



**RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANGEMENT
OFFICE OF WATER RESOURCES
GROUNDWATER AND WETLANDS PROTECTION PROGRAM**



FINAL DRAFT

**PRE-APPLICATION GUIDANCE FOR THOSE SEEKING A
GROUNDWATER WITHDRAWAL PERMIT
FOR > 10,000 GPD**

STEP 1. Complete the Pre-application form and a report containing the required information identified in Attachment A and submit 3 copies of the information to the RIDEM Office of Customer and Technical Assistance with a request for a pre-application meeting. Farmers can coordinate with the Department of Agriculture rather than Office of Customer and Technical Assistance.

STEP 2. Meet with DEM to discuss the project and the pumping test requirements.

Please submit Attachment A at least one week in advance of the meeting. At the meeting, the Department will discuss any requirements for the pumping test, any wetlands concerns that have been identified in Attachment A, the location of pumping test discharge point, any fill, access concerns, aquifer characteristics, pumping rates, changes in protocol, stabilization etc...

Note: A separate wetlands permit may be necessary if there is a potential impact to the wetland from the discharge point or from construction of roads or facilities for the pumping test. DEM will advise whether or not wetlands permit will be required.

STEP 3. Submit your pumping test proposal to the Office of Freshwater Wetlands. The proposal must address the concerns from any prior meeting(s) and it must address the requirements in Attachment B. An approval of the pumping test is required from this Department prior to commencement of the pumping test.

Note: Please notify this Department at least 3 days prior to commencement of the pumping test.

STEP 4. Submit a final pumping test report to the Office of Freshwater Wetlands – applicants are urged to request a second meeting to discuss pumping test results and requirements for the wetland permit application.

STEP 5. Apply to the Office of Freshwater Wetlands for a permit and include the final pumping test report along with the requirements in Attachment C.

Note: All surface water withdrawals require a freshwater wetlands permit.

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PRE-APPLICATION FORM FOR GROUNDWATER WITHDRAWAL PROJECTS

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Rhode Island Department of
Environmental Management
Office of Technical & Customer Assistance
235 Promenade Street
Providence, RI 02908

Rhode Island Department of
Environmental Management
Department of Agriculture
235 Promenade Street
Providence, RI 02908

Submit one form for each proposed water withdrawal source (project).

A. APPLICANT INFORMATION *(Please Type or Print)*

Applicant Name: _____

Applicant Mailing Address: _____ Telephone No. _____

City /Town: _____ State: _____ Zip: _____

B. PROJECT INFORMATION

Project Location (*Address*): _____

City/Town: _____ State: _____ Zip: _____

Tax Assessor's Plat (s) and Lot Numbers(s): _____

Project Consultant Name : _____

Project Consultant Mailing Address: _____ Telephone No. _____

City/Town: _____ State: _____ Zip: _____

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ATTACHMENT A

I. PROJECT DESCRIPTION

- A. Describe the project including an explanation of the project purpose and why the withdrawal is necessary.
- B. Identify the location of the proposed withdrawal.
- C. Identify the watershed in which the proposed well is located and source water (river and aquifer) for the withdrawal.
- D. Is this project within CRMC jurisdiction?
- E. Describe how much of the water is actually consumed and the quantity and location of return flow relative to the withdrawal point (whether upstream or downstream). If the water is returned downstream of the point of withdrawal, discuss how this will effect water quantity in the basin. If an out-of-basin transfer of water is proposed, discuss impacts on water quantity in the basin of origin – as well as the receiving basin.
- F. Describe the proposed new or replacement withdrawals - rate, quantity, duration and frequency including:
 - 1. Maximum 24 hr. withdrawal volume (MGD or GPD)
 - 2. Maximum withdrawal rate (GPM)
 - 3. Average day withdrawal volume (MGD or GPD)
 - 4. Proposed duration and frequency of pumping (i.e. proposed operating protocol)
 - 5. Summer to winter ratio and max daily to average daily ratio (if different)
 - 6. Maximum daily flow to average daily flow

II. SYSTEM DESCRIPTION

Describe existing sources of supply both purchased and produced for your water supply system (if applicable) – including rate, quantity, duration and frequency.

- A. Maximum 24 hr. withdrawal volume (MGD or GPD)
- B. Maximum withdrawal rate (GPM)
- C. Average day withdrawal volume (MGD or GPD)
- D. Current duration and frequency of pumping for all wells
- E. Peaking factor MDD/ADD
- F. Original design yield and current yield
- G. List all State permit approvals and any conditions in those approvals that are relevant to water withdrawals
- H. Describe legal obligations to supply water
- I. Estimate-evaluate
 - a. Fire fighting
 - b. Non-account (including system use-unmetered public use)
 - c. Meter inaccuracies-major leaks (annual basis % of water produced)
- J. Describe any system deficiencies

III. SITE CONDITIONS

Description of natural and manmade features, including wetlands, watercourses, fish and wildlife habitat, floodplains, and structures potentially affected by the proposed diversion due to physical alterations, or streamflow or water level depletion(s).

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Presence of sensitive or multiple receptors may limit site availability for water supply withdrawal. Some of the information required in this section can be found on the RIDEM website geographic data viewer at <http://www.dem.ri.gov/maps/index.htm#GV> and click on the Environmental Resource Map.

Other information such as low flow studies and water availability studies to locate existing withdrawals can be found on the USGS website at <http://www.wrb.ri.gov>.

A. Provide a 1:6,000 scale or larger map depicting the proposed well site and the area within ½ mile radius of the proposed well including the following information:

1. Current land uses
2. Known water withdrawals within ½ mile
3. Zoning
4. Lakes, ponds, streams, and wetlands within 1000' radius of the well
5. The following sensitive receptors exist within 1000' of your site
6. Priority habitat for rare and endangered species
 - a. Recreational areas (parks or management areas, public beaches, boat ramps)
 - b. Amphibian breeding pools
 - c. Stocked trout streams
 - d. Cold water fisheries resource
 - e. Any other critical resources
 - f. Public and Private wells

B. Provide listings and locations of the following potential threats within one-half mile of your site?

1. Identified CIRCLAS sites
2. Combined Sewer Overflows or Sanitary Sewer Overflows
3. Landfills
4. Salt Storage Facilities
5. DPW Garages
6. Agricultural Uses
7. Automobile graveyards and junkyards
8. Industrial Parks/Plants
9. Petroleum, Gas station and oil bulk stations and terminals

C. Provide listings and locations of the following within the watershed of the proposed well:

1. RIPDES or NPDES permitted facilities (National Pollution Discharge Elimination System)
2. Public and known private water withdrawals
3. Regulated impoundment(s) within the watershed

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III. HYDROLOGIC CONDITIONS

This section is intended to preliminarily evaluate the potential impacts of proposed withdrawals on streamflow and availability of water in the river basin. The following stream screening criteria provides guidance concerning a withdrawal's potential for impact on flow.

Proposed groundwater withdrawals are assumed to have a 1:1 relationship with the amount of streamflow or water level depletion in hydrogeologically connected waterbodies (in other words, one gallon of water withdrawn from a well is expected to result in one gallon depleted from the affected waterbody) . The Department will accept calculations, which may show a lesser amount of depletion (such as Jenkins-Barlow calculations) in the pre-determination. It is generally considered that a cumulative consumptive use of 5% of the 7Q10 returned within ½ mile of the withdrawal is de minimus and would not result in measurable impacts to the river however, isolated wetlands and amphibian breeding pools may be impacted.

Studies have shown that at a cumulative, consumptive use of 50% of the 7Q10 creates measurable changes in the fish communities (Freeman, M.C. and Marcinek, P.A., Environmental Management Vol. 38, No. 3, pp. 435-450). The Department recommends that you carefully select your water source to avoid small streams and pools.

- A.** Provide the following flow statistics to the nearest stream reach from the withdrawal point. If the withdrawal location is near a confluence of two streams, please provide flows of both streams. These are the 7Q10 flow (MGD) and ABF of the nearest hydrologically connected stream(s) and the methods used to determine the 7Q10 and ABF.
- B.** Provide the peak cumulative consumptive use (MGD) within the basin in July, August and September (reference the USGS Water Availability Studies)
- C.** Identify locations within the basin that are stressed for quantity, quality or habitat (reference state's 303(d) list, USGS Water Availability Studies)
- D.** Provide a hydrologic budget of the watershed
- E.** Provide the aquifer characteristics
- F.** Provide results of any field test, secondary contaminants, and VOC analysis if available
- G.** For wells with planned yields of 10,000 gpd or greater in any 24 hour period, please provide a preliminary conceptual model of the aquifer, including:
 - 1. Conceptual model of groundwater flow through the proposed well site including recharge and discharge areas
 - 2. Stratigraphic cross-sections and boundary conditions
 - 3. Initial estimates of the Well Head Protection Area

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IV. DEMAND MANAGEMENT AND CONSERVATION PLANNING

- A.** As part of its assessment of water resource impact avoidance measures, the Department evaluates the applicants' efforts to optimize water efficiency and effectively manage demand (Rule 10.01). Describe what you do or plan to do to ensure the efficient use and conservation of water as detailed below. Provide data on historic, current, and projected future demand (projections from approved water system supply management plans may be used if still valid), if applicable.
1. Average daily demand for the last 5 years, current year, and projected 5 and 20 year periods (system-wide and per capita basis, if relevant).
 2. Maximum daily demand (MGD) for the last 5 years, current year, and projected 5 and 20 year periods (MGD and per capita basis, if relevant).
 3. Describe current water conservation programs and their impact, please provide assumptions and methodologies.
- B.** Provide data on historic current and projected future water production (supply): For 5 and 20 year periods, considering only current sources (supply) data, and with water supplied from proposed well.
1. What is your system's redundancy? Can you meet your average day demand with your largest existing source off-line? Can you meet your average daily demand from other available sources?
 2. Do any of your existing sources have restricted or diminished capacity? If so, briefly indicate which sources and the reasons for the capacity restrictions. Are these restrictions temporary or permanent?
- C.** Water Conservation— what efforts have been made to avoid the need for a new or expanded withdrawal? Has every reasonable effort been made to avoid the need for new withdrawals? Has conservation been practiced and is it effective?
1. Detailed description of a community's efforts to discover and minimize unaccounted-for (non-account) water including leak detection and repair program and meter reading, calibration and replacement program. Consistent with AWWA recommendations, the goal is to reduce this to less than 10%.
 2. Outline the existing efforts and the strategy for adopting and implementing measures to optimize water efficiency, conserve water and reduce peak demands:
 - a. Consideration of construction or acquisition of additional storage facilities
 - b. Establishing caps on per-day residential water use
 - c. Technical assistance to major users to implement water efficiency and water conservation measures
 - d. Outdoor watering requirements (local ordinances re: limiting lawn size or incentives for native or xeriscape plantings or use of rain gardens)
 - e. Retrofit or replacement of residential plumbing fixtures
 - f. Implementing a water conservation pricing structure and billing program
 - g. Increased education
 - h. Recycling of gray water

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V. ALTERNATIVE PLANS

The wetlands regulations require a demonstration of avoidance and minimization. With regards to water supplies, this includes formulating, evaluating effects and comparing alternative plans: At a minimum, the plans that must be formulated are:

- a.** Leak detection alternative
- b.** Conservation and demand management alternatives including but not limited to:
 - 1.** Toilet replacement program
 - 2.** Outdoor water bans
 - 3.** Pricing Structure
- c.** Alternate locations at the site to minimize wetland crossings
- d.** Alternative sources of supply

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ATTACHMENT B

PUMPING TEST PROPOSAL

The pumping test proposal must provide the following information for each pumping test. If any deviations from the listed protocol(s) are necessary, please explain the reasons why.

I. SITE INFORMATION

A. Historic water level data

B. Site Plan showing location of piezometers, observation wells, pumping wells, staff gages, nearby wetlands, discharge point and other pertinent information.

Note: Please refer to the attached document “Technical Standards for Water-Table Monitoring of Potential Wetland Sites” ERDC TN-WRAP-05-2 US Army Corps of Engineers for piezometer locations and installation recommendations.

- If staff gages are required one must be outside of the influence of pumping and the other must be located in the stream reach closest to the pumping well. In certain cases a stilling well may be required around the gage.
- Selected observation wells should fully penetrate the aquifer and should also be screened in the same aquifer as the screen of the pumping well unless there needs to be an exception (i.e. to confirm a confined aquifer, to evaluate surface water infiltration, or to locate source water from a bedrock well).
- Selected observation wells and/or staff gages should be set so as to observe impacts to surrounding wetlands including identified vernal pools or amphibian breeding areas within the area of influence of the production well.

C. Plan showing any other wells, private or public, in the area that may affect the cone of depression and to whether or not they will be running during the pumping test.

D. Location and log (depth, yield, lithology) of all exploratory wells, water table of the pumping well and the screen depths (if not possible to screen through the entire aquifer, explain why).

E. Description of the aquifer extent and characteristics (e.g. confined, unconfined, transmissivity, storage coefficient).

F. Description of nearby wetlands and methods that will be used to define stratigraphy in the wetland and impacts of pumping. Peat probing and monitoring wells or a combination of both are acceptable unless another is deemed more appropriate.

G. Description of recharge available to the well site including the delineation of drainage area and estimated precipitation compared to desired withdrawal rate.

II. OPERATIONAL INFORMATION

A. Description of the physical dimensions of the test well

B. Description of the planned test pumping rate

- There should be no more than a 10 percent variation in the pumping rate during the course of the test unless a step test is used to determine the rate of pumping.

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- The proposed well must be pumped for some duration (minimum of 3-5 days depending on amount requested) at a rate for which the source approval is sought.
 - All of the wells within the influence of the pumping well must be pumped at their approved yield for the duration of the pumping test unless modeling is conducted to determine the cumulative impacts.
- C.** Documentation of test drilling and preliminary pumping test results
- D.** Documentation of method (i.e. step test)
- E.** Description of planned duration of test
- F.** Description of the location of discharge (make sure water is not returned to the pumping well through infiltration). A freshwater wetlands permit for the pumping test is not necessary provided proper erosion and sediment controls are installed to avoid freshwater wetland impacts from any discharge to any receiving..
- G.** Description of the measurement frequency of the observation wells, pumping well, precipitation and staff gages and discussion of proposed measurement methods.
1. Precipitation – During the pumping test, precipitation should be measured daily on site to the nearest 0.01 in. Precipitation measurements should commence 5 days prior to the startup of the pumping test. If at all possible the pumping test should be scheduled so that there is no heavy rainfall for 2 days prior, during and 1 day after the pump test
 2. Water-level readings in the well commence after one minute of pumping, the 1 ½ minute measurement should be made and then it should continue on the order of ten readings per log cycle of time in minutes.
 3. Measurements of antecedent water levels (all wells and stream gages min. 3 days). If there are tidal influences or other reasons for the static levels to fluctuate, then more than 3 days at 2 times per day of antecedent measurements may be required in order to establish the proper pattern.
- H.** The flow measuring device must be capable of providing instantaneous flow measurements accurate to within ±5% of the pumping rate. The flow meter must be calibrated and maintained in accordance with manufacturers specifications. Measurements and adjustments of the pumping rate should occur frequently at the start of the test until a stable rate is achieved around every 2 hours. Flow can also be measured using an orifice and piezometer tube. The time and measurement of the pumping rate should be recorded in the field notes and included as an appendix in the report.
- I.** Description of the drawdown and recovery reading methodologies. Recovery must be recorded to until a minimum of 95% of the drawdown is restored.
1. All drawdown and recovery readings shall be recorded to the nearest ¼ inch. (0.02 feet).
 2. The pumping well should be fully developed prior to the pump test.
- J.** Describe stabilization criteria.
- K.** Describe the step test methods that may be used to determine pumping rates.
- L.** Describe how the water contours would be drawn and resolved. Since the wetlands application already requires contours the water contours should be drawn over the land contours.
- M.** Describe the well's proposed pumping schedule.
- N.** Shutdowns for generator service should not exceed 2 hours.
- O.** Description of planned water quality measurements. It is recommended that specific conductance, pH, temperature and other indicator parameters in samples from the surface water body, production well

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discharge, and appropriate observation wells are collected before and during the pump test. Discuss methods anticipated to generate appropriate mass balance equations to estimate the extent of induced infiltration under pumping conditions. These water quality tests do not replace the Department of Health water quality testing requirements.

- P. Description of vertical hydraulic conductivity estimations. Recommended techniques include, field or laboratory techniques like streambed piezometers to measure the hydraulic conductivity.

III. REQUIREMENTS FOR LARGER OR MORE COMPLEX PROJECTS AS DETERMINED BY THE DEPARTMENT

- A. Stream profiling or enhanced stream gaging. This may be required to supplement induced infiltration information when large volumes of water are taken out near a stream.
- B. In certain complex hydrogeologic situations, it is difficult to predict the zone of contribution for a well without employing a numerical computer model. Based on the geologic and hydrogeologic complexity of the aquifer, DEM may require that a specific modeling approach be used to delineate the zone of contribution to the pumping well and well head protection areas and to delineate areas of potential impact with MODFLOW or other approved method.
- C. Habitat survey and analysis which includes lists of those species considered to be endangered, threatened, or of special concern in the state within the 1' drawdown contour calculated for August.
- D. The installation of as many monitoring or observation wells which are necessary to validate the assumptions used in the computer model and to assess existing or suspected water quality problems.

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ATTACHMENT C

The freshwater wetlands application must include all of the requirements outlined in the freshwater wetlands regulations and:

- The pumping test report
- All data collected during the pumping test including accurate records of pumping rate, barometric pressure, drawdown and recovery readings and localized weather conditions.
 - Drawdown and recovery analysis.
 - Aquifer transmissivity and storativity including graphs and calculations, determined from the pumping test analysis.
- Safe Yield calculations using appropriate methods.
- Discussion of the wetland hydraulic connection to the underlying aquifer based on the aforementioned borings and/or peat probes.
- The pumping schedule that is anticipated for the new source based on population served, the engineering complexity of the system, and availability of alternate sources.
- Discussion of watershed impacts, identification of any RIPDES facilities, 7Q10 flows and impacts on any IPDES dischargers.
- Discussion of impact on upstream or downstream users.
- Estimations of consumptive use to the watershed.
- Design analysis necessary to determine no adverse impacts to the natural resources found in the impacted area.
- Proposed backup, storage and conservation measures for low flow and drought conditions.
- Discussion of environmental impacts to the surrounding wetlands, stream and watershed.
- A calculation of existing aquatic base flow values
- Hydrologic and hydrogeologic studies quantifying and qualifying the groundwater flows may be required for significant or environmentally sensitive projects.
- A species inventory addressing aquatic resources and community structure may be required for the project area; scope of work must be approved by the Office of Water Resources.
- A comprehensive description of proposed methodology of irrigation and pesticide/herbicide application, if applicable
- A narrative describing potential impacts to all state waters associated with the project and surrounding area.