

# Brownfield: an abandoned, inactive, or underutilized industrial or commercial site located primarily in urban areas and their surrounding suburbs

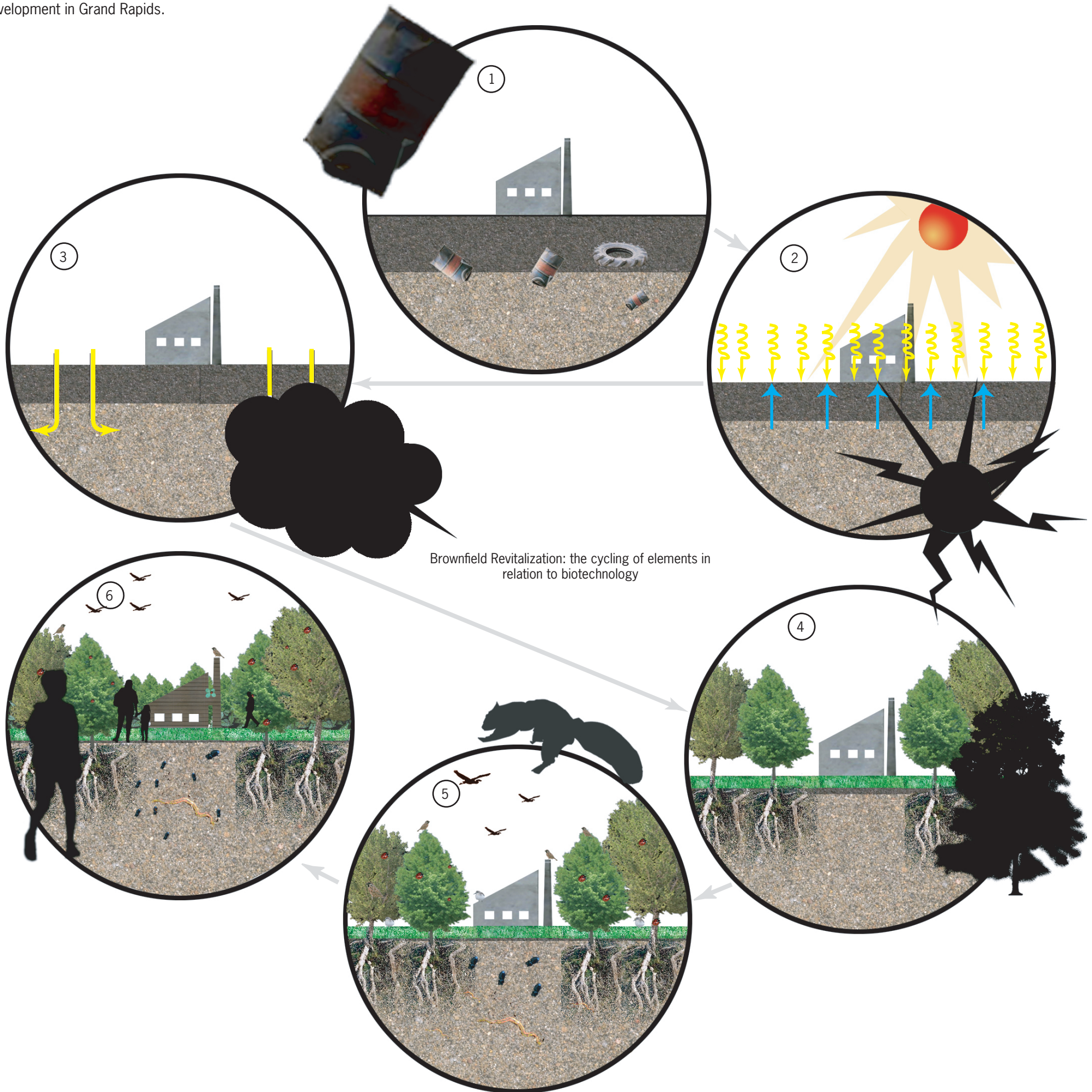
Brownfield sites are inactive because they are believed to have hazardous waste contamination onsite. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), enacted in 1980, established prohibitions and requirements concerning closed and abandoned brownfield sites. It provided for liability of persons responsible for releases of hazardous waste at brownfield sites.

Although CERCLA establishes important legislation concerning waste clean-up, it also hinders brownfield re-development because of real or perceived legal and economic liabilities by land owners and developers. Knowledge and suspicion of a site's contamination typically results in its no longer being considered for redevelopment, or "environmental redlining." In turn, industry is developed in industrial parks located outside of urban areas and far from brownfields.

Sources of environmental contamination include: former coal gas plants, fuel and chemical distributors, incinerators, plastic manufacturing, paper manufacturing, metalworking and fabrication, automotive assembly facilities, textile printing and finishing. Smaller, service-oriented facilities such as gas stations, auto repair shops, and dry cleaners are also prime contributors.

Michigan has been successful in redeveloping brownfield sites, relative to other states. Michigan legislature has created programs providing state-funding of contaminated site clean-ups, and some state recovery of costs from responsible parties.

One of Michigan's urban success stories is the American Seating Park, a project in downtown Grand Rapids. This site was a manufacturing facility that produced office, stadium, and event seating for much of the 20th century. Five years ago, manufacturing operations relocated leaving the site unused. The Michigan Economic Development Corporation and the city of Grand Rapids offered redevelopment credit and tax benefits to developers, who have designed a 175,000 sq ft mixed use building on the site, contributing to urban development in Grand Rapids.



- ① Brownfield site
- ② Solar-detoxification: Sunlight is the primary energy input in reactions that break down contaminant molecules in air or water. For water, detoxification reactions used are either photochemical, using UV light from the solar spectrum, or thermal, using high temperature heat generated by concentrated solar collectors.
- ③ Bioreactor: Liquid and air enhance microbial processes, which operates to rapidly transform and degrade organic waste. Aerobic, anaerobic, and hybrid (aerobic-anaerobic) methods are employed.
- ④ Bioremediation: The use of microorganisms and plant material to metabolically mediate desired chemical reactions or physical processes.
- ⑤ Recovery of ecosystem. Animal life returns to the brownfield site.
- ⑥ Brownfield site is redeveloped, as a park.