



STATE OF TENNESSEE  
DEPARTMENT OF ENVIRONMENT & CONSERVATION  
Division of Water Resources  
William R. Snodgrass Tennessee Tower  
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Nashville, Tennessee 37243

## **Notice of Determination**

**July 2, 2015**

**City of Franklin  
NRS12.195**

This notice sets out the final determinations of the Tennessee Department of Environment and Conservation, Division of Water Resources regarding an Aquatic Resource Alteration Permit and §401 Water Quality Certification requested by the City of Franklin pursuant to the *Tennessee Water Quality Control Act of 1977* and *Clean Water Act*, respectively. The permit is required for the construction of a raw water intake and withdrawal of water for drinking water supply from the Harpeth River.

### **Introduction**

The City currently owns and operates a water treatment plant (WTP) with a capacity of 2.1 million gallons per day (mgd). The raw water is withdrawn from the Harpeth River within the City limits and stored in an open earthen reservoir (114 million gallon design capacity as initially constructed) for later treatment. The City purchases the balance of its water from the Harpeth Valley Utility District. In 2005, the City saw an average daily demand of 6 mgd and a peak demand of 9.3 mgd in the water distribution system. The City has been evaluating alternatives, including WTP expansion, to address present and future water demands and to comply with newly promulgated federal water regulations.

The original WTP was constructed in 1952 and was expanded and upgraded in 1968 and again in 1994. Because the WTP was constructed prior to the TDEC Aquatic Resource Alteration Permit (ARAP) rule promulgation, the withdrawal was not initially regulated under an ARAP. However, a 2006 proposal to increase the withdrawal and upgrade the existing WTP facilities required authorization under the ARAP program.

### **Background**

The permit application requests an Aquatic Resource Alteration Permit that would authorize renewal of the City's permit to withdraw water from the Harpeth River for drinking water. The

City of Franklin holds an Aquatic Resource Alteration Permit (ARAP # NRS06.332), which was issued by the Division on November 28, 2007, for withdrawal of drinking water from the Harpeth River.

In the course of issuing permit # NRS06.332, the Division determined that the proposed withdrawal rate at 20 percent of the flow in the river would not result in an impairment of the uses designated to the Harpeth River when it was coupled with an additional requirement that the withdrawal would not cause the flow to fall below 10 cubic feet per second (cfs), or occur below this threshold.

Issuance of the 2007 ARAP authorized an increase in the pumping capacity to 7,800 gallons per minute (gpm), or 11.2 mgd under the conditions that the withdrawal must cease at and below 10 cfs and that no more than 20% of the instantaneous flow may be withdrawn.

The 2007 ARAP also required removal of a lowhead dam located just downstream of the existing intake. Since the issuance of that permit, the City and its partners successfully removed the dam and conducted physical restoration of the stream channel at the site of the former dam.

A public notice that announced the current application for a withdrawal permit renewal (NRS12.195) was published on August 1, 2014. A public hearing was requested in response to the notice. The Division held a hearing on the evening of Tuesday, October 21, 2014 at the Police Department Community Room in Franklin, Tennessee. Comments were received from agencies and the public throughout this process. These comments are addressed in this document.

### **Final Action**

The Division reviewed the best available science in drafting this permit, and has built on NRS06.332, with additional conditions regarding flow and withdrawal measurement and reporting, and a new withdrawal restriction based upon minimum dissolved oxygen levels.

The Division received and considered a number of comments as part of the public participation process. Those comments, and Division responses, are categorized below.

### **Comments From Public Participation**

#### **Higher Minimum Flow Cutoff**

##### **Comments**

“Need a minimum flow of 50 cfs. The compromise should be a higher flow minimum but anything above that, the City of Franklin should be able to take all they need with no percentage restrictions. This would allow the City to better manage their raw water supply.”

“TDEC could impose a higher cut-off flow that ensures that the permittee’s withdrawals will not cause water quality violations associated with low flow”.

“To maintain the wetted width or maximum inundation of the river channel, the Division should establish the minimum flow at 20 cfs in order to reach stable width of around 50 feet.”

“...a definitive hydrological study of this reach of the Harpeth River is needed to ensure an adequate ecological in-stream flow regimen will be maintained.”

### **Determinations**

The Division has no basis at present to impose a new minimum flow limit. In setting this limit originally in the 2007 ARAP, the Division reviewed the data from a flow simulation model provided by the City and the information and data involving wetted width provided by the United States Geological Survey. The wetted width data from the USGS gage at Highway 96 about one mile downstream of the raw water intake showed that the wetted width did not increase significantly with flows over 10 cfs.

In the absence of more conclusive data regarding the flow – ecology relationships in the Harpeth River at minimum flows, we determined that the 10 cfs cutoff is the lowest flow that insures inundation of the riffles in this river reach at sufficient depths and velocities to preserve ecological functions and support of uses designated for this river segment.

The body of literature surrounding instream flow – ecology relationships continues to grow. In Tennessee, we hope to continue that research with cooperative agreements with agencies such as the USGS and others. In particular, the Division is investigating a regionalized approach to the development of low flow thresholds using existing flow and channel cross-section data.

Other efforts include the development of a revised TMDL (total maximum daily load) on the Harpeth River<sup>1</sup> and the formulation of an Instream Flow Workgroup to help guide the science of stream flow decisions.

The Division is committed to the application of a scientific approach using the most current, verifiable data in setting the limits of this or any other water withdrawal from the waters of Tennessee. The limits and conditions of this permit are subject to timely adjustment if and when new information becomes available.

### **Reduction of the Proportion of Flow Withdrawn**

#### **Comments**

“Reducing the allowable removable flow to no more than 10 percent would enhance conditions favorable to fish and aquatic life in the river”.

“Previous investigations have determined that a 10% or less base flow removal from this location would ensure conditions favorable to achieve and maintain the fish and aquatic life use designation”.

“Expanding scientific knowledge supports reduction of the percent withdrawal from 20% to 10%”.

#### **Determinations**

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<sup>1</sup> <http://www.tn.gov/environment/article/tennessees-total-maximum-daily-load-tmdl-program>

The data and information on which the Division relied currently supports maintaining the withdrawal limit of 20% of the flow. Formerly, in setting the limits for the first permit (NRS06.332), the Division had relied on a hydrologic model to look at how much the withdrawal would change the flow patterns of the river. That hydrologic model indicated that the 20% withdrawal did not change the flow patterns of the river significantly, but it lacked an ecological component.

During the course of the review for this permit renewal, the Division re-examined allowing 20% of the flow to be removed. We now have access to a USGS statistical analysis that is based upon changes in flow in the Tennessee Valley that have a statistical significance to fish species richness. This statistical analysis, when applied to the Harpeth River, showed no difference in fish species between withdrawing 10% or 20% of available flow, with the 10 cfs cutoff, limits of the current pump capacity, and current storage volume of the reservoir factored in.

While either approach is limited in providing in-depth, site-specific answers to flow changes and ecological impacts, they do provide the best available information testing the scenario that was permitted. The division is committed to the continued evaluation of the most current scientific understanding of the ecological effects of instream flow alterations, including actively working with other state and federal resource agencies. Advances in our technical understanding and methods of determining ecological effects will be applied to all permitted withdrawals.

### **Antidegradation Statement – Alternatives Analysis, Social and Economic Necessity**

#### **Comments**

“Consider the alternate plan of getting the drinking water from Harpeth Valley Utilities District. The District already provides the bulk of drinking water for Franklin year-round and 100% of the City’s drinking water many days of the summer from a large drinking water plant on the Cumberland River (over 20 times the size of the City’s current plant)”.

“The City of Franklin should conduct an economic feasibility study to determine if the proposed withdrawal of water from the Harpeth River; including the costs of new construction, maintenance, operation, and administration, is more economical than the purchase of water from Harpeth Valley Utilities District”.

“Permittee has not complied with regulations requiring alternatives analysis and assessment of practicable alternatives to avoid net loss of resources or to comply with Tennessee’s Antidegradation Statement”.

“The ARAP application does not sufficiently demonstrate that reasonable alternatives are not feasible to justify degradation”.

#### **Determinations**

The applicant is not proposing a new or expanded withdrawal, and therefore the proposal is not subject to the mandatory provision in the anti-degradation rule requiring a demonstration of social or economic necessity. This review was previously conducted during the issuance of NRS06.332, when the Division concluded that the amount of degradation resulting from the withdrawal was justified. The Division continues to concur with the applicant that there is some benefit in maintaining and operating a secondary source of municipal water supply, if it can be

done in a sustainable manner that protects the resource's designated uses. The long term economic feasibility of operating its own municipal water plant is a consideration for the City administration.

This segment of the Harpeth River is designated for the uses of livestock watering and wildlife, irrigation, industrial water supply, recreation, and fish and aquatic life.

Of the designated uses for this river segment, livestock watering and wildlife, irrigation, and industrial water supply uses are fully supported. Where a use is fully supported, parameters for which criteria exist in support of that use are termed available parameters.

Recreation and fish and aquatic life uses are not supported in this river segment. Where a use is not supported, parameters for which criteria exist are termed unavailable.

Under the Antidegradation Statement, the following standards apply to available and unavailable parameters:

(2) Waters with unavailable parameters

(b) In waters with unavailable parameters, no new or expanded water withdrawals that will cause additional measurable degradation of the unavailable parameter shall be authorized.

(3) Waters with available parameters

(b) In waters with available parameters, new or expanded water withdrawals that would cause degradation above the level of de minimis will only be authorized if the applicant has demonstrated to the Department that reasonable alternatives to degradation are not feasible and the degradation is necessary to accommodate important economic or social development in the area and will not violate the water quality criteria for uses existing in the receiving waters.

The term "new or expanded" applies where a previous determination of necessity for a specific amount of alteration has not been performed by the Division.

Because the Division has previously determined that the withdrawal was necessary to accommodate important economic or social development, and this withdrawal is not considered "new or expanded", the permit review was not governed by the requirements of this section of the Antidegradation Rule.

The reauthorization of this permit is, however, subject to standards of water quality, and an evaluation of the amount of degradation resulting from the activity. The Division has determined that the withdrawal, as permitted, will not cause a violation of water quality standards nor cause a loss of use support.

## **Dissolved Oxygen**

### **Comments**

“If the proposed expanded water withdrawal would cause “additional measurable degradation” to dissolved oxygen, additional withdrawals are unavailable and cannot be authorized under the anti-degradation regulations.”

“The Division must establish a condition of no withdrawal when river upstream and in vicinity of the intake is below dissolved oxygen standard of 5 mg/l.”

### **Determinations**

There are many factors that affect dissolved oxygen in waters. Flow affects dissolved oxygen by aeration of the water column by turbulence. A reduction in flow could reduce turbulence, which would lessen the addition of dissolved oxygen by aeration. Conversely, dissolved oxygen could be low during periods of high flow, and not be impacted by a withdrawal.

Because of the direct relationship of flow to dissolved oxygen, particularly at lower flows, the city volunteered, and the permit requires, that the City monitor dissolved oxygen and cease withdrawal when dissolved oxygen is less than the minimum water quality standard of 5 milligrams per liter. The results of this monitoring, or any other new information such as a revised TMDL, will be evaluated as available. The limits and conditions of this permit are subject to timely adjustment if and when new information becomes available.

### **Accurate Measuring, Compliance Monitoring**

#### **Comment**

“Accurate measuring of the river’s upstream flow and monthly reporting of withdrawals are needed”.

#### **Determinations**

Under the present circumstances the City uses a USGS gage that is located just over one mile downstream. This approach has allowed the City a method with which to comply with the withdrawal limitations of the existing permit. All parties recognize limitations of this method and the new permit requires the City to present to the Division a plan to provide more suitable river flow gaging for the purpose of permit compliance. The permit requires the new gage to be in place by October 1, 2015.

### **Permit Duration**

There was discussion of how long the permit should remain in effect, with a shorter period being desired so that potential new information could be incorporated into the next permit issuance. The maximum permit duration under statute is 5 years and at this time, ARAP permits are generally issued for that timespan. It should be noted that other permits within the Division, such as NPDES permits, are routinely issued for durations of less than five years if necessary to get the permit on the watershed cycle<sup>2</sup> where planning, monitoring, water quality assessment, TMDL

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<sup>2</sup> <http://www.tn.gov/environment/article/watershed-management-cycle>

development and permitting activities are synchronized. It is the Division's intent for ARAP permits in general to begin transitioning to this watershed management approach over the duration of this permit, with the goal of having this permit in cycle with other permits in the Harpeth River watershed by 2021.

In the meantime, as outlined in the permit's Reopener clause, the Director of the Division has authority to modify, suspend or revoke and reissue the permit based on a change in any condition or receipt of new information that requires either a temporary or permanent change in the conditions of the permit.