

## Chapter 4 PUBLIC UTILITIES AND INFRASTRUCTURE (06/21/16)

The City of Newark is a full-service utility provider, overseeing water, wastewater, and electricity to residents, businesses, industry, and the University of Delaware. The City also maintains and manages a stormwater-sewer system that channels and carries stormwater runoff from City streets to surface water or stormwater management facilities.



Newark Reservoir by Mel Brooks, Jr.

### **Water Quality and Supply**

Because clean and safe water is a basic requirement for public health now and in the future, Newark’s water supply must be preserved and protected. The 1972 adoption of the Federal Water Protection Control Act Amendments (PL92-500) fostered this objective by requiring the “chemical, physical and biological integrity of the nation’s waters.” The Water Resources Agency (WRA), originating from Section 208 of the Federal Water Pollution Control Act, was charged with the responsibility for implementing the law’s provisions. Since then, WRA has issued several reports describing in detail New Castle County’s program of accessing water quality, developed new water quality–assessment procedures, and issued *Water 2020*, which included plans for ensuring adequate and safe water supplies in the future.

The State of Delaware Department of Natural Resources and Environmental Control (DNREC) operates Delaware’s primary water quality–monitoring program. DNREC laboratories operate a complete water quality–related analytical program and participate in the United States Environmental Protection Agency’s (EPA) analytical quality-assurance program. These laboratories are well equipped and use the latest available instrumentation and state-of-the-art-procedures. Other water samplings from area streams and lakes are conducted periodically by the United States Geological Service (USGS) and the University of Delaware’s Water Resources Center. The USGS monitors stream flow at eight “full-record” and 12 “partial-record” stations at streams throughout New Castle County.

The City’s Public Works and Water Resources (PWWR) Department oversees all water and wastewater operations throughout the City (and to a limited extent outside of its corporate limits) including water treatment, water distribution, and wastewater. Our water supply is derived from our

surface water allocation from the White Clay Creek, ground water wells from the South Wellfield and stored water from the Newark reservoir which is fed from the White Clay Creek.

Water Supply

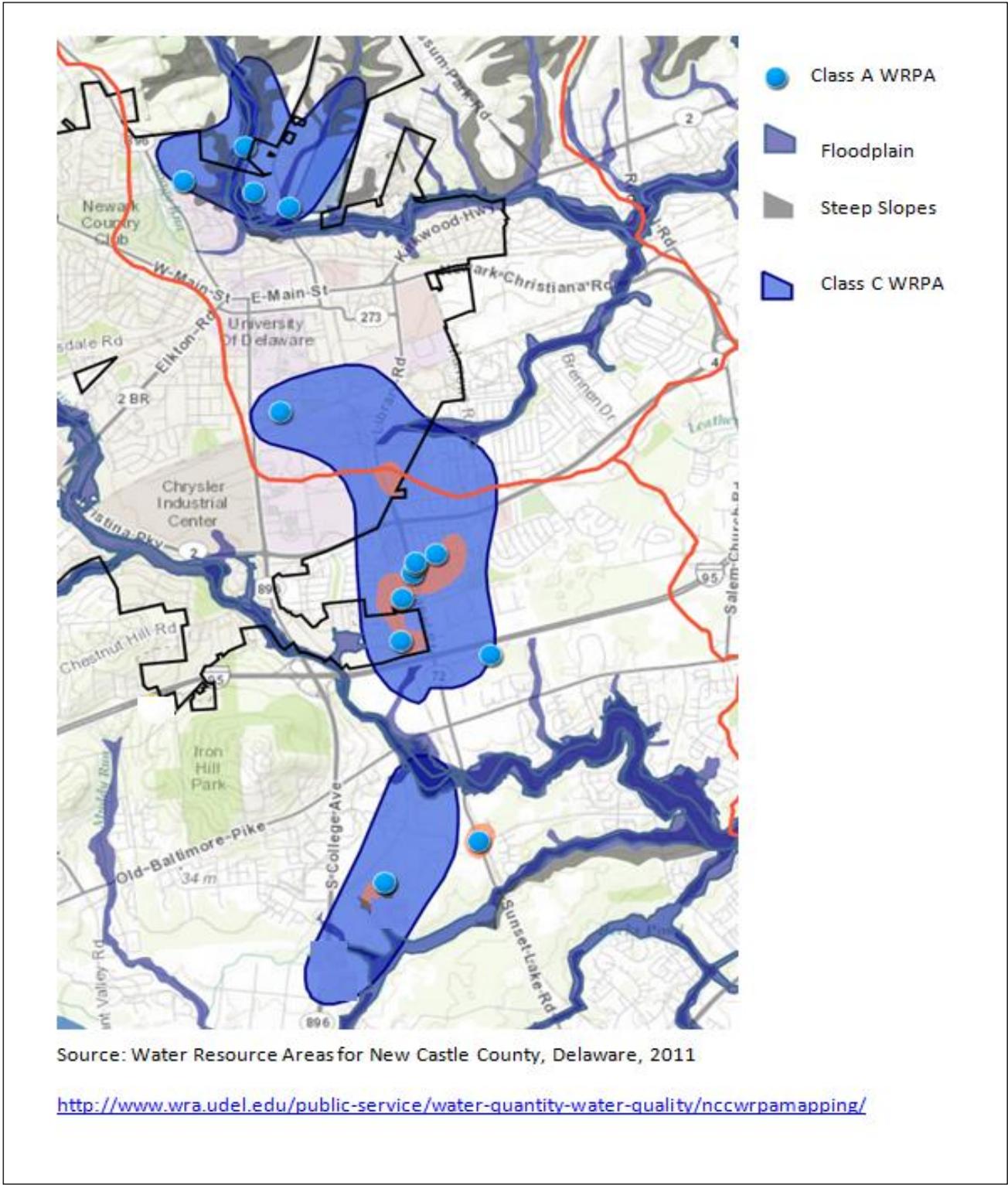
In 2014, the City used 767 million gallons from its White Clay Creek intake, exceeding the allocation of 648 million gallons but staying under the Delaware River Basin Commission’s (DRBC) allocation of 3.8 billion gallons per year. The City of Newark PWWR Department is in discussions with DNREC to determine why the DNREC allocation was not updated at the same time as the DRBC allocation when the reservoir was constructed. This overuse was necessary because of the contamination issues in the well field. However, the allocation was calculated based on stream flow and protection of species in White Clay Creek, and this volume may not be available during dry years. Future water use must make use of a greater number of the City’s facilities and not rely so heavily on a few sources.

As seen in the City’s 2014 water usage, there is not a considerable amount of expansion of supply that needs to be done to be able to meet future demand. Although it is fortunate that very slow growth of resident population is expected, the proposed plan does not address water used by students, who compose approximately 34% of the City’s total population when they are present.

The PWWR Department continually monitors water supply lines and water quality. Moreover, City regulations prohibit the discharge of harmful and toxic liquids, vapors, and materials into Newark’s sanitary sewers. Heavy metal concentration is also specifically limited by ordinance; pretreatment standards and facilities are also specified. In addition, new septic systems are not permitted in the city. Newark’s *Subdivision and Development Regulations* also include strict erosion- and sediment-control standards, which are designed to minimize land disturbance, runoff, and erosion during construction. Uncontrolled runoff and erosion can have obvious and direct negative impacts on Newark’s creeks and streams. The *Subdivision and Development Regulations* also include specific standards to ensure that new developments have properly designed and installed water systems and sanitary sewer systems that will not result in discharges into Newark’s streams. The PWWR Department also monitors new development proposals in terms of their impact on the City’s water-supply aquifers, located in the southeastern and northern portions of the City, based on Newark’s *Water Resources Protection Regulations*, which were adopted in 1991. In addition, the Department reviews development proposals to assure compliance with all the applicable provisions of the *Delaware Code*, Title 7, Part VI, Conservation Natural Resources, Chapter 60, Environmental Control, subchapter VI, “Source Water Protection,” which is incorporated in this plan by reference.

Map 4-1 shows the Water Resource Protection Areas (WRPAs) in the City of Newark, which includes the Special Flood Hazard Areas (SFHA), the “Class A WRPA”, defined as, and the WRPA Recharge Areas. These areas are delineated by the Water Resources Agency for New Castle County, in conjunction with the City of Newark Public Works and Water Resources Department. Additional restrictions apply to these areas in order to protect drinking water supply from pollution that may be associated with inappropriate land uses.

Map 4-1: City of Newark Water Resource Protection Areas (WRPAs)



All of these measures taken together have direct benefits for Newark’s water-supply system and the water quality of its local streams. In addition to its obvious importance in terms of municipal water supply, water quality is also crucial for the protection of stream habitat for fish and wildlife. Finally, because of the direct correlation between impervious cover and protecting the watersheds’ water quality, the City will consider expanding Newark’s current impervious cover limitations.

The City’s *Water Resources Protection Regulations* are found in Chapter 30, Article VII of the City of Newark Code, and can be accessed through the link below:

[https://www2.municode.com/library/de/newark/codes/code\\_of\\_ordinances?nodeId=CH30WA\\_ARTVIIWAREPRRE](https://www2.municode.com/library/de/newark/codes/code_of_ordinances?nodeId=CH30WA_ARTVIIWAREPRRE)

*Water Treatment*

The department is responsible for the maintenance and operations of all the equipment and facilities for surface water treatment, nine active water supply wells, and a groundwater-treatment plant to ensure that the water quality meets the standards of the State of Delaware Division of Public Health. The water-treatment process includes aeration, filtration, chlorination, lime addition, iron sequestering, and fluoridation. Water is supplied by the South Well Field Treatment Plant and the Newark Water Treatment Plant. The South Well Field Treatment Plant removes iron and manganese from several wells that the city uses depending upon demand. The Newark Water Treatment Plant draws water from the White Clay Creek. During droughts and periods where the water quality in the creek is unsuitable for treatment, the City draws its water from the Newark Reservoir. The reservoir holds approximately 318 million gallons and is designed to supply Newarkers during a 90-day drought—the longest drought on record.

*Water Distribution*

The water distribution system provides water services to more than 34,210 customers, including 31,454 full time residents and University students. More than 1.24 billion gallons of water is pumped by six booster pumping stations through 150 miles of pipe and nine finish water tanks annually to serve more than 10,000 water-service connections, of which there are more than 1,300 commercial and industrial accounts. Average daily water usage in the city is approximately 3.5 million gallons per day (mgd). The City’s maximum daily production is approximately 6 mgd. A 2008 project at the Newark Water Treatment Plant brought the total capacity of that plant to 5 mgd. When this project was completed, the total system capacity, including the South Well Field and backup wells in the Laird tract, provided a total production capacity in excess of 8.5 mgd—well above current daily usage.

Flow and pressure in the city is good, with few exceptions. The sum of groundwater allocations for the City is more than 1.5 billion gallons per year, enough to cover the expected demand over 20 years without relying on any surface water supply. While water availability for future development is clearly adequate, new projects may require system improvements to convey water to the site in some cases. Developers, of course, are responsible for all improvements associated with and made necessary by their projects.

However, the City continues to investigate contamination in certain wells within the South well field for remediation and to meet future demands. In 2014, only five wells were used, and only 31% of the total water supply was groundwater.

Wastewater

The department transports over 2.2 billion gallons of wastewater annually through the city’s 95 miles of sewer-distribution lines. The City operates a wastewater-collection system that conveys sewage to the New Castle County interceptors located at city limits. Sewage is treated at a regional wastewater-treatment plant located in the City of Wilmington. Under the City’s agreement with New Castle County, which transmits sewage to Wilmington, City of Newark sewage is regulated for quality. The majority of Newark’s local sewer lines are capable of conveying additional flow. Generally, infill developments in older sections of the city may require system improvements to adequately convey wastewater generated by the development if it is significantly more than the previous use.

Stormwater Management

The PWWR Department oversees the stormwater system–capacity evaluation and develops detailed recommendations for system expansion and capital-maintenance projects through the City’s annual Capital Improvements Program. Utilizing the Capital Program departmental review system, the Planning and Development Director and Planning Commission must review the proposed projects prior to Council’s approval to evaluate Program recommendations in light of the City’s short-range land-use and development projections. The Public Works and Water Resources Department maintains detailed records showing all storm-drainage and stormwater management facilities.

Also regarding the City’s stormwater and drainage system, the Public Works and Water Resources Department is responsible for Newark’s compliance with the EPA’s National Pollutant Discharge Elimination System (NPDES) Permit Program. Newark has been designated a Phase II city under this program based on its population. The City has received a five-year NPDES permit from DNREC and is currently preparing to receive a draft of its next five-year permit. The City intends to improve stormwater quality based on its submitted permit, addressing the six required EPA permit Minimum Control Measures (MCM). Once the requirements for Total Maximum Daily Loads (TMDLs) are finalized by DNREC, these requirements will be incorporated into the City’s stormwater management–quality program, as mandated by DNREC.

In light of the City’s policy regarding the municipal responsibility for long-term maintenance of stormwater management retention and/or detention basins in single-family developments, the Department will continue to closely scrutinize these aspects of development proposals to insure that proposed site plans include adequate access for City maintenance and repair and, perhaps most importantly, maintenance-free or low-maintenance design.

The *Delaware Sediment and Stormwater Regulations* have been revised and became effective on January 1, 2014. A three-step plan review process is now prescribed in the regulations. Proposed development projects must submit a Stormwater Assessment Study for the project limits of

disturbance and hold a project application meeting with the reviewing delegation agency as the first step, prior to submitting stormwater calculations or construction drawings, which are the second and third steps, respectively. Resulting from the project application meeting, a Stormwater Assessment Report will be completed by the reviewing agency and the developer and forwarded to the City. This Stormwater Assessment Report will rate the anticipated engineering effort necessary to overcome certain stormwater assessment items such as soils, drainage outlets, and impervious cover. The Sediment and Stormwater Program recommends that the City consider the ratings from the Stormwater Assessment Report in making a decision to issue preliminary approval for any development request by incorporating the Stormwater Assessment Report as a required element when a plan is submitted into the municipal preliminary plan approval process.

**Electric Utility Service**

The City operates its own electric distribution utility to provide electric services to commercial and residential customers within the city limits. Power is purchased on the wholesale power market through the Delaware Municipal Electric Corporation (DEMEC) of which Newark is one of eight full requirements municipal members within the state of Delaware. Several outgoing distribution circuits at 34.5 kv, 12.5 kv and 4 kv (being phased out) distribute power throughout the city. Over 12,000 customers are supplied power through these lines from distribution transformers, which reduce the voltage to levels appropriate for end users. The responsibilities of the Electric Department include the maintenance of substation sites, substation units, circuit breakers, transformers, and more than 165 miles of electric distribution lines. In addition to maintenance requirements, new power lines, substations, and underground electric utilities are constructed and installed to expand services to new customers. All of the City’s electricity originates at one substation. While back up transformers and circuits serve to reduce the incidence, frequency and duration of outages, the city is currently focused on developing a separate substation connected to the regional transmission system for additional redundancy and reliability.

By operating its own electric service, the City is able to provide a reliable, efficient service at rates that are typically lower than the rates of private power companies. The average estimated monthly electric utility payment for Newark utility customers is \$149. By comparison, the average estimated monthly utility payment for residents in all surrounding areas of northern New Castle County and Wilmington is \$159 (1).

In addition, electric revenues account for about 36% of the City’s net revenue, while Electric Department operations use only about 9% of the city budget. Therefore, the extra revenues stay in the community by means of a general fund margin transfer which heavily offsets the need for higher taxes. This hometown power model provides great advantages when compared to for profit utility providers where the substantial margin funds would go to stockholders instead of the local community in the form of services. Newark also benefits from the opportunity to self-serve city facilities such as street lights, pump stations, traffic signal, etc. at its wholesale rate.

A new 15-year Electric Service Agreement (ESA) was entered into with the University of Delaware in 2013 providing long-term revenue stability from our largest customer and some rate relief to the University associated with subsidies of residential customers identified in our most recent cost of service rate study. While we fully expect to maintain the current ESA relationship

with the University following the term of the current agreement, the city's electric revenue concentration risk (UD accounts for approximately 28%, or about \$14 million of our annual electric utility revenue) is mitigated by its ownership and investment in distribution assets. Newark will remain the owner of the retail distribution system.

The Electric Department participates in the annual development of City's Capital Improvements Program. The Department recommends specific system-wide capacity and capital-maintenance projects for consideration by the Planning Commission and ultimate Council approval. To accomplish this task, the Department maintains a sophisticated GIS computer-based system that records all transmission lines, transformers, substations, poles, street lights, and aerial facilities. Project-specific infrastructure recommendations are made through the Planning and Development Department's coordinated development-review process and, where necessary, are incorporated into the City's development agreements.

**Plan Goals and Action Items: Public Utilities**

Provide high-quality services to residents and businesses, as well as to efficiently accommodate future growth.

**Strategic Issues:**

- Management and funding of electric infrastructure to accommodate future growth and the development of the STAR Campus.
- Management and funding of stormwater infrastructure to address flooding issues.
- Source water protection to ensure the quality and supply of surface water and groundwater.
- Meeting new state and federal environmental quality regulations.

**Community Vision: Sustainable**

<b>Goal</b>	<b>Maintain and improve the City’s existing utility and infrastructure system (water, wastewater, electric, and stormwater) so it will adequately meet the needs of current and future residents and businesses as well as the University.</b> Maximizing the existing utility and infrastructure systems for water, wastewater, electric, and stormwater is the most environmentally and economically <i>sustainable</i> approach to providing reliable service.
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**Action Item 1**

**Develop a Full Asset Inventory and Management System of existing treatment and distribution resources to proactively address aging infrastructure and impacts of future developments.** A comprehensive inventory and management system would advance Newark as a “Sustainable Community” by creating a systematic approach to replacing aging infrastructure and a predictive model for how growth and development will affect existing conditions.

*Partnering agencies:*

Department of Public Works and Water Resources  
University of Delaware Water Resources Agency

**Action Item 2**

**Leverage partnerships to improve water quality and reduce flooding.** The City advances its vision as a “Sustainable Community” by coordinating with local, state, federal, and regional planning agencies to address water-quality and flooding issues regionally and to improve conditions within the City.

*Partnering agencies:*

Department of Public Works and Water Resources  
University of Delaware Water Resources Agency  
United Water  
DNREC  
Brandywine Conservancy  
New Castle County Conservation District

State of Maryland  
 Commonwealth of Pennsylvania  
 United States Department of Agriculture (USDA)

Action Item 3

**Develop a sustainable funding source to manage stormwater infrastructure.** The City should evaluate approaches to create a sustainable funding source in order to optimize resources to reduce damage and inconvenience from flooding, promote aquifer recharge, and minimize degradation.

*Partnering agencies:*

Department of Public Works and Water Resources  
 University of Delaware Water Resources Agency  
 The development community

Action Item 4

**Create a centralized database in a GIS Mapping System for all utilities.** Using the data recorded through the full asset inventory, GIS mapping creates a visual model that enables the City to more effectively manage its existing resources, focus on problem areas, and better predict future development needs.

*Partnering agencies:*

Department of Public Works and Water Resources  
 University of Delaware Water Resources Agency  
 The development community

**Community Vision: Sustainable**

<b>Goal 2</b>	<b>Ensure that City utilities meet or exceed all federal and state environmental-quality demands.</b> Meet all federal and state environmental-quality regulations and, where feasible, implement best practices that go beyond what is required.
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Action Item 5

**Meet or exceed new state and federal requirements of the National Pollutant Discharge Elimination System (NPDES) permit and Stormwater Management Plan.** As authorized by the Clean Water Act, the NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or manmade ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. The NPDES permit program is administered by the State of Delaware.

*Partnering agencies:*

Department of Public Works and Water Resources  
 Delaware Water Resources Agency

DNREC

Action Item 6

**Meet or exceed Delaware’s new Sediment and Stormwater regulations.** The revised *Delaware Sediment and Stormwater Regulations* have a goal of reducing stormwater runoff for the rainfall events up to the equivalent one-year storm, 2.7 inches of rainfall in 24 hours. Runoff reduction encourages runoff to infiltrate back into the soil as in the natural predevelopment system and results in pollutant removal and stream protection. Best management practices that encourage infiltration or reuse of runoff, such as porous pavements, rain gardens, rain barrels and cisterns, green roofs, open vegetation swales, and infiltration systems should continue/expand for new development sites with the City. Furthermore, the City may wish to consider policies such as limiting land disturbance on new development projects, limiting impervious surfaces by allowing narrower street widths, reducing parking requirements, and allowing pervious sidewalk materials.

*Partnering agencies:*

Department of Public Works and Water Resources  
 Delaware Water Resources Agency  
 DNREC

Notes:

1. Electric rates reflect a seasonal average of monthly rates for residential customers consuming 1,000 kWh per month.