

# **Eco-Libre Life-Line Documentation**

*Release 1.0.0*

**© 2023, Michael Altfield and the Eco-Libre Team**

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Welcome! This is the official documentation for the Eco-Libre Life-Line.

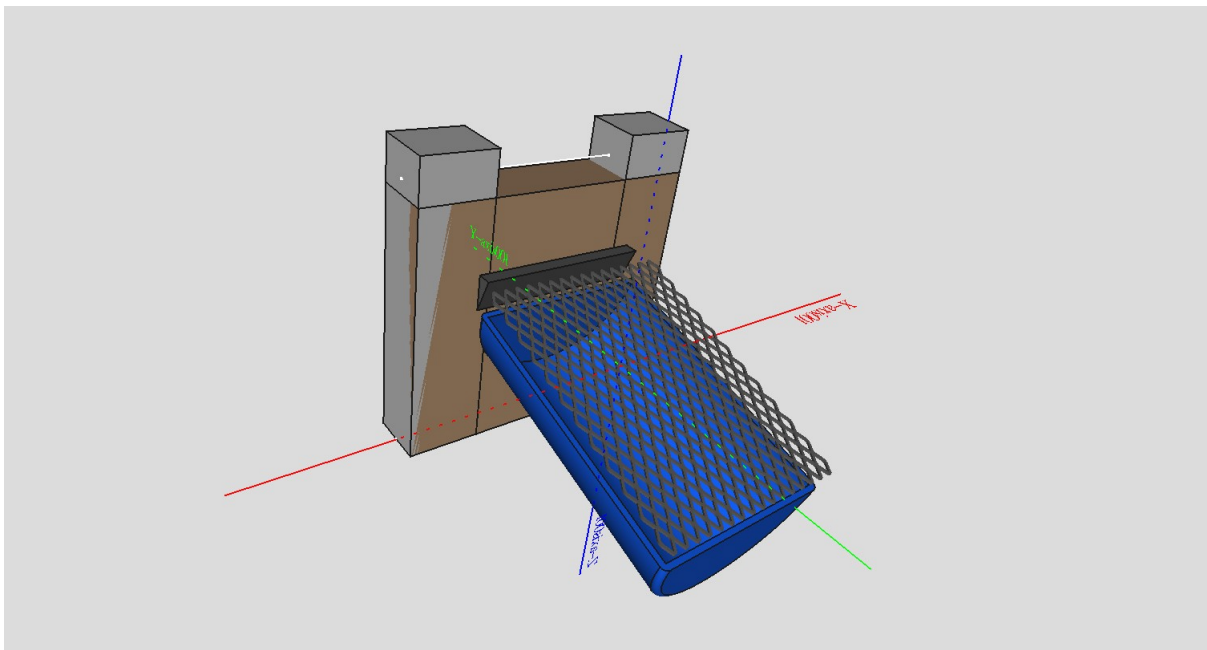


Figure 1. CAD Design of the Eco-Libre Life-Line





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## Introduction

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The Eco-Libre Life-Line is a raw water intake, filtration, and storage system.

- [Chapter 2](#)



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## Frequently Asked Questions

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### 2.1 Q: How can I get updates about Eco-Libre?

You can [signup](#) for our Eco-Libre email newsletter or follow us on any of the following social media profiles:

- Twitter [@EcoLibreNews](#)
- Facebook [@EcoLibreNews](#)
- Mastodon [@ecolibre@chos.social](#)
- GitHub [Eco-Libre](#)
- YouTube [@Eco-Libre](#)

### 2.2 Q: My questions isn't listed. Where can I get support?

Please see [Chapter 8](#)

### 2.3 Q: This is an example question

This is an example



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# Theory

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This section will describe the research behind this project and how it would benefit the lives of your community.

## 3.1 Concept

The Eco-Libre Life-Line project is a system designed to collect, filter, and store surface water for an off-grid community.

## 3.2 Design Goals

The water system should be:

1. Low-Maintenance
1. Hygienic

## 3.3 Low-Maintenance

**Low-Maintenance** means that low-tech automation and well-engineered, self-cleaning systems should be employed so that the system only needs routine maintenance once or twice per year.

## 3.4 Hygienic

**Hygienic** means that the water stored in the clean water tanks and delivered to sinks should be free of contamination (bacteria, parasites) and be safe to drink.

## 3.5 Size

**Pico (3-person)** (the smallest Eco-Libre Life-Line water system) should provide sufficient water for 3-people.

**Nano (15-person)** The small-size system should be horizontally scalable by multiplying the number of filters and tanks to provide sufficient water for a 15-person community

**Micro (30-person)** To handle a community of up to 30-people, a larger system design is provided.

**Milli (150-person)** To handle a community of up to 150-people, the micro system is horizontally scaled.

## 3.6 Components

### 3.7 Intake

The water intake will consist of a weir on a stream with two openings with turbulence bars that channel turbulent water down onto a screen-covered 200-liter barrel angled at a downward slope.

This is a common low-budget, self-cleaning intake design that will shed organic debris during high-flow (eg a heavy rain).

The distance from the bottom of the weir to the top of the screen should be at least 20 cm.

The size of the holes in the screen should be 1-5 mm (it should be supported by a expanded metal screen below it).

The screen on the barrel should be mounted on a hinge to allow for routine maintenance.

### 3.8 Settling Tank

A radial-flow settling tank should be located very near to the intake and will remove sediment that passed the intake screen.

### 3.9 Large Sediment Filter

A self-cleaning spin down filter (largest size micron available) will remove debris that passed through the settling tank.

The flush valve should be automatically opened electronically by a timer.

### 3.10 Pre-Filter

This pre-filter will remove turbidity from the water before it enters the slow sand filter.

This

is

[built]([https://web.archive.org/web/20070728135100/http://www.refugeecamp.org/learnmore/water/slow\\_sand\\_f](https://web.archive.org/web/20070728135100/http://www.refugeecamp.org/learnmore/water/slow_sand_f)) from a 200-litre HDPE drum that's filled with rocks and (mostly coarse) sand.

### 3.11 Slow Sand Filter

The [Slow Sand Filter]([https://en.wikipedia.org/wiki/Slow\\_sand\\_filter](https://en.wikipedia.org/wiki/Slow_sand_filter)) will remove harmful bacteria and parasites from the water.

This

is

[built]([https://web.archive.org/web/20070728135100/http://www.refugeecamp.org/learnmore/water/slow\\_sand\\_f](https://web.archive.org/web/20070728135100/http://www.refugeecamp.org/learnmore/water/slow_sand_f)) from a 200-litre HDPE drum that's filled with rocks and (mostly fine) sand.

## Media Sediment Filter

A self-cleaning spin down filter (smallest size micron available) will remove filtering media debris (sand) that may have come-out of the filters

The flush valve should be automatically opened electronically by a timer.

### **3.12 Clean Water Tank**

The clean water tank stores potable water.

### **3.13 Lifeline**

Pipes supply clean water from the clean water tanks to the community.





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## Praxis

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This section will show example builds of the Eco-Libre Life-Line around the world.

### 4.1 Get Listed!

Did you build this? Please [let us know](#) and we'll add your build to this page.



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## Getting Started

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This section will document how to build the Eco-Libre Life-Line.

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**Note** You can view the documentation to build a previous version by selecting a different version in the bottom-left menu

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..\_intake:



### Intake

This is a section that will talk about how to build the intake component of the life-line system.

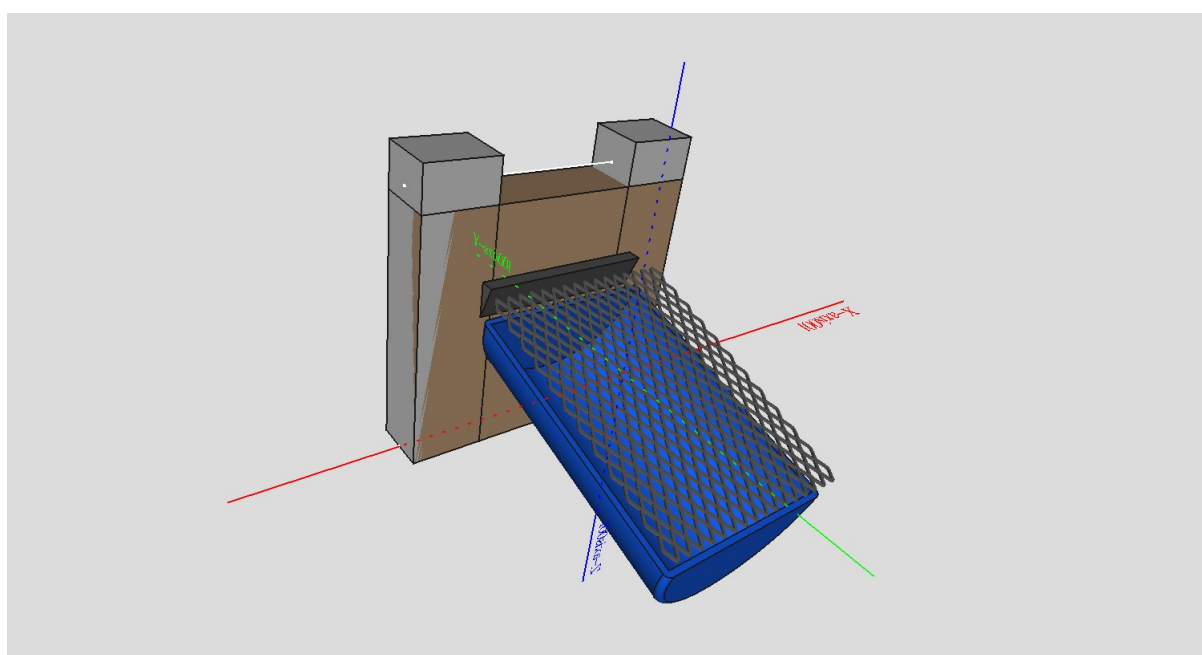


Figure 6.1. CAD Design of the Eco-Libre Life-Line

## 6.1 Bill of Materials

### 6.1.1 Specifications Intake Barrel

1. Model SD - SHT Product Plastic Barrel \*Material HDPE Weight 9.5 KG Capacity 200L Temperature Range -35 - 80 degrees Color Blue/White Size 930 mm X 590 mm (equipped with two 55 mm diameter bung holes) The quantity required: One (split exactly in half) The unit cost: Varies by nation

### 6.1.2 Specifications Concrete Weir

2. Model n/a \*Product Quikrete \*Material (ready-made bags of sand, cement, and aggregate) \*Weight 25kg \*Capacity .30 yards total \*Temperature Range not to be used in temps less than 5C (40F) \*Color n/a \*Size n/a \*The quantity required: 20 -21 bags The unit cost: Varies by nation

### 6.1.3 Specifications Weir Rebar

3. *Model Product Rebar Material Steel Weight Capacity Temperature Range Color Size* “1000 mm in our model (225 mm pieces allow for a 1” extension for hanging turbulence bars. The quantity required: Many engineers suggest <https://www.hunker.com/13425063/concrete-slab-rebar-spacing-guideline> a minimum distance of one slab thickness (200 mm in our model) between rebars and a maximum of three slab thicknesses.” The unit cost: Varies by nation

Specifications Model GPI1109091 Product GPI 2 in. NPT Bung Adapter Kit Material PVC Weight Capacity Temperature Range Color Size 55 mm or 2.16 in The quantity required: 2 The unit cost: Varies by nation

Specifications Model Product 2 in PVC valve Material PVC Weight Capacity Temperature Range Color Size The quantity required: 2 The unit cost: Varies by nation

Specifications Model Product Angle Bar Material Steel Weight Capacity Temperature Range Color Size “One length of 1300 mm angle bar cut into two pieces (at least 650 mm) in our model. Often sold in 6.1 m lengths at hardware stores. You’ll need two lengths of the most inexpensive steel angle bar available and it must span the width of both the weir opening as well as the 590 mm diameter of the 200L barrel top. Painted to prevent rusting after they are cut to size and drilled for attaching to rebar or self tapping concrete screws/bolts.” The quantity required: 2 The unit cost:

Specifications Model Product Expanded metal mesh Material Steel Weight Capacity Temperature Range Color Size 590 mm diameter of the 200L barrel top. The quantity required: 2 The unit cost:

Specifications Model Product 20 Stainless Steel Mesh Material PVC Weight Capacity Temperature Range Color Size 930 mm X 590 mm The quantity required: 2 The unit cost: Varies by nation

Simple tables:

List Type	Examples (syntax in the <b>text source</b> )
Bullet list	<ul style="list-style-type: none"> <li>items begin with “-”, “+”, or “*”</li> </ul>
Enumerated list	<ol style="list-style-type: none"> <li>items use any variation of “1.”, “A)”, and “(i)”</li> <li>also auto-enumerated</li> </ol>
Definition list	<b>Term is flush-left</b> : <i>optional classifier</i> Definition is indented, no blank line between
Field list	<b>field name</b> field body
Option list	-o at least 2 spaces between option & description

Specification	Build of Materials
Model	GPI1109091
Product	GPI 2 in. NPT Bung Adapter Kit
Material	PVC
Weight	n/a
Capacity	n/a
Temp Range	n/a
Color	n/a
Size	55 mm or 2.16 in
Quantity req’d:	2
The unit cost:	varies by nation

- Bill of Materials

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## Contributing

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Thank you for considering to help us!

As an open-source project, we depend on the work of volunteers to stay alive, and your time helping to improve our project is very much appreciated :)

### 7.1 Wish List

Below is a list of items on our TODO list. If you'd like to help us tackle these tasks, please [contact us](#) as there may be someone already working on a given task that you may be able to collaborate with.

Please be aware that any contributions you make will be made open-source. See license for more info.

TODO

### 7.2 Donate

Running the Eco-Libre project has many fees, including

1. Server & domain infrastructure fees
2. Purchasing hardware items for testing & iterating

If you have more money than free time, you can also help Eco-Libre by making a donation. We accept Bitcoin and Monero.

BTC 1DXyJpmu2KQMw2v4QJVzzjZo6f87BBndu6

XMR

4B5ra5N1SN4d7BqDtkxAE5G5kGNz5mA5oCob41RzzoduM1uPAcr7QmNLzXtci5HvtkNXC7SowkxMjUUCXF2hm57MMS4jwxx

:: TODO: Open-collective

Donations of any amount are **greatly** appreciated. Thank you!





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# Support

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As an open-source project, we try to keep all of our support requests on GitHub. If you

1. have a question that is not answered by this documentation,
2. discover a bug in the software, or
3. would like to request a feature in the software

then please [create an issue](#) on our GitHub.

If you don't want to register for an account on GitHub or you'd like to remain anonymous, then you can [email us](#). We'll put the issue on GitHub for you.



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## Changelog

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. \_license:



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```
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## Attribution

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Thank you to the following folks who have contributed to the Life-Line project!

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- [Jack Nugent](#)

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- [Python](#)
- [FreeCAD](#)
- [Vim](#)
- [Gimp](#)
- [Kdenlive](#)
- [Sphinx](#)
- [Read The Docs](#)
- [Roboto Font](#)
- [Material Design Icons](#)
- [Wordpress](#)
- [phpList](#)
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### 11.1 Similar Projects

The reader may be interested to investigate the following similar projects:

- [Open Building Institute](#)
- [WikiHouse](#)
- [One Community Global](#)
- [Auroville Earth Institute](#)





