Mangrove's Sustainability Approach

At Mangrove, sustainability starts with how we manufacture. Our (SPI) selective paste intrusion process is designed to reduce unnecessary material use, eliminate conventional formwork, recover and reuse aggregate, and support responsible water management. By combining digital manufacturing with durable concrete construction, we produce products with greater manufacturing efficiency than many traditional methods while maintaining long service life in the built environment.

Our approach is grounded in a few practical advantages. We use Type 1L cement as a lower carbon alternative to traditional portland cement. Our two primary raw materials, cement and sand, are sourced regionally in Michigan and delivered in bulk. Our virtual zero waste process avoids conventional molds and support structures, recovers surrounding aggregate for reuse, and routes wash water through treatment and recovery systems designed to separate solids and support responsible wastewater handling.

Material efficiency by design

Mangrove prints rather than relying on conventional formwork or support structures. The aggregate surrounding printed parts are drained from the print box, recovered, and returned to the system for future production. This approach reduces raw material consumption, lowers waste, simplifies handling, and supports a cleaner manufacturing process overall.

Regional sourcing and bulk delivery

Mangrove's two primary raw materials, cement and sand, are sourced regionally in Michigan (115 miles from Mangrove – reduced carbon footprint) and delivered in bulk. Shorter supply chains help reduce transport intensity, and bulk delivery reduces packaging waste associated with smaller unitized formats such as bags, totes, and other container based delivery methods.

Lower carbon cement strategy

Mangrove uses Type 1L cement, which incorporates finely ground limestone and can reduce cement related carbon dioxide emissions relative to traditional portland cement, depending on mix design and application.

Mold free production

Because Mangrove manufactures without conventional molds, the process avoids many temporary materials commonly associated with traditional casting, including wood, rubber, plastics, adhesives,

epoxies, and petroleum based form oils. That reduces waste, lowers consumable use, and removes several process steps tied to mold preparation, stripping, storage, and maintenance.

Water stewardship

Concrete production uses water in mixing and cleaning. Mangrove incorporates a filter press based recovery approach that separates solids from wash water, supports reuse in future batches, and captures cement fines and particulates for responsible management. This helps reduce freshwater consumption, minimize discharge to municipal systems, and lower the environmental impact associated with slurry disposal.

Additive manufacturing reduces overdesign

Because Mangrove prints rather than casts, we can optimize internal geometries, reduce unnecessary mass, and engineer strength where it is needed. That allows for more efficient use of material and helps avoid the overdesign common in more conventional production methods.

Lower labor and equipment intensity

No conventional formwork also means no carpentry labor for mold building, no form stripping, no crane lifts for heavy molds, no form oil application, and no mold storage or maintenance. Lower labor and equipment intensity supports safer, simpler, and more efficient production.

Digital precision reduces rework

Digital manufacturing helps reduce dimensional error, rejected parts, rework material, and overproduction. Less rework means more consistent output and lower total lifecycle impact per finished product.

Durable products and responsible end of life

Mangrove manufactures durable concrete products intended for long service life. At end of life, concrete can be crushed and repurposed for secondary applications such as aggregate, asphalt, or gravel where local practices allow.

Continuous Improvement

Mangrove views sustainability as an operating discipline, not a slogan. We are focused on improving how we recover material, manage water, reduce avoidable waste, and refine production efficiency over time. As our systems advance, we expect to deepen the operational data behind these efforts and continue strengthening our manufacturing approach.