TO: Pennsylvania Department of Environmental Protection (DEP)

FROM: Environmental and Natural Resources Law Clinic of the Widener School of Law, on behalf of its client Blue Mountain Preservation Association

DATE: August 22, 2007

RE: Written Public Comment on Application and Proposed Individual NPDES Permit No. PAS10S119, Alpine Rose Resorts, Eldred Township, Monroe County

Blue Mountain Preservation Association (BMPA) opposes the issuance of an Individual NPDES Permit for the discharge of stormwater from construction activities at the proposed Alpine Rose Resorts facility in Eldred Township, Monroe County. This opposition is based on substantive deficiencies in the materials submitted by Alpine Rose Resorts (Alpine). These concerns are summarized as follows:

SUBSTANTIVE DEFICIENCIES

BMPA believes that the application suffers from several substantive deficiencies. Pennsylvania's Antidegradation Regulations, at 25 Pa. Code § 93.4c(b)(1)(i)(B), squarely places the burden on the applicant to show compliance with the three-part test set forth in the regulations: consideration of a non-discharge alternative, application of ABACT, and proof that the discharge will maintain and protect the existing water quality of the receiving stream. BMPA believes that Alpine has failed to carry its burden in this regard.

1. The General Antidegradation Analysis is Deficient

Alpine has submitted an "Antidegradation Report for Alpine Rose Resorts" prepared by Christopher Blechschmidt ("the Blechschmidt Report") that appears to be an attempt to show how Alpine complies with the Antidegradation Regulations. BMPA believes that the Blechschmidt Report is deficient in several respects. Among the deficiencies:

a. *Misuse of DEP Guidance*. The Blechschmidt Report references DEP's Water Quality Implementation Guidance throughout. However, the language of the Guidance is used in a kind of checklist fashion, with citation to particular language in the Guidance and then some argument about how Alpine meets the language. BMPA submits that this is a misuse of the Guidance. As DEP itself makes clear in its disclaimer:

> The policies and procedures outlined in this guidance are intended to supplement existing requirements. Nothing in the policies or procedures shall affect regulatory requirements.

> The policies and procedures herein are not an adjudication or a regulation. There is no intent on the part of DEP to give the rules in these policies that weight or preference. This document establishes the framework within which DEP will exercise its administrative discretion in the future. DEP reserves the discretion to deviate from this policy statement if circumstances warrant.

Guidance at pp. i-ii. In short, there is much more to antidegradation than simply following what DEP itself characterizes as a non-exhaustive list of factors, principles, or concepts that help shed light on what is required under § 93.4c.

b. *Improper Claim of No New Discharge Post-Construction.* BMPA categorically rejects the premise underlying the Blechschmidt Report that, once the construction of the site is complete and stormwater infiltrates through the pervious surfaces, the discharge from the site is not subject to regulation. Although BMPA has serious doubts about the efficacy of the proposed pervious pavement (more on that in a moment), the fundamental problem is that the Blechschmidt Report views this question solely in volumetric terms. BMPA submits that is an inappropriate view to take in this case. Pre-construction, stormwater flows down the north side of Blue Mountain in a sheet flow pattern, with some water infiltrating into the ground and the rest reaching the wetlands and Creek. Post-construction—even if the volume is exactly the same—the regime is completely different because the water will be captured in detention basins and a wet pond, and redirected into drainage swales and other conveyances, in a manner that is completely different from the pre-construction flow regime. By gathering the water into ponds, Alpine will alter the natural patterns of infiltration, and thereby alter the groundwater component of additions to the Aquashicola Creek. In short, stormwater will discharge to the Creek in a new and different way post-construction. As is explained below, the use of detention basins and the wet pond pose serious risks to the Creek because of thermal impacts. What is important at this point, however, is for DEP not to fall into the trap of thinking that the regulatory issues here end with a comparison of pre- and post-construction volumes without any consideration of the changes to the manner, location, and quality of the discharge post-construction.

c. *The Pervious Concrete Solution Has Not Been Adequately Explained.* One of the key assumptions of the Blechschmidt Report is that the use of pervious concrete will cause all stormwater falling on imperious surfaces to be infiltrated (thereby keeping the pre- and post-construction volumes the same). During its review of the "application," BMPA was not provided with any detailed engineering information about how and where the pervious concrete will be installed. The failure of Alpine to provide that information makes it impossible for DEP and BMPA to verify that the concrete will in fact do what the Blechschmidt Report claims it will do. That is reason alone to reject the application.[1] Yet even without that necessary engineering

[1] For example, the Pervious Concrete Pavements attachment to the Blechschmidt Report warns that a "critical assumption" in calculating storage capacity of the pervious pavement system is that "the entire system is level. If the top of the slab is not level, and the infiltration rate of the subgrade has been exceeded, higher portions of the slab will not fill and additional rainfall may run to the lowest part of the slab. Once it is filled, the rain will run out of the pavement, limiting the beneficial effects of the pervious concrete." Pervious Concrete Pavements attachment at p. 12. Thus, where and how the system will be constructed is critical to understanding whether the system will generate the benefits claimed. All the Blechschmidt Report offers is a theoretical, back-of-the-envelope calculation that may or may not be accurate—especially considering the fact that the Resort is being built on the side

information, there is significant reason to doubt that the Blechschmidt Report's claims will in fact occur. For example, a view of the site plan suggests that a significant percentage of the surface area that was previously designed to be impervious surface is the 3.2 mile roadcourse itself. Based on the hand-written calculation sheets included in the Blechschmidt Report, it appears that Alpine does not intend to use pervious surfaces on the roadcourse, but only on the helipad and access road. The report does not explain how the helipad and access road can infiltrate the stormwater falling on the roadcourse. BMPA is not aware of any design changes to funnel water from the roadcourse to the helipad. Simple logic suggests that it is impossible for all the stormwater falling on the newly concreted surfaces to be infiltrated in such a small area.

In short, BMPA believes that the Blechschmidt Report fails to provide the hard data DEP needs to assess the ability of the Alpine site to satisfy the requirements of the Antidegradation Regulations.

2. The Thermal Impact Analysis Is Deficient

One of the reasons for remand proffered by the EHB in its September 7, 2006 ruling was that Alpine and DEP had failed to consider potential thermal impacts to the Aquashicola Creek, a High Quality water and Cold Water Fishery under Pennsylvania's regulations. Thermal impacts to the Creek are vitally important to its continued maintenance as a HQ and CWF water. Under 25 Pa. Code § 93.7, CWF waters should not exceed a temperature of 66° F during July and August. *See* excerpt from § 93.7 attached as Exhibit 1 to this memo. Temperature data from sampling in the Creek by the County and by the Aquashicola and Pohopoco Watershed Conservancy shows that there is very little margin for thermal increase. Data from samples taken during July and August 2001 – 2006 shows temperatures near (and in some instances above) the 66°F limit:

Monroe County Samples Taken at Bridge at Mountain Rod and Upper Smith Gap Rd.

2001 Temp	2002 Temp	2003 Temp	2004 Temp	2005 Temp	2006 Temp
17.8°C	18.5°C	17.8°C	17.8°C	19.9°C	18.5°C
64.04°F	65.3°F	64.04°F	64.04°F	67.82°F	65.3°F

See printout of temperature data BMPA obtained from County attached as Exhibit 2 to this memo.

Monroe County Samples Taken at Kunkletown Rod & Gun Club

2004 Temp	2005 Temp	2006 Temp
18.1°C	20.5°C	18.7°C
64.58°F	68.9°F	65.66°F

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of a mountain. Detailed engineering—and calculations based on that detailed engineering—are essential to any assessment of the effectiveness of the proposed pervious system.

See printout of temperature data BMPA obtained from County attached as Exhibit 3 to this memo.

Aquashicola and Pohopoco Watershed Conservancy Samples Taken at Kunkletown Rod & Gun

7/26/06 Temp	8/31/06 Temp
20.6°C	17.2°C
69.08°F	62.92°F

See printout of temperature data BMPA obtained from APWC attached as Exhibit 4 to this memo.

Aquashicola and Pohopoco Watershed Conservancy Samples Taken at Voght Property

8/28/06 Temp
18.9°C
66.02°F

See printout of temperature data BMPA obtained from APWC attached as Exhibit 5 to this memo. Clearly, the Aquashicola Creek is already on the edge of its temperature limits even before Alpine's discharge is considered.

Alpine has submitted "Analysis of Potential for Adverse Thermal Impacts to Aquashicola Creek as a Result of the Proposed Development of the Alpine Motorsports Facility" prepared by Thomas D. Gillespie for Alpine Asset Holding LLC[2] ("the Gillespie Report") in connection with its application. In the first part of the Gillespie Report (p. 5 – 13), Mr. Gillespie provides modeling data from his analysis of the thermal effect on stormwater from heated impervious surfaces. In the second part of the Report p. 13 – 16), Mr. Gillespie considers the effect of the retention of water is basins and ponds on site. In this second part, Mr. Gillespie provides no modeling or sampling data. Instead, he provides only theoretical opinion based upon an impressive sounding "Technical Analysis" that the Latent Heat of Evaporation will remove the heat from the water body. His conclusion, after mentioning the "speculation" during the EHB hearing that standing water in detention basins could become hot because of solar heating, is unequivocal: "Such accumulation of thermal energy and the presumed excessive increase in water temperatures are not possible." Gillespie Report, p. 13. In short, Gillespie believes that thermal heating in a stormwater detention pond **cannot happen**. Further, because the Latent Heat of Evaporation is a universal principle of physics, the logical consequence of Mr. Gillespie's conclusion is that, according to Mr. Gillespie, thermal heating in a stormwater detention pond **cannot happen any time in any place**. BMPA believes that the Gillespie Report

[2] BMPA notes for the record that Alpine Asset Holding LLC is not the applicant for the NPDES permit at issue here (as identified in the July 21, 2007 Public Notice) and has never been identified before in the previous permitting process. BMPA questions the appropriateness of even allowing this report to be used in light of these facts.

is inadequate and the conclusion that thermal heating in stormwater detention basins cannot happen is just plain wrong for several reasons:

a. DEP's Own Guidance Documents Contradict Gillespie's Conclusion

In April 2006, DEP issued its Pennsylvania Stormwater Best Management Practices Manual, Document No. 363-0300-002 ("Manual"). Alpine intends to use both a wet pond and several extended detention basins on site both during construction and post-construction. In connection with wet ponds, DEP's Manual states:

> ***Due to the potential to discharge warm water***, wet ponds should be used with caution near temperature sensitive waterbodies.

Manual Chapter 6, BMP 6.6.2 (p. 154 of 245) (emphasis supplied). DEP is even more adamant about the use of extended detention basins:

> The use of extended detention basins within Exceptional Value or High Quality watersheds as defined by Chapter 93 of Pennsylvania's Code ***is not recommended*** and may be prohibited by local ordinances.

Manual Chapter 6, BMP 6.6.3 (p.166 of 245) (emphasis supplied). Thus, in contrast to Gillespie's categorical claim that heating within detention basins cannot happen, DEP has found that such heating can occur, and therefore advises against using these BMPs in HQ watersheds like the Aquashicola.

b. Other Governmental Agencies Recognize the Heating Potential of Stormwater Ponds

DEP is not alone in its concern about stormwater detention basins and wet ponds heating water in a way that can be harmful to cold water aquatic systems. Among the other governmental agencies raising this concern is the USEPA, which states the following in its "Stormwater Best Management Practice Design Guide: Volume 1 General Considerations," Document No. EPA/600/R-04/121 (September 2004):

- "**Ponds pose a risk to cold water systems because of their potential for stream warming**," *id*. at Table 5-4 on p. 5-7 (emphasis supplied);

- Table listing Watershed Factors for various BMPs shows that, for Cold Water systems, Ponds are "**Restricted due to thermal impacts**," *id*. at Table 5-9 on p. 5-13 (emphasis supplied)

Copies of these excerpts are attached as Exhibit 6 to this memo. New Jersey has likewise raised the thermal impact concern. In the New Jersey Stormwater Best Management Practices Manual (February 2004), New Jersey DEP has this to say about wet ponds:

> Wet ponds may be limited by the ***potential for discharge water to be heated*** in the permanent pool during summer months and ***should not be used if the receiving waters are ecologically sensitive to temperature change***.

Id. at Chapter 9.11, p. 9.11-2 (emphasis supplied). A copy of this excerpt is attached as Exhibit 7 to this memo.

Clearly, DEP, USEPA and NJDEP do not accept Gillespie's claim that heating in stormwater detention ponds is "not possible." Of course, there is good reason for this, as the next section makes clear.

c. Studies Prove That Stormwater Detained in Ponds/Basins Is Heated

Unlike Gillespie's theoretical musings, scientists have tested and proven that stormwater kept in detention basins is in fact heated during that storage time. The scientific tests showing this fact that BMPA has been able to gather in the time for public comment include:

- Mark S. Kieser, "Andrew" Feng Fang, and Jeffrey A. Spoelstra, "Role of Urban Stormwater Best Management Practices in Temperature TMDLs." A copy of this study is attached as Exhibit 8 to this memo. This study measured temperatures in a stormwater BMP consisting of a forebay, wet pond, and wetland in the City of Portage in lower southwest Michigan. The study measured temperatures in all three components of the BMP. The data revealed that "stormwater detained in the sediment forebay and wet pond was always warmer than ambient air" by an average difference of 3.6°C (6.48°F) in the forebay and 2.9°C (5.22°F) in the wet pond. Report at p. 6. This caused the study authors to remark that "[t]his **confirms the heating effect or additional thermal loading to the collected stormwater runoff in the two ponds during the detention period due to solar inputs**." Report at p. 6-7 (emphasis supplied). In the conclusion of the Report, the study's authors state that "[i]t is also clear that **open water detention ponds are not a suitable stormwater BMP option for stormwater treatment to protect coldwater habitats**" and that the "fundamental differences between thermal pollution and other common constituent pollutants may **render the sole use of detention ponds as inappropriate for thermal treatment of urban stormwater that is returned to coldwater receiving streams**." Report at p. 14 (emphasis supplied).

- "Swan Ponds Stormwater Facility: Temperature Impacts to Tenny Creek" (2003) prepared by the Clark County (WA) Public Works Water Resources Section. A copy is attached as Exhibit 9 to this memo. This study found that the outlet temperature from a stormwater detention pond averaged a 3.28°F increase over the inlet temperature, with a maximum increase of 5.3°F. Report at p. 3. The Report's authors interpreted this temperature data as "indicating that **impounded water was heated prior to discharging downstream**." *Id*. (emphasis supplied). The study also found that the **ponds** in turn **had "a significant impact on stream temperature."** *Id*. (emphasis supplied). Further, the study found that a floating

mat of duckweed that forms each year in the pond "likely has a mitigating influence on temperature increases within the facility", *id*. at p. 4—suggesting that the temperature increase in the pond would have been higher if the pond surface was clear (exactly what Alpine intends to have at its facility).

- Stormwater Assessment Monitoring and Performance (SWAMP) Program, Ministry of the Environment, Ontario, Canada, "Synthesis of Monitoring Studies Conducted Under the Stormwater Assessment Monitoring and Performance Program" (November 2005). A copy of this study is attached as Exhibit 10 to this memo. Summarizing various studies conducted of stormwater management systems in Canada, this Report states as part of its conclusions that "[**o]ne downside of ponds** and wetlands **is that they invariably increase water temperature**," with the increase during low flow events being measured as between 4°C (7.2°F) and 11°C (19.8°F). Report at p. 92 (emphasis supplied).

- Galli studies. BMPA is aware of three studies by J. Galli of the Metropolitan Washington Council of Governments that are likely relevant: "Thermal Impacts Associated with Urbanization and Stormwater Management Best Management Practices" (1990), a study including stormwater detention ponds in Prince Georges County, MD; "Thermal Impacts Associated with Urbanization and BMPs in Maryland" (1991); and "Analysis of Urban BMP Performance and Longevity in Prince Georges County, Maryland: Final Report" (1992). The 1990 Report is widely cited in the literature, and has been characterized as finding that **stormwater detention structures produce higher outflow temperatures (compared to inflow)**, and that such "BMPs mitigate flow and treat for common pollutant but **create a thermal loading condition**." *See* Kieser et al at p. 3 (emphasis supplied). BMPA has found references to the 1990 study that characterize its conclusion as finding that **stormwater detention wet ponds heat storm water by about 9°F** from the inlet to the outlet. *See* webpage excerpt from North Carolina State University attached as Exhibit 11 (emphasis supplied). BMPA is attempting to obtain copies of the Galli studies from the Metropolitan Washington Council of Governments and Mr. Galli himself, but has not yet received them. BMPA will forward the study when received, but requests that DEP make its own efforts to locate these seminal studies as part of its review of these comments.

Clearly, the actual experimental data available to the public refutes Gillespie's theoretical claim that the Latent Heat of Evaporation will prevent any heat increase in stormwater detention ponds. DEP should be highly skeptical of Gillespie's conclusion and Alpine's claims based on it.

The study Gillespie cites (Ham et al (2006)), does not alter this analysis. Although a copy of the full study could not be obtained in time for these comments, the abstract available (*see* Exhibit 12 attached hereto) strongly suggests that the study was not of a stormwater detention pond, but rather of a pond on a free-flowing stream (which likely does not have the same detention—and therefore potential heating—times as detention ponds). The issue in this case is stormwater detention basins and ponds, and the data from those types of basins/ponds (set

forth above) clearly and consistently show that the water's temperature increases during detention. In fact, the Ham study appears to contradict Gillespie's claim that the Latent Heat of Evaporation prevents temperature in a water body from increasing. According to the abstract, even in a free flowing stream like the Pennypack Creek, Ham found that the temperature in the ponds **were up to 4°C (7.2°F) warmer** than the Creek itself—proof, as the abstract says, that ponds of water "heat up during summer months." Thus, the Ham study supports BMPA's position (and the studies cited above) that ponding of water tends to heat the water up—precisely the opposite of what Gillespie and Alpine claim here.

Given the measured temperatures in the Creek without any stormwater heating in detention ponds, all of the proven temperature increases in the studies would push the Aquashicola well beyond the 66°F maximum under 25 Pa. Code § 93.7. Of greatest concern to BMPA is that the ponds at the Alpine property are being designed to meet the 25 Pa. Code Chapter 102 requirements for sediment and erosion control in special protection watersheds. One of the key requirements is that the detention basins increase detention time from the usual two days to four or more days, *see* 25 Pa. Code § 102.4(b)(6)(C),[3] which means that **these temperature effects proven in the studies will be likely be even more pronounced in the Aquashicola Creek.** Allowing Alpine to discharge under the proposed permit puts the Aquishicola at extreme risk of water quality degradation.

Gillespie's demonstrably false premise that no heating of stormwater will occur is fatal to Alpine's antidegradation analysis. Alpine has adopted Gillespie's conclusion that no thermal impacts will occur. *See* Watershed Analysis Module submitted by Alpine at Section B attached as Exhibit 13 (citing Gillespie Report to justify conclusion that there will be no thermal impacts); Blechschmidt Report at p. 6 (expressly directly DEP to the Gillespie Report to prove that there will be no additional or new pollutants discharged to the Creek). Adopting this discredited "no thermal impact" view means that Alpine has not done any ABACT analysis on thermal impacts, and more specifically whether the proposed BMPs will in fact mitigate the thermal heating of stormwater to a sufficient level that there will be no adverse impacts to the water quality of the Creek.

The burden is on Alpine to show that the water quality of the Aquashicola will not degrade or worsen as a result of the discharge to the Creek. On the issue of thermal impacts, the only thing Alpine offers is the theoretical claim of Mr. Gillespie—a claim that is thoroughly discredited by the DEP, USEPA, NJDEP, and actual scientific evidence showing a clear threat of adverse thermal impacts from stormwater discharges. BMPA respectfully suggests that Alpine

[3] This is yet another inaccuracy in the Gillespie Report. Gillespie claims that heating cannot occur because stormwater at the Alpine site will only be detained for one to three days. *See* Gillespie Report at p. 14 ("the detention periods of stormwater in the Alpine basins will be between one and three days"); p. 16 ("In the case of the Alpine property, water will be present in the detention basins for a maximum of three days"). Gillespie is wrong on two accounts: (a) Chapter 102 BMPs require 4 – 7 day detention times, and (b) there will be a wet pond near the lowest point of the property (i.e., closest to the Creek) that will always have water in it. There is nothing in the application or the testimony at the EHB hearing to suggest that post-construction the detention basins and wet pond will be significantly different from what they will be during construction, which means that the longer detention times will be a permanent feature of the Alpine site (unless Alpine does not intend to comply with Chapter 102, in which case the application should be rejected on that ground). So either Gillespie is wrong, or Alpine is in violation of Chapter 102.

has failed to carry its burden of proof for the required antidegradation analysis under 25 Pa. Code § 93.4c. DEP's issuance of the permit in light of Alpine's failure to carry its burden would be arbitrary and capricious and in violation of the Antidegradation regulations. Further, regardless of whether Alpine carried its burden, BMPA respectfully submits that DEP's issuance of the permit, in light of the evidence of the measured temperatures in the Aquishicola Creek and the universal scientific evidence showing significant thermal impacts from detaining stormwater in ponds, would itself be arbitrary and capricious for failing to protect the water quality of the Creek.

BMPA believes that the information provided herein is more than adequate for DEP to reject Alpine's application. BMPA strongly urges DEP to deny Individual NPDES Permit Application No. PAS10S119 and not issue the requested permit to Alpine Rose Resorts.

INDEX OF EXHIBITS TO MAELC'S COMMENTS ON BEHALF OF BMPA

Exhibit #	Description
1	Excerpt of 25 Pa. Code § 93.7
2	Monroe County Sampling Data – Aquashicola Creek (Bridge at Mountain Rd. and Upper Smith Gap Road)
3	Monroe County Sampling Data – Aquashicola Creek (Kunkletown Rod and Gun Club)
4	Aquashicola and Pohopoco Watershed Conservancy Sampling Data – Aquashicola Creek (Kunkletown Rod and Gun Club)
5	Aquashicola and Pohopoco Watershed Conservancy Sampling Data – Aquashicola Creek (Voght Property)
6	Excerpt from USEPA, "Stormwater Best Management Practice Design Guide: Volume 1 General Considerations," Document No. EPA/600/R-04/121 (September 2004)
7	Excerpt from NJ DEP, New Jersey Stormwater Best Management Practices Manual (February 2004)
8	Mark S. Kieser, "Andrew" Feng Fang, and Jeffrey A. Spoelstra, "Role of Urban Stormwater Best Management Practices in Temperature TMDLs."
9	Clark County (WA) Public Works Water Resources Section, "Swan Ponds Stormwater Facility: Temperature Impacts to Tenny Creek" (2003)
10	Stormwater Assessment Monitoring and Performance (SWAMP) Program, Ministry of the Environment, Ontario, Canada, "Synthesis of Monitoring Studies Conducted Under the Stormwater Assessment Monitoring and Performance Program" (November 2005).
11	Web page from North Carolina State University Biological and Agricultural Engineering Department
12	Abstract of Ham et al., "Effect of Upstream Ponds on Stream Temperatures" (2006), *found at* http://www.springerlink.com/content/d850845876776586/.
13	Watershed Analysis Module from Alpine's Revised Application (as presented to BMPA by the Monroe County Conservation District)