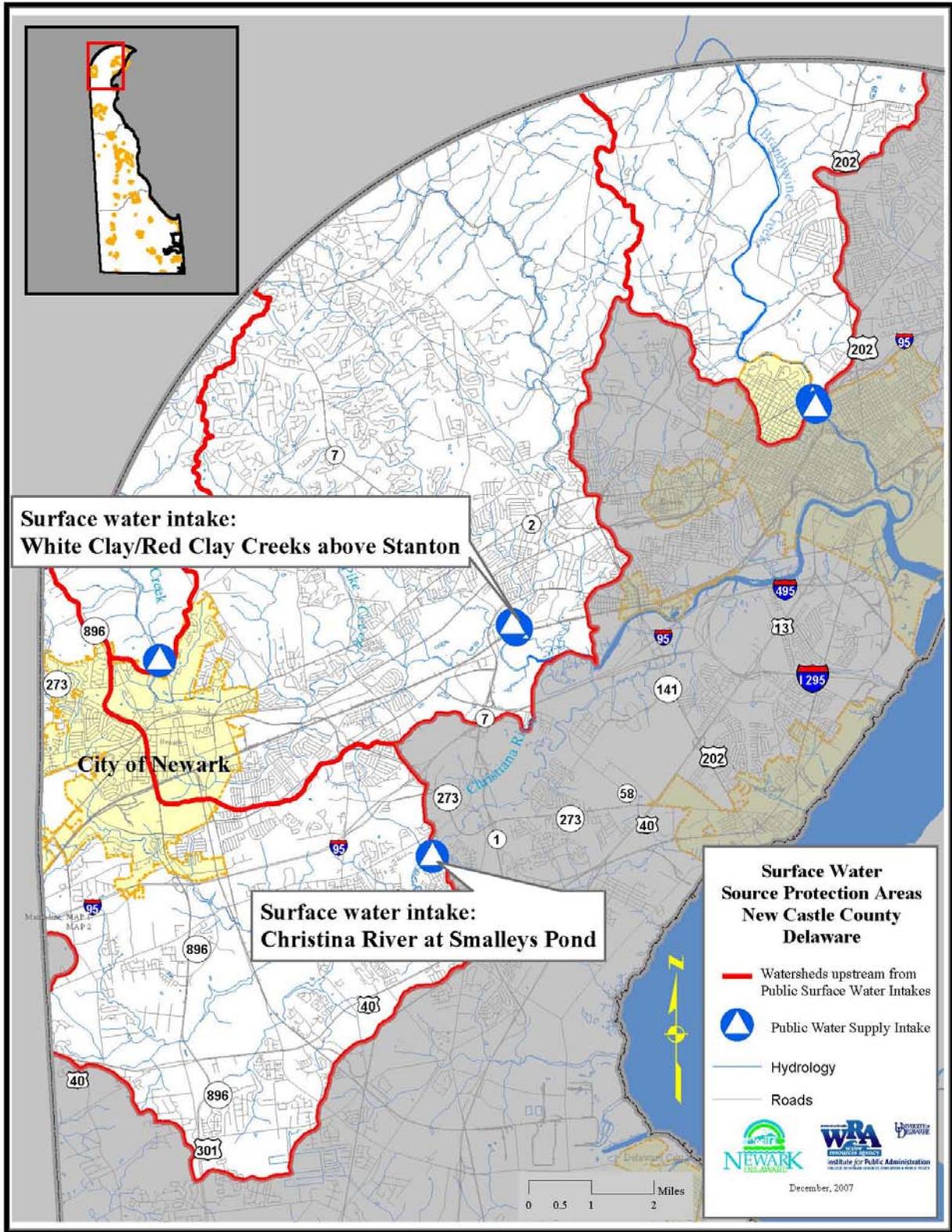
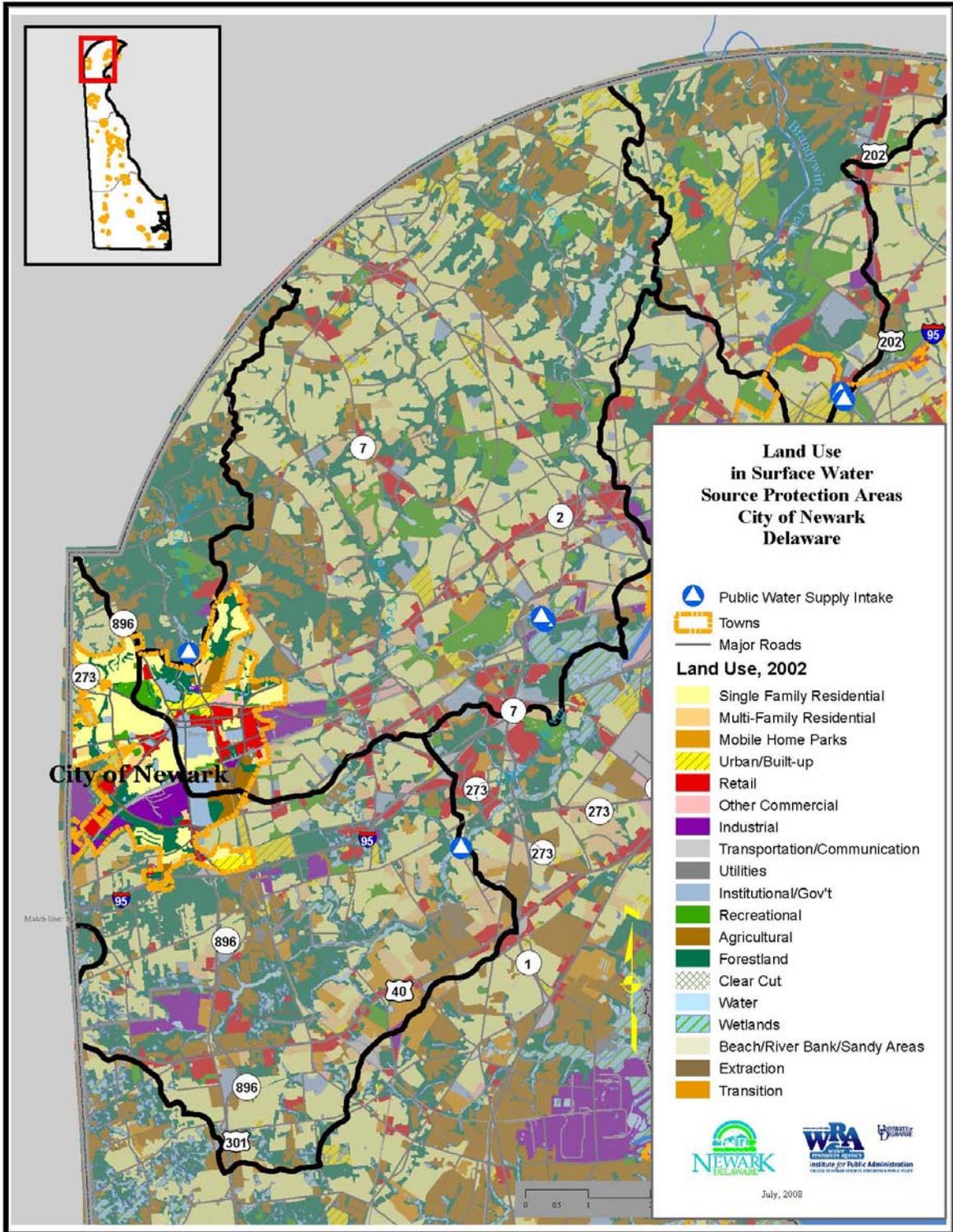


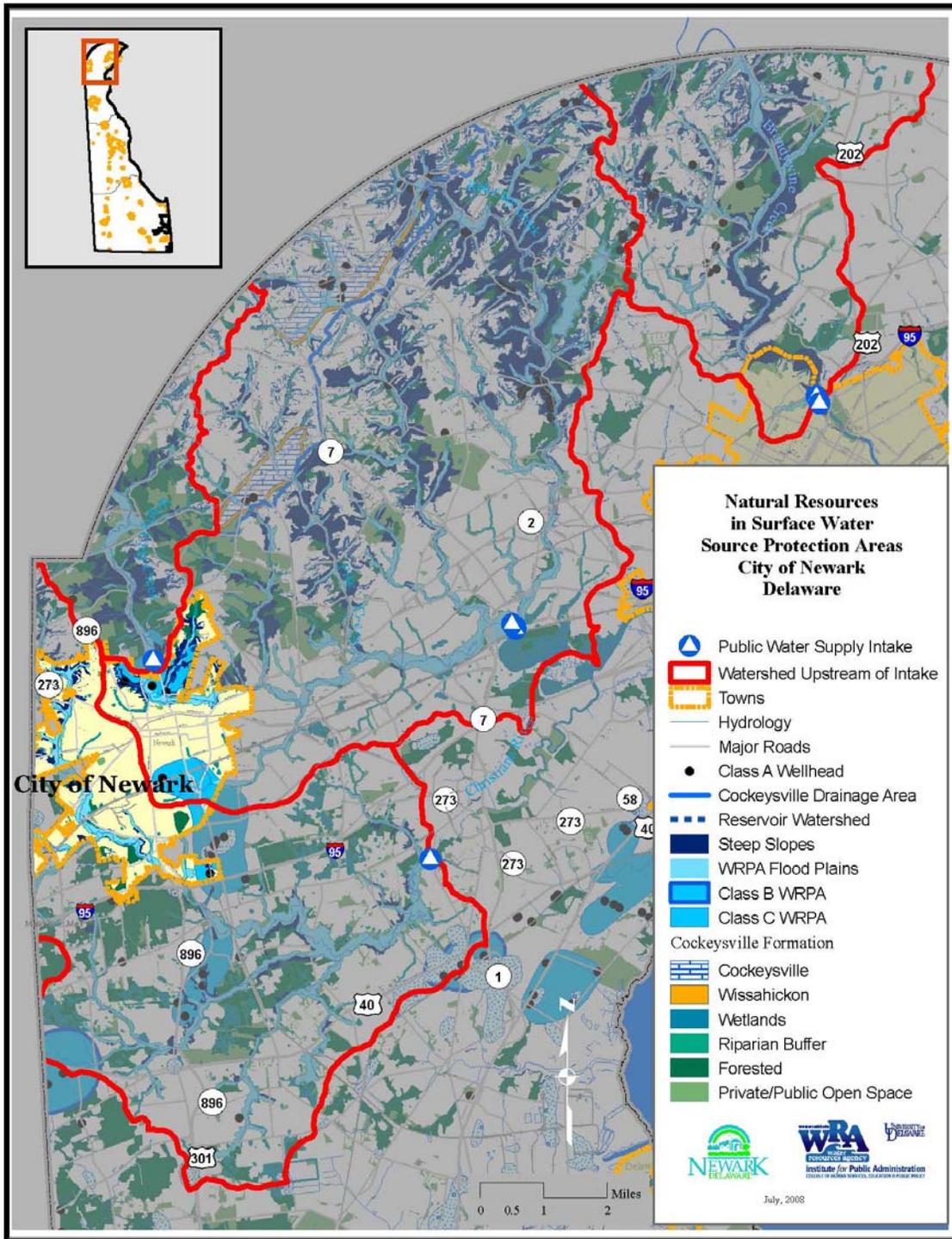
Figure 1--Proportion of built and unbuilt areas of Newark which are protected and not protected by the significant natural resources specified in Table 3.



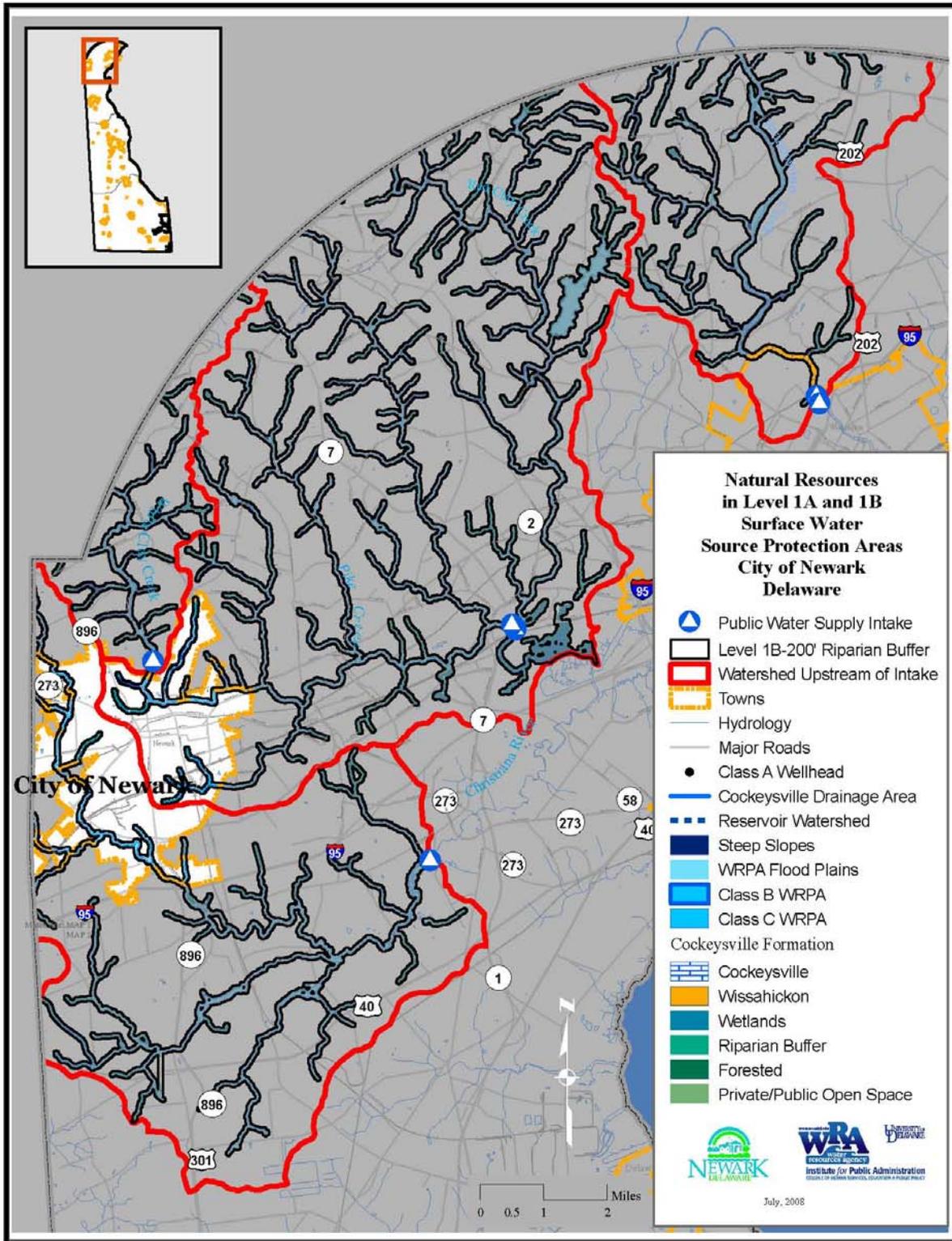
Map 1 – Overview of the watersheds upstream of surface water intakes in New Castle County, indicating surface water intakes downstream of the City of Newark



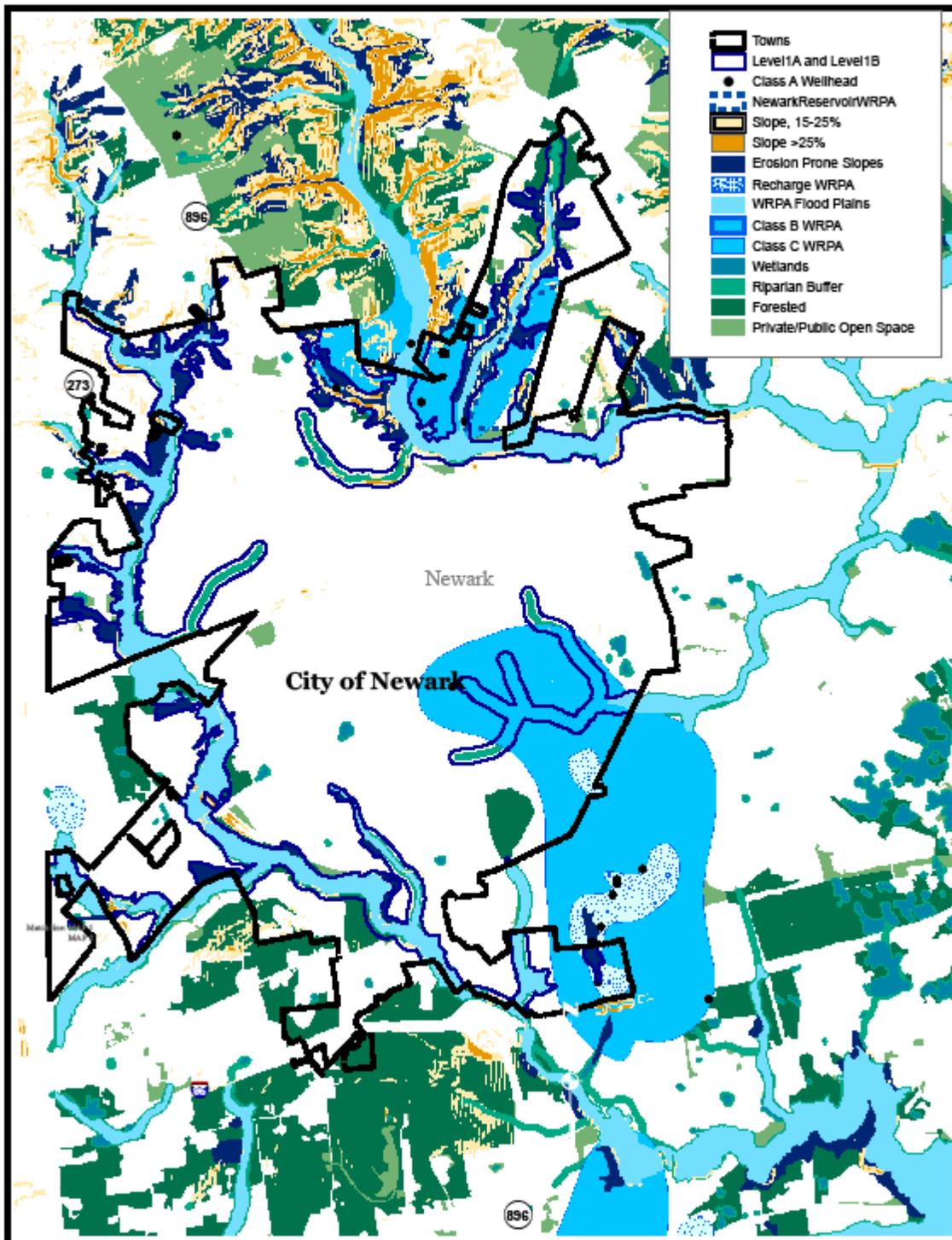
Map 2 – Land use within the watersheds upstream of surface water intakes in New Castle County, highlighting the City of Newark



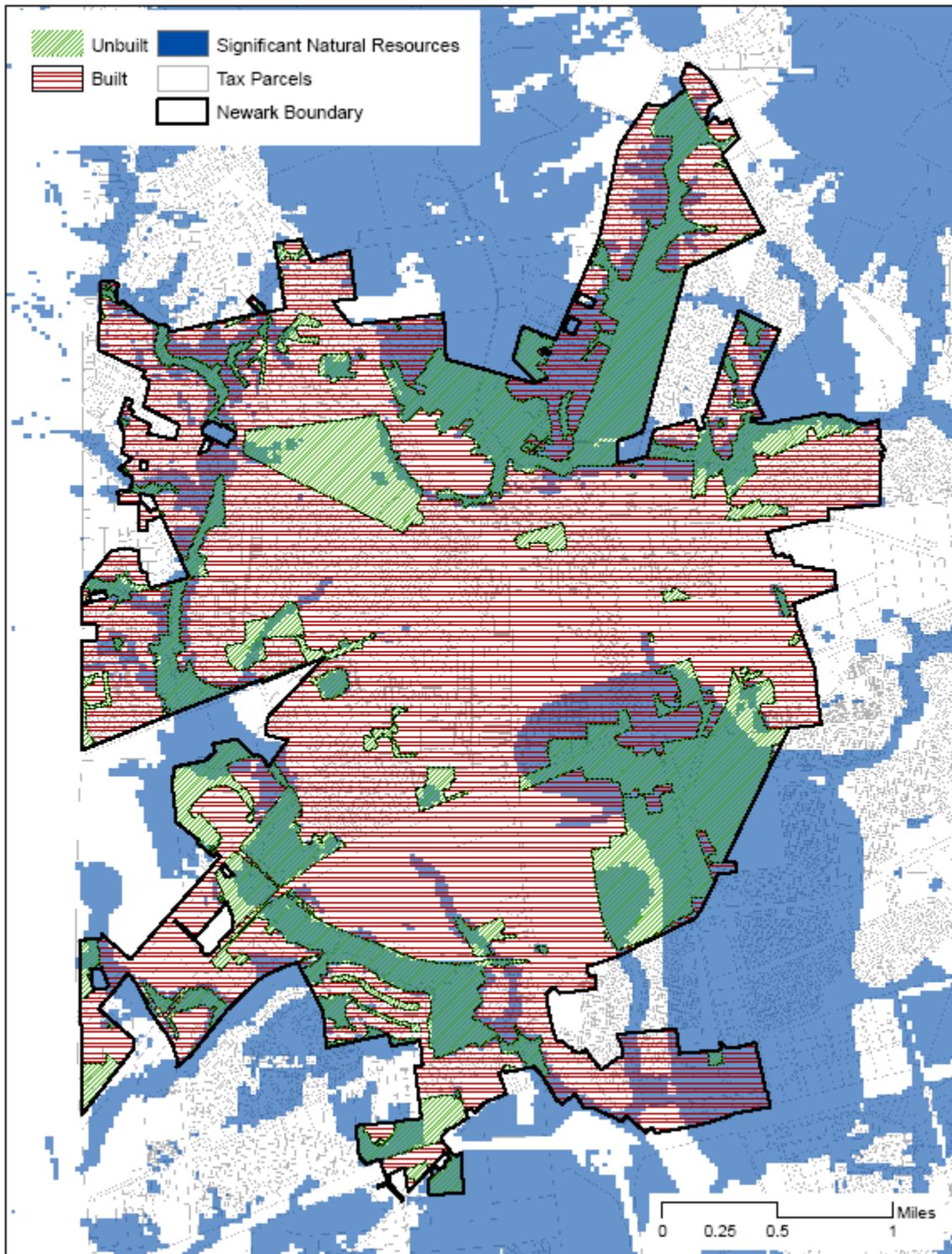
Map 3 – Significant natural resources in watersheds upstream of surface water intakes in New Castle County, highlighting those within the City of Newark



Map 4 -- Significant resources in watersheds upstream of surface water intakes in Level 1 state protection areas of New Castle County, highlighting those within the City of Newark



Map 5 – Detail of the City of Newark, showing significant and protected natural resource areas, and the delineation of the Level 1 (Level 1A plus Level 1B) protection zone



Map 6 – The City of Newark, showing areas of built and unbuilt land, and areas of significant natural resources as defined in Table 3