SANDSTONE CREEK FARMS
APPLICATION FOR A WATER WITHDRAWAL

PERMIT DECISION
And
RESPONSE TO PUBLIC COMMENTS

May 9, 2014

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EXECUTIVE SUMMARY

SANDSTONE CREEK FARMS
APPLICATION FOR A WATER WITHDRAWAL

On November 14, 2013, the Department of Environmental Quality (DEQ) received from SandStone Creek Farms a water withdrawal permit application submitted under Part 327, Great Lakes Preservation, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended. Additional information was required for an administratively complete application, which was provided on January 9, 2014. The permit application is for a proposed increased large quantity water withdrawal at an existing aquaculture facility to expand the operation of the trout farm.

Subsection 32723(4) of Part 327 requires the DEQ provide for a public comment period of not less than 45 days before a permit application is acted upon. The DEQ announced the permit application and invited public comment via public notice and website posting on January 27, 2014. A copy of the public notice was transmitted to SandStone Creek Farms and to the local units of government for postings accessible to the public. Public comments were accepted by DEQ until March 13, 2014. There were no public comments received on this permit application.

On May 9, 2014, the DEQ rendered a decision in favor of permit issuance. It was concluded that all conditions for approval under Subsection 32723(6) have been met. This document includes the basis of the decision for issuance of a permit to SandStone Creek Farms for an increased water withdrawal of up to 11.8 million gallons per day (MGD) from groundwater. This is an increase over the facility’s existing 3.024 MGD withdrawal from the same bedrock aquifer.
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I. BACKGROUND

Proposed Withdrawal

The proposed increased withdrawal is for up to 11.8 MGD for aquaculture operations at an existing trout farm. The permit applicant, SandStone Creek Farms (The Farms), proposes to use the increased withdrawal to expand the operation of the existing aquaculture facility. A series of wells would be installed on The Farms property, and operated as necessary to supply a flow-through water system at the aquaculture facility. Virtually all water withdrawn will be discharged after use directly to Sandstone Creek adjacent to the property. Consumptive use of water will occur only nominally from evaporation. Therefore, the estimated water loss from the local hydrologic system, or from the Great Lakes Basin, is negligible. The proposed withdrawal point is located at approximately 42.2482° latitude, and -84.5011° longitude, in Section 36 of Sandstone Township, T02S R02W, Jackson County.

II. STATUTORY STANDARD

A person who proposes to develop new or increased withdrawal capacity of 2 MGD or more from the waters of the state to supply a common distribution system, is required to obtain a water withdrawal permit prior to making the withdrawal (MCL 324.32723[1]).

Application Submittal

A person required to apply for a water withdrawal permit shall do so by submitting an application for the withdrawal to the DEQ containing the following information (MCL 324.32723[2]):

- Capacity of equipment used to make the withdrawal.
- Location of the withdrawal.
- Withdrawal source, including depth and geologic stratum if the source is groundwater.
- Amount and rate of withdrawal, and whether the withdrawal will be intermittent.
- Intended maximum monthly and annual volumes and rates, if different from the capacity of equipment used to make the withdrawal.
- Relevant information related to seasonal use.
- Description of how the water will be used and location, amount and rate of return flow.
- Any other information the person would like the DEQ to consider.

The application is required to include an evaluation of existing hydrological and hydrogeological conditions and a detailed description of any proposed preventative measures where relevant. The applicant must certify they will be in compliance with the environmentally sound and economically feasible water conservation measures applicable to the water use sector, or to the specific proposed withdrawal. The application must also include a description of how the withdrawal will be implemented such that all criteria of Section 4.11, Decision-Making Standard of the Great Lakes – St. Lawrence River Basin Water Resources Compact (Compact) will be met. The application must be accompanied by an application fee of $2000.00.

Administrative Requirements

MCL 324.32723 requires that a permit application be considered administratively complete 30 days after receipt by the DEQ, unless the applicant is notified of deficiencies in the application requiring additional information. The DEQ is required to provide a public comment period of not less than 45 days prior to acting on an application, and shall render a decision within 120 days of receipt of an administratively complete application.

The DEQ received the permit application from The Farms on November 14, 2013. Additional information was required and was provided on January 9, 2014, at which time the application was determined to be administratively complete. On January 17, 2014, the DEQ sent a letter
and public notice document to The Farms notifying them of the 45-day public comment period and the requirement to post the notice at a nearby locality that is accessible to the public.

The DEQ announced the permit application and invited public comment via notice in the DEQ Environmental Calendars dated January 27, February 10, February 24, and March 10, 2014. Comments were accepted by the DEQ until March 13, 2014.

The consumptive use estimate of the proposed withdrawal does not exceed the 5 MGD threshold established in the Compact for proposals requiring prior notice and consultation with the other Great Lakes states and provinces. Accordingly, management and regulation of the withdrawal is at the discretion of Michigan, and no notification was made to the states party to the Compact, or to the provinces party to the international Great Lakes – St. Lawrence River Basin Water Resources Agreement.

### Conditions Required for Issuance of a Permit

The DEQ shall issue a permit for a water withdrawal if all of the following conditions are met (MCL 324.32723[6]):

- All water withdrawn, less any consumptive use, is returned to the source watershed.
- The withdrawal is implemented to ensure there is no individual or cumulative adverse resource impact (ARI) based upon an evaluation of available information by the DEQ.
- The withdrawal will be implemented in compliance with all applicable local, state, and federal laws, as well as legally binding regional interstate and international agreements.
- The proposed use is reasonable under common law principles.
- The permit applicant certifies compliance with the environmentally sound and economically feasible water conservation measures (WCM) applicable to the water use sector.
- The proposed withdrawal does not violate public or private rights and limitations imposed by Michigan water law or other common law duties.

A permit issued under MCL 324.32723 is considered to satisfy parallel conditions given in Section 4.11, Decision Making Standard, of the Compact. Subsection 4.11(5) of the Compact provides greater specificity on reasonable use conditions including: planned efficient use of the water; avoidance or minimization of waste; efficient use of existing water supplies; the balance between economic and social development and environmental protection as they relate to other existing or planned withdrawals and uses sharing the same water source; the supply potential of the water source; the degree and duration of any expected adverse impacts, and the proposed plans and arrangements for avoidance or mitigation of such impacts; and the restoration of hydrologic conditions and functions, if necessary.

### III. DECISION MAKING PROCESS

#### Returning Water to the Source Watershed

The proposed water source is groundwater from the Marshall Formation bedrock aquifer. The horizontal direction of regional groundwater flow in the Marshall Formation in this area is northwest towards Lake Michigan (Hoaglund, et al., 2002). The hydrogeological study submitted with the permit application cites flowing artesian wells and springs as evidence of an upward direction of groundwater flow from the Marshall Formation through the overlying bedrock formations and glacial deposits to the ground surface and Sandstone Creek. Sandstone Creek is a tributary of the Grand River, which flows into Lake Michigan.

The groundwater from the bedrock wells is used to provide a flow-through system for a trout farm. After treatment, the water is discharged into Sandstone Creek. The applicant estimates
that less than one percent of the water is lost due to evaporation. Thus the water withdrawn, less consumptive use, is returned to the source watershed.

**Adverse Resource Impact**

Subsection 32721(1) of Part 327 prohibits a person from making a “new or increased large quantity withdrawal from the waters of the state that causes an adverse resource impact” (ARI). Subsection 32701(1)(a) defines an ARI as decreasing the flow of a river or stream by explicit percentages of flow, such that its ability to support characteristic fish populations is functionally impaired, or decreasing the level of a lake or pond through a direct withdrawal that would impair the uses made of the lake or pond, including its ability to support characteristic fish populations. Subsection 4.11(2) of the Compact similarly requires that a proposed withdrawal will be implemented so as to ensure it will result in no significant individual or cumulative adverse impacts to the quantity or quality of the waters and water dependent natural resources of the Great Lakes Basin.

The Farms permit application includes an evaluation of existing hydrological and hydrogeological conditions. The evaluation provides a detailed depiction of the known characteristics of the local setting, and illustrates the complexity of the geology and groundwater movement. Water well drilling logs were also provided for the existing wells on the Farms property, which provide pertinent information about the site and about the probable specifications of the proposed wells. The existing wells range from 112 to 200 feet total borehole depth below ground surface, and are cased to depths of 60 to 80 feet with the remaining well depth being open borehole to the bedrock aquifer. The aquifer is under artesian pressure to the degree that all existing wells naturally flow to the ground surface, and the proposed wells are also anticipated to naturally flow at the 11.8 MGD rate requested in the permit application.

In the south-central Lower Peninsula, the upper portion of the bedrock stratigraphy generally consists of (moving upward): Coldwater Shale confining layer, Marshall Formation bedrock aquifer, Michigan Formation confining layer, Bayport Limestone (which can be a confining layer) and the Saginaw Formation bedrock aquifer. Glacial deposits overlie the Saginaw Formation, except where bedrock outcrops are present. The Michigan Formation and Bayport Limestone are highly eroded in this area of Jackson County and may be missing at this facility. There are outcrops of the Saginaw Formation in this area of Sandstone Township (hence the names of the township and Sandstone Creek).

In the area of this facility, the Marshall Formation is under enough confining pressure from overlying lower permeability deposits that its groundwater potentiometric surface (the level to which groundwater would naturally rise in a well) is above the ground surface, resulting in flowing artesian wells. Thus the vertical component of the groundwater flow direction is upward, meaning that groundwater flows upward from the Marshall Formation through the Saginaw Formation into the glacial deposits and Sandstone Creek. There are numerous reports of springs and flowing artesian wells in this area.

Because the groundwater potentiometric surface is above ground level, wells in the Marshall Formation in this area don’t require pumping. The groundwater flows out of the wells under its own artesian pressure. If enough wells tap the Marshall Formation in this area, there is the potential for the artesian pressure in the Marshall Formation to be reduced to the point where the wells no longer flow and require pumping to produce water.

The Farms proposed withdrawal will supply a rapid flow-through water system for the purposes of rearing trout which require cool, clean water. Virtually all of the water withdrawn is discharged directly to Sandstone Creek as treated effluent, with only nominal consumptive
losses due to evaporation expected at less than one percent. The discharge of treated water from the trout farm directly into Sandstone Creek will offset any reduction in groundwater baseflow to Sandstone Creek caused by a reduction of vertical groundwater flow to the creek from the underlying Marshall Formation aquifer. Therefore the proposed withdrawal is not likely to cause an ARI in terms of decreasing the stream flow in Sandstone Creek.

In addition to the stream flow in Sandstone Creek, another factor to consider is whether the change in groundwater baseflow and the direct discharge of treated water to Sandstone Creek will change the water temperature to the point where it will adversely affect characteristic fish species. Of primary concern is the potential thermal alteration of Sandstone Creek during summer, which is classified as a cool small river having mean July temperatures of 67.1° F to 69.8° F. A substantial discharge of warm effluent water could have similar consequences in relation to the ARI standard as that of an excessive groundwater withdrawal with no return flow discharge. The discharge is regulated under Part 31, Water Resources Protection, of the NREPA. The Farms has also applied for a Part 31 permit, and the concurrent Part 31 permit review process allowed the water withdrawal permit staff to rely upon the expertise of the Part 31 permit staff to evaluate the thermal and water quality effects of the discharge on Sandstone Creek. This review found that the rapid flow-through system will not allow for excessive heating of the water prior to discharge into the creek, and therefore thermal alteration of Sandstone Creek is not expected.

The DEQ determined the impact of the withdrawal as proposed is not likely to result in individual or cumulative ARIs as defined in Part 327, nor will it result in any significant individual or cumulative adverse impacts to the quantity and quality of the waters and water dependent natural resources of the Great Lakes Basin, as required in the Compact.

Consumptive Use Considerations

The proposed withdrawal has only nominal consumptive use loss due to evaporation, estimated to be less than one percent. Virtually all water withdrawn will be discharged to Sandstone Creek in the immediate vicinity of the withdrawal.

Conservation Measures

As a condition of permit approval the applicant must self-certify that he or she is in compliance with the WCM associated with the applicable water use sector or with measures developed for the specific withdrawal. WCM have not been adopted for the aquaculture sector, but The Farms has identified the WCM from the agricultural irrigation sector that also apply to aquaculture. The Farms has also committed to WCM for their specific withdrawal, and to instituting WCM that will modernize and improve the efficiency of the existing water use. For example, all current and new raceways and earthen ponds will be lined to eliminate leaks. The Farms has also been working with governmental agencies, university researchers and extension services and consultants to implement best management practices for water conservation and water quality.

Reasonable Use

A proposed withdrawal must be deemed reasonable under common law principles of Michigan water law, and as required in the Compact as a condition of approval. The specific criteria from the Compact are outlined below, and are consistent with Michigan’s test for determining reasonable use as set forth in Michigan Citizens for Water Conservation v. Nestle Waters of North America, Inc. [Michigan Citizens for Water Conservation v Nestlé Waters N America Inc,
Efficiency of the Proposed Water Use: This requirement is tied to the user’s commitment to WCM in the future operation of the withdrawal. The Farms certified they will be in compliance with the WCM applicable to aquaculture, and commits to avoidance or minimization of the waste of water through their own additional WCM.

Efficient Use of Existing Water Supplies: Efficient use of existing water supplies and withdrawal capacity is an essential consideration when an increased withdrawal is proposed. It is intended to ensure that water is being efficiently used by a large quantity user before they are granted approval for an increased withdrawal. The Farms has committed to retrofitting the existing aquaculture facility to modernize it and improve water use efficiency, including lining earthen ponds and raceways to better maintain water in the system and minimize the amount of additional withdrawal volumes necessary for the expanded operation.

Balance between Economic Development, Social Development and Environmental Protection: The reasonableness of a water use relates to the balance between economic development, social development, and environmental protection and is an important consideration in the acceptability of a proposed withdrawal. The DEQ has determined the proposed withdrawal and the permitted discharge will have a low probability of adverse environmental impacts, balanced by positive economic and social development factors. The economic development potential of the trout farm expansion is clear, including additional employee staffing and the associated economic multiplier factors. There are also associated positive economic effects during the construction phase of the project for the work to be contracted and completed. In regards to social development considerations, the current trout farm is a popular tourist attraction and will remain so following its expansion. The Farms is currently utilized by local academic institutions as a working classroom, with the intention of increasing this participation opportunity in the future. There are no known negative economic or social development factors anticipated as a result of the proposed withdrawal or farm expansion. The proposed withdrawal is determined to be reasonable in regards to the balance between economic and social development, and environmental protection.

Supply Potential of the Water Source: The impact of the proposed withdrawal on the quantity, quality, reliability, and safe yield of hydrologically interconnected water sources is considered in the review process. Since the existing and proposed wells at this facility are flowing artesian wells, they will not create cones of depression that will impact the yield of nearby wells. Over the long term, too many wells completed in the Marshall Formation could reduce the confining pressure to the point where the wells are no longer flowing artesian wells and require pumping to provide water. The facility’s existing and proposed wells are deeper than most area wells. The greater depth of the facility’s wells reduces the probability of decreasing the confining pressure to the point where artesian wells stop flowing. The proposed withdrawal does not present any known or anticipated threat to the quantity or quality of hydrologically connected water sources, nor the reliability or the safe yield of the source. However, as a precaution the permit will be conditioned to require that the permit holder take corrective actions if the withdrawal interferes with the normal operation of other nearby wells, including reducing artesian pressure to the point where wells stop naturally flowing.

Degree and Duration of Likely Adverse Impacts: The probable degree of any adverse impacts to the quantity or quality of the waters and water dependent natural resources of the Great Lakes Basin, or to other uses of water expected to be caused by the proposed withdrawal must be considered. As previously stated under the Adverse Resource Impacts section, the withdrawal is not expected to cause adverse impacts to the waters or water dependent natural resources of the Great Lakes Basin. However, the proposed withdrawal may have the potential
to adversely impact other uses of groundwater in its vicinity by way of reducing the water level in the aquifer. Based on available information, the probability of this occurring is low but cannot be ruled out. Immediately surrounding the proposed withdrawal property is a relatively sparsely populated residential area, with the exception of a small subdivision housing development within 0.5 miles to the south, and another slightly further to the northeast. All private wells in the area are completed in bedrock aquifer(s) generally at the same or shallower depth below ground surface as the existing and proposed wells at The Farms. However, most well locations are getting their groundwater from shallower depth intervals in the bedrock aquifers than The Farms’ wells, and most do not naturally flow at the surface as do the Farms’ existing and proposed wells. This may indicate that most private wells are completed in a shallower, separate bedrock aquifer than The Farms’ existing and proposed wells, or that the Bayport Limestone and/or Michigan Formation confining layers aren’t present at those well locations, and may therefore reduce or eliminate the likelihood of interference with those wells’ operation. However, sufficient information does not exist to make a projection as to the potential impact on water levels, or adverse impact on other wells’ operation. As such, should adverse impacts occur to other uses of the aquifer, as a condition of permit approval and compliance The Farms is required to rectify the problem with the affected well owners.

Restoration of Hydrologic Conditions and Functions: If a withdrawal proposal includes measures for restoration of hydrologic conditions and functions of the source watershed they may also be considered in the review process. The withdrawal proposal did not include measures for restoration of hydrologic conditions and functions of the source watershed.

Applicable Local, State and Federal Laws

A withdrawal must be in compliance with all applicable local, state, and federal laws as well as legally binding interstate and international agreements, including the Boundary Waters Treaty of 1909 to be approved. The Boundary Waters Treaty of 1909 was agreed to by the U.S. and Canada to provide a mechanism for the resolution of disputes over waters bordering the two countries and to ensure the waters of the Great Lakes remain navigable. The DEQ has concluded the proposed withdrawal would be in compliance with applicable state and federal laws, and international agreements including the Boundary Waters Treaty of 1909. This facility also applied for permits under Parts 91, Soil Erosion and Sedimentation Control; 301, Inland Lakes and Streams; and 31, Water Resources Protection, of the NREPA, and an aquaculture license from the Michigan Department of Agriculture and Rural Development. A condition of the water withdrawal permit will require the permittee to maintain compliance with all applicable local, state, and federal laws including but not limited to obtaining permits.

Public or Private Rights, Limitations and Common Law

The issuance of a permit on the proposed withdrawal must not violate public or private rights or the public trust doctrine, or exceed limitations imposed on the use of the resource by Michigan water law or other common law decisions. Specifically, the DEQ must ascertain if the issuance of the permit would interfere with the public’s use of the water resources, or with the state’s ability to maintain the resources for the public’s reasonable use. The DEQ’s analysis concludes that the public’s use of the water resources will not be impaired by the proposed withdrawal, and that it is unlikely that this withdrawal will negatively impact the normal operation of other wells. However, due to the impracticality of predicting the impact on other wells with certainty, the DEQ requires rectification of any observed adverse impacts as a condition of permit approval and compliance.

IV. PUBLIC PARTICIPATION PROCESS

The DEQ announced the permit application and invited public comment via notice in the DEQ Environmental Calendars dated January 27, February 10, February 24, and March 10, 2014.
The notice included an Internet link to the permit application packet and a draft permit made available on the DEQ website. The applicant was also required to post the public notice at a nearby locality that is accessible to the public. The public notice announced the 45-day public comment period beginning on January 27, and concluding March 13, 2014.

There were no comments received regarding the proposed withdrawal during or after the public comment period.

V. SUMMARY OF DEQ POSITION

The DEQ concludes that with the addition of specified permit conditions, the proposed withdrawal meets all criteria for a water withdrawal permit under Part 327 and that a permit may be issued. The authorized increased withdrawal capacity is 11.8 MGD from groundwater.

References Cited: