THE COMMONWEALTH OF MASSACHUSETTS

WATER RESOURCES COMMISSION

100 CAMBRIDGE STREET, BOSTON MA 02114

REPORT OF THE FINDINGS, JUSTIFICATIONS AND DECISION OF THE WATER RESOURCES COMMISSION Relating to the Approval of the Town of Wilmington's Request for an Interbasin Transfer Pursuant to M.G.L. Chapter 21 § 8C AMENDED OCTOBER 11, 2007

DECISION

On June 14, 2007, by an eight to zero (8-0) vote, the Water Resources Commission (WRC) approved the Town of Wilmington's request for an Interbasin Transfer for admission to the MWRA Water Works System. This vote was taken after review of the facts provided by the applicant, analysis of the associated data, and consideration of comments received concerning this proposal.

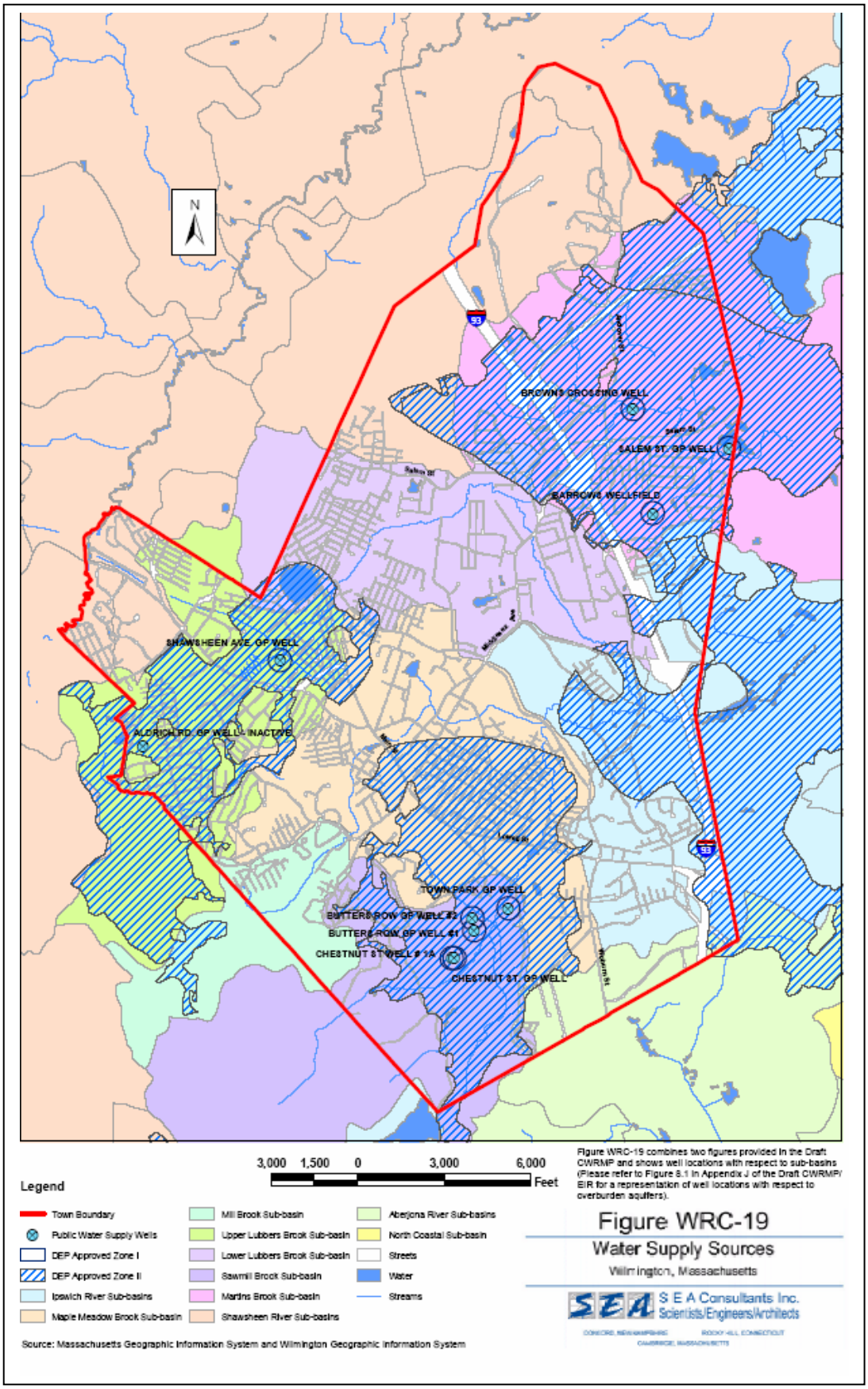
INTRODUCTION

On September 1, 2004, the Massachusetts Water Resources Commission (WRC) received a request for approval of an action to increase the present rate of interbasin transfer under the Interbasin Transfer Act (M.G.L. Chapter 21 §§ 8B-8D) from the Town of Wilmington, as part of a Final Comprehensive Water Resources Management Plan/Environmental Impact Report (CWMP/EIR). Wilmington is proposing to purchase a maximum of 3.25 million gallons per day (mgd) of water from the Massachusetts Water Resources Authority (MWRA) to supplement its existing water supply sources (Figure 1). This represents a maximum day demand. Wilmington's average day demand (ADD), based on the years 2001 to 2005, has ranged from 2.11 mgd to 2.80 mgd. In 2003, five of Wilmington's wells were taken off-line due to contamination and the Town started receiving water from the MWRA on an emergency basis. The current reliable capacity of Wilmington's active sources is estimated as 1.70 mgd. Wilmington has a Water Management Act permit for 3.56 mgd, although in 2003, DEP proposed limiting the permit to 3.36 mgd. This is currently under appeal. Wilmington is requesting to transfer a maximum amount of 620.5 million gallons per year (mgy) from the MWRA system. This equates to an average annual transfer of 1.70 mgd.

FACTS PERTAINING TO THE PROPOSAL

1. Wilmington has land area in the Ipswich River basin, the Mystic River subbasin of the Boston Harbor basin and Shawsheen River basin.
2. The MWRA Waterworks System has sources in the Chicopee River basin and the Nashua River basin. The Interbasin Transfer (IBT) application was submitted as part of the Final Comprehensive Water Resources Management Plan/Environmental Impact Report (CWMP/EIR) for this project (EOEA #8844).

Figure 1


N
BROWNS CROSSING WELL
SALEM ST. GP WELL
BARROWS WELLFIELD
SHAWSHEEN AVE. GP WELL
ALDRICH RD. GP WELL- INACTIVE
TOWN PARK GP WELL
BUTTERS ROW GP WELL #2
BUTTERS ROW GP WELL #1
CHESTNUT ST WELL # 1A
CHESTNUT ST. GP WELL
3,000 1,500 0 3,000 6,000
Feet
Legend
Town Boundary
Public Water Supply Wells
DEP Approved Zone I
DEP Approved Zone II
Ipswich River Sub-basins
Maple Meadow Brook Sub-basin
Mill Brook Sub-basin
Upper Lubbers Brook Sub-basin
Lower Lubbers Brook Sub-basin
Sawmill Brook Sub-basin
Martins Brook Sub-basin
Shawsheen River Sub-basins
Aberjona River Sub-basins
North Coastal Sub-basin
Streets
Water
Streams
Source: Massachusetts Geographic Information System and Wilmington Geographic Information System
Figure WRC-19 combines two figures provided in the Draft CWRMP and shows well locations with respect to sub-basins (Please refer to Figure 8.1 in Appendix J of the Draft CWRMP/EIR for a representation of well locations with respect to overburden aquifers).
Figure WRC-19
Water Supply Sources
Wilmington, Massachusetts
S E A Consultants Inc.
Scientists/Engineers/Architects

3. The CWMP addressed Interbasin Transfer Act (ITA) issues, as well as issues not jurisdictional under the ITA. Only the purchase of water from the MWRA, one of the issues addressed in the water supply sections, is jurisdictional under the ITA.
4. The WRC accepted Wilmington's application as complete at its January 11, 2007 meeting.
5. Two required public hearings were held to take comment on this application on February 27, 2007 and February 28, 2007.
6. On April 12, 2007, the WRC discussed Staff's recommendation to approve Wilmington's application under the Interbasin Transfer Act to join the MWRA's Water Works system.
7. A public hearing on the Staff Recommendation was held on April 26, 2007.
8. Responses to comments received through the public comment period are available in a separate report from the WRC.

EVALUATION OF THE PROPOSED INTERBASIN TRANSFER

This Interbasin Transfer application was reviewed on its own merits. The Decision was made on facts relevant to the Interbasin Transfer Act and its regulations. The application was evaluated against the eight criteria outlined in the regulations (313 CMR 4.05), as well as the Interbasin Transfer Act Performance Standards and with consideration of comments received through the public comment process.

SYNOPSIS OF THE EVALUATION CRITERIA (313 CMR 4.05)

Criteria	Application Meets?
Criterion #1: MEPA Compliance	Yes
Criterion #2: Viable In-Basin Sources	Yes
Criterion #3: Water Conservation	With Conditions
Criterion #4: Forestry Management	Not Applicable
Criterion #5: Reasonable Instream Flow	Yes
Criterion #6: Groundwater/Pumping Test	Not Applicable
Criterion #7: Local Water Resources Management Plan	Yes
Criterion #8: Cumulative Impacts	Yes

BASIS FOR THE WRC DECISION

This application was reviewed by WRC staff at the Department of Conservation and Recreation (DCR) Office of Water Resources, and staffs from the Department of Environmental Protection's (DEP) Division of Watershed Permitting and Northeast Regional Office, and Department of Fish and Game's (DFG) Division of Fisheries and Wildlife and Riverways Program. This Decision was made after an extensive evaluation of the project and of Wilmington's compliance with the six applicable criteria of the Interbasin Transfer Act regulations. Attachment 1 provides a synopsis of how the application addresses these criteria. The following section describes in detail, compliance with the criteria.

Criterion #1 MEPA Compliance
An environmental review, pursuant to Section 61 and 62H, inclusive, of Chapter 30, was required for this proposed action. The Interbasin Transfer application was submitted as part of the Final Comprehensive Water Resources Management Plan/Environmental Impact Report (CWMP/EIR) for this project (EOEA #8844). The Secretary's Certificate on the FCWMP/EIR was issued on October 15, 2004 and required that a Supplemental FEIR (SFEIR) be developed. The SFEIR included a partial response to the WRC's comments. The Secretary's Certificate on the SFEIR was issued on July 28, 2006 and stated that no further MEPA review was necessary.

Criterion #2 Viable In-Basin Sources
To meet this criterion, Wilmington was required to demonstrate that it had identified and developed all viable sources in the receiving area. Wilmington has ten existing groundwater sources, all located in the Ipswich River basin (See Table 1). Only four of these sources are currently active. Five wells were taken off-line in 2003 due to contamination. Another well has been inactive since 1972 because of elevated levels of naturally-occurring iron and manganese. Wilmington has estimated the current reliable capacity of its active sources as 1.70 mgd, although redevelopment or reconstruction may increase the yield of its existing wells. Wilmington operates two water treatment plants: the Butters Row Water Treatment Plant and the Sargent Water Treatment Plant. The Butters Row Water Treatment Plant served the wells lost to contamination and currently treats water only from the Shawsheen Avenue well. It is now being used below its design capacity of 3.0 mgd. The Sargent Water Treatment Plant, which also has a design capacity of 3.0 mgd, serves the wells on the north side of Wilmington (Brown's Crossing, Barrows and Salem Street wells). The Sargent Water treatment plant is also operating below its design capacity because the sources that it treats are not operating at their permitted withdrawal limits, as their capacities have deteriorated over time. The estimated operating capacity of the wells served by the Sargent Water Treatment Plant is approximately 1.8 mgd. Wilmington maintains interconnections with North Reading, Burlington and Woburn, as well as an emergency connection with the MWRA. The emergency connection with MWRA has been in use since 2003, when some of Wilmington's wells were taken off-line in response to contamination concerns.

Existing Wells
Wilmington has five wells in the Maple Meadow Brook subbasin of the Ipswich River basin. These wells are located in the southern end of Wilmington and include the two Butters Row wells, two Chestnut Street wells, and the Town Park well. Combined, these wells have an approved yield of 4.54 mgd, according to the town's current Water Management Act (WMA) permit. In 1999, ammonia, nitrate, and nitrite concentrations were discovered in the well water and resulted in Wilmington developing and implementing an Emergency Contingency Plan. In 2002, N-nitrosodimethylamine (NDMA) was discovered in the Maple Meadow Brook Aquifer and in Wilmington's wells which draw from that aquifer. Subsequently, many additional chemical contaminants have been identified in the Maple Meadow Brook Aquifer. The contamination includes a dense, non-aqueous phase liquid that has settled on the bedrock surface. The source of contamination is from an upgradient property formerly used for industrial purposes. The contamination is being remediated through the U.S. Environmental Protection Agency Superfund program with participation by DEP's Bureau of Waste Site Cleanup. The full extent of the contamination is not known and cleanup of ground water contamination is in early

Table 1
Wilmington's Existing Water Supply Sources

	WMA Daily Max. Rate (mgd)	**Current Max. Capacity (mgd) ***	**Current Capacity 16 hr/day (mgd)**	Comments/Status
Maple Meadow Brook Aquifer				
Butters Row – 1	1.30	0.50	0.34	**Off-Line (aquifer contamination)**
Butters Row – 2	1.37	0.86	0.58	
Chestnut St – 1	1.37	0.50	0.34	
Chestnut St – 1A	combined	0.97	0.65	
Town Park	0.50	0.22	0.14	
Subtotal Maple Meadow Brook Aquifer	**4.54**	**3.05**	**2.05**	
Lubbers Brook Aquifer (treated at Butters Row Water Treatment Plant)				
Shawsheen Ave	0.72	0.72	0.48	**Active**
Aldrich	Not included in permit	Not Applicable	Not Applicable	**Discontinued in 1972 (elevated iron and manganese concentrations)**
Subtotal Lubbers Brook subwatershed	**0.72**	**0.72**	**0.48**	
Martins Brook (treated at Sargent Water Treatment Plant)				
Brown's Crossing	1.55	0.72	0.48	**Upgrade to original capacity proposed**
Barrows	0.94	0.65	0.43	
Salem St	1.01	0.46	0.31	**Upgrade to original capacity proposed**
Subtotal Martins Brook subwatershed	**3.50**	**1.83**	**1.22**	
Town Total Capacity	**8.76**	**2.55**	**1.70**	**Current capacity does not include Maple Meadow Brook wells**
WMA Permit Limit	**3.56**	**3.56**	**3.56**	
Projected Average Day Demand 2025	**3.32**	**3.32**	**3.32**	
Projected Max Day Demand 2025	5.08	5.08	5.08	

Note: * indicates calculation based upon wells operating 24 hours per day, not optimal

stages. DEP, in a letter to the Town of Wilmington dated October 23, 2003, concurred that use of the aquifer as a source of drinking water should be discontinued for the foreseeable future, until plans to control/remove contaminants, and to ensure that use of the aquifer does not pose a threat to public health have been developed, approved by DEP, and implemented.

Wilmington's Shawsheen Avenue well is located on the west side of town along Lubbers Brook, and is currently in operation, utilizing the Butters Row treatment plant. The Shawsheen Avenue well has an approved yield of 0.72 MGD. The Aldrich gravel packed well is also located within this aquifer near the headwaters of Lubbers Brook, but has been designated as inactive since 1972 because of heavy iron and manganese concentrations. The Aldrich well was not incorporated into Wilmington's Water Management Act permit and would require New Source Approval to be reactivated.

The remainder of Wilmington's active water supply sources, Brown's Crossing Wellfield, Barrows Wellfield, and Salem Street Well, are located in northern Wilmington, in the Martins Brook subbasin. Water from these wells is treated at the Sargent Water Treatment Plant. The Browns Crossing Wellfield, a tubular wellfield, has an approved yield of 1.55 mgd. The Town reports the current yield of the wellfield as 0.72 mgd. Another tubular wellfield, the Barrows Wellfield, has an approved yield of 0.94 mgd, but Wilmington estimates the current yield of this wellfield as 0.65 mgd. A gravel-packed well at Salem Street has an approved yield of 1.00 mgd, but a reported existing capacity of 0.46 mgd. The Town is considering rehabilitation of the Brown's Crossing Wellfield and has started rehabilitation of the Salem Street Well. At Salem Street, two satellite wells are installed and pumps have been installed, but the site has only been able to produce about 500 gpm (0.72 mgd). The Town is studying the situation to determine if the approved yield (700 gpm, or 1 mgd) can be restored. It is unlikely that full rehabilitation will be achieved at either Brown's Crossing or Salem Street, and the Town may only realize a maximum additional yield of approximately 1.08 mgd. This potential maximum increase is still less than the 1.60 mgd additional capacity estimated to be needed by 2025 to meet Wilmington's average day demand. Due to the limited size of its contributing area, the Barrows Wellfield was not targeted for increased withdrawal or upgrades. The Town would still need an additional source of water to meet its long term needs. The Browns Crossing and Salem Street wells cannot be rehabilitated without taking them offline. This would require Wilmington to have a reliable back-up water supply source. The FEIR states that the existing Brown's Crossing Wellfield and Salem Street Well could gain approximately 0.8 mgd and 0.52 mgd, respectively, through restoration. Even with full restoration of these sources, more water would still be needed to meet the Town's current and future demands. The WRC supports operation of in-basin water supplies that avoids further degradation of the Ipswich River or its tributaries. These wells should be used to the extent environmentally and physically feasible, in accordance with the Town's WMA permit. If use of the wells is not feasible, it is possible that the Town may experience a water supply shortfall in the future.

Existing Interconnections

Wilmington has explored the possibility of obtaining permanent water supply from neighboring communities. Although existing emergency interconnections exist with North Reading, Burlington, and Woburn, and all of the surrounding communities are willing to assist Wilmington with short-term emergencies, none would commit to a long-term permanent supply.

Communities contacted were Woburn, North Reading, Andover, Burlington, Tewksbury and Billerica.

Development of new in-town sources
In 2001, Wilmington investigated the development of gravel-packed wells in the Shawsheen River basin portion of town. A potential location was identified, but test drilling in 2002 did not result in favorable results for development of a municipal water supply. The Town also investigated the development of bedrock wells within the Shawsheen River basin and identified three potential sites. Test wells were not drilled at the bedrock well sites; however, the SFEIR evaluated the economic feasibility of developing the bedrock well sites and determined that the cost of water from these sites would be greater than MWRA water. Another concern is that the bedrock well sites are located in the vicinity of industrial property. Wilmington was reluctant to make an investment in new water supply sources that may be subject to contamination.

Wilmington considered potential well sites within the Ipswich River basin to be non-viable as a result of the flow impacts that have been documented in the Ipswich River. It is unlikely that MassDEP would permit new wells in an already impacted basin without significant restrictions.

Wilmington has a small amount of land area within the Boston Harbor Mystic River basin. No overburden aquifers are mapped within this area, and this area is in the headwaters of the basin, so the potential for municipal wells in this area is low.

At WRC staff's request, Wilmington evaluated the feasibility of using the Maple Meadow Brook aquifer wells for a non-potable industrial water supply. Wilmington's industrial water demand is estimated at 1.0 mgd and the Maple Meadow Brook Wells could supply this rate. Such a system would be required to operate with separate treatment, piping and storage from the potable water supply both in the distribution system and within any buildings that utilized it. Wilmington was reluctant to consider this option because of the liability issues related to serving this water to customers, and it did not have assurance that any customers would be interested in the service. An economic analysis in the SFEIR indicated that the cost of implementing such a system would result in water rates more expensive than the cost of MWRA water. Therefore, a non-potable industrial supply of water from the Maple Meadow Brook well field appears to be infeasible at this time.

Criterion #3 Water Conservation
Wilmington has an existing water conservation program which meets most of the 1999 IBT Performance Standards for Criterion #3 and most of the Water Conservation Standards for the Commonwealth of Massachusetts. Wilmington does not meet the Performance Standard for a rate structure which encourages conservation. However, the Town is currently conducting a rate study and has committed to implementing a rate structure which encourages conservation, once the study is complete. Wilmington has not fully complied with the Water Conservation Standard which requires that water suppliers meter or estimate contractor use of water from hydrants (in place in both the 1992 and 2006 Standards). The Water Department's regulations require that contractors use temporary meters when using hydrants, however, the 2005 Water Audit indicated that unmetered water use by contractors could be a major source of water loss for the town, as contractors may not be diligent in using the meters. The Water Audit Report recommended that

the Water Department conduct periodic monitoring and consider enforcement provisions to ensure that contractors are using hydrant meters at construction sites.

Based on this, the WRC has determined that Wilmington is in the process of addressing the ITA Performance Standard for conservation rates and will be increasing its enforcement of contractor hydrant use. Therefore the WRC has determined that Wilmington meets this criterion, with conditions. These are, that if this transfer is approved, Wilmington must provide a copy of the completed rate study, a description of the conservation rate structure proposed to be adopted, and documentation that it has been implemented. In addition, if the transfer is approved, Wilmington must provide a plan to increase its enforcement of contractor hydrant use and a timetable for implementation, as well as update its water conservation plan to incorporate the 2006 Water Conservation Standards.

Wilmington has a very low rate of unaccounted-for water, averaging 4.19% from 2001 to 2005. The Town performs a leak detection survey every two years. Residential gallons per capita per day (gpcd) ranged from 51 in 2004 to 72 in 2002. The average residential gpcd for the years 2001 to 2005 is 62.

The Town adopted a Water Restriction By-law in 1999, however, in 2006, it elected to utilize the "Calendar Trigger" restrictions outlined in DEP's January 17, 2006 Water Management Act Permitting Policy revisions. Wilmington currently allows watering to be done only with hand-held devices.

The WRC notes that the Water Management Act (WMA) permit for Wilmington is currently under appeal and contains different requirements for the control of outdoor water use. According to comments from DEP, its 2006 Guidance, which outlines the Calendar Trigger restrictions, states that "This Guidance shall not apply to DEP permits under the Water Management Act for which an Administrative appeal or judicial review is pending at the time of its effective date." DEP has stated that "Wilmington's appeal (was) filed in May 2003 (and) clearly predates the effective date of the Guidance so it should not be applied." The Calendar Trigger restrictions that Wilmington has proposed as part of its interbasin transfer application are more stringent than the 1999 Water Restriction By-law and must remain in effect at least until the Administrative Law Judge issues a ruling on the Wilmington appeal. If this ruling is silent on outdoor water use restrictions, Wilmington's Calendar Trigger restrictions shall remain in effect until they are superseded by any subsequent WMA permit restrictions issued by DEP.

Wilmington received $300,000 as part of an EPA Targeted Watershed Grant, administered by DCR. With this grant, the Town has undertaken a two-part research demonstration project to return water to the Ipswich River basin and reduce non-point source runoff to Silver Lake, within the town of Wilmington. The first part of the project involved redevelopment at the town beach, and included repaving the parking lot, demonstrating four types of pervious pavement, converting two storm culverts to open grass swales, and installing several bioretention cells. The second part of the project, across the lake from the town beach, involved retrofitting a neighborhood within the catchment area of a direct outfall to the lake by installing rain gardens and permeable pavers along the streets in the public right-of-way to intercept and filter street,

driveway, and roof runoff. This two-part project was completed in June 2006. This project is being monitored by USGS and quarterly progress reports are being furnished to DCR.

In addition to the Silver Lake project, the Targeted Watershed Grant is funding a second project in Wilmington. Thirty nine residential rainwater harvesting systems were installed at private residences in Wilmington in the spring of 2006 to provide water for outdoor use. The systems provide either 200-gallons or 800-gallons of storage for rainwater run-off and include a pressure pump for delivery through a hose spigot. Additionally, in April 2007, a large underground rainwater storage vault of approximately 8,000-gallons was installed at a Wilmington public school to assist in meeting the irrigation needs of an adjacent ball field. The rainwater harvesting systems will be monitored through the grant to evaluate their effectiveness in reducing demand of potable water for outdoor use.

Table 2 lists Wilmington's water conservation accomplishments with respect to all of the water conservation standards.

Criterion #4 Forestry Management
This criterion refers to surface water sources currently used by the proponent, and so is not applicable to this proposal. Wilmington's sources are ground water sources.

Criterion #5 Reasonable Instream Flow and Criterion #8 Cumulative Impacts
Wilmington is proposing to purchase up to 620.5 mg of water from the MWRA per year. This is an average of 1.7 mgd. System hydraulics and the maximum interbasin transfer amount requested will result in a maximum transfer of 3.25 MGD. The Town proposes to use a source management plan that would, in general, maximize use of its local water supplies during the winter months, and maximize use of the MWRA water during the summer months (low-flow periods) in order to enhance flow in the Ipswich River basin. MWRA's sources are the Quabbin Reservoir in the Chicopee River Basin and the Wachusett Reservoir in the Nashua River basin (Figures 2, 3, and 4). The majority of Wilmington's land area is located in the Ipswich River basin, with small portions in the Shawsheen River basin and the Boston Harbor Mystic River basin.

The Interbasin Transfer Act regulations (313 CMR 4.05) direct the WRC to consider that "reasonable instream flow in the river from which the water is transferred is maintained" in making its decision to approve or deny an Interbasin Transfer request. In this case, the impacts of transferring an average of 1.7 mgd on the operations of the MWRA Water Works System were evaluated. This included impacts to reservoir levels, drought levels, low flows, intermediate flows, high flows, and the MWRA's mandated downstream releases. In addition, the cumulative impacts of the Wilmington transfer and other potential transfers (Reading's partial supply and Dedham-Westwood's partial supply) were evaluated on a monthly basis. These three potential transfers could result in an additional combined annual average of 2.45 mgd of system demand. It should be noted that Reading's demands were evaluated with the scenario of it purchasing MWRA water only during summer months, not during the entire year. Reading is in the process of applying for additional interbasin transfer to allow purchase of its entire public water supply year-round from the MWRA. The results of the analysis with a full-time MWRA source for Reading are not believed to be significantly different, however.

Table 2
Wilmington's Conservation Status

CONSERVATION				
Public Education	A broad-based public education program which attempts to reach every user at least two times per year	Develop and implement an education plan	Water Bill Inserts Internet/cable notifications	Yes
	Target largest users		Contacts commercial/ industrial users directly. In 2006, the Town conducted water audits of its 10 largest users.	Yes
		Include self supplied users in the public education campaign	Water use restrictions are noticed in the local newspaper, on local cable access, the Town's website and at the public library	Yes

CONSERVATION				
Leak Detection and Repair	Full Leak Detection survey within the previous two years of the application	Conduct complete system-wide leak detection every two (2) years or as described in this section	The last survey was completed in 2005; the next is scheduled to be conducted in 2007	Yes
	Documentation of survey and of leaks identified and repaired	Repair all leaks found as expeditiously as possible. Establish a priority system for leak repairs.	Documentation of the 2005 leak detection survey was provided. It included a list of the leaks identified and repaired. Detectable leaks are fixed immediately after being found.	Yes
	Completed by methods at least as comprehensive as the MWRA's regulations for leak detection	Conduct field surveys for leaks and repair programs in accordance with the AWWA Manual 36 and any MassDEP guidance documents.	Field surveys are conducted according to AWWA methods.	Yes
		Conduct the ASR water audit on an annual basis using the MassDEP Water Audit Guidance Document	Wilmington files properly completed ASRs yearly	Yes
		Meet or demonstrate steady progress towards meeting 10% UAW as soon as practicable	The average unaccounted-for water was 4.19% from 2001 to 2005	Yes

CONSERVATION				
Metering	100% Metering All public buildings should be metered	100% metering, including all indoor water use at all municipal facilities	Wilmington is 100% metered. All public buildings are metered.	Yes
	Quarterly billing, based on actual meter readings; bills should be easily understood by customer	Implement quarterly billing as soon as possible. For domestic accounts bill customers on actual, not estimated, meter readings.	Wilmington bills its customers quarterly, based on actual meter readings; the bills appear to be easily understood by customer	Yes
	Regular maintenance, calibration, testing and repair program; description of program included in application	Implement a water meter repair/replacement policy and program based on AWWA standards and guidelines from MassDEP	Wilmington retrofit all of its meters with Automatic Meter Reading systems in 2004. A regular testing program, based on AWWA standards, has been instituted.	Yes
	Master meters calibrated annually; documentation of annual master meter calibration	Calibrate any meter used to record quantity, according AWWA Standards can be consulted for calibration requirements and accuracy standards.	Because of iron and manganese fouling, master meters are tested and calibrated every 4-5 months. Documentation of master meter tests and calibrations was provided.	Yes
		Properly size the service lines and meters	Service lines and meters are properly sized.	Yes
		Increase billing frequency.	Wilmington bills its customers quarterly	NA
		Establish an annual budget line item for the metering program.	Water Department funds are dedicated in a special revenue account, which is similar to an enterprise account.	Yes
		Seal all water account metering systems against tampering and periodically inspect to ensure water works system integrity.	All water account metering systems are sealed against tampering and periodically inspect to ensure water works system integrity.	Yes
		Establish the necessary regulations and controls to ensure that owners of large meters calibrate the meters annually and provide the results as part of an annual reporting requirement.	The Town owns all commercial and industrial meters and tests according to AWWA guidelines	Yes

CONSERVATION				
Pricing	Documentation of full cost pricing	Full Cost Pricing	Full Cost Pricing: Water Department funds are dedicated in a special revenue account, which is similar to an enterprise account.	Yes
	Rate structure must encourage water conservation		$3.58/100 cubic feet; at the completion of the rate study, the Town has committed to implement a rate structure which encourages conservation.	No
		Perform a rate evaluation every three to five years	Rates are evaluated semi-annually. A water rate study is now underway.	Yes
		Prohibit decreasing block rates.	Wilmington does not allow decreasing block rates.	Yes
Residential water use	If the community's residential gallons per capita/day is greater than 65, the proponent should be implementing a comprehensive residential conservation program that seeks to reduce residential water use through a retrofit, rebate or other similarly effective program for encouraging installation of household water saving devices, including faucet aerators, showerheads and toilets and through efforts to reduce excessive outdoor water use.	Install Water Efficient Plumbing Fixtures. Use Residential Water Efficiently. Meet or demonstrate steady progress toward meeting residential water use of 65 gallons per capita per day (gpcd) including both indoor and outdoor use as soon as practicable Implement a comprehensive residential water conservation program	The average per capita residential water use was 62 gallons per person per day from 2001 to 2005.	Yes

CONSERVATION				
Public sector water use	All public buildings should be metered		All public buildings are metered	Yes
	Retrofit all public buildings with low-flow devices		All public buildings have been retrofit with low-flow devices	Yes
	Proponents should provide records of water audits conducted on public facilities. The most recent audit should have occurred within two years prior to the application for Interbasin Transfer approval.	Conduct indoor and outdoor audits as described in these standards	A water audit was conducted in the Fall of 2005. The April 2006 draft water audit report was provided	Yes
		Build new public buildings with equipment that reduces water use. Water saving devices and measures should be well identified to users of public buildings and facilities.	Any new public building will be built in accordance with State plumbing codes. Water saving devices in municipal buildings are not identified to the public.	Partially
		Focus on replacing/ retrofitting water consuming equipment in buildings (e.g. bathrooms, boilers, chillers).	As equipment requires replacement, priority is placed on utilizing equipment with energy and water saving features.	Yes
		Practice good, efficient lawn and landscape water use techniques	Moisture sensors have been installed on all irrigation systems for municipal recreation fields. All but two of these systems have been disconnected from the municipal water supply.	Yes
		Meter or estimate contractor use of water from fire hydrants for pipe flushing and construction.	The 2005 water audit indicated that unmetered sales and construction water losses should be pursued for potential water loss reductions. Contractors are required to use temporary hydrant meters, but contractors may not be diligent in using them. The Water Department will conduct periodic monitoring and consider enforcement provisions to ensure use of the meters by contractors at construction sites.	Partially
		Strictly apply plumbing codes and incorporate other conservation measures in new and renovated buildings.	Plumbing codes are strictly applied and other conservation measures are incorporated in new and renovated buildings.	Yes

CONSERVATION				
Water Supply System Management/ Comprehensive Planning	Written Drought/emergency contingency plan, to include: - seasonal use guidelines - measures for voluntary and mandatory water use restrictions and describe how these will be implemented - tie water use restrictions to streamflow and/or surface water levels in the affected basin(s) where this information is available	Develop a drought management plan that follows American Water Works Association Drought Management Planning guidance; Develop strategies appropriate to the system to reduce daily and seasonal peak demands and develop contingency plans to ameliorate the impacts of drought, seasonal shortages and other non-emergency water supply shortfalls; Develop emergency management plans according to MassDEP requirements	A water use restriction by-law was adopted in April 1999. Wilmington has opted to use the "Calendar Trigger", as described in DEP's 1/17/06 Water Management Act Policy to restrict outdoor water use.	Yes Yes
	Unaccounted-for water should be at 10% or less		Unaccounted-for water is less than 10%	Yes
		Develop a written program to comply with these Conservation Standards and, where possible, recommendations	Wilmington has a Conservation Plan that is based on the 1992 Conservation Standards. Their ITA application was submitted before the 2006 standards were adopted.	Yes
		Make the above documents readily available to personnel from all municipal departments	Documents are readily available to other town departments.	Yes

CONSERVATION MEASURE	1999 IBT PERFORMANCE STANDARD	2006 WATER CONSERVATION STANDARD	ACCOMPLISHMENTS	MEETS STANDARDS
Other	A program of land use controls to protect existing water supply sources of the receiving area that meet the requirements of the Department of Environmental Protection.		Ground Water Protection District regulated through by-laws and Board of Health regulations	Yes
	A long-term water conservation program which complies with the Water Conservation Standards for the Commonwealth of Massachusetts should be in place.		A long-term water conservation plan was developed in 2001	Yes

CONSERVATION				
Lawn and Landscape Water Conservation		Minimize watering lawns or landscapes	Moisture sensors have been installed on all irrigation systems for municipal recreation fields. All but two of these systems have been disconnected from the municipal water supply.	Yes
		Develop and implement seasonal demand management plans which identify water supply and environmental indicators (such as streamflow triggers) to serve as water use restriction triggers and outline a set of increasingly stringent and effective water use restrictions that are designed to protect public health and the environment.	Wilmington has opted to use the "Calendar Trigger", as described in DEP's 1/17/06 Water Management Act Policy to restrict outdoor water use. Since the loss of several wells, the Town has restricted hours for outdoor water use and the use of sprinklers and irrigation systems (hand held only).	Yes
		Adopt and implement (as appropriate) a water use restriction bylaw, ordinance or regulation, which applies to both municipal and private wells. This bylaw, ordinance or regulation should provide the ability to implement mandatory water use restrictions.	When they are allowed, underground sprinklers are metered. Moisture/rain sensors are required. Sprinkler systems can only be used between 7 PM and 6 AM.	Yes
		Abide by water restrictions and other conservation measures implemented by the municipality or water supplier.		
		Fully enforce water use restrictions. Empower authorities to issue warnings to first-time offenders and citations to repeat offenders.	Authorities are empowered to issue fines to violators	Yes

In its analysis of these criteria, the WRC relied on data provided in the Wilmington CWRMP/SFEIR plus additional submittals in response to WRC request, plus information regarding the MWRA system in a document titled, "MWRA Water System Supply and Demand" (May, 2002). Streamflow data for the analysis were obtained from the US Geological Survey, and release data for the MWRA Reservoirs were obtained from the Department of Conservation and Recreation, Office of Watershed Management.

MWRA System

The main components of the MWRA water supply system include the Quabbin and Wachusett Reservoirs, the Ware River intake, and its extensive distribution system. The construction of Winsor Dam on the Swift River was completed in 1939, creating the Quabbin Reservoir within the Chicopee River basin. The Quabbin Reservoir has a watershed area of 186 square miles, and maximum storage capacity of 412 billion gallons, equivalent to about four years worth of supply. In addition to the water flowing into the Quabbin directly, Quabbin Reservoir can receive water from the Ware River (also in the Chicopee River basin) via the Ware River intake. The Ware River at its intake has a watershed area of 96.8 square miles. The Quabbin Reservoir is connected by pipeline (the Quabbin Aqueduct) to the Wachusett Reservoir in the Nashua River basin. Wachusett Reservoir has a capacity of 65 billion gallons and a watershed area of 107 square miles. The Quabbin Reservoir came on-line in 1948 to supply the public water works system now operated by the MWRA, significantly supplementing the existing reservoir system (including the Wachusett Reservoir) that had been serving the Boston metropolitan area.

The MWRA reservoir system is operated with the primary objective of ensuring high quality adequate water supply. Secondary operational objectives include maintaining an adequate flood protection buffer particularly during the spring melt and hurricane seasons and maintaining required minimum releases to both the Swift and Nashua Rivers. The MWRA controls Wachusett Reservoir elevation through transfers from Quabbin Reservoir. The objective is to operate Wachusett Reservoir over a narrow operating range (between elevation 390 and 391.5 feet) while allowing Quabbin Reservoir to freely fluctuate. The Quabbin Reservoir elevation at the primary spillway is 530 feet. There is also a smaller, low-level spillway at elevation 528 feet.

The operation of Quabbin Reservoir includes maintenance of a minimum flow in the Swift River at Bondsville (five miles downstream of Winsor Dam) of 20 mgd, or 30 cubic feet per second (cfs). This threshold was mandated in Chapter 321 of the Acts of 1927 (Massachusetts General Laws). A 1929 War Department permit (now overseen by the Army Corps of Engineers) also requires seasonal releases from the Winsor Dam to maintain flow for navigability on the Connecticut River between June 1 and November 30. The seasonal releases are 70 cfs (45 mgd) if the flow in the Connecticut River, as measured at the Montague stream gage, falls below 4,900 cfs, and 110 cfs (70 mgd) if the flow in the Connecticut River falls below 4,650 cfs.

During its normal operation, the Quabbin Reservoir maintains the required thresholds stated above through controlled releases through a turbine (formerly used for hydropower production) or a turbine by-pass pipe. The by-pass pipe has a capacity of approximately 70 mgd (108 cfs). The reservoir has been historically controlled to maximize safe yield and assure water quality, while at the same time satisfying the regulatory required releases. Uncontrolled releases, or spills, occur periodically over the spillway. Uncontrolled releases are undesirable due to downstream flooding impacts and the rapid increase of high flow these cause.

Transfers from the Ware River to Quabbin Reservoir are only allowed when flows in the Ware River are above 85 mgd (131 cfs), and must be limited to the period from October 15 to June 15. In addition, permission must be obtained from the Army Corps of Engineers to transfer water during the periods of June 1 through June 15 and October 15 through November 30. Under the "limited Ware" approach currently implemented by the MWRA, transfers from the Ware River are made only on a limited basis for flood control or to help fill the Quabbin when Quabbin Reservoir levels are beneath their seasonal normal values. Transfers from the Ware River are avoided as possible.

The streamflow requirements listed above are intended to maintain pre-existing mill operation on the Swift River and navigation on the Connecticut River, but do not take into account the other instream uses which are evaluated when determining a reasonable instream flow. Flow in the Swift River was significantly impacted when the Quabbin Reservoir was built. An Indicators of Hydrologic Alteration (IHA) analysis of pre-1939 flows compared to post-1939 flows indicates that in general, streamflows in the Swift River have been significantly reduced by construction of the reservoir. The mean annual flow has decreased from 313 cfs to 100 cfs. In addition, all monthly flows have been reduced (Gomez and Sullivan Engineers, Overview of Water Use and Transfer in the Chicopee River Basin, 2003).

Minimum releases are also mandated with the operation of the Wachusett Reservoir on the South Branch of the Nashua River. Chapter 488 of the Acts of 1895 (Massachusetts General Laws) requires a release of 12 mg per week or 1.71 mgd (equivalent on average to approximately 2.6 cfs). An additional 12 mg per week can be requested by a downstream mill owner. Similar to the Quabbin Reservoir and the Swift River, the flow characteristics of the Nashua River were significantly altered when the Wachusett Reservoir was constructed.

Hydrologic Analysis--Overview

The safe yield of the MWRA reservoir system is approximately 300 mgd (MWRA, 2002). Demands on the MWRA water supply system peaked in 1980 at 343 mgd and were above 300 mgd for 20 years. Since this time, MWRA system demand has decreased dramatically as a result of aggressive water conservation efforts, water efficiency initiatives, response to price and rate increases, and regional economic conditions. The average annual baseline demand for the period of 2000 to 2004 was 233 mgd. In its comment letter on Wilmington's interbasin transfer application, MWRA notes that the most recent five-year average demand (2002 to 2006) was 224 mgd, and

the 2006 reservoir withdrawal was 212 mgd. The Metropolitan Area Planning Council estimates future demands for the existing system to be an additional 13 mgd through 2025. Using the 2000 to 2004 demand of 233 mgd, the interbasin transfer analysis was based on a future demand for the existing system of 246 mgd. Adding the proposed demands from Wilmington, Reading, and Dedham-Westwood (2.5 mgd) results in a total future demand of 248.5 mgd. The future demand for the existing system using more recent data would be 237 mgd, plus the future proposed demands would bring the future estimate below the future demand projected from the existing system used in the Wilmington interbasin transfer analysis. The Wilmington application points out that this figure is substantially lower than historic system demands and is far below the system safe yield.

Several types of data are available to evaluate the potential impact of the Wilmington transfer, as well as any planned or proposed transfers, on the Quabbin Reservoir. Streamflow data, or a hydrograph showing the impact of the proposed transfer on the donor river basin, is usually evaluated as part of an interbasin transfer review. However, several factors make the use of downstream flow data difficult in this case. First, the Quabbin Reservoir has a huge storage capacity, which is used to maintain a constant minimum flow. Second, the current MWRA system demand is significantly lower than its historic demand; therefore superimposing the transfer on a historic downstream hydrograph would not be realistic. For these reasons, other types of data, including releases and reservoir levels, are being used to evaluate these criteria. To account for the change in system demand, some of the analyses have used a shortened period of record on which to superimpose the transfer. Due to the presence of large water supply dams and their associated reservoirs, Aquatic Base Flow (ABF) criteria were not applied to downstream releases, since the outflows from the dams would not reflect the size of the watersheds above the dams on a cubic feet per second per square mile (cfsm) basis.

The Wilmington application indicates that in general, given the relatively small size of the Wilmington transfer in comparison to the capacity of the reservoir and the magnitude of discharges over the spillway, and the discharges governed by regulatory requirements, the effects on hydraulic characteristics from Wilmington's withdrawals will be imperceptible. Intended downstream releases at Quabbin, Ware, and Wachusett will not change. There would only be a slight reduction in unintended spillway flows at Quabbin.

Both time series flow graphs and flow duration curves are used to describe river flow conditions. Figure 5 shows both the time series and flow duration curve for the Swift River at the West Ware gage for the time period of 1950 to 2006. The Swift River West Ware gage is located 1.4 miles downstream from Winsor Dam and has a period of record from 1913 to present. The West Ware gage is located approximately 3.6 miles upstream of the compliance point at Bondsville. The intervening drainage area between the two points is reported to contribute 4 mgd of base flow (MWRA Water System Supply and Demand, 2002); therefore, releases of at least 16 mgd are made from the Quabbin Reservoir to maintain the minimum 20 mgd flow required at Bondsville. Significant flow variation is evident in the time series graph, and the flow duration curve depicts the very high frequency of flows that exceed the minimum release requirement from the Quabbin

Reservoir. For example, releases of 60 mgd are equaled or exceeded approximately 37 percent of the time. The slope of the flow duration curve increases significantly about 100 mgd, reflecting conditions when the maximum release from the bypass has been exceeded and high flows begin over the spillway.

Releases from Wachusett Reservoir typically occur through a fountain on the downstream side of the dam at the headwaters of the Nashua River. Flows are measured by a venturi flow meter and typically are 1.8 mgd in the winter, and approximately 1.72 mgd during warmer months when the fountain is in use. Both of these conditions represent an essentially fully open valve at the fountain, so the flows are fairly constant. In addition, approximately 0.4 mgd of water from Wachusett is discharged to Lancaster Mills as non-contact cooling water. This water is discharged to the Nashua River just downstream of the dam. MWRA also estimates that an additional 0.9 mgd of seepage occurs from the Wachusett Reservoir dams and dikes (personal communication, Stephen Estes-Smargiassi, MWRA). A pressure-reducing sleeve valve installed a few years ago allows additional discharges up to 100 mgd. Flows between 1.8 and 100 mgd may be released through a sleeve valve to control the reservoir level or when Wachusett Reservoir is being supplemented with Quabbin water for water quality purposes. These intermediate flows are typically increased in 25 mgd increments over a period of two days (similarly, flows are decreased over a period of two days when the release is completed). Flows above 100 mgd occur when the Wachusett reservoir is spilling over the dam. Weekly release data provided by the DCR Office of Watershed Management for the period of 1938 to 2006 were used in the hydrologic analysis. Average daily flows were calculated from the monthly values for each month during this period. Daily release data were provided for the period of 2002 to 2006, and separate analyses were performed using these data. Figure 6 shows the time series and flow duration curve for releases from Wachusett Reservoir for the time period of 1938 to 2006. The graphs show that the minimum of 1.71 mgd release or greater occurred 92.5 percent of the time; however, between 2002 and 2006 the minimum release was achieved greater than 99 percent of the time. Flows above 100 mgd (spills) occurred approximated 2.25 percent of the time between 1938 and 2006 and rose to 26 percent of the time during the 2002 to 2006 period.

Figure 7 shows the time series and flow duration curve for the Ware River for the time period of 2002 to 2006. Ware River flows were measured at the USGS gage 01173000, known as Ware River at intake works near Barre, MA from 1928 to 2005. According to MWRA, the Ware intake at Barre was designed to pass the first 85 mgd before flow can be siphoned into the intake. Flow is measured by MWRA using its own meter at the intake. The USGS gage time series has superimposed on it the reduced flow as a result of diversions to the Quabbin Reservoir. Between 2002 and 2005, diversions to the Quabbin were as high as 85 percent of the total flow in the Ware River (e.g., 87 mgd passing the intake, while 507 mgd diverted to Quabbin). However, since the diversions are only allowed at flows exceeding 85 mgd (and the operating practice is to not divert below 89 mgd), there are no impacts to low flows caused by the diversions. It is noted that diversions from the Ware River to the Quabbin Reservoir are typically only made

when the reservoir level is below normal or the Army Corps of Engineers requests it for flood control.

Low Flows
USGS data indicates that the minimum Quabbin release to the Swift River (16 mgd) as measured at the West Ware gage was maintained 99 percent of the time between 1950 and 2006. Because the mandated flow requirements have been maintained, even during periods when demands were nearly 100 mgd over the current level, and through the drought of record, it is assumed that those releases will continue to be met and permit conditions will be satisfied under the proposed transfer demand scenarios, which are significantly less than the historic use. Additional demands from Wilmington and other proposed users are not expected to affect Swift River releases from the Quabbin Reservoir, which represent the majority of low flows.

Low-flow impacts on Ware River diversions as a result of the additional demands posed by Wilmington, Reading, and Dedham-Westwood are not expected. Ware River diversions are limited to non-low-flow months (November through May), and to periods when flow exceeds 85 mgd.

Data provided by the DCR Office of Watershed Management for the period of 1938 to 2006 indicate that releases from Wachusett Reservoir to the Nashua River have met the 1.71 mgd requirement more than 92.5 percent of the time (99 percent of the time since 2002). Again, additional demands of Wilmington and other proposed users are not expected to affect Nashua River releases from the Wachusett reservoir.

Intermediate Flows
While only "minimum" release requirements apply to the Quabbin and Wachusett Reservoirs, data indicate that intermediate flows occur as a result of releases above the minimum requirements. Data from the USGS Swift River West Ware gage indicate that flows between 100 mgd and 500 mgd occurred approximately 30 percent of the time for the period of 1950 to 2006. It should be noted that there is a mechanical limitation to intermediate releases from the Winsor Dam. The bypass structure is limited to approximately 70 mgd and the next opportunity for releases is a spill over the low-level spillway.

At the Wachusett Reservoir, flows between 10 mgd and 100 mgd are estimated to have occurred approximately 6 percent of the time for the period of 1938 to 2006 (based on monthly data). During the 2002 to 2006 period, flows between 10 and 100 mgd also occurred approximately 6 percent of the time. The ability to release controlled flows is limited to 100 mgd through the sleeve valve at Wachusett. When possible, more frequent intermediate seasonal flow releases from the Wachusett Reservoir would be beneficial to the Nashua River.

Intermediate flows at the Ware River intake (between 50 to 100 mgd) occurred 38 percent of the time between 2002 and 2006. During this period, at times when the diversion was activated, up to 85% of Ware River flow was diverted, while maintaining

at least the minimum 85 mgd downstream release. For the period analyzed (2002 to 2006), the Ware diversion was operated 184 days, or about 27 percent of the time during the intermediate flows. It is acknowledged that Ware diversions are limited based on MWRA's operating principles. Even with the diversions, however, the frequency and magnitude of intermediate flows in the Ware River appears nearly normal.

High Flows

Increasing demands can impact the amount of water that is released from Quabbin. In order to evaluate the impact of the proposed Wilmington interbasin transfer (and other proposed future transfers), the applicant provided a figure depicting flows at the Swift River West Ware gage for the period of 1990 to 2003, shown as Figure 8. The applicant states that there is no correlation between flows in the Swift River and system demand; rather, variations in flow are related to operational practices as well as climatic conditions. Increasing transfers from the Quabbin Reservoir to meet water quality objectives and to meet increased summer demands decrease the likelihood of spills. The figure also shows that flow variation exists in the Swift River downstream of the Winsor Dam. In particular, high flows occur frequently, although not annually, in the form of uncontrolled spills. During the period of 1950 to 2006, flows above 500 mgd were recorded at the USGS Swift River gage approximately 3 percent of the time. The issue of uncontrolled releases and spring flows at Quabbin are further discussed under the section Impacts to Other Uses, *Fisheries.* Spills from Quabbin are undesirable because of their adverse impacts downstream including warm water release to the cold-water fishery and flooding issues.

High flows on the Ware River are impacted by diversions to the Quabbin Reservoir. High flows (above 100 mgd) at the Ware River intake occurred 30 percent of the time between 2002 and 2006. During this period, at times when the diversion was activated, up to 84% of Ware River flow was diverted, while maintaining at least the minimum 85 mgd downstream release. For the period analyzed (2002 to 2006), the Ware diversion was operated only 34 days, or about 6 percent of the time during high flows. As noted previously, Ware diversions are limited based on MWRA's operating principles. Even with the diversions, however, the frequency and magnitude of high flows in the Ware River appears nearly normal. The addition of Wilmington and other communities will not likely have an impact on the use of Ware River diversions or high flows in the Ware River.

Since high flows from the Wachusett Reservoir are generally uncontrolled spills, and the reservoir level is intended to be managed to a narrow range of levels, the proposed withdrawals are not considered to have an impact on high flows in the Nashua River. High flows (greater than 100 mgd) are estimated to have occurred approximately 2 percent of the time over the period between 1938 and 2006 (using monthly data); however, the high flows occurred much more frequently (27 percent of the time, based on daily data) between 2002 and 2006.

Quabbin Levels/Drought Analysis

Quabbin Reservoir levels fluctuate by design, but minimum percent full values have been established and are the basis for drought designations. The applicant evaluated maximum pool level reductions at various demands and hydrologic conditions simulated from 1948 through 2000. The results of the analysis are that at the base withdrawal, plus Wilmington and future community demands (248.5 mgd total), the maximum pool descent does not vary considerably from current demand conditions. The additional community demands would result in a Quabbin level descent to elevation 502.7 feet, well above the minimum acceptable pool descent of 470 feet elevation. At demands less than 290 mgd, pool descent is not modeled to reach thresholds for concern for the MWRA system (MWRA, 2002).

An analysis was conducted to determine the impact of the proposed transfer on the Quabbin Reservoir during a drought. Increasing additional demands can impact the frequency with which a reservoir system reaches various drought levels. This analysis of the incremental transfers for Wilmington, Reading, and Dedham-Westwood is useful to determine impacts to levels in the reservoir as well as impacts to other communities currently on the MWRA system. Analyses of the increase in demand due to the proposed Wilmington transfer and future community transfers show that the MWRA system would result in no increase the frequency and duration of drought levels (Stage 1 drought levels remained the same at 5 months over the entire period analyzed). This analysis was based on a period of 1948 to 2000. At demands less than 270 mgd, models of drought action thresholds do not show unacceptable impacts to the MWRA system.

Impacts to Flow Characteristics

Interbasin Transfer Act criteria require evaluating impacts of the transfer on specific flow statistics. No impact to the Swift River 95% flow duration (20.0 mgd) is expected, compared to existing conditions. The 95% flow duration is equivalent to the state-mandated release requirement of 20 MGD at Bondsville. Data from the Swift River gage indicate that the mandated release has been achieved at virtually all times and it is expected that it will be maintained into the future and will not be affected by the proposed transfer or those of future communities included in this analysis.

Likewise, the 95% flow duration at the Wachusett Reservoir is not likely to be affected by the proposed additional transfers requested by Wilmington, Reading, and Dedham-Westwood. The estimated 95% flow duration for the Nashua River (based on weekly historical release data) is 1.6 mgd, slightly below the 1.71 mgd mandated release. Data provided by the DCR Office of Watershed Management indicate that the mandated release has been achieved at virtually all times since 2002 and it is expected that it will be maintained into the future and not be affected by the proposed transfer. Thus, the 95% flow duration flow is expected to increase slightly with future operations to at least the 1.71 mgd threshold.

The 95% flow duration at the Ware River should not be impacted by the proposed increase in interbasin transfer since Ware River diversions are not allowed during low flow periods.

Impacts to Other Uses

Fisheries

According to the Massachusetts Division of Fisheries and Wildlife, the Swift River below Winsor Dam, down to the confluence with the Ware River, contains significant fisheries habitat. In addition, the river is one of only two rivers in Massachusetts which receive a cold-water release that significantly benefits habitat, such as the catch and release trout fishery directly below the dam. The current required flow releases are beneficial to the fishery, as they provide a continuous source of fresh cold water. DFW operates a trout hatchery downstream of the Winsor Dam on the Swift River, which uses river intakes as part of its water supply. Relatively warm-water spills from the surface of Quabbin Reservoir during the summer can be detrimental to the fish hatchery operation, and high flood flows can damage the river intake.

An instream flow incremental method (IFIM) study of the Swift River in 1997 by Normandeau Associates for MWRA indicated that the current flow releases were adequate to protect the Swift River trout fishery. The study found substantial, large, deep pools in the Swift River that serve as habitat refuge for adult trout. The efficacy of pools as low flow refuges is enhanced by an abundance of overhanging and downed trees that contribute substantial amounts of woody debris.

As part of the review of the Reading Interbasin Transfer application for MWRA water, approved by the Water Resources Commission in 2005, DFW, MWRA and DCR Office of Watershed Management considered habitat improvements that could be made within the limitations of existing permits. Through a Memorandum of Understanding with MWRA, DCR's Office of Watershed Management is responsible for developing policies and procedures to be followed during wet weather or flood periods, to enable MWRA to determine how much water (above statutory requirements) is released into the Nashua, Swift, Ware, or Sudbury Rivers. During winter and spring months when the Quabbin Reservoir is filling to high levels, it may be possible to increase releases to the Swift River (using the Winsor Dam by-pass and/or other future improvements). Winter/spring diversions from the Ware River (in accordance with permitted limitations) may be used to supplement Quabbin and allow for enhancement of higher controlled or variable Swift River releases in the spring months. The WRC recommends that DFW, MWRA and the DCR Office of Watershed Management continue to cooperate to establish and implement enhanced release procedures to the Swift River from the Quabbin Reservoir.

MWRA and DCR Office of Watershed Management have taken a number of steps to address fisheries issues in the Swift River. The McLaughlin Fish Hatchery's main concerns are related to summer spill water temperature, ramping rates of the extra flows required by the Army Corps permit, and very high flood flow impacts on their river intake. These steps include:

1. Implementation, in the early 1990s, of continuous 24-hour discharges from Quabbin into Swift River all year round, instead of higher releases for 5-7 hour periods.

2. Revision of MWRA operations to more slowly ramp up the higher volume controlled discharges made in the summer months, in response to a request of the Division of Fisheries and Wildlife.
3. Consideration is made to Fish Hatchery concerns regarding warm water spills in reservoir operating procedures. These procedures consider the placement of stoplogs in Quabbin's lower spillway structure to increase reservoir elevation and decrease spills and increases in cold-water discharges at the dam to offset the warmer surface spillway discharges. These actions usually take place over a short time period with daily discussions between Fish Hatchery and DCR Office of Watershed Management staff.
4. DCR Office of Watershed Management has offered assistance and personnel to design or implement habitat improvements and modifications on the Swift River, in response to suggestions by others that placing sediment and rocks in strategic areas may benefit fish habitat. DCR has also received a state grant to construct a walkway bridge over the upper reach of the Swift River above the "Y Pool" to improve access for fishermen.

MWRA has also made a number of improvements at the Wachusett Dam related to downstream releases. At the request of the Nashua River Watershed Association, MWRA has decreased the ramp-up rate for extra discharges made as an indirect result of water supply quality considerations or for flood control purposes. MWRA has also replaced the valves at the base of the dam to provide better operational control. Since their replacement, planned releases to the South Branch of the Nashua River, particularly in the spring and early summer, have greatly exceeded the minimum flow requirements. Average discharges from 2001 through 2006 were 21 times the minimum requirement.

Hydropower

A hydropower turbine was in use at the Winsor Dam until 1991, when it was damaged by a fire. The 1997 Normandeau study was commissioned to determine suitable flow levels for fisheries during drought periods as this information would directly impact the feasibility of generating hydropower while maintaining a trout fishery. However, no action was taken to re-implement the hydropower production and according to MWRA there are no plans at this time to reactivate the hydropower station at the Winsor Dam. The addition of the proposed communities to the MWRA system would not likely have any impact on hydropower at the Winsor Dam nor on any downstream hydropower facilities.

Recreation

Aside from the sport fishery addressed above, there is some boating recreation on the impoundments in Bondsville and it has been suggested that the South Nashua River may be boatable under certain flow conditions. Again, these uses will not be affected because operation of Quabbin and Wachusett reservoirs will not change with the Wilmington transfer.

Wetlands
Other than the Quabbin Reservoir itself, the only significant wetland in the Chicopee River basin that could be affected by the transfer is in Ware, along the Swift River. The area is 70 acres of open water impounded by a dam in Bondsville. Because this area is open water and is part of the river, current minimum flow requirements appear to be adequate to protect the wetland area.

Summary of Reasonable Instream Flow Analysis
The analyses of release data indicate there will be no change in the operation of the Quabbin and Wachusett Reservoirs in response to the proposed Wilmington transfer or other communities proposing to join the MWRA water system included in the analysis. Downstream flows will continue to meet all applicable permit and regulatory requirements. Current resources will be unaffected by the transfer. The Commission recognizes that current conditions represent a highly engineered environment. Modifications to the timing and magnitude of releases to the Nashua River (i.e., intermediate flows) may be beneficial to the downstream aquatic habitat. The Secretary of EOEA has instructed the WRC to address the instream flow needs of the Ware, Swift, and Nashua River basins during its review of projects under the Interbasin Transfer Act and as part of the ongoing dialogue among MWRA, DFG, WRC and other stakeholders. This Decision attempts to address the balance between water supply needs and aquatic habitat needs of flow, water quality and water temperature in the Swift, Ware, and Nashua Rivers.

Criterion #6 Groundwater/Pumping Test
This criterion is not applicable to this proposal. MWRA's sources are surface water sources.

Criterion #7 Local Water Resources Management Plan
In June 2006, Wilmington submitted a Supplemental Final Comprehensive Water Resources Management Plan/Environmental Impact Report. (SFEIR). This report concludes the Town's water resources planning process, which started prior to 1999. This planning process addresses wastewater, stormwater and water supply issues within Wilmington. The SFEIR outlines the chapters of the Comprehensive Water Resources Management Plan reports which discuss the issues required to be addressed in a Local Water Resources Management Plan. These reports address the issues identified in the 1999 Interbasin Transfer Act Performance Standards, Appendix B, Local Water Resources Management Plan Outline. Therefore on June 14, 2007, the WRC approved Wilmington's Local Water Resources Management Plan, with the condition that the entire CWMP/EIR and other documents used in the ITA process be placed in a location that will be easily accessible to other town departments, boards and commissions. The Water Department should advertise the availability of these documents to these town agencies.

OTHER ISSUES CONSIDERED
The Secretary's Certificate on the SFEIR stated that numerous comments had been received through the MEPA process requesting regular monitoring of the Martins Brook

Aquifer area in Wilmington, and the use of permanent streamflow gages to help monitor the impacts of Wilmington's sewering, stormwater and water supply plan on headwater tributary streams to the Ipswich River. In the Certificate, the Secretary asked that DEP and the Water Resources Commission include this issue in their respective Water Management Act permit and Interbasin Transfer Act approval review processes for this project. The WRC believes that this issue is more appropriately addressed in the Water Management Act process, since the criteria for approval outlined in the Interbasin Transfer Act and regulations do not address streamflow impacts as a result of existing sources in the receiving basins. The WRC supports DEP's efforts in addressing Ipswich River basin issues in Wilmington's WMA permit. The appeal of the permit amendment issued in 2003 is pending, as of the date of this Decision. However all permits within the Ipswich River Basin, including Wilmington's, will expire in 2009.

EO 385

This Decision is consistent with Executive Order 385, which has the dual objective of resource protection and sustainable development. This Decision does not encourage growth in areas without adequate infrastructure nor does it cause a loss of environmental quality or resources.

CONDITIONS OF THE WRC DECISION

Based on the analyses and concerns expressed about this project, the approval of Wilmington's application under the Interbasin Transfer Act, as proposed, for admission to the MWRA Waterworks System is subject to the following conditions. **Wilmington must commit in writing to abide by any conditions required by the approval of this transfer.**

In order to demonstrate compliance with Criterion #2 that all reasonable efforts have been made to identify and develop all viable sources in the receiving area of the proposed interbasin transfer.

1. Wilmington must consult with WRC Staff if it intends to revise its source management plan in such a way that it results in using more MWRA water than has been approved under this review. Any increase in purchase from the MWRA over the approved 620.5 mgy will require additional WRC approval under the ITA. In addition, Wilmington must notify the WRC of any system changes, including those in infrastructure or operation, which could allow the Town to increase its rate of interbasin transfer.
2. If in the future, the Maple Meadow Brook Aquifer wells are rehabilitated, or if any additional in-basin sources of water are developed, Wilmington, or the proponent of use of this water supply, must notify the WRC for consideration of the implications of this in-basin water availability on this Interbasin Transfer Act approval.
3. Wilmington must work with DEP to condition its Water Management Act permit so that the amount permitted is distributed between its own local sources and MWRA.

In order to fully comply with Criterion #3, that all practical measures to conserve water have been taken in the receiving area:

1. Wilmington must continue effective demand management programs that meet the Interbasin Transfer Performance Standards for Criterion #3, Water Conservation.
2. Wilmington must provide the DEP Annual Statistical Reports to the WRC for the first five (5) years after the town begins to receive MWRA water, to determine if the programs in place are successful in keeping unaccounted-for water at or below 10% and residential gallons per capita per day (gpcd) at 65 or less and to confirm that the interbasin transfer from MWRA to Wilmington meets the annual limit of 620.5 million gallons. After the five year period, Wilmington will provide these reports on request of the WRC Staff.
3. If the amount of unaccounted-for water increases to greater than 10%, Wilmington must either provide an explanation of why this has occurred (e.g. water main break, large fire, etc.) or provide a plan, for WRC approval, to reduce unaccounted-for water to acceptable levels.
4. If per capita residential water use increases above 65 gpd, the Town must implement a comprehensive residential conservation program that seeks to reduce residential water use through a retrofit, rebate or other similarly effective program for encouraging installation of household water saving devices, including faucet aerators, showerheads and toilets and through efforts to reduce excessive outdoor water use, including the imposition of seasonal water use rates and other measures. If this occurs, the Town must provide a plan for this program to the WRC for approval.
5. Wilmington must provide a copy of the completed rate study, a description of the conservation rate structure proposed to be adopted, and documentation that it has been implemented, before it can begin to receive water from the MWRA. The adopted rate structure shall conform to the rate structures described in the Water Conservation Standards for the Commonwealth of Massachusetts.
6. Wilmington must provide a plan to increase its enforcement of contractor hydrant use and a timetable for implementation by September 1, 2007.
7. Wilmington must update its water conservation plan to reflect 2006 edition of the Water Conservation Standards for the Commonwealth of Massachusetts. This revised plan must be submitted to WRC Staff within a year of the approval of this transfer.
8. The Calendar Trigger restrictions on outdoor water use must remain in effect at least until the Administrative Law Judge issues a ruling on the Wilmington WMA permit appeal. If this ruling is silent on outdoor water use restrictions, the Calendar Trigger restrictions shall remain in effect until they are superseded by any subsequent WMA permit restrictions issued by DEP.

In order to fully comply with Criterion #7, that the communities and districts in the receiving area have adopted or are actively engaged in developing a local water resources management plan.

1. The entire CWMP/EIR and other documents used in the ITA process must be placed in a location that will be easily accessible to other town departments,

boards and commissions. The Water Department should advertise the availability of these documents to these town agencies.