



# Connecting Green Spaces

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# Contents

<b>Brief and specification</b>	<b>1</b>
<b>The designer</b>	<b>2</b>
<hr/>	
<b>Visualising product timescales</b>	<b>3</b>
<b>Rewilding the city</b>	<b>4</b>
<hr/>	
<b>Building the foundations</b>	<b>6</b>
<b>Guttering development</b>	<b>7</b>
<b>Lamppost Development</b>	<b>9</b>
<hr/>	
<b>The Eko-System</b>	<b>11</b>
<b>Branding and regulations</b>	<b>12</b>
<b>Manufacturing</b>	<b>13</b>
<b>References</b>	<b>15</b>

# Brief and Specifications

## Brief

Design a product for **urban wildlife** that **connects** wildlife populations. The product must encourage the growth of species but **cannot unbalance the ecosystem**.

## Technical Design Specifications

**Must withstand the elements and wildlife usage.** It should not break or lose function during all reasonable weather scenarios or when used by wildlife, both in its intended purpose and in any other way wildlife would foreseeably use the product.

**Must be able to thrive alone** without continuous maintenance. It is acceptable for the product to occasionally require some form of maintenance, although it should not require any form of regular maintenance or other human interaction to continue to function.

**Must connect to create a network.** Isolated green spaces can actually be detrimental to urban biodiversity, thus it is important urban green spaces become connected to enhance biodiversity instead of harming it (Beninde et al., 2015; Lepczyk et al., 2017).

**Must support biodiversity.** The product should not favour a small set of species but should enhance the growth of any and every species that can be found in an urban environment.

**Should not require damage or modification to the city.** It should be possible to integrate the product into the city without major damage or modification to the city's existing structures. It should complement existing structures instead of replacing them.

**Must feel natural and safe for wildlife.** The product should integrate into the urban ecosystem and not involve wildlife adapting to foreign materials or unnatural behaviours in order for the product to function as intended.

## Emotional Design Specifications

**Must draw attention.** Urban green spaces have a variety of health benefits for humans (Wolch et al., 2014). but these are not immediately obvious. Therefore the product should draw attention to itself so people can see it is in place and know the values it represents.

**Should provide some short term value.** Wildlife and biodiversity take time to develop and grow. The product should provide some short term value for users to benefit from while the improvements to urban wildlife slowly develop.

**Should enhance the natural beauty of the area.** The growth of wildlife and increase in biodiversity should become a spectacle and a beautiful thing to look at for people in the area.

# The designer

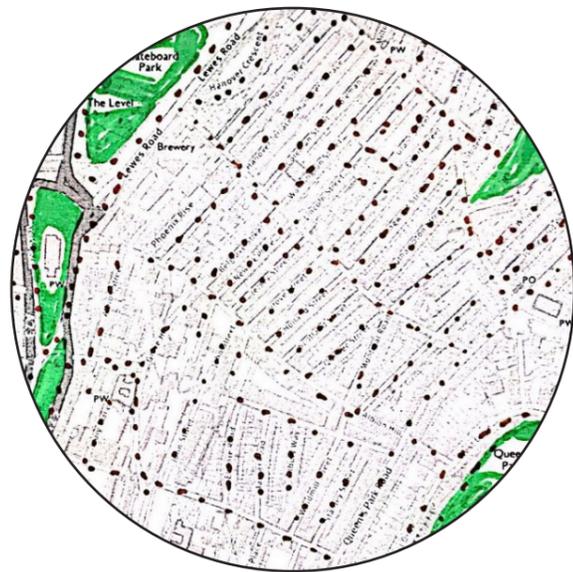
I am a designer who wants to **create** breathtaking **new realities**. Places and things that capture people's imaginations. I take a great deal of **inspiration from film** and its ability to engross people in wonder and magic of far away fictional worlds. I'm inspired by how prop designers can dress up normal places and items and turn them into new worlds. Although I am typically more inspired by mechanical objects and creations from designers such as Daniel Simon and Mark Button, I am also an animal lover and wanted to transform our world into theirs. I took a lot of inspiration from Avatar (2009) and how they portray **a world where nature is intertwined** with their way of living and how nature forms a **connected network**. I'd like to capture some of that wonder and bring it into the real world through my designs. In our world we have restricted nature into small green spaces dotted around cities. I'd like to see it integrated into a key part of every city, not limited to certain areas. I'd like to transform the grey normality of a city into **a vibrant colourful place overflowing with nature and brimming with life**.



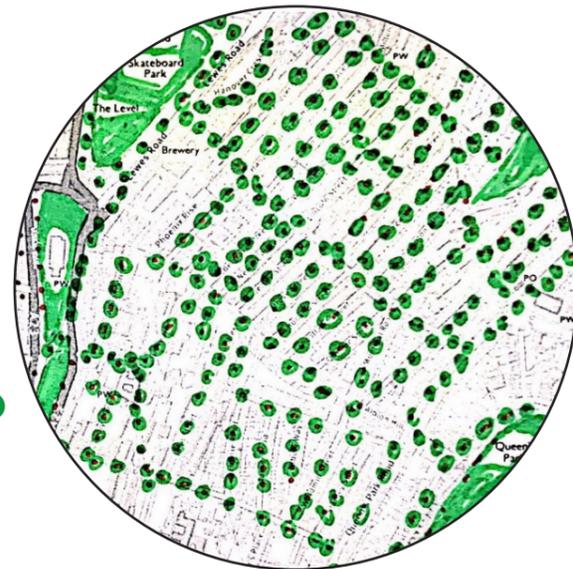
# Visualising product timescales

Working with plantlife as an integral part of the project presented a **unique challenge: timescale**. Trees that are considered 'fast growing' take 10 years to reach 25 feet (Rindels, 1995). Therefore in order to achieve the vision of a network of plant life covering an entire city the product **would need to function over several decades**.

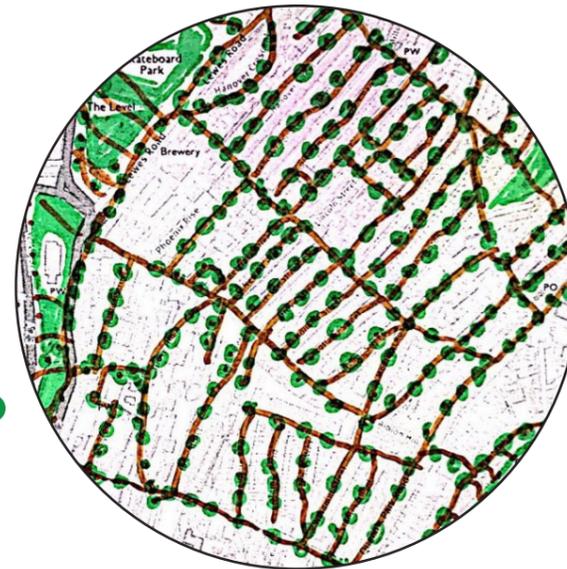
This also means it will be several decades before the primary value of the product appears, thus it is important to **add some short term value** to the product as it will be difficult to sell something that is ineffective for over a decade.



Initially, the products would be installed and dotted all over the city



After 10 years the trees would've begun to grow larger and set the foundation for the network.



After 20 years the trees are beginning to connect and link up, growing larger and creating a network of branches between them.



After 30+ years the trees will have become linked via inosulation and the city will be covered in a network of plantlife connecting every street.

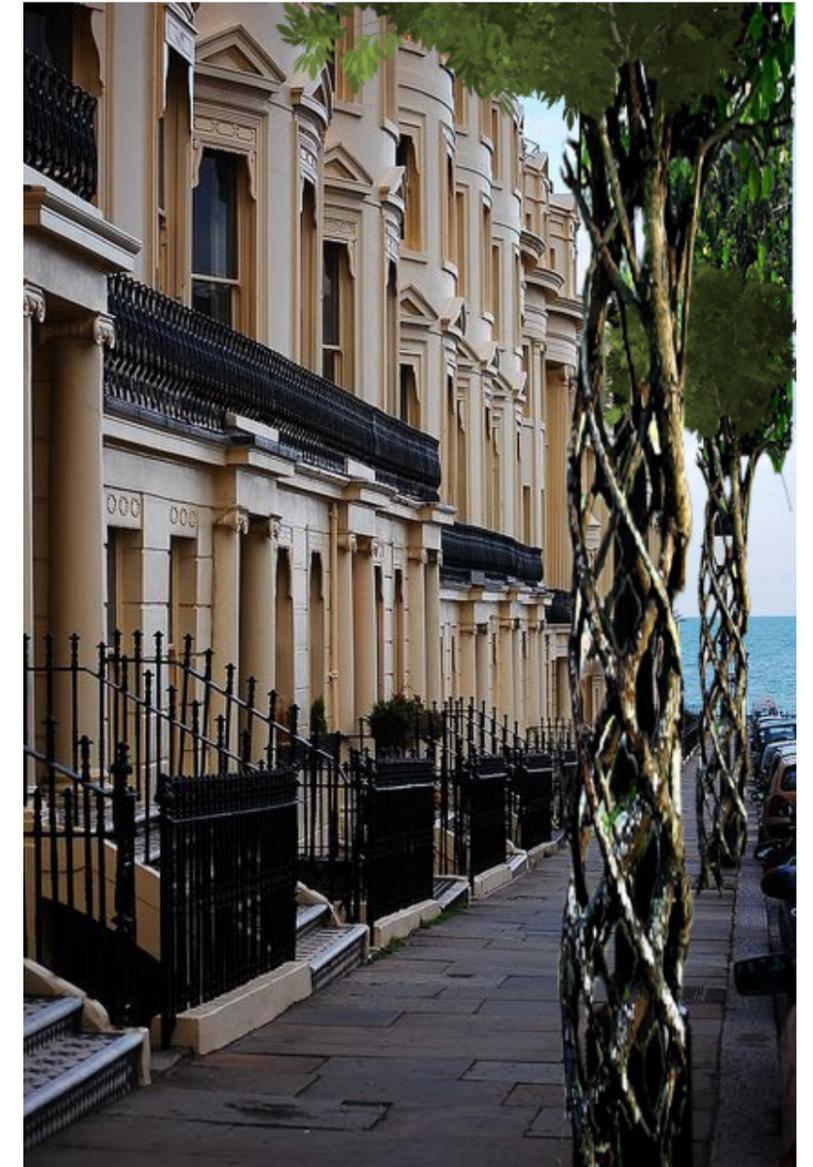
# Rewilding the city



The starting point of this project was a **vision of trees** around a city being shaped into a **natural network** to create a system of 'roads' for wildlife throughout the city. The trees would be shaped into a spiral both to be **visually striking** and to ensure all wildlife can easily climb it and take advantage of the network.



In order to shape **trees into spirals** they would require some form of **frame** to be held in place. Early on I looked at large tubes that the spiral trees would grow inside of. The spirals would have a pattern to make them part of **the art of the spiral trees** and allow wildlife access to the spiral tree within.

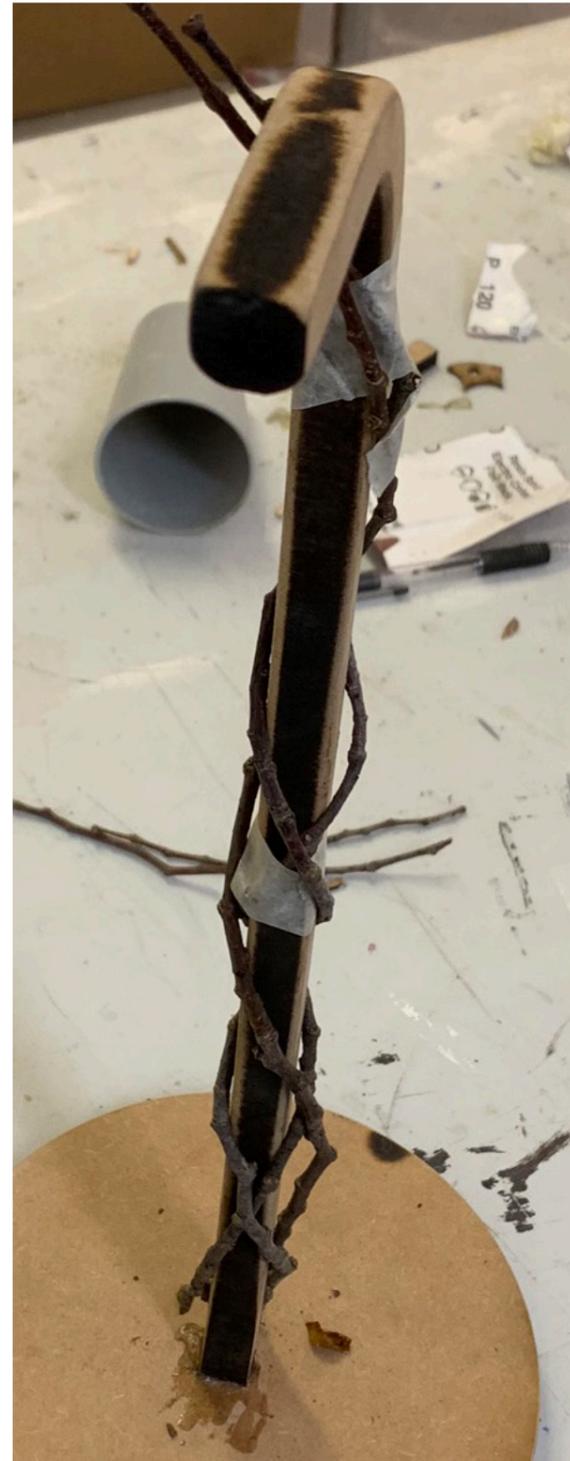


The tube frames took away from the **natural aesthetic** of rewilding the city and looked far **too uniform and man made**, so I looked at using **existing structures** such as lampposts to **shape the trees**.

# Rewilding the city



I experimented with shaping branches around scale lampposts to visualise a **wilder and less uniform shape**.



This sketch model of a street with trees wrapped around the lampposts helped me realise that **the idea was not viable**. Lampposts are never this close together and after observing lampposts in person I realised they are **too spread out** to realistically connect the trees between them.



Instead of trees, **wisteria** will be used. A fast growing vine that **can be shaped and grown from containers** (How to grow Wisteria, 2020), it also produces beautiful flowers that **bring colour to the city**.

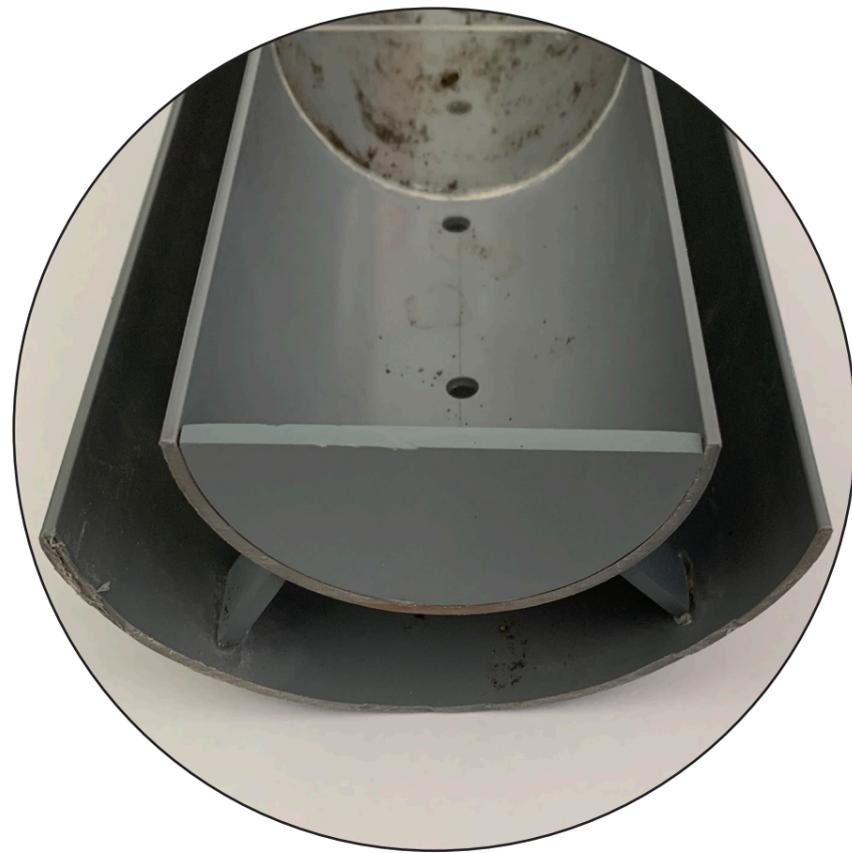
# Building the foundations



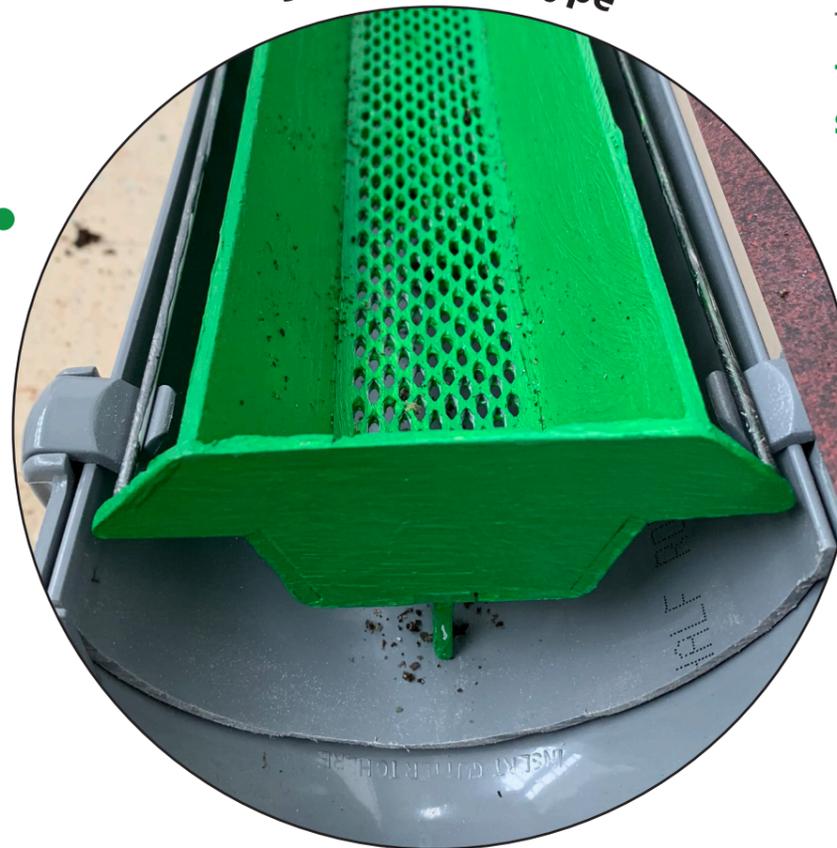
Shifting my focus to building the foundations, I designed a combination of **redesigned guttering and a lamppost mount**. Both items **attach to existing infrastructure** (guttering and lampposts) to lay the **foundations of a network** of wildlife. The guttering acts as a plant pot and **uses rainwater** headed for the gutter **to feed the plants**. Similarly, the lamppost mount attaches to any lamppost with adjustable feet and catches rainwater to feed the plants. For the guttering I took a more functional engineering approach to the design, while the lamppost mount allowed for some more creativity with the shape.

# Gutter development

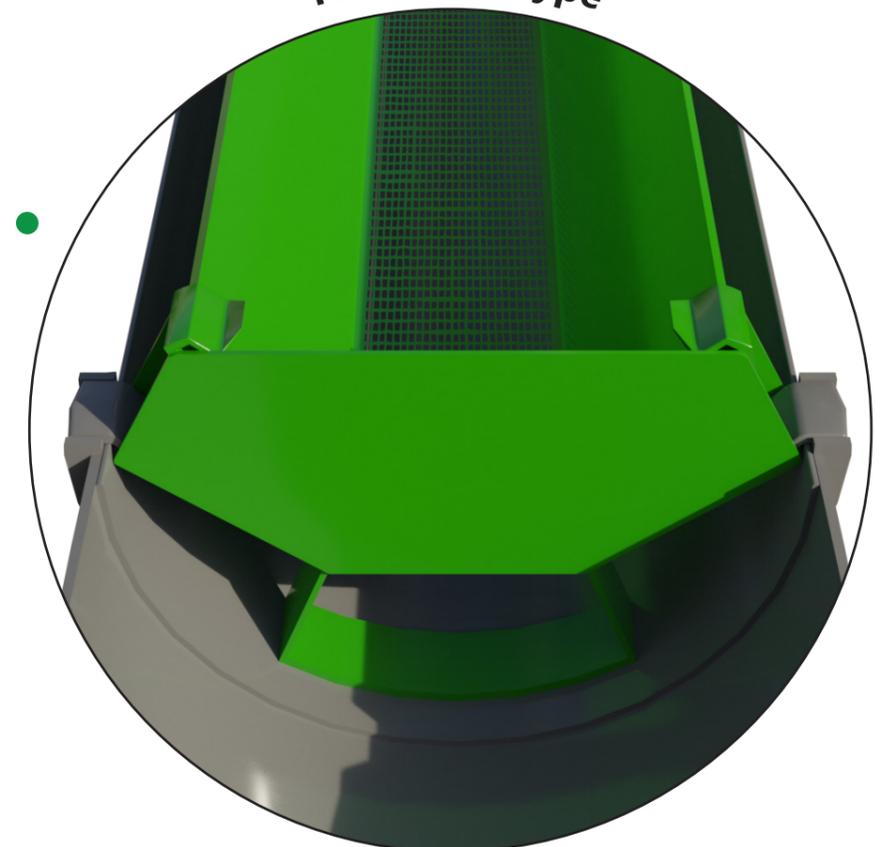
First Prototype



Second Prototype



Final Prototype



## Securing the insert

The first prototype had the guttering insert attached to the guttering itself, **requiring replacement of all guttering**.

The next iteration was able to be **attached to the pre-existing guttering** and was held up by a single foot, although this was **unstable**.

The final prototype features wider base that is **shaped to fit in the contour** of the guttering, making it far more **stable and secure**.

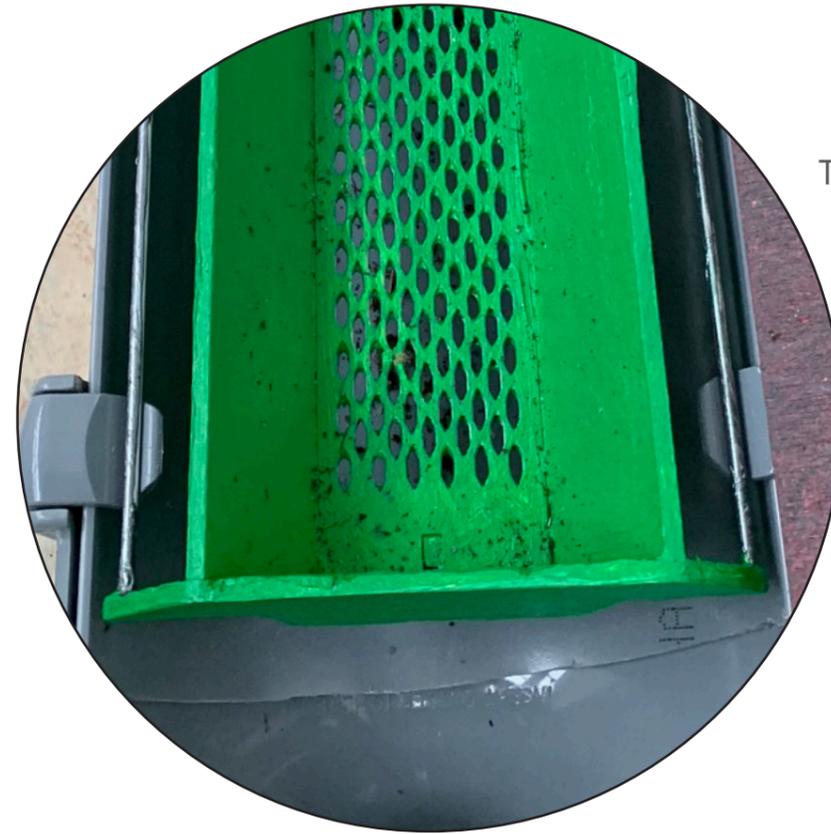
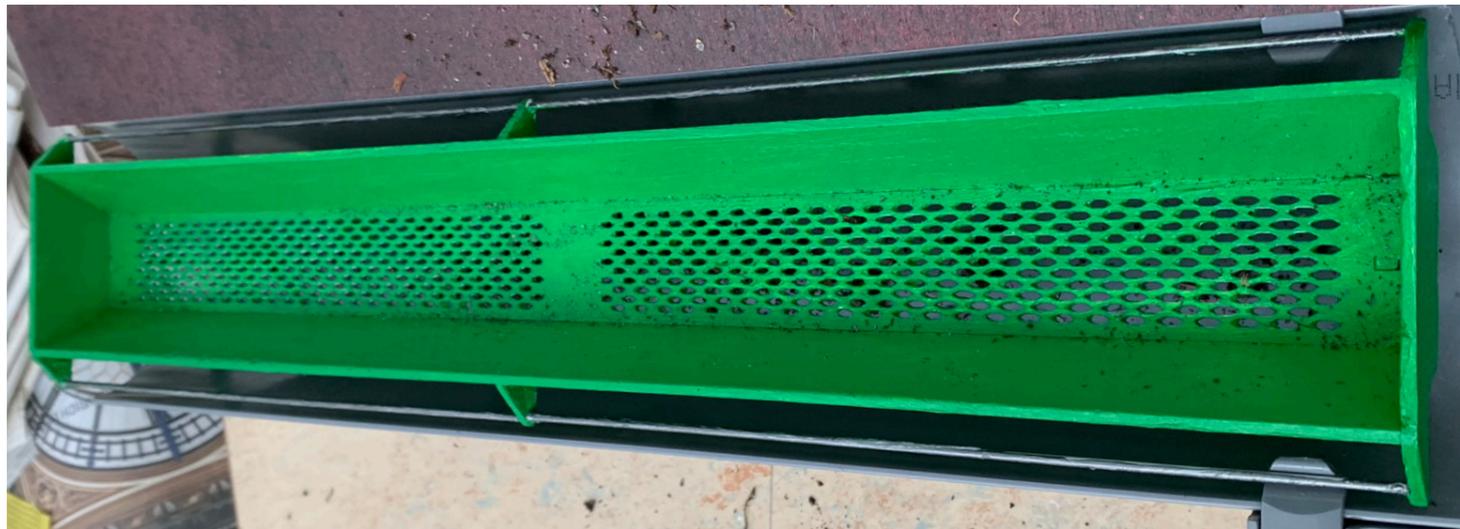
## Draining water

The first prototype **drained excess water** via 8mm holes. These cause a lot of **dirt to flow through** them.

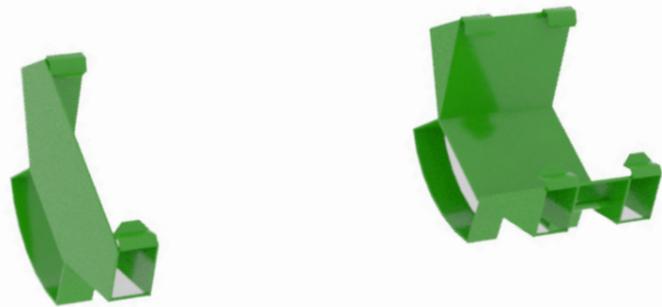
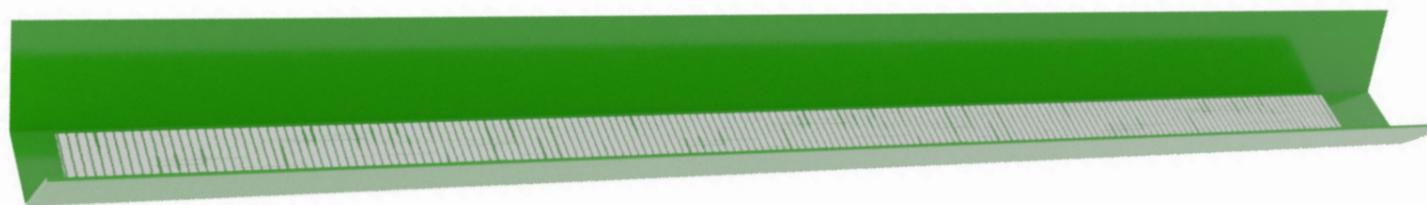
The second prototype has much **smaller holes across a larger surface** and side walls shaped to funnel water down towards them.

The final prototype featured a **mesh of 0.5mm holes**, as testing showed this was most efficient at **containing the soil while allowing water to drain** (testing available in the technical manual).

# Gutter development

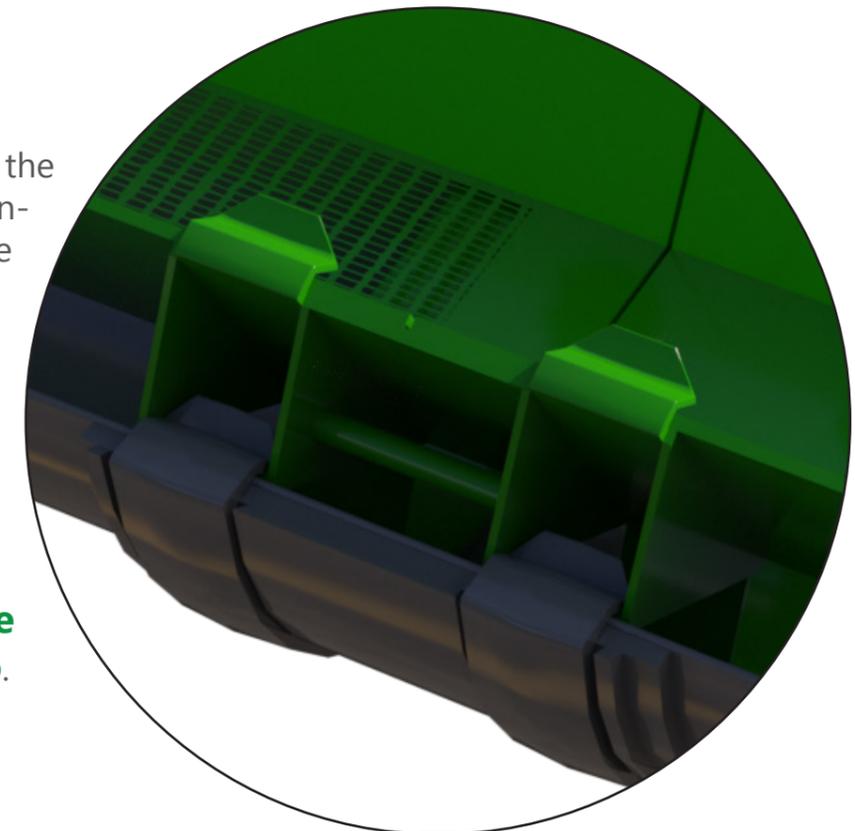


The guttering insert initially had **bars running along its length**, these would sit on the clips that hold standard guttering together to hold the insert in place. The bars could also be used to **tie ropes** to connect to the lamppost plant pots, to **guide the growth of the wisteria**.



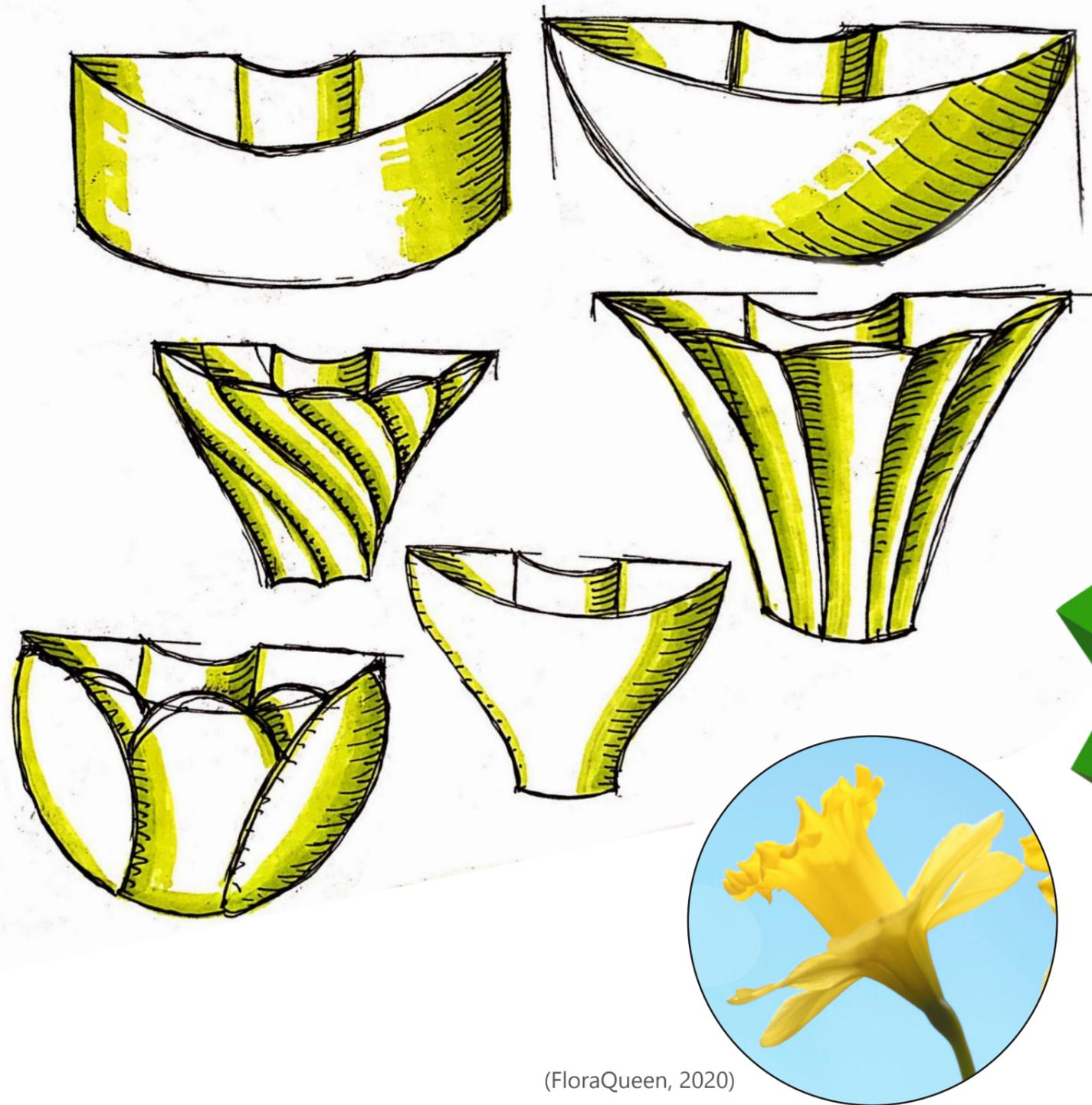
I began with redesigned guttering that would replace gutters. It evolved into a guttering insert that would be placed into existing guttering. Finally, I redesigned it as **separate pieces**, the main insert, the end pieces and the connector pieces, that would be cut to length and **connected in the same way normal guttering is**.

Instead of sitting on top of the clips, the final prototype connector and end parts have been redesigned to **hook under the clips** so it is attached **more securely**. The smaller attachments are also much stronger than a long bar. The connector pieces also have **a bar** in-between them to **tie the guide ropes for the wisteria to**.



# Lamppost Development

For the development of the lamppost mount shape I moved from very uniform simple shapes to **more organic shapes**, attempting to incorporate **biomimicry** by looking at **blossoming flowers for inspiration**.



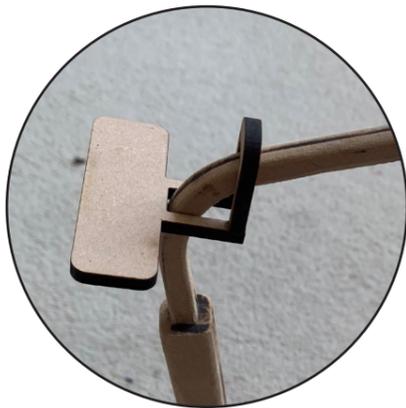
(FloraQueen, 2020)

The shape is purposely **half round** so that it **does not interfere with the light** given off by the lamppost it is attached to. The shape also means that water is **funnelled toward** the lamppost and **a mesh** at the bottom to **drain along the lamppost** (see the technical manual for more details).



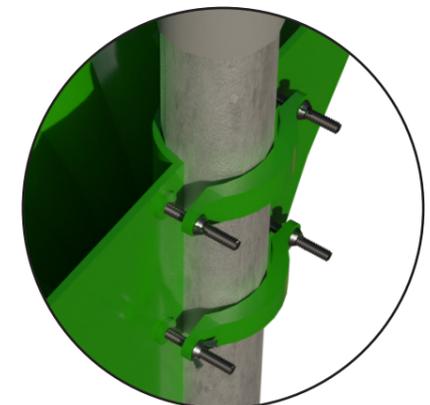
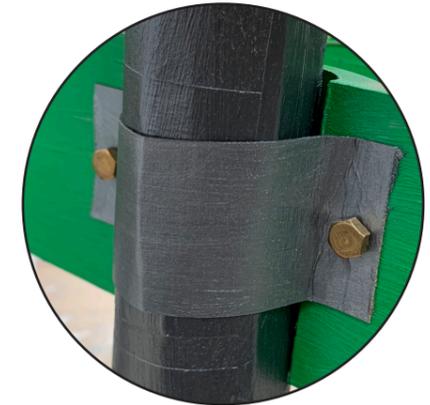
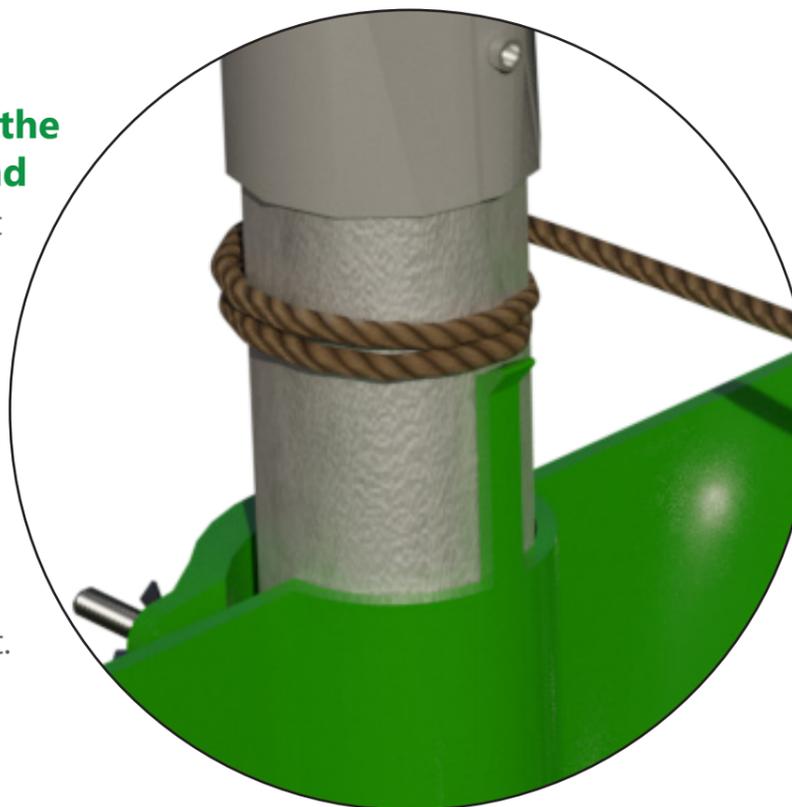
# Lamppost Development

I experimented with different shapes and ways to **attach the plant pot** to the lamppost and **support the structure**.



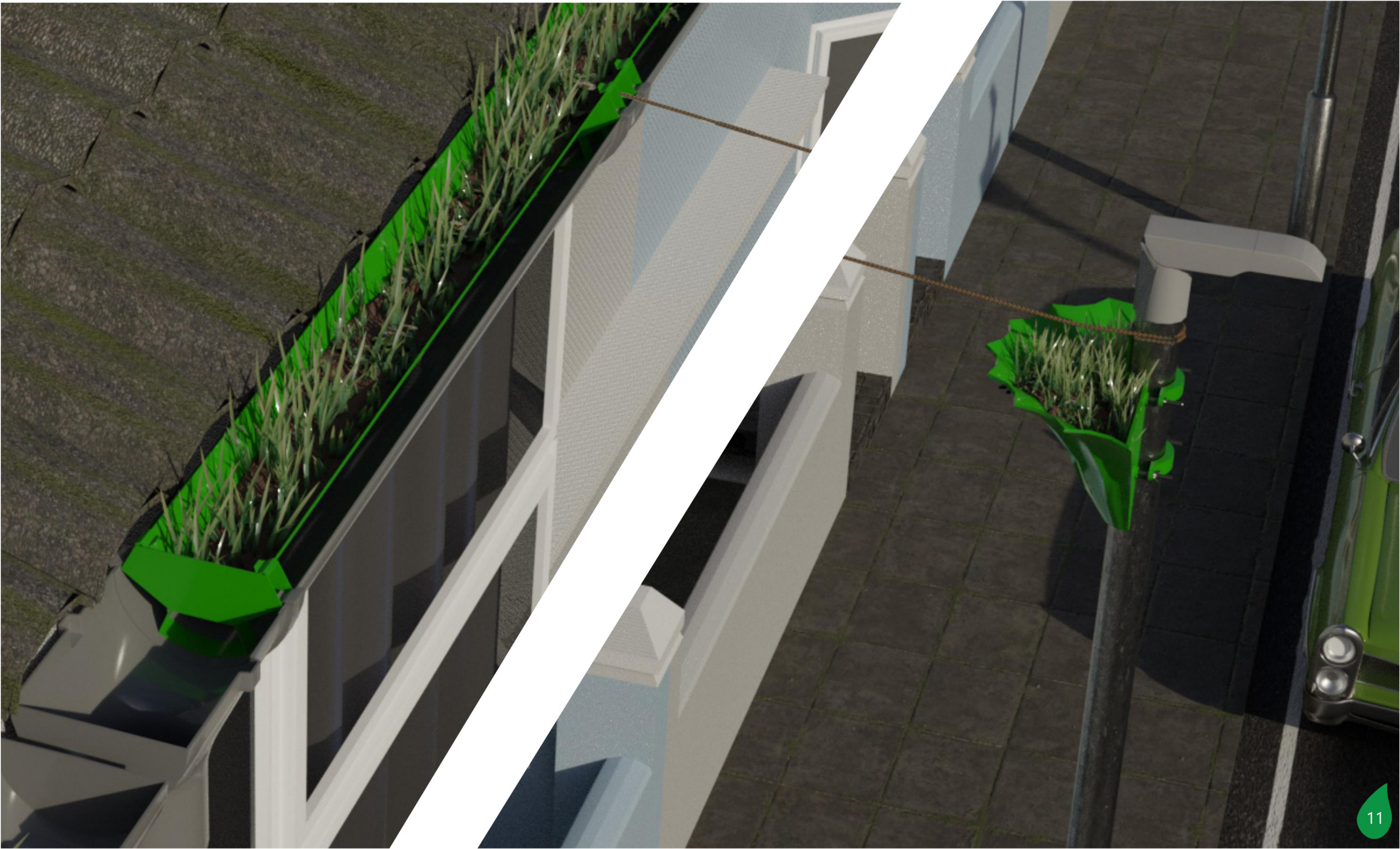
The lamppost plant pot had a **railing around the side** to attach guide ropes for the wisteria to but these were **ugly and very fragile**.

It made more sense to **tie the guide ropes around the lamppost** itself as it would be **stronger** and allow the guide **ropes to be above the plants** so they could grow toward it. I redesigned the railing into a **small ledge that holds up the rope** tied around the lamppost.



I looked at how signs are attached to lampposts and similar poles and designed **an adjustable mechanism** so that the lamppost plant pot can be **mounted on a variety of differently shaped lampposts**.

# The Eko-System



# Branding and regulations

## Branding

In order to **generate value** for the product in the early stages, before the network of wildlife has grown, the Eko-System parts are **bright green** so that they stand out and serve as **an indicator** that the place where it has been seen has **prioritised nature**. It signals to people that they are in a place where nature is welcome and its growth encouraged. It seeks to **brand a city as environmentally conscious and forward thinking**.

## Regulations

There are **no regulations** in the UK that prevent products being inserted into or **attached on to guttering** (The Building Regulations 2010, 2015). It does specify that there should not be metal components in guttering and by extension the guttering inserts should not feature any metal parts either. The document also mandates that guttering must be of **standard sizes**, which makes it far easier to create a product that suits all guttering sizes. Furthermore, the document details specific regulations with regard to the degree of water flow guttering should be able to handle for certain roof sizes. As such, the design **cannot alter the water flow** capabilities of the guttering. Originally it was proposed that there would be a barrier restricting the water flowing through the gutter in order to keep a level of water to feed the plant life in the guttering at all times. This was removed to appease guttering regulations.

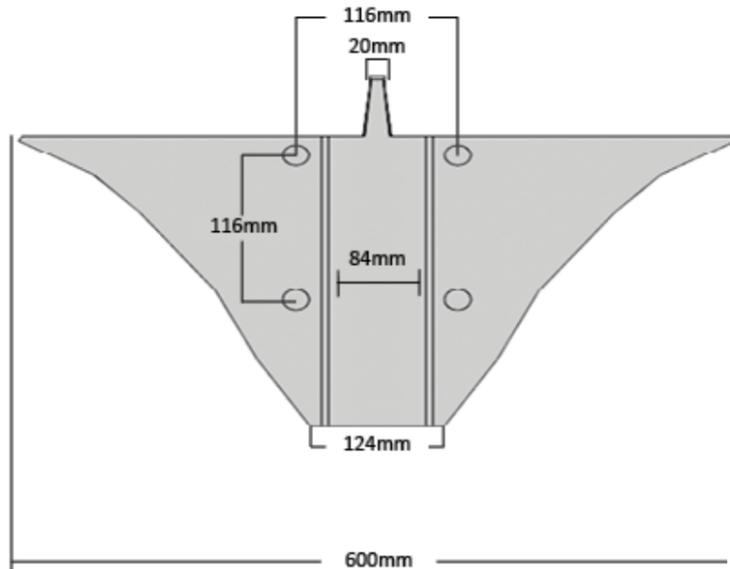
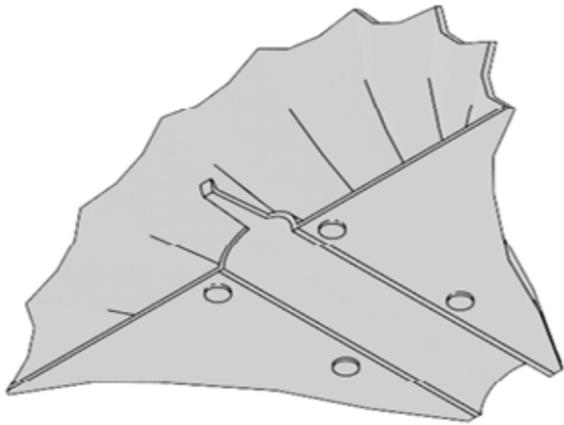


Furthermore, there **do not appear to be any regulations** preventing the attachment of devices to a lamppost, assuming the **appropriate council permission** has been sought. As long as the lamppost itself meets regulations, there is nothing that would disallow the lamppost mount being attached (Civic Voice, 2010).



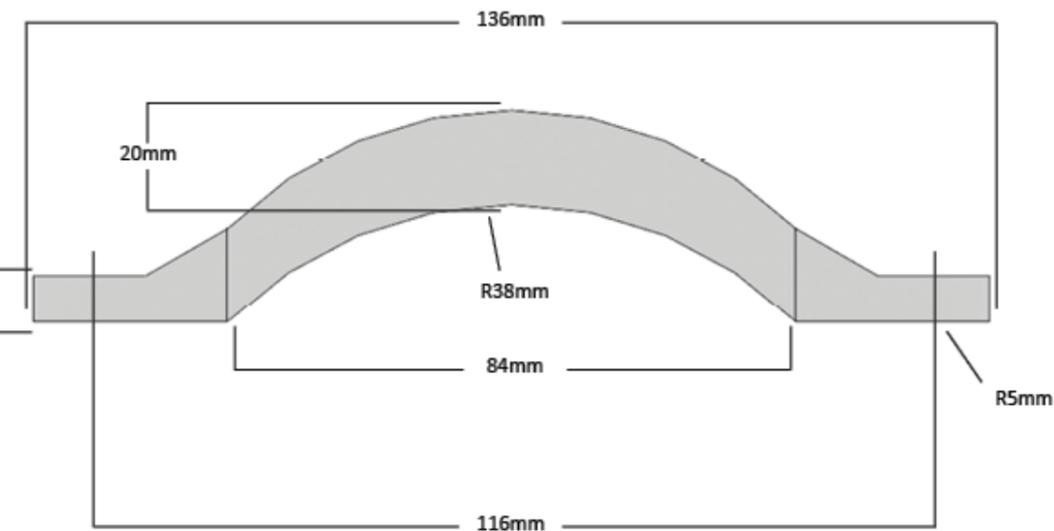
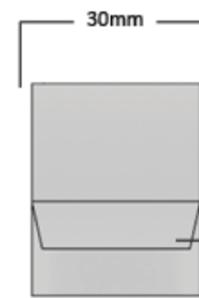
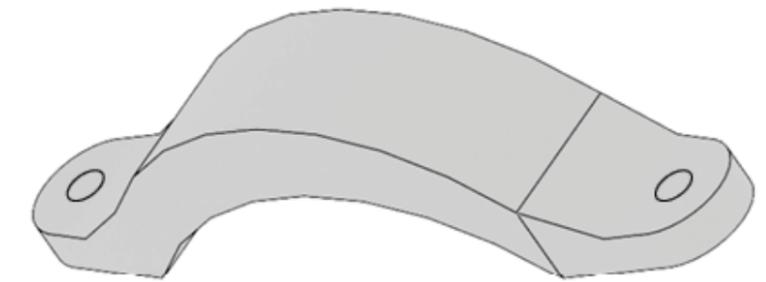
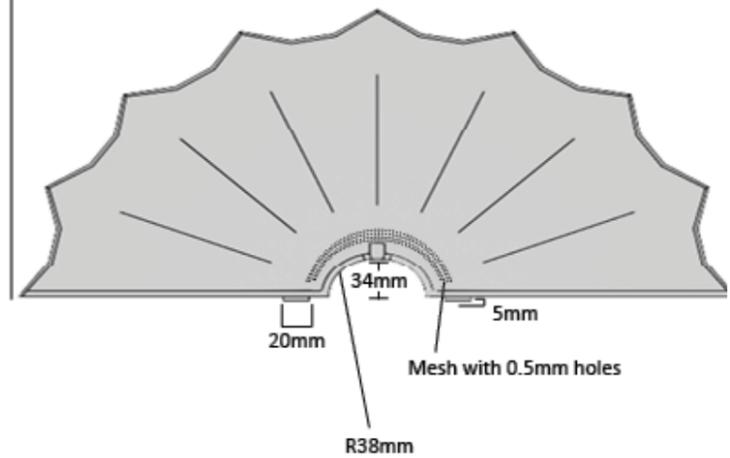
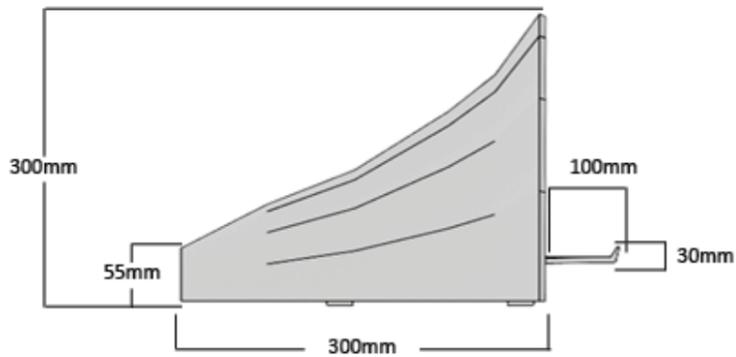
# Manufacturing

## Lamppost Mount



The rear mounts are attached to the lamppost mount via **4x M10 grub screws and secured using 4x M10 Wing nuts**. Please refer to the technical manual for a full bill of materials and instructions for how put the pieces together.

## Rear Mount



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