



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

100 Cambridge Street 9th Floor Boston, MA 02114 • 617-292-5500

Maura T. Healey
Governor

Kimberley Driscoll
Lieutenant Governor

Rebecca L. Tepper
Secretary

Gary Moran
Acting Commissioner

February 23, 2023

U.S. Veterans Administration
Massachusetts National Cemetery
Attn: Victor Gamboa, RA
Off Connery Avenue
Bourne, MA 02542

Town: Bourne
WMA Permit #: 9P4-4-22-036.02
Program: Water Management Act
Action: Final Permit

Dear Mr. Gamboa:

Please find the following attached:

- Findings of Fact in Support of the issuance of Permit #9P4-4-22-036.02; and
- Water Management Act Permit #9P4-4-22-036.02 to the U.S. Veterans Administration Massachusetts National Cemetery.

If you have any questions concerning this letter, please contact Julie Butler at (781) 742-8467 or Julie.Butler@mass.gov.

Sincerely,

Duane LeVangie
Water Management Program
Bureau of Water Resources

ecc: Ed Pesce, Pesce Engineering & Associates
Neal Price, Horsley Witten
Jim McLaughlin, MassDEP SERO
Len Pinaud, MassDEP SERO
Jonathan Hobill, MassDEP SERO
Julia Blatt and Sarah Bower, Mass Rivers Alliance
Jesse Leddick, MassDFG NHESP
Kristy Senatori, Cape Cod Commission
Andrew Gottlieb, Association to Preserve Cape Cod

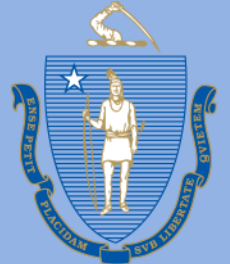
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繁體中文 Chinese Traditional

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简体中文 Chinese Simplified

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Ayisyen Kreyòl Haitian Creole

Dokiman sa-a se yon bagay enpòtan epi yo ta dwe tradwi l imedyatman. Si ou bezwen dokimar sa a tradwi, tanpri kontakte Direktè Divèsite MassDEP la nan nimewo telefòn endike anba.

Việt Vietnamese

Tài liệu này rất quan trọng và cần được dịch ngay lập tức. Nếu quý vị cần dịch tài liệu này, xin liên lạc với Giám đốc Đa dạng của MassDEP theo các số điện thoại ghi dưới đây.

ប្រទេសកម្ពុជា Khmer/Cambodian

ឯកសារនេះគឺសំខាន់ហើយគួរត្រូវបានបកប្រែភ្លាមៗ។ ប្រសិនបើអ្នកត្រូវការឱ្យគេបកប្រែឯកសារនេះ:

សូមទាក់ទងមកនាយកដ្ឋានពិពិធកម្មរបស់ MassDEP តាមលេខទូរស័ព្ទខាងក្រោម។

Kriolu Kabuverdianu Cape Verdean

Kel dokumentu li é inportáti y debe ser traduzidu imidiatamenti. Se bu meste di kel dokumentu traduzidu, pur favor kontakta Diretor di Diversidádi di MassDEP na numeru abaxu indikadu.



Contact Glynis L. Bugg, 857-262-0606

**Massachusetts Department of Environmental Protection
100 Cambridge Street 9th Floor Boston, MA 02114**

TTY# MassRelay Service 1-800-439-2370 • <https://www.mass.gov/environmental-justice>
(Version revised 1.5.2023) 310 CMR 1.03(5)(a)

Русский Russian

Это важный документ, и он должен быть безотлагательно переведен. Если вам нужен перевод данного документа, пожалуйста, свяжитесь с директором по вопросам многообразия (Diversity Director) компании MassDEP по указанному ниже телефону.

العربية Arabic

هذه الوثيقة مهمة ويجب ترجمتها على الفور. إذا كنت بحاجة إلى هذه الوثيقة مترجمة، يرجى الاتصال بمدير التنوع PMassDE على أرقام الهواتف المدرجة أدناه.

한국어 Korean

이 문서는 중요하고 즉시 번역해야 합니다. 이 문서의 번역이 필요하시다면, 아래의 전화 번호로 MassDEP의 다양성 담당 이사에 문의하시기 바랍니다.

հայերեն Armenian

Այս փաստաթուղթը կարևոր է և պետք է անմիջապես թարգմանվի:
Եթե Ձեզ անհրաժեշտ է այս փաստաթուղթը թարգմանել, դիմեք MassDEP-ի բազմազանության տնօրենին ստորև նշված հեռախոսահամարով:

فارسی Farsi Persian

این سند مهم است و باید فوراً ترجمه شود.
اگر به ترجمه این سند نیاز دارید، لطفاً با مدیر بخش تنوع نژادی MassDEP به شماره تلفن ذکر شده در زیر تماس بگیرید.

Français French

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Deutsch German

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Ελληνική Greek

Το παρόν έγγραφο είναι σημαντικό και θα πρέπει να μεταφραστεί αμέσως. Αν χρειάζεστε μετάφραση του παρόντος εγγράφου, παρακαλούμε επικοινωνήστε με τον Διευθυντή Διαφορετικότητας του MassDEP στους αριθμούς τηλεφώνου που αναγράφονται παρακάτω.

Italiano Italian

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हिन्दी Hindi

यह दस्तावेज़ महत्वपूर्ण है और इसका तुरंत अनुवाद किया जाना चाहिए. यदि आपको इस दस्तावेज़ का अनुवाद करने की आवश्यकता है, तो कृपया नीचे सूचीबद्ध टेलीफोन नंबरों पर मासडेप्स डाइवर्सिटी के निदेशक से संपर्क करें.

Contact Glynis L. Bugg, 857-262-0606

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Findings of Fact in Support of Water Management Permit #9P4-4-22-036.02 Massachusetts National Cemetery

The Department of Environmental Protection (“MassDEP” or “the Department”) has completed its review of the U.S. Veterans Administration (VA) Massachusetts National Cemetery (MNC) Water Management Act (WMA) permit application. This review was conducted in regard to the permit for MNC to withdraw water from the Cape Cod Basin. The Department hereby issues Water Management Permit #9P4-4-22-036.02 (the “Permit”) in accordance with the Water Management Act (M.G.L. c. 21G). The Department makes the following Findings of Fact in support of the attached Permit and includes herewith its reasons for issuing the Permit and for the conditions of approval imposed, as required by M.G.L. c. 21G, § 11, and 310 CMR 36.00. The Permit is being issued since such action is necessary for the promotion of the purposes of M.G.L. c. 21G. The Department may modify, suspend or terminate the Permit, after notice and hearing, for violations of its conditions, of M.G.L. c. 21G, or of regulations adopted or orders issued by the Department, and when deemed necessary for the promotion of the purposes of the Water Management Act.

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.

Withdrawal Description and History

The MNC property is co-located with the Joint Base Cape Cod (JBCC), formally known as the Massachusetts Military Reservation. MNC consists of 749 acres, of which approximately 240 acres are presently developed with gravesites, access roads, and support facilities. Irrigation water for the MNC has historically been supplied since 1979 by a single irrigation well known as IW-1, which remains in use. Irrigation water was also previously supplied by treated groundwater via a pipeline from the JBCC Landfill 1 (LF-1) groundwater remediation treatment system. However, with the LF-1 remediation treatment plant now shutdown, the pipeline is inactive, and that supplemental supply is not available.

MNC is undergoing an expansion that is projected to continue through 2060. The purpose of the expansion is to fulfill the need for additional burial sites. Currently, approximately 120 acres are irrigated, and a projected 18 irrigated acres will be added in the next 20 years (13 acres in Phase 4 and 5 acres in Phase 5, according to the current VA Master Plan). By 2060 an additional 16

irrigated acres are planned, for a total irrigated area of 154 acres. As part of the expansion plan, MNC identified that a WMA permit would be appropriate, not only for the expansion but for existing withdrawals as well.

The proposed sources of irrigation supply include three wells: the existing IW-1; an existing groundwater extraction well from a now closed and cleaned-up remediation system that was repurposed for irrigation supply (IW-2, formerly named EW-5); and a new irrigation well (IW-3). The repurposed well and new well are proposed to supplement IW-1 in order to meet the irrigation demand and provide redundancy moving forward.

Note that the IW-3 well used in the June 2020 pumping test (a requirement of the WMA permit application) was a temporary test well. Per MassDEP requirements, the final IW-3 production well was required to be located within 250 feet of the test well, be more than twice the 8-inch diameter of the test well, and have a maximum day permitted pumping rate of no more than twice the rate of the test well during the pumping test. MNC completed installation of the IW-3 production well in May of 2022, and confirmed that the well location and diameter met MassDEP requirements. The maximum daily withdrawal volume authorized in Special Condition 2 (below) is exactly twice that of the test well's rate during the pumping test.

MNC submitted its WMA permit application on October 8, 2021. On December 21, 2021, the Department sent MNC an Order to Complete (OTC) that outlined additional information needed to complete the Draft WMA Permit. MNC initially responded to the OTC on April 7, 2022, with further information submitted via email from May through December of 2022.

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

The WMA 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.

Permit Extension

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. That date was further extended by 462 days by the Governor's COVID-19 Order No. 42, "Order Resuming State Permitting Deadlines and Continuing to Extend the Validity of Certain State Permits," issued on July 2, 2020. Recent promulgation of

revised regulations (310 CMR 36.00) have adjusted permit expiration dates in several basins, including the Cape, so all permits moving forward in the Cape Cod Basin will have a March 6, 2032 expiration date. Note that this is a change from the expiration date identified in the Draft permit (November 30, 2030).

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 description that follows);
- 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; and
- The special permit conditions in each Water Management Act permit.

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 50.81 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.

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. These Findings

of Fact also explain any changes to special conditions from prior permits, when applicable. This summary of permit special conditions is not intended to, and should not be construed as, modifying any of the permit special conditions. In the event of any ambiguity between this summary and the actual permit conditions, the permit language shall control.

Special Condition 1, Maximum Authorized Annual Average Withdrawal Volume,

authorizes an annual withdrawal volume of 41.50 million gallons per year (MGY) of water, or 0.271 million gallons per day (MGD) over a 153-day irrigation season from MNC's three groundwater sources in the Cape Cod Basin.

In its permit application, MNC reported a history of withdrawals ranging from 26.79 to 57.03 MGY since 2013, with an 8-year average of 43.10 MGY. The table below provides MNC's available withdrawal record. Because the average of MNC's recent withdrawals exceeds its requested volume, and because the MNC is expanding its irrigated acreage, the Department requested information on MNC's approach to lowering its demand in the Department's December 21, 2021 OTC.

MNC responded with detailed irrigation demand estimates and a list of recently implemented water conservation measures. MNC also reported that test plots of a lower water-use turf species were underway, and if successful, would lead MNC to replace the current turf species with it. The lower water-use species, known as Johnathan Green Black Beauty, is estimated to use 30% to 50% less water than MNC's predominant turf species, Kentucky Bluegrass.

In an October 14, 2022 email to the Department, MNC reported that it worked to establish the test plot turf during the 2022 season and will install valves and a flow meter in the Spring of 2023 to accurately measure the volume of water applied to the plots. MNC anticipates the test plot results will be available at the end of the 2023 irrigation season. As such, MNC shall submit a report on the test plot results at the end of the 2023 season (by October 31, 2023). The reporting requirements are provided in Special Condition 1 of the Permit. The requirements include a Turf Replacement Plan, which (if approved by the Department) must be fully implemented by the end of the permit period (March 6, 2032).

In October 2022 correspondence with the Department, MNC noted that it experienced metering problems during the 2022 irrigation season that compromised the accuracy of its withdrawal data. To ensure such issues do not go undetected in 2023, MNC shall submit monthly reports of its total withdrawals and of its withdrawals applied to only the test plots.

If the test plots are unsuccessful (*i.e.*, if the turf health was poor or the water demand was not as low as anticipated (30% to 50% less than the Kentucky Bluegrass demand)), MNC shall file a new permit application by March 1, 2024 for additional volume. The permit application shall include a mitigation plan for the additional volume beyond the baseline, as defined below (see *Mitigation of Impacts for Withdrawals that Exceed Baseline*).

MNC's Reported Annual Withdrawal Volumes, MGY

Year:	2013	2014	2016	2017	2018	2019	2020	2021
Reported Withdrawal	44.82	57.03	53.75	37.71	43.90	30.89	49.96	26.79

Special Condition 2, Maximum Authorized Daily Withdrawal Volumes, identifies the approved maximum daily withdrawal volumes for MNC's three groundwater sources. In its

WMA permit application, MNC requested that the Department approve a maximum daily withdrawal equal to each well's the pumping rate in the June 2021 pumping test, as is typical in WMA permits. However, because the sum of those three rates (3.70 MGD) exceeds both MNC's current and estimated future daily demand, the Department's December 2021 OTC asked MNC to propose a system-wide maximum day withdrawal that reflects its daily demand. MNC responded with an estimate of 2.0 MGD. Therefore, the permit authorizes a combined maximum daily withdrawal of 2.0 MGD. The permit also authorizes individual well withdrawals equal to each well's pumping test rate to allow flexibility during periods when one well is shut down for maintenance or repair.

In its April 7, 2022 OTC response, MNC confirmed that the three wells will be individually metered. MNC also confirmed that all three well meters will be calibrated annually and the calibration reports will be attached to its Annual Report Form.

Special Condition 3, Water Quality Monitoring Program, was developed in consultation with MNC and staff of the Bureau of Waste Site Cleanup (BWSC) in the Department's Southeast Regional Office. As noted above, MNC is part of JBCC, formerly known as the Massachusetts Military Reservation (MMR). Contaminated groundwater plumes are present from historical contamination at MMR. Per the BWSC's advisement, MNC sampled each irrigation well for PFAS (PFOS + PFOA + PFHxS + PFNA + PFHpA + PFDA) at the beginning and end of the June 2021 pumping test that was conducted for the WMA permit application. In March of 2022, MNC also conducted baseline sampling of seven JBCC monitoring wells for PFAS per BWSC's request. All results were below the State PFAS MCL of 20 ng/L.

BWSC recommended including a monitoring condition in the Permit to monitor for changes in PFAS levels once the irrigation system begins fully operating. The irrigation wells will be sampled semi-annually and five JBCC monitoring wells will be sampled biannually. BWSC also recommended that sampling continue for two monitoring well sampling events, at a minimum, in order to have two datasets that follow full-season pumping conditions. The Department will evaluate the results at that time (anticipated for 2026), after which the monitoring program may be modified or discontinued.

Special Condition 4, Water Conservation and Seasonal Demand Management Plan, consistent with good water conservation practices, requires MNC to follow water conservation best management practices (BMPs) and to implement a Seasonal Demand Management Plan (SDMP). The SDMP is intended to address the necessary minimums of acceptable demand management required as dry conditions begin to impact our environment from May through September.

The SDMP, at a minimum, reduces water use between May 1st and September 30th when the Massachusetts Drought Management Task Force declares a drought level of "Level-1 Mild Drought" or higher (Level 2-Significant, Level 3-Critical, or Level 4-Emergency) for the Drought Region in which the water use is located (Cape Cod Region). The SDMP shall also be implemented at times when groundwater levels at a USGS monitoring well fall below a groundwater trigger for 60 consecutive days. The monthly trigger values are the period of record's monthly 25th percentile depth to water levels in a local well, as determined and published by the USGS.

The SDMP provides two options for water use reduction in table format. The Acres Table requires the identification of the number of acres of irrigated turf and the percent reductions in

acreage corresponding to worsening drought. The Time Table requires the identification of irrigation reductions based on changes to the timing of irrigation cycles.

MNC's April 7, 2022 OTC response specified the Time Table reduction approach. This approach is incorporated into the Permit and is shown in Table 6. MNC shall also implement the Best Management Practices (BMPs) that are included Table 5 of the Permit.

Mitigation of Impacts for Withdrawals that Exceed Baseline, requires mitigation, where feasible, of withdrawals over a baseline volume. Pursuant to 310 CMR 36.22, mitigation of withdrawals over a baseline volume is required, if feasible, if future withdrawals exceed the assigned baseline volume. Baseline withdrawal means the volume of water withdrawn 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.

The calculated baseline withdrawal volume for MNC is 41.50 MGY or 0.271 MGD over a 153-day season, which was the estimated average annual volume withdrawn in 2005 plus 5%. This volume was estimated in 2019 by measuring MNC's 2005 irrigated acreage via 2005 aerial imagery and converting it to a percentage of the 2018 irrigated acreage. That percentage was then multiplied by the average annual volume in recent years, which included 2013 through 2018 when the estimate was made in 2019. Lastly, a 5% buffer was added to the result.

As noted previously, MNC requested the baseline volume in its WMA permit application, and this permit authorizes only that baseline volume; therefore, mitigation is not required. However, as also noted previously (see Special Condition 1 above), the Department requires that MNC report on its turf-replacement plans in order to ensure that MNC can limit its demand to the baseline volume.

Minimization of Groundwater Withdrawal Impacts requires permittees with permitted groundwater sources in subbasins¹ with an August net groundwater depletion of 25% or more to minimize their withdrawal impacts on those subbasins to the greatest extent feasible. Minimization is not required in this permit because there are no delineated subbasins in coastal areas, including Cape Cod, and therefore no delineation of net groundwater depletion.

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

¹ Subbasins used for WMA permitting are the 1,395 subbasins delineated by the U.S. Geological Survey (USGS) in *Indicators of Streamflow Alteration, Habitat Fragmentation, Impervious Cover, and Water Quality for Massachusetts Stream Basins* (Weiskel *et al.*, 2010, USGS SIR 2009-5272). The Water Management Regulations, 310 CMR 36.03, define August net groundwater depletion (NGD) to mean the unimpeded median flow for August minus 2000-2004 groundwater withdrawals plus 2000-2004 groundwater returns described by the USGS in Weiskel *et al.*, 2010. A subbasin is groundwater depleted if it has an August NGD greater than 25%.



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Secretary

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Acting Commissioner

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

This issuance of Permit #9P4-4-22-036.02 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: 9P4-4-22-036.02

WATERSHED: Cape Cod

PERMITTEE: U.S. Veterans Administration
Massachusetts National Cemetery
Off Connery Avenue
Bourne, MA 02542

ISSUANCE DATE: February 23, 2023

EXPIRATION DATE: March 6, 2032

NUMBER OF WITHDRAWAL POINTS: Groundwater: 3; Surface Water: 0

USE: Cemetery Irrigation

DAYS OF OPERATION: 153 (May – September)

LOCATION(S):

Table 1. Withdrawal Point Identification

Source Name	Latitude	Longitude	Location
IW-1	41.674000	-70.577762	Off Connery Avenue
IW-2	41.666445	-70.589994	Off Connery Avenue
IW-3	41.667361	-70.580278	Off Connery Avenue

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SPECIAL CONDITIONS

1. Maximum Authorized Annual Average Withdrawal Volume

This permit authorizes the Massachusetts National Cemetery (MNC) to withdraw an annual average volume of 41.50 million gallons per year (MGY) of water, or 0.271 million gallons per day (MGD) over a 153-day season, from its three groundwater sources in the Cape Cod Basin, as shown in Table 2.

Table 2. Maximum Authorized Annual Average Withdrawal Volume

Permit Periods		Permit	
		Daily Average* (MGD)	Annual Total (MGY)
Period One	2/23/2023 to 3/6/2027	0.271	41.50
Period Two	3/7/2027 to 3/6/2032	0.271	41.50

*The daily average withdrawal volume over 153 days per year

In an effort to reduce water demand, MNC planted plots of a lower water-use turf (Johnathan Green Black Beauty, or Black Beauty) in 2022 to test its viability. MNC shall submit a report on the test plot results at the end of the 2023 season (by October 31, 2023). The report shall include the following:

- the test plot acreages;
- a summary of the outcome of the test plots, including the turf's anticipated irrigation rate based on its advertised lower demand, the actual irrigation rate in 2023, and the health of the turf;
- a comparison of the test plots' irrigation rate to the rate applied to the existing Kentucky Bluegrass at MNC. MNC shall ensure comparable irrigation conditions (e.g., soil type, tree shading, etc.) between the Black Beauty test plots and the measured area(s) of Kentucky Bluegrass to allow for an adequate comparison of water demand.
- MNC's plans for the existing and future turf areas based on the test plot results. If MNC intends to plant Black Beauty in the expanded acreage and replace Kentucky Bluegrass in the existing acreage, MNC shall provide a Turf Replacement Plan that includes the acreages of the existing and future areas that will be seeded with this turf species, and a schedule for completion.

MNC shall also submit monthly reports of its total withdrawals as well as withdrawals applied to only the test plots during the 2023 irrigation season. Monthly reports, beginning with the month of May and continuing through September 2023, shall be submitted by the 10th of the following month. Each report shall include the total monthly withdrawal, acres of Kentucky Bluegrass irrigated, acres of Black Beauty irrigated, and the average water use of both turf species.

Provided that the test plot results are successful² and the Turf Replacement Plan is approved by the Department, MNC shall begin implementing the Turf Replacement Plan in the 2024

² Test plot results will be considered successful if the following conditions are met: a) the volume of water applied to the Black Beauty turf during the 2023 irrigation season was 30% to 50% less than the volume applied to the

irrigation season. In its Annual Report Form each year thereafter, MNC shall include a plan implementation summary that notes the irrigated acreage in which the Black Beauty turf was seeded. The plan shall be fully implemented by the end of the permit period (March 6, 2032).

If the test plots are unsuccessful², MNC shall file a new permit application by March 1, 2024 for additional volume. The permit application shall include a mitigation plan for the additional volume beyond the baseline volume (41.50 MGY).

2. Maximum Authorized Daily Withdrawal Volumes

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 addition, the combined daily withdrawal of the three withdrawal points shall not exceed 2.0 MGD.

Table 3. Maximum Authorized Daily Withdrawal Volumes (MGD)

Source Name	Approved Maximum Daily Volume	Combined Maximum Daily Volume
IW-1	2.0	2.0
IW-2	0.65	
IW-3	0.93	

3. Water Quality Monitoring Program

MNC shall monitor for the presence of PFAS6 compounds (PFOS + PFOA + PFHxS + PFNA + PFHpA + PFDA) by sampling its three irrigation wells as well as five monitoring wells at the Joint Base Cape Cod. The sampling schedule is summarized in Table 4. Lab reports containing the sampling results will be electronically submitted to the Department as an attachment to MNC's Annual Report Form each year.

MNC is responsible for the sampling and analysis requirements until the Air Force Civil Engineering Center (AFCEC) on Joint Base Cape Cod incorporates them into the AFCEC base-wide Long Term Monitoring plan (LTM). When implementation of the LTM begins, the sampling requirements of this permit condition will become the responsibility of AFCEC. However, MNC shall continue to submit the sampling results as an attachment to its Annual Report Form each year.

The Department will evaluate all sample results following two monitoring well sampling events, which is anticipated for 2026 according to Table 4. The monitoring program may be modified depending on the results at that time. The Department will also consider requests to modify the monitoring program after 2026. Modifications to monitoring procedures require the specific advance written approval of the Department.

Kentucky Bluegrass, per the water savings advertised in the Black Beauty brochure submitted by MNC; and b) MNC finds the Black Beauty turf maintenance and appearance acceptable for proceeding with a Turf Replacement Plan in which Black Beauty replaces Kentucky Bluegrass as the predominant turf at MNC. Note that "predominant" means the Black Beauty turf must comprise more than 50% of the total irrigated acreage, including both the new (i.e., expanded) and existing turf. For example, if the irrigated acreage at the end of the permit period is 140 acres, more than 70 acres must be 100% Black Beauty.

Table 4. Sampling Schedule of the MNC Water Quality Monitoring Program

Wells to be sampled	Sampling Frequency	First Year of Sampling	Analytes
IW-1, IW-2, IW-3	Semiannually, as follows: 1. Directly after the 1st 30 days of irrigation system startup 2. Between Labor Day and irrigation system shutdown	2023	PFOS, PFOA, PFHxS, PFNA, PFHpA and PFDA
Monitoring Wells 27MW0701, 27MW0701A, 27MW0033A, 27MW0108A, 27MW2107A	Biannually in early Spring (by March 30th)	2024	Same as above

4. Water Conservation and Seasonal Demand Management Plan

MNC shall follow the water conservation best management practices (BMPs) in Table 5 throughout its irrigation season each year. In addition, MNC shall reduce water use from May 1st through September 30th as outlined in its Seasonal Demand Management Plan (SDMP; Table 6) and in the instructions for tracking groundwater levels and drought declarations in Table 7. At a minimum, reductions shall commence when the Massachusetts Drought Management Task Force declares a Drought Level 1 (“Mild”) or higher (Level 2-Significant, Level 3-Critical, or Level 4-Emergency) for the Cape Cod Drought Region, or when groundwater levels fall below the groundwater trigger (*i.e.*, when the depth to water becomes larger than the trigger value as the water table elevation declines) for 60 consecutive days. The groundwater-triggered response actions shall follow the Drought Level 1 (Mild Drought) response actions.

Once implemented, groundwater-triggered reductions 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 (*i.e.*, when the water table elevation has risen above the trigger level) for 30 consecutive days. MNC has been assigned the following USGS monitoring well: #414129070361401 – MA-BHW 198 Bourne, MA. The monthly groundwater trigger values are provided in Table 8. Should the reliability of the groundwater measurements at this well be so impaired as to question their accuracy, the Permittee may request the Department’s review and approval to transfer to another well to trigger reductions. The Department reserves the right to require use of a different well.

MNC shall be responsible for tracking the Massachusetts Drought Management Task Force drought declarations and USGS monitoring well groundwater levels, and recording when drought-triggered or groundwater-triggered irrigation reductions are implemented. Within 14 days of implementing irrigation reductions, MNC shall notify the Department by submitting the MassDEP Notification of Water Use Reductions Form for Golf Courses (<https://www.mass.gov/media/1928991/download>).

Nothing in this permit shall prevent MNC from implementing irrigation reductions that are more stringent than those set forth in this permit.

Table 5. MNC Water Conservation BMPs

1. Water use is 100% metered.
2. Source meters are calibrated annually.
3. Implementation of an irrigation system inspection and maintenance program that includes leak detection and repair, sprinkler head maintenance and replacement on a weekly basis.
4. Irrigation system is operated in the early morning or evening hours, when evaporation is lowest.
5. Irrigation uniformity is improved through evaluation of design criteria such as nozzle size, spacing, scheduling coefficient and pressure selection.
6. Use of a weather app or an onsite weather station combined with an automated sprinkler system governed by atmospheric conditions.
7. Use of a computerized irrigation management system equipped with flow management to increase irrigation efficiency.
8. Use of rain shutoff switches on new and existing irrigation systems.
9. Use of low water-use turf grass, where applicable.
10. Raising turf height during dry weather and drought conditions.
11. Regular aeration of turf to increase the percolation of water into the soil.
12. Use of mulch materials in planting beds to improve water-holding capacity.
13. Use of low water-use landscaping or native drought-tolerant plants around buildings, parking areas, or other appropriate places.
14. Employee training in water conservation and management.
15. Use of low-pressure alarms on water pumps and variable-speed drives.

Table 6. Irrigation Time Reductions in the MNC SDMP

Irrigating for Shorter Durations as Drought Severity Increases Reduced Minutes in Irrigation Cycles		
Massachusetts Drought Levels	Percent	Time (min)
Normal	100%	20
Mild Drought or groundwater trigger is reached	80%†	16
Significant Drought	60%†	12
Critical Drought	40%†	8
Emergency **	0%	
† Irrigation use shall not occur between the hours of 9 a.m. and 5 p.m., except that hand-watering of hot spots may occur at any time		
** Additional actions to be determined by the Governor’s Emergency Proclamation.		

Table 7. 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.

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

- Scroll down to 414129070361401 – MA-BHW 198 Bourne, MA.
- Click on the station number.
- Under “MA-BHW 198 BOURNE, MA” click “Legacy real-time page.”
- On the pull-down menu “Available data for this site” choose “Time-series: Daily data”.
- Under “Available Parameters” click on “WaterLevel, depth LSD (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 (25th percentile) in your permit. Irrigation reductions must be implemented when the daily depth to water level is at or below the trigger for 60 consecutive days.

Drought information is available at the Massachusetts Department of Conservation and Recreation (DCR) Drought Status Website at <https://www.mass.gov/guides/drought-management-in-massachusetts#-current-status->

- The color-coded map displays the seven drought regions in Massachusetts. Irrigation reductions are implemented when a Drought Level 1, 2, 3 or 4 is announced in your region through the DCR website.

Table 8. Groundwater Level Triggers for MA-BHW 198 Bourne, MA

Depth to Water (feet below ground surface)						
March	April	May	June	July	August	Sept
33.32	32.99	32.74	33.12	33.68	34.01	34.31

GENERAL PERMIT CONDITIONS (applicable to all Permittees)

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

1. **Duty to Comply** The Permittee shall comply at all times with the terms and conditions of this permit, the Act and all applicable State and Federal statutes and regulations.
2. **Operation and Maintenance** The Permittee shall at all times properly operate and maintain all facilities and equipment installed or used to withdraw 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.



Duane LeVangie
Water Management Program
Bureau of Water Resources

February 23, 2023

Date