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

November 6, 2017

Marshfield Board of Selectmen
Town Hall
878 Moraine Street
Marshfield, MA 02050

RE: MARSHFIELD – BRP/WMA
Marshfield Department of Public Works
PWS ID #4171000
Water Management Act
Permit #9P421171.01

Dear Sirs,

Attached please find:

- FINAL Findings of Fact in support of the renewal of Permit #9P421171.01, and
- FINAL WMA Permit #9P421171.01 for the Marshfield 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\2017\Marshfield -WMA FINAL Permit 9P421171.01 -11-6-2017

Ecc: Paul DuRoss, Town of Marshfield
Duane LeVangie, MassDEP
Patti Kellogg, MassDEP SERO
Michele Drury, DCR OWR
Michelle Craddock, DFW
Jen Pederson, MWWA

Cc: Samantha Woods, NSRWA, PO Box 43, Norwell, MA 02061
Julia Blatt, Mass. Rivers Alliance, , 14 Beacon St Ste 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.

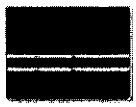
4(a) 中國（傳統）(Chinese (Traditional):
本文件非常重要，應立即翻譯。如果您需要翻譯這份文件，請用下面列出的電話號碼與MassDEP的多樣性總監聯繫。

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):
ឯកសារនេះគឺមានសារៈសំខាន់និងគួរត្រូវបានបកប្រែភ្លាម។ ប្រសិនបើអ្នកត្រូវបានបកប្រែឯកសារនេះសូមទំនាក់ទំនងដង្ហោកជានាយក MassDEP នៅលេខទូរស័ព្ទដែលបានរាយខាងក្រោម។



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# MassRelay Service 1-800-439-2370.

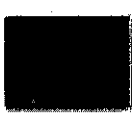
http://www.mass.gov/eea/agencies/massdep/service/justice/ (Version 3.30.15)

10 العربية (Arabic):

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

11 한국어 (Korean):

이 문서는 중요하고 즉시 번역해야합니다. 당신이 번역이 문서가 필요하면 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.

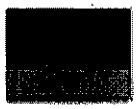
13 فارسی (Farsi (Persian):

این سند مهم است و باید فورا ترجمه شده است.

اگر شما نیاز به این سند ترجمه شده، لطفا 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.

MassDEP
Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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

Findings of Fact in Support of Final Permit Issuance
Water Management Permit #9P421171.01
Town of Marshfield

The Department of Environmental Protection (the Department) makes the following Findings of Fact in support of the attached Final Water Management Permit #9P421171.01, 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 Marshfield Department of Public Works, Water Division, (Marshfield) 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. Marshfield 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 Marshfield 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), Marshfield's permit continues in force and effect until the Department issues a final decision on the permit renewal application.

The expiration date for 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 44.90 MGD, leaving 25.20 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 Marshfield'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.

Marshfield is permitted for an annual withdrawal volume of 83.95 MGY or 0.23 MGD. The Town has a registered volume of 1120.55 MGY [3.07 MGD] for a total annual withdrawal volume of 1204.50 MGY or 3.30 MGD. Marshfield withdraws water for public water supply from 17 wells, 13 of which are registered. Four wells are permitted exclusively. Marshfield's original WMA permit was issued on December 6, 1991. This permit was amended on October 6, 1997 to add 4171000-16G, the Spring Street Well, as a permitted source. Subsequently, the amended permit was modified on May 12, 2004 as the result of a 5-Year compliance review. The modified permit was amended on June 27, 2007 to add 4171000-18G, the Ferry Street Well #2, as a permitted source.

In January 2013, Marshfield applied for a permit amendment to add the Fairgrounds Well as an authorized source. The source final report for the proposed well was approved on December 23, 2008. Based on the prolonged pumping test for the well, the approved pumping rate was determined to be 300 gallons per minute (gpm) or 0.432 MGD. The Zone II for the Fairgrounds Well lies within the previously approved Zone II for Marshfield's existing wells 4171000-05G, 4171000-06G, 4171000-07G, 4171000-08G, and 4171000-17G. The Zone II for these wells are within Marshfield's Water Resource District, which is in compliance with the Wellhead Protection Standards at 310 CMR 22.21(2). As a result of the review of the permit amendment application, the Fairgrounds Well was added to Marshfield's permit as an authorized source with the designated source code of 4171000-19G In April of 2013.

Special Condition 1, Maximum Authorized Annual Average Withdrawal

The Department of Conservation and Recreation's Office of Water Resources (DCR-OWM) developed Final demand projections for Marshfield in the South Coastal Basin in February of 2010. After reviewing comments received, the final demand projections were released in April of 2010. MassDEP intends to base Marshfield's permitted volumes on these projections, as well as the average water sold to Duxbury, Scituate, and Pembroke during 2009-2013 (0.19 MGD). These projections are based on meeting the Performance Standards of 65 residential gallons per capita per day (RGPCD) and 10% unaccounted for water (UAW).

This permit authorizes Marshfield to withdraw up to 3.11 MGD (1135.15 MGY) for the water supply purposes of the Town of Marshfield, with an additional 0.19 MGD (69.35 MGY) available for the sale of water to neighboring suppliers through the permit expiration date of August 31, 2030. This 3.30 MGD total allocation is an increase over the 3.07 MGD originally registered to the Town.

Summary of Marshfield Water Department's WMA Authorizations	
WMA Authorization	**Volume Authorized**
WMA Registration #42117105	3.07 MGD (1120.55 MGY)
WMA Permit #9P-4-21-171.01	0.23 MGD (83.95 MGY)
Total WMA Authorization (including water sold)	3.30 MGD (1204.50 MGY)

In 2015 Marshfield's average daily withdrawal from the South Coastal Basin was 2.66 MGD. If water needs are expected to exceed the maximum authorized in this permit, Marshfield 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 Marshfield'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 Protection requirements have been met and are up to date as of the issuance of this permit.

Special Condition 5, Performance Standard for Residential Gallons Per Capita Day is 65 gallons. Marshfield's permit, which was amended in April 2013, already included the Performance Standard of 65 Residential Gallons Per Capita Day (RGPCD), which they have been in compliance with consistently in recent years. Permittees that cannot comply within the timeframe in the permit must meet Functional Equivalence requirements outlined in Appendix A. Marshfield's DEP-approved 2016 RGPCD was 59.

Special Condition 6, Performance Standard for Unaccounted for Water is 10%. Marshfield has complied with this Standard in recent years as outlined below. 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.

2016	2015	2014
4%	6%	7%

Special Condition 7, Seasonal Limits on Nonessential Outdoor Water Use reflects the restrictions on nonessential outdoor water from May through September. The options outlined in Special Condition 7 are based on whether reported RGPCD for the previous year was in compliance with the RGPCD Performance Standard (see Special Condition #5, Performance Standard for RGPCD).

Each year Marshfield may choose one of two options for implementing nonessential outdoor watering 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 streamflow triggers are based on Aquatic Base Flow (ABF) levels that are protective of aquatic habitat for fish spawning during the spring bioperiod (May-June), and protective of flows for fish rearing and growth during the summer bioperiod (July-September). The flow levels are simulated natural flow values calculated by the Sustainable Yield Estimator (SYE)[1] from index gage flow data which represent the least altered stream flows in Massachusetts, and applied to the assigned local USGS stream gage.

If Marshfield 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, Marshfield 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 7- Day Low-flow Trigger**, at which restrictions increase, is incorporated into both Calendar and Streamflow Triggered restrictions in order to provide additional protection to streamflows when flows are very low. The 7-day low flow trigger is based on the median value of the annual 7-day low flows for the period of record. The 7 day low-flow trigger for the Indian Head River at Hanover gage is **4.9** cfs.

Marshfield may choose to implement limits on nonessential outdoor water use that are stricter than those required by the permit.

Special Condition 8, 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). Marshfield outlined its current conservation measures that go beyond standard Water Management permit requirements in the Order to Complete submitted on March 19, 2015. Continued implementation of specific measures, such as an annual water rate evaluation, and providing water consumption history on bills, is required in Special Condition 8.

Coldwater Fish Resource Protection was incorporated into the Water Management Regulations in November 2014. Marshfield performed a desktop evaluation for three of its subbasins which contained a coldwater fishery (Subbasins 22133, 22090, and 22071). The desktop evaluation using the WMA Permitting Tool indicated that in subbasins 22090 and 22071, even if Marshfield stopped withdrawing from the sources in those subbasins, the Biological Category (BC) would remain a BC 5. In Subbasin 22133, Marshfield would have to decrease its pumping volumes from 0.62 MGD to 0.02 MGD to change from a BC 5 to a BC 4.

The wells that are not in the above subbasins include South River Street Well (08G), the Mt. Skirgo Well (01g) and the Webster Wells 1 and 2 (10G and 11G). Each of these wells has its own limitations that would make it impractical to add some or all of an additional 0.60 MGD (the volume that would have to be reduced in Subbasin 22133 to improve a BC) in withdrawals. The Webster wells have nitrogen concentrations that increase as

pumping increases, potentially raising concentrations above the drinking water maximum contaminant level (MCL) for nitrate. The Mt. Skirco well is already being pumped close to its capacity, and the registered only South River Street well lies close to another cold water fishery. At this time, the Department is not requesting any additional efforts beyond the demand management practices included in this permit to address the Coldwater Fish Resource requirements.

Minimization of Groundwater Withdrawal Impacts in Stressed Subbasins requires permittees with permitted groundwater sources in subbasins 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 Marshfield does not have any permitted sources in the subbasins that are currently August Net Depleted by 25% or more.

Special Condition 9, Mitigation of Impacts for Withdrawals that Exceed Baseline[1] requires mitigation of the impacts of withdrawals above the permittee's baseline by direct and/or indirect mitigation activities.

- Direct mitigation activities result in enhanced streamflow through
  - Wastewater returns to local groundwater,
  - Surface water releases.
  - Stormwater recharge, or
  - Infiltration and inflow removal from sewer systems.
- Indirect mitigation activities are actions that will help to compensate for streamflow impacts resulting from withdrawals.

Marshfield evaluated possible direct mitigation volumes associated with Infiltration and Inflow removal work conducted in town over the last 10 years. Data in sufficient detail to quantify a direct mitigation volume was unavailable. Likewise the town was unable to identify any recent redevelopment projects where stormwater recharge has been improved over previous development recharge values. As a result, no direct mitigation credits could be quantified for Marshfield.

Mitigation of Impacts for Withdrawals that Exceed Baseline Withdrawals is a condition of this permit, since Marshfield's permitted 3.30 MGD withdrawals exceed their Baseline withdrawal of 3.26 MGD which is based on their average withdrawals between 2003-2005 plus 5%. While a 3.30 MGD withdrawal does not appear to change a Biological Category or a Groundwater Withdrawal Category, it does require mitigation in the amount of 0.04 MGD.

Marshfield qualifies for a Wastewater Adjustment since approximately 60% of its service connections are returned to groundwater via septic system. The Wastewater Adjustment for Groundwater within a Major Basin is 85%. Therefore, with an original mitigation value of 0.04 MGD, the calculation is as follows:

0.04 MGD (ask over baseline) X 60% (% of ask over baseline expected to be supplied to users on septic systems) X 85% (% of that additional use expected to returned via those septic systems) = 0.02 MGD

[1] Baseline is the volume of water withdrawn in 2005 plus 5%, or the average annual volume withdrawn from 2003 to 2005, which is greater. Baseline cannot be less than the registered volume, and cannot be more than the authorized volume during the 2003 to 2005 period. For suppliers with authorizations in multiple major basins, baseline is computed for each basin and for the entire system.

Marshfield's Adjusted Mitigation value is 0.02 MGD. As outline in the 2014 Water Management Act Permit Guidance, 1 indirect mitigation credit translates into 0.01 MGD of required mitigation. The 0.02 MGD required to be mitigated by Marshfield can be met with 2 indirect mitigation credits.

Marshfield has a stormwater bylaw that requires full stormwater recharge on development and re-development projects. The stormwater bylaw, which was enacted in 2009, is a one-time creditable activity that is eligible for credits because of the expansion of the geographic extent of the bylaw and to the size of the projects regulated. Marshfield's bylaw expands coverage to the entire municipality not just those areas covered by the Municipal Separate Storm Sewer Systems (MS4) requirements and it lowers the acreage of project sizes regulated by the bylaw to projects of 0.11 acres or larger. MassDEP has identified that municipalities adopting and implementation bylaws with the conditions outlines above are eligible for 7 indirect mitigation credits, 2 credits for the expansion of the geographic extent and 5 credits for the application to smaller project sizes.

The 0.02 MGD required to be mitigated by Marshfield is met through the implementation of the town's stormwater bylaw.

Special Condition 10, Reporting Requirements, ensures that the information necessary to evaluate compliance with the conditions included herein is accurately reported.

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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

FINAL WATER WITHDRAWAL PERMIT RENEWAL
Permit #9P421171.01
Town of Marshfield

This renewal of Permit #9P421171.01 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: 9P421171.01 **RIVER BASIN:** South Coastal

PERMITTEE: Town of Marshfield
Town Hall
878 Moraine Street
Marshfield, MA 02050

EFFECTIVE DATE: November 6, 2017

EXPIRATION DATE: August 31, 2030

TYPE AND NUMBER OF WITHDRAWAL POINTS:
Groundwater: 4 Surface Water: 0

USE: Public Water Supply

DAYS OF OPERATION: 365

AUTHORIZED WITHDRAWAL POINTS:

Table 1: Withdrawal Point Identification

Source	Source Code
Union Street Well #2	4171000-15G
Spring Street Well	4171000-16G
Ferry Street Well #2	4171000-18G
Fairgrounds Well	4171000-19G

SPECIAL CONDITIONS – PERMIT #9P421171.01

1. Maximum Authorized Annual Average Withdrawal

This permit authorizes the Town of Marshfield 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 3.07 MGD previously authorized to the Marshfield under WMA Registration #421171.05. 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 for Marshfield			
	Permit*		Registration + Permit*	
	Daily Average (MGD)	Total Annual (MGY)	Daily Average (MGD)	Total Annual (MGY)
11/6/2017 to 8/31/2020	0.00	0.00	3.07 + 0.0 = 3.07	1120.55
9/1/2020 to 8/31/2025	0.00	0.00	3.07 + 0.00 = 3.07	1120.55
9/1/2025 to 8/31/2030	0.04	14.60	3.07 + 0.04 =3.11	1135.15

*An additional 0.19 MGD (69.35 MGY) may be withdrawn **for the sole purpose of provision to the Towns of Duxbury, Pembroke and Scituate**. Volumes sold to each system shall be detailed when filing the annual Water Supply Statistical Report.

Marshfield may increase annual average daily withdrawals, including those sold, to the maximum authorized (3.30 MGD) prior to September 1, 2025, if Marshfield 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 7; and
- water conservation requirements in Special Condition 8.

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
Union Street Well #2 - 4171000-15G	347 GPM /0.5 MGD
Spring Street Well - 4171000-16G	278 GPM /0.4 MGD
Ferry Street Well #2 - 4171000-18G	500 GPM /0.72 MGD
Fairgrounds Well - 4171000-19G	300 GPM /0.432 MGD

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

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

5. **Performance Standard for Residential Gallons Per Capita Day Water Use**
The Town of Marshfield's performance standard for residential gallons per capita day (RGPCD) is 65 gallons or less. Marshfield is currently required to be in compliance with this performance standard, or, with the functional equivalence requirements (Appendix A).

6. **Performance Standard for Unaccounted for Water**
The Town of Marshfield'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. Marshfield is currently required to be in compliance with this performance standard or, if Marshfield 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.

7. **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. To the extent feasible, all summer outdoor water should take place before 9 a.m. and after 5 p.m. when evaporation and evapotranspiration rates are lower.

Table 4 Seasonal Limits on Nonessential Outdoor Water Use

Marshfield shall limit nonessential outdoor water use through mandatory restrictions from May 1st through September 30 as detailed 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	Nonessential outdoor water use is restricted to: 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 01105730 –Indian Head River at Hanover, MA falls below 7-day the low-flow statistic **4.9 cfs** for three (3) consecutive days. 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.
Streamflow Triggered Restrictions	Nonessential outdoor water use is restricted to: a) **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: • May 1 – June 30: **31 cfs** for three (3) consecutive days • July 1 – September 30: **13 cfs** for three (3) consecutive days b) **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. Once implemented, the restrictions shall remain in place until streamflow at the gage meets or exceeds the trigger streamflow for seven (7) consecutive days.
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	Nonessential outdoor water use is restricted to: 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 01105730 –Indian Head River at Hanover, MA falls below the 7-day low-flow statistic **4.9 cfs** for three (3) consecutive days. 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.
Streamflow Triggered Restrictions	Nonessential outdoor water use is restricted to: b) **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: • May 1 – June 30: **31 cfs** for three (3) consecutive days • July 1 – September 30: **13 cfs** for three (3) consecutive days c) **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. Once implemented, the restrictions shall remain in place until streamflow at the gage meets or exceeds the trigger streamflow for seven (7) consecutive days.

Instructions for Accessing Streamflow and Drought Advisory Website Information
If the Marshfield chooses Streamflow Triggered Restrictions, Marshfield shall be responsible for tracking streamflows and drought advisories 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 quarter-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 for 3 consecutive days. 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 01105730 – Indian Head River at Hanover, 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.
Marshfield 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.

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
Marshfield 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.

8. Water Conservation Requirements
At a minimum, Marshfield 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 AWWA Manual 36.
4. Marshfield shall have repair reports available for inspection by the Department. Marshfield shall establish a schedule for repairing leaks that is at least as stringent as the following: 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. Leaks shall be repaired in accordance with Marshfield's priority schedule including leaks up to the property line, curb stop or service meter, as applicable. Marshfield shall have water use regulations in place that require property owners to expeditiously repair leaks on their property.

Table 5: Minimum Water Conservation Requirements
Metering
1. Calibrate all source and finished water meters at least annually and report date of calibration on the ASR.
2. Marshfield 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 AWWA Manual M6 – Water Meters.
3. Marshfield 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. Marshfield shall maintain a water pricing structure that includes the full cost of operating the water supply system. Marshfield shall evaluate rates annually and adjust costs as needed. Full cost pricing factors all costs - operations, maintenance, capital, and indirect costs (environmental impacts, watershed protection) - into prices.
2. Marshfield 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. Marshfield 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. Marshfield 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). Marshfield shall continue to ensure 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. Marshfield shall ensure water conservation practices in all development proposals, particularly low flow devices and water-wise landscaping practices.
Public Education and Outreach
1. Marshfield 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, Marshfield's plan may include the following actions: o Include in bill stuffers and/or bills, current consumption and consumption history and conservation efforts and estimate the dollar savings; o Public space advertising/media stories on successes (and failures); o Conservation information centers perhaps run jointly with electric or gas company; o Speakers for community organizations; o Public service announcements; radio/T.V./audio-visual presentations; o Joint advertising with hardware stores to promote conservation devices; o Use of civic and professional organization resources; o Special events such as Conservation Fairs;

Table 5: Minimum Water Conservation Requirements
o Develop materials that are targeted to schools with media that appeals to children, including materials on water resource projects and field trips; and o Provide multilingual materials as needed.
2. Upon request of the Department, the Town of Marshfield 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. These materials shall include: information provided to customers to calculate their water use and compare it to the standard of 65 rgpcd; information provided to customers on their usage history; the water conservation curriculum provided to schools; information on the water conservation workshops held for the general public; and information provided to customers on water wise landscaping, gardening, and irrigation.

9. Mitigation of Impacts for Withdrawals that Exceed Baseline Withdrawals

Marshfield's is required to mitigate 0.02 MGD for its renewed permitted withdrawals over baseline. The mitigation requirement of 0.02 MGD will be met with Marshfield's implementation of its stormwater bylaw, which was enacted in 2009. One indirect mitigation credit is equal to 0.01 MGD of required mitigation. Review of the bylaw indicates that Marshfield has 7 mitigation credits from the bylaw – 2 for geographic extent (entire municipality is covered) and 5 for including any project 0.11 acres or larger. A copy of Marshfield's Stormwater Bylaw is in Appendix A.

10. Reporting Requirements

Marshfield 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)

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 MassDEP to enter and examine any property, inspect and monitor the withdrawal, and inspect and copy any relevant records, 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 MassDEP pursuant to M.G.L. c. 21G, §§ 15-17, M.G.L. c. 111, § 160, or any other enabling authority.
5. **Transfer of Permits** This permit shall not be transferred in whole or in part unless and until MassDEP approves such transfer in writing, pursuant to a transfer application on forms provided by MassDEP requesting such approval and received by MassDEP 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 36.37.

6. **Duty to Report** The Permittee shall submit annually, on a form provided by MassDEP, a certified statement of the withdrawal. Such report is to be received by MassDEP by the date specified by MassDEP. Such report must be mailed or hand delivered to the address specified on the report form.
7. **Duty to Maintain Records** The Permittee shall be responsible for maintaining withdrawal records as specified by this permit.
8. **Metering** Withdrawal points shall be metered. Meters shall be calibrated annually. Meter shall be maintained and replaced as necessary to ensure the accuracy of the withdrawal records.
9. **Amendment, Suspension or Termination** The Department may amend, suspend or terminate this permit in accordance with M.G.L. c. 21G or 310 CMR 36.29.

APPEAL RIGHTS AND TIME LIMITS

This permit is a decision of MassDEP. Any person aggrieved by this decision may request an adjudicatory hearing. Any such request must be made in writing, by certified mail and received by MassDEP within twenty-one (21) days of the date of receipt of this permit.

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 MassDEP.

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 MassDEP 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 hearing request, 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

MassDEP may waive the adjudicatory hearing filing fee for any person who demonstrates to the satisfaction of MassDEP 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

11/6/17

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

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 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 – Marshfield Stormwater Bylaw

Section Storm Water Management Overlay District
13.04
1. Purpose - The purpose of the Storm Water Management Overlay District is to protect, maintain and enhance the public health, safety, environment, and general welfare by establishing minimum requirements and procedures to control the adverse effects of increased post-development storm water runoff and non-point source pollution associated with new development and redevelopment. These objectives will be met by regulating new construction, construction of impervious surfaces, the removal of natural vegetation, especially large trees, and the excavation and alteration of land, in order to minimize erosion, sedimentation, flooding, water pollution, and other adverse impacts of development within the Overlay District or any adjacent low lying areas.

2. Scope of Authority - The Storm Water Management Overlay District is established as an overlay district and shall be superimposed on other zoning districts established by this Bylaw. All regulations of the Marshfield Zoning Bylaw applicable to the underlying districts shall remain in effect, except that where the Storm Water Management Overlay District imposes additional regulations, such regulations shall prevail.

3. District Boundaries – The boundaries of the Storm Water Management Overlay District are delineated on the Official Zoning Map.

4. Applicability – The following types of development within the Storm Water Management Overlay District are subject to review by the Building Inspector. Notwithstanding other provisions of this Bylaw, no land development within the Storm Water Management Overlay District shall be permitted and no building permit or shall be issued until the provisions of the Storm Water Management Overlay District regulations have been met. Development activities subject to the Storm Water Management overlay district design standards include the following:

4.1 The construction of a new dwelling or principle structure;

4.2. Any substantial alteration or addition to any dwelling or other structure, if such action enlarges the footprint of the structure by more than 200 square feet;

4.3 The removal, filling, excavation or alteration of earthen materials if such alteration changes pre-existing topography and drainage characteristics of the property in a manner that may adversely impact abutting property owners.

4.4 The removal or destruction of more than 5 mature trees having a diameter of six inches or greater, measured four feet from the ground surface. This limitation on cutting of mature trees does not apply to trees that are to be

removed for construction of a street, dwelling, driveway, walkway, septic disposal system, or a retaining wall. Other trees may be removed if in the opinion of the Tree Warden the trees are dead, dying or are diseased trees that represent a safety hazard to public health or property.

4.5 Any activity that increases the impervious coverage on any lot that causes additional volumes of runoff to discharge on abutting properties that may cause flooding and adversely impact abutting property owners.

5. Development Performance Standards – All new construction, substantial alterations, excavation, filling, grading or tree cutting described above in Section 4, shall comply with the following development standards.

5.1 For lots ranging in size from 5,000 to 7,499 square feet, the following development limitations shall apply.
a. Building area shall not exceed 16% of the land area of any lot.
b. Impervious surfaces shall not exceed 25% of the land area of any lot.
c. A minimum of 15% of the lot shall remain undisturbed with existing natural vegetation.

5.2 For lots ranging in size from 7,500 to 9,999 square feet, the following development limitations shall apply.
a. Building area shall not exceed 15% of the land area of any lot.
b. Impervious surfaces shall not exceed 22% of the land area of any lot.
c. A minimum of 25% of the lot shall remain undisturbed with existing natural vegetation.

5.3 For lots ranging in size from 10,000 square feet to 19,999 square feet in area the following development limitations shall apply.
a. Building area shall not exceed 15 % of any lot area.
b. Impervious surfaces shall not exceed 20 % of the lot area.
c. A minimum of 35 % of the lot area shall remain undisturbed with existing natural vegetation.

5.4 In the Storm Water Management Overlay District, the removal of native vegetation, especially large trees having a diameter of six inches or greater, measured four feet from the ground surface, shall be minimized. Trees may only be removed for construction of streets, structures, driveways, retaining walls, walkways, utilities and septic systems. Selective clearing of not more than 5 trees for lawns shall be designated on the site plan.

5.5 To the maximum extent feasible, post development runoff shall not exceed pre-development runoff. All roof runoff shall be retained and recharged on site in drywells or infiltration basins covered by natural vegetation which shall be designed to accommodate a 1" rainfall within a 24 hour period.

5.6 Sediment and erosion control measures as required by the Building

Inspector or designee shall be employed to minimize the impacts during and after construction.

6. Permit Procedures & Requirements – Any activity listed above in Section 4 requires copies of plans to be submitted to the Planning Board, Conservation Commission, Department of Public Works, and Board of Health for review and recommendations. Said Boards shall have 21 days to provide comments to the Building Inspector. If no comments are received within the 21 days, the Building Inspector may proceed with the issuance of the building permit.