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MEMORANDUM

TO: Concord Natural Resources Commission
141 Keyes Road
Concord, MA 01742

FROM: Marie Rudiman, Sr. Risk Assessor/Toxicologist, Weston & Sampson

DATE: January 19, 2021

SUBJECT: Risk Evaluation of EcoFill/Analysis Recommendation

Weston & Sampson, on behalf of the Town of Concord, has performed a risk evaluation of EcoFill, the infill proposed for use at Middlesex School Playing Fields. This memo reviews the available data and evaluates potential health risks children that may use the fields.

Review of Available Data

The Ecofill synthetic turf infill is a polyolefin-based granule that has been engineered to be:

- Free of Poly Vinyl Chloride (PVC) and Polybrominated Diphenyl Ethers (PBDEs)
- Free of Polyfluorinated Alkyl Substances (PFAS) also called Perfluorinated Compounds (PFCs)
- Free of Heavy Metals
- Free of Phthalates
- Free of Phosphates
- Reach compliant: No polybutylene terephthalate (PBT), no Carcinogenic, Mutagenic or Reprotoxic (CMR) ingredients, no Substances of Very High Concern (SVHC) ingredients
- No ingredients classified as “dangerous for the ambient air” (“N” label)
- California Prop 65 Compliant

In Ecofill testing for semi-volatile organic compounds (SVOCs) which included polycyclic aromatic hydrocarbons (PAHs), no constituents were detected above detection limits.

In Ecofill testing for heavy metals, trace concentrations of barium, chromium, lead, selenium, and zinc were detected. These concentrations were compared to background concentrations of these metals that are typically present in natural soil (i.e., native soil that is not contaminated) in Massachusetts. As presented on Table 1, the detected concentrations of metals in Ecofill are less than background concentrations in Massachusetts natural soil.

The carpet is also Reach and California Prop 65 Compliant and meets ASTM F 3188-16 for Safety of Toys (restricts metals, US standard) and EN 71-3 Category III for Safety of Toys (restricts metals, EU

standard).

Risk Characterization

Detected concentrations of metals in Ecofill were also compared to Massachusetts Contingency Plan (MCP) Method 1 S-1 Standards that are protective of potential health risks of direct contact exposures to constituents in soil by residents. The S-1 standards also take into account the potential for leaching of constituents into groundwater from soil and exposures to aquatic receptors in downgradient surface water bodies. As presented on Table 1, the detected concentrations of metals in Ecofill are orders of magnitude below Method 1 S-1 standards. Therefore, there is No Significant Risk of harm to human health from exposure of these concentrations of metals in Ecofill.

EPA has prepared the first part of a study of crumb rubber entitled, Tire Crumb Rubber Characterization, Part 1, Vols 1&2 (EPA, 2019). The findings support the premise that while chemicals are present, human exposure appears to be limited based on what is released into air or simulated biological fluids. Numerous studies have shown that under natural conditions, the concentrations of constituents that leach from synthetic turf and various infills are at concentrations that below applicable standards and at concentrations that do not pose a significant health risk (Zelibor (1991), Groenevelt and Grunthal (1998), Florida Department of Environmental Protection (1999), Sheehan et al. (2006), Johns and Goodlin (2008), Mota et al. (2009), Connecticut DEP (2010), Cheng et al. (2014)). Additionally, Ecofill has been engineered to not contain toxic chemicals.

Conclusions and Recommendations:

Based on the results of the comparison of detected concentrations of metals in Ecofill to background concentrations and human health standards, the trace concentrations of metals observed in Ecofill pose No Significant Risk of harm to human health and are at concentrations less than typically observed in background soil. Further, both the infill and carpet meet European Union (EU) and US standards of safety regarding chemical content.

The chemicals that are typically analyzed for with installation of synthetic turf are semi-volatile organic compounds, which includes both polycyclic aromatic hydrocarbons (PAHs) and phthalates, and heavy metals. Ecofill does not contain PAHs, phthalates or heavy metals above background concentrations.

To be conservative, it is recommended that one monitoring well be installed immediately downgradient of the synthetic turf and that groundwater collected from that monitoring well be tested for semi-volatile organic compounds on a quarterly basis for one year. If no SVOCs are detected above detection limits or established background concentrations in groundwater after one year, sampling should be completed on a yearly basis in the spring when there is typically more rainfall and therefore, more potential for leaching of constituents from the synthetic turf and infill. Analysis for metals is not recommended because the concentrations of metals in Ecofill are at trace concentrations and below background concentrations in soil. Both Ecofill and the carpet meet EU and US standards restricting metal content in the turf.

Prior to installation of the synthetic turf, collection of at least one round of background groundwater sampling is recommended. Since the proposed fields are next to a public roadway, background concentrations of PAHs and certain metals including lead and zinc may be present. Zinc is associated with the decomposition of tires along roadways since tires on automobiles are made up of up to 8% of zinc oxide; the formulation of tires is between 3 and 8% zinc oxide. Lead along roadsides is associated with the historic use of lead as an additive in gasoline. PAHs are associated with leaching from the asphalt used to pave roadways.

Attachments: Table 1

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