Management of yard waste is a significant challenge in the US, where in 2008 13.2% of the 250 million tons of municipal solid waste (MSW) was reported to be yard waste. This paper describes research conducted in the laboratory and field to examine the application of vegetative mulch as daily and intermediate landfill cover. Mulch was found to exhibit stronger physical properties than soil, leading to a more stable landfill slope. Compaction of mulch was found to be significantly greater than soil, potentially resulting in airspace recovery. Degradation of mulch produced a soil-like material; degradation resulted in lower physical strength and hydraulic conductivity and higher bulk density when compared with fresh mulch. Mulch covers in the field permitted higher infiltration rates at high rain intensities than soil covers, and also generated less runoff due to greater porosity and hydraulic conductivity as compared to soil. Mulch covers appear to promote methane oxidation more than soil covers, although it should be noted that methane input to mulch covers was more than an order of magnitude greater than to soil plots. A life cycle assessment comparing global warming impacts for use of mulch as an alternative landfill cover to both using mulch as biofuel or composting mulch, shows that using mulch as landfill cover offsets greenhouse gas emissions by sequestering a great portion of green waste carbon inside the landfill.