COMMONWEALTH OF MASSACHUSETTS
DIVISION OF ADMINISTRATIVE LAW APPEALS

May 19, 2009

In the Matter of	Docket No. 2003-074
TOWN OF WILMINGTON	DEP File No. 9P-3-17-342.01 Wilmington

RECOMMENDED FINAL DECISION

Summary of decision

Appeal by petitioner Town of Wilmington from a modified water withdrawal permit issued to it by the Department of Environmental Protection (DEP) on May 19, 2003, pursuant to M.G.L. c. 21G and 310 CMR 36.00, that (1) maintained, at 0.45 million gallons per day (mgd), the annual average daily volume of groundwater that the town may withdraw from sources in the Ipswich River Basin above its registered withdrawal volume of 2.91 mgd, and (2) mandated that the town implement a "water bank" (requiring that two gallons of water be kept within the Basin for every new gallon of demand from the town's public water system) when the town's actual water withdrawal exceeded its total authorized water withdrawal volume.

Following a hearing, and with agreed-upon revisions of special conditions 5, 6, 7, 9 and 10 included in it, it is recommended that Wilmington's water withdrawal permit as modified in 2003 be sustained, and that a revised modified permit including the revised special conditions be issued to the town, subject to such further modifications as DEP may require following its redetermination of the Ipswich River Basin's safe yield pursuant to *Hamilton v. DEP*, C.A. No. 06-745, Memorandum of Decision and Order on Cross Motions for Judgment on the Pleadings (Essex Super. Ct., Jul. 13, 2007).

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MARK L. SILVERSTEIN, Administrative Magistrate.

Background

a. Statutory and regulatory framework

As do many other municipalities in northeastern Massachusetts, the Town of Wilmington obtains a significant portion of its public water supply from water within the Ipswich River Basin, a water withdrawal that is regulated under the Massachusetts Water Management Act, M.G.L. c. 21G. Enacted in 1985, the Act directs the Department of Environmental Protection (DEP) and the Water Resources Commission to "cooperate in the planning, establishment and management of programs to assess the uses of water in the commonwealth and to plan for future water needs." M.G.L. c. 21G, § 3, first para. The Act charged the Commission with crafting "principles, policies and guidelines" for planning and managing the Commonwealth's water use and conservation, M.G.L. c. 21G, § 3, second para.[1] It also directed DEP to "adopt such regulations as it deems necessary to carry out the purposes of this chapter, establishing a mechanism for managing ground and surface water in the commonwealth as a single hydrological system and ensuring, where necessary, a balance among competing water withdrawals and uses." M.G.L. c. 21G, § 3, sixth

[1]/ M.G.L. c. 21G, § 3, second para. provides in pertinent part that the Commission:

> . . . shall adopt principles, policies and guidelines necessary for the effective planning and management of water use and conservation in the commonwealth and for the administration of this chapter as necessary and proper to ensure an adequate volume and quality of water for all citizens of the commonwealth, both present and future. Such principles, policies and guidelines shall be designed to protect the natural environment of the water in the commonwealth; to assure comprehensive and systematic planning and management of water withdrawals and use in the commonwealth, recognizing that water is both finite and renewable; and to allow continued and sustainable economic growth throughout the commonwealth and increase the social and economic well being and safety of the commonwealth's citizens and of its work force.

para.[2] DEP did so by promulgating its Water Management Act Regulations, 310 CMR 36.00, beginning in 1986.

Section 4 of the Water Management Act established a "withdrawal volume threshold" of 100,000 gallons per day (gpd) that DEP may, by regulation, raise or lower generally "upon a finding that such different threshold is necessary and adequate to protect the public health, safety and welfare," M.G.L. C. 21G, § 4, para. 1.[3] DEP may also, by regulation, lower the withdrawal volume threshold for a particular "water source" below the generally-applicable threshold "upon findings that such water source is in need of special protection because of the nature or volume of demands made upon it, and that the reduced threshold is therefore necessary and adequate to protect the public health, safety and welfare." M.G.L. c. 21G, § 4, para. 2.[4]

Whether the withdrawal volume threshold is set at 100,000 gpd or at some other volume, any person withdrawing more than the threshold volume of water must register these withdrawals with DEP. M.G.L. c. 21G, § 5, first para.[5] Any person who wishes to begin withdrawing more than the threshold volume must apply to DEP for, and obtain, a water withdrawal permit. M.G.L. c. 21G, § 7. Among the factors that DEP must consider in reviewing a water withdrawal permit are "[t]he

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[2]/ M.G.L. c. 21G, § 3, sixth para. also directed that DEP's regulations specify "criteria, standards and procedures for issuing permits, requirements for the content and form of permit applications, reasonable permit application fees, and requirements for monitoring, inspection and reporting of water withdrawals and usage by permitted water users."

[3]/ Water withdrawals below this threshold do not require approval under the Act. M.G.L. c. 21G, § 4, para. 1.

[4]/ DEP's regulations define "water source" as "any natural or artificial aquifer or body of surface water, including its watershed where ground and surface water sources are interconnected in a single hydrological system." M.G.L. c. 21G, § 2.

[5]/ The Act defines "person" to include a municipality. See M.G.L. c. 21G, § 2.

impact of the proposed withdrawal on other water sources which are hydrologically interconnected with the water source from which the withdrawal is to be made," and "[t]he water available within the safe yield of the water source from which the withdrawal is to be made." *Id.* DEP's Water Resources Management Program Regulations, 310 CMR 36.00, also specify safe yield as one of the factors that must be considered in reviewing a water withdrawal permit application. 310 CMR 36.26(1).[6]

The Water Management Act defines "safe yield" as:

> the maximum dependable withdrawals that can be made continuously from a water source including ground or surface water during a period of years in which the probable driest period or period of greatest water deficiency is likely to occur; provided, however, that such dependability is relative and is a function of storage and drought probability.

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[6]/ 310 CMR 36.26(1) provides that:

> In reviewing a permit application, the Department shall consider at least the following:
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> (a) the water available within the safe yield as determined by the Department in 310 CMR 36.31. Only the consumptive loss to the water source attributable to the new withdrawal(s) shall be considered in determining whether the permit application(s) in any permit round exceed the safe yield of the water source;
> (b) the impact of the proposed withdrawal on other withdrawal points and on other water sources that are hydrologically interconnected with the water source from which the withdrawal is to be made;
> (c) the anticipated times of year when the withdrawal is or will be made, and any projected changes in the withdrawal over a 20 year period;
> (d) reasonable protection of water uses, land values, investments and enterprises that are dependent on previously registered, permitted or otherwise allowable withdrawals;
> (e) the use to be made of the water proposed to be withdrawn and other existing, presently permitted or projected uses of the water source from which the withdrawal is to be made;
> (f) the approved water resources management plan for any city or town in which the withdrawal is located; (g) any State water resources management plan adopted by the Commission;
> (h) reasonable conservation practices and measures;
> (i) reasonable protection of public drinking water supplies, water quality, wastewater treatment capacity, groundwater recharge areas, navigation, hydropower resources, water-based recreation, wetland habitat, fish and wildlife, agriculture and floodplains; and
> (j) the impact of the proposed withdrawal on reasonable economic development and the creation of jobs in the Commonwealth.

M.G.L. c. 21G, § 2. DEP's regulations define "safe yield" as "the maximum annually averaged daily water use consumptive loss rate that can be sustained from a water source with an acceptable degree of risk." 310 CMR 36.03 (definition of "safe yield").[7] "Consumptive loss rate" is the rate at which a water source such as a basin loses water because a portion of the water withdrawn from it is not discharged back to it—for example, because used water is directed into sewers that discharge effluent via a treatment facility to the ocean or to some other discharge point outside of the basin. *See* 310 CMR 36.03 (definition of "consumptive loss").

The Act directs DEP to deny all applications for withdrawal permits from a particular water source if it "finds that the combined volume of existing, permitted and proposed withdrawals exceeds the safe yield of a water source or that existing, permitted or proposed water withdrawals are otherwise in conflict . . . ." M.G.L. c. 21G, § 11, first para. The regulations include a similar permit denial provision. 310 CMR 36.30(2) states that "[t]he Department shall deny any or all permit applications for withdrawals from a water source if it finds: (a) that the combined volume of existing, permitted and proposed new withdrawals exceeds the safe yield of the water source. . . ." The regulations also provide that if DEP issues the requested permit, the permit must include a condition requiring that "the withdrawal in combination with other registered and permitted withdrawals shall not exceed the safe yield of the water source." 310 CMR 36.28(1)(j).

The Water Management Act does not state how the safe yield of a water source is to be determined. The regulations state how DEP is to determine safe yield and what data and factors it may consider in doing so, *see* 310 CMR 36.31, but regulatory revisions have changed these details.

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[7]/ This definition has remained unchanged through various regulatory revisions since the late 1980s. In none of these revisions have the regulations defined "acceptable degree of risk."

For example, in 2003, when DEP issued the modified permit challenged here, the regulations provided that in determining the safe yield of a water source, DEP could consider "minimum streamflow guidelines" developed by two other agencies (the Department of Environmental Management and the Water Resources Commission). 310 CMR 36.31(1) (1994 rev.). The current regulations substitute the "natural variability of streamflow and aquatic habitat protection" for "minimum streamflow guidelines," however. *See* 310 CMR 36.31(1) (2005 rev.).[8] In addition, the regulations in effect in 2003 stated that "[i]n water sources deemed appropriate by Department, safe yield shall be determined using surface water streamflow analysis" based upon data recorded at selected streamflow gauge locations within the basin in question, or, where this type of data was

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[8]/ 310 CMR 36.31(1)(1994 rev.), which was in effect in 2003, provided that:

> The Department may, in any determination of safe yield by water source, consider at least the following:
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> > (a) minimum streamflow guidelines as developed by the Department of Environmental Management and the Commission;
> > (b) the water balance of the water source;
> > (c) the hydrologic impacts of proposed, existing and permitted withdrawals;
> > (d) the safe yield of any isolated or severely impacted subbasin within the water source;
> > (e) any additional applicable information.

310 CMR 36.31(1) (2005 rev.), currently in effect, provides that:

> In determining the safe yield of a water source, the Department may consider at least the following:
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> > (a) the natural variability of streamflow and aquatic habitat protection;
> > (b) the water balance of the water source;
> > information or guidelines developed by the Department of Conservation and Recreation or the Water Resources Commission;
> > (c) the hydrologic impacts of proposed, existing and permitted withdrawals;
> > (d) the safe yield of any isolated or severely impacted subbasin within the water source;
> > (e) any information or guidelines developed by the Department of Conservation and Recreation or the Water Resources Commission; and
> > (f) any other or additional information deemed applicable or relevant by the Department.

"inadequate or nonexistent," based upon an estimate of average daily streamflow in July, August and Septmber of 1980 and 1981 using a mathematical model or observations from a gauge outside of the basin. 310 CMR 36.31(2) (1994 rev.). This provision does not appear in the current version of 310 CMR 36.31. The preface to the current regulations explains that DEP is refining its approach to safe yield and expects to undertake "a more comprehensive revision" of its regulations, including provisions pertaining to safe yield, when its research has been completed and evaluated.[9]

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[9]/ The preface to the regulations states that:

> The science underlying the proper management of the state's water resources has evolved since the initial promulgation of the Regulations. The Department now has more information and a better technical understanding of the importance of natural variation of streamflow in maintaining water resources and the effect that water withdrawals and other human influences have on the sustainability of such water resources for present and future generations. Consequently, the Department has amended the Regulations to more specifically reflect current scientific knowledge, thereby furthering the goal of insuring the preservation of the water resource itself and determining an appropriate balance among competing water withdrawals and uses.
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> Consistent with the above theme, the Department has determined that the original regulatory definition of "safe yield", which is more narrow than the definition of this term in the Act, no longer sufficiently comports with the most current and protective technical basis for determining safe yield. The concept of safe yield is fundamental to the proper management of a water source, taking into account the natural variability of streamflow, and serves as the principal regulatory basis for determining the scope of permitted water withdrawals in a water source. The Department is working on a more refined, longer term approach to determining safe yield using the latest United States Geological Survey ("USGS") research. Upon the completion and evaluation of this research, the Department expects to undertake a more comprehensive revision of the Regulations in the future. In the interim, the Department has amended the Regulations to eliminate the original, obsolete definition of safe yield, and inserted in place thereof the broader, more accurate definition of safe yield in the Act.
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> The Department's interpretation and interim application of the statutory definition of safe yield is further specified in the Department's "Water Management Act Policy for Permit and Permit Amendment Applications and 5-Year Reviews", dated April 2, 2004 (the "Policy"). More specifically, the Policy: "1) requires more protection of our stressed water resources through implementation of conservation standards and other measures affecting nonessential water uses, 2) prevents conditions from getting worse by using higher standards to evaluate all proposed increases in water use, and 3) requires increased withdrawals to evaluate the feasibility of mitigating impacts through offsets in water management elsewhere and implement those that are feasible, commensurate with the degree of stress in the basin and impact of the withdrawal."

When DEP grants a water withdrawal permit, the permit must include at a minimum the "provisions" and "conditions" that the regulations prescribe. Required provisions include the permit's term, which cannot exceed 20 years, 310 CMR 36.27(3), and also "the maximum allowable withdrawal volume expressed in terms of average daily withdrawal per year or per some shorter period of time as applicable, from each withdrawal point," "the identification and limitation of use of the water withdrawn," and "the maximum allowable peak withdrawal." 310 CMR 36.27(2). The permit must also include conditions requiring, at a minimum, that the municipality or other permit-holder implement measures specified at 310 CMR 36.28(1), including flow meter installation (unless DEP determines this condition to be inapplicable), implementation of water conservation measures, and monthly recording and reporting of all future water withdrawals, unless DEP requires more frequent monitoring. The permit must also include a condition stating that the authorized water withdrawal "in combination with other registered and permitted withdrawals shall not exceed the safe yield of the water source . . . ." 310 CMR 36.28(1)(j).

Notwithstanding the permit's stated term, a water withdrawal permit with a term greater than five years is subject to review by DEP every five years, and DEP can modify the permit's provisions and conditions based on the data generated by this five-year review, including information regarding safe yield. *See* 310 CMR 36.33(4).

b. <u>The Ipswich River Basin - an oveview</u>

Beginning at its headwaters in Reading, Burlington and Wilmington, the Ipswich River flows

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310 CMR 36.00 (2005 rev.): Preface to the Revisions to the Massachusetts Water Resources Management Program, at 1, second through fourth paras.

slowly through coastal lowlands in northeastern Massachusetts along a relatively shallow slope averaging 3.1 feet per mile, for a total fall in river elevation of 110 feet by the time the river reaches the coastal town of Ipswich 36 miles away and empties into the Atlantic Ocean at Plum Island Sound.[10] Flat topography, low stream gradients and slow stream currents characterize the 155-square-mile basin associated with the Ipswich River. Old dams along the river and its tributaries have created what a United States Geologic Survey (USGS) study of Ipswich River Basin aquatic habitat published in 2001 described as "long reaches of moderately deep, slow-moving water with characteristics that are more pond-like than riverrine," including one at the head of Maple Meadow Brook, a tributary headwater of the Ipswich River in Wilmington. *See* Armstrong, David S., Richards, Todd A. and Parker, Gene W., *Assessment of Habitat, Fish Communities, and Streamflow Requirements for Habitat Protection, Ipswich River, Massachusetts, 1998-99*: Water-Resources Investigations Report 01-4161 (U.S. Dept. of the Interior, United States Geological Survey, Northborough, MA 2001) (the "*USGS Aquatic Habitat Study*"), at 3.[11]

Water quality along the length of the Ipswich River is good as long as the river flows. The river is generally separated from developed areas, and protected naturally from pollutant runoff, by forested wetland, meadow and shrub wetlands, and patches of upland forest, and its waters are classified as suitable for public water supply (with appropriate treatment), as a source of water for irrigation and industrial cooling, for primary and secondary contact recreation, and as habitat for fish,

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[10]/ A copy of this study was filed with the intervenors' prefiled direct testimony. *See* Prefiled direct testimony of Kerry Mackin, sworn-to May 19, 2004, at Exh. 6.

[11]/ *Id.* at 3, and at 4, Fig. 1.

other aquatic life, and wildlife.[12] The river's flow is not constant, however. The shallow, slow flow that is characteristic of the Ipswich River dwindles during the summer months, so much so in some years that portions of the river have ceased to flow (mostly in the upper Basin) and the river bed has been dry.

The United States Geological Survey has collected streamflow data at the two gauging stations it has operated along the Ipswich River since the 1930s, one of them downstream from Wilmington, below the South Middleton dam, and the other below the Willowdale Dam near Ipswich.[13] This data confirms that streamflows "typically are lowest in July, August and September"[14] Portions of the upper Ipswich River Basin (above the dam in South Middleton) "frequently are dry or have interrupted flow or extremely low flows."[15] During a 1934 drought, the upper nine miles of the river reportedly "dried or had isolated stagnant pools of water for the last 2 weeks of August"; more recently, during the late summer of 1999, a stretch of Maple Meadow Brook (a tributary of the Ipswich River) downstream of the Wilmington town wellfields "had interrupted or extremely low flow" during late summer.[16] Dry conditions in portions of Ipswich River headwaters with resulting fish kills and fresh water mussel die-offs occurred during the late summer in 1993, 1995, 1997, 1999 and 2002.[17]

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[12]/ *Id.* at 5.

[13]/ *Id.* at 5.

[14]/ *Id.*

[15]/ *Id.*at 8.

[16]/ *Id.*at 8, 12.

[17]/ *Id. at 8*; *see also* Prefiled direct testimony of Kerry Mackin, sworn-to May 19, 2004, at 2-4, and at Exh. 7 (photographs taken during the summer of 1999 during low-flow conditions, showing areas

The *USGS Aquatic Habitat Study* noted increased water demands above the USGS streamflow gauge at South Middleton (in the upper Ipswich River Basin, in other words) and, as well, a correlation between low-flow conditions in the Ipswich River and both dry weather conditions and water withdrawals from the Basin.[18] Its authors concluded that "[s]treamflows in the Ipswich River Basin are substantially affected by water-supply withdrawals that stress aquatic communities, cause fish and mussel kills during dry years, and limit the value of the Ipswich River as a biological, recreational, and scenic resource."[19] It was also their opinion that in order to meet the requirements of the Massachusetts Water Management Act, DEP and the Department of Environmental Management "need to determine streamflows that will maintain continuous flow in the Ipswich River, that will provide habitat adequate to sustain aquatic life during low-flow periods, and that will provide the seasonably variable flows necessary to sustain the ecological integrity of the Ipswich River."[20]

The authors of the *USGS Aquatic Habitat Study* also determined minimum streamflows for habitat protection—meaning "a minimum streamflow that will provide sufficient habitat to sustain fish communities over the summertime"[21] —by focusing upon four "ungaged riffles."[22] These were areas of the Ipswich River with the steepest slopes and shallowest depths that were particularly

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of dry streambed and isolated pools in the Ipswich River near Mill Street in Reading/North Reading.

[18]/ *USGS Aquatic Habitat Study*, at 12.

[19]/ *Id.* at 65.

[20]/ *Id.*

[21]/ *Id* at 67.

[22]/ *Id.* at 66.

sensitive to low-flow conditions, but at which the USGS did not have stream gauges emplaced. The Study explained that:

> [d]uring declining flows, these riffles are among the first reaches to show habitat losses or develop fish-passage problems, and are the first to go dry. These riffles are critical sites for monitoring habitat losses on the Ipswich River. Streamflows that maintain good habitat in these critical riffles also appear to provide adequate habitat conditions in adjacent non-riffle reaches to sustain fish communities during summer low-flow periods.[23]

One of these ungaged riffle sites was along the Ipswich River approximately two miles east of Wilmington, at Mill Street in the North Reading/Reading area; the other three were (proceeding downriver) along the Ipswich River at Log Bridge Road in Middleton, at Route 1 in Topsfield, and at Mill Road in Ipswich.[24] At the Mill Street riffle site in Reading/North Reading, the minimum streamflow required for habitat protection during the summer season, "normalized" for the drainage area in question, was determined to average between 0.45 and 0.48 cubic feet per second per square mile (cfsm), depending upon the methodology used and conditions assumed at the riffle site.[25] The minimum streamflows determined at all four ungauged riffle sites along the Ipswich River were then averaged to generate a "streamflow threshold" of 0.42 cfsm—the "single average minimum streamflow" that was needed, according to the Study, in order to assure aquatic habitat protection in the Ipswich River during the summer months.[26]

The *USGS Aquatic Habitat Study* noted, however, that because the Ipswich River's natural

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[23]/ *Id.*

[24]/ *Id.* at 66-67, and at 4, Fig. 1 (map showing the location of these riffle sites along the Ipswich River).

[25]/ *Id.* at 67. Streamflow requirements considered necessary to support aquatic habitat were determined by using the Tennant, New England Aquatic Base-Flow, Wetted Perimeter, R2Cross and Range of Variability approach methods. *Id.* at 66.

[26]/ *Id.*

flow regime varied "within an annual cycle, between wet, normal, and dry years, and from upstream to downstream," streamflows within the River "cannot be expected to meet a minimum summer time streamflow requirement at all sites or at all times," and the 0.42 cfsm streamflow threshold "may not be met for a period of several months during the summer at several downstream sites." [27] The Study therefore emphasized the importance of maintaining streamflow thresholds in the River's upper reaches. It projected that a "restoration" of the Ipswich River's aquatic ecosystem "could be achieved by maintenance of a minimum streamflow requirement of about 0.42 $(ft^3/s)/mi^2$ to 0.49 $(ft^3/s)/mi^2$ for the summer period, together with higher streamflow requirements for other seasons," and that "[t]hese flow restorations, combined with removal of dams and other barriers to fish passage, would allow fish communities to recover toward the goal of maintaining target communities consisting of more fluvial species in higher numbers." [28]

c. Wilmington's 1991 Water Withdrawal Permit and 1997 Permit Modification

The Ipswich River Basin includes all or parts of 22 Massachusetts municipalities,[29] many of which (Wilmington among them) use the Basin as a public water source, as do two municipalities

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[27]/ *Id.* For example, according to the *USGS Aquatic Habitat Study*, "the medians of monthly mean streamflows for the summer months, normalized for drainage area" were 1.01 cfsm in June, 0.49 cfsm in July, 0.47 cfsm in August, and 0.51 cfsm in September at the riffle at Mill Street in Reading/ North Reading, but were lower at the USGS Ipswich River gage downstream: 0.87 cfsm in June, 0.27 cfsm in July, 0.25 cfsm in August, and 0.23 cfsm in September. *Id.*

[28]/ *USGS Aquatic Habitat Study*, at 67.

[29]/ North Reading, Middleton and Topsfield are located entirely within the Basin. So, too, are large portions of Wilmington, Reading, North Andover, Boxford, Wenham, Hamilton and Ipswich, relatively smaller portions of Burlington, Andover, Lynnfield, Peabody, Danvers and Beverly, and "minor portions" of Woburn, Bullerica, Tewksbury, Essex, Georgetown and Rowley. *Id.* at 3.

outside the Basin (Salem and Lynn).[30] A number of these municipalities registered their respective withdrawals of Basin water above the 100,000 gpd threshold volume after M.G.L. c. 21G was enacted in 1985, and then applied to DEP for a permit under the statute allowing Basin water withdrawal above the threshold volume.[31]

Preparatory to issuing water withdrawal permits to Ipswich River Basin municipalities, DEP determined the Basin's safe yield based upon a "reference streamflow " for the Ipswich River Basin of 0.22 cfsm developed by the Massachusetts Water Resources Commission in 1989.[32] This was well below the minimum streamflow threshold of 0.42 cfsm that the *USGS Aquatic Habitat Study* would recommend more than a decade later (*see* above, at 12-13), but it was consistent with the regulatory approach to determining safe yield at the time, including consideration of "minimum streamflow guidelines" developed by the Commission and the Department of Environmental Management. *See* 310 CMR 36.31(1) (1994 rev.) (discussed above, at 6-7).

Relying upon the reference streamflow value of 0.22 cfsm, DEP concluded that if this flow rate were maintained in the river, there could be withdrawn safely from the Ipswich River Basin not only the total registered withdrawal volume of 28.39 mgd but, as well, an additional withdrawal volume of 3.29 mgd, for a total safe yield of 31.68 mgd.[33] DEP allocated this safe yield among the Ipswich River Basin towns and cities that had applied for water withdrawal permits. Pursuant to

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[30]/ *USGS Aquatic Habitat Study, at 3.*

[31]/ *See Town of Hamilton v. Department of Environmental Protection*, C.A. No. 06-745, Memorandum of Decision and Order on Cross Motions for Judgment on the Pleadings, at 3 (Essex Super. Ct., Jul. 13, 2007).

[32]/ *Id.* at 4, n.4.

[33]/ *Id.* at 4.

permits that DEP issued in 1991, each of these municipalities was allowed to withdraw (over a 20-year period, subject to review and modification by DEP every five years) a volume of water comprising the municipality's registered withdrawal volume and an additional "annual average daily volume.[34] Wilmington's 1991 permit allowed the town to withdraw, from groundwater wells in the upper reaches of the Ipswich River Basin, an annual average daily volume of 0.45 mgd in addition to its registered water withdrawal volume of 2.91 mgd, for a total of 3.36 mgd.[35] The 1991 permit allowed Wilmington to increase its withdrawal of water above the registered volume from 0.45 mgd to 0.65 mgd in 1999 and to 0.80 mgd by 2008.[36] DEP modified the permit in 1997, however, to hold this average daily withdrawal volume at 0.45 mgd through 1999, because the town's actual withdrawals above the registered volume were significantly below the withdrawal volumes that the 1991 permit allowed.[37]

d. Wilmington's 2003 Modified Permit

DEP had anticipated reviewing the Ipswich River Basin water withdrawal permits again in 1999, but it deferred this further review until the United States Geological Survey completed several ongoing studies of the Basin.[38] In DEP's view, the reports generated by these studies, including the *USGS Aquatic Habitat Study* published in 2001 (discussed above, at 9-13), provided "the best

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[34]/ *Id.* at 3-4.

[35]/ Modified Water Withdrawal Permit, M.G.L. c. 21G, No. 9P-3-17-342.01, issued to Town of Wilmington, dated May 19, 2003 (the *2003 Modified Permit*); cover letter dated May 19, 2003, at 2.

[36]/ *Id.*; cover letter dated May 19, 2003, at 1.

[37]/ *Id.*

[38]/ *Id.* at 2.

available science on flow and habitat for the Ipswich River." [39] After reviewing these reports and, as well, additional water withdrawal-related information that Wilmington and other Ipswich River Basin permit holders furnished, DEP concluded, in early 2003, that a combination of groundwater withdrawals and increased development within the Basin (including an increase in impervious areas) were contributing to low flow conditions in the Ipswich River and impairing the River's ability to provide aquatic habitat, contact recreation and safe drinking water sources.[40] DEP also noted that since 1997, Wilmington had withdrawn much less water above its registered volume than the 0.45 mgd allowed by the permit in every year except 1999.[41] The agency determined, consequently, that unless and until conditions in the Ipswich River improved significantly, it was "unlikely that any permittees in the Ipswich River Basin will be approved to increase their authorized withdrawals"; in addition, it was "essential that all permittees keep their withdrawals at or below their authorized

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[39]/ Prefiled direct and rebuttal testimony of Thomas J. Lamonte, sworn-to June 2, 2004 (Lamonte PFT), at 3, para. 6. DEP also reviewed three other reports generated by USGS studies of the Ipswich River Basin:

> (1) Zarriello, Phillip J. and Ries III, Kernell G., *A Precipitation-Runoff Model for Analysis of the Effects of Water Withdrawals* on Streamflow*, Ipswich River Basin, Massachusetts*, Water-Resources Investigations Report 00-4029 (U.S. Dept. of the Interior, U.S. Geological Survey, Northborough, MA 2000);
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> (2) Zarriello, Phillip J, *Effects of Water Management Alternatives on Streamflow in the Ipswich River Basin, Massachusetts*, Open File Report 01-483 (U.S. Dept. of the Interior, U.S. Geological Survey, Northborough, MA 2002); and
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> (3) Zarriello, Phillip J, *Simulation of Reservoir Storage and Form Yields of Three surface-Water Supplies, Ipswich River Basin, Massachusetts*, Water Resources Investigation Report 02-4278 (U.S. Dept. of the Interior, U.S. Geological Survey, Northborough, MA 2002).

Lamonte PFT at 3, n.2.

[40]/ *2003 Modified Permit*; cover letter, at 2.

[41]/ *Id.* at 3.

volumes."[42]

Consistent with this determination, DEP issued a further modification of Wilmington's water withdrawal permit on May 19, 2003. The *2003 Modified Permit* maintained, at 0.45 mgd, the annual average daily volume of groundwater that the town could withdraw above its 2.91 mgd registered withdrawal volume. It allowed Wilmington to withdraw, in other words, the total water volume of 3.36 mgd from the Basin that the 1991 permit allowed based upon the overall safe yield DEP determined for the Basin at that time. However, in contrast with the 1991 Permit, the *2003 Modified Permit* allowed no increase in the average annual daily volume—an increase that had not occurred, at any rate, in part because Wilmington had not withdrawn even the daily average withdrawal volume or the total authorized volumes it was allocated.[43]

The *2003 Modified Permit* also imposed new conditions that were not included in the 1991 permit, among them these:

Special condition 1 required that the town implement a water bank (following DEP approval of an implementation plan and schedule) requiring that two gallons of water be kept within the Basin "for every gallon of water demand added" to the town's public water system "[i]f, for any year beginning with calendar year 2004, the Town exceeds its total authorized volume of 3.36 MGD on an average annual daily basis . . . ." The water bank requirement applied "even if the Town exceeds its total authorized volume on an average annual daily basis by an amount that is less than the threshold volume."

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[42]/ *Id.* at 2.

[43]/ The *2003 Modified Permit* noted that "[e]xcept in 1999, the Town's actual water withdrawal has been significantly below the volumes originlally allocated." *2003 Modified Permit*, at 2.

Special condition 5 required that Wilmington implement and enforce mandatory restrictions on non-essential water use whenever streamflow in the Ipswich River (measured at the USGS gauge at South Middleton, or if that gauge failed, at the USGS gauge in Ipswich) fell below 0.42 cubic feet per second per square mile for three consecutive days between May 1 and September 30. *2003*.[44] DEP derived this "trigger" for water restrictions from the recommendation of the U.S.G.S. Aquatic Habitat Study that a minimum streamflow of 0.42 csfm be maintained in order to restore the Ipswich River's aquatic ecosystem *(*discussed above, at 11-13).[45] Public notice that mandatory water restrictions had to be published in a local newspaper "within 5 business days of the date that the required action is triggered." Special condition 5 also mandated that Wilmington issue a public notice for voluntary water restrictions when streamflow fell below 56 cfsm between May 1 and September 30.

Special condition 6 required that Wilmington (a) maintain unaccounted-for water use, including water used for fire protection[46] to 10 percent or less of overall water use, (b) limit residential water use to 65 gallons per day or less, (c) maintain its water use at or below an average daily volume of 3.36 mgd from May 1 through September 30, and (d) "make the use of unregulated irrigation wells subject to the restrictions on nonessential outside water use that are triggered by

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[44]/ Special Condition 5 also required that Wilmington issue a public notice for voluntary water restrictions when streamflow fell below 0.56 cfsm between May 1 and September 30. *2003 Modified Permit*, at 4.

[45]/ Prefiled direct and rebuttal testimony of Thomas J. Lamonte, sworn-to June 2, 2004, at 19, para. 38.

[46]/ The *2003 Modified Permit* defined "unaccounted for water" as "the difference between water pumped or purchased and water that is metered or confidently estimated," including "water that cannot be accounted for due to meter problems, unauthorized hydrant openings, unavoidable leakage, recoverable leakage, illegal connections, stand pipe overflows and fire protection." *2003 Modified Permit*, Special Condition 6, at 5.

streamflow threshholds" and that apply to "customers of the public water system" under the 2003 Modified Permit.

Special condition 7 required that Wilmington develop and implement an enhanced water conservation plan if, in any year beginning with calendar year 2004, the town failed to comply with the 65 gallon per day limit on residential water use or the seasonal water use cap of 3.36 mgd between May 1 and September 30 imposed by special condition 6. This plan could include, among other things, the adoption and enforcement of bylaws "or other regulations" requiring moisture sensors on automatic sprinklers, limiting land clearing to create lawns, and, "to promote infiltration of stormwater," requiring that groundwater be recharged "at a rate 1.5 times the volume of recharge for new development projects and a rate of 1.0 times the volume of recharge for redevelopment projects for the appropriate hydrologic group . . . ." ; it could also include a program to make water-saving devices (such as faucet aerators and low-flow shower heads) available to public water supply customers at cost and "to provide rebates or other incentives for the purchase of low flow appliances (washing machines, dish washers and toilets) and the installation of moisture sensors or similar control technology on irrigation systems."

Special condition 8 mandated the actions that Wilmington was required to take "at a minimum" in order to keep unaccounted-for water at or below 10 percent of overall water use, as required by special condition 6. This included the replacement of individual water service meters with meters that could be read remotely, and the repair of leaks in water pipes leading to the service meter within seven days after detection. Special condition 8 also required that the town conduct a full leak detection survey of its entire water distribution system every three years or "whenever the volume of unaccounted for water increases by 5% (for example, from 3% to 9%) or more over the

percentage reported on the Town's Annual Statistical Report for the prior calendar year."

Special condition 9 required that Wilmington report to DEP "both the raw and finished water volumes for the entire water system" and "[r]aw water volumes . . .for individual sources."

Special condition 11 directed the town to implement a program to reduce water use by its ten largest industrial and commercial water supply system customers.

e. 2003 Modified Permit Appeal

Wilmington filed a timely appeal on June 6, 2003[47] challenging most of the special conditions included in the *2003 Modified Permit* and requesting that it be issued a water withdrawal permit containing the terms and conditions recited by its 1991 permit. In the alternative, the town sought the deletion or modification of the special conditions to which it objected specifically, claiming that:

> Special condition 1 (water banking; *see* above, at 17) was prohibitively costly, discriminated against new water supply users, and unreasonably chilled the town's economic development. Wilmington requested that special condition 1 be deleted from the modified permit.
>
> Special condition 5 (streamflow-based triggers for restrictions on water use; see above, at 17-18) was overly burdensome, as the town had already implemented voluntary and mandatory water use restrictions. Wilmington sought a modification of this special condition that took its water use restrictions into account.
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> Special condition 6 (unaccounted for water use and restrictions on unregulated wells; *see* above, at 18) inappropriately counted water used for firefighting as part of the town's unaccounted for water. The special condition improperly took away from the town's water

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[47]/ 310 CMR 36.40 provides that "[a]ny person, who is aggrieved by a decision of the Department with respect to any permit application, or an addition to an existing withdrawal" may request an adjudicatory hearing pursuant to M.G.L. c. 30A, and that the hearing request must be sent to and received by DEP within 21 days "of the date of receipt of the decision being appealed." The *2003 Modified Permit* recited the same 21-day appeal period but added (as the regulations do not) that "[o]nly the portions of the Modified Permit that reflect a modification of the Town's current permit may be the subject of an appeal, since the appeal period associated with [the] Town's current permit has expired." *2003 Modified Permit*, at 11.

and sewer commission the ability to more accurately estimate the difference between water pumped or purchased and water that was metered or estimated. In addition, the special condition's requirement that Wilmington restrict private well use would require unauthorized entry by the town upon private land for enforcement against private well operators, and would intrude into the exclusive jurisdiction of the state Department of Health to regulate private wells. Wilmington requested that special condition 6 be deleted from the modified permit.

Special condition 7 (development and implementation of an enhanced water conservation plan; *see* above, at 18-19) infringed upon municipal home rule by mandating that Wilmington adopt specific bylaws, and imposed an onerous financial burden on the town by requiring that it issue rebates for privately-owned appliances. Wilmington sought a modification of this special condition.

Special condition 8 (mandating the actions Wilmington was required to take "at a minimum" in order to keep unaccounted-for water at or below 10 percent of overall water use, as required by special condition 6; *see* above, at 19) was unreasonable and arbitrary because it did not take into account that water leaking from Wilmington's public water supply system stayed within the Basin, and in addition penalized good water management by imposing more onerous penalties when unaccounted-for water deviated by smaller percentages from the 10 percent of overall use requirement. Wilmington sought a modification of this special condition.

Special condition 9 (requiring that Wilmington report both raw and finished water for the entire water system and raw water volumes for individual sources; *se*e above, at19) was not consistent with DEP's regulations, which took the position that non-consumptive water uses (*i.e.*, uses of raw water that was not treated so it was fit to drink) were not allowed by the Water Management Act. In addition, DEP had allowed other municipalities credit for raw water that was returned to the Basin after it was used. Wilmington sought a modification of this special condition.

Special condition 11 (directing the town to implement a program to reduce water use by its ten largest industrial and commercial water supply system customers; *see* above, at 19-20) unfairly penalized Wilmington, which had implemented aggressive and effective water conservation measures, including measures requiring water use efficiency on the part of its largest water supply users. Wilmington sought a modification of this special condition.

On June 11, 2003, the Ipswich River Watershed Association, Inc., Essex County Greenbelt Association, Inc., and a ten citizens group filed a combined appeal and motion to intervene in

Wilmington's appeal.[48] These parties also moved to intervene in adjudicatory appeals by other Ipswich River Basin municipalities or water supply boards challenging modified permits that DEP issued to them in May 2003.[49] The intervenors claimed in each of these appeals (including this one) that the water withdrawal volumes allocated by DEP to the municipality in question and to the Basin's other communities exceeded the Basin's safe yield, and in view of this requested that the water withdrawal allocations be reduced for each of these municipalities, Wilmington among them. The intervenors also sought more stringent modified permit conditions, including a requirement that the town implement a water bank immediately rather than when actual water withdrawals exceeded the total authorized water withdrawal volume of 3.36 mgd on an average annual daily basis for any year beginning with calendar year 2004, as the *2003 Modified Permit* required.

These modified permit appeals were filed at the former Office of Administrative Appeals (OAA), which, together with its staff and caseload, was moved from DEP to the Executive Office of Environmental Affairs in July 2003. *See* St. 2003, c. 41. Because the appeals challenged identical special conditions and presented similar objections to them, they were administered jointly at first. Each appeal presented unique facts, however, among them the location of the appealing municipality's water withdrawal wells, and seasonal flow variations in that area of the Ipswich River

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[48]/ It is unclear when the intervenors received the *2003 Modified Permit* or, thus, whether their appeal was timely. However, the intervenors have been treated as such throughout this appeal rather than as petitioners maintaining their own appeal, and that has sufficed for them to attain party status. The timeliness of their direct appeal is, at best, an academic issue, consequently, and I do not consider it.

[49]/ These other modified permit appeals were by the towns of Danvers (Docket No. 2003-066), Hamilton (Docket No. 2003-065), Middleton (Docket No. 2003-080), North Reading (Docket No. 2003-063), Topsfield (Docket No. 2003-079) and Wenham (Docket No. 2003-068), by the City of Peabody (Docket No. 2003-072), and by the Lynnfield Water District (Docket No. 2003-076), the Lynn Water and Sewer Commission (Docket No. 2003-070), and the Salem and Beverly Water Supply Board (Docket No. 2003-071).

Basin. Accordingly, Administrative Law Judge James P. Rooney held separate prehearing conferences in September and October, 2003, although he continuing to issue consolidated rulings on common legal issues—for example, on the scope of adjudication relative to safe yield (discussed below).

In January 2004, the modified permit appeals and the former OAA Administrative Law Judges, were transferred yet again, this time to the Division of Administrative Law Appeals (DALA). Now a DALA Administrative Magistrate, ALJ Rooney held a prehearing conference in this appeal on October 15, 2003, established a schedule for adjudication (including deadlines for filing prefiled testimony and holding the live portion of the hearing), and identified the issues to be adjudicated. Among these were issues related to the water bank required by the *2003 Modified Permit* (whether DEP had authority to require a water bank under M.G.L. c. 21G, and whether the requirement should be made more stringent as the intervenors proposed) and issues related to safe yield, among them (a) what is the safe yield of the Ipswich River, and (b) whether the 0.45 mgd annual average daily withdrawal authorized by the modified permit would, when combined with withdrawals allocated to other Basin communities, exceed the Basin's safe yield and, if so, whether and to what level this authorized withdrawal should be reduced.

After the appeal was transferred to DALA, Administrative Magistrate Rooney issued in all of the 2003 modified permit appeals, including this one, a consolidated ruling in which he declined to redetermine the Ipswich River Basin's safe yield. That was because DEP had not made this redetermination initially, and would be entitled to do so via a remand if a redetermination of the 1991 safe yield figure was required. In addition, determining safe yield anew would require a Basin-wide evaluation that was beyond the scope of evidence to be considered in each of the appealed 2003

modified permits. What would be addressed, instead, in each these modified permit appeals was "whether the information available to the DEP on safe yield should have a bearing on the nature of the conditions or allocations in the modified permits." Safe yield would be, thus, "simply . . . evidence concerning the appropriateness of permit conditions." *Matter of Town of Danvers*, Docket Nos. 2003-063—2003-080, Ruling on Issues to be Adjudicated: Safe Yield, 11 DEPR 59, 61 (Mass. Div. of Admin. Law App., Apr. 2, 2004).

With this appeal severed for separate adjudication, the parties next submitted the prefiled testimony of their respective witnesses.

Wilmington filed testimony by:

(1) David Peeling, P.E., a Massachusetts registered professional engineer and senior project engineer with the town's drinking water consulting engineering firm, SEA Consultants, which had developed a comprehensive water resources management plan (CWRMP) for the town in 2003.[50] Mr. Peeling has a B.S. degree in aeronautical engineering from the Uited States Air Force Academy and an M.S. degree in environmental engineering from the University of Massachusetts-Amherst; and (2) Michael Woods, who has served as Wilmington's water and sewer superintendant since 1988, following 2½ years each as assistant water and sewer superintendant and as assistant town engineer.[51] Mr. Woods is a Massachusetts licensed drinking water supply facilities certified grade 3D full operator, and is certified by DEP as a backflow prevention device tester and surveyor.

The intervenors filed testimony by:

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[50]/ Prefiled direct testimony of David Peeling, P.E., sworn-to May 7, 2004 (Peeling PFT); prefiled rebuttal testimony of David Peeling, P.E., sworn-to June 11, 2004 (Peeling RT).

[51]/ Prefiled direct testimony of Michael Woods, sworn-to May 12, 2004 (Woods PFT); prefiled rebuttal testimony of Michael Woods, sworn-to June 11, 2004 (Woods RT).

(1) Louis Wagner, the Massachusetts Audubon Society's regional scientist for the greater Boston region, who served previously as the Society's water resources specialist.[52] Mr. Wagner has a B.S. degree in natural resources from the University of Connecticut and an M.S. degree in wildlife ecology from West Virginia University; and

(2) Kerry Mackin, the executive director of the Ipswich River Watershed Association, Inc.[53] Ms. Mackin is the former Town of Topsfield conservation administrator. She has an M.S. degree in natural resources management and administration from Antioch University.

DEP filed testimony by:

(1) Thomas J. Lamonte, an environmental analyst IV in DEP's Water Management Act Program.[54] Mr. Lamonte has a Masters Degree in environmental policy from Tufts University;

(2) Duane LeVangie, a regional planner in DEP's Division of Watershed Planning and the program manager of DEP's Water Management Program.[55] Mr. LeVangie has a B.S. degree in geography from Salem State College; and

(3) Kellie O'Keefe, an environmental analyst IV in DEP's Water Management Act Program.[56] Ms. O'Keefe has a B.A. degree in geological sciences from the University of Rochester, has completed graduate-level courses in environmental studies at the University of Massachusetts-

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[52]/ Direct testimony of Louis Wagner, sworn-to May 18, 2004 (Wagner PFT).

[53]/ Direct testimony of Kerry Mackin, sworn-to May 19, 2004 (Mackin PFT); rebutal testimony of Kerry Mackin, sworn-to June 11, 2004 (Mackin RT).

[54]/ Prefiled direct and rebuttal testimony of Thomas J. Lamonte, sworn-to June 2, 2004 (Lamonte PFT).

[55]/ Prefiled direct and rebuttal testimony if Duane LeVangie, sworn-to June 2, 2004 (LeVangie PFT).

[56]/ Prefiled direct testimony of Kellie O'Keefe, sworn-to June 2, 2004 (O'Keefe PFT).

Lowell, and is certified by DEP as a backflow prevention device tester.

I held a hearing in the Wilmington appeal (Docket No. 2003-074) after the parties filed prefiled direct and rebuttal testimony, on June 21, 22 and 23, 2004. On August 6, 2004, the intervenors filed a post-hearing memorandum and proposed language for a revised permit condition requiring the immediate implementation of a water bank. DEP filed a post-hearing memorandum on August 4, 2004. On September 1, 2004, Wilmington filed a statement confirming that it would not be filing a post-hearing memorandum.

f. Further litigation in appeals challenging modified permits issued to other Ipswich River Basin municipalities

Magistrate Rooney issued a consolidated recommended final decision in three of the other modified permit appeals in early 2006. *Matter of Towns of Hamilton, Topsfield and Wenham*, Docket Nos. 2003-065, 2003-079 and 2003-068, Recommended Final Decision, 13 DEPR 3 (Jan. 19, 2006). The DEP Commissioner's Final Decision in these adjudicatory appeals adopted Magistrate Rooney's recommended decision, which added to the water bank condition a requirement that the town implement the water bank in any year in which the number of new connections to the town's water supply exceeded two percent of existing connections. *Matter of Towns of Hamilton, Topsfield and Wenham*, Docket Nos. 2003-065, 2003-079 and 2003-068, Final Decision, 13 DEPR 98 (Mar. 27, 2006).[57]

Topsfield appealed the Commissioner's Final Decision to the Suffolk Superior Court challenging, as it had during the adjudicatory appeal, the modified permit condition requiring a water

[57]/ Neither DEP nor any other party proposed the addition of any such condition to Wilmington's *2003 Modified Permit*.

bank. In affirming the Final Decision, Suffolk Superior Court Justice Patrick Brady rejected the town's claims that the water bank constituted an unlawful tax on new public water supply users, that Magistrate Rooney had not considered evidence regarding the town's anticipated growth and economic development, and that the magistrate lacked authority to recommend a modification of the revised permit's water bank condition. *Topsfield v. DEP*, C.A. No. 06-2438 (D), Memorandum of Decision and Order on Plaintiff's and Defendant's Motions for Judgment on the Pleadings (Suffolk Super. Ct., Jun. 15, 2007).

Hamilton and the intervenors appealed the Commissioner's Final Decision to the Essex Superior Court. Hamilton's adjudicatory appeal had challenged the propriety of the summer water withdrawal cap required by the modified permit. The intervenors had challenged DEP's failure to redetermine the Basin's safe yield before it issued Hamilton's 2003 modified permit, and had also asserted (as they do here) that the water bank required by the permit modification should be imposed immediately. On July 13, 2007, Superior Court Justice Elizabeth M. Fahey affirmed the final decision but concluded that DEP was required by its own regulations to determine the Ipswich River Basin's safe yield before it issued modified water withdrawal permits. The court ordered that DEP redetermine safe yield and "report to the parties as soon as is reasonably possible" so that they "can take whatever action each deems appropriate." *Town of Hamilton v. Department of Environmental Protection*, C.A. No. 06-745, Memorandum of Decision and Order on Cross Motions for Judgment on the Pleadings, at 20 (Essex Super. Ct., Jul. 13, 2007). In so doing, Justice Fahey rejected the intervenors' claim that a water bank should be imposed immediately rather than when the town exceeded its allowed withdrawal, as the modified permit required, because "[w]ithout a determination of safe yield by DEP, there is no basis for this court to impose an immediate water

bank in the Town, especially in light of the fact that public water consumption there is voluntarily decreasing." *Id.*

The intervenors filed copies of both of these Superior Court decisions with me on August 7, 2007, although their cover letter did not request anything other than that the decisions be brought to my attention, and none of the parties filed any motion requesting relief based upon either court decision. Neither Wilmington nor DEP objected to this filing, and accordingly I have made the court decisions a part of the record and taken notice of them.

Discussion

1. Modified special conditions addressing matters other than water banking

It was Wilmington's position throughout this appeal that the modified permit's special conditions granted it insufficient credit, or no credit, for measures it had already implemented by 2003 in order to enhance water conservation and groundwater recharge within the Ipswich River Basin.[58] The town was requiring, for example, that runoff from new impervious surfaces created by site development (for example, roofs and paved parking areas) be infiltrated to groundwater; in addition, the town was planning to capture street runoff and direct it to a recharge basin that would release this stormwater volume, in turn, to Basin groundwater. Because it had closed five wells in the Maple Meadow Brook Aquifer in March 2003 due to water quality concerns, the town had

[58]/ The town summarized these efforts during the June 21, 2004 hearing session. Although the intervenors disputed the effectiveness of these measures in conforming water withdrawal to the Basin's actual safe yield, their implementation was not disputed.

reduced pumping within the Basin.[59] Partly in response to these well closings, Wilmington was importing one million gpd of water from the Massachusetts Water Resources Authority (MWRA), whose sources were well beyond the Ipswich River Basin. As only 20 percent of the town was sewered, most of this water was being added to the Basin via subsurface sewage disposal systems. In addition, the town had implemented an emergency declaration between April and October that precluded the use of lawn sprinklers and confined hose watering to the hours between 5 p.m. and 9 a.m.

With these measures in place, particularly the importation of MWRA water, Wilmington withdrew less water from the Basin than the 3.36 mgd allowed by the *2003 Modified Permit*—3.2 mgd from the Basin during the summer of 2003 and 2.2 mgd during non-summer months, according to uncontradicted figures presented by the town during the June 21, 2004 hearing session.[60] These withdrawal volumes would be reduced even further if Wilmington were allowed to join the MWRA system and increase its consumption of MWRA water to 1.5 mgd. In view of the substantial withdrawal volume reductions it had already achieved and its increasing use of MWRA water, Wilmington argued that there was no need to implement the special conditions it challenged.

DEP expected that Wilmington's efforts to reduce its water withdrawals would improve groundwater conditions in the Basin—in particular, closing the town's Maple Meadow Aquifer wells

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[59]/ *2003 Modified Permit*, at 3; *see also* Woods PFT, at 2-3.

[60]/ DEP's figures for the town's water use in 2003 were similar. According to Environmental analyst Kellie O'Keefe, "[t]he Town of Wilmington's seasonal water use, including water purchased from adjacent communities to address the emergency situation," meaning the closure of the wells in the Maple Meadow Brook Aquifer, "was 2.5 million gallons per day from May through September 2003, almost 900,000 gallons below Wilmington's seasonal cap of 3.36 million gallons per day included in its Modified Permit." O'Keefe PFT, at 7, para. 23.

and importing MWRA water during summer months when streamflow in the Basin was low—although groundwater monitoring well data would be needed to confirm these improvements. Nonetheless, DEP emphasized, the Basin remained stressed, and the town's withdrawals of Basin water were still significant. Although only 20 percent of the town was sewered, the town's industrial users disposed of wastewater into these sewers, and as a result, 50 percent of the water used in Wilmington was carried away by sewer for disposal outside of the Ipswich River Basin; moreover, soils in Wilmington were not suitable for infiltrating wastewater to groundwater, and it was doubtful whether other towns in the upper Basin with more suitable soils would agree to take Wilmington's wastewater load.[61] Town wells continued to pump water within the Basin's headwaters at Lubbers Brook and Martins Brook, where the impact of water withdrawal on stream flow was greatest; in addition, there was no question that the Ipswich River was "oversubscribed" for water withdrawal, and even though groundwater was still present, it was insufficient to allow the river to flow year-round, and no single mitigating measure (including any of those Wilmington had implemented) would relieve this stress. In this context, DEP viewed the 0.42 cfsm trigger for implementing mandatory water use restrictions as an "environmental benchmark"—a point at which water conservation efficiencies needed to improve, as low-flow conditions demonstrated.[62]

On the second hearing day (June 22, 2004), the parties attempted to craft a procedure for determining an historical groundwater flow "baseline" that could be prove helpful in evaluating the *2003 Modified Permit* 's 0.42 cfsm streamflow trigger for imposing mandatory restrictions on non-

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[61]/ Lamonte cross-examination, June 21, 2004.

[62]/ *Id.*

essential water use. One possible way to do this was to obtain groundwater level data recorded since the 1950s at the USGS well in Wilmington between Lubbers Brook and Martins Brook. In addition, the parties discussed, during the colloquy before me, whether drawdowns in the Wilmington town wells could be correlated more accurately with streamflow—for example, by selecting a location for installing a new USGS gauge with telemetry, assuming that USGS authorized this step and that the town could obtain funding for the cost of maintaining the news gauge, estimated by DEP at between $15,000 and $18,000.

The colloquy produced no agreement on this point, and therefore the record remained without evidence of an historical groundwater flow baseline for evaluating the 0.42 cfsm trigger for imposing mandatory restrictions on non-essential water use. However, the town represented during the June 22, 2004 hearing session that it might prefer "living with the permit" with several modifications, such as not counting water used in firefighting toward the 10 percent limit on "unaccounted for" water. In addition, by the close of the colloquy on June 23, 2004, it was clear that cross and redirect examination would focus upon the water bank requirement (special condition 1), and that the parties would be attempting to resolve proposed modifications to the other special conditions that the town challenged.

To guide these discussions, and with the parties' consent that I do so, I disclosed my preliminary conclusions at the beginning of the June 23, 2004 hearing session as to each of the challenged special conditions. These were:

> As to special condition 1 (water banking; *see* above, at 17): No change was necessary. The trigger for implementing a 2:1 water bank would remain, thus, a water withdrawal by the town in excess of its authorized volume of 3.36 mgd on an average annual daily basis in any year starting with 2004.

As to special condition 5 (streamflow-based triggers for restrictions on water use; see above, at 17-18): These triggers should remain as the modified permit stated them—0.56 cfsm for voluntary water restrictions and 0.42 cfsm for mandatory water restrictions. However, the town should be allowed to maintain water restrictions based upon these streamflows during the period May 1-September 30 regardless of streamflow, in order to reduce the number of public notices of voluntary and mandatory restrictions that special condition 5 required. I directed the parties to consider the testimony of town witness David Peeling, P.E. regarding the practical difficulties that implementing notice under special condition 5 would cause, and the related suggestions made by DEP environmental analyst Thomas J. Lamonte in his prefiled testimony.[63]

As to special condition 6 (unaccounted-for water use and restrictions on unregulated wells; *see* above, at 18): Water used for fire suppression should not be included in Wilmington's unaccounted-for water use, provided that the town gave DEP an estimate of the volume of withdrawn water used for this purpose. I had not reached a preliminary conclusion about restricting unregulated wells, however.

As to special condition 7 (development and implementation of an enhanced water conservation plan; *see* above, at 18-19): Although the special condition did not require bylaw adoption and instead made this an option, it could be redrafted to omit mention of bylaws and also to take into account the town's ongoing preparation of a comprehensive water resources management plan (CWRMP).

As to special conditions 8 (keeping unaccounted-for water at or below 10 percent of overall water use, as required by special condition 6), 9 (requiring reporting of both the raw and finished water volumes for the entire water system, and raw water volumes for individual sources), and 11 (reduction of water use by Wilmington's its ten largest industrial and commercial water supply system customers) (*see* above, at 19-20), I noted that the parties had not yet proposed modifications, and that unless they did, I was inclined to let these special conditions stand as the *2003 Modified Permit* recited them.

The parties agreed during the June 23, 2004 hearing session to confer and propose agreed-upon revised special conditions. In a status report they filed on July 23, 2004, the parties presented agreed-upon revisions of special conditions 5, 6, 7, 9 and 10, and also reported that they were proposing no changes to special conditions 8 and 11.

I therefore sustain, without change, special condition 8 (mandating the actions Wilmington

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[63]/ *See* Lamont PFT, at 17-18, paras. 35-36.

was required to take "at a minimum" in order to keep unaccounted-for water at or below 10 percent of overall water use, as required by special condition 6) and special condition 11 (directing the town to implement a program to reduce water use by its ten largest industrial and commercial water supply system customers). I also approve the revisions of special conditions 5, 6, 7, 9 and 10 to which the parties agreed. These revisions appear in the Appendix to this Recommended Final Decision.

2. Water Bank requirement (special condition 1)

As the parties had reached no agreement regarding special condition 1 by the June 23, 2004 hearing session, and in view of the town's willingness to "live with" the modified permit in view of the modifications made to the remaining challenged special conditions, the hearing continued on the intervenors' claim that the modified permit should require immediate water banking.

Emphasizing dry river and stream bed conditions throughout the Ipswich River Basin during summer months through 2003,[64] the intervenors contended that the River has been "over-allocated" since DEP determined that there was an additional withdrawal volume of 3.29 mgd that could be allocated to Basin municipalities above their registered withdrawal volume of 28.39 mgd.[65] That determination was based upon the assumption that maintaining a low minimum streamflow threshold of 0.22 cfsm would assure aquatic habitat protection in the Ipswich River during summer months.[66]

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[64]/ For example, Ipswich River Watershed Association Executive Director Kerry Mackin presented, in her prefiled direct testimony, a detailed description of the dry river bed conditions and resulting fish mortality she observed in the Reading/North Reading area in September 1995 (four years after DEP issued the original water withdrawal permits to the upper Basin municipalities), during the summers of 1997 and1999, and in September 2002. Mackin PFT, at 2-3, paras. 9-17, and the photographs attached as Exhs. 2-5.

[65]/ *See* above, at 14.

[66]/ Mackin PFT, at 10-13, paras. 48-58. The 0.22 cfsm threshold is discussed above, at 14.

Ipswich River Watershed Association Executive Director Kerry Mackin testified, however, that the Basin's safe yield would already be below the withdrawal volume of 3.29 mgd that DEP allocated among the Basin's municipalities even if the minimum streamflow needed to assure aquatic habitat protection during summer months was raised slightly, from 0.22 cfsm to 0.25 cfsm.[67] However, the *USGS Aquatic Habitat Study* recommended that a higher minimum streamflow of 0.42 cfsm be maintained, and at that streamflow (as well as at any streamflow above 0.30 cfsm), there was no additional water to be allocated among Basin municipalities above their registered withdrawal volumes consistent with actual safe yield.[68] Mackin recalculated the Basin's safe yield based upon a reference streamflow of 0.42 cfsm using data from the USGS gauges in the upper Basin, at South Middleton, and in the lower Basin, at Ipswich; using the Ipswich gauge data, her calculations showed that "the registered withdrawals exceed safe yield in the upper watershed by 2.35 mgd per day," and using data from the South Middleton gauge showed that "the deficit is much greater, indicating that safe yield is exceeded by a larger amount."[69]

The 0.22 cfsm safe yield figure was therefore outdated, the intervenors urged, reflecting neither current development levels within the basin nor current streamflow conditions. As a result, it does not assure the adequate protection of streamflow and aquatic life or further the statutory goal of "managing ground and surface water in the commonwealth as a single hydrological system and ensuring, where necessary, a balance among competing water withdrawals and uses," as M.G.L. c. 21G, § 3 requires.

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[67]/ *Id.* at 11, para. 54.

[68]/ *Id.* at 11, para. 54, and at 13, para. 58 and n.4.

[69]/ *Id.* at 15-16, para. 67.

Although they advocated DEP's obligation to determine safe yield anew, the intervenors stated at the outset of the hearing on June 21, 2004 that they were not seeking a decision here compelling a redetermination of the Ipswich River Basin's safe yield. This position was consistent with Magistrate Rooney's April 2, 2004 ruling that safe yield issue could not be determined anew in any of the individual appeals challenging the 2003 modified permits, this appeal included, and that instead, safe yield would be considered to the extent it was relevant to the appropriateness of conditions in the modified permit.[70] They also understood that Basin water withdrawals would not be reallocated here. The intervenors argued, however, that without reductions in Basin water withdrawal allocations, the modified water withdrawal permits must require immediate water use offsets or mitigation programs or they would do nothing to mitigate the Basin's over-allocation.[71] These measures would, in their view, begin the process of restoring flow within the Ipswich River Basin by returning more water to it, particularly in the upper Basin where the River originates. In Wilmington's case, the necessary measures included reduced infiltration of groundwater into sewers (through leak detection and repair programs), increased storm water infiltration (to reduce transport of water for disposal out of the basin, primarily to the MWRA's Deer Island effluent treatment facility in Boston Harbor), reduced water withdrawal volumes, and immediate water banking.[72]

The intervenors' arguments are persuasive, at least as far as maintaining river flow at a level

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[70]/ S*ee* above, at 23-24.

[71]/ *See, e.g.*, Mackin PFT, at 17-18, para. 76.

[72]/ The intervenors were clear that this focus was intended to generate a more immediate remedy for the Basin rather than to waive their safe yield-related claims, including the claim that DEP was required to determine safe yield anew and base its permit and permit modification decisions on a new safe yield determination. For the record, the claim was not waived; as noted above, the intervenors continued to press their claim that DEP was required to redetermine the Basin's safe yield in *Hamilton*, and prevailed on it with a decision directing DEP to redetermine safe yield. *See* above, at 27-28.

necessary to restore the River's aquatic habitat is concerned. As a practical matter, however, the record does not support a finding that immediate water banking would be more effective, or even as effective, in restoring groundwater and flow within the Ipswich River Basin than would the other measures the intervenors advocated. The evidence suggests strongly that reducing the "export" of Basin water to disposal points outside of the Basin via sewers—for example, by reducing infiltration of Basin groundwater into the sewers—would significantly reduce the Basin's "water deficit" and improve river flow, as would water conservation measures and restrictions on nonessential water use. These measures are already underway in Wilmington to a significant extent, and the agreed-upon revised special conditions should bolster their implementation.

Adding immediate water banking in Wilmington to this mix would not hurt the effort to restore groundwater and river flow, and might even result in a measurable reduction of the water deficit, at least in the upper Basin. That is not enough to show, however, that Wilmington's modified permit must include immediate water banking, or that making the implementation of water banking dependent upon the town exceeding its total authorized withdrawal volume rather than immediately violates M.G.L. c. 21G or 310 CMR 36.00. The case for immediate water banking within the parameters governing the permit (including the existing Basin water allocations) is particularly difficult to make here because, since 1999, Wilmington's water withdrawal has been below the daily average withdrawal volume and the total authorized withdrawal volume allocated to it (*see* above, at 17). The intervenors, who advocated a more stringent water bank requirement and who had the burden of going forward on this issue, did not present evidence that consumption of Basin water was increasing on the part of public water supply users. Meeting the burden was difficult, if not impossible, in view of the town's importation of MWRA water following closure of

the Maple Meadow Aquifer wells (*see* above, at 28-29). Wilmington's intent to increase its importation of MWRA water rather than to bring closed wells back on line suggests that the consumption of Basin water by public water supply users within the town will decrease even further.

In the final analysis, the intervenors' claim that a water bank should be imposed immediately is based, as it was in *Hamilton*, upon their claim that the Basin's actual safe yield is being exceeded and that Basin water is over-allocated among the municipalities using it. However, safe yield is not being redetermined here, and neither are the allocations of Basin water being adjusted, including the 3.36 mgd allocated to Wilmington. In advance of the safe yield redetermination that Justice Fahey ordered DEP to perform, this matter presents no more of a factual basis for imposing a water bank immediately in Wilmington than *Hamilton* presented.

With the redetermination of the Basin's safe yield that Justice Fahey ordered in *Hamilton* still pending, and in view of the town's willingness to "live with" the *2003 Modified Permit* with the agreed-upon revised special conditions, I reject the intervenors' claim that the modified permit should impose a water bank immediately and sustain the water bank requirements recited by special condition 1.

Disposition

It is my recommendation that with the agreed-upon revisions of special conditions 5, 6, 7, 9 and 10 (*see* Appendix) included in it, the Town of Wilmington's water withdrawal permit as modified in 2003 be sustained, and that DEP issue a revised modified permit including the revised special conditions to the town, subject to such further modifications as DEP may require following its redetermination of the Ipswich River Basin's safe yield pursuant to *Hamilton v. DEP*, C.A. No.

06-745, Memorandum of Decision and Order on Cross Motions for Judgment on the Pleadings (Essex Super. Ct., Jul. 13, 2007).

Notice

This decision is a recommended final decision of the Administrative Magistrate. It has been transmitted to the Commissioner of the Department of Environmental Protection for her final decision in this matter, including the issuance of a revised modified water withdrawal permit to the Town of Wilmington as this decision recommends. This decision is therefore not a final decision subject to reconsideration, and may not be appealed to the Superior Court pursuant to M.G.L. c. 30A. The Commissioner's decision is subject to rights of reconsideration and court appeal and will contain a notice to that effect.

Because this matter has now been transmitted to the Commissioner, no party shall file a motion to renew or reargue this recommended final decision or any portion of it, and no party shall communicate with the Commissioner's office regarding this decision, unless the Commissioner, in her sole discretion, directs otherwise.

Mark L. Silverstein
Administrative Magistrate

APPENDIX:
REVISIONS TO SPECIAL CONDITIONS 5, 6, 7, 9 and 10 OF THE TOWN OF WILMINGTON'S WATER WITHDRAWAL PERMIT AS MODIFIED IN 2003

5. Streamflow Triggers and Outside Water Use Restrictions

(Substitute the following paragraphs for Special Condition 5. New language is in italics)

The Town of Wilmington is presently under an Emergency Declaration that will expire on October 9, 2004, unless renewed. It is anticipated that the Emergency Declaration will be renewed because of the loss of the Maple Meadow Brook Wells due to contamination and the absence of a reliable permanent supplemental water supply. This is anticipated to occur in the summer of 2005. The Emergency Declaration will continue to be renewed until Wilmington obtains such a permanent replacement supply. Under the Emergency Declaration, the Town is required to restrict nonessential outside water use to hand held hoses and to prohibit watering by hand held hoses between the hours of 9am to 5pm ("Mandatory Restrictions").

In light of the foregoing facts, the Town shall continue to limit nonessential outside watering in accordance with the Emergency Declaration. After the Emergency Declaration has been lifted or finally expires, whichever comes first, Wilmington shall implement the Required Actions identified in the following table, when streamflow falls below the levels identified for 3 consecutive days as measured at the USGS Stream gauge noted.

Period	Streamflow Trigger (3 consecutive days below threshold)	Flow Volume (USGS South Middleton Gauge Station #01101500 *	Required Action
May 1st thru September 30th	**< 0.56 cfsm**	**< 24.9 cfs**	**Public Notice for Voluntary Water Restrictions**
May 1st thru September 30th	**< 0.42 cfsm**	**< 18.7 cfs**	**Implementation of Mandatory Water Restrictions**

cfsm = cubic feet per second per square mile
cfs = cubic feet per second

***** The streamflow thresholds set forth above are the daily mean streamflows recorded at the applicable USGS gauge. Should the reliability of flow measurements a the South Middleton Gauge Station be so impaired as to question its

accuracy, the permit holder may request that the trigger mechanism be transferred to the USGS Ipswich Gauge #01102000. The implementation of restrictions will be triggered by the same cfsm values that translate to a flow of 70 cfs for voluntary restrictions, and 52.5 cfs for mandatory restrictions. Should the Department become aware of concerns about the reliability of either gauge, it may upon immediate notification to the permit holder transfer the measurement point to an alternate gauge. The Department reserves the right to require the use of a different gauge.

Both Required Actions (voluntary and mandatory restrictions) require the filing of a public notice in a local newspaper within 5 business days of the date that the required action is triggered. *In order to reduce the number of public notices needed to implement restrictions, the Town may take some or all of the following actions: (1) the Town may impose Voluntary Restrictions commencing May 1st and ending September 30th annually, before the streamflow falls below 0.56 cfsm; (2) the Town may impose Mandatory Restrictions at any time commencing May lst and ending September 30th annually, before the streamflow falls below 0.42 cfsm. The Town may continue mandatory restrictions after the streamflow is above 0.42 cfsm for the seven consecutive days. If the town chooses to impose voluntary or mandatory restrictions as set forth in subparagraphs (1) and (2) before the streamflow triggers are reached, the Town shall accompany the imposition of the restrictions with the public notice required herein. In that event, the Town will not be required to file a separate public notice when the streamflow trigger(s) is reached.*

A copy of each notice as published shall be forwarded to the Department within 10 business days of publication. Each notice shall at a minimum include:

1. the streamflow value that triggered the required notification;
2. the need to limit water use, especially nonessential outside water use, to protect streamflow for aquatic life and to ensure a sustainable drinking water supply;
3. ways individual homeowners can limit water use, especially nonessential outside water use; and
4. in the case of mandatory restrictions, a detailed description of the restrictions and the penalties for violating the restrictions.

At a minimum, mandatory restrictions shall limit nonessential outside water use to hand held hoses only and include hourly restrictions on nonessential outside water use. At a minimum, hourly restrictions shall avoid water use during the hours 9 a.m. - 5 p.m. when evapotranspiration rates are typically the highest. Notwithstanding the foregoing, irrgation of public parks and recreational fields by means of automatic sprinklers equipped with moisture sensors or similar control technology may also be permitted outside of the hours 9 a.m. to 5 p.m. For purpose of this Modified Permit, the term nonessential outside water use is defined to include those uses that do not have health or safety impacts, are not required by regulation and are not needed to meet the core functions of a business or other organization. The Town shall have the authority to enforce mandatory restrictions, including the authority to assess penalties or impose fines for violations.

The Town shall implement, and in the case of mandatory restrictions, enforce the restrictions until streamflow exceeds for seven consecutive days the applicable streamflow threshold set forth in the table above.

In order to evaluate the effectiveness of the restrictions on nonessential outside water use, the Department requires that the Town along with the Annual Statistical Report submit a report documenting all actions taken by the Town to implement and enforce the restrictions on nonessential outside water use, including without limitation the dates the restrictions on nonessential outside water use were in place, the streamflow threshold that triggered the restrictions, the restrictions imposed and the Town's efforts to enforce the restrictions including the names and addresses of those against whom action was taken and any fines or penalties imposed.

6. Ipswich River Basin Performance Standards

(under the subheading *Performance Standard for Unaccounted for Water*, amend the second paragraph by deleting "fire protection" from the last sentence and adding the following):

Water used for fire protection and fire training may be excluded from Unaccounted-for-Water in the Annual Statistical Report if the Town utilizes a methodology for "confidently estimating" such uses and submits that methodology in writing to the Department for its review and approval. The Town may utilize, and the Department will approve, the following methodology: the Wilmington Fire Chief or his designee provides to the Water and Sewer Department an estimated consumption based upon hose volume and/or pumping capacity over time. All fire suppression and fire protection uses shall be listed separately in the Annual Statistical Report and shall be listed separately from other volumes calculated and reported as Unaccounted-for-Water in that Report. The methodology used for this estimation must be attached to the Report in addition to the estimated volumes used. The daily water use for the three days immediately prior to and three days immediately following the fire suppression/ training event shall also be reported to the Department.

(under the subheading *Performance Standard for Restricting the Use of Unregulated Irrigation Wells*, insert a new paragraph between the existing first and second paragraphs above the chart):

If the Town elects to regulate private irrigation wells, it may do so by means of a bylaw or by regulation of the Wilmington Board of Health including, by way of example, regulation for the protection of public health pursuant to M.G.L. c. 111.

7. Enhanced Water Conservation Plan

(substitute the following new first paragraph)

If in any year, beginning with calendar year 2005, Wilmington fails to comply with the Performance Standards For Residential Per Capita Water use and/or Seasonal Water Use,

the town shall implement an enhanced water conservation plan for the following year. The conservation plan shall comprise measures included in this Comprehensive Water Resources Management Plan (CWRMP), which measures have been identified collectively in the CWRMP. Notwithstanding the foregoing, if the Town has implemented all the conservation measures identified in the CWRMP, and still exceeds the performance standards for residential per capita water use and/or seasonal water use, the Town shall supplement the conservation plan included in the CWRMP with additional conservation measures not yet implemented by the Town. The Town shall document to the Department all the conservation measures it has implemented, referencing the applicable provisions of the enhanced water conservation plan and the CWRMP. Additional measures to supplement the conservation measures in the CWRMP may include without limitation the items listed below:

9. Requirement to Report Raw and Finished Water Volumes
(delete the second sentence and replace with the following):

Raw water volumes shall also be reported for individual sources as recorded by the raw water flowmeters at each source.

10. Comprehensive Water Resources Management Plan
(In the second sentence, the date for submission of the Final CWRMP is changed from May 31, 2004 to August 31, 2004.)