THE BIRDHOUSE
The Wasteland in the City
The research and graduation project are about the revalue of unfinished, abandoned landscapes through architectural structures. Nowadays it is almost rare to find places and landscapes in cities that have no function, are left behind or not taken care of. Even in the city of Rotterdam, which is less dense than Amsterdam, every square meter is very valuable and is often planned for. If it does not have a destination yet, then developers are eager to make that piece of land profitable. This capitalistic view is characteristic for our productive, accelerated and consumptive society. In this society, we tend to forget the small, but valuable things in life and stray away from our core, our existential self, which is that we are part of nature. In our continuous drive for moving forward, we tend to neglect the need for spaces for reflection or just being. The city needs these breathing spaces where, for a moment, the citizen is not a passive consumer, but an active and playful participant, a wanderer, a collector and an explorer in these ‘Places for Freedom’.

Preliminary to the design a research was done on the unfinished, abandoned landscapes of Rotterdam: places in the city that lost their formal use, are left behind and often taken over by nature. Those places fascinated me as they actually oppose the productive and planned city and the effects thereof. In order to find the proper methods to explore and close read those places, a study was done in psychogeography. Psychogeography is an exploration of urban environments that emphasizes playfulness and ‘drifting’ to find unexpected perspectives and therefore can create new awareness of places. Walking, the merit of wandering, as the main act of the research for encountering those places, means slowing down which allows close reading of space, remembrance and let in the invisible sensory experience. Furthermore, the methods photographing, drawing and writing were used to document, represent and make them legible for others. It allowed me to perceive the specific qualities of the observed places and lead to a categorization of different types of unfinished landscapes found in Rotterdam. For the design proposal, the three typical unfinished landscapes of Rotterdam are being exposed: the wasteland in the city, the in-between landscape and the industrial landscape.

With the design ‘Places for Freedom’ I create architectural structures inside those chosen unfinished landscapes to offer an alternative way of being in and thinking about the city. These structures are inviting one to be present in the moment and provide a sensory experience of a place, they are enhancing the specific qualities of each landscape. ‘Places for Freedom’ offers a break in our routinized journeys within the city, a closer relationship with our natural environment and moments for intimate informal encounters, not only with humans, but also with animals and plants which are the other inhabitants of the city.
THE WASTELAND IN THE CITY
As there is a lack of formal activity, an absence of people controlling this landscape, your attention is dragged towards other things. Like the type of vegetation, the light strokes on the building next to the plot, the reflection of water on the side of the quay. The wind moving the grass, the sound of the city nearby. Birds flying above you, people moving fast, people moving slow. Laughing, chatting and crying. And when no one is there, silence. Clouds moving fast, clouds moving slow, it starts raining. In the distance you hear an ambulance. The smell of oats coming from one of the factories on the other side of the water. I feel like having a cookie...
The Wasteland in the City: a terrain that is not maintained and has at the moment no function. Most of the time many different types of wild plants can be found, such as stonecrop & evening primrose. The Wasteland in the City is not found on the periphery of the city (as most other types of unfinished landscapes are) but it is set in dense urban fabric. Because the land is more profitable this type of landscape is often more temporal than other unfinished landscapes, and therefore more unique.
I found this one on my walk to the South of Rotterdam. After passing by an industrial zone, where it is more common to encounter wastelands, I was quite surprised finding a wasteland in Katendrecht.

Katendrecht is now one of the most vivid neighborhoods of Rotterdam, with restaurants, shops, housing and culture leisure. To see this spacious piece of unused land here was quite amazing. I felt instantly attracted to it because of its location next to the waterfront and its southwards orientation.

As coming frequently at different moments of the day to this place I was able to localize some of the specific characteristics. When I climbed the hill which is on the side of the plot, I realized I wanted this overview of the landscape. Having the view of the city and the waterfront at once. The place is used as a passage as I found two elephant trails or “olifantenpaadjes”. This place was also used by other inhabitants like insects and animals. Being there at several moments I saw that the most frequent visitor of the place was the bird.
The specific characteristics of the place are classified into the following components: The Context, The Traces, The Users, the passengers, The Sensory Experience.

A soft map was made of the place in order to localize the context and the landscape itself.
Vertical expression to fit urban context of 4 to 6 story high surroundings, drags the attention when walking by or from the other side of the water. Also to touch the landscape as less as possible. Having the view of the city and the waterfront at once.

The place is used as a passage as I found two elephant trails. The design should emphasize on showing found traces such as this one.

After coming several times on different hours and day to this place I noticed that the most frequent inhabitant is the bird. The traces in the side tell a story about who is using the space. Although during day time nobody is inside the landscape, a lot of people do pass the landscape frequently. With bike, with car or by walking. Nowadays there are a lot of different cultural citizen initiatives on Katendrecht, such as Theater Walhalla. Involving local actors into the place.
THE BIRDHOUSE
A vertical structure (a 'tower', a 'folly') is the site for seasonal activities, a place for humans and birds. During the summer a scaffolding structure can be attached to climb inside and to overview the landscape, the city and the waterfront. Local actors living on Katendrecht like Theater Walhalla can hold festive events such as an open-air theater. After the performance the curtain is placed upwards and the city is turned into a piece of scenery. Like a tree sheds its leaves during seasonal change, the birdhouse will 'shed' the additional scaffolding structures during the winter. The prefabricated concrete core will remain and will function as a folly. It does not have a practical purpose and becomes an anchor point in the landscape to drag the attention when walking by. As it lost its use - a lack of activity during winter, the place is turned into a site of contemplation and reflection (whereas the arches are framing the city and landscape around it). The structure allows one to stand beneath it and one has time to let in the sensory experience of a place. Such as the sounds of the city nearby, the sounds of the animals in and around the landscape, the wind moving the grass, the light reflection on the waterfront, the smells coming from the factories across the water, etc. However, a very important purpose of the core is that it operates as house for the most frequent user of the place: the bird. The different holes on the exterior of the core are dimensioned to inhabit various kind of birds (as each type of bird has its preferable size to live in). The inside of the concrete core is cast with a bird nest texture to make humans also feel a little bit like a bird coming home in their nest.
LAYERS OF TIME

THE CORE
the physical trace which will remain in the landscape and decay slowly, nature can take over or maybe one day it is part of a new building block.

the trunk of a tree

SCAFFOLDING
the temporal/flexible structure allowing growth and change during seasons.

the leaves of a tree

THE EVENT
The most temporal element of the design. The moment it gets inhabitated, the sensorial experience of the place, or activating the place with temporal events.

the moment, the experience, the interaction
Fragile monuments
As these are temporal places, I want the design interventions to be more dynamic than usual through incorporating time. With the structures I do not want to oppose nature but merge with nature. Incorporating time would mean that there is room for growth, change and decay. That nature can take over the structures of maybe one day it will be changed into something else. It is moralistic in the way of a monument, but it doesn’t commemorate an event of the past, it rather wants to open the eyes for future events in a friendly way.

de Solà-Morales, Ignasi; Weak Architecture; 1987
This diversity of times becomes absolutely central in what I have chosen to call weak architecture… These architectures transform the aesthetic experience into ‘event’…
The straight lines are the olifantenpaadjes: the existing infrastructures found in the place. The birdhouse is connecting with these existing path structures. The olifantenpaadjes will guide you inside the landscape. From these roads two winding paths of stepping stones are leading you to the birdhouse. The path is deliberately made curvy, to emphasize on the idea of wandering, which is never a straight line. The stepping stones are placed from heart to heart with exactly the dimension of an average footstep. The stones are not too big, so every step you have to make carefully and will encourage one to slow down.
This is the summer version. When the leaves are in full bloom and activities are taken place into the birdhouse. The core exists of prefabricated concrete elements. To occupy as little space within the landscape as possible, the area of the ground floor is limited and the structure becomes gradually wider towards the top.

The prefabricated elements can be assembled with a crane from the street, this to not destroy the landscape during construction time. The scaffolding structure will be attached to the anchors in the concrete core for stability (it also allows different configurations).
It is summer... The scaffolding structure is built around the core and it is possible for people to climb up to experience the landscape, the city and the waterfront from above (bird’s eye perspective).

When approaching the Birdhouse the tactility of the structure reveals. The dark and shiny scaffolding structure is covering the more rough and light coloured core.
1. Prefab concrete floor element | 20 cm
2. 0/32 ballast base course | 20 cm
3. Building ground as subsoil or substructure
4. Gravel, on a slope of 2 degrees for water drainage | 10 cm
5. Hollow wood-concrete blocks | 20x20x20 cm
6. Foundation beam
7. Paalfundering
8. Prefab reinforced concrete elements (the core)
9. Anchors | to attach scaffolding
10. Scaffolding staircase | 26 cm x 20 cm (open entrance)
11. Soil on gravel layer
12. drainage outlet

Vaste grondlaag op deze plek is
vanaf 15 meter.
De fundering moet aansluiten op
die laag. Vandaar wordt er een
paalfundering in deze situatie
toegepast. Dit kan zowel met
hout als beton. In deze situatie
is gekozen voor beton.
When one is climbing up the stairs one is arriving at the first floor which is there for different events, gatherings and encounters. To look and to be looked at. A small audience of 20 to 30 people can fit on the stands to enjoy the summer theatre of Walhalla. When the performance is finished the fabric can be moved upward and the city is turning into the new scenery.
1. Reinforced prefab concrete elements inside with texture of birdnest
2. Anchors to attach the scaffolding
3. Console
4. System scaffolding (re-used from building construction sites)
5. Wooden planks for scaffolding structures | 3 cm, pinewood
6. Steps | 25 cm x 25 cm
7. Wooden beam | 25 cm x 460 cm
8. Wooden planks | 3 cm, pinewood

DETAIL V2 / 1:16
1. Hanging system for dynamic curtains
2. Fixed part of the curtain, stofdicht steigernet
3. Joints of the scaffolding, attachment of the curtain is done with tie wraps (like in on construction sites)
4. Adjustable wooden plans (flooring). Different heights possible.
ELEVATION BIRDHOUSE
view from the top - on the waterside, facing south Rotterdam
TALKING WALLS
The In-Between Landscape
PLACES FOR FREEDOM
The Revalue of Unfinished Landscapes
Through Architectural Structures

Graduation Design Book
Esmeralda Bierma

PLACES FOR FREEDOM / BOOK II /
Talking Walls / The In-Between Landscape

Mentors:
Mark Pimlott
Leontine de Wit
Gilbert Koskamp
Leeke Reinders

TUDelft Faculty of Architecture and the Built Environment
© 2018 Esmeralda Bierma
The design proposal is a statement opposing our productive, accelerated and consumptive society and intends to offer an alternative way of being in and thinking about the city.
The research and graduation project are about the revalue of unfinished, abandoned landscapes through architectural structures. Nowadays it is almost rare to find places and landscapes in cities that have no function, are left behind or not taken care of. Even in the city of Rotterdam, which is less dense than Amsterdam, every square meter is very valuable and is often planned for. If it does not have a destination yet, then developers are eager to make that piece of land profitable. This capitalistic view is characteristic for our productive, accelerated and consumptive society. In this society, we tend to forget the small, but valuable things in life and stray away from our core, our existential self, which is that we are part of nature. In our continuous drive for moving forward, we tend to neglect the need for spaces for reflection or just being. The city needs these breathing spaces where, for a moment, the citizen is not a passive consumer, but an active and playful participant, a wanderer, a collector and an explorer in these 'Places for Freedom'.

Preliminary to the design a research was done on the unfinished, abandoned landscapes of Rotterdam: places in the city that lost their formal use, are left behind and often taken over by nature. Those places fascinated me as they actually oppose the productive and planned city and the effects thereof. In order to find the proper methods to explore and close read those places, a study was done in psychogeography. Psychogeography is an exploration of urban environments that emphasizes playfulness and ‘drifting’ to find unexpected perspectives and therefore can create new awareness of places. Walking, the merit of wandering, as the main act of the research for encountering those places, means slowing down which allows close reading of space, remembrance and let in the invisible sensory experience. Furthermore, the methods photographing, drawing and writing were used to document, represent and make them legible for others. It allowed me to perceive the specific qualities of the observed places and lead to a categorization of different types of unfinished landscapes found in Rotterdam. For the design proposal, the three typical unfinished landscapes of Rotterdam are being exposed: the wasteland in the city, the in-between landscape and the industrial landscape.

With the design ‘Places for Freedom’ I create architectural structures inside those chosen unfinished landscapes to offer an alternative way of being in and thinking about the city. These structures are inviting one to be present in the moment and provide a sensory experience of a place, they are enhancing the specific qualities of each landscape. ‘Places for Freedom’ offers a break in our routinized journeys within the city, a closer relationship with our natural environment and moments for intimate informal encounters, not only with humans, but also with animals and plants which are the other inhabitants of the city.
The In-between landscape is a landscape between all kinds of infrastructure, also called the ‘berm’. As Rotterdam is highly dominated by infrastructure since the reconstruction after World War II, it is a typical landscape of the city. You can find it everywhere around you. In most cases it is mowed but there are some unregulated in-between landscapes (‘bermen’).

As the plants can grow uncontrollable the height of the plant during the summer can reach up to 1.5/2 meter high. These in-between landscapes are usually narrow but long. As kind of species are using this place, such as bees, butterflies and other kind of insects.
This particular place lies between to the waterfront and the sidewalks, bikelane, carlane and tramline. The depth of the plot is more less 10 meter and it is 150 meters long. It is set on slope. Coming here on several moments I was kept by all the movement taking place around me. All the different speed rhythms: from slow to fast, with often people with focused motion and directions. When filming some of this movement, people who passed by were looking a bit weird. What is that girl doing over there? What attracted me was not only the movement around me, but also above me. The wind moving all the different types of grass, and of course the beautiful waterfront all along the site.

With the intervention on this site, I wanted to make people aware of all the different movements that are constantly in and around the place. To experience and emphasize the length of the landscape I have chosen for 3 structures inside them which will guide you through the place. The structures refer to the position of the human body and will help you to become more present in the moment. They will drag your attention to the rhythms, the sounds, and the different light phases of the day.

Laying position will focus on above and underneath, standing will focus on the sides of the plot and the sitting will focus on the direction of inside the plot.
The specific characteristics of the place are classified into the follow components: The Context, The Traces, The Users, the passengers, The Sensory Experience. A soft map was made of the place in order to localize the context and the landscape itself.
Movement, different rhythms everywhere around the place. This photograph is taken in the winter, when the grass was mowed. The Metro stop Coolhaven is very close by this in-between landscape, this is one of the reasons it is always a quite busy place of pedestrians walking by to Erasmus, de Hoge School, to Delfshaven or to Het Park.

The In-Between landscape not seen as a border laying between the water and the other infrastructure, but as a potential connector.
TALKING WALLS
Stacked block structures (‘follies’) are placed in a left-over landscape (berm) between infrastructures to reveal and frame the poetic of the everyday life in and around the place. Functioning similar as a chapel along the roadside. These structures do not have a practical purpose (like a folly), but they do want to tell stories about the experiences of a place. A story one is able to see, to read only when slowing down. It is about perceiving, not only with the eye but also with other senses like, smell, sound and touch. Furthermore, the architectural structures want to emphasize on being in the moment as the experiences are all about a short timeframe: the minutes and the hours of a day. They focus on all the different rhythms around you.

As this place is set between infrastructures there is movement everywhere around you: moving cars, moving trams, moving bikes, moving pedestrians, moving boats. But also, above you, under you and inside the landscape: moving clouds and moving grass.

I call it Talking Walls because through the wall-structures the experiences of the place are emphasized and in such a way you can see them as talking with their surroundings, talking with the human encounters and talking with each other.

The in-between landscape is often characterized by being narrow but long. To experience the full length of the place three structures are placed divided in the landscape, to guide one through it. As these places are about the individual encounter, contemplation with the artifact, they refer to the position of the human body: sitting, laying, standing.

The laying one is emphasizing on the awareness on what is beneath us and above us. It is designed like a bed. The walls are partly built, and nature can take over the structure itself. Laying on the bed you have the view of the sky. In the corner of your eye you still see the moving grass around you.

The standing structure serves as a frame to expose the movement on sides of the plot. Wandering through the walls. It allows one to move through this landscape, being in the landscape with views on the water, views on people, views on traffic.

The sitting structure is closed from its environment. Only through various holes in the wall the sunlight is able to come inside in different patterns during the day. The holes also provide the sounds coming inside from the sides of the plot.

This place is about light and sounds.

Construction: The base is made of prefabricated concrete elements to touch the landscape as less as possible. The walls are made of blocks made of waste and concrete. The idea is that people themselves can build the structures with the blocks and re-use materials. To change the user into an active participant.
BEING IN TIME

THE ENCOUNTER
THE MOMENT

STACKING BLOCKS
A temporal layer as the blocks are not cemented but stacked

THE TRACE
THE PLATFORM

LAYING
Focusing on the movement beneath and above

STANDING
Focusing on the movement on the side of the plot

SITTING
Closing off from the busy traffic side and focus on the inside of the landscape
The laying structure is designed like a two person bed. In order to guidance people to be more present in the moment this structure is dragging your attention towards what is beneath you and above you. By placing the blocks (on the floor) in slightly different heights, you are becoming aware of the ground. When laying on the bed you are enclosed by plants that can climb up the steel frames.
1. Prefab concrete floor element | surface 250 x 500 cm
2. 0/32 ballast base course | 20 cm
3. Building ground as subsoil or substructure
4. Plant trough, hollow concrete block filled with mineral substrate layer for planting/climbers to go on the steel structures
5. Sand | 5 - 8 cm
6. Hollow wood-concrete blocks
7. Wood cushion, oak | 25 x 120 cm
8. Prefab concrete 'bed' element | 120 x 200 cm
9. Steel tubes | diameter 3 cm
10. Vertical Planting, climbers and creepers - Fallopia Aubertii
11. Drainage/outlet
12. Soakaway (gravel), leachate pipe
II. STANDING
II. STANDING / FLOORPLAN
II. STANDING / ELEVATION OUTERWALL
II. STANDING / ELEVATION INNERWALLS
II. STANDING / COLLAGE
III. SITTING / VIEW FROM ROAD
III. SITTING / VIEW FROM WITHING THE LANDSCAPE

III. SITTING / FLOORPLAN
III. SITTING / SECTION
THE WILD GARDEN

The Industrial Landscape
The design proposal is a statement opposing our productive, accelerated and consumptive society and intends to offer an alternative way of being in and thinking about the a city.
The research and graduation project are about the revalue of unfinished, abandoned landscapes through architectural structures. Nowadays it is almost rare to find places and landscapes in cities that have no function, are left behind or not taken care of. Even in the city of Rotterdam, which is less dense than Amsterdam, every square meter is very valuable and is often planned for. If it does not have a destination yet, then developers are eager to make that piece of land profitable. This capitalistic view is characteristic for our productive, accelerated and consumptive society.

In this society, we tend to forget the small, but valuable things in life and stray away from our core, our existential self, which is that we are part of nature. In our continuous drive for moving forward, we tend to neglect the need for spaces for reflection or just being. The city needs these breathing spaces where, for a moment, the citizen is not a passive consumer, but an active and playful participant, a wanderer, a collector and an explorer in these ‘Places for Freedom’.

Preliminary to the design a research was done on the unfinished, abandoned landscapes of Rotterdam: places in the city that lost their formal use, are left behind and often taken over by nature. Those places fascinated me as they actually oppose the productive and planned city and the effects thereof. In order to find the proper methods to explore and close read those places, a study was done in psychogeography. Psychogeography is an exploration of urban environments that emphasizes playfulness and ‘drifting’ to find unexpected perspectives and therefore can create new awareness of places. Walking, the merit of wandering, as the main act of the research for encountering those places, means slowing down which allows close reading of space, remembrance and let in the invisible sensory experience. Furthermore, the methods photographing, drawing and writing were used to document, represent and make them legible for others. It allowed me to perceive the specific qualities of the observed places and lead to a categorization of different types of unfinished landscapes found in Rotterdam. For the design proposal, the three typical unfinished landscapes of Rotterdam are being exposed: the wasteland in the city, the in-between landscape and the industrial landscape.

With the design ‘Places for Freedom’ I create architectural structures inside those chosen unfinished landscapes to offer an alternative way of being in and thinking about the city. These structures are inviting one to be present in the moment and provide a sensory experience of a place, they are enhancing the specific qualities of each landscape. ‘Places for Freedom’ offers a break in our routinized journeys within the city, a closer relationship with our natural environment and moments for intimate informal encounters, not only with humans, but also with animals and plants which are the other inhabitants of the city.
THE INDUSTRIAL LANDSCAPE
These leftover landscapes that are situated at the industrial areas, often at the periphery of the city. They lay between factories and the stage of wilderness is often the most advanced of all types of unfinished landscapes.

As Rotterdam is a harbor city there are quite a lot of industrial landscapes. Because a lot of industry is removed or replaced the number of wastelands inside those areas is big. As these places are often set on the periphery of the city the value for money is not that high and landscapes can be empty for years.
Specific characteristics
/ Most advanced stage of wilderness, high biodiversity, all kind of species living in the place.
/ Landscape character, as it is set on the periphery of the city, less densely populated
/ Open, wide character, less human scale, less intimate space
/ Often rough places (materiality a lot of steel)
/ Local actors such as artist, designers, workshops and start-ups are concentrated in the area. They are all around the wasteland I found but there is a lack of meeting point.
The specific characteristics of the place are classified into the follow components: The Context, The Traces, The Users, the passengers, The Sensory Experience. A soft map was made of the place in order to localize the context and the landscape itself.
THE WILD GARDEN
An enclosed garden is the site where the advantage stage of wilderness of the wasteland is celebrated, a place for humans and plants. Inside the enclosure there are three platforms for encounter, play and reflection. Through the experience of elemental elements such as water, fire, wind and earth awareness to our natural environment is dragged (as we sometime tend to forget our existential self of being part of nature).

The wooden walkway, the cloister, marks the landscape, but it does not close off from its surroundings. The open structure allows the connection between the inner world and the external world. The enclosure, the walkway is shaped as a circle to be able to walk continuously on the edge between inside and outside. Symbolizing the cycle of life. The temporal wooden structure can be built by local actors as the wood workshop next to it. The garden can be maintained by local actors such as the voedseltuin.

Water place – reflection. The water place is natural equilibrium basin. The idea is that when it rains water can flow naturally and will be restored underground. When water is needed the handpump serves as mechanism to circular the water.

Fire place – gathering, BBQ. The small amphitheatre around the fireplace is for gathering, poetry, presentations, but also a place to bbq with local people of the area.

Wind place – play. A platform with swings to enjoy the moments with the air.

Earth – the center of the enclosed space. Different events can be held here such as sculpture expositions, small parties and gatherings, open air restaurant with cooking from the garden etc.
URBAN SITUATION
The platforms are made of concrete and the wooden-concrete blocks. They are the traces in the landscape. Time is incorporated in the design by allowing slowly decay of materials and nature that can take over.
The wooden walkway, the cloister, the enclosure, is to create a more intimate interior space inside the rough industrial area: to celebrate the advantage stage of wilderness but also to learn from it. What kind of weeds are there actually, and how can you use them for cooking for example. The idea is that local communities, like Buurman (the woodworkshop) built the structures themselves. Therefore the construction is designed to be as simple as possible.

Furthermore, the wooden walkway is the contemplative area where one walks alone or with others. It is designed from very close, dense structure (which closes of the street side) to a very open, wide part (opens to the wasteland).
The center of the Wild Garden functions as a square. People can gather, local communities can bring their chairs and tables to sit and eat outside, but also sculpture exposition can be hold for example. It is a place where different events can take place.
Ecological Equilibrium in the Waterpool | less care and attention/maintenance

1. Partial shade covered by plants and floating leaves in the pond
2. Surface should be at least 10 m²
3. Circulating water for water quality
4. In Winter it is better to lower the water level
5. Essential to change water for cleaning purposes
6. Smaller ponds might use fountains, waterfalls or aeration systems to raise the oxygen content
7. Aquatic plants play a critical role in balancing your pond's ecosystem by providing valuable biological filtration that removes nitrogen, ammonia, nitrates, and other minerals from the water that algae love to feed on!

Different depths (0/30 cm, 30/50 cm - medium shallow zone and deep water area)

Oxygenating plants are interesting

- Bulrush (Schoenoplectus)
- Manna grass (Glyceria)
- Hornwort (Ceratophyllum demersum)

Floating plans help regulate biological equilibrium (shade the water and therefore algae)

Hand Pump | Manually operated pump, for self-supply of water

- Force rod
- Piston rod
- Piston, Cup seal and Piston valve
- Flange with suction valve

Drainage

- Water Storage
- Pipe for recycled water into storage
- Foundation | concrete quality C20/25, no frost risk

Ballast Base Course | 15 cm

Concrete blocks | 40x20x20 cm

0/32 ballast base course | 15 cm

0/45 frost protection course | 19 cm

Concrete blocks | 40x20x20 cm

0/32 ballast base course | 15 cm

Waterproof concrete, prefabricated pool, impermeable to water

Prefab concrete water collector with water canals to

Bath for birds

11. Suction pipe

3. Cylinder

Hand Pump | Manually operated pump, for self-supply of water

- Force rod
- Piston rod
- Piston, Cup seal and Piston valve
- Flange with suction valve