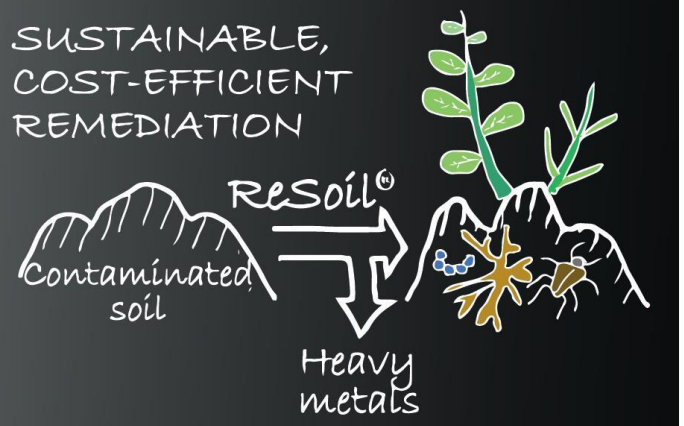
ReSoil®

by envit

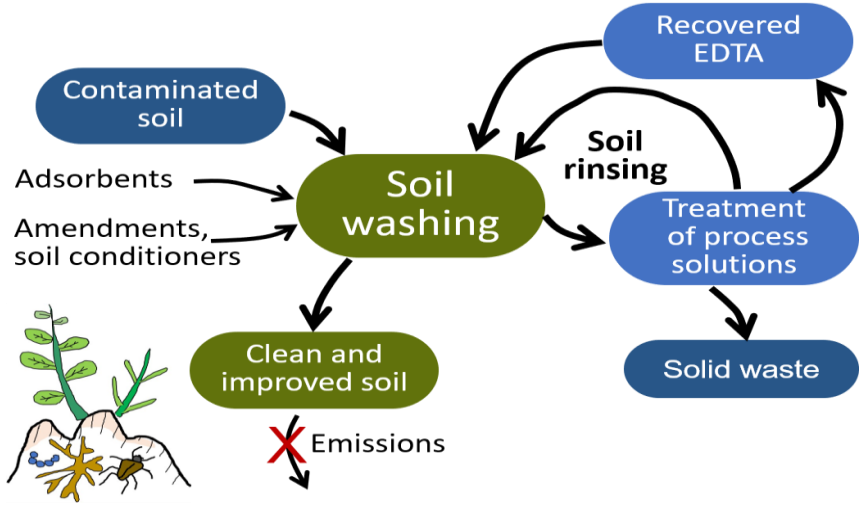


- Agricultural soil
- Urban soil
- Paddy fields
- Brownfields
- Military polygons
- Excavated & disposed soil

Toxic metals such as Pb, Cd, Cu, Zn, Ni and the **toxic metalloids** As and Sb (**heavy metals**) are the predominant soil contaminants.

ReSoil® is an innovative **EDTA-based** soil washing technology developed by **Envit Ltd.** that enables the removal of heavy metals from contaminated soils in a closed-loop, emission-free process without wastewater, while preserving the soil as a natural substrate.

ReSoil®



Soil remediation (heavy metal removal, immobilization) and soil improvement.

International patents:

1.) EP 2720812B1 (2019), Washing of contaminated soil. Patent family: US 9108233B2, CA 2871879C, WO 2012173576A2

2.) EP 3153246B1 (2018), Method for soil and sediment remediation. Patent family: US 10124378B2, CN 107096789B, CA 2942367A1

3.) EP 3492187B1 (2021), Curbing toxic emissions from contaminated substrate. Patent family: US 10751771B2, CN109877149A, CA 3026163A1

4.) **EP4301529B1 (2025) Removal of arsenic, antimony and toxic metals from contaminated substrate**. (*Grade AAA, Patent Valuation Report, KIPA 2025-06-20*)

ReSoil® features in **17 papers** in high-ranking sci. journals.

- In **ReSoil®** the chelating agent **EDTA** (ethylenediamine tetraacetate) is used to extract **heavy metals** from the soil.
- **ReSoil®** is a batch process with a soil remediation cycle of **< 1.5 hours**.
- **EDTA** and **all process water are recycled** in a pH gradient of 12.5 – 2 given by CaO / Fe^{2+} and H_2SO_4.
- Metals and metalloids precipitate with Fe and in the form of hydroxides.
- Excess and residual reagents are removed from the process solutions, e.g. as Ca salts.
- Water is only required to balance the moisture in the remediated soil and for lime hydration.
- The washed soil is used as a **filter** to purify the process solutions.
- Emissions from the washed soil are contained by rinsing the soil and adding zero-valent iron (Fe^0) to the soil slurry.
- **Closed cycle: No waste water** is produced, only solid waste.

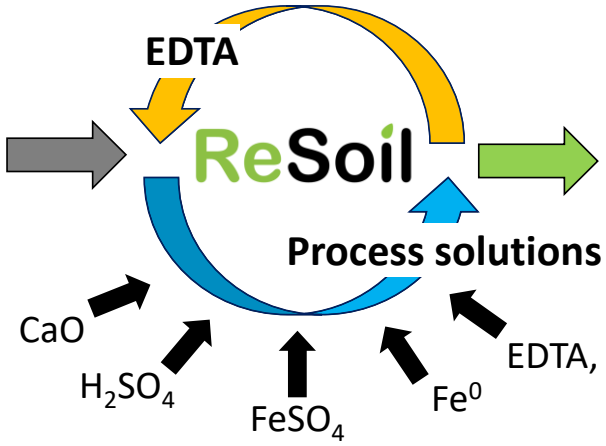
ReSoil® CASE STUDIES

Treatment of different **soil types.**

Removal of up to:
- 95% of lead
- 98% of zinc
- 83% of cadmium
- 75% of copper
- 85% of manganese
- 72% of chromium
- 65% of arsenic
- 58% of antimony

Solid waste

The heavy metal concentrations in the **leachate** from the remediated soil are insignificant.

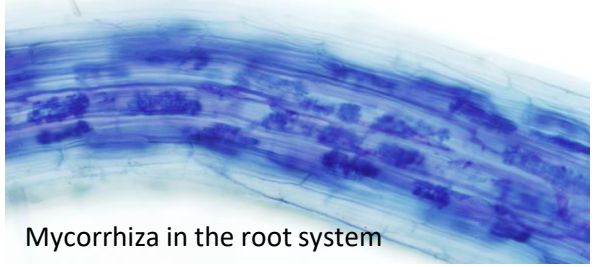


The **chemical, physical and biological properties** of the soil are preserved.

Restoration of soil for different **land uses:**

- Urbanisation/development
- Recreational use / training
- Agriculture
- Other ecosystem services, e.g. C sequestration

Plant growth is not impaired, the **heavy metal concentration in the plants** is reduced by up to 99%.



Mycorrhiza in the root system

REMEDIATION OPTIONS for soils contaminated with heavy metals

AVAILABLE TECHNOLOGIES	In use by	Effective for heavy metal removal	Applicable for highly contaminated soil	Applicable for all soil types	Applicable for multi-contaminated soil	Preserves soil (Green & sustainable)	NO problematic emissions	Cost for end customer (€/m³)
Soil dig & dump	Construction companies	YES	YES	YES	YES	NO	Soil deposition	100 – 700
Engineered solutions (soil capping)	Construction companies	YES	YES	YES	YES	NO	Leaching	30 – 200
Solidification & Stabilization	Construction companies	NO	YES	NO	YES	NO	YES but difficult to achieve	40 – 100
Classical soil washing (removal of fines)	Remediation companies	YES (up to 80%)	YES, optionally	Only for light and sandy soils	YES	NO	Deposition of contaminated fines	50 – 150
Immobilization by various additives	Remediation companies	NO (reduces Bio-metal accessibility)	NO	Difficult for rich, heavy soils	Theoretically	YES	YES	20 – 60 + repeatable periodical cost
Phytoremediation	Remediation companies	Not efficient for Pb, As, Cu.	NO	YES	NO	YES	Contaminated biomass	?
ReSoil®	Remediation companies	**YES (up to 95%)**	**YES**	**YES**	**YES**	**YES**	**YES**	**70 – 150**

- Of the commercially available technologies listed above, **ReSoil®** is the only one that efficiently removes toxic metals and metalloids from the soil, is environmentally friendly and sustainable, and maintains and improves the soil as a functional natural substrate.
- **ReSoil®** is compatible with biological treatments for the removal of **organic pollutants**.
- **ReSoil® is cost-effective**, it recycles efficient but **expensive EDTA** with **low-cost materials** (lime / Fe^{2+}, sulfuric acid).

Envit FACILITIES – from feasibility studies to on-site soil remediation

ReSoil® laboratory

Capacity:
50 g / batch.

Purpose:
To test soil samples (0.5 kg) sent to Envit Ltd. for heavy metal removal efficacy.

ReSoil® mobile pilot plant

Capacity:
50 kg / batch.

Purpose:
- R&D: removal of heavy metals and organic pollutants, soil remediation and improvement etc.
- Teaching and training in ReSoil® technology.

ReSoil® trailer

Capacity:
5 kg / batch.

Purpose:
- On-site presentation of ReSoil® technology.
- Feasibility tests

ReSoil® mobile commercial plant

Capacity:
50-200 m^3 soil / day.

Purpose:
Commercial soil remediation on-site.

Concept design

Envit

Domen Leštan, CEO & CTO | Neža Finžgar | Anela Kaurin | Simon Gluhar | Grega E. Voglar

- **Envit Ltd.** is an R&D SME, a spin-off from the University of Ljubljana, Slovenia.
- The core team of five, all with PhDs, has **experience in science, technology and project management.**
- **The CEO and CTO** is a highly respected **engineer with experience in business development**, recognised by ScholarGPS™ as one of the top 0.05% of scientists worldwide for academic excellence. www.scholargps.com

Seeking Mission Soil Partners for Pilots and Demonstration Projects

- **Looking for research, public-sector, and implementation partners** for Horizon Europe Mission Soil projects focused on soil health, restoration, and pollution prevention.

- **Pilot opportunities available:** On-site pilot testing of ReSoil® to validate performance under real-world conditions (urban, industrial, agricultural soils).

- **Living Labs & Lighthouses:** We are interested in contributing to Living Labs and Lighthouse projects as a technology provider for soil decontamination and regeneration.

- **From lab to field:** We support the full innovation chain—from laboratory validation and feasibility studies to field-scale demonstration.