COMMONWEALTH OF MASSACHUSETTS

EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS

# DEPARTMENT OF ENVIRONMENTAL PROTECTION

ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

**THE OFFICE OF APPEALS AND DISPUTE RESOLUTION**

March 27, 2015

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In the Matter of Docket No. WET-2014-014

File No. SE 315-1029

Jim Williamson – Barberry Homes, LLC Walpole

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**RECOMMENDED FINAL DECISION**

This appeal was filed by a Ten Residents Group (the “Petitioners”) challenging a Superseding Order of Resource Area Delineation (“SORAD”) issued by the Massachusetts Department of Environmental Protection (“the Department”) related to the status of streams that are tributaries to Traphole Brook under the Massachusetts Wetlands Protection Act, G.L. c. 131, § 40 and the Wetlands Regulations, 310 CMR 10.00. The Applicant, Jim Williamson for Barberry Homes LLC, intends to develop the property after confirming the resource areas at the site. The Department’s SORAD determined that the streams were intermittent, based on the methodology described in the regulations. The Walpole Conservation Commission had reached the same conclusion, with the caveat that the decision had been difficult because the regulations did not provide a method for basing a determination on field characteristics indicative of a perennial stream. This jurisdictional determination is significant because it determines the level of protection afforded to the streams and specifically whether the site is subject to the performance standards for the 200-foot wide Riverfront Area along perennial streams. 310 CMR 10.58.

The Petitioners seek a determination that the streams are perennial rather than intermittent. A specific area of dispute was whether the watershed is less than 0.5 square mile, because the size of a small watershed is a critical component for determining whether a stream is perennial or intermittent under the regulations. 310 CMR 10.58(2)(a)1. Stressing the unconventional nature of the area, the Petitioners asserted that the unusual hydrology of the site warrants a different approach than prescribed by the regulations. The Petitioners also found support in recently conducted studies by the Massachusetts Division of Fisheries and Wildlife to determine the status of the streams as a cold water fishery, suggesting that the streams are perennial. After an evidentiary hearing, I conclude that the streams are intermittent, not perennial, based on the regulatory methodology, and recommend that the Department’s Commissioner issue a Final Decision sustaining the Department’s SORAD.

ISSUE FOR ADJUDICATION

The issue for adjudication identified by the parties at the Pre-Hearing Conference is as follows: Whether the Department’s SORAD correctly determines jurisdiction at the site by finding that the stream(s) on the site are intermittent pursuant to 310 CMR 10.58(2)(a)1.c.?

Under the wetlands regulations, the burden of going forward and the burden of proof are placed upon the Petitioners as the party contesting the Department’s position in the appeal. 310 CMR 10.03(2); 310 CMR 10.05(7)(j)3.b. The weight to be attached to any evidence in the record rests within the sound discretion of the Presiding Officer. 310 CMR 1.01(13)(h)1. The facts must be applied to the applicable regulation. Agency regulations are binding in an adjudicatory proceeding. Challenges to the regulation itself must be brought in court. See Matter of Kendra and Peter Wilde / Matter of Owen Larkin and Marjorie Reedy Larkin, Docket Nos. WET-2009-018 and WET-2009-034, Recommended Final Decision (December 7, 2009), adopted by Final Decision (January 6, 2010)(regulation governing intermittent and perennial stream designations binding), rev’d on other grounds, Larkin v. DEP, C. A. No. 10-1165-H (Suffolk Sup. Ct., September 21, 2011). See also Matter of Milwaukee Metropolitan Sewerage District, Docket No. 97-165, Final Decision-Order of Dismissal, 1998 MA ENV LEXIS 926 (June 23, 1998), aff'd sub nom. Milwaukee Metropolitan Sewerage District v. Department of Environmental Protection, C.A. No. 98-3867, Memorandum of Decision and Order on Cross-Motions for Partial Judgment on the Pleadings (Suffolk Sup. Ct., July 26, 1999).

**REGULATORY FRAMEWORK**

The Riverfront Area is defined in the regulations as a resource area generally 200 feet wide extending from the mean annual high-water line of a river, which in turn is defined as a perennial, as opposed to intermittent, stream.[[1]](#footnote-1) Thus, a determination must be made as to whether a stream is perennial or intermittent at a particular site. Importantly, a determination that a stream is intermittent, and therefore does not have a Riverfront Area, does not render it without protection under the Wetlands Regulations. Where applicable, resource area performance standards for land under water, bank, land subject to flooding, bordering vegetated wetlands, and criteria for the buffer zone will govern any work proposed at a site. See Preface to Revisions to the Massachusetts Wetlands Regulations (310 CMR 10.00) Relating to the Definition of “Extended Drought” and Distinguishing “Perennial Rivers” from “Intermittent Streams,” 2002 Regulatory Revisions (hereinafter, “Preface to 2002 Revisions”).

After working with a technical advisory committee on the distinction between intermittent and perennial streams, the Department revised its regulations in 2002 to improve consistency with sound science and to promote ease of implementation. Preface to 2002 Revisions. Under the regulations, watershed size and surficial geology are critical factors in classifying a stream as intermittent or perennial. A stream shown as perennial at a particular location on the United States Geological Survey (USGS) topographic map or that has a watershed size of more than one square mile is deemed perennial. Streams with a watershed size between 0.5 and one square mile may be perennial based on either a USGS methodology called StreamStats or a subsurface geology characterized by a high percentage of stratified drift.[[2]](#footnote-2) Although not explicitly stated, streams with a watershed size of less than 0.5 square mile are intermittent unless shown as perennial on the USGS map.

Specifically, the regulatory provision at issue in this appeal states as follows:

1. A river is any natural flowing body of water that empties to any ocean, lake, pond,

or other river and which flows throughout the year. Rivers include streams (*se*e

310 CMR 10.04: Stream) that are perennial because surface water flows within them

throughout the year. Intermittent streams are not rivers as defined herein because surface

water does not flow within them throughout the year. . . . . Rivers begin at the point an intermittent stream becomes perennial or at the point a perennial stream flows from a spring, pond, or lake. Downstream of the first point of perennial flow, a stream normally remains a river except where interrupted by a lake or pond. Upstream of the first point of perennial flow, a stream is normally intermittent.

a. A river or stream shown as perennial on the current United States Geological

Survey (USGS) or more recent map provided by the Department is perennial.

b. A river or stream shown as intermittent or not shown on the current USGS map

or more recent map provided by the Department, that has a watershed size greater

than or equal to one square mile, is perennial.

c. *A stream shown as intermittent or not shown on the current USGS map or more*

*recent map provided by the Department, that has a watershed size less than one*

*square mile, is intermittent unless:*

i. *The stream has a watershed size of at least ½ (0.50) square mile* and has a predicted flow rate greater than or equal to 0.01 cubic feet per second at the 99% flow duration using the USGS StreamStats method. The issuing authority shall find such streams to be perennial; or

ii. When the USGS StreamStats method cannot be used because the stream does not have a mapped and digitized centerline . . . and *the stream has a watershed size of at least ½ (0.50) square mile*, and the surficial geology of the contributing drainage area to the stream at the project site contains 75% or more stratified drift, the issuing authority shall find such streams to be perennial. . . .

310 CMR 10.58(2)(a)1(emphasis added). The streams at the site are not shown on the USGS map and the watershed is less than one square mile. Under these circumstances, the regulations require that the watershed be at least 0.5 square mile, *and* exhibit a specified predicted flow rate *or* percentage of stratified drift. 310 CMR 10.58(2)(a)1c. i and ii. Although there were references to predicted flow rates and the presence of stratified drift, the testimony focused on the watershed size. Although the streams at the site apparently did not have mapped and digitized centerlines, the parties used, in part, the StreamStats program to determine watershed size.

The regulations contain a provision that allows a determination based on field observations and documentation of a lack of flow throughout the year to show a stream is intermittent, but there is no similar provision allowing a determination that a stream is perennial. 310 CMR 10.58(2)(a)1.d. Field observations or indicators, therefore, may not be used to establish that a stream is perennial. The preface to regulatory revisions made in 2002 explains the rationale in a section entitled “Perennial Streams with Very Small Watersheds”:

Some commentators requested that the regulations include a method for proving that streams with very small watersheds (i.e. less than one square mile) flow throughout the year. These streams may emanate from springs, or in areas such as Cape Cod, they may draw upon a large regional groundwater aquifer system. Regardless of watershed size, these streams are considered perennial under the regulations if they are shown as perennial on USGS topographic maps. For those streams shown as intermittent, or not shown at all, they may be considered perennial if the watershed size is at least one-half square mile and it meets either the STREAMSTATS or stratified drift provisions. The stratified drift provisions have been broadened in the final regulations to encompass the entire state rather than a more limited list of watersheds. Streams that do not fit into

these categories must be classified as intermittent. Unfortunately, proving that a stream is perennial by direct observation requires multiple observations made in the late summer and early fall months over many years, and the Department could not craft a workable provision to accommodate those timeframes.

Preface to 2002 Revisions. Thus, the absence of a methodology in the regulations to classify a stream as perennial based on field indicators or observations was intentional, and is not susceptible to a contrary interpretation.

**TESTIMONY OF THE PARTIES**

The Petitioners filed comprehensive testimony to support their position that the streams at the site are perennial. They offered the expert testimony of Denis D’Amore, a Professional Engineer and Ph.D with his own consulting firm. He considered the hydrogeologic setting, the presence of an underlying high yield aquifer, groundwater and precipitation records, and stream observations. Dr. D’Amore identified three streams, all of which he believed had as their source groundwater that was discharging from the high yield aquifer. D’Amore PFDT, para. 8. He described “Stream A” as originating from the north side of the site. From the east side near GLM flags 25-36 and 12-1 to 12-40, “Stream B,” at 150 ft. long, joins “Stream C,” which runs 1,400 ft. to the confluence with Traphole Brook. He used a method of “superposition” to calculate the contributing drainage area, or watershed area. He calculated a drainage area of 1.68 square miles for stream A and 1.08 square miles for Streams B and C. D’Amore PFDT, para. 9; Exs. 5 and 6. Superimposing these two drainage areas and correcting for the small area of 0.03 square mile that was on the far side of Traphole Brook, he calculated the drainage area as 0.68 square mile, and 0.65 square mile with the correction for the small area of 0.03 square mile. In sum, he concluded that the streams originating from the site had a watershed size of 0.65 square mile, more than 0.5 square mile, and therefore that the streams were perennial. D’Amore PFDT, paras. 9 and 10, Oral Testimony.

The Petitioners also filed the testimony of Laura L.P. Vaites, a member of the Ten Residents Group with undergraduate and Masters training in biological sciences. Vaites PFDT, Introductory para. She documented her involvement with evaluation of the site, including communications with the Neponset River Watershed Association, Dr. D’Amore, and the Division of Fisheries and Wildlife. She also filed extensive videography of the streams taken in late July and early August of 2014 that show the effects of groundwater and rainfall on flow. Vaites PFDT, para. 5. She consulted a USGS scientist who performed calculations using the StreamStats program showing that Stream C had a 91% probability of being perennial. Vaites PFDT, para. 2. She stated that the regulations do not proscribe a cumulative measure of drainage areas for streams with unique hydrologic characteristics, including close geographic proximity, the same high-yield aquifer source, and drainage into the same stream, Traphole Brook. Vaites PFDT, para. 4. She described the streams as a network within the same bordering vegetated wetland. Id. Ms. Vaites provided the survey results of the Division of Fisheries and Wildlife on Traphole Brook, which is identified as a cold water fishery due to its habitat for Eastern Brook Trout. Vaites PFDT, para. 6. Further sampling had been conducted in Streams A and C at the site which indicated a breeding population of Brook Trout over several seasons, supporting a finding that the streams are perennial. Vaites PFDT, para. 7. She noted the importance of preserving water quality to sustain cold water fish in small headwater streams. Vaites PFDT, para. 8.

Finally, the Petitioners presented the testimony of three additional witnesses. Thomas Palmer, the Willett Pond Manager of the Neponset River Watershed Association, filed testimony consisting of communications on behalf of the Association that he had prepared related to the site. The Association’s view that the spring sustaining the stream is perennial was supported by direct observation of flow in August, a StreamStats prediction of a 77% chance the spring is perennial, and mapping showing an underlying high-yield aquifer. Palmer PFDT, para. 2. He disagreed with an interpretation of the regulations that the watershed size and stratified drift percentage are cut-off points rather than presumptions that allow the consideration of additional evidence. Palmer PFDT, para. 3. He cited the preface to the 2002 regulations allowing direct observations of lack of flow to overcome the method for determining whether a stream is perennial. Id. Mr. Palmer attached a table from a 2006 USGS study of prediction under the regulations compared with actual data, which shows that for streams with a watershed size of 0.3 to 0.39 square mile, the topographic maps and the revised regulations based on watershed size and surficial geology were correct less than 75% of the time, while StreamStats predictions were correct 80% of the time; StreamStats predicted the streams had a 77% chance of being perennial and only a 23% likelihood of being intermittent. Id.

Also as testimony for the Petitioners, Katherine J. Hinds, a member of the Residents Group and property owner near the site since 1997, took a video of the streams showing flowing water on November 26, 2013 which she described as the final day in “the third driest Fall on record.” Hinds PFDT, para.5. She stated that the presence of flow under these conditions demonstrates that the streams are perennial. Id. Pamela J. Verrochi, a member of the Residents Group and property owner near the site since 1984, testified that she had continuously visited the site over thirty years and had never seen the wetlands and streams dry. Verrochi PFDT.

In rebuttal testimony, the Petitioners emphasized that the streams were fed by groundwater from the underlying high yield aquifer, and did indeed flow throughout the year. They believed that the total drainage area of the aquifer below the site was relevant, not just the surficial drainage that was captured in the regulations. They noted that a comment by Department staff Thomas Maguire that the streams were “likely perennial in reality” indicated that the site may not conform to the regulations but should be protected nonetheless. They further argued that the failure to take stream A into account was improper. Finally, they argued that all streams should be measured at their confluence with Traphole Brook rather than upstream at the property boundary.

The Applicant filed the testimony of Joyce E. Hastings, a land surveyor and environmental consultant with 30 years of experience. Hastings PFDT, para. 2. She filed the Abbreviated Notice of Resource Area Delineation for the property on behalf of the Applicant, through GLM Engineering Consultants, Inc. which she owns and where she serves as president. Hastings PFDT, paras. 1 and 9. Her wetlands delineation performed at the site is not in dispute. She determined that two streams at the site near wetlands flags 12-7 to 12-40 are intermittent. Hastings PFDT, para. 16.[[3]](#footnote-3) This determination was based on the USGS map, which does not show the stream to be perennial, and the watershed size, which she determined to be 0.34 square mile, or less than 0.5 square mile. Hastings PFDT, para. 17 and 18. She calculated the watershed in two ways, by tracing the watershed on the USGS topographic map, yielding a watershed size of 220 acres or 0.34 square mile, and by using StreamStats, yielding a watershed size of 0.31 square mile. Hastings PFDT, paras. 19 and 20. Based upon these evaluations of the watershed size as less than 0.5 square mile, she concluded that the streams were intermittent.

The Department filed the testimony of two witnesses, both experienced members of the Department’s Wetlands program, Gregory J. Decesare and Thomas Maguire. Mr. Decesare conducted the site visit and identified two streams east of flags GLM 12-1 to GLM 12-40 and a channel flowing from a bowl-shaped feature near Flag 12-24. Decesare PFDT, paras. 10 and 22.[[4]](#footnote-4) During the site visit, the channel and two streams contained flowing water but an intermittent stream to the east did not. He described the methodology for the calculation of the watershed size using the USGS topographic map: beginning at the point where the streams cross the property line flowing north, a continuous line is drawn perpendicular to the contours connecting highest points and crossing depressions until returning to the starting point. Based upon this method as performed by a colleague in the Wetlands Program, the Department measured the watershed as 207 acres or 0.32 square mile. Decesare PFDT, para. 18. He stated that, in response to an inquiry from the Commission to Mr. Maguire, Mr. Maguire had calculated the watershed at 0.3 sq. mi. at the point where the channel joins the intermittent stream to the east and crosses the property line. Decesare PFDT, para. 19.

Mr. Deceare attached to his testimony a communication from Philip Zarriello of the USGS prepared in response to an inquiry from Laura Vaites of the Petitioners group. Mr. Zarriello calculated the watershed size at 0.31 sq. mi. based on StreamStats using a point where the intermittent stream flowed into Traphole Brook to the north of the property boundary. Decesare PFDT, para. 20. Mr. Decesare also attached a letter from Thomas Palmer of the Neponset River Watershed Association, which included a StreamStats report with the watershed calculated at 0.3 sq. mi. Decesare PFDT, para. 19. He further noted that the Petitioners’ Notice of Claim also identified the watershed size for the two streams as 0.3 sq. mi. Decesare PFDT, para. 23. Based on this information, Mr. Decesare testified that the streams, which are not shown on the USGS map, do not have a watershed size of at least 0.5 square mile, and therefore are classified as intermittent pursuant to 310 CMR 10.58(2)(a)1.c.

Mr. Decesare further stated that another stream, “Stream A” as identified by the Petitioners, is located beyond the Applicant’s property line and flows away from it. He further stated that Stream A had not been identified in the original application, he had therefore not made a determination as to its status, and it should be considered under another filing. He testified that if subject to this proceeding, Stream A must be considered individually and not calculated cumulatively with the other streams. Decesare Reb. paras. 32 to 34.

Thomas Maguire, the Department’s second witness, provided an explanation of the StreamStats methodology and operation. He observed four streams on the site, and noted one stream depicted on the plan that he did not observe. Maguire PFDT, para. 24 and Ex. E. For purposes of his analysis, he combined three streams, TM-B, TM-C, and TM-D, and used the confluence with Traphole Brook to provide a “conservative” watershed area. Maguire PFDT, para. 34, Oral Testimony.[[5]](#footnote-5) He explained that, to delineate a watershed, the user selects a “point-of-interest” along a stream. The selection of the “point-of-interest” largely determines the watershed size, as the downstream point will have a larger watershed and an upstream point will have a smaller watershed. An alternative method identifies “flow paths” based on the selected “point-of-interest.” Maguire PFDT, para. 17. Thus, the selection of the “point-of-interest” is a determinative factor in either method. Maguire PFDT, paras. 14 to 16. Mr. Maguire testified that he would typically select as the “point-of-interest” the down-gradient property line that the stream crosses to calculate the watershed size. He would select a geographic or manmade feature, such as a sharp bend or culvert, only if such an obstruction could cause a stream to back up across a property line. Maguire PFDT, para. 28. Mr. Maguire testified that his normal practice was to measure each stream’s watershed separately, but in the circumstances presented here where the confluence of two streams could cause a backwater effect at the property lines, he combined three streams (TM-B, TM-C, and TM-D) using the flow path method to yield a conservative watershed area of 0.32 sq. mi. Maguire PFDT, paras. 35, 41, and 46.

Mr. Maguire addressed two additional streams. Mr. Maguire calculated Stream A to have a watershed size of 0.11 sq. mi., but reiterated Mr. Decesare’s position that it was not originally identified for consideration. He testified that Stream E was associated with wetlands on the most easterly portion of the site and had also not been included in the original application. He estimated the watershed size of Stream E as 0.14 sq. mi. Maguire PFDT, paras. 29, 30, 52 and 54. Thus, each stream’s watershed, according to Mr. Maguire’s methodology, is less than 0.5 sq.mi. and each of the streams is therefore intermittent. Maguire PFDT, paras. 36, 42, and 47. He testified that the methodology used by the Petitioners was inaccurate because it was impermissible to combine all watersheds. Maguire PFDT, para. 55. Finally, he testified that fish use intermittent streams when they are flowing as well as perennial streams, and the presence of fish was not relevant to the classification of a stream under the regulations. Maguire PFDT, para. 56.

**DISCUSSION AND FINDINGS**

The Petitioner’s position relies in large measure on whether each stream is evaluated separately to determine whether it is perennial, or may be evaluated on a cumulative basis with other streams. The Rivers Protection Act added a new resource area, the Riverfront Area, which extends landward from the mean annual high-water line of a perennial stream. Chapter 258 of the Acts of 1996, s. 18. The Riverfront Area is present only when a stream is perennial, i.e., a river. Implicit in the statutory scheme is that each stream is discrete and must be evaluated individually to determine whether or not it has a Riverfront Area. A cumulative evaluation would open the door to jurisdiction over areas that would not qualify individually, contrary to the statutory intent.

Similarly, the Department’s description of the selection of a “point-of-interest” for the purpose of determining watershed size as the downstream property line, or a further downstream if a constriction is present, is consistent with the statutory scheme. The question in a determination of whether a stream is perennial or intermittent relates to its status on the property in question. Using the confluence with another stream at a point below the property boundary would tend to overstate the watershed size, and provide information as to whether the stream is perennial at that locus rather than at the property in question.

The Petitioners, however, make the case that these streams are each perennial, and advocate for a flexible interpretation of the regulations to support that classification. The regulatory language does not support the Petitioners’ approach. Explicit in the regulations is the concept that there is a “first point of perennial flow” along any stream that distinguishes the upstream intermittent stream from the downstream perennial river. 310 CMR 10.58(2)(a)1. As noted by the Department, the references to “river” or “stream” in the regulations describing this distinction are singular rather than plural, reflecting that each watercourse is to be considered individually. Indeed, the regulations rely on the StreamStats program, which defines a drainage area, another term for watershed, as an area that drains to a point on a stream, in square miles. See [www.water.usgs.gov/osw/streamstats](http://www.water.usgs.gov/osw/streamstats). For this reason, the watershed of each stream is logically calculated individually for purposes of determining whether it is sufficiently large to meet the regulatory threshold for sustaining perennial flow at a particular point.[[6]](#footnote-6) I find that the Department’s position is consistent with the regulations and the statute, that to determine watershed size, a stream’s watershed should be evaluated individually rather than cumulatively based on a point at or near the intersection with the downgradient property boundary. Even with Mr. Maguire’s calculations that added Streams B and C with Stream D, the watershed was 0.32 square mile, less than 0.5 square mile as required under the regulations for a perennial stream. Even adding the watershed of Stream A of 0.11 square mile, the total does not meet the regulatory requirement. Evaluated under the regulatory methodology, I find that each stream at the site has a watershed of less than 0.5 square miles and therefore each must be classified as intermittent, not perennial.

It is clear from the Preface to the 2002 regulatory revisions that the Department chose a methodology that would not allow the type of evidence filed by the Petitioners, by the exclusion of a methodology based on field observations or indicators to show that a stream flows throughout the year. While it is possible that these streams are in fact perennial and there is some evidence supporting a predictive analysis that the streams are perennial, the regulations do not allow a probabilistic conclusion. The Department instead selected watershed size of 0.5 square mile as a determinative factor as to whether a stream is a river. Preface to 2002 Revisions. To be accorded a riverfront area, a stream must meet the criteria for a perennial stream, i.e., a river, as identified in the regulations.

**CONCLUSION**

Based on these findings I conclude that the method of determining watershed size based on a point along each stream at or near the downgradient property boundary as described by the Department’s witnesses is correct. Based on that point, the watershed size for each stream may be determined either by drawing a perpendicular line across contours and calculating the enclosed area or by using the StreamStats program. Based on the regulatory methodology, none of the streams at the site has a watershed size of more than 0.5 square miles, and therefore none is a river. I recommend that the Department’s Commissioner issue a Final Decision sustaining the SORAD issued by the Department.

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Pamela D. Harvey

Presiding Officer

**NOTICE- RECOMMENDED FINAL DECISION**

This decision is a Recommended Final Decision of the Presiding Officer. It has been transmitted to the Commissioner for his Final Decision in this matter. This decision is therefore not a Final Decision subject to reconsideration under 310 CMR 1.01(14)(e), and may not be appealed to Superior Court pursuant to M.G.L. c. 30A. The Commissioner’s Final Decision is subject to rights of reconsideration and court appeal and will contain a notice to that effect.

Because this matter has now been transmitted to the Commissioner, no party shall file a motion to renew or reargue this Recommended Final Decision or any part of it, and no party shall communicate with the Commissioner’s office regarding this decision unless the Commissioner, in his sole discretion, directs otherwise.

1. “The Riverfront Area is the area of land between a river's mean annual high-water line measured horizontally outward from the river and a parallel line located 200 feet away” (except in densely populated areas, where the area extends 25 feet). 310 CMR 10.58(2)(a)3. The “Mean Annual High-water Line of a river is the line that is apparent from visible markings or changes in the character of soils or vegetation due to the prolonged presence of water and that distinguishes between predominantly aquatic and predominantly terrestrial land.” 310 CMR 10.58(2)(a)2. “The boundary of the Riverfront Area is a line parallel to the mean annual high-water line, located at the outside edge of the riverfront area. At the point where a stream becomes perennial, the riverfront area begins at a line drawn as a semicircle with a 200 foot (25 foot in densely developed areas; 100 foot for new agriculture) radius around the point and connects to the parallel line perpendicular to the mean annual high-water line which forms the outer boundary.” 310 CMR 10.58(2)(a)(3)b.

   [↑](#footnote-ref-1)
2. The Preface to the 2002 regulatory revisions contains a helpful explanation of StreamStats:

   STREAMSTATS is a new statistical tool developed by USGS that can be accessed through the USGS web site at http://ma.water.usgs.gov/streamstats/. This web site provides valuable stream flow information to applicants and regulators alike. STREAMSTATS incorporates watershed size and geology into its calculations, and can be used to analyze the probability that a stream flows on a year-round basis at a particular location. That probability is reported in terms of flow duration statistics. Flow duration statistics indicate the percentage of time stream flows are equaled or exceeded at a given stream location. For example, if a stream’s flow at the 99% flow duration is five cubic feet per second, the stream’s flow is predicted to be greater or equal to that discharge rate 99% of the time. Streams with a predicted flow rate greater than or equal to 0.01 cubic feet per second at the 99% flow duration rate are considered perennial. The 99th percentile is the best available statistical expression of the statutory language “flows throughout the year.

   Preface to 2002 Revisions. [↑](#footnote-ref-2)
3. These two streams are Stream B and Stream C as identified by the Petitioners. [↑](#footnote-ref-3)
4. These two streams are Stream B and Stream C as identified by the Petitioners. [↑](#footnote-ref-4)
5. Streams TM-B and TM-C are the Petitioners Streams B and C. The Petitioners did not address Streams TM-D or TM-E. [↑](#footnote-ref-5)
6. An exception may be warranted for streams with more than one channel, as occurs in braided streams. The witnesses did not describe such circumstances at this site. The Petitioners testified that the streams were part of a bordering vegetated wetland, but that was not a determinative factor in the outcome. [↑](#footnote-ref-6)