

06/26/2017

STAFF REPORT

MAJOR PERMIT MODIFICATION WITH RENEWAL

In the matter of:

NJ AMERICAN WATER-PASSAIC

Water Allocation Permit No. 5008
Milburn Township, Essex County

In compliance with the provisions of N.J.S.A. 58:1A-1 et seq., NJ American Water - Passaic, 167 JFK Parkway, Short Hills, New Jersey, 07078, filed a major modification application with the Department of Environmental Protection on January 8, 2016, which was amended on March 31, 2016 and January 19, 2017. The application requests the privilege to divert a maximum of 2,936 million gallons of water during any month (mgm), not to exceed 10,050 million gallons of water during any year (mgy) at a maximum rate of 92,013 gallons per minute (gpm) from existing and proposed new Well Nos. 38, 44, 46, 50, 51, 52, 53, 54, 55, Kelly 6, Kelly 7, Kelly 8, Kelly 9, and Layne D-R; 118 to 157 feet deep screened in the Stratified Drift aquifer and from the Passaic River and Canoe Brook.

This major modification request represents an increase of 2,052.5 mgm and 885 mgy above the existing overall allocation of 883.5 mgm and 9,165 mgy and the addition of 1 new groundwater source, Well 50 at a rate of 700 gpm. The request is to increase the raw water diversions from Canoe Brook to 585 mgm from the current limit of 155 mgm. The diversion from the Passaic River is requested to be increased to 2,030 mgm from the current limit of 561.8 mgm. The maximum diversion rate of Well 51 is requested to be increased to 1,000 gpm, an increase of 300 gpm from the currently approved rate of 700 gpm. Canoe Brook Well No. 47 will be replaced by new Well 55 and Well 54 will be added to the Canoe Brook wellfield.

The application also requests to eliminate the Passaic River pumping moratorium in June and September.

The diversion is used for Public Community Supply and serves the following communities in Essex, Morris, Somerset and Union Counties:

Bedminster	Portions of:
Berkeley Heights	City of Orange
Bernard	Florham Park
Bernardsville	Harding
Chatham	Hillside
Chester	Livingston
Far Hills	Mendham
Livingston	South Orange
Long Hill (formally Passaic)	Union
Maplewood	Warren
Millburn	Watchung
New Providence	
Short Hills	
Springfield	
Summit	
West Orange	
Four Seasons at Chester (in future)	

Public notice was required due to the requested increase in diversion from Canoe Brook and the Passaic River, the request to allow pumping from the Passaic River in June and September, increase the pumping capacity of Well 51, and the addition of Wells 50 and 54 as diversion sources.

The notice of application was published on June 26, 2017 in the Star Ledger.

Background/Findings of Fact

1. As part of the renewal permit issued on December 7, 2015, NJAW was required to increase the pumping capacity of the Passaic River and Canoe Brook Wellfields because the permittee no longer had sufficient pumping capacity to divert the allocation limits assigned to these wellfields. This modification is intended to address these deficiencies for the wellfields. Additional lost pumping capacity issues within the Canoe Brook Wellfield will be addressed in a future permit modification application.
2. In 1982 when the Water Allocation Permit was modified from the previous Board of Conservation and Development/Water Policy and Supply Council (WSC) approvals to the existing permit format, it appears the diversion volumes were incorrectly interpreted when the new water allocation permit limits were calculated. The Canoe Brook diversion permit approved on December 8, 1926 states the diversion from Canoe Brook “shall not exceed an average of 5 mgd during any calendar year” which would equate to an annual diversion limit of 1,825 mgy. No monthly diversion limit was expressed or implied in the original approval. The 1982 renewal of this diversion privilege limited the Canoe Brook diversion to 155 mgm, which is 5 mgd multiplied by 31 days.

The Passaic River diversion approval dated December 20, 1954 identifies the diversion limit as “The amount of water which shall be diverted under this approval shall not exceed an average of 80 mgd during any calendar month and not more than an average of 11 mgd during any calendar year”. This would equate to an annual diversion limit of 4,015 mgy. Similar to the Canoe Brook diversion approval, no monthly diversion limit was expressed or implied in the original approval. The 1982 permit limited the combined Passaic River and Canoe Brook diversions to 561.8 mgm. The surface water diversion limit appears to have been calculated by adding the 5 mgd annual average Canoe Brook diversion, the 11 mgd annual average Passaic River diversion plus the additional 2.12 mgd Passaic River diversion transferred from the Northeast Well and multiplying it by 31 days.

The difference between the interpretation of the original approvals and the conditions created in the Water Allocation Permit issued in 1982 and carried through to the current allocation permit would severely limit the monthly diversion during high flow periods in the winter and spring months. A summary of the diversion limits is presented in the table below:

Summary of Historic, Current and Requested Allocation Limits					
	Source	MGD	MGM		MGY
Current Allocation	Canoe Brook	40	155	561.8	--
	Passaic River	80	--		--
		2.12			--
Historic Approval	Canoe Brook	--	--		1825
	Passaic River	80	--		4015

- Water is requested to be diverted under this modification permit for public supply and reservoir filling from the following sources at the maximum rates specified below:

Groundwater

Groundwater

Well Permit No.	Well Name or Designation	Subject Item ID	Pump Capacity (gpm)	Aquifer
2500070360	WELL KELLY 9	WSWL863960	950	glacial sand and gravel
2500069670	WELL KELLY 8	WSWL825663	250	glacial sand and gravel
2500069073	WELL KELLY 7	WSWL826935	800	glacial sand and gravel
2500069074	WELL KELLY 6	WSWL822882	700	glacial sand and gravel
P201002148	LAYNE D-R	WSWL913535	415	glacial sand and gravel
2500066787	WELL 53	WSWL812242	700	glacial sand and gravel
2500018486	WELL 52	WSWL65071	1,000	glacial sand and gravel
2500004873	WELL 51	WSWL64846	1,000	glacial sand and gravel

Well Permit No.	Well Name or Designation	Subject Item ID	Pump Capacity (gpm)	Aquifer
2500003703	WELL 46	WSWL64827	300	glacial sand and gravel
2500002577	WELL 44	WSWL64814	250	glacial sand and gravel
E201613818	WELL 54	WSWL1283470	600	glacial sand and gravel
E201613819	WELL 55	WSWL1283483	250	glacial sand and gravel
4500000257	WELL 38	WSWL69962	450	glacial sand and gravel
2500004872	WELL 50	WSWL64845	700	glacial sand and gravel

Surface Water

Intake No.	Intake Description	Subject Item ID	Maximum Diversion Rate (gpm)	Pump Capacity (gpm)	Water Body/ Stream Name
INTAKE 2	PASSAIC RIVER	WSIN75716	57,028	49,760	PASSAIC RIVER
INTAKE 9	CANOE BROOK	WSIN75715	13,890	13,890	CANOE BROOK
INTAKE 10	CANOE BROOK	WSIN77473	13,890	13,890	CANOE BROOK

4. This application request is for a modification of an allocation granted by the following:

Permit No.	Date Issued	Source of Water	Diversion Amount	
			(MGM)	(MGY)
5008	12/7/2015	Canoe Brook Wells, Passaic River Wells, Canoe Brook, Passaic River	883.5	9,165
5008	7/1/2008	Canoe Brook Wells, Passaic River Wells, Canoe Brook, Passaic River	883.5	9,450
5008	1/1/2008	Canoe Brook Wells, Passaic River Wells, Canoe Brook, Passaic River	883.5	9,450
5008	8/1/2007	Canoe Brook Wells, Passaic River Wells, Canoe Brook, Passaic River	883.5	9,450
5008	1/17/2003	Canoe Brook Wells, Passaic River Wells, Canoe Brook, Passaic River	883.5	9,450
5008	12-13-1982	Canoe Brook Wells, Passaic River Wells, Canoe Brook, Passaic River	883.5 mgm	
839	6-09-1955	Passaic River Wells	3.0 mgd	
816	12-20-1950	Passaic River	2,480 mgm 2.12 mgd	4,015 mgy
324	5-08-1929	Canoe Brook Wells	7.375 mgd	
250	12-08-1926	Canoe Brook	5.0 mgd annual average	

5. The following information is available for the applicant's diversion sources:

Well Data

Well Name or Designation	Pump Capacity (gpm)	Aquifer	Drilling Completed Date	Finished Depth (feet)	Smallest Diameter (inches)
LAYNE D-R	415	glacial sand and gravel	06/22/2010	133	12
KELLY 9	950	glacial sand and gravel	03/04/2008	130	12
KELLY 8	250	glacial sand and gravel	05/29/2007	132	12
KELLY 7	800	glacial sand and gravel	10/09/2006	127	12
KELLY 6	700	glacial sand and gravel	07/14/2006	136	12
55	250	glacial sand and gravel	Proposed	+/- 152	-
54	600	glacial sand and gravel	Proposed	+/- 157	-
53	700	glacial sand and gravel	01/12/2006	140	12
52	1,000	glacial sand and gravel	1976	150	-
51	1,000	glacial sand and gravel	09/08/1955	121.4	12
50	700	glacial sand and gravel	8/18/1955	118.1	12
46	300	glacial sand and gravel	08/14/1954	160	12
44	250	glacial sand and gravel	06/20/1953	153	12
38	450	glacial sand and gravel	1922	130	-

Intake Data

Intake Name	Pump Capacity (mgd)	Maximum Diversion Rate (mgd)	Diversion Source Type	Water Body/ Stream Name	Watershed Name
Passaic River	71.65	82.12	WA On Stream	Passaic River	Upper Passaic, Whippany, Rockaway
Canoe Brook	40	40	WA On Stream	Canoe Brook	Upper Passaic, Whippany, Rockaway

Well Static Water Level Data

Well Name or Designation	Historical Static Water Level		Recent Static Water Level	
	Date	Level (feet)	Date	Level (feet)
KELLY 6	7/25/2006	42.7	7/15/2014	47.3
44	6/18/1953	55	6/16/2014	58.1

Well Test Data (from Well Records)

Well Permit No.	Test Date	Static Level (feet)	Pumping Time (hours)	Yield (gpm)	Drawdown (feet)	Specific Capacity (gpm/ft drawdown)
2500004873	9/9/1955	29	8	1,000	28.1	35
2500003703	8/13/1954	70	-	200	-	-
2500002577	6/18/1953	55	12	690	19	36
P201002148	6/22/2010	62.6	72	519	34.7	15
2500069670	10/2/2006	43	24	750	20	38
2500070360	3/4/2008	37	24	1,142	20	57
2500069073	10/12/2006	48.4	24	838	23.5	36
2500069074	7/25/2006	42.7	24	990	18.1	55
2500066787	1/12/2006	33.5	24	1,894	27.8	68
2500004872	8/18/1955	28.3	5	1,018	18	56.5

6. Passaic River water is diverted by a single intake structure with 6 pumps and a total capacity of 49,760 gpm. The drainage area at the intake is 115 square miles. The maximum permitted diversion rate is 82.12 mgd, although the current pump capacity is only 71.65 mgd. NJAW is proposing to install new pumps to restore the 82.12 mgd capacity of the pump station. Water is impounded by a concrete weir approximately 25 yards downstream of the intake. The intake discharges to Reservoir 2 and is connected by gravity to Reservoir 1. Currently, no diversion is permitted from June 1st to September 30th of each year and at times when the passing flow immediately downstream of the diversion is less than 116 cfs as calculated from the United States Geological Survey stream flow gage at Chatham (01379500). A second allocation of 2.12 mgd was transferred from the Northeast Well (Permit No. 5013) to the Passaic River diversion. This allocation is not subject to the passing flow or seasonal restrictions of the 80 mgd diversion.

The second intake structure is a dual intake on Canoe Brook. Each pump has a capacity of 13,890 gpm. The drainage area at the intake is 11 square miles. The diversion will not cause the flow in Canoe Brook to be less than 2.12 cfs as measured at the USGS stream flow gage at Summit (01379530).

The Canoe Brook Reservoir system consists of 3 off-stream impoundments with a combined storage of 2.9 billion gallons. The reservoirs have no drainage area and are 100% reliant on pumped storage. Raw water from the surface water sources are diverted into Canoe Brook Reservoir 1. Water is diverted from Reservoir 1 into the treatment plant or can be pumped to Reservoir 3 (Cedar Ridge Reservoir). The Canoe Brook Reservoir System has a safe yield of 10.8 mgd.

7. A review of quarterly diversion reports indicates the following water use from the Passaic River Wellfield:

Year	Annual Use (mg)	Maximum Monthly Use (mg)	Average Monthly Use (mg)	Existing Allocation (mgm)
2016	648.347	59.567 (Jul)	54.029	93
2015	748.554	72.716 (May)	62.380	93

Year	Annual Use (mg)	Maximum Monthly Use (mg)	Average Monthly Use (mg)	Existing Allocation (mgm)
2014	831.256	72.004 (Jul)	69.271	93
2013	578.512	70.210 (Mar)	48.209	93
2012	637.015	78.557 (Jul)	53.085	93
2011	657.516	58.504 (May)	54.793	93
2010	684.001	63.167 (Jun)	57.000	93

It should be noted that Well 51 is operating at a diversion rate in excess of 1,033 gpm, which is above the approved rated pump capacity of 700 gpm.

8. A review of quarterly diversion reports indicates the following water use from the Canoe Brook Wellfield:

Year	Annual Use (mg)	Maximum Monthly Use (mg)	Average Monthly Use (mg)	Existing Allocation (mgm)
2016	1,567.159	145.210 (Jul)	130.597	228.7
2015	1,244.162	128.449 (Dec)	103.680	228.7
2014	1,182.271	142.599 (Jan)	98.523	228.7
2013	1,666.001	142.601 (Aug)	138.833	228.7
2012	1,635.297	142.600 (May, Jul, Dec)	136.275	228.7
2011	1,540.179	156.185 (Mar)	128.348	228.7
2010	1,748.675	178.619 (Mar)	145.723	228.7

Pumping from wells 44, 53, 38, Layne D-R, Kelly 6, Kelly 7, and Kelly 8 have diverted at rates in excess of the approved rated pump capacity.

9. A review of quarterly diversion reports indicates the following water diverted from Canoe Brook to the Canoe Brook Reservoir:

Year	Annual Use (mg)	Maximum Monthly Use (mg)	Average Monthly Use (mg)	Existing Allocation (mgm)
2016	262.247	102.530 (Dec)	21.854	155
2015	352.493	154.937 (Dec)	29.374	155
2014	59.310	37.782 (Jun)	4.943	155
2013	6.009	6.009 (Mar)	0.501	155
2012	143.160	84.425 (Apr)	11.930	155
2011	96.475	38.100 (Nov)	8.040	155
2010	190.374	124.900 (Mar)	15.865	155

10. A review of quarterly diversion reports indicates the following water diverted from the Passaic River to Canoe Brook Reservoir:

Year	Annual Use (mg)	Maximum Monthly Use (mg)	Average Monthly Use (mg)	Existing Allocation (mgm)
2016	2,015.650	443.082 (Dec)	167.971	561.8
2015	2,121.490	454.103 (Apr)	176.791	561.8
2014	2,074.281	495.946 (Jan)	172.857	561.8
2013	1,740.329	393.506 (Jan)	145.027	561.8
2012	1,554.884	340.869 (Dec)	129.574	561.8
2011	2,332.683	547.497 (Dec)	194.390	561.8
2010	1,487.236	502.731 (Dec)	123.936	561.8

11. A review of quarterly diversion reports indicates the following total water diverted from Canoe Brook and the Passaic River to the Canoe Brook Reservoir:

Year	Annual Use (mg)	Maximum Monthly Use (mg)	Average Monthly Use (mg)	Existing Allocation (mgm)
2016	2,277.897	545.612 (Dec)	189.825	561.8
2015	2,473.983	558.203 (Dec)	206.165	561.8
2014	2,133.591	495.946 (Jan)	177.799	561.8
2013	1,746.338	393.506 (Jan)	145.528	561.8
2012	1,698.044	408.734 (Apr)	141.504	561.8
2011	2,429.158	560.697 (Dec)	202.430	561.8
2010	1,677.610	507.931 (Dec)	139.801	561.8

12. A review of quarterly diversion reports indicates the following total water use:

Year	Annual Use (mg)	Maximum Monthly Use (mg)	Average Monthly Use (mg)	Existing Allocation (mgm)	(mgy)
2016	4,493.403	737.787 (Dec)	374.450	883.5	9,165
2015	4,466.699	737.417 (Dec)	372.225	883.5	9,450
2014	4,147.118	708.477 (Jan)	345.593	883.5	9,450
2013	3,990.851	604.966 (Jan)	332.571	883.5	9,450
2012	3,970.356	576.404 (Apr)	330.863	883.5	9,450
2011	4,626.853	766.162 (Dec)	385.571	883.5	9,450
2010	4,110.286	722.296 (Dec)	342.524	883.5	9,450

13. A review of quarterly diversion reports indicates the following total diversion from permits 5008, 5011, 5013, 5157, and 5401:

Year	Annual Use (mg)	Maximum Monthly Use (mg)	Average Monthly Use (mg)	Existing Allocation (mgy)
2016	5,908.898	841.308 (Dec)	492.408	None
2015	5,820.264	850.999 (Dec)	485.022	None
2014	5,530.710	829.879 (Jan)	460.893	11,365.200
2013	5,357.079	736.453 (Jan)	446.423	11,328
2012	5,381.427	684.577 (Apr)	448.452	11,238
2011	6,100.372	882.822 (Dec)	508.364	11,328
2010	5,643.896	832.488 (Dec)	470.325	11,328

14. A review of water utilization reports indicates the following total water imported from other systems:

Year	Annual Import (mg)	Maximum Monthly Import (mg)	Average Monthly Import (mg)
2016	8,289.819	881.150 (Jul)	690.818
2015	8,592.853	1,109.891 (Aug)	716.071
2014	7,783.235	823.907 (Aug)	648.603
2013	8,272.277	901.215 (Jul)	689.356
2012	8,329.895	1,028.557 (Jul)	694.160
2011	8,005.521	951.568 (Jul)	667.127
2010	8,438.869	1,081.990 (Jul)	703.239

15. A review of water utilization reports indicates the following total water exported to other systems:

Year	Annual Export (mg)	Maximum Monthly Export (mg)	Average Monthly Export (mg)
2016	960.711	127.125 (Jul)	80.059
2015	962.926	160.898 (Aug)	80.244
2014	861.466	108.421 (Jul)	71.789
2013	728.808	94.911 (Aug)	60.734
2012	790.730	190.357 (Aug)	65.894
2011	928.036	113.289 (Aug)	77.336
2010	990.424	158.802 (Aug)	82.535

16. A review of water utilization reports indicates the following diversion from the Canoe Brook Reservoir System:

Year	Annual Use (mg)	Maximum Monthly Use (mg)	Average Monthly Use (mg)	Safe Yield (mgm)*	(mgy)
2016	2,132.006	295.079 (Aug)	177.667	402	3,942
2015	2,645.099	307.220 (May)	220.425	402	3,942

Year	Annual Use (mg)	Maximum Monthly Use (mg)	Average Monthly Use (mg)	Safe Yield (mgm)*	(mgy)
2014	2,501.995	290.180 (Jul)	208.500	402	3,942
2013	1,835.766	242.670 (Jul)	152.981	402	3,942
2012	1,676.426	237.241 (Jul)	139.702	402	3,942
2011	1,489.531	236.564 (Jul)	124.128	402	3,942
2010	1,554.883	249.694 (Jul)	129.574	402	3,942

* No monthly limit is established. A reasonable peak month demand of 120% of the safe yield multiplied by 31 days is used to represent what a reasonable peak month demand would be, but should not be implied as a diversion limit.

17. A review of quarterly diversion and water utilization reports indicates the following service area demand for NJAW-Passaic (includes permits 5008, 5011, 5013, 5157, & 5401, excludes contract sales):

Year	Annual Use (mg)	Maximum Monthly Use (mg)	Average Monthly Use (mg)
2016	13,092.115	1,367.089 (Jul)	1,091.010
2015	13,654.108	1,494.864 (Aug)	1,137.842
2014	12,872.924	1,308.428 (Aug)	1,072.744
2013	13,000.943	1,368.657 (Jul)	1,083.412
2012	12,904.286	1,526.151 (Jul)	1,075.357
2011	12,268.427	1,424.176 (Jul)	1,022.369
2010	12,993.175	1,545.227 (Jul)	1,082.765

18. The population served is approximately 231,780, which represents an average monthly consumption of 70 gpcd, and a peak monthly consumption of 86 gpcd based upon 2016 water use data, with a 45 percent residential use component.
19. The applicant’s diversion sources are located within: Planning Area No. 4, Upper Passaic River as designated by the New Jersey Water Supply Master Plan; the Northeast Drought Region; and Watershed Management Area No. 6, Upper Passaic, Whippany and Rockaway Rivers.

The diversion is not located within the Delaware River Basin, Pinelands, or Highlands.

Well Locations

Well Permit No.	Well Name or Designation	Elevation Above Mean Sea Level – US FEET	Location
P201002148	LAYNE D-R	173	167 JFK Parkway
2500070360	KELLY 9	179	167 JFK Parkway
2500069670	KELLY 8	170	167 JFK Parkway

Well Permit No.	Well Name or Designation	Elevation Above Mean Sea Level – US FEET	Location
2500069073	KELLY 7	174	167 JFK Parkway
2500069074	KELLY 6	171	167 JFK Parkway
2500066787	53	170	167 JFK Parkway
2500018486	52	182	Rt.124 & Passaic River
2500004873	51	178	Rt. 124 & Passaic River
2500004872	50	176	Rt. 124 & Passaic River
2500004019	47	195	Canoe Brook Rd
2500003703	46	192	Canoe Brook Rd
2500002577	44	194	Canoe Brook Rd
4500000257	38	169	167 JFK Parkway

Intake Locations

Intake Name	Intake Description	Elevation Above Mean Sea Level – US FEET	Location
INTAKE 2	PASSAIC RIVER	178	167 JFK Parkway
INTAKE 9	CANOE BROOK	167	167 JFK Parkway
INTAKE 10	CANOE BROOK	167	167 JFK Parkway

20. Flow meters for all diversion sources have been calibrated within the past five years. The most recent dates of calibration are:

Source Name	Calibration Date
WELL LAYNE D-R	3/16/2015
WELL KELLY 9	3/16/2015
WELL KELLY 8	3/16/2015
WELL KELLY 7	3/16/2015
WELL KELLY 6	3/16/2015
WELL 53	3/16/2015
WELL 52	3/23/2015
WELL 51	3/23/2015
WELL 46	3/16/2015
WELL 44	3/16/2015
WELL 38	3/16/2015
PASSAIC RIVER	3/12/2015
CANOE BROOK	3/22/2013
CANOE BROOK	3/22/2013

21. The following wells have been abandoned, decommissioned, are inactive or unused:

Well Name or Designation	Well Permit No.	Depth (feet)	Status
Well 54	E201613818	-	Proposed well (Not yet drilled)
Well 55	E201613819	-	Proposed replacement well (Not yet drilled)
Kelly 1	4500000260	136	Sealed
Kelly 2	4500000261	134	Decommissioned 10/16/2008
Kelly 4	4500000262	129	Decommissioned 10/3/2007
Kelly 5	4500000263	131	Sealed
Layne D	4500000258	129	Decommissioned 2/2/2011
1 to 29 and 31 to 36	Pre-1947	22-315	These wells reportedly have either had the casings pulled or the location is under Canoe Brook Reservoirs 1 and 2.
C-30	E201605518	137	Used for Monitoring
Layne "C"	Pre-1947	325+	Well not found
45	Pre-1947	130	Well not found
37	Pre-1947	303	Sealed
39	Pre-1947	304	Sealed
40	Pre-1947	300	Sealed
41	Pre-1947	303	Sealed
42	Pre-1947	305	Sealed
Layne "E"	Pre-1947	140	Sealed
Kelly 6	2500001994	144	Sealed
49	2500004193	149	Sealed
Continental 1	4500000259	105	Used for Monitoring
48	2500004100	138	Decommissioned 5/1/2006
47	2500004019	162	Decommissioned 2/4/2008

Well Continental 1 should be redesignated from a public community well use to a monitoring well use by a NJ licensed well driller. As part of the reevaluation of the Canoe Brook Wellfield, NJAW has requested to delay redesignating Well Continental 1 until after the wellfield reevaluation is complete. As part of this evaluation, NJAW is exploring the possibility of reactivating Well Continental 1.

22. The applicant has failed to comply with the maximum diversion rates for wells 44, 51, 52, 38, Layne D-R, Kelly 6, Kelly 7, and Kelly 8. Between all the sources, at least 125 occurrences have been reported from 2011 to 2016 where a source has exceeded its rated pumping capacity. It should be noted that while the wells exceeded their individual diversion limits, no monthly or annual wellfield limits were exceeded.

23. Water, after use, is discharged to the following:

Wastewater Plant Name	NJPDES ID	Discharge Waterbody
Joint Meeting of Essex & Union Co.	NJ0024741	Arthur Kill
Passaic Valley Sewerage Comm.	NJ0021016	Upper New York Bay
Environmental Disposal Corp.	NJ0033994	Tributary to Raritan River
Berkeley Heights	NJ0027961	Passaic River
Bernards Sewerage Auth.	NJ0022845	Mine Brook
Chatham Pollution Control # 1	NJ0020290	Black Brook
Chatham Glen STP	NJ0052256	Passaic River
Woodland Water Pollution Control Facility	NJ0024929	Loantaka Brook
Livingston STP	NJ0024511	Passaic River
Mendham East Plant	NJ0058050	Discharge to Groundwater
Mendham West Plant	NJ0068811	Discharge to Groundwater
Long Hill Twp. STP	NJ0024465	Passaic River
Rahway Valley Sewerage Auth.	NJ0024643	Arthur Kill
Middlesex County U.A.	NJ0020141	Raritan Bay
Bernardsville Sewerage Auth.	NJ0026387	Mine Brook
Florham Park Sewerage Auth.	NJ0021636	Passaic River
New Providence	NJ0021636	Passaic River
Mendham Borough	NJ0021334	India Brook

The treatment works are not under a sewer connection ban or other restriction imposed by NJDEP.

24. The system has the following interconnections with adjacent systems:

Interconnection with	No.	Size (inches)	Use
NJAW Raritan System (2004002), Coit Street	1	Booster Station 20"	Transfer/Import
NJAW Raritan System (2004002), Diamond Hill	1	Booster Station 24"	Transfer/Import
NJAW Raritan System (2004002), Mount Horeb	1	12"	Transfer/Import
NJAW Raritan System (2004002), Chambers Brook	1	16"	Transfer/Import
NJAW Raritan System (2004002), Route 206/Ski Hill Dr.	1	16"	Import/Export
NJAW Raritan System (2004002), Peapack Rd.	1	8"	Emergency

Interconnection with	No.	Size (inches)	Use
NJAW Raritan System (2004002), Carnegie & Laurel	1	6"	Emergency
NJAW Raritan System (2004002), Burnett Ave.	1	6"	Emergency
NJAW Raritan System (2004002), Plainfield Rd.	1	6"	Emergency
NJAW Raritan System (2004002), High Point Dr.	1	6"	Emergency
PVWC (1605002), Water Source Pipeline	1	36"	Purchase
PVWC (1605002), Fairview Ave.	1	Booster Station 24"	Purchase
Morris County MUA (1432001), Old Brookside Road	1	12"	Purchase
Morris County MUA (1432001), Cold Hill Road	1	12"	Purchase
Montclair Water Bureau (0713001), Mountain Ave.	1	8"	Purchase
Montclair Water Bureau (0713001), Harrison Ave.	1	8"	Emergency
Montclair Water Bureau (0713001), Hilltop Pl. & Enfield	1	8"	Emergency
Livingston Township (0710001), Mt. Pleasant Ave.	1	8"	Sell
Livingston Township (0710001), Northfield Road	1	6"	Sell
Livingston Township (0710001), Ross Road	1	6"	Sell
Livingston Township (0710001), Eisenhower Pkwy.	1	12"	Sell
Livingston Township (0710001), White Oak Ridge Rd. Hobart Gap	1	12"	Emergency
Livingston Township (0710001), East Hobart Gap Rd.	1	16"	Emergency
East Hanover Township (1410001)	1	8"	Sell
East Hanover Township (1410001), Ridgedale Ave.	1	6"	Sell
Roxiticus Water Company Inc. (1419001), Pleasant Valley Road	1	12"	Sell
Fairleigh Dickinson University (1417300), Park Ave. Tank	1	8"	Sell
Southeast Morris County MUA (1424001), Park Ave.	1	Booster Station 16"	Wheeling
Southeast Morris County MUA (1424001), Melanie Ln.	1	12"	Wheeling
Southeast Morris County MUA (1424001), Convent Rd	1	6"	Emergency
East Orange Water Commission (0705001), Mountain & Wyoming	1	20"	Emergency
Essex Fells Borough (0706001), Oval Rd.	1	16"	Emergency
Orange Water Department (0717001) White & Spring Streets	1	12"	Emergency
Orange Water Department (0717001), Walker Rd. & Burnett Ter.	1	6"	Emergency
Roseland Borough Water Department (0718001), Passaic Ave., Pitcairn Dr.	1	6"	Emergency

Interconnection with	No.	Size (inches)	Use
South Orange Water Department (0719001), Ridgewood near Audley	1	10"	Emergency
South Orange Water Department (0719001), Wyoming and West End	1	6"	Emergency
South Orange Water Department (0719001), Gregory and Luddington	1	6"	Emergency
South Orange Water Department (0719001), South Orange Avenue	1	16"	Sell
Verona Water Department (0720001), Forest & Fairway	1	6"	Emergency
West Caldwell Township Water Department (0721001), Passaic Ave.	1	6"	Emergency
West Caldwell Township Water Department (0721001), Passaic Ave. Howland Circle.	1	6"	Emergency
Chatham Water Department (1404001), Edgewood Rd.	1	8"	Emergency
Chatham Water Department (1404001), Inwood & Lafayette	1	6"	Emergency
Chatham Water Department (1404001), Lafayette & Watchung	1	6"	Emergency
Chatham Water Department (1404001), Fairfax Terrace	1	8"	Emergency
Florham Park Water Department (1411001), Columbia Turnpike	1	12"	Emergency
Florham Park Water Department (1411001), Ridgedale Ave.	1	10"	Emergency
Madison Water Department (1417001), Shunpike & Candlewood	1	6"	Emergency
Madison Water Department (1417001), Shunpike & Loantaka	1	6"	Emergency
Madison Water Department (1417001), Shunpike & Noe, Chatham	1	6"	Emergency
Sisters of Christian Charity (1418002), Florham Park Tank	1	8"	Emergency
Newark Water Department (0714001), Myrtle Ave. and Valisburg Ter.	1	12"	Emergency
Newark Water Department (0714001), Shaw Ave.	1	2"	Emergency
Newark Water Department (0714001), Springfield Ave.	1	6"	Emergency
Newark Water Department, (0714001), Selvage Street	1	6"	Emergency

25. The applicant has agreements for the sale or purchase of water from the following:

Other Contracts with	Sell or Purchase	Contract Amount	Effective Date	Expiration
NJAW Raritan System (2004002)	Transfer	19.5 mgd 372 mgm 4,380 mgy	NA	NA
PVWC (1605002)*	Purchase	30 mgd 759.5 mgm 6,000 mgy	7/10/1991	7/10/2016
Morris County MUA (1432001)	Purchase	1 mgd 31 mgm 237 mgy	9/9/1998	None
South Orange Village (0719001)	Sale	2 mgd, 62 mgm, 730 mgy	1/1/2017	12/31/2046
Livingston Township (0710001)	Sale	1.261 mgd 32.7 mgm 300 mgy	1/16/2012	1/01/2032
East Hanover Township (1410001)	Sale	0.521 mgd 15.833 mgm 190 mgy	11/10/2014	12/16/2022
Fairleigh Dickinson University	Sale	NA	No contract	No contract
Sisters of Christian Charity (1418002)	Sale	NA	No contract	No contract
Southeast Morris County MUA (1424001) **	Wheeling	6 mgd 876 mgy	9/11/1991	9/11/2016

* Contract amount is the total amount in the agreement which includes water purchased for NJAW Little Falls System (PWSID 1605001).

** Water wheeled through NJAW's interconnection with PVWC to SMCMUA.

26. The system is 100 percent metered.
27. The applicant has indicated that their unaccounted-for-water was 24.6 percent in 2016. While this is above the Bureau's acceptable standard of 15 percent, the Bureau is not requiring immediate action to reduce the percent of unaccounted-for-water at this time. NJAW is continually upgrading equipment to conserve water and continually tests new technology to reduce losses in the system. Sensors that provide continuous acoustic monitoring have been installed in several communities and equipment using the Echologics's EchoShore DX system has been installed and operating in several communities serviced by NJAW, including Irvington which is serviced by the Passaic system. In addition to testing new technologies, NJAW employs leak detection survey crews that continuously survey for leaks in the system.

- 28. The water system has storage capacity of 22.2 MG, as compared with a 2016 average water demand of 35.9 MGD.
- 29. The applicant submitted a Water Conservation Plan on May 1, 2017.
- 30. Sub-surface diversions in the same aquifer within the radius of influence include the following:

Well Owner	Well Permit No.	Depth (feet)	Capacity (gpm)	Distance (miles)
Chatham Borough (5046)	4500000270	142	1,050	0.9
	4500000271	143	560	0.9
Canoe Brook Country Club (2427P)	2500012993	138	540	0.9

- 31. Public water supply wells regulated by the Water Allocation Permit program, within a 5-mile radius include the following:

Well Owner	No. Of Wells	Depth (feet)	Aquifer	Capacity (gpm)	Distance (miles)
East Orange Water Commission (5040)	20	110-400	Stratified Drift, Towaco Formation	175-1,000	1.3-3.2
Chatham Boro. Water Dept. (5046)	3	142-150	Stratified Drift	560-1,200	0.9-1.1
Madison Boro. Water Dept. (5069)	5	130-178	Stratified Drift	750-1,500	1.5-3.1
Livingston Twp. Water Dept. (5074)	7	100-456	Rahway Till, Boonton and Towaco Formations	300-400	3.2-4.7
Orange City Water Dept. (5077)	6	104-125	Glacial Sand & Gravel	700-1,400	3.6-4.5
Florham Park Boro. Public Works (5214)	3	103-135	Glacial Sand & Gravel	900-1,300	3.4-3.7
Southeast Morris County MUA (5264x)	3	118-209	Glacial Sand & Gravel	600, 1,400	4.2-4.5

- 32. According to the DEP-GIS-Geoweb 2017 Contaminated Sites list, and OPRA On-line Report web page information, potential pollution sites within one mile, of the diversion include:

Name of Source	Distance (feet)	(Formation) Aquifer Affected	PI number
Micro Precision Tool Shop	4,500	Unknown	G000041441
132 Main St.	1,720	Unknown	G000062561

Name of Source	Distance (feet)	(Formation) Aquifer Affected	PI number
Chatham Garage	3,000	Unknown	477086
36-42 River Road	4,070	Glacial Sand & Gravel, Towaco (CEA)	554732
Shell Service Station 138313	1,470	Towaco (CEA)	004747
Sunoco Service Station	2,160	Glacial Sand & Gravel (CEA)	020296
Ness Co. DBA Pauls Chatham Gulf	4,260	Unknown	025600
Chatham DPW Industrial Cleaner Spill	4,650	Unknown	293953
National Manufacturing Co. Inc.	5,030	Glacial Sand & Gravel (CEA)	007108
Raceway Summit	3,670	Unknown	007941
Mobil Service Station 12KKI	1,490	Unknown	006230
Ali Enterprises Inc. (Summit Shell)	4,730	Glacial Sand & Gravel (CEA)	004771
Exxon Facility 30987	2,270	Towaco (CEA)	008600
Pumping Station 4	1,330	Unknown	008277
Sun Valley Plaza	4,700	Unknown	576054
Chatham Mobil	4,840	Glacial Sand & Gravel, Passaic (CEA)	012580
Burling Instrument Co.	5,240	Unknown	G000001643
City Garage	3,300	Unknown	008156
Chatham Boro. DPN	5,240	Unknown	002553
Summit Trust Bank	3,250	Unknown	024590
Bauer Automotive Services Inc.	4,820	Unknown	014673
528 Morris Ave	5,200	Unknown	G000045014
Ciba Geigy Corp	4,700	Towaco (CEA)	014650

33. Well 50 is located within a designated freshwater wetland area. The applicant should comply with N.J.S.A. 13:9-1 et seq. and N.J.A.C. 7:7A for the construction of any structures required for the proposed diversion. It should be noted that Well 50 is an existing well that has not been used in several decades. The applicant is not proposing to construct a new well, however it is not indicated if any new infrastructure is necessary to put the well back in service.
34. The minimum passing flow monitoring location was incorrectly referenced in the previous water allocation permit. The current permit has the compliance location at the United States Geological Survey (USGS) stream flow gage no. 01379500 near Chatham. The passing flow compliance

location should be identified as immediately downstream of the diversion location. The minimum passing flow requirements for the diversion is currently referenced as follows:

The minimum passing flow requirement for the Passaic River diversion had been established as 116 cfs, at the USGS stream flow gage no. 01379500 near Chatham.

It should be noted that the drainage area at the Chatham gage is 100 square miles, while the drainage area at the intake is 115 square miles. The 15 square mile increase in drainage between the gage location and the intake does not contribute enough flow to warrant calculating the decrease in flow volume from the intake to the gage.

The minimum passing flow for the Passaic River diversion should be explained as follows:

The diversion from the Passaic River should cease when the calculated minimum passing flow immediately downstream of the intake is less than 116 cfs. The minimum passing flow should be monitored by utilizing the flow measured at the USGS stream flow gage no. 01379500 near Chatham and subtracting the diversion from the Passaic River intake, if any.

The minimum passing flow requirement for the Canoe Brook had been established as 2.12 cfs at the USGS stream flow gage no. 01379530 near Summit.

35. At the point of diversion, the water quality classification is FW2-NT.
36. The nearest diversion in the amount of 7,750 mgm by North Jersey District Water Supply Commission and Suez New Jersey is located over 15 miles downstream from the diversion. A diversion of 2,325 mgm by Passaic Valley Water Commission is also permitted at the same location.
37. The nearest wastewater discharge, Florham Park Sewerage Authority in the amount of 1.4 mgd, is located 2.1 miles downstream from the diversion.
38. The estimated consumptive use of water is 100 percent, which is equivalent to 21.18 mgd if the full treated water volume is diverted.
39. Well 47 was a previously approved diversion source that was decommissioned on February 4, 2008. The well was kept as a diversion source in the allocation permit and the permittee has proposed to construct replacement Well 55 to recover the lost pumping capacity. A well permit number has been obtained, but the well has not been constructed yet. The well should be constructed to meet replacement well criteria for Well 47 in accordance with N.J.A.C. 7:19-1.5(b)3.
40. NJAW is requesting the addition of new Well 54. The well would be sited at a point between exiting Kelly Wells 6 and 8 with a proposed pumping capacity of 600 gpm.

41. NJAW idled Well 50 sometime around the year 2000. Due to its age and the duration of time it was not in use, the well is currently unable to sustain the requested diversion rate. NJAW plans to redevelop this well to recover the lost pumping capacity prior to placing it back into service.
42. The addition of Well 50 at a requested rate of 700 gpm and the increase in diversion rate of Well 51 from 700 gpm to 1,000 gpm will increase the diversion capacity of the Passaic River Wellfield to above 93 mgm.

The replacement of Well 47 with Well 55 and the addition of new well 54 will increase the diversion capability of the Canoe Brook Wellfield to allow for the diversion of the previously approved allocation of 228.7 mgm.

Staff Analysis and Conclusions

1. The applicant has failed to comply with the maximum diversion rates for numerous wells. The applicant has indicated they will be submitting a major modification application to request increases in the maximum diversion rates of the wells identified.
2. The applicant’s consultant, Sevee & Maher Engineers, Inc. (SME) performed a 4 hour step test on Well 50 to determine a diversion rate to conduct the 72 hour test. The well was pumped at rates of 200, 300, 400, and 500 gpm. A pumping rate of 500 gpm was picked for the 72 hour test due to the drop off of well efficiency above this rate. SME explained that the efficiency loss is likely due to the poor well screen condition identified in the video log of the well and that the well is in need of redevelopment prior to placing it back into service.

The constant rate pump test began on February 8, 2016. Well 50 was pumped at a near constant rate of 500 gpm. The water levels in wells 51 and 52 and Layne DR were monitored during the test. At the end of the 72 hour test, wells 51 and 52 were activated at rates of 700 gpm each to test the wellfield at a rate of 1,900 gpm. The wells were pumped at this combined rate for 24 hours. Water levels were monitored prior to the test and during the recovery stage. Barometric pressure and flows in the Passaic River were also monitored throughout the test. A minimal amount of precipitation in the form of snow was observed during the test.

Results of the aquifer test are as follows:

Well No.	Q (gpm)	Depth (feet)	Distance (feet)	Direction	Drawdown (feet)
50	500	118	0	-	43.7
51	0	121.5	319	North	4.48
52	0	143	532	South	4.03

The applicant’s consultant also monitored well Layne D-R in the Canoe Brook Wellfield during the pump test, however, no discernable response was observed during the test.

The applicant's consultant using the Neuman, 1972 method of aquifer analysis determined that the aquifer exhibited unconfined characteristics. Transmissivity was determined to range from 71,200 to 77,050 gpd/ft with a Storativity of 7.9×10^{-4} to 2.0×10^{-4} , while a Radius of Influence of 5,400 feet for a one foot drawdown was calculated.

In reevaluating the aquifer test data with the Hantush and Jacob leaky-aquifer model method of aquifer analysis the New Jersey Geological and Water Survey determined that the values obtained are conservative. While the aquifer properties are reasonable, NJGWS questions the ability of the three Passaic River Wellfield sources to sustain the necessary diversion volumes to divert the previously approved limit of 93 mgm. It is recommended to perform additional testing after the rehabilitation of Well 50 to evaluate the sources for well interference and excessive drawdown. A test duration of longer than 72 hours is recommended and should continue until water levels in the wells stabilize.

The addition of Well 54 to the Canoe Brook Wellfield at a point between wells Kelly 6 and 8 is not expected to generate any impacts beyond that of the existing wells. NJAW modeled the impacts of operating the proposed well and showed little to no change in the pumping water level in the formation.

3. The applicant provided tables of monthly flow data collected at the USGS gages to show the flows that would be available for diversion in order to justify the requested monthly increase from Canoe Brook and the Passaic River. The Bureau reviewed the data to determine if the monthly diversion limits requested are reasonable and flows could actually be diverted.

The Canoe Brook request of 585 mgm is requested based on the analysis of flows from March of 2015. NJAW provided a simple calculation that took the daily average flow for each day, subtracted the minimum passing flow, converted the volume from cfs to mgd and provided the total volume that could have been diverted during that month, presuming every gallon of water above the minimum passing flow can be captured. While this is a best case scenario of water available for diversion, it is not representative of the actual stream flow that would be available for diversion. In addition, March of 2015 is not a good month to analyze because the gage failed during the portion of the month with the highest flows estimated by USGS. The Bureau analyzed the average daily flows available from USGS vs. the actual gaged flow data and found that while average daily stream flow values indicate that flows in excess of 40 mgd were available for diversion, the actual gaged flows showed that because of the flashy nature of the drainage basin, flows would far exceed 40 mgd for a given period leaving water passing that could not be pumped and then falling below 40 mgd later in the day, thus producing an average flow available for diversion where not all water could be captured.

The Bureau evaluated the applicant's request to increase the monthly and annual diversions from the Canoe Brook and Passaic River, and remove the June and September pumping moratorium from the Passaic River diversion. Utilizing the Riverware Modeling software developed by CADSWES University of Colorado Boulder, the Department developed a model for the Passaic River Basin. The model simulates the operation of all surface water users in the Passaic Basin for the years 1922 until 2010 using a daily time step. This model was used to simulate the effect of the applicant's request on existing downstream users. The model assumed the previously approved minimum passing flows are maintained and the reservoir draft was at the approved safe yield of 10.8 mgd. All minimum passing flows for water users in the basin were maintained in the model and the diversion limits for the raw water surface water intakes were removed to determine the impact of operating the

pump stations. It was determined that restoring the raw water diversion limits from the Canoe Brook and Passaic River to those previously approved by the WSC, and permitted pumping from the Passaic River in June and September can occur without reducing the safe yield of any downstream purveyors.

The model simulated the operation of the Canoe Brook and Passaic River intakes and provided maximum simulated diversions by each pump station. In its peak month of operation, the Canoe Brook Intakes 9 and 10 diverted 425 mg and Passaic River Intake 2 diverted 1,080 mg.

4. The applicant's current water use is reasonable. The water use reported on the quarterly diversion reports does not reflect water treated for use. The surface water diversions from the Passaic River and Canoe Brook are raw water diversion used to fill the Canoe Brook Reservoir system. To calculate the system demand, the reservoir diversion should be added to the total well diversion.

NJAW-Passaic has approved water main extension permits with a total demand of 30.396 mgm and 238.588 mgy.

5. The applicant's current allocation is adequate to meet their future demands. Demand projections provided by the applicant indicate that their ten year demands will be 1,791.022 mgm, and 14,605.411 mgy. Analysis of this in conjunction with historical water use shows that a recommended groundwater allocation of 321.7 mgm in conjunction with the Canoe Brook Reservoir safe yield of 10.8 mgd should be sufficient to meet their needs when combined with the other allocation permits possessed by the permittee and transfers from the Raritan Basin. A comparison of the ratio of maximum monthly use to annual use for the applicant indicates that an annual allocation of 3,780 mgy from groundwater sources in conjunction with 3,972 mgy from the Canoe Brook Reservoir should be sufficient to meet their needs when combined with the other allocation permits possessed by the permittee and transfers from the Raritan Basin.
6. Public community water supply systems are in the public interest because they are generally safer and more reliable than individual domestic wells that are not subject to the same testing, monitoring and standards as a public community supply well. Historically the Department has viewed local governmental approval of a project as signifying that it is in the public interest. Therefore, the proposed diversion is considered to be in the public interest in accordance with N.J.A.C. 7:19-2.2(f)1.
7. Natural replenishment of ground water is probably occurring because the observed fluctuations do not follow a continual decreasing trend and can be attributed to seasonal usage.

The applicant indicated that approval of the use of Wells 50 would not exceed the natural replenishment or safe yield (water available continuously during projected future conditions, without creating undesirable effects) of the water resource or threatened to exhaust such waters, or render them unfit for use. The Bureau's analysis of the application in conjunction with the NJGWS review of the aquifer test confirms this given that the Passaic River Wellfield monthly diversion limit will not be increased and will not exceed the natural replenishment. Due to the proximity of the wells to each other, the Bureau does have concerns that the 3 wells operating will not be capable of sustaining a 93 mgm diversion rate. The permittee should be required to pump test the wellfield until water levels stabilize at the approved diversion rate.

The addition of Well 54 to the Canoe Brook Wellfield is not expected to exceed the natural replenishment of the water resource as water levels in the wellfield have remained stable and the overall wellfield diversion limits will not be increased.

Therefore, approval of this application at the recommended rates is in accordance with N.J.A.C. 7:19-2.2(f)2.

In order to confirm this, static water level reports should be required as a condition of this permit to determine future trends.

8. Between 0 and 5,400 feet away from Well 50 there are 3 large capacity wells. The NJGWS analysis of the aquifer test anticipated a long-term drawdown of one foot at a distance of 4,400 to 5,400 feet based upon Well 50 operating at 700 gpm. The large capacity wells identified as being within the 5,400 feet radius of influence should have sufficient water above their pumps under normal conditions so that interference experienced should not adversely impact their ability to pump their allocations.

It is unlikely there are any small capacity domestic wells located within the radius of influence of Wells 50 and 55 as the area is supplied by public water systems. Any small capacity wells in use would likely be for irrigation or small industrial use. Because the operational impacts of Well 50 will be combined with the existing operation of Wells 51 and 52, Well 55 will be combined with the existing operation of 10 other wells that make up the Canoe Brook Wellfield and the monthly and annual diversion limits will not be increased, any wells, if present, should experience no noticeable change in operation.

The consumptive use of 18.12 mgd on an annual average from Canoe Brook and the Passaic River should not create problems for downstream water users because it has been determined that the applicant's request to increase the monthly and annual diversion limits from Canoe Brook and the Passaic River along with allowing pumping from the Passaic River in June and September will not affect the ability of these downstream users to divert their full allocations.

Therefore, the proposed diversion is just and equitable to the other Passaic River Basin water users as it does not adversely affect other existing withdrawals, in accordance with N.J.A.C. 7:19-2.2(f)3.

The diversion from Intakes 9 and 10, and 2 will not impact the flow in the Passaic River and Canoe Brook, because the previously established minimum passing flows will not be changed. Therefore, there is no need to modify the minimum passing flows.

Approval of the use of increased diversions from Canoe Brook under this permit should only be granted if the diversion does not cause the previously approved minimum passing flow to fall below 2.12 cfs as measured at the USGS stream flow gage no. 01379530 Canoe Brook near Summit.

Approval of the use of increased diversions from the Passaic River under this permit should only be granted if the diversion ceases at times when the flow in the Passaic River immediately downstream of the intake is less than 116 cfs as calculated from the measured flow at the USGS stream flow gage no. 1379500 Passaic River near Chatham. The flow is calculated by subtracting the measured flow at the USGS Passaic River near Chatham from the diversion volume.

Therefore, approval of this application at the recommended rates is in accordance with N.J.A.C. 7:19-2.2(f)3.

9. Elevated chloride concentrations are not a consideration in the Buried Valley aquifer at this location.

Therefore, approval of this application at the recommended rates is in accordance with N.J.A.C. 7:19-2.2(f)4.

10. Based upon the information provided by the applicant, the diversion is not expected to contribute to the spread of groundwater pollution. The request to increase the maximum diversion rate will allow the previously approved monthly diversion limit to be pumped. As this monthly diversion volume had been historically approved and diverted, no new impacts to known contaminated sites are expected as a result of the diversion rate increase.

Therefore, the proposed diversion will not spread ground water contamination nor interfere with any groundwater remediation in accordance with N.J.A.C. 7:19-2.2(f)4.

11. The Bureau of Freshwater Wetlands has been notified of the proposed diversion since the new diversion source is located in a freshwater wetlands or transition area.
12. The proposed diversion is located within Planning Area 4 of the New Jersey Statewide Water Supply Plan, August 1996 (NJSWSP). According to the NJSWSP, in Area 4, a water supply surplus exists, however, much of this surplus is exported to supply demands in Areas 5 and 6. The NJSWSP recommends implementing programs to ensure existing water supplies are preserved and managed. In addition, the plan recommended the Department develop a water supply model of the Passaic/Hackensack management/operation simulation model.

The applicant's request to add Wells 50 and 55 as diversion sources and increase the maximum diversion rate of Well 51 will allow the permittee to divert the previously approved groundwater allocation. The requests to increase the diversion limits of the Canoe Brook and Passaic River intakes and allow pumping from the Passaic River in June and September has been modeled utilizing the Department's Passaic/Hackensack Riverware Model and predicts no reduction in safe yield of downstream users as a result of the increased diversions. Approval of the requested diversions will increase resiliency of the Canoe Brook Reservoir system and water supply in Northeast New Jersey in accordance with the plan. Therefore, this application is in accordance with N.J.A.C. 7:19-2.2(h).

13. The applicant has no alternate source of water capable of supply the system demand.

There is no need to develop an alternate source at this time.

14. Even after the applicant's aquifer testing, it is unclear if the wellfield can sustain the diversion of 93 mgm. The Departments main concern is that the wells did not stabilize during the 24 hour stress test and the combined diversion from the three wells could dewater Well 50 below the top of the screen. The applicant should be given conditional approval for the allocation increase and be required to redevelop/replace Well 50 and perform an aquifer stress test with all 3 wells operating at the approved diversion rates until the pumping water level stabilizes. NJAW should be required to

submit a schedule to redevelop Well 50 and obtain the requested diversion rate of 700 gpm. In addition, a separate schedule for a wellfield stress test should be submitted. The test should take place after Well 50 is redeveloped to its approved diversion rate and should continue until the water level in the wellfield stabilizes. An aquifer test plan should be submitted for Department for review and approval prior to conducting any aquifer test.

15. The installation of Well 55 as a replacement well to Well 47 should be approved as a minor permit modification. However, if the constructed well does not meet the replacement well criteria established in N.J.A.C. 7:19-1.5(b)3, then NJAW will not be permitted to utilize the new source and a major permit modification will be required to permit the source.
16. The installation of Well 54 as a new source should be approved provide the proposed location of the well does not change, the proposed depth remains the same and the pumping capacity is limited to a maximum rate of 600 gpm.
17. The condition to redesignate Well Continental 1 from a public supply well to a monitoring well should be delayed until the reevaluation of the Canoe Brook wellfield is completed. If Well Continental 1 is not utilized as part of the Canoe Brook wellfield, it should be redesignated or decommissioned at that time.
18. The new diversion limits should be established as follows:

The Passaic River Wellfield should be approved with a monthly diversion limit of 93 mgm as previously permitted, as the applicant applied to increase the pump capacity of the wellfield.

The Canoe Brook Wellfield should be approved with a monthly diversion limit of 228.7 mgm with the understanding that NJAW will continue efforts to restore the pumping capacity of the wellfield to allow for the full allocation to be diverted.

The Canoe Brook intakes 9 and 10 should be approved at a maximum diversion rate of 40 mgd, a monthly diversion limit of 425 mgm and an annual diversion limit of 1,825 mgy (5 mgd annual average) as was previously approved by the Board of Conservation and Development.

The Passaic River Intake 2 should be approved with a maximum diversion rate of 82.12 mgd, a monthly diversion limit of 1,080 mgm and an annual diversion limit of 4,015 mgy (11 mgd annual average) as was previously approved by the Department of Conservation and Economic Development.

The total surface water diversion limit of 561 mgm should be eliminated as it was incorrectly calculated and is too restrictive.

The overall permitted maximum diversion rate should be established at 92,013 gpm as requested.

The overall monthly diversion limit should be increased from 883.5 mgm to 1,826 mgm. The monthly limit proposed is a combination of the maximum volumes of water modeled to be diverted from the Passaic River and Canoe Brook plus the monthly groundwater limits.

The overall annual diversion limit should be increased from 9,165 mgd to 9,620 mgd. The annual limit is determined as follows:

Source	Maximum Diversion Rate	Monthly Limit	Annual Limit
Passaic River	82.12	1,080	4,015
Canoe Brook	40	425	1,825
Passaic River Wellfield	-	93	1,090
Canoe Brook Wellfield	-	228.7	2,690
Overall	-	1,826	9,620

Summary

The Department has completed its review of this application pursuant to N.J.A.C. 7:19-1 et. seq. The review of this application reveals that it does not have any adverse impacts and meets, based upon the information certified to in the application, the statutory requirements of N.J.S.A. 58:1A-1 et. seq.

Therefore, based upon a review of the information submitted with the application, existing water allocation files, and the attached New Jersey Geological and Water Survey review of the application, the following conclusions have been reached regarding this application:

- The overall maximum diversion rate should be increased from 62,252 to 92,013 gpm as requested.
- The overall monthly diversion limit should be increased from 883.5 mgm to 1,826 mgm.
- The overall annual diversion limit should be increased from 9,165 mgd to 9,620 mgd.
- Well 50 should be included as a diversion source at the requested diversion rate of 700 gpm.
- The maximum diversion rate of Well 51 should be increased from 700 gpm to 1,000 gpm.
- Well 55 should be approved as a replacement well to Well 47 provided the new well is constructed to meet replacement well criteria.
- Well 54 should be approved as a diversion source with a rated pump capacity of 600 gpm.
- The diversion from the Passaic River should be limited to the rated pump capacity of 82.12 mgd as previously approved.
- The combined monthly diversion limit from the Passaic River Intake 2 and Canoe Brook Intakes 9 and 10 of 561 mgm should be removed.
- A monthly diversion from the Passaic River Intake 2 should be established at 1,080 mgm

- An annual diversion limit from the Passaic River Intake 2 should be established at 4,015 mgd as previously approved by the WSC.
- The diversion from Canoe Brook Intakes 9 and 10 should be limited to 40 mgd as historically approved.
- The monthly diversion limit from Canoe Brook Intakes 9 and 10 should be increased from 155 mgm to 425 mgm.
- An annual diversion limit from Canoe Brook intakes 9 and 10 should be established at 1,825 mgd as historically approved by the WSC.
- The monthly diversion limit for the Canoe Brook Wellfield of 228.7 mgm should be carried forward as previously permitted.
- The annual diversion limit for the Passaic River Wellfield of 93 mgm should be carried forward as previously permitted.

Therefore, this application should be approved in accordance with the following recommendations as the applicant has satisfied the requirements of N.J.A.C. 7:19-2.2 et seq.

References

In addition to the historical information on file at the Bureau of Water Allocation & Well Permitting and the application submitted, the following information sources were also utilized to establish the recommendations contained within this Staff Report:

Bureau of Safe Drinking Water PWSID No. 0712001.

March 1, 2001. The New Jersey State Development and Redevelopment Plan. New Jersey State Planning Commission, Trenton, New Jersey.

August 1996. Water for the 21st Century: Vital Resource, New Jersey Statewide Water Supply Plan. New Jersey Department of Environmental Protection – Office of Environmental Planning, Trenton, New Jersey.

Recommendations

Issuance of the modification permit is recommended with an expiration date of 10 years from the effective date and is subject to the attached Permit Requirements:

Date: _____

Robert Hudgins
Bureau of Water Allocation & Well Permitting