



Eco-Aguas

plantas de tratamiento

A PRODUCT OF GRUPO ZAMIA

COSTA RICA · ON-SITE WASTEWATER TREATMENT

Your septic tank is not treating anything.

What every homeowner building outside a municipal sewer should know before they let someone bury a concrete box in their garden — and the biological alternative that turns the same water into irrigation.

Eco-Aguas, plantas de tratamiento · Specified, supplied and installed by Zamia Group

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THE DECISION NOBODY EXPLAINS TO YOU

Two options, and one of them gets chosen by default

If your lot is not connected to a municipal sewer — and most lots outside the Central Valley are not — you must build your own sanitary solution before anyone will approve your plans. There are two real choices, and almost everyone takes the first one without being shown the second.

A septic tank with a drainfield. Cheap, familiar, and what your contractor will propose because it is what he has always built. It is also, on a great many Costa Rican lots, not legal — and on many more, it is legal on paper and fails in practice.

A biological treatment plant. More expensive on day one. It actually treats the water, it fits on lots where a drainfield cannot go, it produces water you can legally reuse, and its result is something you can measure at the outlet and hand to an inspector — not something you have to take on faith.

This document explains the difference in enough detail that you can make the decision yourself instead of inheriting someone else's habit.



WHAT YOU ARE ACTUALLY BUYING

A septic tank is a settling chamber, not a treatment system

This is the single most misunderstood fact in residential construction here, and it is worth being precise about. A septic tank does not clean water. It holds it still long enough for solids to sink and grease to float, then lets the liquid in the middle flow out. That liquid is still sewage. Its organic load has been reduced by roughly a third.

The actual treatment — such as it is — happens afterwards, in the soil of the drainfield, performed by bacteria in the ground you are standing on. Which means the part of the system doing the real work is the part you cannot see, cannot inspect, and cannot service.

A biological treatment plant does the work inside the tank, under controlled conditions, with a measurable result at the outlet. The difference is not marketing. It is the difference between sewage leaving your tank and water with a few milligrams of organic load per litre leaving it.

You are not choosing between two treatment systems. You are choosing between a treatment system and a holding tank that hands the problem to your soil.



THE REGULATION — DECRETO 42075-S-MINAE

Your lot may not legally permit a drainfield at all

Costa Rican law does not simply allow a septic tank anywhere you like. Subsoil disposal of treated wastewater is governed by Decreto 42075-S-MINAE, and it imposes physical conditions on your land that a great many lots — particularly coastal, steep, clay-heavy or small ones — do not meet:

Soil infiltration rate	Must fall between 2,0 and 24,0 min/cm. Clay is too slow. Loose coastal sand is too fast. Both fail.
Water table depth	Must sit at least 1,5 m below the bottom of the infiltration trench. Near the coast, near rivers, and in the rainy season this is frequently impossible.
Absorption wells	Prohibited outright, for treated and untreated water alike. Infiltration trenches are the only accepted device.
Land area and setbacks	The trenches need real space, plus separation from boundaries, wells, springs, roads and watercourses. Small lots run out of room.
Water consumption	Subsoil disposal is admissible up to 190 m ³ per month. Above that, additional treatment is required before the drainfield.
Where effluent may go	Septic effluent may not be discharged to a watercourse, a storm drain, or anything that is not a drainfield or a further treatment unit.

If your lot fails any one of these, a septic system is not an option you are declining. It is an option you do not have. And the moment this is discovered — usually by an inspector, usually late — the project stops.

A treatment plant changes the question entirely. Because its effluent already meets discharge standards, you are no longer dependent on your soil doing the treatment. An Eco-Aguas plant can also be installed above ground, which is the only workable answer on a high water table.

HOW IT WORKS

One tank, five stages, no chemicals in the treatment

An Eco-Aguas plant is a single blow-moulded HDPE tank, divided internally into a sequence of chambers by thick structural baffles. Wastewater arrives by gravity and passes through the stages below before leaving as clear, odourless water. It is a biological process: bacteria do the work, and the equipment exists to give them oxygen and time.

1 • Screening	A removable basket at the inlet catches non-biodegradable material — textiles, wood, plastic. Organic matter, including toilet paper, passes through and is digested. This is the one point of routine attention, and it takes a minute a month.
2 • Settling	Heavy solids drop out and grease floats off before the water reaches the biology, protecting the stages downstream.
3 • Aeration	A diaphragm blower above ground feeds air through a diffuser at the floor of the chamber. Bacteria consume the organic load and ammonia is oxidised — this is where the treatment actually happens.
4 • Moving-bed biofilm (MBBR)	Suspended plastic media give the bacteria a large surface to live on, which is what lets a tank this size carry a full household's load steadily rather than crash under a peak.
5 • Clarifier and disinfection	Remaining fine solids settle and are lifted back upstream by air. A final chamber polishes the water before it leaves, with disinfection available where the intended use requires it.

The only moving part in the entire installation is a 45-watt diaphragm air blower — a Japanese SECOH unit, 39 dB(A) at one metre, housed above ground in the control cabinet. There is no pump inside the tank, no chemical dosing in the treatment stages, and nothing electrical submerged in sewage. Apart from the stainless screws on the covers, there is no metal in the tank at all — which is why it does not care about salt air.



The tank with its three access covers open, showing the internal baffles, the biofilm media and the air-lift pipework. Every stage is reachable from the surface.

MEASURED PERFORMANCE

Effluent figures from an accredited laboratory, not from a brochure

The table below is the effluent of an installed Eco-Aguas plant as measured by an accredited environmental laboratory in September 2025, reported against the strictest class of the discharge standard it was tested under. These are measured values at the outlet — the number that matters to an inspector and to your soil.

Parameter	Measured effluent	Standard limit
pH	7,7	6 – 9
BOD5 (mg/l)	6,8	10
COD (mg/l)	28	50
Suspended solids (mg/l)	below 4 (not detected)	10
Ammonia nitrogen (mg/l)	0,141	5
Total nitrogen (mg/l)	2,92	15
Total phosphorus (mg/l)	0,22	0,5
Faecal coliform (per litre)	230	1 000

Effluent values are from a single laboratory sample at one installed unit; performance at any site depends on load, installation and maintenance. For comparison, a correctly built septic tank removes roughly 30 % of BOD5 and leaves the rest to your soil.

COMPLIANCE IN COSTA RICA

What a treatment plant lets you do that a septic tank does not

Discharge to a watercourse	Permitted where the effluent meets the limits of Decreto 33601-MINAE-S. Septic effluent may never be discharged to a body of water.
Infiltrate on difficult ground	Because the water arrives at the soil already treated, the burden on your land is far lower — and above-ground installation solves a high water table outright.
Reuse the water	Decreto 33601 permits reuse of treated wastewater, subject to the microbiological quality of its Table 7 and never for human consumption. Septic effluent cannot be reused under any circumstances.
Pass inspection with evidence	What Costa Rica regulates is the quality of the water leaving your system. Every Eco-Aguas installation can be delivered with effluent sampling by an accredited Costa Rican laboratory — a measured result on your own property, which is a very different conversation with an inspector than a hand-built tank with no paperwork.

Final approval of any sanitary system requires drawings and calculations signed by a professional registered with the CFIA, and approval under the wastewater system regulations in force. Zamia manages that process; we do not ask you to.

SIZING

Choose by people, not by square metres

Plants are sized by the number of people the system serves — not by the size of the house. A common and expensive mistake is sizing for bedrooms rather than for realistic occupancy. A four-bedroom holiday villa occupied six weeks a year and a three-bedroom home with a live-in family are very different loads.

Model	People	Capacity m ³ /day	L × W × H (m)	Tank volume m ³	Power kWh/day
Eco-Aguas 1200	6 – 8	1,0 – 1,2	2,10 × 0,95 × 1,75	2,7	≈ 1,0

The Eco-Aguas 1200 serves a single-family home of six to eight people. Where in that range your house falls depends on the proportion of solids to water: a plant treats organic load, not litres, so a household that uses more water per person dilutes the load and sits at the upper end, while a water-frugal household with the same number of people sits at the lower end. It is the size the great majority of houses outside the sewer network actually need. Larger sizes for bigger households, multi-family buildings, small hotels and worker housing are being added to the range.



Eco-Aguas 1200. Three sealed access covers at grade, rated for foot traffic; blower housed separately above ground.

Price on request. The plant is supplied complete with blower and internal pipework, ready to install. Freight to site, excavation, concrete base, connecting pipework, electrical supply and commissioning are quoted only after a site visit — the ground, the access and the distances are what decide them, and quoting them blind is how projects end up with change orders.

LIVING WITH IT

What maintenance actually means

This is where the honest comparison matters most, because it is where people assume a treatment plant is a burden. The required routine is short:

Task	Frequency	What it involves
Check the blower is running	Periodically	It is above ground, in its own housing, and audible.
Empty the inlet screen basket	Monthly	Lift it out, remove non-biodegradable material, replace it. A minute.
Clean the blower air filter	Annually	A household task, no tools of consequence.
Check sludge level	Annually	A simple depth check at the settling chamber, following the instruction sheet you receive at commissioning.
Remove excess sludge	When the annual check calls for it	Pumped out with the blower switched off. The sludge is non-toxic and usable as fertiliser.
Top up the disinfection tablets	Every 2 – 4 weeks, where disinfection is in use	Slow-release chlorine tablets in the final chamber. Only needed if your permitted use requires disinfected effluent; we tell you at design stage.
Replace the blower diaphragm	Every 12 – 18 months	A low-cost wear part, changed above ground in minutes. We keep them in stock.

Running cost is electricity, and it is smaller than people expect: the blower draws 45 watts, roughly 1 kWh per day — less than a domestic refrigerator. Every installation comes with a written warranty from Grupo Zamia, in your name, and with the people who installed it a WhatsApp message away.

Now the other side of the ledger. A septic tank needs pumping every few years, and a drainfield has a finite life — the soil gradually seals with biological growth until it stops accepting water. When that happens the answer is not a repair. It is excavating a new drainfield somewhere else on your property, which is why the regulation expects you to keep reserve area available. If your lot has no spare ground, that day is a serious problem.

A treatment plant asks you for a minute a month. A drainfield asks you for nothing at all, until one day it asks you for your garden.

THE SECOND LIFE OF YOUR WATER

Every day, your house produces irrigation water. Most people bury it.

This is the part of the argument that changes people's minds, and it is only available to you if you treat the water properly in the first place.

A household of six to eight produces up to 1 200 litres of treated water every single day — and it produces it in January and February exactly as reliably as in October. In Guanacaste and along the Pacific coast, where it may not rain for four or five months and municipal restrictions arrive with the dry season, that is not a minor benefit. It is a garden that stays alive while the neighbours' turns brown.

Model	Treated water m ³ /day	Garden it can irrigate*	Over a 150-day dry season
Eco-Aguas 1200	1,2	240	180

* At an application rate of 5 mm/day, typical for ornamental landscape in the dry season. Your actual demand depends on planting, exposure and soil. For larger landscapes this supplements irrigation rather than replacing it — we would rather tell you that now than have you discover it in March.



What Zamia builds around the plant

Buffer storage	The plant produces water continuously; irrigation happens in bursts. A holding tank sized to the system is what makes the two compatible.
Submersible pump and filtration	Sized to your zones and head. Treated water still carries fines, so disc or screen filtration protects the emitters.
Disinfection where required	Reuse must meet the microbiological quality of Table 7 of Decreto 33601. Where a polishing step is needed we specify UV or dosing — and we tell you up front if your intended use requires it.
Subsurface drip and zone control	Drip below the surface is both efficient and the sensible safety barrier, keeping treated water away from contact and aerosol. Controller, zone valves and rain sensor complete it.
A guaranteed legal outlet	Critical and routinely forgotten: the plant must always have its permitted disposal route available, even when irrigation is off or storage is full. We design the overflow first, not last.

Zamia has built irrigation and pumped water systems for years — on a twenty-hectare farm before we built for clients. This is not a service we bolted on to sell tanks.

WHAT HAPPENS NEXT

How we work

1 • A conversation	Tell us where the lot is, how many people will live there, and whether you have a soil test or a water-table observation. Fifteen minutes on WhatsApp usually establishes whether a drainfield is even available to you.
2 • A site visit	We look at the ground, the access, the levels and the distances. This is what allows us to quote installation honestly instead of guessing and correcting later.
3 • A written proposal	Model, siting, civil works, connections, electrical, commissioning and the professional fees for approval — itemised, with what is excluded stated plainly.
4 • Installation and commissioning	Delivered, set, connected, started up and regulated. You receive the manual and the warranty in your name.
5 • Optional irrigation phase	Quoted separately, built once the plant is running and its output is proven.

Tell us where you are building.

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Eco-Aguas is the treatment-plant brand of Zamia Group — Grupo Zamia LTDA, a registered Costa Rican construction company. We specify, supply and install Eco-Aguas plants as part of a build or as a standalone project, and we do not install septic tanks. That is a deliberate policy, and this document is our reasoning for it.



Notes and limitations

- Dimensions, tank volume, process description, materials and blower rating are taken from the manufacturer's technical documentation and written technical clarification of 23 September 2026 for the Eco-Aguas 1200.
- Effluent figures are from laboratory report No. 640 of 9 September 2025, issued by an environmental laboratory holding CMA accreditation, on a single sample taken at an installed unit and reported against Class 1A of the discharge standard it was tested under. They are measured outlet values, not guaranteed removal rates, and performance at any site depends on load, installation and maintenance.
- Hydraulic capacity is the manufacturer's stated 1,0 – 1,2 m³/day. The range of six to eight people is Zamia's rating at Costa Rican domestic water use of 140 – 180 litres per person per day; the manufacturer rates the unit at five people on a 240-litre allowance and a design influent of up to 180 mg/l BOD₅. The two describe the same plant under different water use. Design occupancy for approval is set by the professional signing the drawings.
- Regulatory references are current as of August 2026 and are summarised, not quoted in full: Decreto 33601-MINAE-S (discharge and reuse), Decreto 42075-S-MINAE (subsoil disposal of treated ordinary wastewater), and the regulations in force for approval and operation of wastewater treatment systems. A reform of Decreto 33601 was placed under public consultation in late 2024; confirm the text in force at the time of your project.
- This document is informative and commercial. It does not replace a design signed by a professional registered with the CFIA, nor a soil infiltration test, nor the approval process required by your municipality and the Ministry of Health.

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