



COMMONWEALTH of VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMIT
TO WITHDRAW GROUNDWATER
(FOR USE IN GROUNDWATER MANAGEMENT AREAS)

Permit Number: GW0046701
Effective Date: September 1, 2014
Expiration Date: August 31, 2024

Pursuant to Section 62.1-256 of the Ground Water Management Act of 1992 (Chapter 25, Title 62.1 of the Code of Virginia) and the Groundwater Withdrawal Regulation (9VAC25-610-10 et seq.), the STATE WATER CONTROL BOARD hereby authorizes

Permittee Princess Anne Country Club
Address 3800 Pacific Avenue
Virginia Beach, Virginia 23451
Facility Princess Anne Country Club

to withdraw and use groundwater in accordance with this permit and the application received June 3, 2013 and subsequently amended.

The permittee is authorized to withdraw 26,430,000 gallons per year and 206,000,000 gallons in the 10 year permit term.

The permittee shall comply with all requirements contained on this cover page, Part I - Permit Standards, Limitations, and Conditions, Part II - Special Conditions, the Ground Water Management Act of 1992 (Chapter 25, Title 62.1 of the Code of Virginia), and the Groundwater Withdrawal Regulation (9 VAC 25-610-10 et seq.). Nothing in this permit or this regulation shall be construed to relieve the permittee of the duty to comply with all applicable Federal and State statutes and regulations.

The permitted withdrawal will be used to provide irrigation water for the golf course and clubhouse landscaping and wet suppression for the tennis courts. Other beneficial uses are not authorized by this permit.

Any noncompliance with permit conditions, the Groundwater Withdrawal Regulation (9VAC25-610-10 et seq.) or the Ground Water Management Act of 1992 (Chapter 25, Title 62.1 of the Code of Virginia) is a violation of the regulation and law, and is grounds for enforcement action, permit termination, revocation, amendment, or denial of a permit renewal application.

By direction of the STATE WATER CONTROL BOARD, this Permit is granted by:

Signed 

Date 8/5/14

For the STATE WATER CONTROL BOARD

Part I
Permit Standards, Limitations and Conditions

1. The withdrawal of groundwater shall originate from the following withdrawal points:

<u>Owner Well Name</u>	<u>DEQ Well #</u>	<u>Depth</u>	<u>Aquifer</u>	<u>Latitude</u>	<u>Longitude</u>
Fairway #8 Well	228-00441	90'	Yorktown-Eastover	<u>36°51' 59.1"</u>	<u>75° 59' 33.9"</u>
Fairway #9 Well	228-00442	90'	Yorktown-Eastover	<u>36°51' 54.5"</u>	<u>75° 59' 16.7"</u>
Fairway #13 Well	228-00443	97'4"	Yorktown-Eastover	<u>36°52' 11.1"</u>	<u>75° 59' 33.5"</u>
Fairway #15 Well	228-00444	90'	Yorktown-Eastover	<u>36°52' 25.2"</u>	<u>75° 59' 16.4"</u>
Clubhouse Well	228-00510	110'	Yorktown-Eastover	<u>36°51' 53.5"</u>	<u>75° 58' 55.25"</u>

2. Withdrawals from the well or well system are limited as follows:

In a calendar month: Total pumpage from these wells shall not exceed 6,300,000 gallons. The permittee shall report any amount in excess of the monthly withdrawal limit by the fifth day of the month following the month of over withdrawal.

3. Water use from each well and total system water use shall be recorded monthly and reported on forms provided by the Department of Environmental Quality (Department) to the Groundwater Withdrawal Permitting Program by the tenth day of each January, April, July and October for the respective previous standard quarter. Records of water use shall be maintained by the permittee as required in Section 9VAC25-610-130(F).
4. Permitted users shall install in-line totalizing flow meters to read gallons, cubic feet or cubic meters on each well prior to beginning the permitted use. Meters shall be tested in accordance with American Water Works Association (AWWA) Manual M-6, "Water Meters - Selection, Installation, Testing, and Maintenance". Such meters shall produce volume determinations within plus or minus 10% of actual flows. A defective meter or other device must be repaired or replaced within 30 days. A defective meter is not grounds for not reporting withdrawals. During any period when a meter is defective generally accepted engineering methods shall be used to estimate withdrawals and the period during which the meter was defective must be clearly identified in groundwater withdrawal reports.
5. Each permitted well shall be equipped in a manner such that water levels can be measured during pumping and non-pumping periods without dismantling any equipment. Any opening for tape measurement of water levels shall have an inside diameter of 0.5 inches and be sealed by a removable plug or cap. The permittee shall provide a tap for taking raw water samples from each permitted well.
6. The permittee shall not place a pump or water intake device lower than the top of the uppermost confined aquifer that a well utilizes as a groundwater source or lower than the bottom of an unconfined aquifer that a well utilizes as a groundwater source.
7. Each well that is included in this groundwater withdrawal permit shall have affixed to the well casing, in a prominent place, a permanent well identification plate that records the Department's well identification number, the groundwater withdrawal permit number, the total depth of the well and the screened intervals in the well, at a minimum. Such well identification plates shall be in a format specified by the Department and are available from the Department.

8. The Water Conservation and Management Plan (Plan) as described in the application received June 3, 2013 and subsequently amended is incorporated into this permit and included as Attachment A. Requirements in the Water Conservation and Management Plan shall have the same effect as any condition contained in this permit and may be enforced as such. Records of activities conducted pursuant to the Plan are to be submitted to DEQ upon request.
9. This permit may be reopened for the purpose of amending the conditions of the permit to meet new regulatory standards duly adopted by the Board.
10. A new permit application shall be submitted 270 days prior to any proposed modification to this permit that will result in an increase of withdrawal above permitted limits, violate the terms and conditions of this permit, or to continue withdrawals greater than 300,000 gallons in any month while an application for renewal is being processed (9VAC25-610-96).
11. This permit may be reopened for amendment, transfer, or revocation as described in Part VI of the Groundwater Withdrawal Regulation (9VAC25-610-290 through 9VAC25-610-340).
12. The permittee must notify the Department in writing and obtain staff approval of any change in the status, construction or pump setting of wells included in this permit. A revised GW-2 form must be submitted to the Department within 30 days in the event that the physical construction of a well is altered or the pump setting in the well is changed.
13. The permittee must notify the Department in writing of any change of contact person, address, or phone number that is contained in the application received June 3, 2013.
14. Upon presentation of credentials the Board or Department, or any duly authorized agent, shall have the power to enter, at reasonable times and under reasonable circumstances, any establishment or upon any property, public or private, located anywhere in the Commonwealth for the purposes of obtaining information, conducting surveys or inspections, or inspecting wells and springs to ensure compliance with any permits, standards, policies, rules, regulations, rulings and special orders which the Board or Department may adopt, issue or establish to carry out the provisions of the Ground Water Management Act of 1992 and the Groundwater Withdrawal Regulation.

Part II
Special Conditions

1. The Mitigation Plan, as described in the application received June 3, 2013 and subsequently amended, is incorporated into this permit and included as Attachment B. Requirements in the Mitigation Plan and subsequent revisions shall have the same effect as any condition contained in this permit and may be enforced as such.
2. A minor amendment to this permit must be made to include additional wells. Additional wells may be permitted under a minor amendment if the total withdrawal does not exceed the permitted amount contained in this permit, the withdrawal from all additional wells originates from the Yorktown-Eastover Aquifer, and the location of the wells are approved by DEQ staff prior to construction. Additionally, a complete suite of geophysical logs (Spontaneous Potential, Single Point Resistance, 16/64 Short and Long Normal, Natural Gamma) shall be submitted to the Department prior to setting the pump intake.
3. The permittee shall collect a ground water quality sample from the Fairway #9 Well, DEQ Well# 228-00442 completed in the Yorktown-Eastover Aquifer on a quarterly basis. Prior to collecting the sample, the well shall be pumped sufficiently to withdraw at least three well volumes and the Ph, temperature, and conductivity of the discharge shall be stabilized. The sample shall be analyzed for, at a minimum, chloride, sulfate, alkalinity, fluoride, calcium, magnesium, zinc, sodium, iron, and potassium content, and an anion-cation balance (as described in Part 1030 of "Standard Methods for the Examination of Water and Wastewater") shall be performed on the results. A report of the results shall be submitted quarterly with the withdrawal reports required in Condition 3 of Part I of this Permit. Records of groundwater quality sampling results including documentation of Ph, temperature, and conductivity stabilization prior to sampling shall be maintained by the permittee as required in 9VAC25-610-130(F).

Water quality analyses with cation-anion imbalances greater than the recommended limits as described in the Standard Method are considered suspect and the reason for the excessive imbalance must be explained in writing by the laboratory at the time of report submittal or the sample re-tested or the well re-sampled and tested within 30-days of the initial test result that fell outside of the recommended limits. DEQ reserves the right to require a re-test or re-sample and test after review of the laboratory's explanation for the excessive imbalance.

4. A continuous water level recording instrument shall be maintained on Monitoring Well #3 (DEQ # 228-445). Daily low water level records shall be submitted quarterly with the withdrawal reports required in condition 3 of Part I of the Permit. Records of water levels shall be maintained by the permittee as required in 9VAC25-610-130 (F).
5. If the monitoring information required in Conditions 3 and 4 above indicates the potential for adverse impacts on groundwater levels or groundwater quality that are due to this withdrawal, this permit may be reopened to include groundwater level and/or quality action levels.

6. Pump settings in individual wells are limited as follows:

<u>Owner Well Name (or #)</u>	<u>DEQ Well#</u>	<u>Max Pump Setting</u> (ft below land surface)
Fairway #8 Well	228-00441	66'
Fairway #9 Well	228-00442	62'
Fairway #13 Well	228-00443	70'
Fairway #15 Well	228-00444	60'
Clubhouse Well	228-00510	68'

The permittee may provide additional information regarding the depth of the top of the Yorktown-Eastover Aquifer to justify pump settings different from those listed above. Note, the above pump setting limits are based on the limited site data provided and could be modified based on review of additional site data. Any change in the pump settings must receive prior approval by Department staff and be included in this permit as a minor amendment.

7. No later than six (6) months from the effective date of this permit, the permittee shall ensure that the pump intakes of the three wells listed below meet the Maximum Pump Settings stated in Special Condition #6 above and repeated below. The permittee shall advise, in writing, DEQ of the adjusted or confirmed pump setting within 30 days of the modification.

<u>Owner Well Name (or #)</u>	<u>DEQ Well#</u>	<u>Max Pump Setting</u> (ft below land surface)
Fairway #8 Well	228-00441	66'
Fairway #13 Well	228-00443	70'
Clubhouse Well	228-00510	68'

8. The permittee shall maintain an in-line totalizing flow meter to read gallons, cubic feet or cubic meters on the irrigation lake's withdrawal. Water withdrawn from the irrigation pond to supply the irrigation system shall be recorded monthly and reported on forms provided by the DEQ to the Department by the tenth day of each January, April, July and October for the respective previous standard quarter. Records of irrigation water use shall be maintained by the permittee as required in 9VAC25-610-130(F).

9. If the permittee intends to reapply for another permit term, within 270 days prior to the expiration date of this permit, the permittee shall collect induction logs to the depth of the three PVC production wells: Fairway #9 (DEQ# 228-00442), Fairway #15 (DEQ# 228-00444), and the Clubhouse Well (DEQ# 228-00510). The induction logs shall be referenced by the DEQ well number and submitted to Department staff within 30 days of collection. At least one week prior to conducting the work, the permittee shall notify the Department of the scheduled induction log collection date.

10. If a viable source of municipal reuse water becomes available as an alternate source of water for some or all of the golf course irrigation needs, the permittee shall accept this source as an alternate irrigation water supply for the facility.

11. This permit may be reopened if the issuance of ground water withdrawal permits required by the Ground Water Management Act of 1992 for existing permitted or certificated users indicate that the basis used for predicting compliance with regulatory drawdown criteria was inaccurate.

ATTACHMENT A

WATER CONSERVATION AND MANAGEMENT PLAN

F WATER CONSERVATION PLAN

Numerous water conservation strategies will be and have been implemented which include turfgrass selection, irrigation design, and best management practices. The combination of all of these strategies has been implemented to ensure minimum use of water.

Description of System and System Maintenance

The existing two acre irrigation lake is clay lined with one 18" outfall. The pump system was installed in 2007 and has been routinely serviced every year since installation. The pump system has two VHD pumps and one maintenance pump that keep the system pressurized. These pumps are submerged into a concrete wet well that is also routinely maintained each spring for debris, cracks and sedimentation.

Irrigation water is transported through a pipe that was installed in 2007 and is rated for 200 PSI. The irrigation heads are Rainbird series 700, 750, 900 and 950 and serviced on an as needed basis. All leaks are fixed as soon as possible and the club incorporates hand watering into their daily routine to limit unneeded water. The club uses TDR 300 Moisture Meters on a daily and even hourly basis to monitor moisture levels on the playing surfaces.

All irrigation heads are controlled by the Rainbird Cirrus automatic control system. All applications are based on Moisture meter readings and have a rain sensor incorporated into the system that will shut down all irrigation if a rain event happens after hours.

The club has over 16 hours of training with each of at least three team members that incorporates system maintenance and operation.

The manufacturer's guidance is followed and yearly maintenance is provided

Inflow and outflow is metered and is compared. Leak detection is primarily visual in nature since all the heads are on the surface and there are multiple team members and golfers that peruse the course daily and hourly.

Lake levels are monitored daily and the club maintains lake levels lower than the spillway elevation to prepare for "pop-up" rain events. The lake has an automatic shut-off system that tells the wells to stop if the lake level exceeds the threshold set by the club.

Reuse water is not an option at this time.

Requirements for Use of Water Saving Plumbing

The 2007 golf course renovation project resulted in an upgraded irrigation system. The improved system results in better control of water application such that areas requiring the most water can be differentiated from the areas requiring the least water. For example, shaded areas require less water than the areas experiencing more hours of direct sunlight and are consequently allocated less water. The improved irrigation system also allows watering more frequently with less water. This equates to less wasted water.

Irrigation heads have been installed to ensure water is sprayed onto turf grass areas and not sprayed into non turf areas.

The 2007 course renovations included replanting the fairways with 419 hybrid Bermuda Grass. This species was selected partly due to its improved drought tolerance compared to other cultivars of Bermuda Grass and other grass types.

Princess Anne uses modern sprinkler heads which are more efficient and result in less water loss than older systems.

The irrigation system is computer controlled, which will allow the club to better match precipitation rates to infiltration rates in order to control run-off more efficiently.

The irrigation system uses a variable frequency drive pump station. The VFD pump station better controls the amount of pressure utilized to run sprinkler heads. This pressure control helps to alleviate air and water hammers which can contribute to irrigation line breaks.

The irrigation system allows the club to pump wetting agents directly into the irrigation system. By utilizing wetting agents, they are capable of watering with less frequency because our water is being better adsorbed by the soil.

The club uses independent irrigation control on putting greens. Each green has two sets of sprinkler heads; inside and outside. Since each of these two surfaces have very different water demands and cultural requirements, the system was designed to accommodate. In this way we do not over water either surface causing excess run off.

Water Loss Reduction Program

The staff and membership of Princess Anne Country Club have been informed to report all irrigation leaks to the appropriate persons immediately. This allows their department to fix leaks in a timely manner. This information is relayed during weekly staff meetings and the use of the monthly club newsletter.

Visual inspections are conducted weekly on the irrigation system to define any potential leaks. If leaks are discovered, they must be repaired immediately.

The golf course superintendent carefully determines the proper irrigation amount on a daily basis. Weather reports are checked daily to determine when rainfall will occur. Temperatures are gauged to estimate the need for irrigation. Decisions are supplemented by the use of soil probes to identify areas in which the soil is dry and irrigation is needed.

The Club implements core aerification twice per year to improve water infiltration and minimize runoff during irrigation or rainfall events. Aerification occurs each spring or fall.

Cart paths have been constructed to minimize wear and tear and limit soil compaction.

Water meters are read monthly to monitor the success of water conservation efforts. Usage is compared to the previous month and the same month for previous years. If a significant difference occurs, information is reported to the golf course superintendent to understand why the increased usage has occurred. He shall consider items such as amount of rainfall, and temperature to determine whether the increased use is attributed to increased need or need for better conservation practices or leaks within the irrigation system. If a leak is suspected, a leak detection and repair program will be implemented.

Watering primarily occurs at night or in early morning when wind and evaporation are the lowest.

All equipment and machinery is washed using a hose with a shutoff nozzle, and soap and water bucket.

Materials are swept from floors instead of washing down whenever possible.

Water Use Education Program

All existing maintenance employees are presented with a copy of this water conservation and management plan to ensure they are educated on potential water conservation strategies. All new maintenance employees are presented a copy of the water conservation plan on their first day of hire. Personnel specifically address all best management practices, which can be implemented to save water.

Water Conservation is discussed at each quarterly staff meeting

Evaluation of Potential Water Reuse Options

No water reuse alternatives are feasible. A small amount of runoff is collected in the stormwater/irrigation pond which supplements well water.

Requirements for Mandatory Water Use Restrictions

When the City of Virginia Beach or the Director of DEQ declares water use restrictions, the golf course superintendent shall inform all employees. Maximum precautions and awareness shall be taken to ensure that all restrictions are followed. The club superintendent and manager shall discuss restrictions and ensure they have a complete understanding. If necessary, they will work with either local government or DEQ to ensure they understand the requirements of the restrictions. The facility will comply with any penalties for failure to comply with mandatory water use restrictions.

ATTACHMENT B

MITIGATION PLAN

MITIGATION PLAN

DEQ GROUNDWATER WITHDRAWAL PERMIT NO: GW0046700-01

OWNER NAME: Princess Anne Country Club

FACILITY NAME: Princess Anne Country Club

LOCATION: Virginia Beach, Virginia

INTRODUCTION

On May 1, 2013 Princess Anne Country Club (hereafter Princess Anne) submitted a Ground Water Withdrawal Permit Application to the Virginia Department of Environmental Quality (DEQ) to withdraw ground water. Ground water withdrawals associated with this permit will be utilized to irrigate golf course turf grass.

The purpose of this Mitigation Plan is to provide existing ground water users a method to resolve claims that may arise due to the impact of the withdrawal from Princess Anne's groundwater well field. Predicted draw down of water levels due to the withdrawals from the Yorktown Aquifer are shown on the attached figures.

Modeled impacts, as shown on the attached maps, extend beyond the boundary of the golf course facility. Due to these findings, Princess Anne recognizes that there will be a rebuttable presumption that water level declines that cause adverse impacts to existing groundwater users within the area of impact are due to this withdrawal. Claims may be made by groundwater users outside this area; however, there is a rebuttable presumption that Princess Anne has not caused the adverse impact. Princess Anne proposes this plan to mitigate impacts to existing users and excludes impacts to wells constructed after the effective date of this permit.

CLAIMANT REQUIREMENTS

To initiate a claim, the claimant must provide written notification of the claim to the following address:

Contact Name: Mr. William Shonk

Title: Certified Club Manager, PACC

Permittee Name: Princess Anne Country Club

Address: P.O. Box 627

Virginia Beach, VA 23451

The claim must include the following information: (a) a deed or other available evidence that the claimant is the owner of the well and the well was constructed and operated prior to the effective date of the permit; (b) all available information related to well construction, water levels, historic yield, water quality, and the exact location of the well sufficient to allow Princess Anne to locate the well on the claimant's property; (c) the reasons the claimant believes that the Princess Anne withdrawal has caused an adverse impact on the claimants well(s).

CLAIM RESOLUTION

Princess Anne will review any claim within five (5) business days. If Princess Anne determines that no rebuttal will be made and accepts the claim as valid, Princess Anne will so notify the claimant and will implement mitigation within thirty (30) business days. If the claim is not accepted as valid, Princess Anne will notify the claimant that (a) the claim is denied or (b) that additional documentation from the claimant is required in order to evaluate the claim. Within fifteen (15) business days of receiving additional documentation from the claimant, Princess Anne will notify the claimant (a) that Princess Anne agrees to mitigate adverse impacts or (b) the claim is denied. If the claim is denied, the claimant will be notified that the claimant may request the claim be evaluated by a three (3) member committee. This committee will consist of one (1) representative selected by Princess Anne, one (1) representative selected by the claimant, and one (1) representative mutually agreed upon by the claimant and Princess Anne .

Any claimant requesting that a claim be evaluated by the committee should provide the name and address of their representative to Princess Anne. Within five (5) business days of receipt of such notification, Princess Anne will notify the claimant and claimant's representative of the identity of Princess Anne's representative and instruct the representatives to select a third representative within ten (10) business days. Representatives should be a professional engineer or hydrogeologist with experience in the field of ground water hydrology. Princess Anne agrees to reimburse the members of the committee for reasonable time spent, at a rate prevailing in the area for experts in the above listed fields, and for direct costs incurred in administering the plan. The claimant may, at his or her option, choose to provide the reimbursement for the member of the committee selected by the claimant and up to half of the reimbursement for the mutual representative.

Within ten (10) business days of selection of the third representative, the committee will establish a reasonable deadline for submission of all documentation it needs to evaluate the claim. Both the claimant and Princess Anne will abide by this deadline.

Within fifteen (15) business days of receipt of documentation, the committee will evaluate the claim and reach a decision by majority vote. The committee will notify the claimant regarding its decision to (a) deny or (b) approve the claim. If the claim is approved, Princess Anne will mitigate the adverse impacts within thirty (30) business days of making the decision or as soon as practical. If the claim is denied by the committee, Princess Anne may seek reimbursement from the claimant for the claimant's committee representative and one half of the 3rd representative on the committee.

If a claimant within the indicated area of impact indicates that they are out of water, Princess

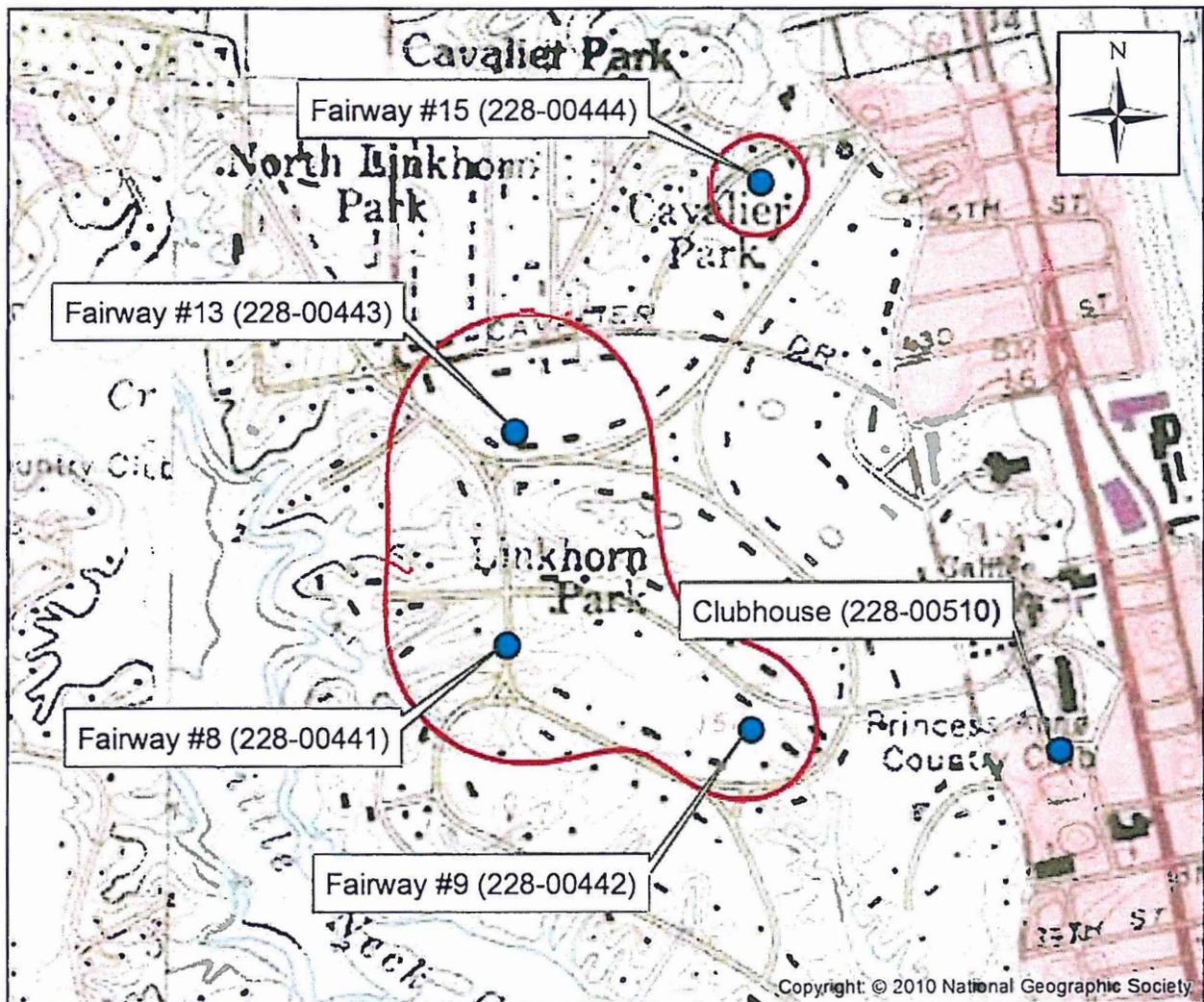
Anne will accept the responsibility of providing water for human consumptive needs within seventy-two (72) hours and to cover the claim review period. Princess Anne reserves the right to recover the cost of such emergency supply if the claim is denied by Princess Anne or found to be fraudulent or frivolous. If Princess Anne denies a claim and the claimant elects to proceed with the three (3) member committee, Princess Anne will continue the emergency water supply at the claimant's request during the committee's deliberations but reserves the right to recover the total costs of emergency water supply in the case that the committee upholds the denial of the claim. Similarly, Princess Anne reserves the right to recover costs associated with the claim process if a claim is found to be fraudulent or frivolous.

If it is determined by the committee or shown to the committee's satisfaction that a well operating under a mitigation plan similar to Princess Anne's Plan other than those owned and operated by Princess Anne has contributed to the claimed adverse impact, Princess Anne's share of the costs associated with mitigation will be allocated in proportion to its share of the impact. Such a determination shall be made by the committee after notification of the third party well owner, giving the third party well owner the opportunity to participate in the proceedings of the committee.

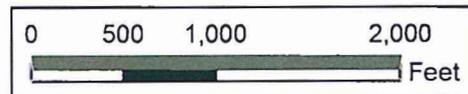
PLAN ADMINISTRATION

Nothing in the Plan shall be construed to prevent the Department of Environmental Quality Staff from providing information needed for resolution of claims by the committee.

Princess Anne Country Club Area of Impact - Yorktown-Eastover Aquifer



- Princess Anne Country Club Wells
- Area of Impact



Simulated drawdown at or exceeding one foot in the Yorktown-Eastover aquifer resulting from a 2-dimensional Hantush-Jacob (1955) simulation of 7 years at the maximum yearly rate of 26,430,000 gallons per year followed by 3.33 months at the maximum monthly rate of 6,300,000 gallons per month from the Yorktown-Eastover aquifer. Maximum radius of one-foot drawdown (Area of Impact) occurs less than 1,250 feet from each pumping well.

Technical Evaluation performed by Aquaveo, LLC for the Virginia DEQ, Office of Surface and Ground Water Supply Planning December 2, 2013

