



PUBLIC WORKS AND WATER RESOURCES
DEPARTMENT

CITY OF NEWARK

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July 6, 2015

John T. Barndt, P.G. Manager
Department of Natural Resources and Environmental Control
Division of Water
Water Supply Section
89 Kings Highway
Dover, Delaware 19901

Re: City of Newark Water Conservation Plan and Certification of Adequate Water Supply.

Dear Mr. Barndt,

In accordance with the reporting requirements of House Bill 118 amending Title 26 of the Delaware Code relating to the Water Supply Self Sufficiency Act of 2003 the City of Newark (City) is submitting a certification of adequate water supply for the projected year (2018), a certification that none of our water sources are reliant on an out-of-state water authority or utility, an analysis of the impact of our water conservation rates on our customer's demand for water, and information regarding our water conservation plan for the next three year period.

Please call the City of Newark at 302-366-7000 if you have any questions.

Sincerely,

Thomas Coleman, P.E.
Director Public Works & Water Resources



**CITY OF NEWARK
DELAWARE**

**WATER CONSERVATION PLAN
AND
CERTIFICATION OF ADEQUATE WATER SUPPLY**

JULY 2015



Table of Contents

	<u>Page Number</u>
Certification of Adequate Supply.....	2
Certification of Non-Reliance on Out-of-State Water Authorities or Utilities.....	4
Evaluation and Analysis of the City’s Water Conservation Rates.....	4
Drought Response Plan.....	5
City of Newark Drought Operating Plan.....	5
Reservoir Operations Plan.....	7
Water Conservation Plan.....	8

Attachments

	<u>Attachment Number</u>
Delaware River Basin Commission, Notice of Commission Action, Docket No. D-2002-02 CP dated September 9, 2003	1
“Source Water Assessment of the Public Water Supply Wells For City of Newark, New Castle County, Delaware”.....	2
The Portion of the City Code Dealing With Water Rates.....	3
Graph of the Volume of Water Metered per Each Metered Customer in Each Year.....	4
City of Newark Drought Response Plan.....	5
Operations and Maintenance Manual for the Newark Supply Reservoir.....	6



Certification of Adequate Supply

The City of Newark (“City”) has reviewed its previous water usage, future growth potential and water system capacity and certify that we have sufficient capacity to supply water to the City’s customers through the projected year, 2018.

Significant factors in this determination are the availability of the Newark Reservoir, and the availability of all five treatment units at the Newark Treatment plant for a capacity of 5 MGD. To create a factor of safety the certification calculations are based on an output from each unit of 600 gallons per minute (GPM).

Because of the reservoir, Newark is able to continue using the Curtis Water Treatment Plant during periods of drought or when flows in the White Clay Creek are too turbid for filtration. The reservoir holds approximately 318 million gallons and is designed to supply the Newark Treatment Plant during a 90 day drought.

Information regarding Newark’s ability to withdraw water from the White Clay Creek for domestic water purposes is discussed in the Delaware River Basin Commission, Notice of Commission Action, Docket No. D-2002-02 CP dated September 9, 2003. This document is included as Attachment (1). The South Well Field Treatment plant has the capability to treat 3 MGD. Water for the South Well Field Treatment plant is drawn from several wells. The capacity of these wells is shown in the following table.



<i>General Well Information City of Newark</i>						
	DNREC ID	Depth	Diameter	Capacity GPM	Aquifer	Nor Op GPM
South Well Field						
Well 10	10622	153'	4"	60	Potomac	0
Well 11	10003	63'	10"	150	Columbia	70
Well 12	10002	175'	10"	75	Potomac	75
Well 13	10004	62	10"	350	Potomac	320
Well 14r	10005	164	12"	325	Potomac	0
Well 15	182	59	10"	425	Columbia	300
Well 16	181	169	10"	475	Potomac	0
Well 17	1508	81	12"	400	Columbia	275
Well 19	31430	133'	6"	75	Potomac	0
			Total	2335		1040
Laird Tract Wells						
Well 20	81438	285	10"	550	Wissahickon	400
Well 21	81439	400	10"	200	Wissahickon	0
Well 23	10006	400'	8"	350	Wissahickon	350
Well 25	10007	419	8"	150	Wissahickon	0
			Total	1250		750
	Grand Total			3585		1790

A portion of the above information was taken from the “Source Water Assessment of The Public Water Supply Wells For City of Newark, New Castle County, Delaware” The pertinent portion of this report is provided as Attachment (2).

Water from well 14r and well 16 exhibit high levels of volatile organic compounds (VOC) Tetrachloroethylene (PCE) and 1,2-Dichloroethane (DCA), respectively; as such, well 14 and well 16 are currently not in service. The City is currently working to test and install a VOC removal system for well 14r to treat the water to drinking water quality standards. Additionally, the City is continuing its coordination with DNREC regarding the source of groundwater contamination and any potential resolutions.



Supplementing the City's wells treated at the South Well Field Treatment plant, Newark has the capability to withdraw groundwater from the Laird Tract wells located in the northern half of the municipal boundary.

The average monthly water demand projected for 2018 is 4.2 MGD or 2,917 gallons per minute (GPM).

The City's source of supply to meet this demand is as follows.

South Well Field	1040 GPM
Laird Tract wells	750 GPM
Newark Treatment Plant	<u>3000 GPM</u>
Total capacity in GPM	4790 GPM
Total capacity in MGD	6.9 MGD

The treatment capacities of the Newark and South Well Field plants in conjunction with the source water available for treatment from the White Clay Creek, the reservoir, and our wells, will allow Newark to meet the projected demand for 2018. As necessary, Newark also has the capacity to produce additional water to meet our maximum day or hour demands as well as make up for lost production in the event that we need to perform maintenance on a treatment unit at either plant or lose the use of a well.

Certification of non reliance on out-of-state Water Authorities or Utilities

As discussed above, sources of water are the Newark Water Treatment Plant that draws surface water from the White Clay Creek and the South Well Field Treatment Plant that treats water drawn from our wells in the South Well Field. Therefore, Newark certifies that we are not reliant on contracts with any out-of-state Water Authorities or Utilities to meet our demands during a drought of record.

Evaluation and Analysis of the City's Water Conservation Rates

The City of Newark utilizes an inclining block rate. The rate for the first 1,273 cubic feet of water is \$4.86/100 cubic feet. The rate for every cubic foot after 1,273 is \$6.20. This is a premium of 22% over the base rate (this rate was put in place January 1, 2012). In addition to the inclining block rate the City considers all water consumed when calculating the sewer bill. The portion of the City code dealing with water rates is provided as Attachment (3).

Consumption and billing system data were queried over the past nine years. The volume water metered per each metered customer in each year was tabulated and graphed as provided as Attachment (4). One can see that on a system wide basis water usage on a per bill basis has reduced since its peak in 2007 equating to roughly a 10% drop in



consumption. Evaluating consumption on a per bill basis allows us to compare water usage over time even though we have been adding customers each year.

It is also important to note that starting in 2013, the City started the installation of its Smart Meter program. The new higher accuracy meters have likely increased the volume of water billed thereby reducing the apparent affect of the conservation rate.

As the cost of water increases and more individuals find it prudent to conserve, and as the percentage of water conserving fixtures in the system grows the City believes that consumption per bill will likely continue to decrease at a similar or greater rate. Therefore, any changes to the conservation rate structure or conservation program are not necessary at this time.

Drought Response Plan

The following information draws upon the Three-Phase Drought Operating Plan as Amended and Approved by the Delaware Water Supply Coordinating Council on September 17, 2014 and the City Code.

City of Newark Drought Operating Plan

Water use and supply information will be reported to the UD Water Resource Agency as requested to assist in the development of water demand trends and supply forecasts. The condition of wells and ancillary equipment necessary for water production will be checked prior to the critical summer months to insure that they are ready and available for use if needed.

Water levels in the reservoir will be maintained at the highest level possible consistent with operational requirements and the reservoir operation and maintenance manual. A more detailed discussion can be found under the heading **Reservoir Operations Plan**.

During periods of expected or actual droughts Newark will monitor weather and stream conditions on a daily or more frequent basis to insure compliance with our withdrawal permits and other operational considerations.

As drought conditions are announced Newark will implement the following procedures:



Phase I Drought Watch

Notify residents that drought conditions are possible. Emphasize that water conservation is always appropriate. Publicize water conservation techniques in conjunction with the notices on the TV and internet. Compliance would be voluntary. Discuss conditions that might result in the issuance of a drought warning.

Continue to monitor stream flow and weather forecasts. Maintain the maximum supply of water in the reservoir. Continue to monitor the condition of wells and ancillary equipment necessary for water production

Phase II Drought Warning

Notify residents that a drought is expected to affect Newark. Continue efforts to publicize water conservation techniques. Discuss in detail the water conservation steps that will be put in place if a drought emergency is declared. Discuss the conditions that might result in the issuance of a drought emergency. Compliance with Drought Warning conservation steps would be voluntary.

Continue to monitor stream flow and weather forecasts. Maintain the maximum supply of water in the reservoir. Continue to monitor the condition of wells and ancillary equipment necessary for water production

Phase III Drought Emergency

Notify residents of the restrictions that are in place to conserve the limited resources that are available. Water use restrictions may include but are not limited to the following prohibitions or requirements:

- a. Washing of streets, driveways, sidewalks, parking lots, service station aprons or other outdoor surfaces.
- b. Watering of lawns.
- c. Watering of outside shrubbery, trees, plants, or other vegetation except from a watering can or other container.
- d. Washing cars, trucks, trailers or other types of mobile equipment.
- e. Filling or refilling of swimming pools except to meet Board of Health standards.
- f. Customers must take immediate action to repair water leaks from water lines or plumbing fixtures on their premises.



Continue to monitor stream flow and weather forecasts. Maintain the maximum supply of water in the reservoir. Continue to monitor the condition of wells and ancillary equipment necessary for water production.

The following language is paraphrased from the Delaware Water Supply Coordinating Council's Seventh Report to the Governor and General Assembly. This information is useful as it generally describes the procedures that will be followed. However, in the event that the White Clay Creek is flowing above 14 MGD Newark has the ability to withdraw water regardless of the drought condition.

Drought Watch

Upon declaration of a Drought Watch, Newark will continue to withdraw up to 5 mgd from the intake on White Clay Creek, and up to 3 mgd from the south well field to meet system demand,

Drought Warning

Upon declaration of a Drought Warning, Newark will withdraw up to 5 mgd from the intake on White Clay Creek and water from the Newark Reservoir, and up to 3 mgd from the south well field to meet system demand.

Drought Emergency

Upon declaration of a Drought Emergency, Newark will cease withdrawals from the intake on White Clay Creek. The City will withdraw up to 5 mgd from the Newark Reservoir and 3 mgd from the south well field to meet system demand.

Additional details on Newark's plan can be found in the Newark City Code section 30-49. Failure to comply with the provisions of this section can result in penalties in accordance with section 30-50 of the code. A copy of this section of the code is provided as Attachment (5).

Reservoir Operations Plan

Depending on operational requirements the water level in the reservoir may be kept at various elevations throughout the year. During the summer months the reservoir should be maintained as full as possible consistent with safe operation procedures contained in the Operations and Maintenance Manual for the Newark Supply Reservoir the pertinent portion of which can be found at Attachment (6).

In general the following operational sequence will be followed to maintain an adequate supply of water.

Water may be withdrawn from the White Clay Creek to be treated in the Newark Water Treatment plant and or fill the reservoir such that one or both of these operations does not cause the stream flow at the Newark Gauging station to fall below 14 MGD.



As the stream level falls one or both operations will need to be stopped to keep the stream flow above 14 MGD. When stream flows are below 14 MGD such that no water may be withdrawn from the creek or water quality issues make treatment impractical, water for the Newark Treatment Plant will be drawn from the reservoir.

On the occasion of the next rain event and when the water quality is such that refilling the reservoir is prudent the reservoir will be refilled to the extent that stream flows and operational considerations allow.

Refer to the Reservoir Operations and Maintenance Manual for other operational considerations regarding withdrawal and refilling operations.

Water Conservation Plan

Water conservation is an important part of the City of Newark's water use plan. The Newark reservoir provides a much needed source of water during periods when we are unable to draw water from the White Clay Creek due to rain events that raise the turbidity, droughts that reduce the volume below the minimum flow by requirements at the gauging station, and other upstream events that may make the water undesirable for treatment and consumption. Newark's continued emphasis on water conservation will help preserve and protect our potable water resources.

The City use a variety of methods to inform our customers of water conservation issues. We take advantage of community events such as the White Clay Creek Fest, the City web site, the City cable access channel, notices in bills, annual water quality reports and literature that we have available at the customer service counter. Recently, the City has completed its implementation of a Smart Meter Project. The project allows residents to view their consumption history in near real time, provide more accurate meter readings, reduced operating costs, and increased opportunities for leak detection via automated alerts if usage drastically increases or if 24 hour per day continuous usage is detected for a set determined number of days.

ATTACHMENT 1

DELAWARE RIVER BASIN COMMISSION
P.O. BOX 7360
WEST TRENTON, NEW JERSEY 08628-0360

Project Review

NOTICE OF COMMISSION ACTION

Date: September 9, 2003

Docket No. D-2002-02 CP

Project Sponsor: City of Newark
P.O. Box 390
220 Elkton Road
Newark, Delaware 19715-0390

Project Description: Surface Water and Groundwater Withdrawal

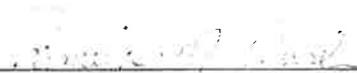
Referred by: Delaware Department of Natural Resources and Environmental Control

Action by Commission:

Incorporated in the Commission's Comprehensive Plan for the Delaware River Basin and approved pursuant to Section 3.8 of the Delaware River Basin Compact. See attached docket for terms and conditions.

Explanatory Note:

The action has been taken by the Commission in accordance with its responsibilities under Sections 3.8, 11.1 and 11.2 of the Delaware River Basin Compact. The Commission maintains a comprehensive water resources plan for the Delaware River Basin and reviews water resources projects proposed by other public and private agencies. Review of projects enables the Commission to prevent conflicts among water users and to protect the integrity of the Comprehensive Plan.


Pamela M. Bush, Esquire
Commission Secretary

Enclosure

c: Kevin C. Donnelly
Harry W. Otto
Stewart Lovell, DNREC
Mary Ellen Noble, Delaware Riverkeeper Network

DOCKET NO. D-2002-2 CP

DELAWARE RIVER BASIN COMMISSION

City of Newark
Surface Water and Groundwater Withdrawal Project
City of Newark, New Castle County, Delaware

PROCEEDINGS

This is an application submitted by the City of Newark on December 11, 2001, and referred to the Commission, pursuant to an Administrative Agreement under Sections 2-3.4 (a) and 2-3.7 of the *Administrative Manual - Part II, Rules of Practice and Procedure*, by the Delaware Department of Natural Resources and Environmental Conservation (DNREC) on May 22, 1991, and for review of an increased surface water and groundwater allocations. The project surface water and groundwater withdrawal was approved by the DNREC on May 12, 2003, (Permits Nos. 88-0018 AM, 88-0018 BM, 88-0018 CM, and 88-0018 DM), subject to approval by the Delaware River Basin Commission (DRBC).

The application was reviewed for inclusion of the project in the Comprehensive Plan and approval under Section 3.8 of the Delaware River Basin *Compact*. The New Castle County Planning Department has been notified of pending action on this docket. A public hearing on this project was held by the DRBC on September 3, 2003.

DESCRIPTION

Purpose. – The purpose of this project is to increase withdrawal from the applicant's existing surface water and groundwater sources to provide a conjunctive use system that includes a new 317 million gallon off-stream storage reservoir, that can provide a combined total reliable public water supply capacity of 5 million gallons per day (mgd), on an average monthly basis.

Location. – The existing project wells are located as follows:

WELL NO.	LATITUDE (N)	LONGITUDE (W)	AQUIFER
South Well Field			
10	39° 39' 26"	75° 44' 04"	Columbia
11	39° 39' 14"	75° 44' 06"	Columbia

WELL NO.	LATITUDE (N)	LONGITUDE (W)	AQUIFER
12	39° 39' 32"	75° 43' 43"	Potomac
13	39° 39' 27"	75° 44' 04"	Columbia
14	39° 39' 23"	75° 44' 04"	Potomac
15	39° 39' 01"	75° 44' 11"	Columbia
16	39° 38' 57"	75° 43' 24"	Potomac
17R	39° 37' 39"	75° 44' 19"	Columbia
19	39° 37' 52"	75° 43' 36"	Potomac
Laird Tract Well Field:			
20	39° 41' 35"	75° 45' 11"	Wissahickon
21	39° 41' 27"	75° 44' 42"	Wissahickon
23	39° 41' 51"	75° 45' 15"	Wissahickon
25	39° 41' 40"	75° 45' 43"	Wissahickon

The existing surface water intake is located as follows:

INTAKE NO.	LATITUDE (N)	LONGITUDE (W)
Curtis Treatment Plant	39° 41' 29"	75° 45' 2.5"

Surface water is diverted via an existing millrace on White Clay Creek located just west of Route 72 approximately 1,200 feet upstream of the City of Newark's corporate boundary, in New Castle County, Delaware. The millrace once served the Curtis Paper Mill, which no longer operates. The intake is located at the mill site, and hence called the Curtis Intake. The millrace diversion is located at River Mile 70.7 – 10.3 – 10.9.

Area served. – The applicant's distribution system serves a northwestern portion of New Castle County including all of the City of Newark and outlying areas between Route 95 and the Pennsylvania and Maryland state lines. The service area is shown in a plan entitled "City of Newark-Water Service Area" submitted with the project application.

The City is interconnected to United Water Delaware.

Physical features. –

a. **Design criteria.** – The City of Newark operates a public water supply system consisting of 13 wells for a total combined capacity of 144 million gallons (mg) per 30 days (4.8 mgd) and a surface water source, the White Clay Creek, currently approved for an allocation of 150 mg/30 days (5 mgd), although currently the water treatment plant's average capacity is approximately 2.5 mgd. The City of Newark proposes to increase use of its existing wells (including a new replacement well) for a combined total of 5.35 mgd during any 30-day period, and increase its surface water withdrawal to a peak day withdrawal of 18 mgd (restricted to

10.57 mgd for any 30-day period). The increased surface water withdrawal from White Clay Creek will be used to maintain storage in an approximately 317 mg off-stream reservoir which is located in an upland area northeast of Paper Mill Road in New Castle County, just north of the City of Newark's corporate boundary. The reservoir will be filled during periods when flow exceeds 14 mgd, i.e., 25 percent of the Average Daily Flow (ADF) in the White Clay Creek (approximately 56 mgd). Up to 18 mgd (approximately 32 percent of the ADF) will be diverted via an existing raceway that is already utilized by the applicant for its filtration plant. Up to 15 mgd of the water will be pumped approximately 800 feet east of the treatment plant to the reservoir via a 24-inch diameter pipe. The reservoir is situated on a 112-acre upland site; approximately 75 acres of the site is utilized for reservoir construction. Up to 3 mgd is to be diverted directly to the filtration plant either by pipe from the reservoir or directly from the White Clay diversion, or a combination of both.

The City's goal is to provide, via use of the reservoir and direct withdrawal, a sustained reliable yield of 3 mgd from the reservoir during a drought and a sustained reliable yield of 5 mgd via conjunctive use of its wells with its surface water source. For peak operating flexibility, and to meet future demand, the water treatment plant will be expanded to handle a maximum of 5 mgd. The filtration plant also provides treatment to many of the City's wells. The existing wells, with a combined total increase from 4.8 mgd (144 mg/30 days) to 5.35 mgd (160.5 mg/30 days), will ensure a total reliable capacity of 5 mgd from conjunctive use of the applicant's wells and surface water supply.

In addition to the passing flow trigger of 14 mgd (25 percent of ADF), DNREC has restricted the monthly diversion to an average of 10.57 mgd. Therefore, as stated above, while the peak day diversion of 18 mgd represents approximately 32 percent of the ADF, the monthly allowable average diversion represents approximately only 19 percent of the ADF. These operating constraints and passing flow triggers should conserve and sustain existing in-stream uses, including fisheries and a public water supply intake operated by United Water Delaware approximately 10 river miles downstream.

Most of the City's existing wells have been operated since the 1960's and 70's without adverse impacts or interference problems. The South Well Field and Laird Tract Well Field, will, with the new replacement well, provide up to 5.35 mgd (increased from 4.8 mgd). The South Well Field, developed in the 1960s, has experienced an on-going iron and manganese problem and is operated to minimize the iron and manganese concentrations by combining use with the surface water supply. A new pressure filter for iron and manganese removal has been added and will enable increased use. The wells are typically rested during non-peak demand periods between November and June to conserve aquifer storage.

The Laird Tract Field wells, all located within approximately 1,000 feet of White Clay Creek, have been analyzed by the City and its hydrologic consultants to demonstrate that withdrawals from the wells have no direct influence on White Clay Creek flow since the ground water is pumped from a confining bed and aquifer storage. The report provided, *Hydrology of*

the City of Newark's Laird Tract Wellfield, Newark, Delaware (dated February 5, 1997) developed pump test data showing the Laird Tract Wellfield is not a water table (unconfined) aquifer. Lowering of head in the Laird Tract aquifer by pumping results in movement of water from the confining bed into the aquifer. The confining bed, in turn, is recharged from precipitation and leakage from the stream but over a long period of time and large areal extent. Since this long-term recharge takes place continuously over time, the percentage of recharge derived from the Creek during low-flow periods is essentially, not measurable and non-substantial.

b. **Facilities.** – The existing wells, including replacement Well No. 17R, have the following characteristics:

WELL NO.	DEPTH	SCREENED INTERVAL CASED DEPTH/ CASING DIAMETER	PUMP CAPACITY	YEAR DRILLED
10	100'	NA	75 gpm	1969
11	63'	33-63'	200 gpm	1969
12	175'	145-175'	90 gpm	1956
13	63'	42-62'	300 gpm	1969
14	129'	106-126'	400 gpm	1964
15	69'	44-59'	500 gpm	1969
16	167'	130-145'	475 gpm	1956
17R	60'	120 – 140'	400 gpm	2003
19	133'	118-133'	75 gpm	1974
20	285'	Open hole 102-285'	190 gpm	1990
21	400'	Open hole 55-400'	170 gpm	1990
23	400'	Open hole 70-400'	126 gpm	1973
25	419'	Open hole ?-419'	316 gpm	1973

The 317 mg reservoir is planned for eventual inclusion into the City's park system and may include an interpretive center, trails, and other amenities. The reservoir has no contributing watershed and is a combination of embankments and excavations developed in an upland area. The embankment is constructed of compacted earth with a liner along the inside face to reduce seepage.

Water is diverted to the Curtis Filtration Plant via an existing millrace extending from a low head dam on White Clay Creek to storage and sedimentation ponds situated about $\frac{3}{4}$ of a mile downstream adjacent to the filtration plant. The millrace was restored to maintain an average width of between 18 to 20 feet and to maintain an average flow depth (with 6 inches allowed for sedimentation) of approximately three feet. Two masonry and stone walls control the millrace inlet channel at the White Clay Creek end. The average flow velocity through the millrace should be about .33 feet/second with a maximum of about .5 feet per second. The millrace inlet channel will be upgraded to include flow gates and a floodwall system with overflow spillway. A structural screen/trash rack will be installed in front of the gates.

The raceway leads to a gated pipe inlet to the storage and sedimentation ponds. Adjacent to the ponds will be a new pump station to allow diversion to the new off-stream reservoir as well as to the filtration plant. Just upstream of the storage/ sedimentation pond is an emergency tail race (i.e. a channel) that can divert flood flow directly from the raceway to White Clay Creek and can also be used to drain the raceway for periodic maintenance.

All wells, water service connections, and interconnections with other purveyors are metered.

The project wells and storage facility are above the 100-year flood elevation.

c. **Other.** -- Wastewater at the water treatment plant will be drained to an on-site settling basin where supernatant will be recycled back into the water treatment plant influent. The settled solids will be disposed of an approved landfill.

Wastewater generated from the project service area is conveyed to the City of Wilmington STP most recently approved by DRBC Docket No. D-98-26 CP on November 25, 2000. The treatment facility has adequate capacity to receive wastewater from the proposed project. The City of Wilmington STP discharges to the Delaware River.

Cost. – The overall cost of this project is estimated to be \$13.2 million dollars.

Relationship to the Comprehensive Plan. – The City of Newark's existing wells and surface water withdrawal were previously included in the Comprehensive Plan by Dockets Nos. D-71-13 CP, D-71-132 CP, D-77-45 CP, D-90-110 CP (G), and D-90-110 CP (S). Resolution No. 2000-15 recognized the applicant's progress towards meeting Comprehensive Plan objective via compliance with condition "x" added to Docket No. D-90-110 CP (G) requiring the City of

Newark to initiate an Integrated Water Resources Supply Plan to identify and develop alternate sources of water supply. The City of Newark participated in development of such an Integrated Water Resources Supply Plan, when in 1999, the Governors Task Force created the Delaware Water Supply Coordinating Council (Council) in response to recurrent drought and the drought of 1999. The Council included participation by the DNREC, the Delaware Geological Survey, New Castle County, the Division of Public Health, the University of Delaware Water Resources Agency, the Department of Agriculture, and other interested parties, private and public purveyors, and commercial interests. The proposed surface water storage project was selected as a recommended alternate project on the "A" list developed by the Water Supply Coordinating Council.

FINDINGS

The project is designed to conform to the requirements of the Ground Water and Surface Water Policies of the DRBC.

To protect the aquatic environment and instream uses of White Clay Creek, the withdrawal of water is to cease whenever the passing flow is 14 mgd or less, i.e., approximately 25 percent of the ADF of approximately 56 mgd. Further, DNREC has restricted the maximum allowable 30 day average to 317 mg (10.57 mgd) which presents the average withdrawal from ever exceeding 19% of the ADF. Investigations of the worst case scenario, the summer of 1963, indicates that the 30 day average for Newark's withdrawal would never exceed about 24% of the actual flow during July, August, and September. Thus, the storage project shall have little or no impact on instream uses, during low flow conditions.

After the drought of 1999, the Governors Task Force was formed and initiated action that led to the establishment of the Delaware Water Supply Coordinating Council (Council). The Council coordinated analysis and formulated recommendations identifying effective water supply alternatives, in part, to fulfill requirements of the DRBC to establish an Integrated Resource Plan between appropriate interested parties, DNREC, and public purveyors to address the long-term public water supply needs of Northern New Castle County for an appropriate design drought period. The proposed Newark pump-storage reservoir is a recommended project on the Council's "A" list and should provide the City of Newark with a reliable public water supply for a design period of approximately 20 years, as well as improve the reliability of Northern New Castle County regional systems. Currently, the City of Newark is interconnected to United Water Delaware (UWD), which obtains its water supply principally from the same surface water source, the White Clay Creek. Therefore, development of storage should improve the reliable water supply of both purveyors, as well as the region, during droughts.

Approximately 10 river miles downstream, UWD operates an intake in White Clay Creek with a drainage area of approximately 162 square miles and an ADF of approximately 138 mgd. Examination of the reservoir design and the low flow model, based upon the 1963 low flow worst-case scenario, indicates that the White Clay Creek, in the worst 30-day period, would generate an average flow of 6.4 mgd; during such time, no significant withdrawal would be

allowed to occur, and essentially, all the natural low flow would be allowed to pass. With the proposed storage facility, the City could now utilize its 3 mgd capacity from the off-line storage in conjunction with its wells. During the low flow season of 1963, the average passing flow between July and September to the UWD Stanton intake, accounting for the additional drainage area from White Clay Creek, Red Clay Creek and Mill Creek, should average approximately 16.5 mgd. With additional augmented releases from Hoopes Reservoir (10 cfs or 6.46 mgd), the flow available to UWD in this worst-case scenario should average approximately 23 mgd. This flow, coupled with use of the UWD Tidal Capture Structure (which can provide an estimated 3.5 to 7 mgd during severe drought when salt water migration may influence the water quality at UWD's Stanton intake), should provide UWD between 26.5 to 30 mgd of water supply during a worst-case scenario. Newark's proposed storage reservoir should reduce its dependence on an interconnection to UWD thus increasing the safety factor for regional water supply and reducing the need for UWD to provide emergency water supply via the interconnection. Newark's water withdrawal of 18 mgd represents approximately 32 percent of the ADF near its intake, but can only be operated when 25 percent of the ADF or greater is passing the intake. DNREC has also restricted the 30-day average for the City's withdrawal to 10.57 mgd or approximately 19 percent of the ADF. Therefore, during flow periods when the City is permitted to take up to 18 mgd, (and must average no more than 10.57 mgd over any 30 days) the flows in the White Clay Creek watershed will likely be averaging 57 percent of the ADF or greater. During such times, flow available to UWD should average approximately 64 mgd at its Stanton intake, including subtracting the up to 18 mgd Newark may take. The constraint that Newark not exceed 10.57 mgd (as a 30 day average) means it is highly likely that Newark when filling its reservoir will normally be passing 14 mgd (i.e. 25% of the ADF). These operating constraints, and design parameters conserve flow and apply allocation and passing flow conditions for satisfactory maintenance of existing in-stream uses and the equitable apportionment of water resources.

The United States Department of the Interior, Fish & Wildlife Service (Service), by letter of April 22, 2002, concluded that the project withdrawal, as conditioned with a minimum passby trigger of 14 mgd, will not likely affect any federally listed threatened or endangered species. In review of the project, the service commended the City's substantial efforts to minimize adverse environmental impacts via careful placement of the reservoir in an upland area, with design constraints developed to limit impacts to wet lands and ground water functions. Further, a small upland forested area near Jennys Run, a small stream crossing the northern boundary of the reservoir site, will be preserved to assure conservation of the wet land area contiguous with Jennys Run. An infiltration system designed to allow seepage from the reservoir to the ground water table will ensure the potential for recharge to the Jennys Run watershed is equivalent to the potential recharge prior to development of the site.

The DNREC water allocation is valid for a period of 30 years from date of issue, with review every five years.

Project withdrawals are used for the purpose of public water supply and the consumptive use is estimated to be 10 percent of the total water use.

The project does not conflict with the Comprehensive Plan, and is designed to prevent substantial adverse impact to the water resources related environment, while sustaining the current and future water uses and development of the water resources of the Basin.

DECISION

- I. Wells Nos. 10, 11, 12, 13, 14, 15, 17R, 19, 20, 21, 23, 25 and the Curtis Intake, as described above, are hereby continued in an/or added to the Comprehensive Plan.
- II. The previous approvals granted under Section 3.8 of the *Compact* in Dockets Nos. D-90-110 CP (S) and (G) are hereby rescinded.
- III. The project as described above is approved pursuant to Section 3.8 of the *Compact*, subject to the following conditions:
 - a. Approval is subject to all conditions imposed by the DNREC.
 - b. The wells and intake shall be available at all times for inspection by the DRBC.
 - c. The wells and intake shall be operated at all times to comply with the requirements of the ground water and surface water policies and standards of the DRBC.
 - d. During any 30-day period, the withdrawal from the proposed project surface water intake shall not exceed 317 million gallons. During any 30 day period: the withdrawal from Wells No. 10, 11, 13, 15, and 17R shall not exceed 63.72 million gallons; the withdrawal from Wells 12, 14, 16, and 19 shall not exceed 44.93 million gallons; and the withdrawal from Wells 20, 21, 23, and 25 shall not exceed 51.84 million gallons. The total combined withdrawal from all wells during any 30 day period shall not exceed 160.5 million gallons. The total conjunctive use system shall be operated such that the combined total water use does not exceed the system design capacity of 150 mg in any 30 day period.
 - e. The proposed wells shall be equipped with readily accessible capped ports and drop pipes so that water levels may be measured under all conditions. Existing wells are to be similarly equipped, where possible, with readily accessible ports and drop pipes as repairs or modifications are made at each existing well.
 - f. The applicant shall pay for surface water use in accordance with the provisions of Resolution No. 74-6, as amended.

g. This approval shall expire three years from date below unless prior thereto the applicant has commenced operation of the subject project or has expended substantial funds (in relation to the cost of the project) in reliance upon this approval.

h. The project withdrawal must not cause the streamflow to be less than 14 mgd below the passby gage near the diversion. Whenever the streamflow below the intake is less than this amount, no withdrawal shall be made and the entire natural streamflow shall be allowed to pass. The applicant shall continue to measure its passby flow at the USGS gage station established just upstream of the Paper Mill Road Bridge in accordance to previous conditions of approval for the existing surface water withdrawal.

i. The project diversions shall be metered with an automatic continuous recording device that measures to within 5 percent of actual flow. An exception to the 5 percent performance standard, but no greater than 10 percent, may be granted if maintenance of the 5 percent performance is not technically feasible or economically practicable. A record of daily withdrawals shall be maintained, and monthly totals shall be reported to the DNREC monthly and shall be available at any time to the Commission, if requested by the Executive Director.

j. Each new water service connection shall include a water meter in accordance with the DRBC's Resolution No. 87-7 (Revised).

k. In accordance with DRBC Resolution No. 87-6 (Revised), the applicant shall continue to implement to the satisfaction of the DNREC, the systematic program to monitor and control leakage within the water supply system. The program shall at a minimum include: periodic surveys to monitor leakage, enumerate unaccounted-for water, and determine the current status of system infrastructure; recommendations to monitor and control leakage; and a schedule for the implementation of such recommendations. The applicant shall proceed expeditiously to correct leakages and unnecessary usage identified by the program.

l. The applicant shall implement to the satisfaction of the DNREC, the continuous program to encourage water conservation in all types of use within the facilities served by this allocation permit. The applicant will report to the DNREC on the actions taken pursuant to this program and the impact of those actions as requested by that agency.

m. No water service connections shall be made to newly constructed premises with plumbing fixtures and fittings that do not comply with water conservation performance standards contained in Resolution No. 88-2 (Revision 2).

n. Each new water service connection shall include a water meter in accordance with the DRBC's Resolution No. 87-7 (Revised).

o. The applicant shall continue to implement its Water Conservation Plan as approved by DNREC, and will report to the DNREC on actions taken pursuant to this program and the impact of those actions as requested by the agency.

p. The applicant shall implement to the satisfaction of the DNREC, a drought or other water supply emergency plan.

q. No new water service connections shall be made to premises connected to sewerage systems that are not in compliance with all applicable water quality standards of the Commission.

r. Nothing herein shall be construed to exempt the applicant from obtaining all necessary permits and/or approvals from other State, Federal or local government agencies having jurisdiction over this project.

s. The area served by this project is limited to the service area as described above. Any expansion beyond this area is subject to review in accordance with Section 3.8 of the *Compact*.

t. This approval shall be subject to review and renewal within ten years of the date of approval.

u. The issuance of this withdrawal permit shall not create any private or proprietary rights in the water of the Basin and the Commission reserves the rights to amend, alter, or rescind any actions taken hereunder in order to insure the proper control, use, and management of the water resources of the Basin.

v. If the operation of this project significantly affects or interferes with any domestic or other existing wells or surface water supplies, the applicant, at its own cost, shall investigate valid complaints by users of wells or surface water supplies within the zone of influence of the diversion. Any well or surface water supply which is substantially adversely affected, or rendering it dry or otherwise unusable as a result of the applicant's project diversion, shall be repaired, replaced or otherwise mitigated at the expense of the applicant. A report of investigation shall be submitted to the Executive Director of the Commission as soon as practicable. The Commission shall make the final determination regarding the validity of such complaints, the scope or sufficiency of such investigations, and the extent of appropriate mitigation measures, if required.

w. The Executive Director may modify or suspend this approval, or require mitigating measures, if any information, operating data, or adverse impacts indicate it necessary.

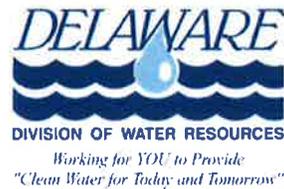
x. For the duration of any drought emergency declared by the Commission, water service or use by the project applicant pursuant to this approval shall be subject to the prohibition of those nonessential uses specified by the DNREC to the extent that they may be applicable, and to any other emergency resolutions or orders adopted hereafter.

BY THE COMMISSION

DATED: September 3, 2003

ATTACHMENT 2

Source Water Assessment
of The Public Water Supply Wells
For
City of Newark,
New Castle County, Delaware



State of Delaware
Department of Natural Resources and Environmental Control
Division of Water Resources
Source Water Assessment and Protection Program
89 Kings Highway
Dover, Delaware 19901

Phone: (302) 739-4793 fax: (302) 739-2296

<http://www.wr.udel.edu/swaphome>

Study Area

The City of Newark is located in northern New Castle County approximately 14 miles southwest of the city of Wilmington, DE and 7 miles northeast of the Town of Elkton, Cecil County, MD (Map 1). The City of Newark serves a population of nearly 33,000 persons and has approximately 9,000 service connections. The service area for the Newark Water Department (NWD) covers approximately 25 square miles. Water for the system is supplied through one surface water intake on the White Clay Creek that supplies 40% of the water for the city and fourteen (14) public wells that pump an average of 4 million gallons per day and contribute 31% of the total water supplied by the city. 29% of the city's water is purchased from other water companies (Newark Water Department, 2000).

Public Water Supply Well Data

Table 1 contains current data contained in databases, files, and reports from DNREC Water Supply Section, the Delaware Geological Survey (DGS), and the Department of Health and Social Services, Office of Drinking Water (DPH-ODW) and has been verified as correct by NWD.

Wells #10, #11, #12, #13, #14, and #15 are the primary sources of supply for the system. Wells #16, #19, #20, #21, and #23 are used for back-up supply. Wells #17, and #25 are currently out of service. Well #8 has been removed from service and will be converted to an alternate use (non-public) in the future, however, it must be considered in this assessment due to its current status. Newark Water Department has scheduled Well #17 for replacement in late 2001.

Well #	DNREC Permit #	Allocation #	Year Constructed	Allocated Capacity (gpm)	Diameter (inches)	Screen Interval (fbgs)	Aquifer	Current Well Status
8	10001	88-0018B	1931	140	16	55-60	Potomac	Out of Service
10	10622	88-0018B	1969	60	4	173-193	Potomac	Offline
11	10003	88-0018B	1956	150	10	31-62	Columbia	Primary
12	10002	88-0018C	1956	75	10	145-170	Potomac	Primary
13	10004	88-0018B	1956	180	10	41-62	Potomac	Primary
14	10005	88-0018C	1956	325	10	106-126	Potomac	Primary
15	182	88-0018B	1968	425	10	44-59	Columbia	Primary
16	181	88-0018C	1968	475	10	130-164	Potomac	Back-up
17	1508	88-0018B	1971	150	8	56-69	Columbia	Out of Service
19	31430	88-0018C	1968	75	6	118-133	Potomac	Back-up
20	81438	88-0018D	1990	550	10	92-360	Wissahickon	Back-up
21	81439	88-0018D	1990	200	10	52-335	Wissahickon	Back-up
23	10006	88-0018D	1971	350	8	70-400	Wissahickon	Back-up
25	10007	88-0018D	1971	150	8	70-419	Wissahickon	Out of Service

Table 1: City of Newark Well Construction Data

gpm = gallons per minute fbgs = feet below ground surface

ATTACHMENT 3

ARTICLE II. - WATER METERS AND WATER RATES

Sec. 30-18. - Installation of water meters and meter yokes; cost.

A water meter shall be installed by the city, at its own cost, on each of the service pipes supplied with water from the city's water mains. The water meter must be installed in a meter yoke. The meter yoke may be purchased from the city at the then current charge. The meter yoke, valves, and piping are to be installed by the property owner and they are the responsibility of the property owner.

(Code 1959, Ch. 22, § 31; Ord. No. 68-11, 4-1-68; Ord. No. 85-9, Amend. No. 5, 2-11-85)

Sec. 30-19. - Location of water meters; approval of building inspector; charge for installation.

- (a) Whenever practical, water meters shall be installed inside the building, in a location approved by the building inspector.
- (b) Whenever it is necessary to install the water meter outside of the building, the property owner must install an outside meter yoke in a meter pit of a design and in a location approved by the water department.

(Code 1959, Ch. 22, § 31; Ord. No. 68-11, 4-1-68; Ord. No. 85-9, Amend. No. 6, 2-11-85)

Sec. 30-20. - City ownership of meters; right to control and inspection.

Water meters are the property of the city and shall be subject to its control and inspection. The city shall have the right to enter, at all reasonable hours, any private property, building, or premises on or within which any water meter is located for the purpose of examining, repairing, replacing, or removing said meter or to take meter readings. Failure of a property owner to comply with the city's initial written notice to provide scheduled access will result in a second notification that if access is not scheduled or provided within 15 business days, water service will be terminated.

(Code 1959, Ch. 22, § 33; Ord. No. 13-22, Amend. No. 1, 8-12-13)

Sec. 30-21. - Water furnished by meter measurements; applicable rate.

All water will be furnished by meter measurements at the rates specified in Section 30-29.

(Code 1959, Ch. 22, § 32)

Sec. 30-22. - Payment of water passing through meter; applicable rate.

All water, whether used or wasted, which passes through any water meter shall be paid for according to the rate specified in Section 30-29 for the particular meter reading; except as provided in Section 30-27 of this code.

(Code 1959, Ch. 22, § 32; Ord. No. 75-13, 3-24-75)

Sec. 30-23. - Determination of water consumption where meter is defective or tampered with.

- (a) Where it has been determined that a water meter is defective in registering or for any reason fails to register properly since the last previous reading, the water consumption of the reading period may be estimated by an average of previous readings or from future readings or upon similar connections.
- (b) Where it has been determined that a water meter has been tampered with or the meter bypass has been opened, the water consumption for the reading period in which the tampering occurred will be twice the highest quarterly consumption for the past eight quarters. The customer shall continue to be billed at this rate until the condition is corrected as certified by the water department.

(Code 1959, Ch. 22, § 36; Ord. No. 85-9, Amend. No. 7, 2-11-85)

Sec. 30-24. - Injury to meters attributable to owners or occupants; repair; costs.

Any water meter damaged from hot water backing for heaters or from any cause directly or indirectly attributable to the property owner or occupants shall be replaced or repaired by the city at the expense of said owner or occupant at the time the meter is replaced.

(Code 1959, Ch. 22, § 34)

Sec. 30-25. - Separate service pipes required; notice to install.

Where water is supplied to more than one property through a single service pipe, the building department, upon approval by the city manager, shall serve written notice upon the property owner or owners whose property does not have a separate service pipe from the water main, to install a separate service pipe from the dwelling to the water main within 60 days of the mailing of such notification. The notification shall be mailed to the last known post office address of the property owner and to the property where the violation exists.

(Code 1959, Ch. 22, § 35; Ord. No. 85-9, Amend. No. 8, 2-11-85)

Sec. 30-26. - Failure of property owner to install service pipe; installation by city; costs.

In the event that any property owner shall fail to install a separate water lateral from the main to the dwelling as required by Section 30-25 of this chapter, the city shall have the authority to install a water lateral from the main to the piping within the dwelling and to assess the cost thereof against the property owner. If the cost is not paid by the property owner within 30 days from the time it is assessed, it shall accumulate interest at the rate of 12% per annum until the next ensuing first day of July when it shall be included in the city tax bill for the property involved and thereafter shall be due and collectible in the same manner as city real estate taxes.

(Code 1959, Ch. 22, § 35; Ord. No. 85-9, Amend. No. 9, 2-11-85)

Sec. 30-27. - Responsibility for water leaks; costs; repair, effect of failure to repair.

The property owner shall be responsible for all water leaks in the service line between the curb stop and the water meter. If such leaks are not repaired within a reasonable time, the water shall be cut off at the curb stop until the repairs are made. Where the city has determined that a leak has occurred in the metered system which has resulted in water usage more than 100% higher than the property owner's highest usage in the previous 24-month period, the city may adjust the bill. The bill may be reduced to an amount which is 100% higher than the highest bill in the previous 24-month period. The next previous bill may also be reduced to the same amount if the city determines the leak occurred in that quarter. Prior to the adjustment, the property owner shall certify that the leaks have been eliminated. No additional adjustment shall be permitted for a 24-month period.

(Code 1959, Ch. 22, § 45; Ord. No. 75-13, 3-24-75)

Sec. 30-28. - Replacement of water meter deferred if leaks may result; notice to owner.

When it is necessary to replace a water meter and the condition of the owner's line is in such a weakened state that leaks may occur if the replacement is made, the city shall advise the owner, in writing, of the condition of the lines and shall defer making the required meter replacement for a period of 30 days. If the owner's lines have not been replaced during said 30-day period, neither the city nor any installer acting on the city's behalf shall be responsible for any leaks that may develop when or after the meter is replaced.

(Code 1959, Ch. 22, § 45; Ord. No. 85-9, Amend. No. 10, 2-11-85; Ord. No. 13-31, Amend. No. 1, 10-14-13)

Sec. 30-29. - Schedule of water rates.

Beginning July 1, 2013, water meter reading and billing may be converted to monthly frequency.

Beginning with all billings based on usage after January 1, 2015, for all customers metered and billed quarterly, the charge for furnishing water shall be due and payable quarterly in accordance with the following schedule:

For meters registering cubic feet:

In city limits: First 1,273 cubic feet at \$4.86 per 100 cubic feet.
All over 1,273 cubic feet at \$6.20 per 100 cubic feet.

Outside city limits: First 1,273 cubic feet at \$6.47 per 100 cubic feet.
All over 1,273 cubic feet at \$8.40 per 100 cubic feet.

For meters registering gallons:

In city limits: First 9,522 gallons at \$6.51 per 1,000 gallons.
All over 9,522 gallons at \$8.29 per 1,000 gallons.

Outside city limits: First 9,522 gallons at \$8.65 per 1,000 gallons.
All over 9,522 gallons at \$11.22 per 1,000 gallons.

Beginning with all billings based on usage after January 1, 2015, for all customers metered and billed monthly, the charge for furnishing water shall be due and payable monthly in accordance with the following schedule:

For meters registering cubic feet:

In city limits: First 425 cubic feet at \$4.86 per 100 cubic feet.
All over 425 cubic feet at \$6.20 per 100 cubic feet.

Outside city limits: First 425 cubic feet at \$6.47 per 100 cubic feet.
All over 425 cubic feet at \$8.40 per 100 cubic feet.

For meters registering gallons:

In city limits: First 3,174 gallons at \$6.51 per 1,000 gallons.
All over 3,174 gallons at \$8.29 per 1,000 gallons.

Outside city limits: First 3,174 gallons at \$8.65 per 1,000 gallons.
All over 3,174 gallons at \$11.22 per 1,000 gallons.

(Code 1959, Ch. 22, § 38; Ord. No. 70-5, 1-14-70; Ord. No. 72-4, 1-10-72; Ord. No. 72-36, 6-26-72; Ord. No. 75-4, 2-10-75; Ord. No. 76-56, Amend. No. 1, 12-13-76; Ord. No. 80-3, Amend. No. 1, 1-14-80; Ord. No. 81-4, Amend. No. 1, 1-12-81; Ord. No. 83-1, Amend. No. 1, 1-10-83; Ord. No. 83-29, Amend. No. 1, 12-12-83; Ord. No. 87-10, Amend. No. 1, 3-9-87; Ord. No. 91-37, Amend. No. 1, 11-25-91; Ord. No. 99-12, Amend. No. 1, 5-10-99; Ord. No. 01-9, Amend. No. 1, 6-25-01; Ord. No. 09-09, Amend. No. 1, 3-9-09; Ord. No. 09-27, Amend. No. 1, 8-24-09; Ord. No. 11-20, Amend. No. 1, 10-24-11; Ord. No. 13-14, Amend. No. 1, 6-10-13; Ord. No. 13-25, Amend. No. 1, 8-12-13; Ord. No. 13-36, Amend. No. 1, 12-9-13; Ord. No. 14-23, Amend. No. 1, 12-15-14)

Sec. 30-30. - Minimum charge for water.

Effective July 1, 1999, there shall be no minimum quarterly or monthly charge for water. All billing shall be based on actual consumption.

(Code 1959, Ch. 22, § 39; Ord. No. 70-5, 1-14-70; Ord. No. 72-4, 1-10-72; Ord. No. 72-36, 6-26-72; Ord. No. 75-4, 2-10-75; Ord. No. 76-56, Amend. No. 2, 12-13-76; Ord. No. 80-3, Amend. No. 2, 1-14-80; Ord. No. 81-4, Amend. No. 2, 1-12-81; Ord. No. 83-1, Amend. No. 2, 1-10-83; Ord. No. 83-29, Amend. No. 2, 12-12-83; Ord. No. 87-10, Amend. No. 2, 3-9-87; Ord. No. 91-37, Amend. No. 2, 11-25-91; Ord. No. 99-12, Amend. No. 2, 5-10-99; Ord. No. 13-14, Amend. No. 2, 6-10-13)

Sec. 30-31. - Minimum charge for group of apartments and condominiums served by one meter.

Effective July 1, 1999, there shall be no minimum quarterly or monthly charge for water for groups of apartments and condominiums. All billing shall be based on actual consumption.

(Code 1959, Ch. 22, § 40; Ord. No. 70-5, 1-14-70; Ord. No. 72-4, 1-10-72; Ord. No. 72-36, 6-26-72; Ord. No. 76-56, Amend. No. 3, 12-13-76; Ord. No. 80-3, Amend. No. 3, 1-14-80; Ord. No. 81-4, Amend. No. 3, 1-12-81; Ord. No. 83-1, Amend. No. 3, 1-10-83; Ord. No. 83-29, Amend. No. 3, 12-12-83; Ord. No. 87-23, Amend. Nos. 1, 2, 6-22-87; Ord. No. 91-37, Amend. No. 3, 11-25-91; Ord. No. 99-12, Amend. No. 3, 5-10-99; Ord. No. 13-14, Amend. No. 3, 6-10-13)

Sec. 30-32. - Water rates outside city.

(a) The Shue-Medill Middle School shall be billed at the in city rate as provided in sections 30-29 and 30-30.

(Code 1959, Ch. 22, § 42; Ord. No. 75-4, 2-10-75; Ord. No. 76-56, Amend. No. 4, 12-13-76; Ord. No. 80-3, Amend. No. 4, 1-14-80; Ord. No. 81-4, Amend. No. 4, 1-12-81; Ord. No. 83-1, Amend. No. 4, 1-10-83; Ord. No. 83-29, Amend. No. 4, 12-12-83; Ord. No. 87-10, Amend. No. 3, 3-9-87; Ord. No. 91-37, Amend. No. 4, 11-25-91; Ord. No. 11-20, Amend. No. 2, 10-24-11; Ord. No. 13-14, Amend. No. 4, 6-10-13; Ord. No. 13-25, Amend. No. 2, 8-12-13; Ord. No. 13-36, Amend. No. 2, 12-9-13; Ord. No. 15-01, Amend. No. 1, 1-12-15)

Sec. 30-33. - Water rates during vacancy of property.

A charge of one-half of the rates provided in Sections 30-29, 30-30, 30-31 and 30-32, shall be made when the owner of any property shall give written notice to the council that his property is about to become vacant and such rates shall be in force for the period of vacancy after receipt of notice.

(Code 1959, Ch. 22, § 41)

Sec. 30-34. - Water rent to be paid by builders.

Builders shall pay water rent from the time the tap is made until the building is completed. Upon application for a building permit, the applicant shall pay a fee for the use of water during construction at the rate of \$15.00 for each \$25,000.00 of building value as reflected in the building permit.

(Code 1959, Ch. 22, § 44; Ord. No. 07-24, Amend. No. 12, 8-13-07)

Sec. 30-35. - When water bills are due and payable; service charge on unpaid balance; adjustments for billing errors and omissions.

Bills for water service shall be due and payable on the day of mailing from the city office, and if not paid within 21 days of the due date, shall be subject to a 1½% per month service charge on the unpaid balance, except that this service charge shall not apply to those residents of the city who are 65 years or older and/or who are disabled and who qualify under Chapter 13, Sections 13-9 and 13-10 of this code.

The city may make appropriate credits or refunds in the event of an overcharge and may bill in arrears in the event of an undercharge provided that such credit or refund is greater than a minimum threshold of two percent difference between the bill received and the corrected bill. Reasons for adjustments may include, but are not limited to, improper connection of metering equipment, failed meters, clerical errors, billing system errors, incorrect meter readings, flow meters configured with an improper volume multiplier, or improper application of the rate schedule. In no case will additional charges to the customer under the application of the preceding paragraph be collected for a period which is more than three years prior to the billing period of discovery. If the customer has been overcharged, the city shall refund the amount due or credit the customer's account at the customer's election to the date the error was made, not to exceed three years prior to billing period of discovery. In the absence of an election by the customer for a refund by check, the city shall credit the customer's account. In the event additional charges are due to the city, installment payments shall be offered for not more than the number of billing periods the account was billed in error. An installment service payment charge shall not be applied to such installment payments.

(Code 1959, Ch. 22, § 43; Ord. No. 75-4, 2-10-75; Ord. No. 76-50, Amend. No. 4, 11-22-76; Ord. No. 78-27, Amend. No. 2, 8-14-78; Ord. No. 78-40, Amend. No. 6, 11-27-78; Ord. No. 13-23, Amend. No. 1, 8-12-13)

Editor's note— Ord. No. 13-23, Amend. No. 1, adopted August 12, 2013, changed the title of section 30-35 from "When water bills are due and payable, service charge on unpaid balance" to "When water bills are due and payable; service charge on unpaid balance; adjustments for billing errors and omissions." The historical notation has been preserved for reference purposes.

Sec. 30-36. - Failure to pay water bill; discontinuance of water service; notice.

If any water bill remains unpaid for more than 40 days after its due date, the consumer shall be notified that if said bill is not paid within five days, the water service will be cut off.

(Code 1959, Ch. 22, § 43; Ord. No. 76-50, Amend. No. 5, 11-22-76; Ord. No. 13-14, Amend. No. 5, 6-10-13)

Sec. 30-37. - Board of health to receive notice of water disconnection.

The city board of health shall be notified whenever water service is discontinued at an occupied dwelling.

(Code 1959, Ch. 22, § 43)

Charter reference— Board of health generally, Art. VI, § 603.

Cross reference— Board of health, § 2-65-2-68.

Sec. 30-38. - Restoration of water service after discontinuance.

- (a) In the event that water service is cut off as provided in section 30-36, such service shall not be restored until the delinquent customer has paid in full all charges due on the date service was discontinued unless the finance director, or his/her designee, determined that the customer has a hardship or hardships which warrant granting and arrangement for partial payment with full payment within six months.
- (b) In addition to the charge under (a) above, the customer must pay in advance of reconnection:
 - (1) A \$50.00 reconnection fee; or
 - (2) In the event of a temporary disconnection at the request of the customer, a \$10.00 service charge; or
 - (3) A service/collection fee of \$50.00 if a city employee visits the property with the intent of collecting the delinquent charges or to disconnect the service and payment is made prior to the disconnection of service; or
 - (4) If the customer desires the service to be reconnected other than normal working hours, an additional \$80.00 service charge will be added to the above charge.

(Code 1959, Ch. 22, § 43, Ord. No. 85-9, Amend. No. 11, 2-11-85; Ord. No. 86-13, Amend. No. 1, 2-24-86; Ord. No. 07-24, Amend. No. 13, 8-13-07; Ord. No. 13-14, Amend. No. 6, 6-10-13)

Sec. 30-39. - Unpaid water bills constitute liens.

Water bills which are unpaid and in arrears for thirty 30 days after they become due shall thereafter constitute a lien upon the lands and premises to which water was furnished, and shall remain a lien until the bill and applicable penalties are paid to the city.

(Code 1959, Ch. 22, § 37; Ord. No. 13-14, Amend. No. 7, 6-10-13)

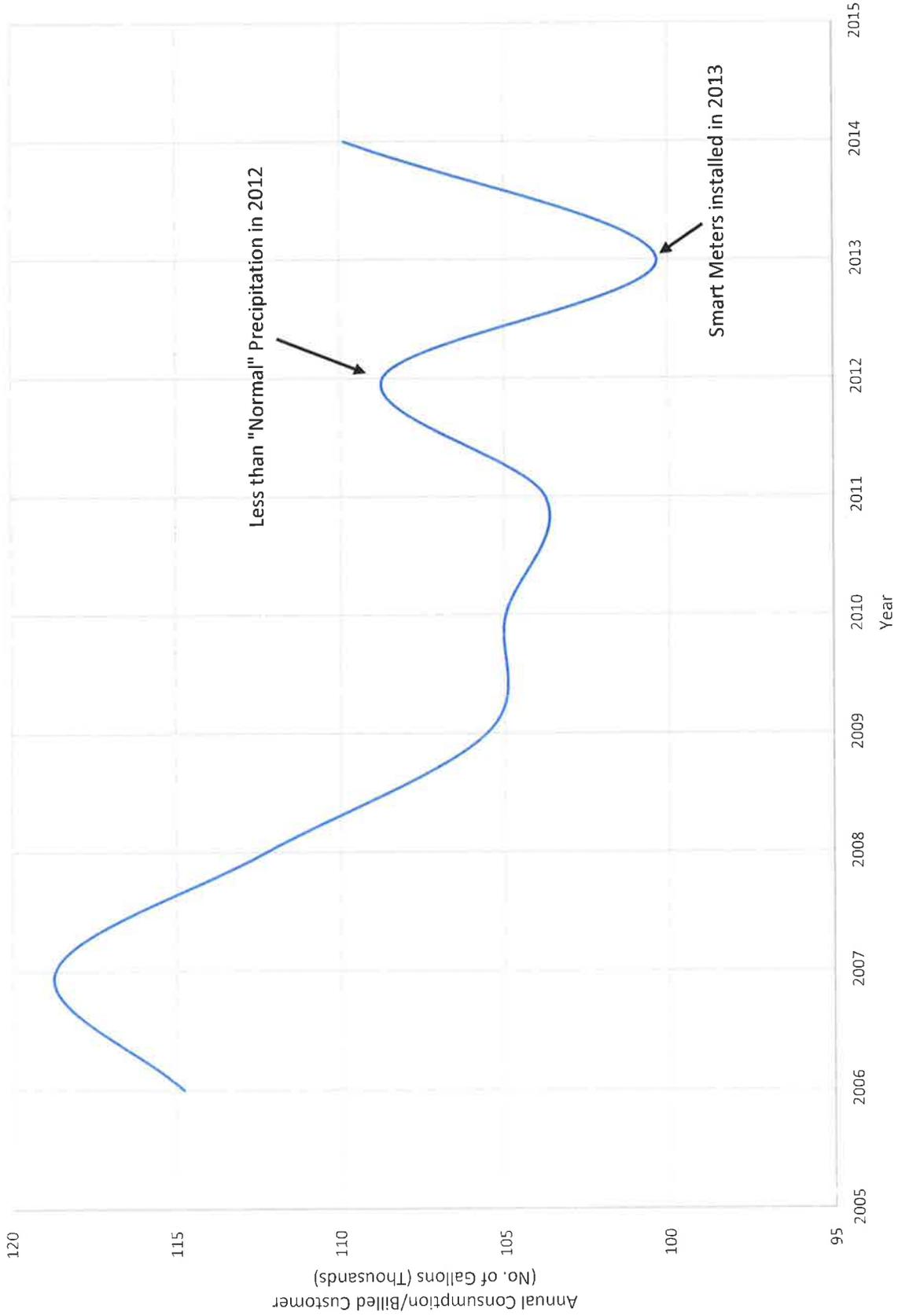
Sec. 30-40. - Discharge of lien for water rent after execution sale.

Any liens for water rent which are attached to any land or premises sold under execution process shall be paid from the purchase price resulting from such sale, and the lien on the land or premises shall be discharged.

(Code 1959, Ch. 22, § 37)

ATTACHMENT 4

City of Newark Water Consumption



ATTACHMENT 5

ARTICLE VI. - WATER RESTRICTIONS

Sec. 30-48. - Authority.

Whenever in the judgment of the city manager, an emergency exists because of a shortage of available water supplies for fire fighting and other essential uses, or when the shortage may be detrimental to the water system, or when the shortage may result in certain of the water service areas being deprived of water, the city manager may declare the temporary enforcement of this article within the Newark water service area. Notice of such declaration must be announced immediately through public announcement.

(Ord. No. 79-41, 9-24-79)

Sec. 30-49. - Restriction of water use.

- (a) Voluntary conservation measures. Upon a determination by the city manager, based upon receipt of information from the water and waste water department, that a shortage exists in the city water supply, the city manager shall be authorized to call on the city's water customers to employ prudent restraint in water usage and to conserve water voluntarily by whatever methods available.
- (b) Mandatory conservation measures. Upon a determination by the city manager, based upon receipt of information from the water and waste water department, that voluntary conservation measures have or will not sufficiently reduce the shortage to prevent a possible emergency, mandatory conservation measures shall be imposed.

Mandatory conservation measures shall consist of curtailment of certain uses of water including, but not limited to, one or more of the following:

- (1) The washing of streets, driveways, sidewalks, parking lots, service station aprons, or other outdoor surfaces.
- (2) Watering of lawns.
- (3) Watering of outside shrubbery, trees, plants, or other vegetation, except from a watering can or other container.
- (4) The filling or refilling of swimming pools except to meet board of health standards.
- (5) The washing of automobiles, trucks, trailers, or any other type of mobile equipment.
- (6) Any customer must take immediate action to repair and stop leakage from water lines or plumbing fixtures on the premises.

(Ord. No. 79-41, 9-24-79)

Sec. 30-50. - Penalties.

The water supply to any unit or establishment may be turned off if any provisions of this article or any orders of the city manager implementing this article are violated. For the first offense, the water may be turned off for a maximum of 12 hours. For the second offense, the water may be turned off for a maximum of 24 hours, and for the third or more offense, the water may be turned off for a maximum of 48 hours. In any case, the water supply will be turned on only after a fee of \$5.00 is paid to the cashier at the Newark Municipal Building.

The decision to turn off water shall be made by the water department director, or his designee. The customer shall be informed that his water service will be turned off for the above prescribed time 24 hours after notice is given. If the customer objects to the turn off, he may appeal to the city manager who shall

review the situation and shall determine whether or not to enforce the turn-off order or modify the same. Such appeal shall be made within 24 hours of notice above set forth.

In addition to the above right to discontinue water service, any customer shall be subject to a fine of up to the following: First offense, \$50.00; second offense, \$100.00; and third offense, \$250.00.

(Ord. No. 79-41, 9-24-79)

Sec. 30-51. - Appeals.

Whenever the city manager issues an order directing restriction or curtailment of the use of water as provided herein, any person subject to such order may appeal to the city council. The city council shall act as a board of appeal on such matters. The city council shall grant an appellant the opportunity to present in writing or, at the option of the appellant, in a public hearing, arguments against the decision of the city manager. Additionally, the city council may, on written application, permit an exemption for less than full compliance with any order of the city manager issued pursuant to this article when, in its judgment, compliance or full compliance would work an exceptional and unjustifiable hardship. All applications for appeals or exemptions must be in writing. The city manager shall be authorized to issue in writing temporary waivers or exceptions within the provisions of this ordinance for such periods of time as may be necessary for the city council to formally consider such exemptions or take appropriate action.

(Ord. No. 79-41, 9-24-79)

ATTACHMENT 6

2.1 DESIGN INTENT AND OPERATION

The Newark Reservoir is a pumped-storage facility that is intended to provide water to the City of Newark in times of drought or other operational necessity. The reservoir is operated by pumping water from White Clay Creek into the reservoir during periods of sufficient flows in the creek. The reservoir is filled by pumping water from the pumping station located at the Newark water treatment plant up to the reservoir's inlet/outlet tower via the 24-inch line. The maximum pumping rate is 15 MGD.

The water in the reservoir is circulated through the perimeter wetlands and sand filter for water quality purposes. During times of drought, water will be released from the reservoir by opening one or more of the gates in the inlet/outlet tower.

The demand reliability curves, prepared by Duffield Associates used for the design of the facility, assume an average 3 MGD demand, a 15 MGD pump rate and a 14 MGD required flowby rate in White Clay Creek. Based on the above listed assumptions, the reservoir volume available between the maximum operating level and El. 172 feet provides a reliability of 90 percent. At the level of the El. 169 feet interior bench, the reliability is approximately 92.5 percent.

The reservoir is designed for the pool level to be regulated on a routine basis, both to release water for use as well as to lower the reservoir level in response to anticipated unusual conditions. Normal operations are for the reservoir level to fluctuate between maximum operating pool of El. 186.0 feet and the 90 percent reliability level at El. 172.0 feet. Instructions are provided in the following sub-sections.

2.2 RESERVOIR FILLING AND RELEASE

2.2.1 First Reservoir Filling

The reservoir was initially filled between November 11, 2005 and April 9, 2006. The pool was raised slowly at a rate of one to two feet per day from El. 130 to El. 172 from November 11 to December 23, 2005. At that time, pumping into the reservoir ceased, and the reservoir level was held constant until March 13, 2006. Pumping was then resumed and the reservoir filled at a rate of about one foot per day, until it reached its maximum operating level at El. 186.

2.2.2 Subsequent Reservoir Fillings

Reservoir filling subsequent to the first filling should be conducted at a maximum rate of 2 feet per day (24-hour period), unless more stringent guidance is provided by DNREC or the Independent Dam Safety Engineer. The reservoir should be closely monitored for wet areas on the embankment and other unusual conditions during the refilling operation. If unusual conditions are observed, the refilling should be stopped and the DNREC and the Independent Dam Safety Engineer should be notified.

2.2.3 Reservoir Release

Reservoir releases are controlled at the inlet/outlet tower through one of five gates (See Section 2.5 Inlet/Outlet Tower and Bridge). Depending upon the reservoir level, gate valves can be opened to release water at any of these five levels. In addition, there is a flap gate at El. 186.25 should the reservoir exceed the normal pool elevation. The maximum permitted operational release rate for the reservoir is 5 MGD. The liner and liner cover system is designed for a maximum drop in reservoir level of one (1) foot over a 24-hour period. The withdrawal rate of 1-foot-per-day should only be exceeded in an emergency condition and only in coordination with DNREC and the Independent Dam Safety Engineer.

2.3 RESERVOIR LEVEL DURING OPERATION

2.3.1 Normal Conditions

As previously noted, the reservoir is designed under normal conditions to operate between El. 186.0 and 172.0 feet (90 percent reliability level). The embankment crest is El. 188.5 feet. Therefore, at the maximum operating level, the total freeboard is 2.5 feet, which is sufficient under usual conditions. The reservoir level must be regulated to maintain the water level at no higher than the maximum operating level of El. 186.0 feet. Instructions are provided in this document for lowering the reservoir in times of anticipated heavy rains and/or high winds to provide additional freeboard.

Since the interior slope is armored to El. 169 feet, no special maintenance procedures should be necessary when the reservoir is at or above this level. However, if the reservoir level is drawn down for an extended period of time, the exposed riprap and Fabriform should be visually inspected before raising the water level. Minor maintenance of the armoring should be conducted, as necessary. In the event that the reservoir is drawn down below El. 169 feet, special procedures that are required before raising the reservoir level are discussed in Sub-section 2.3.2.3 Severe Drought, and in Section 3 Maintenance of the Reservoir.

2.3.2 Unusual Weather Conditions

2.3.2.1 Heavy Precipitation

For anticipated precipitation events in excess of 2 inches, the City should lower the reservoir level to El. 185.0 feet or lower and continuously monitor the reservoir level for changes. The reservoir level should be regulated by the release of water, as needed, to maintain the water level at or below El. 185.0 feet during the event.

For smaller storm events, less than 2 inches, the City should closely monitor the reservoir level for changes. The reservoir level should be regulated so as to maintain the water level at or below El. 186.0 feet.

2.3.2.2 High Winds

For short duration (less than 30-minute) winds of greater than 50 miles per hour (mph) (e.g., winds associated with a thunderstorm), the interior slope protection and wetlands bench should

be thoroughly inspected immediately after the winds subside. High winds will generate waves within the reservoir that may damage the berm separating the reservoir from the perimeter wetlands.

For sustained winds of greater than 50 mph or short duration winds predicted to be greater than 70 mph, the reservoir should be lowered to El. 185.0 feet, or lower. The interior slope protection and wetlands bench should be thoroughly inspected during and immediately after the winds subside.

2.3.2.3 Severe Drought

During periods of severe drought, the reservoir level may need to be drawn down to below El. 172 feet (90 percent reliability) to satisfy water demand. Below El. 169 feet, the liner system is protected by 18 inches of cover soil, which, if exposed, could be susceptible to surface erosion or sloughing caused by wave action and/or rainfall.

When the reservoir level lowered to El. 169 feet or lower, the cover soils and Fabriform concrete mattress should be carefully inspected on a daily basis for signs of erosion or movement. The City should also consider the use of temporary erosion protection measures for the cover soils, such as: plastic sheeting, spray applied amendments, and/or tackifiers. Inspection and potential maintenance of the cover soils will be required prior to commencing to refill the reservoir (see Section 3).

2.4 EMERGENCY SPILLWAY

The emergency spillway is designed to prevent the reservoir level from rising above the embankment crest. It is intended as a safety measure if all other reservoir operations fail. The emergency spillway is illustrated on C-5.01 and C-5.02 of the contract drawings. The emergency spillway is designed to activate at El. 187.0 feet and has a total capacity of about 180 cubic feet per second (cfs) or 116 MGD. The spillway capacity exceeds the maximum pumping rate into the reservoir by a factor of about 7.5.

2.5 INLET / OUTLET TOWER AND BRIDGE

The inlet/outlet structure for filling the reservoir, and for discharging water from the reservoir when needed, consists of a 65-foot-high, 18-foot square reinforced concrete tower and 36-inch-diameter ductile iron pipe (DIP). The inlet/outlet tower is located at the southern end of the reservoir along the interior toe of slope. The structure's deck is at El. 190.0, four feet above the maximum operating level. The top of the concrete slab foundation is at Elevation 128.5, and is 24 feet square. The 36-inch diameter DIP is connected to the 24-inch pipe from the pump station. The general tower arrangement is illustrated on S-3.01, S-3.02, and S-3.03 of the contract drawings.

The inlet/outlet structure was designed to release water at a maximum permitted rate of 5 MGD to the downstream water treatment plant. In addition, the structure permits the water treatment plant to pump up to 15 MGD into the reservoir. Reservoir releases are controlled at the inlet/outlet tower through one of five gates located at El. 130.5, 143.75, 156.5, 168.25 and 181.0 feet. The gate valves are operated from within the control building on top of the inlet/outlet tower. Depending upon the reservoir level, gate valves can be opened to release water at any of

these five levels. In addition, there is a flap gate at El. 186.25 should the reservoir exceed the maximum operating level (Drawing M-3.02). The gate valves are manufactured by Clow Valve Company. They are opened and closed using a POW-R-Drive II hand operator.

2.6 PERIMETER WETLANDS AND SAND FILTER

2.6.1 Purpose

The wetlands and sand filter are provided to maintain a certain level of water quality by removing nutrients and filtering suspended solids. It is expected to help decrease the algae growth in the summer because some of the nitrogen and phosphorous will be removed by the system. The general arrangement of the wetlands and sand filter is presented on C-2.09, C-2.10, and C-2.11 of the contract drawings. Manufacturer's instructions for the wetlands pump are provided in Appendix C.

2.6.2 Normal Operation

Water is delivered to the perimeter wetland by a submersible pump located in the inlet/outlet tower. The pump should operate through the warmer seasons and when the water level is no lower than El. 170 feet. The pump capacity is approximately 5 MGD. However, the actual flow is set to meet the characteristics of the living wetland and the rate of percolation through the sand filter. To set the flow, the gated aluminum pipe that follows the perimeter wetland is modulated such that flow is relatively steady throughout the wetland. Setting the slide gates in the distribution pipes will allow the operator to maintain a reasonably consistent water elevation in the perimeter wetland and a mild flow past the wetland plants. As plants grow and thicken, the operator can adjust the gates as desired to feed water to the plants. Also, the flow can be restricted by the two butterfly valves located at the end of the tower bridge. The water level in the wetlands channel should be regulated so it does not exceed El. 187.0 feet in order to prevent flow over the highest level of the liner.

Flow from the wetland empties onto the sand filter at the north end of the reservoir. The water will percolate through the sand and drain back to the pool. It is expected, with time, the sand will support plants and will be covered with detritus. This is a natural progression and adjustments can be expected to be made to the water flow accordingly.

The "sand" is actually a mixture of iron filings and sand. Iron will act to precipitate soluble phosphorous and, thus, progressively remove it from the reservoir. The growth of algae should be decreased with available phosphorous in the water.

