



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

December 5, 2016

Kingston Board of Water Commissioners
22 Elm Street
Kingston, MA 02364

RE: **KINGSTON – BRP/WMA**
Kingston Water Department
PWS ID # 4145000
FINAL Water Management Act Renewed
Permit #9P-4-21-145.01

Dear Commissioners:

Please find attached the following:

- Findings of Fact in Support of the FINAL Renewed Permit and;
- FINAL Renewed Water Management Act Permit # 9P-4-21-145.01 for the Town of Kingston, Massachusetts.

If you have any questions concerning this letter, please contact Richard Friend at 617-654-6522 or e-mail at richard.friend@state.ma.us.

Sincerely,

Rebecca Weidman
Director, Division of Watershed Management
Bureau of Water Resources

Y:\DWP Archive\SERO\2016\Kingston-FINAL WMA Renewed Permit 9P4-21-145-01 2016-12-05

Y:\DWPWMA\PermitRenewals\South Coastal\ Kingston Final WMA Renewed Permit 9P4-21-145-01 2016-12-05

cc: Richard Loring, Kingston Water Commission
Mathew Darsch, Kingston Water Dept.

Ecc: Michelle Cradock, DFW
Duane LeVangie, DEP
Kristen Berger, CEI
Jen Pederson, MWWA
Julia Blatt, Mass Rivers Alliance
Pine Dubois, Jones River Watershed Assoc.

Communication For Non-English Speaking Parties - 310 CMR 1.03(5)(a)

Contact the MassDEP Diversity Office at 617-556-1161. TTY# MassRelay Service 1-800-439-2370. <http://www.mass.gov/eea/agencies/massdep/service/justice/> (Version 3.30.15)



1 English:

This document is important and should be translated immediately. If you need this document translated, please contact MassDEP's Diversity Director at the telephone numbers listed below.



2 Español (Spanish):

Este documento es importante y debe ser traducido inmediatamente. Si necesita este documento traducido, por favor póngase en contacto con el Director de Diversidad MassDEP a los números de teléfono que aparecen más abajo.



3 Português (Portuguese):

Este documento é importante e deve ser traduzida imediatamente. Se você precisa deste documento traduzido, por favor, entre em contato com Diretor de Diversidade da MassDEP para os números de telefone listados abaixo.



4(a) 中國（傳統）(Chinese (Traditional)):

本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼與 MassDEP 的多樣性總監聯繫。



4(b) 中国（简体中文）(Chinese (Simplified)):

本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼與 MassDEP 的多样性总监联系。



5 Ayisyen (franse kreyòl) (Haitian) (French Creole):

Dokiman sa-a se yon bagay enpòtan epi yo ta dwe tradui imedyatman. Si ou bezwen dokiman sa a tradui, tanpri kontakte Divèsite Direktè MassDEP a nan nimewo telefòn ki nan lis pi ba a.



6 Việt (Vietnamese):

Tài liệu này là rất quan trọng và cần được dịch ngay lập tức. Nếu bạn cần dịch tài liệu này, xin vui lòng liên hệ với Giám đốc MassDEP đa dạng tại các số điện thoại được liệt kê dưới đây.



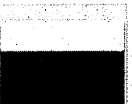
7 ព្រះរាជាណាចក្រកម្ពុជា (Kmer (Cambodian)):

ឯកសារនេះមានសារៈសំខាន់ណាស់ត្រូវបានបកប្រែភាសាប្រសិនបើអ្នកត្រូវបានបកប្រែឯកសារនេះសូមទំនាក់ទំនងទៅលេខកូដជាមួយ MassDEP នៅលេខទូរស័ព្ទដទៃទៀតបានរាយនាមខាងក្រោម។



8 Kriolu Kabuverdianu (Cape Verdean):

Es documento é importante e deve ser traduzido imidiatamente. Se bo precisa des documento traduzido, por favor contacta Director de Diversidade na MassDEP's pa es numero indicode li d'boche.



9 Русский язык (Russian):

Этот документ является важным и должно быть переведено сразу. Если вам нужен этот документ переведенный, пожалуйста, свяжитесь с директором разнообразия MassDEP по адресу телефонных номеров, указанных ниже.



10 العربية (Arabic):

هذه الوثيقة الهامة وينبغي أن تترجم على الفور. إذا كنت بحاجة إلى هذه الوثيقة المترجمة، يرجى الاتصال مدير التنوع في MassDEP على أرقام الهواتف المدرجة أدناه.

Communication For Non-English Speaking Parties - 310 CMR 1.03(5)(a)

Contact the MassDEP Diversity Office at 617-556-1161. TTY# MassRelay Service 1-800-439-2370. <http://www.mass.gov/eea/agencies/massdep/service/justice/> (Version 3.30.15)



11 한국어 (Korean):

이 문서는 중요하고 즉시 번역해야 합니다. 당신이 번역이 문서가 필요하다면 아래의 전화 번호로 MassDEP의 다양성 감독에 문의하시기 바랍니다.



12 հայերեն (Armenian):

Այս փաստաթուղթը շատ կարևոր է եւ պետք է թարգմանել անմիջապես. եթե Ձեզ անհրաժեշտ է այս փաստաթուղթը թարգմանվել դիմել MassDEP բազմազանությունը տնօրեն է հեռախոսահամարների թվարկված են ստորև.



13 فارسی (Farsi (Persian):

این سند مهم است و باید فوراً ترجمه شده است. اگر شما نیاز به این سند ترجمه شده، لطفاً با ما تماس تنوع مدیر MassDEP در شماره تلفن های ذکر شده در زیر.



14 Français (French):

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15 Deutsch (German):

Dieses Dokument ist wichtig und sollte sofort übersetzt werden. Wenn Sie dieses Dokument übersetzt benötigen, wenden Sie sich bitte Diversity Director MassDEP die in den unten aufgeführten Telefonnummern.



16 Ελληνική (Greek):

Το έγγραφο αυτό είναι σημαντικό και θα πρέπει να μεταφραστούν αμέσως. Αν χρειάζεστε αυτό το έγγραφο μεταφράζεται, παρακαλούμε επικοινωνήστε Diversity Director MassDEP κατά τους αριθμούς τηλεφώνου που αναγράφεται πιο κάτω.



17 Italiano (Italian):

Questo documento è importante e dovrebbe essere tradotto immediatamente. Se avete bisogno di questo documento tradotto, si prega di contattare la diversità Direttore di MassDEP ai numeri di telefono elencati di seguito.



18 Język Polski (Polish):

Dokument ten jest ważny i powinien być natychmiast przetłumaczony. Jeśli potrzebujesz tego dokumentu tłumaczone, prosimy o kontakt z Dyrektorem MassDEP w różnorodności na numery telefonów wymienionych poniżej.



19 हिन्दी (Hindi):

यह दस्तावेज़ महत्वपूर्ण है और तुरंत अनुवाद किया जाना चाहिए. आप अनुवाद इस दस्तावेज़ की जरूरत है, नीचे सूचीबद्ध फोन नंबरों पर MassDEP की विविधता निदेशक से संपर्क करें.



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FINAL Findings of Fact in Support of FINAL Water Management Permit #9P421145.01 Town of Kingston

The Department of Environmental Protection (the Department) makes the following Findings of Fact in support of the attached FINAL Water Management Permit #9P4-21-145.01, and includes herewith its reasons for issuing the permit and for conditions of approval imposed, as required by M.G.L. c. 21G, § 11. The issuance of this permit is in response to a water withdrawal permit renewal application by the Town of Kingston Water Department, (Kingston) for the purpose of public water supply.

The Department adopted revised Water Management Regulations at 310 CMR 36.00 on November 7, 2014, (described in greater detail below). Since that time, the Department has been working closely with each Water Management Act (WMA) permittee to fully consider all aspects of their individual situations and ensure thoughtful and implementable permits.

The Department met with Kingston's representatives regarding the conditions in this permit and, in particular, the lowering of Kingston's performance standards from 80 gal/day/capita RGPCD and 15% UAW to 65 gal/day/capita and 10% UAW and the implementation of mandatory non-essential water use restrictions.

The Permit Extensions

WMA permits issued during the first 20-year permitting cycle for the South Coastal Basin expired on August 31, 2010. All permittees seeking to renew their Water Management permit were required to file a renewal application on or before May 31, 2010. Kingston filed a timely renewal application and received a one-year Interim Permit, to August 31, 2011, to continue operations while the permit renewal review was ongoing. The Department published notice of the permit renewal application in the Environmental Monitor on June 23, 2010. No comments were received.

Subsequently, the expiration dates for all Water Management permits were extended for four years by Chapter 240 of the Acts of 2010 as amended by Chapter 238 of the Acts of 2012, collectively known as the Permit Extension Act. In addition, in a letter of September 25, 2015, the Department informed Kingston that the Department would need additional time before making a determination on the application in order to ensure that all permit renewal applicants in the South Coastal Basin fully understood the new Water Management Regulations (discussed below), and to give proper consideration to all permit renewal applications within the basin. Pursuant to M.G.L. c. 30A, § 13, and 310 CMR 36.18(7), Kingston's permit continues in force and effect until the Department issues a final decision on the permit renewal application.

The expiration date for all permits going forward in the South Coastal Basin will be August 31, 2030, in order to restore the staggered permitting schedule set forth in the regulations.

The Water Management Act (M.G.L. c. 21G)

The Water Management Act (Act) requires the Department to issue permits that balance a variety of factors including without limitation:

- Impact of the withdrawal on other water sources;
- Water available within the safe yield of the water source;
- Reasonable protection of existing water uses, land values, investments and enterprises;
- Proposed use of the water and other existing or projected uses of water from the water source;
- Municipal and Massachusetts Water Resources Commission (WRC) water resource management plans;
- Reasonable conservation consistent with efficient water use;
- Reasonable protection of public drinking water supplies, water quality, wastewater treatment capacity, waste assimilation capacity, groundwater recharge areas, navigation, hydropower resources, water-based recreation, wetland habitat, fish and wildlife, agriculture, flood plains; and
- Reasonable economic development and job creation.

Water Management Regulation Revisions

In 2010 the Executive Office of Energy and Environmental Affairs (EEA) convened the Sustainable Water Management Initiative (SWMI) for the purpose of incorporating the best available science into the management of the Commonwealth's water resources. SWMI was a multi-year process that included a wide range of stakeholders and support from the Departments of Environmental Protection, Fish and Game, and Conservation and Recreation. In November 2012 the *Massachusetts Sustainable Water Management Initiative Framework Summary* (<http://www.mass.gov/eea/docs/eea/water/swmi-framework-nov-2012.pdf>) was released.

On November 7, 2014, the Department adopted revised Water Management Regulations at 310 CMR 36.00 that incorporate elements of the SWMI framework and the Water Conservation Standards adopted by the Massachusetts WRC. The regulations reflect a carefully developed balance to protect the health of Massachusetts' water bodies while meeting the needs of businesses and communities for water.

Without limitation, the Department has incorporated the following into Water Management permitting:

- Safe yield determinations for the major river basins based on a new methodology developed through SWMI (see the Safe Yield in the South Coastal Basin section of this document);
- Water needs forecasts for public water suppliers developed by the Department of Conservation and Recreation, Office of Water Resources (DCR), using a methodology reviewed and approved by the Massachusetts WRC;
- Water supply protection measures for public water supplies including Zone II delineations for groundwater sources, and wellhead and surface water protection measures as required by Massachusetts Drinking Water Regulations (310 CMR 22.00);
- Water conservation and performance standards reviewed and approved by the WRC in July 2006 and revised in June 2012 (<http://www.mass.gov/eea/docs/eea/wrc/water-conservation-standards-rev-june-2012.pdf>), including without limitation:
 - performance standard of 65 residential gallons per capita day or less;
 - performance standard of 10% or less unaccounted-for-water;
 - seasonal limits on nonessential outdoor water use;
 - a water conservation program that includes leak detection and repair, full metering of the system and proper maintenance of the meters, periodic review of pricing, and education and outreach to residents and industrial and commercial water users; and
- Environmental protections developed through SWMI, including without limitation:
 - protection for coldwater fish resources;

- minimization of withdrawal impacts in areas stressed by groundwater use;
- mitigation of the impacts of increasing withdrawals.

Safe Yield in the South Coastal Basin

This permit is being issued under the safe yield methodology adopted by the Department on November 7, 2014, and described in the regulations at 310 CMR 36.13. As of the date of issuance of this permit, the safe yield for the South Coastal Basin is 70.1 million gallons per day (MGD), and total registered and permitted withdrawals are 47.4 MGD, leaving 22.70 MGD potentially available. The maximum withdrawals that will be authorized in this permit, and all other permits currently under review by the Department within the South Coastal Basin, will be within the safe yield and may be further conditioned as outlined in the regulations.

Findings of Fact for Special Permit Conditions in Kingston's Water Management Act Permit

The following Findings of Fact for the special conditions included in the permit generally describe the rationale and background for each special condition in the FINAL permit. This summary of permit special conditions is not intended to, and should not be construed as, modifying any of the permit special conditions. In the event of any ambiguity between this summary and the actual permit conditions, the permit language shall control.

Special Condition 1, Maximum Authorized Annual Average Withdrawal, is based on the Water Needs Forecast prepared by DCR. The WNF projects Kingston's demand rising to 1.47 MGD with a 5% buffer by 2030. If water needs exceed the maximum authorized in this permit, Kingston may apply for additional volume at any time by submitting a new Water Management Permit application BRPWM03.

DCR Water Needs Forecasts for Kingston (MGD) Assuming 65 RGPCD and 10% UAW				
Years	2016-2020	2021-2025	2026-2030	2026-2030 + 5% buffer
DCR Water Needs Forecast	1.28	1.33	1.40	1.47

Special Condition 2, Maximum Authorized Daily Withdrawal Rates reflect the MassDEP-approved Zone II maximum daily pumping rate for Kingston's permitted wells based on prolonged pumping tests and the treatment plant capacity for the surface water source. Withdrawals in excess of these maximum daily rates require approval from the Department.

Kingston has frequently exceeded its individual approved daily pumping rate of the Grassy Hole Well and Well 1-86 in recent years. In its response to the OTC, Kingston stated that it is considering installing equipment and/or controls to prevent this from occurring. Special Condition 2 includes a requirement that Kingston submit to DEP a plan by December 31, 2016 that outlines how and when the town will automate the pumping controls of these two wells to prevent the approved daily rates from being exceeded.

Special Condition 3, Zone II Delineation requirements have been met and no further delineations are required as a condition of this permit.

Special Condition 4, Wellhead Protection requirements have been met and are up to date as of the issuance of this permit.

Special Condition 5, Vernal Pool Monitoring Kingston's previous permit required monitoring to assess potential impact to a vernal pool adjacent to the Trackle Pond well. Kingston has been monitoring groundwater water levels, Trackle Pond well pumping volumes, vernal pool levels and Jones River streamflow per the monitoring plan. In the June 29, 2015 response to the Order to Complete prepared by CEI, Kingston requested that vernal pool monitoring be removed from the permit. Reviewing Kingston's use from this well and understanding that improvements to the distribution system have been made to allow for increased Trackle Pond well pumping, the Department requires that the vernal pool monitoring continue. In 2015 the Trackle Pond well pumped an average annual rate of 0.28 MGD, significantly below the approved daily rate of 1.27 MGD.

Kingston must continue to implement the vernal pool monitoring plan to determine if increased pumping of the Trackle Pond well impacts the vernal pool. Kingston may request that monitoring be revised or eliminated in the future if it demonstrates to MassDEP that pumping the Trackle Pond at higher rates (if this occurs) has no impact to the vernal pool.

Special Condition 6, Performance Standard for Residential Gallons Per Capita Day Water for all PWS permittees is 65 gallons. Permittees that cannot comply within the timeframe in the permit must meet Functional Equivalence requirements outlined in Appendix A. Kingston's 2015 Residential Gallons per Capita Day (RGPCD) was 69.

Special Condition 7, Performance Standard for Unaccounted for Water for all PWS permittees is 10%. Permittees that cannot comply within the timeframe in the permit must meet Functional Equivalence requirements based on the AWWA/IWA Water Audits and Loss Control Programs, Manual of Water Supply Practices M36, as outlined in Appendix B. Kingston's recent DEP-reviewed UAW values were:

2013	2014	2015
9.4%	8.9%	9.8%

Special Condition 8, Seasonal Limits on Nonessential Outdoor Water Use is based upon Kingston's RGPCD for the preceding year, and will be implemented according to either: 1) calendar triggered restrictions; or 2) streamflow triggered restrictions.

1. Calendar triggered restrictions: Restrictions shall be implemented from May 1st through September 30th. Many public water suppliers will find this option easier to implement and enforce than the streamflow triggered approach.

2. Streamflow triggered restrictions: Restrictions shall be implemented at those times when streamflow falls below designated flow triggers measured at an assigned, web-based, real-time U.S. Geologic Survey (USGS) stream gage from May 1st through September 30th. At a minimum, restrictions shall commence when streamflow falls below the trigger for three consecutive days. Once implemented, the restrictions shall remain in place until streamflow at the assigned USGS local stream gage meets or exceeds the trigger streamflow for seven consecutive days.

The basis for streamflow triggers is derived from Aquatic Base Flow (ABF) values calculated by the Sustainable Yield Estimator (SYE)¹ for simulated natural flow applied to the assigned local USGS stream gage. The two-tiered trigger values are based on flow levels that are protective of aquatic habitat for fish spawning during the spring bioperiod, designated with the June ABF; and protective flows for fish rearing and growth during the summer bioperiod, designated with the August ABF trigger. Protective flow levels are derived from index gage flow data which represent the least altered stream flows in Massachusetts, and are further described in the Department of Conservation and Recreation (DCR)² and USGS Index Reports³.

¹ Archfield, S.A., Vogel, R.M., Steeves, P.A., Brandt, S.L., Weiskel, P.K., and Garabedian, S.P., 2010, The Massachusetts Sustainable-Yield Estimator: A decision-support tool to assess water availability at ungaged stream locations in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2009-5227, 41 p. plus CD-ROM. See <http://pubs.usgs.gov/sir/2009/5227/>

² Massachusetts Department of Conservation and Recreation (DCR), 2008 Index Streamflows for Massachusetts, May 2008, Prepared by Office of Water Resources for the Massachusetts Water Resources Commission, 45 p., plus CD-ROM.

³ Armstrong, D.S., Parker, G.W., and Richards, T.A., 2008, Characteristics and classification of least altered streamflows in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2007-5291, 113 p., plus CD-ROM.

If Kingston selects the streamflow approach, it has been assigned the USGS local stream gage of #01105870 –Jones River at Kingston. The local gage streamflow triggers at this site are 25 cubic feet per second (cfs) for May and June, and 16 cfs for July, August and September.

Should the reliability of flow measurement at the Jones River gage be so impaired as to question its accuracy, Permittee may request MassDEP's review and approval to transfer to another gage to trigger restrictions. MassDEP reserves the right to require use of a different gage.

The Low-flow statistic being applied replaces the Massachusetts Drought Management Task Force Drought Declaration previously used to trigger more stringent restrictions on seasonal limits on nonessential outdoor water use. This value, referred to as the "7-day low-flow statistic", is the median value of the annual 7-day low flows for the period of record for the Indian Head gage. The 7 day low-flow statistic for the Jones River at Kingston gage is 7.3 cfs and will limit non-essential outdoor watering to no more than 1 day per week as outlined in Special Condition #8. The 7 day low-flow statistic is expected to respond more quickly to low flow conditions in rivers and streams than did the Drought Management Task Force Drought Declaration.

Special Condition 9, Operational Restriction and Monitoring of Well 1-86

The 2009 WMA permit required Kingston to implement a monitoring plan to assess the impacts of pumping the Grassy Hole Well and Well 1-86 on Smelt Pond and Smelt Brook. A monitoring plan was never implemented, and therefore this permit limits the daily combined pumping of the two wells to the approved daily rate of the Grassy Hole Well (0.864 MGD) until Kingston has developed and implemented a monitoring plan approved by the Department. Annual reporting is required as part of the monitoring plan.

The monitoring plan must focus on the impacts of pumping on Smelt Pond and Smelt Brook. Monitoring locations must be identified and assessed for access (observation wells, Smelt Pond and Foundry Pond levels, and Smelt Brook streamflow measuring locations). Monitoring under various pumping, streamflow and seasonal conditions is necessary to assess the impacts of pumping on surface water features. The two supply wells have never been pumped simultaneously for as long as one month at their combined maximum daily rate of 1.674 MGD. The highest monthly combined rate from 2009 to 2015 was approximately 0.9 MGD (July-Aug 2012, June-Sept 2013, and July-Aug 2014). One year of monitoring prior to the wells being pumped above 0.864 MGD is required to establish baseline conditions. DEP may restrict the combined pumping rate under certain hydrologic and/or seasonal conditions if monitoring indicates unacceptable impacts to surface water when pumping exceeds historical rates.

The Grassy Hole Well and Well 1-86 are located in an area where, under non-pumping conditions, a portion of groundwater may flow directly to the ocean, approximately 7,000 feet to the northeast. Using groundwater level data to more precisely determine the direction of groundwater flow between Smelt Pond and the ocean could indicate that a portion of the groundwater captured by the supply wells would have discharged to the ocean. In this case, the streamflow depletion in Smelt Brook would be a portion of the pumped volume.

Kingston could choose to estimate pumping impacts using a numerical groundwater flow model to simulate groundwater flow, streamflow, pond levels and the impacts of pumping the two wells on Smelt Pond and Smelt Brook. The Department would require the model be calibrated to field-measured groundwater and surface water data. A steady-state simulation would be required to represent average long-term (multi-year) conditions. Transient simulations would be used to assess the impact of pumping up to the maximum combined pumping rate during low-flow periods. If Kingston chooses to create a groundwater model, DEP must approve the plans for a model prior to initiating the study.

Special Condition 10, Water Conservation Requirements, incorporates the Water Conservation Standards for the Commonwealth of Massachusetts reviewed and approved by the WRC in July 2006 and revised in June 2012. (<http://www.mass.gov/eea/docs/eea/wrc/water-conservation-standards-rev-june-2012.pdf>).

Special Condition 11, Requirement to Report Raw and Finished Water Volumes is to assure that the information necessary to evaluate compliance with other permit conditions is accurately reported.

Mitigation

Kingston's baseline withdrawal rate is 1.54 MGD, based on the 2005 actual use plus 5%. This renewed permit authorizes Kingston to withdraw up to 1.47 MGD, and therefore there is no increase above baseline, and no mitigation required.

Minimization

Permittees with groundwater sources in subbasins having August net groundwater depletion (August NGD) of 25% or greater are required to develop a plan to minimize the impacts of their withdrawals. However, because all of Kingston's groundwater sources are in areas where the value for August net groundwater depleted has not been determined, Kingston is not required to prepare a Minimization Plan.

Coldwater Fish Resource Protection was incorporated into the Water Management Regulations in November 2014. Coldwater Fish Resource Protection is not a condition of this permit because Kingston's withdrawals do not impact any waters that MA Division of Fisheries and Wildlife has identified as supporting coldwater fish at this time.

General Permit Conditions – contains general requirements applicable to all WMA permittees.

In the event of any conflict or ambiguity between the preceding Findings and the permit, the permit language shall control.



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FINAL WATER WITHDRAWAL PERMIT MGL c 21G

This renewal of Permit #9P421145.01 is approved pursuant to the Massachusetts Water Management Act (WMA) for the sole purpose of authorizing the withdrawal of a volume of water as stated below and subject to the following special and general conditions. This permit conveys no right in or to any property.

PERMIT NUMBER: 9P-4-21-145.01 **BASIN:** South Coastal

PERMITTEE: Town of Kingston
22 Elm Street
Kingston, MA 02025

EFFECTIVE DATE: December 5, 2016 **EXPIRATION DATE:** August 31, 2030

USE: Public Water Supply **DAYS OF OPERATION:** 365

TYPE AND NUMBER OF WITHDRAWAL POINTS: Groundwater: 2 Surface Water: 0

AUTHORIZED WITHDRAWAL POINTS

Table 1: Withdrawal Point Identification

Source Name	PWS Source ID
Trackle Pond Well	4145000-07G
Well No. 1-86	4145000-08G

SPECIAL CONDITIONS

1. Maximum Authorized Annual Average Withdrawal

This permit authorizes the Town of Kingston to withdraw water from the South Coastal Basin at the rate described in Table 2 below. The volume reflected by this rate is in addition to the 0.99 MGD previously authorized to Kingston under WMA Registration #421145.08. The permitted rate is expressed both as an average daily withdrawal rate (million gallons per day or MGD), and as a total annual withdrawal (million gallons per year or MGy) for each five-year period of the permit term.

Table 2: Authorized Raw Water Withdrawal Rates

Permit Period	Permit		Registration + Permit	
	Daily Average (MGD)	Total Annual (MGY)	Daily Average (MGD)	Total Annual (MGY)
12/5/2016 to 8/31/2020	0.29	105.9	0.99 + 0.29 = 1.28	467.2
9/1/2020 to 8/31/2025	0.34	124.1	0.99 + 0.34 = 1.33	485.5
9/1/2025 to 8/31/2030	0.48	175.2	0.99 + 0.48 = 1.47	536.6

2. Maximum Authorized Daily Withdrawal Rates

Withdrawals from individual sources are not to exceed the approved maximum daily rates listed below without specific advance written approval from the Department. Kingston is required to submit a plan to DEP by December 31, 2016 that outlines how Kingston will install controls and/or equipment to prevent pumping the Grassy Hole Well and Well 1-86 above their approved maximum daily pumping rates.

Table 3: Individual Source Maximum Daily Withdrawal Rates

Source Name	PWS Source ID	Approved Maximum Daily Rate (MGD)
Trackle Pond Well	4145000-07G	1.44 MGD
Well No. 1-86	4145000-08G	0.81 MGD

3. Zone II Wellhead Protection Delineations

Department records show that the Trackle Pond Well and Well No. 1-86 each have an approved Zone II delineation. No further Zone II work is required as a condition of this permit.

4. Wellhead Protection

Department records show that Kingston has implemented municipal controls that comply with Wellhead Protection Regulations at 310 CMR 22.21(2).

5. Vernal Pool Monitoring

Withdrawals from the Trackle Pond well must be managed during the period of time from March through June of each year such that the vernal pool adjacent to the well is not dewatered by withdrawals from the well. Site conditions are to be monitored from March through June of each year. "Site conditions" include water levels in the certified vernal pool adjacent to the Trackle Pond Well, precipitation, and groundwater levels. Observed and recorded site condition data is to be held by the Kingston Water Department in Excel spreadsheet form and correlated with:

- streamflow data in the Jones River from USGS gauging station # 01105870,
- precipitation as measured at a point representative of the watershed of the Jones River, Trackle Pond Well withdrawal rates and periods of operation; and
- water levels in the 2 ½ -inch observation well nearest the Trackle Pond Well which is screened at or near the same depth as the Trackle Pond Well.

Data is to be maintained at the offices of the Kingston Water Department, and shall be available for review by the Department upon request.

6. Performance Standard for Residential Gallons Per Capita Day Water Use

The Town of Kingston's performance standard for residential gallons per capita day (RGPCD) is 65 gallons or less. Kingston shall be in compliance with this standard by December 31, 2018, or, if Kingston does not meet the standard, shall be in compliance with the functional equivalence requirements (Appendix A).

7. Performance Standard for Unaccounted for Water

Kingston's Performance Standard for Unaccounted for Water (UAW) is 10% or less of overall water withdrawal for 2 of the most recent years 3 throughout the permit period. Kingston shall be in compliance with this performance standard by December 31, 2019 or, if Kingston does not meet the standard, shall be in compliance with the functional equivalence requirements (Appendix B).

8. Seasonal Limits on Nonessential Outdoor Water Use

Kingston shall limit nonessential outdoor water use through mandatory restrictions from May 1st through September 30th as outlined in Table 4. Kingston shall be responsible for tracking streamflow and recording and reporting when streamflow triggered restrictions are implemented. See Table 4 **Instructions for Accessing Streamflow Website Information**.

Kingston shall also document compliance with the seasonal limits on nonessential outdoor water use in its Annual Statistical Report (ASR), and shall indicate in the ASR if it anticipates implementing calendar or streamflow triggered restrictions during the next year.

Restricted Nonessential Outdoor Water Uses

Nonessential outdoor water uses that are subject to mandatory restrictions include:

- irrigation of lawns via sprinklers or automatic irrigation systems;
- washing of vehicles, except in a commercial car wash or as necessary for operator safety; and
- washing of exterior building surfaces, parking lots, driveways or sidewalks, except as necessary to apply surface treatments such as paint, preservatives, stucco, pavement or cement.

The following uses may be allowed when mandatory restrictions are in place:

- irrigation to establish a new lawn and new plantings during the months of May and September;
- irrigation of public parks and recreational fields by automatic sprinklers before 9 am and after 5 pm; and
- irrigation of , gardens, flowers and ornamental plants by means of a hand-held hose or a drip irrigation system; and
- irrigation of lawns by means of a hand-held hose.

Water uses NOT subject to mandatory restrictions are those required:

- for health or safety reasons;
- by regulation;
- for the production of food and fiber;
- for the maintenance of livestock; or
- to meet the core functions of a business (for example, irrigation by golf courses as necessary to maintain tees, greens, and minimal fairway watering, or irrigation by plant nurseries as necessary to maintain stock).

Public Notice of Seasonal Nonessential Outdoor Water Use Restrictions

Permittee shall notify its customers of the restrictions and penalties for violating the restrictions.

- For calendar-triggered restrictions, customers shall be notified by April 15th each year.
- For streamflow-triggered restrictions, when streamflow at the assigned USGS local stream gage falls below a streamflow trigger for three consecutive days, customers shall be notified as soon as possible, but within three days of implementing the restrictions.

Notice to customers shall include the following:

- A detailed description of the restrictions and penalties for violating the restrictions;
- The need to limit nonessential outdoor water use to ensure a sustainable drinking water supply and to protect natural resources and streamflow for aquatic life; and
- Ways individual homeowners can limit water use, especially nonessential outdoor water use.

Notice that restrictions have been put in place shall be filed each year with MassDEP within 14 days of the restriction's effective date. Filing shall be in writing on the form "Notification of Water Use Restrictions" available on MassDEP's website. Notice to customers and MassDEP need not be provided if Permittee has already implemented water use restrictions that conform to the applicable restrictions and those restrictions are still in force.

Nothing in the permit shall prevent Kingston from implementing water use restrictions that are more stringent than those set forth in the permit.

Table 4 Nonessential Outdoor Water Use Restrictions

Kingston Water Department shall limit nonessential outdoor water use through mandatory restrictions from May 1st through September 30th as outlined in below. To the extent feasible, all summer outdoor water use should take place before 9 am and after 5 pm when evaporation and evapotranspiration rates are lower.

Restrictions for Permittees meeting the 65 RGPCD Standard for the preceding year

RGPCD \leq 65 as reported in the ASR and accepted by MassDEP

Calendar Triggered Restrictions	<p>Nonessential outdoor water use is restricted to:</p> <ul style="list-style-type: none"> a) seven (7) days per week before 9 am and after 5 pm; and b) one (1) day per week before 9 am and after 5 pm when USGS stream gage 01105870- Jones River at Kingston, MA falls below 7.3 cfs for three (3) consecutive days. <p>Once streamflow triggered restrictions are implemented, they shall remain in place until streamflow at the gage meets or exceeds 7.3 cfs for seven (7) consecutive days.</p>
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Streamflow Triggered Restrictions	<p>Nonessential outdoor water use is restricted to:</p> <ul style="list-style-type: none"> a) seven (7) days per week before 9 am and after 5 pm when USGS stream gage 01105870- Jones River at Kingston, MA falls below: <ul style="list-style-type: none"> • May 1 – June 30: 25 cfs for three (3) consecutive days • July 1 – September 30: 16 cfs for three (3) consecutive days b) one (1) day per week before 9 am and after 5 pm when USGS stream gage 01105870- Jones River at Kingston, MA falls below 7.3 cfs for three (3) consecutive days. <p>Once implemented, the restrictions shall remain in place until streamflow at the gage meets or exceeds the trigger streamflow for seven (7) consecutive days.</p>
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Restrictions for Permittees NOT meeting the 65 RGPCD standard for the preceding year

RGPCD $>$ 65 as reported in the ASR and accepted by MassDEP

Calendar Triggered Restrictions	<p>Nonessential outdoor water use is restricted to:</p> <ul style="list-style-type: none"> a) two (2) days per week before 9 am and after 5 pm; and b) one (1) day per week before 9 am and after 5 pm when USGS stream gage 01105870- Jones River at Kingston, MA falls below 7.3 cfs for three (3) consecutive days. <p>Once streamflow triggered restrictions are implemented, they shall remain in place until streamflow at the gage meets or exceeds 7.3 cfs for seven (7) consecutive days.</p>
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Streamflow Triggered Restrictions	<p>Nonessential outdoor water use is restricted to:</p> <ul style="list-style-type: none"> a) two (2) days per week before 9 am and after 5 pm when USGS stream gage 01105870- Jones River at Kingston, MA falls below: <ul style="list-style-type: none"> • May 1 – June 30: 25 cfs for three (3) consecutive days • July 1 – September 30: 16 cfs for three (3) consecutive days b) one (1) day per week before 9 am and after 5 pm when USGS stream gage 01105870- Jones River at Kingston, MA falls below 7.3 cfs for three (3) consecutive days. <p>Once implemented, the restrictions shall remain in place until streamflow at the gage meets or exceeds the trigger streamflow for seven (7) consecutive days.</p>
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Instructions for Accessing Streamflow Website Information

If the Permittee chooses Streamflow Triggered Restrictions, the Permittee shall be responsible for tracking streamflows and recording and reporting to MassDEP when restrictions are implemented.

Streamflow information is available at the USGS National Water Information System (NWIS): Web Interface. The USGS NWIS default shows Massachusetts streamflows in real time, i.e., the most recent, usually quarterly hourly, reading made at each USGS stream gage.

Seasonal Nonessential Outdoor Water Use Restrictions are implemented when the mean daily streamflow falls below the designated trigger. The mean daily flow is not calculated until after midnight each day when the USGS computes the hourly data into a mean daily streamflow. As a result, permittees must use the mean daily streamflow from the preceding day when tracking streamflows.

Mean daily streamflow gage readings are available at the USGS NWIS Web Interface at:
<http://waterdata.usgs.gov/ma/nwis/current/?type=flow>.

- Scroll down to 01105870- Jones River at Kingston, MA
- Click on the gage number.
- Scroll down to "Provisional Date Subject to Revision – Available data for this site" and click on the drop down menu.
- Click on "Time-series: Daily data" and hit GO.
- Scroll down to the "Available Parameters" box. Within the box, be sure "Discharge (mean)" is checked, then, under "Output Format" click "Table" and hit GO.
- Scroll down to "Daily Mean Discharge, cubic feet per second" table and find the current date on the table.
- Compare the cubic feet per second (cfs) measurement shown on the table to the cfs shown under Streamflow Triggered Restrictions above.

Kingston shall document compliance with the Seasonal Nonessential Outdoor Water Use Restrictions annually in its Annual Statistical Report (ASR), and indicate whether it anticipates implementing calendar triggered restrictions or streamflow triggered restrictions during the next year.

9. Operational Restriction and Monitoring of Well 1-86

The combined daily pumping rate of the Grassy Hole Well and Well 1-86 shall not exceed the approved daily pumping rate of the Grassy Hole Well (0.864 MGD) until Kingston has implemented a monitoring plan approved by DEP and has conducted monitoring for at least one year to establish baseline conditions.

Kingston shall monitor groundwater and surface water to assess the potential impacts to Smelt Pond and Smelt Brook from the combined pumping of the Grassy Hole Well and Well 1-86. Kingston shall submit a monitoring plan to DEP for review and approval that contains map(s) and schedule(s) of locations to be monitored and a description of measurement methodologies (for example manual groundwater level measurements, data loggers, in-situ flow measurements, weir flow measurements, etc.). At a minimum, monitoring points shall include water levels in Smelt Pond, Smelt Brook, and Foundry Pond and in observation wells in the area influenced by pumping. Measurement frequency shall be sufficient to correlate with the daily pumping records of the Grassy Hole and Well 1-86 supply wells. Annual monitoring reports shall include tables and graphs depicting monitoring data and pumping volumes, and written analysis describing Kingston's assessment of impacts to Smelt Pond and Smelt Brook from pumping the Grassy Hole Well and Well 1-86.

If the monitoring indicates unacceptable impacts to surface water, MassDEP may restrict the combined pumping of the Grassy Hole Well and Well 1-86 to less than their combined approved daily rate under certain hydrologic and/or seasonal conditions. If MassDEP imposes pumping restrictions, it would not be

until after the wells have been pumped at sufficiently high enough rates during at least one low-flow period of several months duration that impacts of combined pumping during low-flow conditions could be assessed.

10. **Water Conservation Requirements**

At a minimum, Kingston shall implement conservation measures listed in Table 5. The Department recognizes that Kingston is currently implementing a number of these requirements. Compliance with the water conservation requirements shall be reported to the Department upon request unless otherwise noted below.

Table 5: Minimum Water Conservation Requirements	
Leak Detection	
1.	At a minimum, conduct a full leak detection survey every three years. See also Special Condition 7.
2.	Conduct leak detection of the entire distribution system within one year whenever the percentage of UAW increases by 5% or more (for example an increase from 3% to 8%) over the percentage reported on the ASR for the prior calendar year. Within 60 days of completing the leak detection survey, submit to the Department a report detailing the survey, any leaks uncovered as a result of the survey or otherwise, dates of repair and the estimated water savings as a result of the repairs.
3.	Conduct field surveys for leaks and repair programs in accordance with the <u>AWWA Manual 36</u> .
4.	Kingston shall have repair reports available for inspection by the Department. Kingston shall establish a schedule for repairing leaks that is at least as stringent as the following: <ul style="list-style-type: none"> Leaks of 3 gallons per minute or more shall be repaired within 3 months of detection. Leaks of less than 3 gallons per minute at hydrants and appurtenances shall be repaired as soon as possible. Leaks of less than 3 gallons per minute shall be repaired in a timely manner, but in no event more than 6 months from detection, except that leaks in freeway, arterial or collector roadways shall be repaired when other roadwork is being performed on the roadway. <p>Leaks shall be repaired in accordance with Kingston's priority schedule including leaks up to the property line, curb stop or service meter, as applicable. Kingston shall have water use regulations in place that require property owners to expeditiously repair leaks on their property.</p>
Metering	
1.	Calibrate all source and finished water meters at least annually and report date of calibration on the ASR.
2.	Kingston reports its system is 100% metered. All water distribution system users shall have properly sized service lines and meters that meet AWWA calibration and accuracy performance standards as set forth in <u>AWWA Manual M6 – Water Meters</u> .
3.	Kingston shall have an ongoing program to inspect individual service meters to ensure that all service meters accurately measure the volume of water used by your customers. The metering program shall include regular meter maintenance, including testing, calibration, repair, replacement and checks for tampering to identify and correct illegal connections. The plan shall continue to include placement of sufficient funds in the annual budget to calibrate, repair, or replace meters as necessary.
Pricing	
1.	Kingston shall maintain a water pricing structure that includes the full cost of operating the water supply system. Kingston shall evaluate rates at a minimum every three to five years and adjust costs as needed. Full cost pricing factors all costs - operations, maintenance, capital, and indirect costs (environmental impacts, watershed protection) - into prices.
2.	Kingston shall not use decreasing block rates. Decreasing block rates which charge lower prices as water use increases during the billing period, are not allowed by M.G.L. Chapter 40 Section 39L.

Table 5: Minimum Water Conservation Requirements	
Residential and Public Sector Conservation	
1.	Kingston shall meet the standards set forth in the Federal Energy Policy Act, 1992 and the Massachusetts Plumbing Code.
2.	Kingston shall meter or estimate water used by contractors using fire hydrants for pipe flushing and construction.
3.	Kingston must inventory all municipally owned public buildings within their service and provide a plan to retrofit these buildings with water saving devices by six months from the date of permit issuance, provided that it is cost effective. Kingston shall continue to ensure that water saving devices are installed in all municipal buildings as they are renovated, and shall ensure water conserving fixtures and landscaping practices are incorporated into the design of new municipal capital projects.
4.	Kingston shall contact the largest residential users of water to discuss how these customers can lower their water usage, especially for irrigation. Kingston shall report to DEP on the results of this outreach by six months from the date of permit issuance including a list of identified large water users, and any progress made toward reducing their water use.
Industrial and Commercial Water Conservation	
1.	Kingston shall ensure water conservation practices in all development proposals, particularly low flow devices and water-wise landscaping practices.
2.	Kingston shall contact the largest industrial and commercial users of water to discuss how these customers can lower their indoor and outdoor water usage. Kingston shall report to DEP on the results of this outreach by six months from the date of permit issuance, including a list of identified large water users, and any progress made toward reducing their water use.
Public Education and Outreach	
1.	Kingston shall continue to implement its water conservation and education efforts designed to educate the Town's water customers on ways to conserve water. Without limitation, Kingston's plan may include the following actions: <ul style="list-style-type: none"> ○ Include in bill stuffers and/or bills, a work sheet to enable customers to track water use and conservation efforts and estimate the dollar savings; ○ Public space advertising/media stories on successes (and failures); ○ Conservation information centers perhaps run jointly with electric or gas company; ○ Speakers for community organizations; ○ Public service announcements; radio/T.V./audio-visual presentations; ○ Joint advertising with hardware stores to promote conservation devices; ○ Use of civic and professional organization resources; ○ Special events such as Conservation Fairs; ○ Develop materials that are targeted to schools with media that appeals to children, including materials on water resource projects and field trips; and ○ Provide multilingual materials as needed.
2.	Upon request of the Department, the Town of Kingston shall report on its public education and outreach effort, including a summary of activities developed for specific target audiences, any events or activities sponsored to promote water conservation and copies of written materials.

11. Requirement to Report Raw and Finished Water Volumes

Kingston shall report on its ASR the raw and finished water volumes for each water withdrawal point and for the entire water system.

GENERAL CONDITIONS (applicable to all permittees)

1. **Duty to Comply** The permittee shall comply at all times with the terms and conditions of this permit, the Act and all applicable State and Federal statutes and regulations.
2. **Operation and Maintenance** The permittee shall at all times properly operate and maintain all facilities and equipment installed or used to withdraw up to the authorized volume so as not to impair the purposes and interests of the Act.
3. **Entry and Inspections** The permittee or the permittee's agent shall allow personnel or authorized agents or employees of the Department to enter and examine any property for the purpose of determining compliance with this permit, the Act or the regulations published pursuant thereto, upon presentation of proper identification and an oral statement of purpose.
4. **Water Emergency** Withdrawal volumes authorized by this permit are subject to restriction in any water emergency declared by the Department pursuant to MGL c 21G ss 15-17, MGL c 150 ss 111, or any other enabling authority.
5. **Transfer of Permits** This permit shall not be transferred in whole or in part unless and until the Department approves such transfer in writing, pursuant to a transfer application on forms provided by the Department requesting such approval and received by the Department at least thirty (30) days before the effective date of the proposed transfer. No transfer application shall be deemed filed unless it is accompanied by the applicable transfer fee established by 310 CMR 36.33.
6. **Duty to Report** **Duty to Report The Permittee** shall submit annually a certified statement of withdrawal, as specified on a form provided by the Department. The form must be received by the date specified by the Department.
7. **Duty to Maintain Records** The permittee shall be responsible for maintaining withdrawal records in sufficient detail to assess compliance with the conditions of this permit.
8. **Metering** Withdrawal points shall be metered. Meters shall be calibrated annually. Meters shall be maintained and replaced as necessary to ensure the accuracy of the withdrawal records.
9. **Right to Amend, Suspend or Terminate** The Department may amend, suspend or terminate the permit in accordance with M.G.L. c. 21G and 310 CMR 36.29.

APPEAL RIGHTS AND TIME LIMITS

This permit is a decision of the Department. Any person aggrieved by this decision may request an adjudicatory hearing as described herein and in accordance with the procedures described at 310 CMR 36.37. Any such request must be made in writing, by certified mail or hand delivered and received by the Department within twenty-one (21) days of the date of receipt of this permit. The hearing request, including proof of payment of the filing fee, must be mailed to:

Case Administrator
MassDEP Office of Appeals and Dispute Resolution
One Winter Street
Boston, MA 02108

No request for an appeal of this permit shall be validly filed unless a copy of the request is sent by certified mail, or delivered by hand to the local water resources management official in the community in which the withdrawal point is located; and for any person appealing this decision, who is not the applicant, unless such person notifies the permit applicant of the appeal in writing by certified mail or by hand within five (5) days of mailing the appeal to the Department.

CONTENTS OF HEARING REQUEST

310 CMR 1.01(6)(b) requires the request to include a clear and concise statement of the facts which are the grounds for the request and the relief sought. In addition, the request must include a statement of the reasons why the decision of the Department is not consistent with applicable rules and regulations, and for any person appealing this decision who is not the applicant, a clear and concise statement of how that person is aggrieved by the issuance of this permit.

FILING FEE AND ADDRESS

The Department's fee transmittal form, together with a valid check, payable to the Commonwealth of Massachusetts in the amount of \$100 must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

The request shall be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below.

EXEMPTIONS

The filing fee is not required if the appellant is a city or town (or municipal agency), county, district of the Commonwealth of Massachusetts, or a municipal housing authority.

WAIVER

The Department may waive the adjudicatory hearing filing fee for any person who demonstrates to the satisfaction of the Department that the fee will create an undue financial hardship. A person, seeking a waiver must file, together with the hearing request, an affidavit setting forth the facts which support the claim of undue hardship.



Rebecca Weidman, Director
Division of Watershed Management
Bureau of Water Resources

12/5/16
Date

Appendix A – Functional Equivalence with the 65 Residential Gallons Per Capita Day Performance Standard

MassDEP will consider PWS permittees who cannot meet the 65 RGPCD performance standard to be functionally equivalent, and in compliance with their permit, if they have an on-going program in place that ensures “best practices” for controlling residential water use as described below.

If the permittee fails to document compliance with the RGPCD performance standard in its 2018 Annual Statistical Report (ASR), or in any ASR thereafter, then the permittee must file with that ASR a Residential Gallons Per Capita Day Compliance Plan (RGPCD Plan) which shall include, at a minimum:

1. A description of the actions taken during the prior calendar year to meet the performance standard;
2. An analysis of the cause of the failure to meet the performance standard;
3. A description of the actions that will be taken to meet the performance standard which must include, at a minimum, at least one of the following:
 - a) a program that provides water saving devices such as faucet aerators and low flow shower heads at cost;
 - b) a program that provides rebates or other incentives for the purchase of low water use appliances (washing machines, dishwashers, and toilets), or
 - c) the adoption and enforcement of an ordinance, by-law or regulation to require the installation of moisture sensors or similar climate related control technology on all automatic irrigation systems;and may include, without limitation, the following:
 - d) the use of an increasing block water rate or a seasonal water rate structure as a tool to encourage water conservation;
 - e) a program that provides rebates or other incentives for the installation of moisture sensors or similar climate related control technology on automatic irrigation systems;
 - f) the adoption and enforcement of an ordinance, by-law or regulation to require that all new construction include water saving devices and low water use appliances;
 - g) the adoption and enforcement of an ordinance, by-law or regulation to require that all new construction minimize lawn area and/or irrigated lawn area, maximize the use of drought resistant landscaping, and maximize the use of top soil with a high water retention rate;
 - h) the implementation of a program to encourage the use of cisterns or rain barrels for outside watering;
 - i) the implementation of monthly or quarterly billing.
4. A schedule for implementation; and
5. An analysis of how the planned actions will address the specific circumstances that resulted in the failure to meet the performance standard.

If the permittee is already implementing one or more of these programs, it must include in its RGPCD plan the continued implementation of such program(s), as well as implementation of at least one additional program. All programs must include a public information component designed to inform customers of the program and to encourage participation in the program.

RGPCD plans may be amended to revise the actions that will be taken to meet the performance standard. Amended RGPCD plans must include the information set forth above.

If a RGPCD plan is required, the permittee must:

1. submit information and supporting documentation sufficient to demonstrate compliance with its RGPCD plan annually at the time it files its ASR, and
2. continue to implement the RGPCD plan until it complies with the performance standard and such compliance is documented in the permittee’s ASR for the calendar year in which the standard is met.

Appendix B – Functional Equivalence with the 10% Unaccounted for Water Performance Standard

MassDEP will consider PWS permittees who cannot meet the 10% UAW performance standard to be functionally equivalent, and in compliance with their permit, if they have an on-going program in place that ensures “best practices” for controlling water loss. The water loss control program will be based on annual water audits and guidance as described in the *AWWA/IWA Manual of Water Supply Practices – M36, Water Audits and Loss Control Programs* (AWWA M36).

If, as of December 31, 2019, the permittee fails to document compliance with the Unaccounted for Water performance standard (UAW of 10% or less for 2 of the 3 most recent years throughout the permit period), then the permittee shall develop and implement a water loss control program following the *AWWA M36 Water Audits and Loss Control Programs* within 5 full calendar years.

1. Conduct an annual “top down” water audit, calculate the data validity level/score using AWWA Water Loss Control Committee’s Free Water Audit Software, and submit the AWWA WLCC Free Water Audit Software: Reporting Worksheet and data validity score annually with its Annual Statistical Report (ASR).
 - If a PWS’s data validity level/score is less than Level III (51-70), steps recommended through the audit(s) shall be taken to improve the reliability of the data prior to developing a long-term program to reduce real and apparent water losses.
 - Data with a validity score of 50 or less are considered too weak to be used to develop a component analysis or for infrastructure planning and maintenance.
 - Developing data with an acceptably strong validity score can be a multi-year process.
2. When the data validity score meets the Level III (51-70) requirement, the permittee shall conduct a component analysis to identify causes of real and apparent water loss and develop a program to control losses based on the results of the component analysis. The Permittee shall submit the component analysis and water loss control program with a proposed implementation schedule to the Department.
3. Continued implementation will be a condition of the permit in place of meeting the 10% UAW performance standard.
4. Upon request of the Department, the permittee shall report on its implementation of the water loss control program.

A PWS permittee may choose to discontinue the water loss program implementation if UAW, as reported on the ASR and approved by DEP, is below 10% for four consecutive years, and the water audit data validity scores are at least Level III (51-70) for the same four years.

NOTE FOR SMALL SYSTEMS: For small systems with less than 3,000 service connections or a service connection density of less than 16 connections per mile of pipeline, the Unavoidable Annual Real Loss (UARL) calculation and the Infrastructure Leak Index (ILI) developed as the final steps of the top down water audit may not result in valid performance indicators, and may not be comparable to the UARL and ILI calculations for larger systems.

However, these small systems can benefit from developing reliable data and conducting an annual top down water audit. Small systems can rely on the real losses (gallons per mile of main per day) performance indicator developed in the water audit as a measure of real water loss when developing a water loss control program. The M36 Manual discusses the audit process for small systems, and includes a chapter to guide small systems in understanding the results of their audits and in

developing a water loss control program (*Manual of Water Supply Practices – M36, Fourth Edition, Chapter 9: Considerations for Small Systems*, pp. 293-305).

MassDEP UAW Water Loss Control Measures: Permittees who do not have MassDEP approved Water Loss Control Programs in place by 6th calendar year after 2019 will be required to implement the MassDEP UAW Water Loss Control Measures outlined below:

- An annual water audit and leak detection survey, as described in the AWWA M36 Manual, of the entire system.
 - Within one year, repair 75% (by water volume) of all leaks detected in the survey that are under the control of the public water system;
 - Thereafter, repair leaks as necessary to reduce permittee's UAW to 10% or the minimum level possible.
- Meter inspection and, as appropriate, repair, replace and calibrate water meters:
 - Large Meters (2" or greater) – within one year
 - Medium Meters (1" or greater and less than 2") – within 2 years
 - Small Meters (less than 1") - within three years
 - Thereafter, calibrate and or replace all meters according to type and specification.
- Bill at least quarterly within three years.
- Water pricing structure sufficient to pay the full cost of operating the system.

Hardship - A permittee may present an analysis of the cost effectiveness of implementing certain conservation measures included in the MassDEP UAW Water Loss Control Measures and offer alternative measures. Any analysis must explicitly consider environmental impacts and must produce equal or greater environmental benefits. Suppliers will be able to present:

- Reasons why specific measures are not cost effective because the cost would exceed the costs of alternative methods of achieving the appropriate standard;
- Alternative specific conservation measures that would result in equal or greater system-wide water savings or equal or greater environmental benefits than the conservation measures included in the MassDEP UAW Functional Equivalence Plan; and
- When applicable, an analysis demonstrating that implementation of specific measures will cause or exacerbate significant economic hardship.