Stormwater Runoff from Un-trafficked Asphalt Pavements Do Not Adversely Impact the Environment

The information included in this document reflects research and scientific understanding as of March 2024. The information below is based on credible, valid informational sources, published in scientific journals or through government agencies. Citations are provided and readers are encouraged to independently review and verify the statements and claims below. For more information, including the validity of any statement without direct citations, contact NAPA Vice President for Environment, Health & Safety, Dr. Howard Marks, at hmarks@asphaltpavement.org or 301-731-4748.

It has come to our attention that the Town of Andover, Massachusetts, has expressed concerns about paving a pedestrian walkway with asphalt, near the town's drinking water aquifer/reservoir. Below we take the opportunity to provide clarity on some common misunderstandings about how and whether stormwater runoff from asphalt and other pavements might impact water quality – and we share relevant and cited information affirming that un-trafficked asphalt pavements will not adversely impact the environment or water supplies.

With over 90 percent of the nation's highways and roads surfaced with asphalt, asphalt pavement is one of the most recycled materials in the U.S. and the world.

Naturally-occurring asphalt has been in existence since antiquity. The first recorded use of asphalt as road-building material was in 625 B.C.. Prior to that, the Romans used asphalt to seal reservoirs and aqueducts. Naturally-occurring asphalt is no different chemically or functionally than refined asphalt which is a byproduct of crude oil refining – the material itself is waterproof and inert at ambient temperature.

More recently in the U.S., since approximately the 1950s, asphalt has been used to line drinking water reservoirs. Large-scale dams and reservoirs continue to use the material as a liner. The American Water Works Association identifies asphalt liners as one of the few viable drinking water reservoir linings. And we know asphalt also lines fish hatcheries. In fact, recent scientific research illustrates leachate from asphalt shows no significant effect on chronic toxicity of the water-bug daphnia, one of the most susceptible water-borne organisms.

However, stormwater runoff from roadway pavements (asphalt and concrete) has and continues to be investigated for its adverse environmental impact. In the 1960s, environmental agencies recognized that depositions from leaded-gasoline were adversely impacting the surrounding roadway soil and adjacent waterways. Even with the phase-out of leaded gasoline, the increase in vehicular traffic provided additional burdens to roadway stormwater runoff – caused from tire-wear particles, brake lining dust, vehicular oil and grease drippings, and other anthropogenic depositions. One of those vehicular wear materials, oil and grease, contains chemicals called 'PAHs' that are also found in asphalt but in miniscule amounts and immobilized in the pavement matrix.

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To help better differentiate between asphalt pavement itself and vehicular oil and grease drippings, researchers subjected asphalt to EPA leachate test methods to scientifically investigate whether asphalt leaches petroleum constituents. Of six paving asphalts and four roofing asphalts subjected to EPA test methods, "All four roofing samples and three of six paving samples showed no trace of any . . . [of the typical 29 regulated petroleum compounds]" and only two of the samples had slightly detectable results at or above an individual compound's detection level of 0.1 part-per-billion. These findings were reinforced, a few years later at a Danish university when researchers concluded "[c]oncentrations of PAHs that are found above the Danish soil quality criteria near roads paved with bitumen-based asphalt in Denmark are very unlikely to be caused by the leaching of PAHs from the asphalt." During this time, researchers at the University of Connecticut also investigated stormwater runoff quality from asphalt and other driveway materials, finding "runoff from crushed stone driveways was similar in concentrations to runoff from asphalt driveways." In the almost two decades since these thorough research studies were published, there has never been another finding that un-trafficked asphalt itself can leach petroleum constituents.

And a specialized type of asphalt pavement, called porous pavement, has been shown to improve the stormwater runoff quality. EPA recognizes these pavements reduce pavement standing water and stormwater runoff, and can "filter out pollutants that contribute to water pollution." For more information on the benefits of porous asphalt pavement, see Cleaner Water with Asphalt Pavements.

Stormwater runoff from un-trafficked asphalt pavement has been scientifically studied and shown to be environmentally safe, and porous asphalt pavement can even reduce typical atmospheric and vehicular pollutants when used as a stormwater management practice. Further, the ability to effectively recycle asphalt pavement has been one hallmark of the industry's environmental stewardship for over 25 years. Asphalt is the most recycled material in America and is a key strategy to help reduce the carbon footprint of these vital, safe, and cost-effective pavement materials.

As identified above, stormwater runoff from asphalt pavement has been investigated for decades. There is no indication that petroleum constituents in asphalt can leach from the pavement itself. However, there is indication that outside variables, like vehicular drippings, brake dust, and oil and grease, can runoff any pavement during rainfall events. Given the proposed asphalt trail is comparatively small and won't support vehicular traffic, it is highly unlikely there will be any pollutant stormwater runoff entering the drinking water reservoir. NAPA is supportive of using asphalt pavement for such trails, currently existing across the country, with no adverse environmental impact.