



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

FINAL

October 6, 2016

Duxbury Board of Selectmen
Town Hall
878 Tremont Street
Duxbury, MA 02332

RE: DUXBURY – BRP/WMA
Duxbury Water Department
PWS ID #4082000
Water Management Act
Permit #9P421082.01

Dear Sirs,

Attached please find:

- FINAL Findings of Fact in support of the renewal of Permit #9P421082.01, and
- FINAL WMA Permit #9P421082.01 for the Duxbury Water Department.

The signature on this cover letter indicates formal issuance of the attached document. If you have any questions regarding this information, please contact Jen D'Urso at (617) 654-6591 or via e-mail at jen.durso@state.ma.us.

Sincerely,

Rebecca Weidman
Director, Division of Watershed Management
Bureau of Resource Protection

Y:\DWP Archive\SERO\2016\Duxbury -WMA FINAL Permit 9P421082.01 10-06-2016

Ecc: Peter Mackin, Town of Duxbury
Duane LeVangie, MassDEP
Patti Kellogg, MassDEP SERO
Michele Drury, DCR OWR
Michelle Craddock, DFW
Jen Pederson, MWWA
Heidi Ricci, MassAudubon

Cc: Samantha Woods, NSRWA, PO Box 43, Norwell, MA 02061
Julia Blatt, Mass. Rivers Alliance, 14 Beacon St Suite 707, Boston, Massachusetts 02108

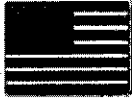
Communication For Non-English Speaking Parties - 310 CMR 1.03(5)(a)

Contact Michelle Waters-Ekanem, Diversity Director/Civil Rights: 617-292-5751 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，应立即翻译。如果您需要翻译这份文件，请用下面列出的电话号码与 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 ប្រទេសកម្ពុជា (Kmer (Cambodian)):

ឯកសារនេះគឺមានសារៈសំខាន់និងគួរត្រូវបានបកប្រែភ្លាមៗ។ ប្រសិនបើអ្នកត្រូវបានបកប្រែឯកសារនេះសូមទំនាក់ទំនងភ្នាក់ងារជាតិរបស់ MassDEP នៅលេខទូរស័ព្ទដែលបានរាយនាងក្រោម។



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.

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

Contact Michelle Waters-Ekanem, Diversity Director/Civil Rights: 617-292-5751 TTY#

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(Version 3.30.15)



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.



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 պէտք 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):

Ce document est important et devrait être traduit immédiatement. Si vous avez besoin de ce document traduit, s'il vous plaît communiquer avec le directeur de la diversité MassDEP aux numéros de téléphone indiqués ci-dessous.



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 przetłumaczone. Jeśli potrzebujesz tego dokumentu tłumaczone, prosimy o kontakt z Dyrektorem MassDEP w różnorodności na numery telefonów wymienionych poniżej.



19 हिन्दी (Hindi):

यह दस्तावेज 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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Findings of Fact in Support of FINAL Permit Issuance Water Management Permit #9P421082.01 Town of Duxbury

The Department of Environmental Protection (the Department) makes the following Findings of Fact in support of the attached FINAL Water Management Permit #9P421082.01, and includes herewith its reasons for issuing the FINAL 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 Duxbury Department of Public Works, Water Division, (Duxbury) 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 to ensure thoughtful and implementable permits.

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. Duxbury 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. 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 Duxbury 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), Duxbury'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 Permit Conditions in Duxbury'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.

Duxbury is permitted for an annual withdrawal volume of 226.60 MGY or 0.62 MGD. The Town has a registered volume of 448.95 MGY [1.23 MGD] for a total annual withdrawal volume of 675.25 MGY or 1.85 MGD. Duxbury withdraws water for public water supply from 12 wells, 9 of which are registered. Four of the 9 registered wells are also permitted and 3 wells are permitted exclusively. Duxbury has a total of 7 permitted wells. The Town was issued its initial Water Management Permit on December 6, 1991 for 4 wells. The Town's WMA permit has been amended twice, March 21, 1994 and October 22, 2001, in order to add three more wells. One registered-only well, i.e., Depot St. Well, has been off-line for many years due to discoloration problems caused by iron and manganese.

Special Condition 1, Maximum Authorized Annual Average Withdrawal The Department of Conservation and Recreation's Office of Water Resources (DCR) developed draft demand projections for Duxbury in the South Coastal Basin in September, 2014. In a response to an Order to Complete from Duxbury dated August 18, 2015, Duxbury indicated that the water needs forecast provided by DCR was acceptable. MassDEP is basing Duxbury's permitted volumes on DCR's Current Trend projections at least for the initial permit period. Recent usage (2014 was 1.49 mgd) has been significantly above the 65/10 projections prepared by DCR, so MassDEP held the Current Trends projection prepared by DCR through 2030 as a placeholder. Duxbury's RGPCD values which have been in the high 80s, will need to be significantly reduced to meet the DCR 65/10 Projections. Duxbury's permitted volumes will be reviewed annually to monitor progress and may be adjusted as result of those reviews.

This Condition authorizes Duxbury to withdraw up to an additional 102.20 MGY or an average of 0.28 MGD above their registered volume to the permit expiration date of August 31, 2030.

Summary of Duxbury Water Department's WMA Authorizations	
WMA Authorization	Volume Authorized
WMA Registration #42108205	1.23 MGD (448.95 MGY)
WMA Permit #9P-4-21-082.01	0.289 MGD (102.20 MGY)
Total WMA Authorization	1.51 MGD (551.15 MGY)

In 2014, Duxbury's average daily withdrawal from the South Coastal Basin was 1.49 MGD. If water needs are expected to exceed the maximum authorized in this permit and Duxbury has made progress addressing their

high RGPCD Duxbury may apply for additional volume at any time by submitting a new Water Management Permit application BRPWM03.

Special Condition 2, Maximum Daily Withdrawals from Groundwater Withdrawal Points, reflects the MassDEP-approved Zone II maximum daily pumping rate for each of Duxbury's permitted wells based on prolonged pumping tests. Withdrawals in excess of these maximum daily rates require approval from the Department.

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 and Surface Water Protection requirements have been met and are up to date as of the issuance of this permit.

Special Condition 5, Water Level Monitoring was established for North Hill Marsh Pond and its underlying aquifer in order to measure and record any potential impact Mayflower Well #2 water withdrawals may have on pond or groundwater levels. The Department has reviewed 10 years of monitoring data and analyses provided by Duxbury, where the base water conservation level of 35.25 feet above MSL, surveyed to NGVD, was triggered a total of six separate occasions. Water levels of North Hill Marsh Pond and the underlying aquifer shall continue to be measured and recorded according to the established time table. The requirement for submitting water level monitoring data and analyses is every 5 years.

Special Condition 6, Conservation Water Levels: were established for North Hill Marsh Pond to limit potential harm to the pond. The base water conservation level of 34.5 feet above MSL, surveyed to NGVD, remains the level by which operations of the Mayflower Well #2 shall cease. Duxbury shall continue to decrease water withdrawal volumes as pond levels fall below 35.25 feet above MSL, surveyed to NGVD.

Special Condition 7, Performance Standard for Residential Gallons Per Capita Day Water has changed from 80 RGPCD required in Duxbury's permit of November, 2008. Duxbury was in non-compliance with this standard in 2010, 2013, and 2014. No compliance plan was filed, as required by Duxbury's permit. During those years, voluntary, and not mandatory, outdoor water use restrictions were implemented. There is no indication that two of the three minimum components of an RGPCD plan were implemented—a rebate program for low water use appliances, and the adoption of a bylaw requiring the installation of moisture sensors on automatic irrigation systems. Duxbury's Water Conservation Questionnaire does indicate that the town provided water saving devices and low flow shower heads at cost. By October 30, 2016, Duxbury shall prepare and submit a compliance plan to address their failure to meet 80 RGPCD. The plan shall document immediate efforts to meet 80 RGPCD, and discuss efforts to meet 65 by December 31, 2018, in accordance with Appendix A, to rectify its non-compliance.

The RGPCD required for all PWS permittees is now 65 gallons. Permittees that cannot comply within the timeframe in the permit must meet Functional Equivalence requirements outlined in Appendix A. Duxbury's DEP-approved 2014 RGPCD was 89.

Special Condition 8, Performance Standard for Unaccounted for Water has changed from 15% UAW required in Duxbury's permit of November, 2008. The UAW required for all PWS permittees is now 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. Duxbury's UAW for the most recent three years has been:

2014	2013	2012
1%	1%	2%

Special Condition 9, Seasonal Limits on Nonessential Outdoor Water Use is based upon Duxbury's Residential Gallons per Capita Day (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.

If Duxbury selects the streamflow approach, it has been assigned the USGS local stream gage of #01105730 –Indian Head River at Hanover. The local gage streamflow triggers at this site are 31 cubic feet per second (cfs) for May and June, and 13 cfs for July, August and September.

Should the reliability of flow measurement at the Indian Head 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.

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.

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 Indian Head River at Hanover gage is 4.9 cfs and will limit non-essential outdoor watering to no more than 1 day per week as outlined in Special Condition #9. 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 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>).

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 Duxbury’s withdrawals do not impact any waters that MA Division of Fisheries and Wildlife has identified as supporting coldwater fish.

Minimization of Groundwater Withdrawal Impacts in Stressed Subbasins requires permittees with permitted groundwater sources in subbasins⁴ with net groundwater depletion of 25% or more during August to minimize their withdrawal impacts on those subbasins to the greatest extent feasible. Minimization of Groundwater Withdrawal Impacts is not a condition of this permit at the present time, since there are no delineated subbasins in Duxbury.

Mitigation of Impacts for Withdrawals that Exceed Baseline Withdrawals requires mitigation of the impacts of withdrawals above the permittee’s baseline, which is based on withdrawals made during 2003-2005. Mitigation of Impacts for Withdrawals that Exceed Baseline Withdrawals is not a condition of this permit at the present time, since Duxbury’s authorized withdrawals in this permit are not exceeding their Baseline withdrawal volume of 1.68 mgd.

Special Condition 11, Reporting Requirements, ensures that the information necessary to evaluate compliance with the conditions included herein is accurately reported.

Response to Comments

Comments on Scituate’s permit renewal application were received from the Superintendent of the Duxbury Water and Sewer Department, and the Duxbury Water and Sewer Advisory Board. The Duxbury Water and Sewer Department requested the elimination of Special Conditions 5 and 6, which pertain to monitoring water levels and a cut-off level for withdrawals at the North Hill Marsh Pond. The Department reviewed 10 year of North Hill Marsh Pond monitoring data, during which time the base water conservation level of 35.25 feet above MSL, surveyed to NGVD, was triggered a total of six separate occasions. As the removal of these monitoring and pump shut off requirements would be a significant change in Duxbury’s permit, the Department believes that further discussion with all impacted parties needs to occur before the conditions can be removed from the permit. The Duxbury Water and Sewer Advisory Board’s comments focused on Special Condition 7, which is the standard of 65 RGPCD. This is a state-wide standard that has been approved by the Water Resources

⁴ Subbasins used for WMA permitting are the 1,395 subbasins delineated by the U.S. Geological Survey in *Indicators of Streamflow Alteration, Habitat Fragmentation, Impervious Cover, and Water Quality for Massachusetts Stream Basins* (Weiskel et al., 2010, USGS SIR 2009-5272).

Commission of the Executive Office of Environmental Affairs and is referenced in 310 CMR 36.28(3)(g); at this time, there are no plans to customize an RGPCD standard to individual community characteristics.



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FINAL WATER WITHDRAWAL PERMIT RENEWAL

Permit #9P421082.01

Town of Duxbury

This renewal of Permit #9P421082.01 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: 9P421082.01 **RIVER BASIN:** South Coastal

PERMITTEE: Town of Duxbury
Board of Selectmen
Town Hall, 878 Tremont Street
Duxbury, MA 02332

EFFECTIVE DATE: October 6, 2016

EXPIRATION DATE: August 31, 2030

TYPE AND NUMBER OF WITHDRAWAL POINTS:
Groundwater: 7 Surface Water: 0

USE: Public Water Supply

DAYS OF OPERATION: 365

AUTHORIZED WITHDRAWAL POINTS:

Table 1: Withdrawal Point Identification	
Source	Source Code
Tremont #1	4082000-05G
Tremont #2	4082000-06G
Evergreen Street #1	4082000-07G
Evergreen Street #2	4082000-08G
Mayflower Street #2	4082000-10G
Damon Street #1	4082000-11G
Damon Street #2	4082000-12G

This information is available in alternate format. Call Michelle Waters-Ekanem, Diversity Director, at 617-292-5751. TTY# MassRelay Service 1-800-439-2370
MassDEP Website: www.mass.gov/dep

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SPECIAL CONDITIONS – PERMIT #9P421082.01

1. Maximum Authorized Annual Average Withdrawal

This permit authorizes the Town of Duxbury to withdraw water from the South Coastal Basin at the rate described in Tables 2 below. The volume reflected by this rate is in addition to the 1.23 MGD previously authorized to the Duxbury under WMA Registration #421082.05. The permitted volume is expressed both as an average daily withdrawal rate (million gallons per day or MGD), and as a total annual withdrawal volume (million gallons per year or MGY) for each five-year period of the permit term.

Table 2: Authorized Withdrawals				
Permit Periods	Total Raw Water Withdrawal Volumes			
	Permit*		Registration + Permit	
	Daily Average (MGD)	Total Annual (MGY)	Daily Average (MGD)	Total Annual (MGY)
10/06/2016 to 8/31/2020	0.19	69.35	1.23 + 0.19 = 1.42	518.30
9/1/2020 to 8/31/2025	0.20	73.00	1.23 + 0.20 = 1.43	521.95
9/1/2025 to 8/31/2030	0.21 + 0.07 buffer = 0.28	102.20	1.23 + 0.28 = 1.51	551.15

**Permit values will be reviewed during each permit block.*

Duxbury may increase annual average daily withdrawals to the maximum authorized (1.51 MGD) prior to September 1, 2026, if Duxbury is meeting:

- residential gallons per capita day water use (RGPCD) of 65 or less, or all RGPCD functional equivalence requirements in Appendix A;
- unaccounted-for-water use (UAW) of 10% or less, or all UAW functional equivalence requirements in Appendix B;
- seasonal limits on nonessential outdoor water use in Special Condition 8; and
- water conservation requirements in Special Condition 9.

2. Maximum Daily Withdrawals from Groundwater Withdrawal Points

Withdrawals from permitted groundwater sources are not to exceed the approved maximum daily rates listed in Table 3 below without advance approval from the Department.

Table 3: Maximum Daily Withdrawal Rates from Authorized Groundwater Withdrawal Points	
Source	Maximum Daily Rate
Tremont #1 & #2 - 4082000-05G & 06G	700 GPM /1.008 MGD
Evergreen Street #1 - 4082000-07G	550 GPM /0.792 MGD
Evergreen Street #2 – 4082000-08G	550 GPM /0.792 MGD
Mayflower Street #2 – 4082000 – 10G	500 GPM /0.72 MGD
Damon Street #1 – 4082000 – 11G	278 GPM/0.4 MGD
Damon Street #2 – 4082000 – 12G	278 GPM/0.4 MGD

3. Zone II Delineation

Department records show that all of the Town of Duxbury's sources have approved Zone II delineations, therefore, no further Zone II work is required.

4. Wellhead and Surface Water Protection

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

5. Water Level Monitoring

North Hill Marsh Pond and its underlying aquifer water levels will continue to be monitored and recorded by Duxbury. Pond and aquifer level measurements shall be recorded, compiled and verified monthly during the period of October through April, weather permitting, and weekly during the period May through September. Measurements shall be made according to the method outlined in Attachment A and analyzed every year. Reports documenting compliance with this condition shall be filed every five years, or upon the Department's request, to the Department, and the Massachusetts Audubon Society.

6. Conservation Water Levels

Groundwater withdrawals from Mayflower Well #2 shall continue to be constrained by water levels in the North Hill Marsh Pond. Mayflower Well #2 withdrawals volumes shall decrease if pond levels fall below the operating level of 35.25 feet above MSL, surveyed to NGVD. Mayflower Well #2 operation shall cease if pond levels fall below the base level of 34.5 feet above MSL, surveyed to NGVD.

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

By October 30, 2016, The Town of Duxbury shall provide a compliance plan documenting efforts to address their failure to meet 80 RGPCD. The plan shall document immediate efforts to meet 80 RGPCD, and discuss future activities to meet 65 by December 31, 2018, in accordance with Appendix A. The Town of Duxbury's performance standard for residential gallons per capita day (RGPCD) is 65 gallons or less moving forward. Duxbury shall be in compliance with this performance standard by December 31, 2018, or, if Duxbury does not meet the standard, shall be in compliance with the functional equivalence requirements (Appendix A).

8. Performance Standard for Unaccounted for Water

The Town of Duxbury'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. Duxbury shall be in

compliance with this performance standard by December 31, 2019 or, if Duxbury does not meet the standard, shall be in compliance with the functional equivalence requirements (Appendix B).

Nothing in the permit shall prevent a permittee who meets the 10% performance standard from demonstrating compliance with the UAW performance standard by developing and implementing a water loss control program following the *AWWA M36 Water Audits and Loss Control Programs*.

Permittees meeting the Performance Standard for Unaccounted for Water through implementation of a water loss control program based on AWWA M36 annual water audits and guidance shall continue to report UAW annually as required in the Annual Statistical Report for public water suppliers.

9. Seasonal Limits on Nonessential Outdoor Water Use

Permittee shall limit nonessential outdoor water use through mandatory restrictions from May 1st through September 30th as outlined in Table 4 below. Permittee shall be responsible for tracking streamflows and drought advisories and recording when restrictions are implemented if streamflow triggered restrictions are implemented. See *Accessing Streamflow and Drought Advisory Website Information* in Table 4 for instructions. Permittee shall document compliance with the summer limits on nonessential outdoor water use annually in its eASR, and indicate whether it anticipates implementing calendar triggered restrictions or streamflow triggered restrictions during the next year. Nothing in this FINAL Permit shall prevent permittee from implementing water use restrictions that are more restrictive than those set forth in this permit.

Duxbury shall limit nonessential outdoor water use through mandatory restrictions from May 1 st through September 30 th 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 < 65 as reported in the ASR and accepted by MassDEP	
Calendar Triggered Restrictions	<p>Nonessential outdoor water use is restricted to:</p> <ol style="list-style-type: none"> seven (7) days per week before 9 am and after 5 pm; and one (1) day per week before 9 am and after 5 pm when USGS stream gage 01105730 –Indian Head River at Hanover, MA falls below 7-day the low-flow statistic 4.9 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 4.9 cfs for seven (7) consecutive days.</p>
Streamflow Triggered Restrictions	<p>Nonessential outdoor water use is restricted to:</p> <ol style="list-style-type: none"> seven (7) days per week before 9 am and after 5 pm when USGS stream gage 01105730 –Indian Head River at Hanover, MA falls below: <ul style="list-style-type: none"> May 1 – June 30: 31 cfs for three (3) consecutive days July 1 – September 30: 13 cfs for three (3) consecutive days one (1) day per week before 9 am and after 5 pm when USGS stream gage 01105730 –Indian Head River at Hanover, MA falls below the 7-day low-flow statistic 4.9 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>

Restrictions for Permittees Not Meeting the RGPCD standard for the preceding year RGPCD = 4.9 cfs for the year and accepted by Mass DEP	
Calendar Triggered Restrictions	<p>Nonessential outdoor water use is restricted to:</p> <ol style="list-style-type: none"> two (2) days per week before 9 am and after 5 pm; and one (1) day per week before 9 am and after 5 pm when USGS stream gage 01105730 –Indian Head River at Hanover, MA falls below the 7-day low-flow statistic 4.9 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 4.9 cfs for seven (7) consecutive days.</p>
Streamflow Triggered Restrictions	<p>Nonessential outdoor water use is restricted to:</p> <ol style="list-style-type: none"> two (2) days per week before 9 am and after 5 pm when USGS stream gage 01105730 –Indian Head River at Hanover, MA falls below: <ul style="list-style-type: none"> May 1 – June 30: 31 cfs for three (3) consecutive days July 1 – September 30: 13 cfs for three (3) consecutive days one (1) day per week before 9 am and after 5 pm when USGS stream gage 01105730 –Indian Head River at Hanover, MA falls below the 7-day low-flow statistic 4.9 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>

Table 4 Seasonal Limits on Nonessential Outdoor Water Use

Instructions for Accessing Streamflow Website Information
<p>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.</p> <p>Seasonal Limits on Nonessential Outdoor Water Use 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.</p> <p>Mean daily streamflow gage readings are available at the USGS NWIS Web Interface at http://waterdata.usgs.gov/ma/nwis/current/?type=flow.</p> <ul style="list-style-type: none"> • Scroll down to gage # #01105730 – Indian Head River at Hanover • 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.

Water Uses Restrictions

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 means of automatic sprinklers outside the hours of 9 am to 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 a hand held hose only.

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 limited fairway watering, or irrigation by plant nurseries as necessary to maintain stock).

Public Notice of Seasonal Nonessential Outdoor Water Use Restrictions

Duxbury shall notify its customers of the restrictions, including a detailed description of the restrictions and penalties for violating the restrictions, by April 15th each year.

Notice that restrictions have been put in place shall be filed each year with the Department 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 website.

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

10. Water Conservation Requirements

At a minimum, Duxbury shall implement the following conservation measures forthwith. 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.
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.	<p>Duxbury shall have repair reports available for inspection by the Department. Duxbury shall establish a schedule for repairing leaks that is at least as stringent as the following:</p> <ul style="list-style-type: none"> o Leaks of 3 gallons per minute or more shall be repaired within 3 months of detection. o Leaks of less than 3 gallons per minute at hydrants and appurtenances shall be repaired as soon as possible. o 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 Duxbury's priority schedule including leaks up to the property line, curb stop or service meter, as applicable. Duxbury 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.	Duxbury 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.	Duxbury shall have an ongoing program to inspect individual service meters to ensure that all service meters accurately measure the volume of water used by its 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.	Duxbury shall maintain a water pricing structure that includes the full cost of operating the water supply system. Duxbury 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.	Duxbury 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.
Residential and Public Sector Conservation	
1.	Duxbury shall meet the standards set forth in the Federal Energy Policy Act, 1992 and the Massachusetts Plumbing Code.
2.	Meter or estimate water used by contractors using fire hydrants for pipe flushing and construction.
3.	Duxbury has reported that all municipally owned public buildings have been retrofitted with water saving devices (faucet aerators, low flow shower heads and low flow toilets). Duxbury shall continue to ensure

Table 5: Minimum Water Conservation Requirements	
that water savings devices are installed in all municipal buildings as they are renovated, and shall ensure water conserving fixtures and landscaping practices are incorporating into the design of new municipal capital projects.	
Industrial and Commercial Water Conservation	
1. Duxbury shall ensure water conservation practices in all development proposals, particularly low flow devices and water-wise landscaping practices.	
Public Education and Outreach	
<p>1. Duxbury 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, Duxbury's plan may include the following actions:</p> <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 Duxbury 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. Reporting Requirements

Duxbury shall report annually as required by completing the electronic Annual Statistical Report (eASR) for public water suppliers, and shall provide other reporting as specified in the Special Conditions above.

General Permit Conditions (applicable to all Permittees)

No withdrawal in excess of 100,000 gallons per day over the registered volume (if any) shall be made following the expiration of this permit, unless before that date the Department has received a renewal permit application pursuant to and in compliance with 310 CMR 36.00.

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 water 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 over which Permittee has authority, title or control, 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 M.G.L. c. 21G, §§ 15-17, M.G.L. c. 150, § 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** The Permittee shall submit annually, on a form provided by the Department, a certified statement of the withdrawal. Such report is to be received by the Department by the date specified by the Department. Such report must be submitted as specified on the report form.
7. **Duty to Maintain Records** The Permittee shall be responsible for maintaining withdrawal and all other records as specified by 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 his 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 municipality (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

10/6/16
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.

ATTACHMENT A

Conduct and verify groundwater and pond level measurements at monitoring stations and observation wells according to the seasonal time frame stated in the permit. Measurements shall be recorded in feet, tenths of feet and hundredths of feet, so far as possible, given possible wave effects on the pond or formations of ice. All field measurement recordings shall be retained as original records at the Duxbury Water Department office. All measurements and calculations shall be recorded. For example, if the wetted tape method is employed, both the length of the tape suspended below the measuring point and the length of the wet tape shall be recorded and the results of subtraction shown. Additionally, the measuring point shall be recorded along with the final calculation of water elevation recorded. Notes indicating the well water is frozen shall also be recorded.

Each measurement must be duplicated in the field with a check measurement. If the results are not reasonably consistent, additional measurements shall be made to resolve discrepancies. Ploppers may be used as long as their length is included in the recorded measurements. Electric tape may be used, but periodic verification of tape marking accuracy shall be conducted. All measurements shall be entered into a computer database and verified accordingly.

The recommended method of computer verification of measurement data is to graph the data for each site after it is entered into the computer. Aberrant data frequently becomes obvious in visual review of a graph, thereby triggering 1) review of the accuracy of the entry, and/or 2) review of the accuracy of the calculations used in deducing the recorded data.