

# Department of Environmental Protection

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

Charles D. Baker  
Governor

Karyn E. Polito  
Lieutenant Governor

Matthew A. Beaton  
Secretary

Martin Suuberg  
Commissioner

December 13, 2018

John Kelly, Town Administrator  
Orleans Town Hall  
19 School Road  
Orleans, MA 02653

RE: Town of Orleans  
PWS ID#: 4224000  
Water Management Permit #9P-4-22-224.01  
WMA FINAL Permit Renewal

Dear Mr. Kelly:

Attached please find:

- FINAL Findings of Fact in support of the renewal of Permit #9P-4-22-224.01, and
- FINAL WMA Permit #9P-4-22-224.01 for the Orleans 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 me at (617) 292-5706 or via e-mail at [duane.levangie@state.ma.us](mailto:duane.levangie@state.ma.us).

Sincerely,

Duane LeVangie  
Water Management Act Program Chief  
Bureau of Water Resources

Ecc: Patti Kellogg, MassDEP, SERO: [patti.kellogg@state.ma.us](mailto:patti.kellogg@state.ma.us)  
Orleans Board of Selectmen, [ezarcaro@town.orleans.ma.us](mailto:ezarcaro@town.orleans.ma.us)  
Todd Bunzick, Orleans Water Dept.: [tbunzick@town.orleans.ma.us](mailto:tbunzick@town.orleans.ma.us)  
Sue Brown, Orleans Water Dept.: [sbrown@town.orleans.ma.us](mailto:sbrown@town.orleans.ma.us)  
Tom Cambereri, Cape Cod Commission: [tcambereri@capecodcommission.org](mailto:tcambereri@capecodcommission.org)  
Jen Pederson, Mass. Water Works Assoc.: [MWWA@verizon.net](mailto:MWWA@verizon.net)  
Rob Almy, Weston and Sampson: [AlmyR@wseinc.com](mailto:AlmyR@wseinc.com)  
Julia Blatt, Mass Rivers Alliance, [juliablatt@massriversalliance.org](mailto:juliablatt@massriversalliance.org)  
Margaret Van Deusen, Deputy Director and General Counsel, Charles River Watershed Association  
Andrew Gottlieb, Executive Director, Association to Preserve Cape Cod

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

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



**1 English:**

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



**2 Español (Spanish):**

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



**3 Português (Portuguese):**

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



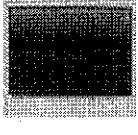
**4(a) 中國 (傳統) (Chinese (Traditional):**

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



**4(b) 中国 (简体中文) (Chinese (Simplified):**

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



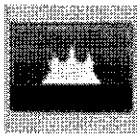
**5 Ayisyen (franse kreyòl) (Haitian) (French Creole):**

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



**6 Việt (Vietnamese):**

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



**7 កម្ពុជា (Kmer (Cambodian):**

ឯកសារនេះមានសារៈសំខាន់និងគួរត្រូវបានបកប្រែភ្លាមៗ ប្រសិនបើអ្នកត្រូវបានបកប្រែឯកសារនេះសូមទំនាក់ទំនងទូរស័ព្ទជាមួយកិច្ចការ MassDEP នៅលេខទូរស័ព្ទដដែលបានរាយនាមខាងក្រោម។



**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.

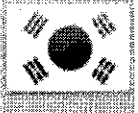
## Communication For Non-English Speaking Parties - 310 CMR 1.03(5)(a)

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



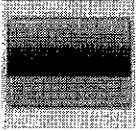
### 10 العربية (Arabic):

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.



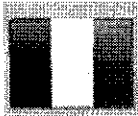
### 12 հայերեն (Armenian):

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



### 13 فارسی (Farsi (Persian):

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



### 14 Français (French):

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.



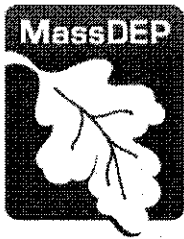
### 18 Język Polski (Polish):

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



# Department of Environmental Protection

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## **Findings of Fact in Support of FINAL Water Management Permit #9P-4-22-224.01 Town of Orleans**

The Department of Environmental Protection (the Department) makes the following Findings of Fact in support of the attached FINAL Water Management Permit #9P-4-22-224.01, 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 submitted by the Town of Orleans Water Department, (Orleans) for the purpose of public water supply.

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

### **The Permit Extensions**

Expiration dates for all Water Management permits were extended for four years by Chapter 240 of the Acts of 2010 and as amended by Chapter 238 of the Acts of 2012, collectively known as the Permit Extension Act (PEA). Orleans' prior WMA permit was originally issued in May 1992, was last amended on October 6, 2006, and was active during the period that all permits on Cape Cod were extended. To keep Orleans on the same permit renewal schedule as all permittees on Cape Cod, the Department accepted a permit renewal application from Orleans pursuant to M.G.L. c. 30A, § 13, and 310 CMR 36.18(7). The Department ran public notice of this renewal application on April 22, 2015 and received no comments.

In a letter on September 25, 2015, the Department informed Orleans 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 Cape Cod Basin fully understood the new Water Management Regulations (discussed below), and to give proper consideration to all permit renewal applications within the basin. On March 21, 2018 the Department issued a DRAFT renewed permit to Orleans, and published notice of the DRAFT permit in the March 21, 2018 Environmental Monitor.

The expiration date for all permits going forward in the Cape Cod Basin will be November 30, 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. For water sources where an estimate of natural annualized streamflow is not applicable because the water source is groundwater-driven, the Safe Yield is determined through estimates of groundwater recharge during drought conditions. For more information on the Safe Yield methodology, go to the November 28, 2012 SWMI Framework Summary and Appendices;
- 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 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;
  - mitigation of the impacts of increasing withdrawals.

### **Safe Yield in the Cape Cod Basin**

This permit is being issued in accordance with the Safe Yield methodology adopted by the Department on November 7, 2014, in the Regulations at 310 CMR 36.13. As of the date of issuance of this permit, the Safe Yield calculation for the Cape Cod Basin is 266.0 million gallons per day (MGD), and total registered and permitted withdrawals are 51.9 MGD. The maximum withdrawals that are authorized in this permit, and all other permits currently under review by the Department within the Cape Cod Basin, will be within the Safe Yield and conditioned in accordance with the regulations. Withdrawal authorizations may be further limited by other factors, such as the impact to local resources, water quality constraints, pumping rate limits placed on individual

wells and surface water supplies, and the regulatory requirement that permit holders demonstrate a need for the water, which for public water systems is done through Water Needs Forecasts prepared by the Department of Conservation and Recreation.

#### **Residential Gallons per Capita Day (RGPCD)**

In areas that experience significant seasonal fluctuations in residential population, as is the case in Cape Cod communities, calculation of an accurate RGPCD is difficult and has not been standardized to date. Therefore, at this time, MassDEP does not require that permittees on Cape Cod meet a specific RGPCD performance standard. The omission of a numerical standard from Orleans' permit does not imply that water conservation is not important for resource protection, and Orleans should still take every opportunity to encourage water conservation, especially during the high use summer season.

#### **Findings of Fact for Special Permit Conditions**

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 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.

Orleans operates 3 permitted sources in the Cape Cod Basin. Orleans was issued its initial Cape Cod Water Management Permit on May 7, 1992.

**Special Condition 1, Maximum Authorized Annual Average Withdrawal Volume**, the Department of Conservation and Recreation's Office of Water Resources (DCR) developed final water needs forecasts (WNF) for Orleans in the Cape Basin on June 16, 2010. Final WNF were issued on August 25, 2010. The DCR forecast was modified by the Water Resources Commission's March 9, 2017, decision that *"for communities with significant seasonal populations (Cape Cod and Islands), a 10% buffer may be added to the projected average day demand for the final five-year period of the water needs forecast"*. The modified WNF for Orleans forecast a 2030 demand of 1.15 MGD with an additional 10% buffer of 0.12 MGD for a total of 1.27 MGD. If Orleans anticipates withdrawals increasing over the permitted amount of 1.27 MGD at any time during the permit period, Orleans may submit a permit application (BRP WM03) for additional withdrawals.

MassDEP recognizes that future growth in water demand may not occur precisely as forecast. Therefore, the permit will authorize withdrawals of up to the maximum of 1.27 MGD at any time during the life of the permit provided that Orleans is meeting all other permit conditions, including:

- Unaccounted-for-water (UAW) of 10%, or all UAW functional equivalence requirements;
- Seasonal limits on nonessential outdoor water use; and
- Water conservation requirements.

**Special Condition 2, Maximum Authorized Daily Withdrawals from Each Withdrawal Point**, specifies the maximum daily volume expressed in millions of gallons per day that may be withdrawn from each of Orleans' permitted sources. The maximum authorized daily withdrawal for any of Orleans' sources is equal to the approved Zone II rate for that source.

**Special Condition 3, Zone II Delineations**, all of Orleans' permitted sources have approved Zone II's delineated.

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

**Formerly Special Condition 5, Wetlands Monitoring**, Annual Monitoring of the wetlands adjacent to Pumping Station #6 and Pumping Station #7 has been a requirement of Orleans' permit since 1992. In 2006, Orleans requested that they be allowed to continue monitoring thru the end of the life of their permit. To date, annual monitoring has indicated little to no impacts and this permit requirement has been removed from Orleans' permit.

**Special Condition 5, Performance Standard for Unaccounted for Water** for all PWS permittees is 10% or less. Orleans' prior permit included a UAW standard of 15%. Orleans' DEP-reviewed UAW values show UAW values below or just above the new standard. Orleans has until December 31, 2020 to meet the 10% standard.

**Orleans' Unaccounted for Water**

2013	2014	2015	2016	2017	Average
7%	13%	13%	8%	3%	9%

**Special Condition 6, Water Conservation Requirements**, incorporates the Water Conservation Standards for the Commonwealth of Massachusetts adopted by the MA Water Resources Commission in July 2006 (updated in 2012) and required by the Regulations at 310 CMR 36.28.

**Special Condition 7, Seasonal Limits on Nonessential Outdoor Water Use**, requires Orleans to implement nonessential outdoor water use restrictions from May 1 to September 30. The town can choose to implement the restrictions based on either the calendar (all summer) or only when groundwater levels in a U.S. Geological Survey monitoring well fall below certain defined levels for at least 60 consecutive days and a drought advisory or greater is declared by the Drought Management Task Force for Cape Cod.

Nothing in this permit prevents the Permittee from implementing additional water use restrictions. MassDEP encourages all PWS's to adopt the Massachusetts Drought Management Task Force's recommendations during times of a declared drought. The current drought status across Massachusetts can be found at <https://www.mass.gov/service-details/current-drought-status>. The map is updated monthly during a declared drought.

#### **Massachusetts Drought Management Task Force Recommendations**

**At Drought Warning:**

- Outdoor water use should be eliminated.

**At Drought Watch:**

- Outdoor water use should be limited to "handheld watering" with a hose or a watering can after 5pm or before 9am (to avoid evaporative losses); and
- Filling swimming pools, washing cars and washing buildings should be prohibited.

**At Drought Advisory:**

- Outdoor watering with irrigation systems and sprinklers should be limited to no more than one day per week; and
- Watering with a handheld hose should be limited to after 5pm or before 9 am (to avoid evaporative losses).

**Special Condition 8, Requirement to Report Raw and Finished Water Volumes** ensures that the information necessary to evaluate compliance with the conditions included herein is accurately reported.

**Special Condition 9, Mitigation of Impacts for Withdrawals that Exceed Baseline<sup>1</sup>**, requires mitigation where feasible, for withdrawals over a baseline volume. Baseline withdrawal means the volume of water withdrawn

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

during calendar year 2005 plus 5%, or the average annual volume withdrawn from 2003 through 2005 plus 5%, whichever is greater provided that:

- (a) baseline cannot be less than a permittee's registered volume;
- (b) baseline cannot be greater than the permittee's authorized volume for 2005; and
- (c) if, during the period from 2003 to 2005, the permittee's withdrawals from the water source were interrupted due to contamination of the source or construction of a treatment plant, the Department will use best available data to establish a baseline volume from the water source.

This permit authorizes Orleans to withdraw up to 1.27 MGD in the Cape Cod Basin, 0.23 MGD above the baseline rate of 1.04 MGD. Since the additional volumes proposed to be withdrawn are expected to serve areas with on-site septic systems, the Department assumes that 85% of the water withdrawn above the baseline will be returned to the subsurface. After accounting for the 85% wastewater return adjustment, 0.035 MGD (15% of 0.23 MGD) of future additional withdrawals from the Cape Cod basin must be mitigated.

Orleans evaluated the direct mitigation volumes associated with stormwater recharge work conducted in town over the last 10 years. Orleans' mitigation requirement of 0.035 MGD is met through a combination of Direct Mitigation volumes achieved through the stormwater recharge of 0.018 MGD from 14 projects installed after 2005 (Appendix B), a 0.01 MGD indirect credit for a Fertilizer Nitrogen and Phosphorous Control Bylaw (Appendix C) enacted in 2013, and the use of 0.01 MGD indirect credit for Land Conservation (Appendix D).

Municipal fertilizer bylaws deemed valid under Chapter 262 of the Acts of 2012 qualify for mitigation credit if they are more restrictive than the DAR regulations enacted June 15, 2015. Orleans' bylaw qualifies for 0.01 MGD mitigation credit. As outlined in the 2014 Water Management Act Permit guidance, 1 indirect mitigation credit translates into 0.01 MGD of required mitigation.

In 2010 the Town of Orleans acquired 22.5 acres of land to establish a conservation easement in Zone II of its wells. Specifically, the Town acquired Parcel 58-1 shown on Brewster parcel Map 45 from the Town of Brewster. With this purchase the Town of Orleans Conservation Commission holds Conservation Restrictions on 2.9 acres within the Zone II of its public water supply source wells. These 2.9 acres add up to 0.29 mitigation credits (0.1 credits per acre), of which 0.01 credits will be used as mitigation for this permit.

**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 Orleans' withdrawals do not impact any waters that the MA Division of Fisheries and Wildlife has identified as supporting coldwater fish at this time.

**Minimization of Groundwater Withdrawal Impacts in Stressed Subbasins**, requires permittees with permitted groundwater sources in subbasins<sup>2</sup> with net groundwater depletion of 25% or more during August to minimize their withdrawal impacts on those subbasins to the greatest extent feasible.

Because Orleans' sources are located where August net depletion has not been established, minimization measures are not required.

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

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<sup>2</sup> 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).



### **Response to Comments received on the Draft Permit**

Comments on the draft permit were filed on April 19, 2018, by Andrew Gottlieb, Executive Director of the Association to Preserve Cape Cod, and April 20, 2018, by Margaret Van Deusen of the Charles River Watershed Association (CRWA). Both organizations raised concerns about the effectiveness of the nonessential water use restriction triggers, the retroactive crediting of mitigation, and the suitability of the mitigation credits awarded in Orleans. CRWA also recommended that wording in Special Conditions #1 and #6 be revised.

In response to these comments, MassDEP has changed Special Condition #1 to make clear that increasing to the full allocation volume (including the buffer) of 1.27 mgd prior to the final permit period is contingent on Orleans meeting the conditions outlined and is at the Department's discretion. Special Condition #6 was also revised to require that Orleans provide an update on their efforts to comply with the water conservation requirements at all interim permit reviews in addition to the next permit renewal.

The Department also added language to the Findings of Fact informing Orleans about the Drought Management Task Force's outdoor water use recommendations during times of declared drought and encouraging the Town to follow the recommendations. The Department supports the regulated community going beyond the water use restrictions outlined in this permit whenever local conditions warrant additional protection.

Finally no changes were made in response to the comments on the mitigation requirements. MassDEP believes the requirements outlined in Special Condition #9 are consistent with the revisions to the Water Management Act regulations promulgated in November 2014.



# Department of Environmental Protection

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## FINAL WATER WITHDRAWAL PERMIT M.G.L. c. 21G

This FINAL permit is issued pursuant to the Massachusetts Water Management Act 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 beyond the right to withdraw the volume of water for which it is issued.

**PERMIT NUMBER:** 9P-4-22-224.01 **BASIN:** Cape Cod

**PERMITTEE:** Town of Orleans  
19 School Road  
Orleans, MA 02653

**EFFECTIVE DATE:** December 13, 2018

**EXPIRATION DATE:** November 30, 2030

**NUMBER OF WITHDRAWAL POINTS:**

Groundwater: 3

Surface Water: 0

**USE:** Public Water Supply

**DAYS OF OPERATION:** 365

**SOURCE LOCATIONS:**

**Table 1: Authorized Withdrawal Points**

Source Name	PWS Source ID
Pumping Station #6	4224000-06G
Pumping Station #7	4224000-07G
Pumping Station #8	4224000-08G

**SPECIAL CONDITIONS**

**1. Maximum Authorized Annual Average Withdrawal Volume**

This permit authorizes the Town of Orleans to withdraw water from the Cape Cod Basin at the rate described in Table 2. The volume reflected by this rate is in addition to the 0.86 MGD previously authorized to Orleans under WMA registration #4-22-224.01. The permit does not authorize annual withdrawals above this rate.

The authorized volume is expressed in millions of gallons, both as an average daily withdrawal rate per day (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. The Department of Environmental Protection will use the raw water withdrawal volume from all authorized withdrawal points to assess compliance with the withdrawal volumes.

**Table 2: Authorized Raw Water Withdrawal Rates**

Permit Periods	Permit*		Registration + Permit	
	Daily Average (MGD)	Total Annual (MGY)	Daily Average (MGD)	Total Annual (MGY)
12/13/2018 - 11/30/2020	0.21	76.65	0.86 + 0.21 = 1.07	390.55
12/1/2020 - 11/30/2025	0.25	91.25	0.86 + 0.25 = 1.11	405.15
12/1/2026 - 11/30/2030	0.29 + 0.12 buffer = 0.41	149.65	0.86 + 0.41 = 1.27	463.55

\*Permit values will be reviewed during each permit period.

Orleans may be authorized to increase annual average daily withdrawals to the maximum authorized (1.27 MGD) prior to December 1, 2026, if Orleans is meeting:

- unaccounted-for-water use (UAW) of 10% or less, or all UAW functional equivalence requirements in Appendix A;
- seasonal limits on nonessential outdoor water use in Special Condition 8; and
- water conservation requirements in Special Condition 7.

**2. Maximum Authorized Daily Withdrawals from Each Withdrawal Point**

Withdrawals from individual withdrawal points are not to exceed the approved maximum daily volumes listed in Table 3 without specific advance written approval from the Department. In no event shall the combined withdrawals from these permitted withdrawal points exceed the withdrawal volumes authorized above in Special Condition 1.

**Table 3: Authorized Maximum Daily Withdrawal Volumes**

Source Name	PWS Source ID	Maximum Daily Rate (MGD)
Pumping Station #6	4224000-06G	0.98
Pumping Station #7	4224000-07G	1.01
Pumping Station #8	4224000-08G	0.50

**3. Zone II Delineations**

Orleans' three permitted wells have Zone II areas and Zone II maximum daily pumping rates approved by the Department (Table 3). No further Zone II work is required as a condition of this permit.

**4. Wellhead Protection**

Orleans is in compliance with its wellhead protection requirements.

**5. Performance Standard for Unaccounted for Water**

Orleans' 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. Orleans shall be in compliance with this performance standard by December 31, 2020 or, if Orleans does not meet the standard, shall be in compliance with the functional equivalence requirements (Appendix A).

**6. Water Conservation Requirements**

At a minimum, Orleans shall implement conservation measures listed in Table 4. Compliance with the water conservation requirements shall be reported to the Department upon request during all interim permit reviews and at the time of permit renewal unless otherwise noted below.

<b>Table 4: Minimum Water Conservation Requirements</b>
<b>Leak Detection</b>
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. Orleans shall have repair reports available for inspection by the Department. Orleans shall establish a schedule for repairing leaks that is at least as stringent as the following: <ul style="list-style-type: none"> <li>○ Leaks of 3 gallons per minute or more shall be repaired within 3 months of detection.</li> <li>○ Leaks of less than 3 gallons per minute at hydrants and appurtenances shall be repaired as soon as possible.</li> <li>○ 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.</li> </ul> <p>Leaks shall be repaired in accordance with Orleans' priority schedule including leaks up to the property line, curb stop or service meter, as applicable. Orleans shall have water use regulations in place that require property owners to expeditiously repair leaks on their property.</p>
<b>Metering</b>
1. Calibrate all source and finished water meters at least annually and report date of calibration on the ASR.
2. Orleans 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. Orleans shall have an ongoing program to inspect individual service meters to ensure that all service meters accurately measure the volume of water used by your customers. The metering program shall include regular meter maintenance, including testing, calibration, repair, replacement and checks for tampering to identify and correct illegal connections. The plan shall continue to include placement of sufficient funds in the annual budget to calibrate, repair, or replace meters as necessary.
<b>Pricing</b>
1. Orleans shall maintain a water pricing structure that includes the full cost of operating the water supply system. Orleans 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

<b>Table 4: Minimum Water Conservation Requirements</b>
impacts, watershed protection) - into prices.
2. Orleans 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.
<b>Residential and Public Sector Conservation</b>
1. Orleans shall meet the standards set forth in the Federal Energy Policy Act, 1992 and the Massachusetts Plumbing Code.
2. Orleans shall meter or estimate water used by contractors using fire hydrants for pipe flushing and construction.
3. Orleans reports that not all municipally owned public buildings have water saving devices. Orleans 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 incorporated into the design of new municipal capital projects.
<b>Commercial Water Conservation</b>
1. Orleans shall ensure water conservation practices in all development proposals, particularly low flow devices and water-wise landscaping practices.
<b>Public Education and Outreach</b>
1. Orleans 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, Orleans' plan may include the following actions: <ul style="list-style-type: none"> <li>○ 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;</li> <li>○ Public space advertising/media stories on successes (and failures);</li> <li>○ Conservation information centers perhaps run jointly with electric or gas company;</li> <li>○ Speakers for community organizations;</li> <li>○ Public service announcements; radio/T.V./audio-visual presentations;</li> <li>○ Joint advertising with hardware stores to promote conservation devices;</li> <li>○ Use of civic and professional organization resources;</li> <li>○ Special events such as Conservation Fairs;</li> <li>○ Develop materials that are targeted to schools with media that appeals to children, including materials on water resource projects and field trips; and</li> <li>○ Provide multilingual materials as needed.</li> </ul>
2. Upon request of the Department, the Town of Orleans 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.

**7. Seasonal Limits on Nonessential Outdoor Water Use**

Orleans shall limit nonessential outdoor water use through mandatory restrictions from May 1<sup>st</sup> through September 30<sup>th</sup> as outlined in Table 5. Orleans shall be responsible for tracking groundwater levels and drought declarations and recording and reporting when restrictions are implemented. See Table 5 for *Instructions for Accessing U.S. Geologic Survey Groundwater Level and Massachusetts Drought Advisory Website Information*. Orleans shall also document compliance with the summer limits on nonessential outdoor water use annually in its Annual Statistical Report (ASR).

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

**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;
- irrigation of gardens, flowers and ornamental plants by means of a hand-held hose or drip irrigation system; and
- irrigation of lawns by means of a hand-held hose.

**Water uses NOT subject to mandatory restrictions** are those required:

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

**Table 5. Seasonal Limits on Nonessential Outdoor Water Use**

**Permittee must at a minimum implement the following outdoor water use restrictions:**

**Groundwater Level Triggered Restrictions from May 1<sup>st</sup> through September 30<sup>th</sup>**

**Nonessential outdoor water use is allowed no more than TWO DAYS per week before 9 am and after 5 pm whenever:**

- Groundwater levels at USGS Monitoring Well 414630070014901 (BMW 22) Brewster, MA decline to or below the groundwater trigger for 60 consecutive days. The monthly trigger levels are listed below and are the period of record monthly 25<sup>th</sup> percentile depth to water level values, as determined and published by the USGS. Restrictions could start on May 1, so monitoring of BMW 22 begins on March 1 of each year. Once implemented, the restrictions shall remain in place until the daily value of the groundwater levels at the assigned USGS monitoring well have recovered to less than the trigger for 30 consecutive days (when the water table elevation has risen above the trigger level); **and**
- A Drought Advisory or greater is declared by the Massachusetts Drought Management Task Force for Cape Cod.

**Trigger Values for Outdoor Water Use Restrictions (feet below land surface)**

March	April	May	June	July	Aug
31.53	31.14	31.13	31.16	31.35	31.59

**Instructions for Accessing U.S. Geologic Survey Groundwater Level and Massachusetts Drought Advisory Website Information**

**Groundwater level information** is available at the USGS National Water Information System (NWIS): Web Interface. The USGS NWIS default shows Massachusetts groundwater levels in real time, i.e., the most recent, usually hourly, water level measured and recorded at each USGS monitoring well.

Seasonal Limits on Nonessential Outdoor Water Use are implemented when the daily mean depth to water level exceeds the designated trigger for 60 consecutive days (*i.e.*, when the depth to water becomes larger than the trigger value as the water table elevation declines). The daily water level is compared to the trigger for that month. To determine if restrictions must be implemented on May 1 it is necessary to monitor the daily water level in March and April.

**Mean daily groundwater level** readings are available at the USGS NWIS Web Interface at [http://waterdata.usgs.gov/ma/nwis/current/?type=gw&group\\_key=county\\_cd](http://waterdata.usgs.gov/ma/nwis/current/?type=gw&group_key=county_cd)

- Scroll down to 414630070014901 (BMW 22) Brewster, MA and click on the station number.
- On the pull-down menu "Available data for this site" choose "Daily data".
- Under "Available Parameters" click on "WaterLevel, BelowLSD (Mean)".
- Under "Output Format" click on "Table" and enter the number of days of records (the default is 7 days; entering 60 will give you 60 days of data) and hit "GO".
- The table provides the "Daily Mean Depth to water level, feet below land surface" for the most recent number of days chosen.
- Compare each day's value to its month's trigger value (25<sup>th</sup> percentile) in your permit. Outdoor water use restrictions must be implemented when the daily depth to water level is at or below the trigger for 60 consecutive days.

**Drought Advisory** information is available at the Massachusetts Department of Conservation and Recreation (DCR) Drought Status Website at <http://www.mass.gov/eea/agencies/dcr/water-res-protection/water-data-tracking/drought-status.html>

- Under "Drought Status Reports", click on "drought map" on the right-hand side of the page. The color coded map displays the six drought regions in Massachusetts. Restrictions are implemented when a Drought Advisory, Watch, Warning or Emergency is announced through the DCR website.

### **Public Notice of Water Use Restrictions**

Orleans shall notify its customers of the restrictions and the consequences of failing to adhere to the restrictions.

- For groundwater level-triggered restrictions, when the daily depth to water level at the assigned USGS monitoring well declines to or below the trigger for 60 consecutive days, customers shall be notified as soon as possible, but within three days of implementing the restrictions.

Notice to customers shall include the following:

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

Notice that restrictions have been put in place shall be filed each year with MassDEP within 14 days of the restriction's effective date by completing and submitting to MassDEP the **Notification of Water Use Restrictions** form, which can be found at

<http://www.mass.gov/eea/agencies/massdep/water/watersheds/municipal-water-use-restrictions.html>

Notice to customers and MassDEP need not be provided if Orleans has already implemented water use restrictions that conform to the applicable restrictions and those restrictions are still in force.

### **8. Requirement to Report Raw and Finished Water Volumes**

Orleans shall report annually on its ASR the raw water volumes and finished water volumes for the entire water system. Monthly raw water volumes for individual water withdrawal points shall be reported annually in the ASR.

**9. Mitigation of Impacts for Withdrawals that Exceed Baseline**

Orleans is required to mitigate 0.035 MGD for its renewed permitted withdrawals over baseline in the Cape Cod Basin. The mitigation requirement of 0.035 MGD is met with the direct mitigation volumes achieved through the stormwater recharge of 0.018 MGD from 14 projects (11.7 acres of impervious surface) that was installed after 2005 and disconnected (Appendix B), a 0.01 MGD indirect credit for the "Fertilizer Nitrogen and Phosphorous Control" Bylaw enacted in 2013 (Appendix C), and the use of 0.01 MGD in indirect credit for Land Conservation. A summary of the land purchase (Brewster Assessor's Map 45, Parcel 58-1) is in Appendix D.

**GENERAL CONDITIONS (applicable to all permittees)**

1. **Duty to Comply** The permittee shall comply at all times with the terms and conditions of this permit, the Act and all applicable State and Federal statutes and regulations.
2. **Operation and Maintenance** The permittee shall at all times properly operate and maintain all facilities and equipment installed or used to withdraw up to the authorized volume so as not to impair the purposes and interests of the Act.
3. **Entry and Inspections** The permittee or the permittee's agent shall allow personnel or authorized agents or employees of the Department at reasonable times to enter and examine any property or inspect and copy any 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 the Department pursuant to M.G.L. c. 21G, s. 15-17, M.G.L. c. 111, s. 160, 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 the electronic Annual Statistical Report (eASR) accessed through the Department's eDEP website, a statement of the withdrawal. Such report must be submitted annually by the date identified on eDEP each year, unless the permittee has explicit permission from the MassDEP Drinking Water program for an extension of time.
7. **Duty to Maintain Records** The permittee shall be responsible for maintaining withdrawal records in sufficient detail to assess compliance with the conditions of this permit.
8. **Metering** All withdrawal points included within the permit shall be metered. Meters are to be calibrated annually.
9. **Amendment, Suspension or Termination** 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 and any person who has been allowed pursuant to 310 CMR 1.01(7) to intervene in the adjudicatory proceeding that resulted in this decision may request an adjudicatory hearing. 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. 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 city or town 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**

The request for a hearing shall state specifically, clearly and concisely the facts which are the grounds for the appeal, the relief sought, and any additional information required by 310 CMR 1.01(6)(b) or other applicable law or regulation. For any person appealing this decision who is not the applicant, the request must include sufficient written facts to demonstrate status as a person aggrieved and documentation to demonstrate previous participation where required.

**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

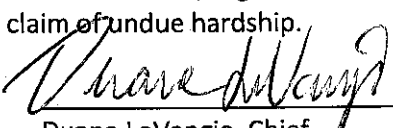
The request shall be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below.

**EXEMPTIONS**

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

**WAIVER**

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

  
\_\_\_\_\_  
Duane LeVangie, Chief  
Water Management Act Program  
Bureau of Water Resources

  
\_\_\_\_\_  
Date

### **Appendix A – 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, 2020**, 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 6<sup>th</sup> 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.

**Appendix B – Orleans List of Stormwater Projects Receiving Direct Mitigation Credit**

Year Impervious Cover Was Installed - Prior to 2005?	Connected to Surface Water Body Pre-2005?	Year BMP Was Installed	Location	Available Plans	Location (Plan Name)	Impervious Area (from design drawings)		BMP Volume (Static) {Cubic Feet}	Description	Design Infiltration Depth (from Design Plans)	Mitigation Credit (from DEP Stormwater Calculator)
						{Square Feet}	{Acres}			{Inches}	{Million Gallons/Day}
Between 1938 and 1971	Y - Town Cove	2006	Windmill at the Cove	Design Drawings 60052 2006-01		69,113	1.59	3,773.00	Concrete Leaching Chambers	0.6551	0.00294
Between 1938 and 1971	Y - Cedar Creek	2009	Rock Harbor Road	Design Drawings 2008-SW-2		44,870	1.03	3,692.50	Cultec Chambers	0.9875	0.00226
Between 1938 and 1971	Y - Crystal Lake	2009	Monument Road & Herring Brook (3 locations)	Design Drawings 2009-SW-01	Area 1	31,836	0.73	517.20	Concrete Leaching Chambers	0.1949	0.00045
Between 1938 and 1971	Y - Crystal Lake	2009			Area 2	27,998	0.64	279.00	Concrete Leaching Chambers	0.1196	0.00023
Between 1938 and 1971	Y - Crystal Lake	2009			Area 3	20,605	0.47	463.20	Cultec Chambers	0.2698	0.00040
Between 1938 and 1971	Y - Cape Cod Bay	2011	Skaket Beach Parking Lot	Design drawings 2013-WQ-01	Area 1A	67,646	1.55	3,703.00	Concrete Leaching Chambers	0.6569	0.00289
Between 1938 and 1971	Y - Cape Cod Bay	2011			Area 1B				Cultec Chambers		
Between 1938 and 1971	Y - Cedar Pond	2011	Locust Road (4 sites)	Design drawings 2011-WQ-02	Area 1	5,878	0.13	1,520.70	Concrete Leaching Chambers and open bottom catch basins	3.1045	0.00323
Between 1938 and 1971	Y - Cedar Pond	2011			Area 2	20,084	0.46	1,930.60	Concrete Leaching Chambers and open bottom catch basins	1.1535	
Between 1938 and 1971	Y - Cedar Pond	2011			Area 3	30,192	0.69	1,407.60	Concrete Leaching Chambers and open bottom catch basins	0.5595	
Between 1938 and 1971	Y - Cedar Pond	2011			Area 4	10,614	0.24	1,756.40	Concrete Leaching Chambers and open bottom catch basins	1.9858	
Between 1971 and 1994	Y - Namskaket Marsh	2013	Overland Way	Brick Hill Design Drawings 2014-SW-01		7,950	0.18	2,623.00	Concrete Leaching Chambers	3.9592	0.00048
Between 1938 and 1971	Y - Pleasant Bay	2014	Tar Kiln Road	Design Drawings 86-14799	Drainage Area 1	14,689	0.34	1,451.00	Catch Basins and Leach Pits	1.1854	0.00079
Between 1938 and 1971	Y - Pleasant Bay	2014			Drainage Area 2				Concrete Leaching Chambers		
Between 1938 and 1971	Y - Pleasant Bay	2014			Drainage Area 3				Concrete Leaching Chambers		
Between 1938 and 1971	Y - Pleasant Bay	2014			Drainage Area 4				Concrete Leaching Chambers		
Between 1938 and 1971	Y-Unnamed Pond	2009	Finlay & Giddah Roads	Design Drawings 2009-SW-02	Plan 1	40,200	0.92	1,067.00	Concrete Leaching Chambers	0.3185	0.00105
Between 1938 and 1971	Y-Pilgrim Lake	2009	Monument & Pilgrim Terrace	Design Drawings 2009-SW-02	Plan 2	36,696	0.84	1,057.00	Concrete Leaching Chambers	0.3489	0.00103
Between 1938 and 1971	Y-Unnamed Pond	2009	Monument & Uncle Vic's	Design Drawings 2009-SW-02	Plan 3	18,192	0.42	1,067.00	Concrete Leaching Chambers	0.7038	0.00080
Between 1938 and 1971	Y - Deep Pond	2009	Cross Rd & Route 28	Design Drawings 2009-SW-02	Plan 6	37,128	0.85	1,067.00	Concrete Leaching Chambers	0.3449	0.00104
Between 1938 and 1971	Y-Unnamed Pond	2017	Portanimituk Infiltration gallery	86-09358		7,280	0.17	1,620.50	Cultec Chambers	2.6712	0.00043
Between 1938 and 1971	Y-Bordering Salt Marsh	2017	Rock Harbor Road Area 1	111-34486	Area 1	12,250	0.28	412.00	Shallow Drainage Chambers	0.4036	0.00039
Between 1938 and 1971	Y-Bordering Salt Marsh	2017	Rock Harbor Road Area 2	111-34486	Area 2	9,188	0.21	1,537.00	Leaching Pits	0.2669	0.00018
Total											0.01859

**Appendix C – Orleans Fertilizer and Nitrogen Bylaw**

**Chapter 103**

**FERTILIZER NITROGEN AND PHOSPHORUS CONTROL**

**GENERAL REFERENCES**

Herbicides — See Ch. 102.

Wetlands regulations — See Ch. 196A.

Wetlands — See Ch. 160.

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**§ 103-1. Purpose.**

A Town bylaw to conserve resources and protect the environment by regulating the outdoor application of nitrogen and phosphorus in order to reduce the overall amount of excess nitrogen and phosphorus entering the town's Resource Areas as defined in the Orleans Wetlands Protection Bylaw (Ch. 160-2) and Orleans Wetland Protection Regulations Ch. 196A-2. Reducing excess nitrogen and phosphorus helps protect and improve water quality of Orleans valuable surface waters.

**§ 103-2. Applicability.**

This bylaw shall apply to and regulate any and all applications of nitrogen and phosphorus fertilizer within the Town of Orleans.

**§ 103-3. Definitions.**

As used in this bylaw, the following terms shall have the meanings indicated:

**AGRICULTURE** — Includes farming in all its branches, generally as the cultivation and tillage of soil, dairying, the production, cultivation, growing and harvesting of agricultural, floricultural, viticultural, or horticultural commodities, and shellfishing, including preparations and delivery to storage or to market or to carriers for transportation to market.

**BEST MANAGEMENT PRACTICE, BMP** — A sequence of activities designed to limit a nonpoint pollution source. For the purposes of this Bylaw and pursuant to Section 103-6 of this Bylaw, BMP means the most current edition of "Best Management Practices for Soil and Nutrient Management in Turf Systems," prepared by University of Massachusetts Extension, Center for Agriculture, Turf Program.

**FERTILIZER** — A substance that enriches the soil with elements essential for plant growth, such as nitrogen, phosphorus, potassium or other substances; fertilizer does not include those nutrients that are normally excluded from fertilizer such as chemicals that are part of dolomite, limestone, or lime.

**IMPERVIOUS SURFACE** — A surface that has been compacted or covered with a layer of material so that it is highly resistant to infiltration by water.

§ 103-3

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§ 103-5

**NITROGEN** — An element essential to plant growth. For the purposes of the Bylaw, nitrogen may be available as slow-release, controlled-release, timed-release, slowly available, or water insoluble nitrogen, which means nitrogen in a form that delays its availability for plant uptake and use after application and is not rapidly available to turf and other plants; and/or quick-release, water-soluble nitrogen which means nitrogen in a form that does not delay its availability for turf and other plant uptake and is rapidly available for turf and other plant uptake and use after application.

**PHOSPHORUS** — Mineral and organic substances that contain phosphorus and that are used for improving the nutrition of plants.

**TURF** — Grass-covered soil held together by the roots of the grass, also known as "sod" or "lawn".

**§ 103-4. Performance standards.**

All applications shall comply with the following standards:

- A. The application of nitrogen or phosphorus is prohibited between October 16 and April 14.
- B. No person shall cause nitrogen or phosphorus to apply to, or otherwise be deposited to any impervious surface including parking lot, driveway, roadway, sidewalk, or ice. Any fertilizer applied, spilled, and/or deposited on any impervious surface, either intentionally or accidentally, must be immediately and completely removed and contained and either legally applied to turf or any other legal site or returned to an appropriate container.
- C. No person shall apply nitrogen or phosphorus directly during or immediately prior to heavy rainfall, such as but not limited to thunderstorms, hurricanes, or northeastern storms, or when the soil is saturated due to intense or extended rainfall.
- D. The application of nitrogen or phosphorus is prohibited within 100 feet of Resource Areas as defined in the Orleans Wetland Protection Bylaw and regulations.
- E. Phosphorus containing fertilizer shall not be applied unless a soil test taken not more than three years before the proposed fertilizer application indicates that additional phosphorus is needed for growth of that turf, or unless establishing new turf or re-establishing or repairing turf after substantial damage or land disturbance, in which case the application shall be in compliance with the Best Management Practices (BMP) developed by University of Massachusetts Extension, Center for Agriculture, Turf Program.

**§ 103-5. Exemptions.**

The following activities shall be exempt from Section 103-4:

§ 103-5 FERTILIZER NITROGEN AND PHOSPHORUS § 103-9

- A. Application of nitrogen or phosphorus for agriculture and horticulture uses
- B. Application of nitrogen or phosphorus to gardens, including vegetable and flower, trees, shrubs and indoor applications including greenhouses.
- C. Application of nitrogen or phosphorus for the establishment of new vegetation in the first growing season, or repairing of turf in the first growing season, after substantial damage.
- D. Yard waste compost or other similar materials that are primarily organic in nature and are applied to improve the physical condition of the soil.

**§ 103-6. Recommendations.**

- A. The Town of Orleans strongly recommends that nitrogen should be applied to turf and other plants at the lowest rate necessary. Any single application of nitrogen should not exceed 0.5 pounds of nitrogen per 1000 square feet, and the annual aggregate total application of nitrogen should not exceed 1.0 pounds per 1000 square feet. The application of any nitrogen should be of an organic, slow-release, water-soluble form.

**§ 103-7. Compliance.**

Fertilizer shall only be applied in conformance with this section within 2 years of its effective date.

**§ 103-8. Enforcement.**

The enforcement authority shall be the Zoning Enforcement Officer or his designee.

**§ 103-9. Severability.**

Should any section, part, or provision of this bylaw be deemed invalid or unconstitutional, such decision shall not affect the validity of the remaining terms of this bylaw as a whole or any part thereof, other than the section, part, or provision held invalid or unconstitutional.

**Appendix D - Summary of Orleans' Land Purchase Indirect Mitigation Credits**

Orleans has purchased land in the South Coastal basin that qualifies for indirect mitigation credit. 0.01 of this credit will be used to meet the Town's mitigation requirement.

<b>Date and Purpose of Town Meeting Approval</b>	<b>Major Basin</b>	<b>Map and Lot</b>	<b>Acres</b>	<b>Credits per acre</b>	<b>Total Credits</b>
June 7, 2010, Purchase and Sale Agreement Between Brewster and Orleans for A Conservation and/or Watershed Protection Restriction	Cape Cod	Brewster Assessor's Map 45, Parcel 58-1	2.9	0.1	0.29