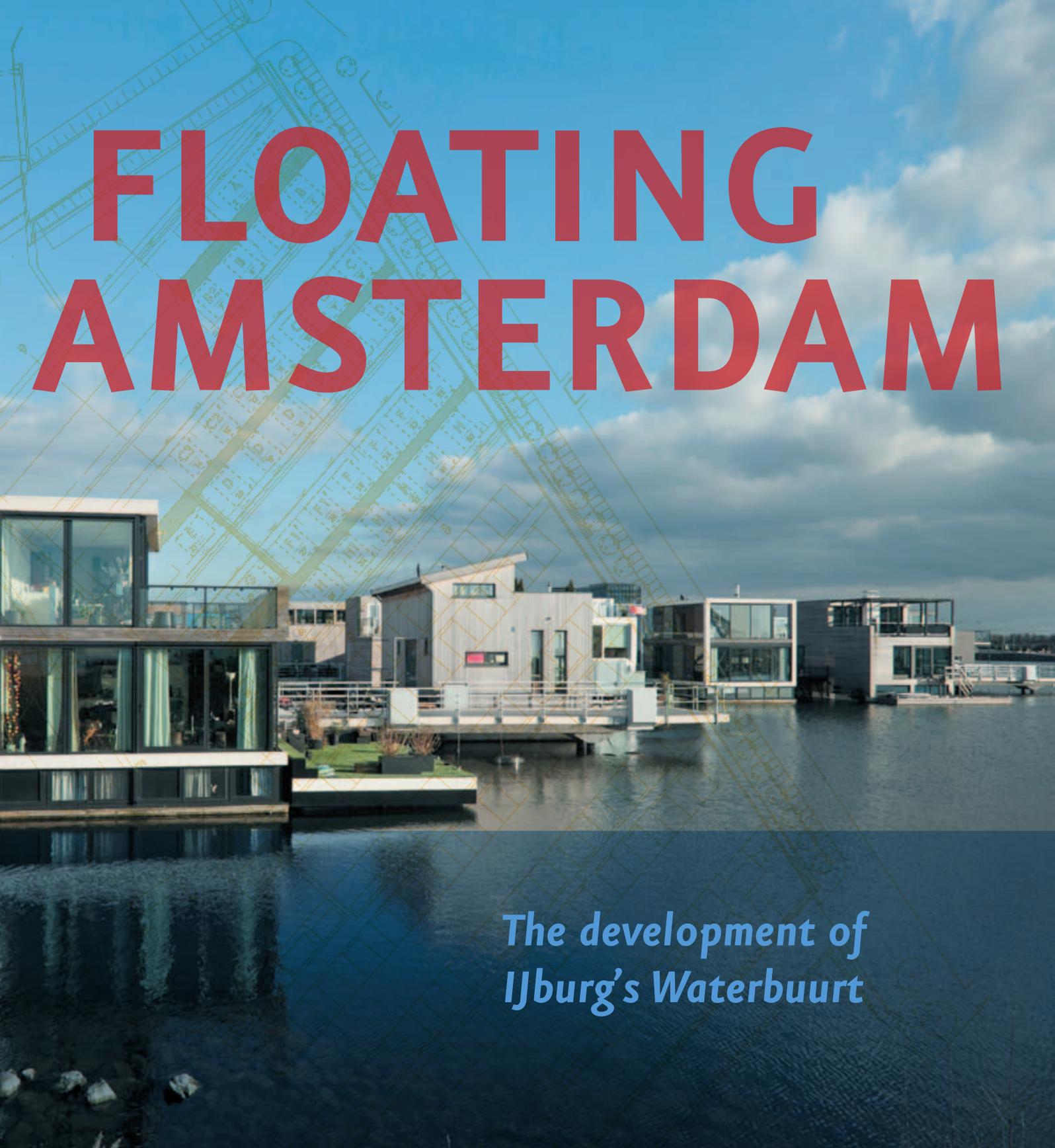


# FLOATING AMSTERDAM



*The development of  
IJburg's Waterbuurt*



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# PREFACE

Living on water is an adventure. First and foremost for the residents themselves. They swim, fish, sail and play to their heart's content in the water on which they live, and they get used to their slightly swaying rooms. Since living on water is no longer restricted to the well-known houseboats along the quays of canals and rivers, it has become an adventure for land developers too.

We have embarked upon that adventure. This booklet is about the experiences we have gained, both as the municipality of Amsterdam with all its various departments, and as the private developers of the project-based part of the floating homes and jetties. Obviously, we will also address the experiences of the many other parties involved: private commissioners, architects, the agent in charge of water management, public utility companies, constructors, and the first residents.

This booklet addresses two variations of living on the water: the project-based floating homes and floating homes constructed under private commission. In the project-based part, the houses have been developed by the private Ontwikkelingscombinatie Waterbuurt West (development combination Waterbuurt West), with a lot of attention to cohesion and architecture. In the part with the private plots, the residents were granted more freedom. Without the restriction of regulations regarding the architectural appearance, they were able to design and construct their floating home as desired.

The initiative for this booklet came from the municipality, who calls these publications 'knowledge books'. Such a book passes on the acquired knowledge to other organisations that face similar challenges. For private parties, a publication like this is less self-evident. Should one give away highly valuable information and experience for free? We think the answer is yes. Why not? Our knowledge and experience is not only the result of our own efforts, but also of the collaboration with numerous other parties. The knowledge can, although fragmented, be obtained in other ways, and everyone can visit IJburg and see the result. We feel it is more sympathetic to bundle all our knowledge and experiences and offer it in one go. As such, a lot of unnecessary delay, costs and effort can be avoided in subsequent projects.

The floating houses in the Amsterdam Waterbuurt are state of the art. We are fairly proud of the result. But developments are not standing still. The next project will have to be smarter, better and more efficient. Maybe you will be involved in this project. Certainly in that case, we hope you find this book informative and inspiring.

*Municipality of Amsterdam, Projectbureau IJburg:*  
Igor Roovers (managing director)

*Ontwikkelingscombinatie Waterbuurt West:*  
Aad van Meel (Housing corporation Eigen Haard)  
Arthur van der Vegt (Woodstone & Sparkey bv)  
Ton van Namen (Monteflore Vastgoed bv)

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# CITY QUARTER ON THE WATER

## INTRODUCTION

The scene can be admired with some regularity since 2009: a house sails in over the water of the IJmeer near Amsterdam, sometimes even in groups of two or three, pulled by a tugboat and controlled by a second boat at the back. With appropriate difficulty, this ensemble manoeuvres through a set of locks that is barely wider than the house itself. The house is then neatly docked to a jetty in the inner water, precisely at the designated location. There it will be riveted to two mooring poles.

### Pioneering

Nearly one hundred homes have sailed into the lake by now. Together, they form the first large-scale complex of floating houses in the Netherlands. And if we look at the signs, it will not be the last. The space for urban development in the Netherlands, and in Amsterdam in particular, is scarce. At the same time, more space will be required for water, as

a result of the expected climate changes. This is not only the case in the Netherlands, but also in deltas all over the world. Using a part of the water as building land can greatly increase the possibilities of city development.

Whilst planning IJburg, the urban expansion project to the east of Amsterdam, Steigereiland ('jetty island') was designated as experimental area. IJburg lies on man-made islands in the IJmeer, without the ring-dike that is common in conventional reclamation practices. As a result, the water is present all around, giving the district its unique and distinct character as city archipelago. It is the perfect place to explore the opportunities of building on water in an urban density, elaborating on initiatives of a single or a few floating houses elsewhere in the country. This has been realised in two varieties: on the western part of the inner lake on a project basis, and on the eastern side by means of private commis-





sions, free from the regulations regarding the architectural appearance.

Basically, a floating house differs only in one respect from other Amsterdam houses: the house rests on the water instead of piles. But that single difference has many consequences, ranging from swinging chandeliers to deviating mortgages, and from risks regarding water quality to jetties that have to be passable under all weather conditions. Many of the things that are routine on land had to be reinvented, technically, legally and financially, and both on the level of urban development and organisational issues. And, in the end, it has all been reinvented, be it sometimes by trial and error.

## ***IJburg, being a new quarter of Amsterdam, had to be lively and bustling***

### **Urban atmosphere**

Waterbuurt ('water quarter') is situated immediately behind the Enneüs Heerma Bridge, an important connection between IJburg and the rest of Amsterdam. When the plans for IJburg began to take their final form in the early nineteen nineties, it soon became clear that water and buildings would together determine the atmosphere of the area. The large housing shortage asked for a high building

density, and, since IJburg is a district of Amsterdam, the area had to be lively and bustling. The wide boulevard, with a tram line in the middle, coming straight from the Enneüs Heerma Bridge, fits in with this character. On this boulevard – named IJburglaan – we find shops, offices and bars,

***Waterbuurt West compares to the Jordaan when it comes to the number of houses per hectare***

in addition to houses. The experimental Steigereiland is IJburg's frontpiece: an outpost before the visitor reaches the much larger islands that lie behind. There are definitely things going on here. Southwest of IJburglaan, on the opposite side of Waterbuurt, private commissions free from regulations regarding the architectural appearance have led to a series of special houses. And to the northeast of this boulevard, in the sheltered inner water that is separated by means of dikes and a set of locks from the wide and sometimes turbulent IJmeer, we find the floating houses of Waterbuurt itself.



Seen from the IJburglaan, this extraordinary quarter is not directly an eye-catcher. The floating houses are hidden behind an elongated residential and commercial building, the Kadegebouw (quay building). The Kadegebouw is architecturally related to the project-based floating homes behind, but is built on a platform up against the quay. According to the original urban design, an apartment building of around thirty metres high, the Sluishuis, would become the eye-catcher upon entering IJburg. As yet, this building will not be constructed. If economic prospects turn for the better, it may come back into view.

Perpendicular to the shore, right behind the Kadegebouw, the jetties with their floating houses lie on the inland water body. These jetties are public and can be accessed through gates under the Kadegebouw. The heads form a diagonal line parallel to the power lines that run above the water, with a pylon right in the middle. Lying on similar jetties at the other side of the water are the floating houses built in private commissions. In total, there are now 93 floating homes, and another 72 will follow, plus a small number of houseboats that are now moored at locations elsewhere in Amsterdam. Waterbuurt West has reached a density of around one hundred houses per hectare, which is comparable to the Jordaan area in the centre of Amsterdam.

In Waterbuurt, there are more forms of maritime living than the floating houses. Three high pile dwellings situated in the water mark the cross bridges between the jetties in the project-based section. Seventeen dike residences built on piles in the water are situated along Haringbuisdijk to the west. And the Kadegebouw is built directly against the shore, with no public street between the facade of the building and the water. All these forms of living derive a special quality from the water, and therefore they belong to IJburg. However, these buildings



*At the left the western part of Waterbuurt, realised on a project base. At the right the eastern part, realised by means of private commissions. (SOURCE: DRO AMSTERDAM)*

demanded less of the ingenuity of designers, developers, governments and suppliers than the floating homes and the jetties on which they lie.

### **Great interest**

The number of preregistrations for the floating houses and the plots of water was explosive. Every house and every plot seemed to be sellable several times, to water sports enthusiasts who want to have their boat moored next to their house, to former houseboat residents returning to Amsterdam, to people who are attracted by the sense of freedom that comes with living on the water. Another part of the interested parties were people who were just looking for a nice single-family house or a plot free of regulations regarding the architectural appearance, whether on land or on water. During the sales

procedure, the U.S. bank Lehman Brothers went down, marking the beginning of a global financial crisis. The private plots had already been raffled and issued, but many candidates of the project-based houses had to retreat. Nevertheless, interest remained so great that it took little time before all houses were sold to their future residents. In an age where every city is looking for varied and distinc-

tive living environments, in which quality of living is a factor of significance with regard to economic development, this is an important signal. Living on the water, in a proper house rather than a houseboat, meets a need. Also in a distinctly urban setting such as IJburg.



*2006, before the building started*

# A MARITIME LIVING ENVIRONMENT

## 2

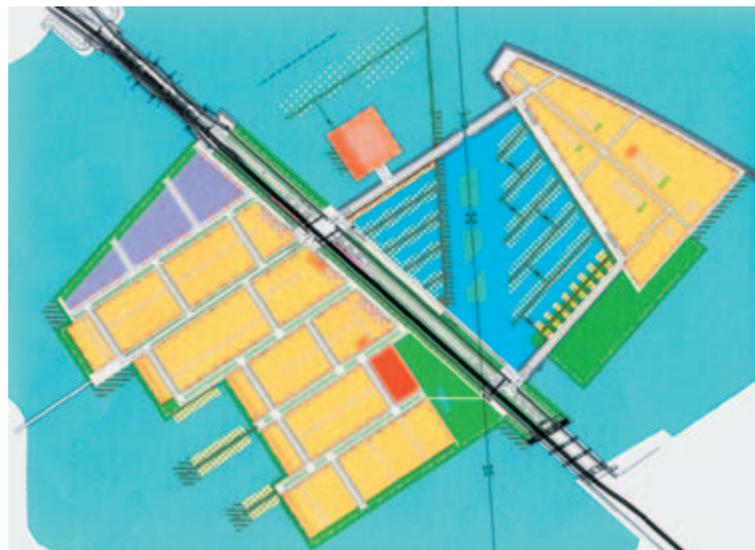
### THE DESIGN

Together with two stone dikes, the islands of Steigereiland collectively create a neatly defined area, a square of water in the city. The power line, that has a construction-free zone of fifty meters on both sides in this area, crosses through as a fifth line. Together, they divide the area into two triangular compartments for the floating houses. This concept can already be recognised in the urban development plan of the Amsterdam Dienst Ruimtelijke Ordening (Planning Division) in 1999. This plan formed the basis for a development competition. Respecting the terms and conditions stated in the plan, developers and housing corporations were invited to make a proposal for the design and the exploitation of the western triangle. The municipality took care of the development of the eastern triangle with its private water plots.

#### Development competition

The result of the competition followed in 2001. The winning proposal came from project developer Arthur van der Vegt (Woodstone & Sparkey bv), in collaboration with Andries Laane of Villanova Architecten. This entry stood out in terms of the design of the jetties, in which all cables and pipes were hidden beneath the surface area, and the innovation of connected floating houses. As a result of this, houses could consist of three storeys and still have a normal width, or even narrower than the floating houses known hitherto, without the houses tipping beyond the safe level because of the rippling water. In addition to this, the houses were posi-

tioned towards the jetty with their narrow side, resulting in a better view of the water and giving the possibility of building more houses per jetty. In short, the entry of Woodstone & Sparkey offered a high building density and affordable rental homes, in a living environment that makes the most of the extra quality offered by living on the water. In the entry, this environment is described as 'the view, the movement, the boat, the sense of romance, the jetties, the sense of individuality, the wind and the clouds, the space, the contact with the elements, feeding the swans from the kitchen, ice-skating around the house'.



*Urban Development Plan of the Amsterdam Planning Division in 2000, part of the schedule of requirements of the development competition. (SOURCE: DRO AMSTERDAM)*



(SOURCE VISUALIZATION: ARCHITECTUURPRODUCTIES BV)

### Programme Waterbuurt according to final urban design plan

- 165 floating houses
  - 55 project-based houses in 3 types:
    - 13 Vancouver (solo); residential space 156 square metres, owner-occupied
    - 24 Sydney (duo) 107 sq. m., owner-occupied
    - 18 Seattle (trio) 100 sq. m., free sector rental
  - 110 private plots, 38 built, rest will follow
- 7 dike houses (128 sq.m.), owner-occupied
- 3 pile dwellings (112 sq.m.), owner-occupied
- Kadegebouw with 83 apartments (owner-occupied/social rental), 13 office spaces and a car park also intended for residents of the floating houses



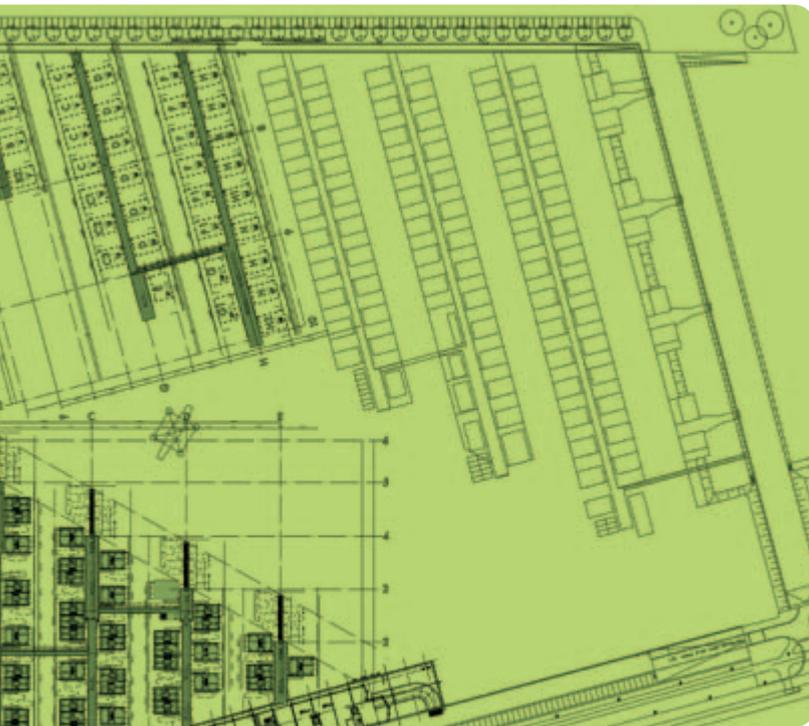
After Woodstone & Sparkey was granted the commission, the company formed a syndicate with developer Monteflore Vastgoed bv and housing corporation Eigen Haard: Ontwikkelingscombinatie Waterbuurt West. Villanova remained involved in the urban design and the development of the jetties. Architectural firms Architectenbureau Marlies Rohmer and Dok Architecten (Liesbeth van der Pol) were called in for the architectural elaboration. Shortly after this, all parties involved met in the Olympic Stadium: developers, designers, representatives of the municipality, and the quality team (a team of external experts that advises on the spatial quality of IJburg). During this meeting, the parties were able to agree on a number of issues that had not been addressed in the competition, but about which the authors already had certain ideas, such as the accessibility of the plots via the water, park-

## **Buildings on the quay serve at the same time as sound barrier and car park**

ing solutions, and the nature of the development along the banks. After this, Villanova could make the final urban design for Waterbuurt.

### **Variation in house types**

The participants of the session in the stadium found each other in a number of adjustments. The variety of house types was increased. Between the floating low-rise buildings, three higher pile dwellings appeared, and the floating houses along the docks were replaced by land-based buildings: the dike houses and the Kadegebouw. Dok Architecten set out to design the Kadegebouw, Architectenbureau Marlies Rohmer took care of the other houses. In itself, it was a logical ambition to have the land-bound houses float as well. All traffic by car and tram between the old town and IJburg would be passing by the floating homes. The eye-catcher would then be complete. But it was exactly these cars and trams that made the ambition unrealistic. The buildings along the quay have to serve as a sound barrier for the houses behind. As such, a large, continuous volume is needed, too big to be constructed on floating platforms and too solid to benefit from the added value of building on water. The jetties in the



*Final urban design plan for Waterbuurt West.*

(SOURCE: VILLANOVA ARCHITECTEN)



*The Kadegebouw (Quay Building) and the jetties before the floating homes were entered.*

western part are now accessible through arches in the Kadegebouw. These also serve as lines of sight between the jetties and IJburglaan. The entrances are specifically designed as arches instead of alleys, since that way they could be wider without cancelling out the acoustic effects.

### **Constructed parking facilities**

By building the Kadegebouw on a platform against the shore, additional space could be realised. This created space for facilities for which there was no room on the jetties. Residents of Waterbuurt West can use the car park and the bicycle sheds in the Kadegebouw, as well as the garbage containers on the quay. Residents of the eastern part can park in

the residential blocks situated at Brigantijnkade. Thanks to this, a major problem that came with the design could be solved. Open parking spaces on the banks, the alternative to a car park, would be a dominant presence in the public space and would disturb the view to and from the water.

### **Network of jetties**

The pattern of jetties has been adjusted in the final design as well. The traverse jetty that was to connect the heads of the jetties in the original design of Waterbuurt West was intended to prevent the jetties from becoming dead-end. Residents and visitors would be able to stroll around the floating neighbourhood, and possible obstructions on the jetties would not constitute unsurpassable obstacles. However, the traverse jetty would make the individual plots inaccessible to larger boats. This would lead to

problems, both during the transport of the houses and the dredging procedures that have to take place every twenty years or so. In addition to this, a traverse jetty would visually close off the residential water from the open water, whilst it is precisely this open water that is one of the great qualities of living on the water. And so, instead of the traverse jetty, bridges have been constructed between the jetties at various locations, following the pattern that had already been designed for the private plots at the opposite side. As such, a network of strolling routes still emerged. The bridges are opened incidentally, for instance when a house is entered.

The public space lives and breathes water. In the choice of materials, in the design and in its character. And also in its use: thanks to the berths next to the houses and the public landing stages at the heads of the jetties, a great number of barges,

yachts, and other private boats can be seen on the water. The jetties are accessible by foot to everyone who wants, even though they make up a mental barrier for those who have no business coming there, thanks to their design. They are three metres wide, and are provided with railings and aluminium surfaces. Cars cannot access the jetties, and they are not intended for cycling. The step from the dock onto the jetty therefore feels like a step from land into the maritime world. The dikes and quays around the inland water body are of a different character. Even though there is no passing traffic here, they do belong to the mainland and they have a width and a panorama that invite to taking a tour.

### **No vegetation**

According to the municipal designers, plants and trees are not part of an urban-maritime environment. On the jetties, trees and bushes would look out of place, and, given the limited width, would even be dangerous: in case of emergency they would block the escape routes. Trees on the dike are a definite no, since they make maintenance more difficult, and blown-down trees can lead to cracks in the dike. The main green area is made up by IJburg's test island, in the north-eastern corner of Waterbuurt. This park is periodically flooded with water, so it has no high vegetation or buildings on it. In future, vegetation that will increase water quality can be expected here, in the form of floating islands and natural banks of the dams, but the amount of green will remain modest. Not all residents are happy about this. Some of them have solved this issue by creating a floating garden next to their home, at the spot where other people have a terrace or a boat.

### **Sight lines across the water**

The network of jetties forms the basis of the quarter. To the east, where architectural diversity is high thanks to private commissioning, the plots





*Dike houses*

have great regularity. Only at the head, there are a number of plots that are placed diagonally to the main direction. Residents could disturb this order if they decide not to use the maximum building area in their plot. Towards the west, architecture is more uniform but the rhythm of the plots is more informal. This section contains free-standing houses, houses connected two by two, and rental houses that are linked in groups of three, plus the pile dwellings as high landmarks. Nevertheless, the allotment is not random. The plots have been designed in such a way that as many houses as possible have a view on the water from both the front and the rear facade. The various open spaces between the houses offer a view over the water from the jetties. All three pile dwelling are situated at the head of a cross bridge. From a distance, they underline the walking routes through this part of Waterbuurt.

### **Architectural style**

Architect Marlies Rohmer gave the project-based houses a “no-nonsense design, basic, referring to the

water world, and comfortable at the same time”. A “hybrid”. The building materials are light in colour. Front and rear are white, with lots of glass and synthetic profiles that look like steel. Synthetic laths line the closed walls at the sides, softening the metal look with their white and brown shades. The buyers had a lot of choice with regard to the completion of the house, both for the inside lay-out and the exterior. Some have opted for a walkway around the house, others have chosen a terrace or a veranda.

The image in the eastern part, where every resident could design his own house, is colourful. Tautly designed houses float next to cosy wooden specimens, and attention-grabbers such as a sky-blue house contrast brotherly with functional down-to-

## ***Almost all homes in West have a view on the water from the front and the rear side***





### **Building envelope Waterbuurt East**

Width: 7 metres

Length: 10 metres

Height above water: 7.5 metres

Depth under water: 1.5 metres

Third storey: 50% of the maximum surface

Minimum of 20% of the plot has to remain open water, so cannot be used for a garden or terrace

earth designs. Floating gardens and terraces are more numerous than in the west. Sometimes a shed is placed on it, or the base on which the annexe floats is turned into a cellar. The main reason for unity is the fact that the vast majority of residents have used the entire 'building envelope', the outer limits of the dimensions of the building plot. And so, despite varied architecture, a distinctive typology has been created: a square form, the living area on the second floor around one metre above the water, and a third storey where half the surface has been saved for a roof terrace.



## *We have called it La Scalota Grigia*

“The opportunity to buy this house came unexpectedly. The previous candidate failed to organise finances, so we dived in. Some things you just do, like booking a holiday to Turkey. This was something comparable. Here, we have an ideal combination: the ultimate freedom of the water, a comfortable and detached owner-occupied house, and the city centre only fifteen minutes away. The only things we miss are a garden and storage space. Our jetty has a common bicycle shed in the Kadegebouw, but this is not very spacious.

We like having a social lifestyle. When we just moved here, we sat outside enjoying a glass of wine. That attracted neighbours. By now, we occasionally organise a neighbourhood party at the head of the dock where the jetty is extra wide. We put up a party tent or gather wood and make a fire. Our jetty is the only one with its own Facebook group, where we inform people that there are free seats for dinner. We always have five or six extra people checking in.

It is a nice neighbourhood, but it only works if you think about the other residents. We live closely together. You do not want to have a screaming family living right behind you. Water carries sound; you can hear a mumbling coot at fifty metres from your bedroom. If there is a party across in the private-built section, we can follow the conversations almost literally. Usually, the parties break up at the decent hour of one in the morning.

For some time, we have had to deal with a derailed family living in the Kadegebouw. The children would sit on the boats, screaming loudly, throwing eggs. We would take a detour around the jetties to reach our home. They received a prohibition to enter the landing, and the problem was solved. Nevertheless, we are vulnerable here. All goes well as long as the social contacts run smoothly.

You have two different species of people here: those who like the quiet and the space of the water and who attach to their individuality, and the pioneers that enjoy a life of partying and fancy boats. We have seen yachts sailing in that could have been moored in Saint-Tropez. But we live together in harmony.

When we registered our floating home in the ship's register, we were allowed to give it a name. We have called it La Scalota Grigia – Italian for The Grey Box. As soon as a house sails in and passes the set of locks, a miracle takes place. It suddenly becomes immovable property. First and foremost, this is apparent when it comes to leasehold. A thing that does worry us is the maintenance of the jetty. Panels are loose and weeds are sprouting up at the Kadegebouw. Bicycles and potted plants are not allowed on the jetties, but there is no one to monitor this. This is a real shame. A large project like this is not finished as soon as it is completed.



*Willem and Janu*

It took us fifteen months before we finally moved here. We have made a lot of modifications. Initially, not a lot was possible, but at a later stage we had more freedom. For instance, our living room is situated at the top, where we have the best view. We have a small built-in pantry there. We had to indicate everything in advance and in minute detail: where we wanted the piano and the closets to go, how many square metres of tiles we needed. This allowed the contractor to calculate the thickness of the walls in order to keep the houseboat level. Sometimes, it tilts when we move no more than a bookcase. We notice this when drawers open by themselves or when shower water fails to run away. This can be corrected by the balance tanks under the water. Divers can have water running in or out of them.

The wonderful thing about this place is the intense way of living with the seasons. The typical Dutch scenes in winter, when the house is frozen in. The merriment in summer. The gusts of wind are very noticeable, with the houseboat moving slowly to and fro, like when one enters the port of Harwich by ferry. The power line gives a kind of ringing tone in case of stormy weather, giving a truly Nova Zembla feeling."

# FROM QUAYSIDE TO RESIDENCE

## THE JETTIES

The jetties turned out to ask for even more inventiveness and patience than the floating houses themselves, for which some experience had already been gained elsewhere in the country. Constantly, new parties came into view, all with new demands and proposals. Take, for example, the architect, who has designed a fine form of lighting. This has been neatly concealed underneath the railing, since lamp posts would look rather out of place on a jetty. This lightning technique gives a great low light, allowing

the stars to remain visible at night, according to Vilanova Architecten who have designed the jetties. However, the police will only give a seal of sustainable security if the light sufficiently shines upwards. Only then, the faces of passing pedestrians are sufficiently recognisable. A quick field research demonstrated that the reflection on the walking surface was sufficient. After this, the foremen from the municipality came into view, proposing to go back to the idea of lamp posts. This would speed up the





process, falls within budget and keeps maintenance easy. In the end, the parties have found each other in led lighting under the railing, with fittings that are easily accessible and that have a long maintenance cycle. Similar processes took place with regard to other issues. The jetties are important for the maritime atmosphere in Waterbuurt. They have a modest design, not to distract the attention from the water, and have been designed with great care. This becomes definitely apparent from the resulting

***The jetties are marked as public space, since Waterbuurt was not to become a gated community***

jetties, even though the elegance of the first drawings has not entirely been reached.

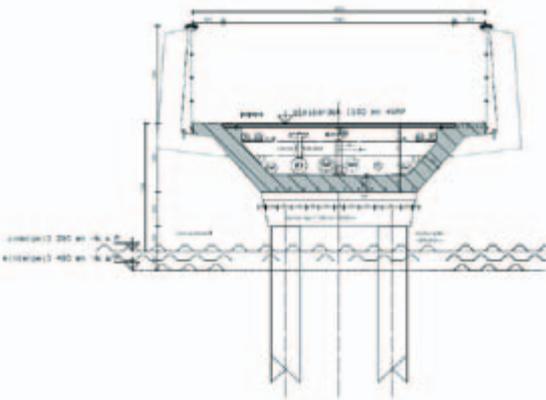
### **The jetties are public**

The jetties form the connection between the shore and the house, not only for people, but also for all kinds of cables and pipes that lie in a concrete base under the walking surface. The jetties have been developed by the Ontwikkelingscombinatie Waterbuurt West, in commission of the municipality of Amsterdam. This way, they would connect optimally to the project-based houses. In the end, they were also used in the eastern part. Following European standards, the municipality of Amsterdam put out to tender. The municipality could have saved itself a lot of trouble and effort by not labelling the jetties as public space. A lot less organisations are involved and have a say in the development of private spaces. But Waterbuurt was not to become a gated commu-

nity, accessible only to authorised persons. Moreover, a lot of the complications would have arisen anyway, but would have become the problem of the residents themselves. In Waterbuurt East, the residents of the private plots would have had to form a group in order for the jetties to be developed. In West too, a Home Owners' Association would be necessary for the management of the jetties.

### Design

The jetties have a minimalist design, not to distract the attention from the water. They stand on slender legs in the inland water. The construction was designed in such a way that it requires few poles, and the concrete tank for the cables and pipes is not visible from the walking surface. The jetties are no more than three metres wide. The dead-end parts are two metres wider. These are the minimum dimensions the fire brigade requires for safe evacuation. There is a metre between the jetty and the facade of the adjacent houses on both sides. This way, the water remains prominently present in the public space, despite the high building density.



*Cross-section of the three-meter-wide jetty.*

(SOURCE: VILLANOVA ARCHITECTEN)

The cross bridges that connect the jetties are only a metre and a half wide. Their height is equal to the minimum height of the bridges in the Amsterdam canal belt. Boats, rafts and other small vessels can pass underneath. In case of dredging work and the mooring of new houses the bridges have to be opened. This requires a bridge keeper who operates the bridges manually. Pleasure boats can moor on the public landing stages on the heads of the jetties in Waterbuurt West.

## ***Entering the aluminium jetty deck is an experience in itself***

### Railings

A railing is indispensable with a width of three meters. This is not the case in a marina, but in a residential area, it is. Jetties have to be accessible under all weather conditions, and children should be able to run and play safely and without supervision. In case of emergency, there is aid in the form of lifebuoys (that add to the maritime atmosphere anyway) and steps leading out of the water. In the eastern part, the railing is not extended to the head of the jetty, in order to keep the view on the water as open as possible. However, residents feared that sooner or later people would end up in the water. At their request, a temporary fence was put up here. This may in future be replaced by a proper railing, but there are also ideas to turn the heads into public landing stages, like on the other side.

For each house, the railing is interrupted over a distance of around one metre in order to provide access to the entrance. This was no problem in the western



part, but in the eastern part, this led to a difficulty. Since these residents were free in their architecture, they were also free in the choice of the location of the entrance. Arrangements with the contractor left no room for additional construction or cutting of elements. In addition to this, every entrance is flanked by a meter box, which already had to be put in place during the construction of the jetty. These residents had to indicate the location of the entrance early in the process, and could not change this at a later stage.

### **Walking surface**

The base of the jetties is made of concrete and its surfaces are aluminium. The selected type of alu-

minium is low in maintenance and does not become slippery in case of rain, thanks to perforation. These are two advantages over wood, the material that was initially selected for the surfaces. The light reflection in the silver-grey metal gives the jetties an industrial character that goes well with urban water. Entering the aluminium is an experience in itself, as it is not only physically but also mentally a clear step from the mainland to the maritime world. The aluminium panels are removable, allowing the cables and pipes in the concrete tank to be accessible from above for repair and maintenance work. The space between the railings is free of obstacles, so no flower boxes, benches, bicycle racks or other street furniture can be found here. All facilities that could not be put under the surface,

like lighting and meter boxes, have been integrated in the railings. Everything that blocks the walking surface could interfere with work on the cables and pipes and is prohibited by the fire brigade.

### **Cables and pipes**

Utility services were hesitant in advance. They are used to putting their pipes underground and could not oversee the complications of working in a concrete jetty tank. In the so-called cables and pipes meeting, a regular meeting where the representatives of dozens of organisations coordinate their work, it was suggested to make the connections at

the beginning of the jetty. This way, the developer and the residents would be responsible for everything that runs under the jetties. This wish clashed with the municipal premise for the jetties to be public. The utility services agreed after the municipality promised to take care of a special fixing system in the concrete base: a kind of rail to which the cables and pipes could be attached, as a result of which they do not lie freely, whilst leaving enough space for maintenance work. Laying the cables and pipes was only a small effort now, smaller than digging a trench in the ground first.

Meter boxes are incorporated in the railings at every house entrance. All utility services had to



*The broadened head of the jetty with a heat resistant glass panel in the middle.*

agree, because a standard meter box is over twice as high. Because the jetty is fixed and the house moves up and down with the water level, the cables behind the box have to be flexible. This part of the cables comes at the expense and responsibility of the home owner, because the obligations of the utility services stop at the meter box (which also holds the mains for drinking water). A similar construction is applied for the sewer: the common pipe is fixed, and the flexible connection is of the home owner's responsibility. The private builders in the eastern part of Waterbuurt all installed their own pump to squeeze their waste water to the common pipe. It soon turned out that the capacity of the pumps diverged strongly. The lightest pumps offered insufficient resistance to the pressure of the common discharge pipe, allowing waste water to seep in instead of being removed. It turned out that a minimum

## ***When the water pipes get too warm, a draining pipe automatically opens***

pump capacity had to be part of the technical building requirements for private builders. The fact that not everyone is accustomed to take care of their own sewer connection became apparent when Waternet received a complaint during the first colder winter weeks. Only a small number of houses were occupied at that time. In one of them, the drains were clogged. Inspection revealed that the public sewer was perfectly in order but the private connection was not, lying in the ice, without isolation, completely frozen.

All cables and pipes now run under the surface of the jetty: gas, electricity, water pipes for drinking

water, fire fighting and sewerage, telecommunication and cable television. The only thing missing is district heating. Pipes used for this are warm and have a thick insulation coat. This would lead to problems for the flexible connection between jetty and residence. As a result, the residents of the floating houses and the pile dwellings are the only occupants of IJburg that heat their homes with gas and cook on gas – all other residents of IJburg are connected to district heating and have electric cooking.

Special provisions were needed for the water pipes. They may not freeze, and drinking water must not become too warm because of the risk of contamination with the deadly Legionella bacteria. To avoid freezing, a specific technique is used that is also employed in car parks: a ribbon around the pipe that heats up as soon as a thermostat indicates that the temperature is dropping below zero. The remedy against warming up was less obvious. It was found in a flushing mechanism: if the thermometers indicate a temperature that is too high, a draining pipe automatically opens at the open end of the jetty. As a result, the drinking water will flow, cooling the pipe.

### **Fire security**

The Amsterdam fire brigade extinguishes only with drinking-water. This turns the seemingly easy task of extinguishing a fire in a floating house into a complicated matter. In addition to this, residents and visitors must be able to escape without having to jump into the water. For little children and other people without a swimming certificate, jumping into the water could be lethal. Escape opportunities and accessibility to the fire brigade ask for special requirements regarding the design of the jetties.

Length and width follow the rules of fire security. At three metres, the jetty is wide enough for advancing fire fighters and people fleeing in the opposite

direction. The cross bridges provide an alternative route for people escaping. At the heads of the jetties, behind the bridges, there is no such alternative route. This explains why the jetties are wide at the heads and have a glass panel in the middle. If heat and smoke are so very severe that the affected property cannot be passed in a normal way, people can find their way out crawling behind the panel, which is heat resistant enough to protect people passing.

The fire brigade can come up to the quay by car and has to proceed by foot, with all their extinguishing gear and safety equipment. This can only be done over a distance of up to two hundred metres, and this is the reason why the jetties are no longer than this. However, this is too long a distance for a normal hose to be connected to a pump at the quay. Therefore, a dry hose runs underneath the jetties,

## **Extinguishing a fire in a floating house may look simple but requires a complex protocol**

next to all other cables and pipes of the utility services. In case of fire, the fire brigade places a pump wagon on the mainland in order to fill the dry hose with drinking water. Each jetty has a number of points where a fire hose can be connected. In addition to this, the fire brigade also demanded a cart on each jetty, in order to transport the fire hose and other materials to the burning house. All in all, it has become a rather complicated protocol that deviates from normal procedures, and perhaps clashes with the instinct of auxiliary services.



*The entry of the middle rental houses: a staircase of which the steps hinge on two sides.*

## **Complications during execution**

The construction of the jetties took considerably longer than expected. After the construction was granted, the selected contractor calculated the selected specifications, a procedure that is not unusual in itself. However, the number of points for improvement was unusually high. On all of these points, a justified decision had to be reached by the municipality as commissioner, together with the architect, the constructor and the Ontwikkelingscombinatie Waterbuurt West. Second opinions came both from the client's side and the contractor's side, contradicting each other on various points. In the end, a number of suggestions turned out to be appropriate, but a large number were attributable to the assumption that a jetty had to be able to carry a car and had to be able to resist a collision with a

large river-vessel. Both of these assumptions are not applicable.

This process of calculation and recalculation was very time-consuming. As long as a jetty is not constructed, a plot of water cannot be handed over and put into use. This had major consequences for the buyers, in particular for the owners of the private plots. They had to wait a year and a half longer than was originally intended. In the meantime, the first houses left the dry docks of the manufacturers, the buyers of the old houses arrived with their moving vans, and the banks set off to study the dissolving conditions in the mortgage contracts. The municipality has tried to come up with a suitable solution for all buyers that were duped by the delay. A number of floating houses have been attached to the shore with temporary piping and cables. However, it goes without saying that the buyers would have preferred to move into their own plot of water straight away.

### **Entrance boards**

The project-based houses lie at a distance of one metre from the jetty. An entrance board is needed to bridge this gap. This entrance board has to absorb the fluctuations in the water level, a difference of sixty centimetres between the highest and lowest level. What goes for all other aspects of living in Waterbuurt goes for the entrance boards too: in a floating neighbourhood like this, there is more to it than in the case of a houseboat moored at a pier or a shore. The Building Act states a maximum slope angle to secure access for disabled persons. A difference in water level of up to sixty centimetres and a distance of one metre between the jetty and the facade of the house creates an angle of inclination that is too big.

In the western part of Waterbuurt, the design of the entrance board has been integrated with the house.

Most of the houses have their entrance at the side of the house. Not only does the facade remain available for windows and, therefore, for views, the entrance board is also longer, allowing the angle of inclination to fall within the statutory range. However, this was not the case for the rental houses, which are connected in groups of three. The middle residence can only be reached via the front of the house. An ingenious construction has been designed to solve this problem: a special staircase of which the steps hinge on two sides. At an average water level, the staircase has only a slight angle, at an extreme level, the angle is steeper. Since it is not a barrier-free entrance, this solution asked for an exemption from the Building Act.

### ***The entrance board has to absorb the fluctuations of the water level***

The private commissioners could not simply use a standard entrance board from a trade in ship supplies. These entrance boards stick out a little over the edge of the jetty, and thus form an obstacle on the walking surface. Fire safety regulations and the accessibility of pipes and cables for maintenance do not allow such obstacles. Not all residents were aware of this. Many of them have eventually opted for a simple step that moves along with the level of the water, even though this makes the houses not accessible to visitors who are bound to a wheelchair.

# A CLEAN AND SHELTERED INNER LAKE

## WATER MANAGEMENT

On the inner lake of Waterbuurt, you will only very rarely find a plastic bag, PET-bottle or chocolate wrapper floating in the water. Residents tend to show great responsibility and discipline. This is essential, considering the lake is part of a small water circuit. Pollution cannot flow away and polluted water cannot easily be thinned out. Not all residents are aware of the fact that the maximum sizes stated in the building envelope are related to water quality as well. Not everyone realises that problems can arise with regard to water management if the house lies too deep or if more than twenty per cent of the open water on the plot is covered by a floating terrace.

### Small water level differences

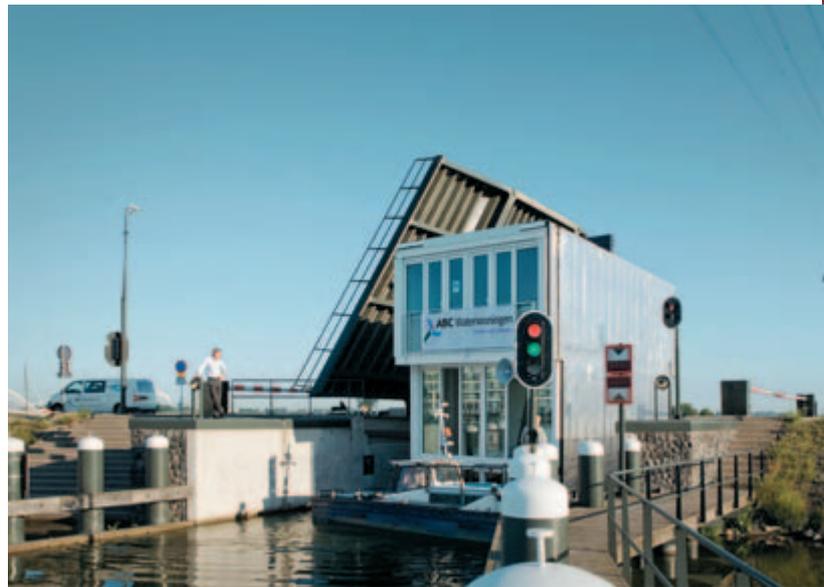
The inner lake of Waterbuurt entirely consists of almost still, isolated surface water. It collects the rain water of the whole of Steigereiland. As a result, the water, and all pollution it collects underway, does not flow directly into the IJmeer. This was an essential requirement of the state government for the development of IJburg: the water quality in the IJmeer should not suffer from the realisation of IJburg. Because of that, the lake would have been dug out anyway, even without the floating houses. Every island on IJburg has a similar separated area of surface water.

Because the water is separated from the IJmeer, it is sheltered enough for housing. The water level difference of sixty centimetres can be fully explained by precipitation and evaporation. The IJmeer itself

knows much larger level differences. Besides, together with the Markermeer, the IJmeer has such a large water surface that weather influences can be vehement. Without a set of locks, a storm could push up or clear out the inner lake.

### Water quality

Still, isolated water quickly becomes turbid. It provides an excellent habitat for algae, including the toxic blue-green algae. The Kadegebouw and the dike houses, intended to ward off traffic noise, also shield from wind and sunlight. This makes the water quality even more vulnerable. This problem



*The set of locks which separates the inner lake from the IJmeer.*



***Without a set of locks,  
a storm could push up or  
clear out the inner lake***

has been acknowledged from the beginning of the planning process. Waternet, the agent that is in charge of water management on behalf of the municipality of Amsterdam and the district water board of Amstel, Gooi and Vecht, formulated twenty possible measures to maintain a good water quality. Three of these measures have been selected. They have not yet been implemented. The idea is to introduce them during the next couple of years. Twenty to thirty propellers, to be affixed under the jetties,

put the water in motion. The banks of the dams in the north and the south have a nature-friendly design, and there will be a number of floating, green islands (floatlands) in the water. This vegetation extracts food from the water, as a result of which algae are less likely to grow. This way, the water should remain clear and clean enough to make it an enjoyable environment for living and recreation. The exact effects cannot be calculated in advance. If they turn out to be disappointing, Waternet can implement additional measures to increase the water quality.

Thanks to the minimum free water area of twenty per cent per plot, enough sunlight reaches the water

## ***There is an annual deposit of one to two centimetres of sludge***

everywhere. This is important for the growth of aquatic plants that help purify the water. Both from the point of view of urban planning and water management, it is not desirable that the twenty per cent of open water is used for a terrace or another floating platform. Nevertheless, this does happen, mainly in the part with the private plots. Strict





enforcement is not yet possible. Dienst Milieu- en Bouwtoezicht (the Environmental and Building Department) checks whether the zoning plan is respected, and Waternet checks navigation in the Amsterdam waterways. It is not always clear which of the two is responsible if too much water is covered up. It depends on the nature of the floating platform. Is it, in a legal sense, a part of the house or a separate vessel?

### **Pollution**

Every now and then, an occasional paper napkin or sandwich wrapper is blown off a roof terrace and ends up in the water. However, throwing waste into the water is not a custom in Waterbuurt. People who live on the water know better than that. The pollution issue is set in a different light when it comes to the maintenance of the house. In this case, it is not only about objects in the water, but also of materials, such as paint residue, chemicals and building waste. They would have to decompose in the lake itself, which takes a long time. Shipping a floating house to a yard is not an option. Dismantling and emptying the house would be a huge operation. If there is no terrace or platform, you will always need a pontoon or other construction on the water. This construction would have to be suitable for waste handling on the spot. Part of this problem can be dealt with during construction by using materials that need little maintenance. For instance, the plas-

tic profiles and laths employed in the project-based houses do not have to be painted.

For the same reason, the municipality does not scatter salt on the jetties in case of snow or glaze ice. The salt would eventually end up in the surface water. Fortunately, the jetties have a railing on both sides for sliding passengers to hold on to. This is an advantage over ordinary residential streets.

### **Maintenance under water**

At the bottom of the lake there is a deposit of sludge. With one or two centimetres per year, this can add up to a thick layer. The main reason for the floating houses to have a depth of a maximum of a meter and a half is that there should remain enough space between the concrete foundation and the bottom of the lake. If this is not the case, the house could get stuck in the mud when the water is low.

Water manager Waternet periodically dredges away the sludge. This is an agreement that was made during the planning process, and for which residents are probably grateful, as there are also examples in the Netherlands where residents have to do the dredging work themselves. And this is not an easy task. Machinery that pumps away sludge from under the house does exist, but are not common amongst Dutch organisations in charge of water management. Houseboats are usually moved if the bottom of the water has to be cleaned. In Amsterdam, it takes a dredging team an entire day to clear out a single berth. The temporary removal of a floating house is not an option, and the pile dwellings cannot be moved altogether. The first dredging operation will take place around 2030. The dredging industry in the Netherlands is rapidly developing, so it can be expected that the possibilities to suck away sludge from under ships and buildings will be improved by then.

AART KOEMAN (WATERBUURT OOST)

## *I am a real water person*

“It is a marvellous sight, every time a new house sails in. Everybody goes outside and stands on the quay to watch how a new ark passes the open bridge and is moored at its final destination. Such a spectacle lasts one to two hours. In my case, it took a while before the house could be put at the right spot. A tugboat was working on the water, and on the jetty there was a group of locals pushing and pulling as well. That was great.

I am a real water person. Swimming, paddling in the water, beautiful. Yesterday, I went wind surfing for a quarter of an hour. And every now and then, we take our sailboat and take off. We do not head for town very often, but our neighbours take their boat to do their shopping at the Landmarkt, the local supermarket offering regional products located along the IJ in Amsterdam North. The combination of the water and the city within reach strongly appeals to us. I used to live in Scheveningen, where you have that same feel. When I cycle home from the bustle of the city, over the bridge and overlooking the IJmeer, I enjoy the sensation of tranquillity.

We live here with the three of us: Simone, our two year old Ties and me. A second child is underway. Ties can go outside without problems: we have put glass partitions around our terrace. On the jetty, we always have him wear a life jacket. This is an absolute necessity. A lot of kids live around here. This is inherent to the neighbourhood, with its abundance of new, spacious houses. With so many children around, I would appreciate a fence along the quay. Evidently, there are more unfenced quays in Amsterdam, but this one is inevitable, there being no other route to the houses.

My mother has a houseboat on Zeeburgereiland, not very far away from here. As a result, I more or less know what it takes to build on the water. On the same day we were selected for a plot, I immediately built a small model. Architect Jos Roodbol turned this into a very pretty design. In the end, it has become completely different than we originally wanted. For instance, we were thinking about having a pergola on the roof terrace and a walkway around the house. It is a boat, so you need a walkway. Our design was assessed three times, but suddenly, we were not allowed to have a walkway. This was very frustrating, especially if you consider that you see a pergola or walkway on other residences. Anyway, all residents have some issues they had to deal with. I think it would be a good idea to attract a legal office working as a sort of mediator. Such an institution could estimate what points allow for flexibility and what points do not. That would be appropriate.

We were allowed to have a floating shed next to our house. We have constructed it ourselves. It is accessible via a staircase at the back. On the roof, we have a terrace. Due to circumstances, we were allowed to con-



*Aart, Ties and Simone*

struct a side entrance that leads from the terrace into the living room. Normally, you are only allowed to build an entrance at the front door. It is convenient though. We tend to walk back and forth a lot. Once, when the wind was northern, a hose siphoned and the shed sank. When we dredged it up, there was an eel swimming in it. The water is loaded with fish here, attracting birds such as cormorants.

We live very comfortably here. We have built a house that is energy-efficient, with most windows facing south, minimising windows overlooking the north. The atmosphere in the neighbourhood is very laid-back. And you get a lot of people just strolling around, especially on nice Sundays. A lot of architects, people with cameras, sometimes a busload of Japanese. It does not bother me in the least. On the contrary, I invited them to come in during construction. To me, they are welcome."

# 5 STABLE AND BALANCED

## BUILDING TECHNIQUES

If floating houses are to become a common sight in the national construction industry, the major construction companies will undoubtedly want to be involved. But for now, most floating homes are constructed in the same dry docks as new houseboats. The specimens found on IJburg are almost all made by manufacturing plants on the shores of the IJsselmeer and the Markermeer. They were then pulled along the water to Amsterdam. The smallest set of locks that had to be passed on the way determined the maximum size of the house. This was the last set of locks on the route, the eight metres wide set of locks that connects the IJmeer to the inner lake of Steigereiland.

Other building techniques are possible as well. One of the houses in Waterbuurt East was designed and built by the owner himself. For another, only the concrete base came from an ark builder, and the building itself was constructed by a regular builder. In theory, it would be possible to build the house on or near the location of the water plot itself, even though this would lead to complicated building logistics. In effect, building waste is not supposed to end up in the water, and the building plot has to be accessible to machines and the supply of building

***Floating houses are built in a manufacturing plant, free from weather conditions***

materials. And why should one build on the plot anyway? The opportunity to build houses in a manufacturing plant, free from frost and other weather conditions, is one of the advantages of this form of construction as opposed to regular construction. It is efficient and less prone to delays. The house could theoretically be transported over land to its final destination, even though special permission would be required because of its large dimensions. Cross-overs and traffic lights could form practically unassailable barriers. Transport over the water, as in IJburg, is cheaper and easier.

Not all construction sites can deliver a proper floating house. For some, the concrete base is simply too big. Others miscalculate the requirements for this kind of real estate, resulting in floating houses that lie too deep or not level. Building inspectors from the municipality of Amsterdam went over to the sites of the ark builders to check the house during construction on these aspects. These aspects were new to the inspectors as well, and asked for additional reading. After the house was moored, another inspection took place at the water plot, this time of the fully furnished property. For the private plots in particular, this led to quite a few corrections.

### **Buoyancy**

A house of one hundred thousand kilos pushes aside exactly one hundred thousand kilos of water. This fact has been known ever since Archimedes thought this out in his bathtub. One hundred thousand kilos



equals one hundred cubic metres. Spread out over a surface of fifty square metres, this leads to a depth of two metres. The house will not sink any deeper. Floating houses do not need to be lighter than land-based homes. Every house would float as soon as it hits the water, that is to say, as long as does not fill up with water. The trick is to keep the house level and stable.

In IJburg, the maximum dimensions somewhat diverge from the calculation sketched above. With a

surface of seventy square metres, the depth is one metre and a half. The maximum weight of the house adds up to a little more than one hundred thousand kilos. The private builders in Waterbuurt East almost all stuck to these dimensions, without the intervention of municipal inspectors, but some did so before having the house decorated and furnished. The weight of furniture and installations quickly adds up to as much as six or seven thousand kilos. This makes the house sink for around ten centimetres deeper into the water. As soon as someone fills the bathtub, another centimetre can be added to this. Residents have overcome excess depth with additional balance tanks on the side of the house. Not a pretty sight, but necessary for the water to flow through and for the occasional dredging of the ground under the house.

The houses in Waterbuurt West are built on a concrete foundation, a so-called caisson. At the ark builder's construction site, this caisson is poured in one single pour, making it free from vulnerable cracks and holes. It can lie in the water for hundreds of years without maintenance. The space inside the caisson, the so-called *sous l'eau* ('under the water'), can be used as part of the house. A lot of residents have turned it into their bedroom floor, since the level is situated one metre and a half below the water, making the view limited. An alternative method is to put Styrofoam (polystyrene)



pontoons under the house, covered in a shell of metal or concrete. The disadvantage of these pontoons is that the space cannot be used as living space, the advantage is that all floors are situated entirely above the water.

### **Balance**

The weight of a floating house must be evenly distributed over the surface area. This applies to the building itself as well as the furnishings and installations inside. If this is not the case, the house would tilt to one side or the other. This is uncomfortable, in extreme situations even unsafe, and, last but not least, a very awkward sight. There are no legal standards regarding balance. Nevertheless, a small deviation of half a degree means a tilted position of a number of centimetres at the roof. In advance, the Ontwikkelingscombinatie had agreed on certain requirements the house had to comply with at completion. Some of the private commissioners failed to live up to them, as a result of which they had to carry out the corrections themselves after completion of the house. In some cases, this was possible by using balance tanks or other forms



of counterbalance, in other cases the house had to go back to the constructor. One house was officially declared inhabitable for some time. This house was lying so tilted that a dangerous situation could occur even on the roof terrace.

### ***A house can get out of balance because of a piano or a Jacuzzi***

Only rarely, houses are furnished symmetrically. The kitchen and the plumbing in particular are of a relatively high weight, because of the use of heavy materials such as ceramics and steel, the large number of pipes, and the small surface areas. In order to achieve a good balance, the ark builder can vary the thickness of the concrete walls of the foundation or the inside walls of the house itself. Big, empty rooms get heavier walls than small rooms with lots of installations and facilities. This had to be calculated for each house individually, not in the least because the buyers of the project-based houses had a lot of freedom in the layout of their home. If



## ***A wooden construction on top of a concrete base gives a low centre of gravity***

degrees is acceptable as long as the distance to the adjacent house remains at least three metres.

To keep the houses in place, they have all been connected to two steel mooring poles, by means of a fixed connection. The construction allows houses to move up and down a couple of decimetres, along with the water level. The mooring poles are positioned in an angle, this giving the greatest stability. They are part of the plot: private commissioners received the building plot including the mooring poles. Their fixed positioning put some into trouble, especially if the perimeter of the house was somewhat deviant. In this case, it was more difficult to moor the house straight.

The project-based houses and a large number of the private houses are made out of timber and have wooden floors. The reason for this is that wood is a

the imbalance is caused by the layout of the house, for instance if the resident decides to put a piano in the corner of the living room, or install a Jacuzzi on the roof terrace, either an external balance tank or an internal counterweight will be needed to restore the balance. Some houses have special provisions for this, such a box under a bed in the *sous l'eau* that can be filled with sand, lead or bottles of water.

### **Stability**

Balance is the degree of tilt in calm weather. Inherent to floating houses is the fact that they sway to and fro in case of heavy wind, regardless of the balance. In the sheltered inland water of Steigereiland, the amount of fluctuation is limited, yet present. Someone who has installed a hanging lamp above the dining table will notice this immediately. There is no legal standard for the accepted degree of instability. However, there is a standard taken up in the NTA (Dutch Technical Agreement) for floating constructions, established in 2011. The NTA is the precursor to the NEN standard (ISO standard) on which many institutions base their rules and regulations. According to this NTA, a tilted position of four





light building material and is not harmful to the water on which it floats. Leachable metals, such as zinc, lead and copper are not allowed to be used, not only because of the pollutants they release as soon as they come into contact with the water, but also because of their weight, which is not suitable for building on water. The wooden structure on a concrete foundation gives the house a low centre of gravity, which promotes stability. A house that is top-heavy would be much more sensitive to storm and heavy weather. For the same reason, it is advisable to put the bathroom on the lowest floor and the kitchen on the entrance level.

The smaller houses in Waterbuurt West are bolted together. This has to do with space, but also with stability. On the whole, larger houses tend to lie

more stable than smaller houses with the same height. The houses, that are connected two-by-two or three-by-three, have a width of 4.5 metres each. For a three storey building, this is not enough to ensure a stable position. Connecting the houses amounts to a tenfold increase in stability. The houses on IJburg all have their own private concrete foundation. They were entered one by one and have been bolted together at the spot – not in the least because this was the only way to pass the set of locks upon entering. The lack of stability of a single small house can cause problems during transport. There is a risk that a newly built house collides with the lock doors and walls. The ark builder working for the Ontwikkelingscombinatie Waterbuurt West had to load the houses with dozens of barrels of water in order to prevent this from happening.

# MOVEABLE OR IMMOVEABLE PROPERTY

## RULES AND REGULATIONS

Floating houses are a nuisance when it comes to rules and regulations. All bureaucracy surrounding construction and financing are based on the assumption that Dutch houses stand firmly on the ground. Only a small minority of homes (mainly trailers and houseboats) are mobile. Special rules apply to them. In the case of floating houses, we are dealing with houses that can theoretically be moved, even though they are clearly not intended to do so. After the necessary preparations, and with the aid of a tug boat, a floating house can be transported to another place. It is not likely that people are intending to do so, but it is possible.

### **Unambiguous choice**

Various institutions have considered the question of whether they could accept a floating house as real estate in the sense of immovable property, such as a regular house, or to regard it as moveable property, comparable to a houseboat. The consequences can be substantial, both for the residents and the government. Other requirements apply regarding construction, tax authorities apply other charges and exemptions, and the banks state other condi-

tions regarding mortgages. Three legal systems are affected: administrative law, fiscal law, and private law. And where one system designates a floating residence as immovable property, another system will not necessarily do so as well.

The developers of the floating houses in IJburg have chosen to consider the houses as immovable property from the start. Such an unambiguous decision limits the insecurity surrounding financial issues and regulations. This decision will then have to be implemented consistently, making the intentions clear to all institutions and agents involved. When it comes to engineering, architecture, sales contracts – it cannot be explicitly enough. It is one of the reasons why IJburg's floating houses are anchored to two mooring poles. They can move up and down the water in accordance with the water level, but cannot leave their spot. Despite these efforts, not all parties are convinced. The floating houses of IJburg are not treated as immovable property in all respects.

### **Requirements regarding construction and architecture**

Waterbuurt is part of the urban development plan of IJburg as a whole. In order to make IJburg succeed as a new part of Amsterdam, there has constantly been a focus on coherent programming, a consistent look, and a logical connection with the surrounding area. The floating houses could be integrated if they were regarded as immovable prop-

***Where one legal system classifies the house as immovable property, the other legal system may not***

erty. This way, the municipality could, by means of the zoning plan, make demands regarding the number of houses and the execution, and – by means of rules regarding the external appearance – the architecture. The eastern part is exempted from rules and regulations regarding the latter.

The National Building Act sets requirements regarding safety, usability and sustainability of new developments. For the construction of a regular house, an environmental permit is required, ensuring the municipality that all planning and technical requirements regarding the construction are met. By considering a floating home as immovable property, they fall under the National Building Act as well. If a floating home was not seen as ‘building’ but as ‘houseboat’, a mooring permit from the municipality would be sufficient to moor and move into it legally. A municipality could go as far as making additional requirements to a mooring permit to make it correspond with the requirements stated in the Building Act, but this would be a very inelegant detour. It requires a separate set of rules for floating houses, which also has its effect on normal houseboats.

## ***Because the floating houses are immovable property they must comply with the Building Act***

The same principle applies to extensions and terraces. As soon as they are attached to the ground, whether or not via the house itself, the government makes certain requirements with regard to urban planning, architecture and technical details. The construction has to fit into the zoning plan. For



extensions and terraces, residents need an exemption from Waternet as the manager of Amsterdam waters, or so it was determined in advance. A problem arose when a resident attached a terrace to the house by means of hinges. The municipal building inspection found that such a terrace, with a fixed connection to the house, had to fit in with the zoning plan. If a terrace is attached only with ropes or chains, this requirement is not necessary. Since then, an exemption from the zoning plan is granted when it comes to fixed terraces, as opposed to an exemption from Waternet in case of a loosely attached terrace, provided they comply with the conditions.

### **Tax charges and exemptions**

The second legal system is that of fiscal right. Owner-residents may deduct mortgage interest from income tax. This regulation also applies to houseboat owners that are moored at a permanent location. The municipality benefits financially from such a status of immovable property, since, in that case, the floating residence falls under the regular tax charge of immovable property tax (OZB). Amsterdam charges houseboats and other mobile residences the same tax amount as proper immovable property (the so-called moveable property tax), but not all municipalities employ such regulations.

Tenants have a financial benefit if they live in social housing, because they are eligible for housing benefit. The status of immovable property gives certainty to this. However, this situation does not occur in Waterbuurt. There is no floating social housing, even though this was initially intended. Tenants in the private sector do not have the advantage of housing benefit. Nevertheless, most of them would opt for a status of immovable property, because whoever rents a proper house has a much stronger legal status when it comes to issues regarding maintenance, rent and termination of the contract than the tenant of a boat.

### **Jurisprudence is not clear**

Disputes within the two previously mentioned legal systems are settled by two different institutions. The Division of the Council of State is the highest court in administrative law. In tax law, this is the Supreme Court. The Council of State uses the definition of 'construction' from the Model for Building Regulations of the Association of Dutch Municipalities (VNG) as its criterion. The definition includes every construction with a static character, resting on the ground or connected to the ground, either directly or indirectly. The static character has to be evident from the absence of a mechanism that



enables transport, such as an engine or a sail, or the actions necessary to detach the construction and move it. A floating houseboat that is attached to the quay with ropes and hooks is already regarded as immovable property. This broad definition provides no problems for floating houses, as they easily fall under it. However, this applies to administrative law only, so in issues regarding licences and exemptions.

## ***Each house has two records in the Land Register. One as a plot and one as a ship***

In January 2010, the Supreme Court passed judgement on a tax issue of a houseboat in Almere. It reached a different conclusion than the Council of State. The Civil Code defines moveable property as ‘buildings and constructions that are permanently united with the ground, either directly or by connection to other constructions or works’ (article 3:3). The Supreme Court interprets this definition as a permanent connection to the shore. A connection to the bottom of the water is not sufficient if the building does not rest on it. The presence of cables and pipes to the shore is not enough.

### **Mortgages**

Agreements between financial institutions and their clients fall under a third legal system, namely private law. For a bank, the question whether a house is permanently connected to the ground is more than a formal question. The house is the collateral for the mortgage. If they see more risk in association with a floating house than with a regu-



lar piece of real estate, they will adjust the mortgage conditions accordingly. There is, for instance, the alleged risk of sinking or lying askew, but also the risk that the collateral has sailed away at the moment the bank wants to reclaim it. As an alternative for the normal mortgage on houses, some banks offer a ship mortgage. Not all banks offer this possibility, and interest rates tend to be higher (yet the term is longer) than those of a normal mortgage. Banks and tax authorities both make their own assessment of whether a loan for a floating house passes for a normal house mortgage or not. The tax authorities may accept the deductibility of interest of a loan that is considered as ship mortgage by a bank and vice versa.

With regard to IJburg, the banks were rather safe than sorry. Inexperience with floating houses gave them reason for extra caution. Still, some banks offer mortgages that are comparable with normal house mortgages, even though they are put together differently. Most mortgages consist of two parts: the part with the plot as collateral, and the part of the ship mortgage for the floating house itself. The consequence of this construction is that the floating homes are recorded twice in the Land Register: the plot as immovable property, and the house – as moveable property - in the ship's register. With regard to this latter registration, the concrete foundation of the houses is marked during construction, as is common in shipbuilding.

### **Need for generic criteria**

The common feature of the definition of immovable property is that the connection to the site is permanent. Houses constructed on piles in the ground are considered as real estate. The same goes for pile dwellings. The fact that the post on which the house rests is above the surface makes no difference. But not all poles are the same. If the poles to keep the house in place are mooring poles, authorities start having doubts, no matter how tightly the house is attached to the pole. This leads to confusion and uncertainty, not in the least for residents. It would be a good thing if the government lays down one generic set of criteria, binding for all authorities and falling within all legal systems, which make the legal status of floating houses unambiguously clear.



BERT HAPPÉ (WATERBUURT OOST)

## *There is a great sense of togetherness*

“In summer we most enjoy living here. We tend to be outside as much as possible. The kids are in the water, and so are we from time to time. Sometimes we organise swimming clubs, swimming around the houses with the neighbours. And we regularly go away by boat, of course. Into town, or in the other direction towards Muiden or Pampus. Severe winters are exciting. You can really hear the ice crack from here. There is a lot of ice-skating, and we have even had a disco on ice. But nothing compares to summer. We have just had a lousy summer. That really gives the feeling of missing out on something.

Sometimes I have the feeling of living in a boys' book. Building rafts to clean the windows, neighbours knocking on the door to borrow my raft, that kind of stuff. You really get to know your neighbours here. There is a great sense of togetherness. During the construction period we already had a resident group on the internet. Everybody is trying to find solutions for the same problems, we all stick up for one another. Not long ago, a motor scooter was stolen from the jetty. The guy who did it fortunately got caught. One of the neighbours then suggested buying air horns that we can use to warn each other in case of emergency. I have one of those now.

Our name came second when the notary raffled the plots. We were simply lucky. We now have a plot at the head of a jetty. We have a view over the water from our kitchen and our terrace. That gives a wonderful sense of freedom. We have even started to consider the power pylon as a work of art. There are now ideas to create berths for day trippers at the head of the jetty. According to the handbook, to which we had to accord our design, these berths would be situated next to the head of the jetty. If it is up to me, they will be situated at their original location.

I have built this house myself, with a design programme on the computer. You see, building is my hobby. After that, we selected an architect for the technical details. You have to, as there is such a lot to it. The depth was a particularly complicated story. Like many others, we were lying deeper than the metre and a half maximum the municipality had stated. They were very strict about this. We have solved it with two tanks on either side of the house, underneath the water. There are water taps on them, which allows us to fill them with water or empty them. We did need a separate building permit for this. That was not easy, since I did not know exactly how things would look in the end.

We are thinking about signing up for a new plot for the second phase of Waterbuurt. That way, we can use our experiences in building this house and apply the solutions we have seen in other houses. I would build



*Monique, Tara, Tessa and Bert*

living areas even closer to the water now. Neighbours have created very pretty rooms with empty spaces and high ceilings. They have really got the most out of the building envelope. That is very nicely done.

The only time we are aware of the disadvantage of a narrow jetty inaccessible to cars is when we get home with our heavy shopping bags. At these occasions, I realise that it is quite a walk home. For heavy loads we have a communal trolley on the dock. In case of moving house? Well, time will tell. When we moved here, we used the pick-up moped from one of our neighbours. We moved the sofa in at the building site of the contractor, and the Jacuzzi was hoisted up to the roof terrace when we passed the set of locks upon entering. It will have to be sawn into pieces to get rid of it, or else we will need a boat with a crane on it.”

# DEVELOPING IN COLLABORATION

## THE COMMISSIONING

The development of Waterbuurt West was an unusual project, but the division of roles was done in a typically Dutch way. The municipality determines the location and the programme, makes the location suitable for building and hands the land over to a corporation or a project developer who executes the project. Unlike most Dutch municipalities, Amsterdam employs a system of leasehold. The ground is and remains municipal property and is leased to the owner of the building on in. The individual commissioning in Waterbuurt East is more exceptional to the Netherlands and to Amsterdam in particular. The interest in this type of housing is growing, but it is not yet commonplace.

### Preparation for building

The main difference with the regular process of area development lies in the preparation of the site. This includes filling up the land, levelling and cleaning up the ground, plus the installation of cables, pipelines and infrastructure. Groundwork was not needed for the houses in Waterbuurt West.

***For all unexpected twists in the building process the developer and the municipality could rely on each other***

The construction of infrastructure went hand in hand with the houses on the land surrounding the inner water. Site preparation was limited to the construction of the mooring poles and the jetties, with all their cables and pipes. This turned out to be a difficult and very costly task, partly due to lack of experience with similar multifunctional jetties.

In other situations, measures may have been necessary to make the water habitable. The water has to be calm, and the risks of collisions with commercial ships have to be minimal. The inner lake of Waterbuurt was a prerequisite, including the set of locks and the dikes. No extra water works were necessary to make the site habitable. If this had been the case, the costs for preparing the site would have risen and would have become very high.

### Public – private partnerships

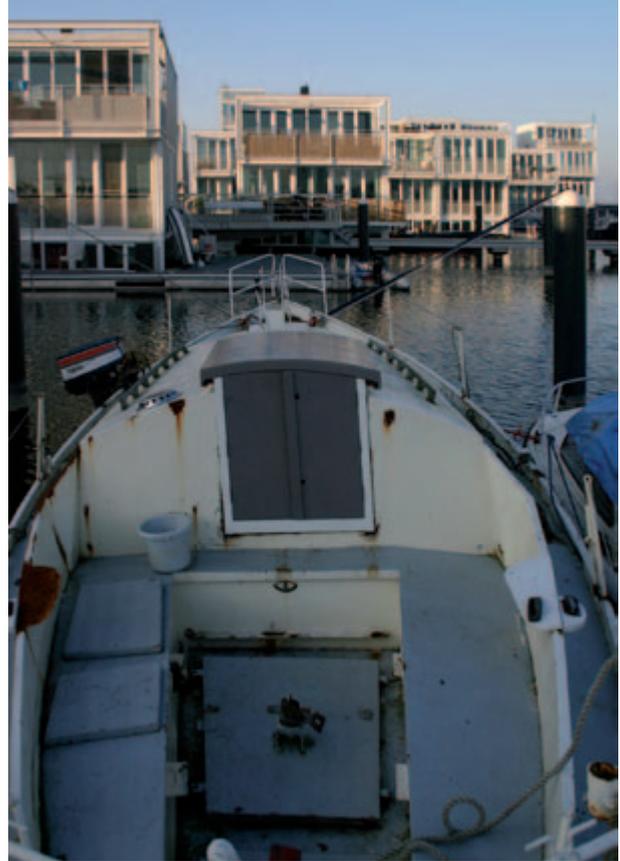
In general, the municipality lays out the public space. The jetties in Waterbuurt West are an exception to this rule. The development of the jetties has been outsourced to the Ontwikkelingscombinatie Waterbuurt West, in order to obtain an optimum connection to the houses. The development took place in close collaboration with municipal engineers. Conversely, the municipality took care of the procurement and financing of the construction of Waterbuurt, the Ontwikkelingscombinatie always remaining closely involved.

The development and construction of the jetties is the best example of the collaboration between the municipality and the private Ontwikkelingscombinatie. That cooperation went even further than that: the two parties also worked together in the areas of urban design and the architecture of the project. For all unexpected twists in the building process, the municipality and the Ontwikkelingscombinatie relied on each other. Mutual trust was essential and a decisive factor in the success of the project. The willingness to work together played a role already during the selection of the developer.

### Construction and land costs

The construction costs per square metre do not differ much from the construction costs for regular houses. The floating houses in Waterbuurt West turned out to be ten per cent more expensive than comparable land-based houses. Advantages are the absence of piles and the fact that the houses can be built in a sheltered environment, free from weather influences. Disadvantages are the additional transport costs after construction and the maximum size that the building technique permits, as a result of which large-scale building was impossible. The ambition to have a number of floating houses in the social sector turned out to be unfeasible. The main reason for this was that the concrete foundation on which the houses float could not be wider than seven metres, for else they could not pass the set of locks during transport. Because of this restriction, the connected rental properties each have their own

***Houseboat dwellers had to get used to the rules, landlubbers to the peculiarities of living on the water***



concrete foundation. If it had been possible to build on larger foundations, more houses could have been connected, and stacked building would have been possible as well. This would have brought social floating houses within reach.

The amount of ground rent depends on the building costs. In general, such a connection exists with regard to price fixing of land sold by the government. The value of the land is basically determined by the revenue of the intended function minus the required investments. Since neither is materially different from regular building, the height of the ground rent is not noticeably different.

### Private commissioning

Professional developers, designers and inspectors had to learn how to deal with the peculiarities of building on the water. The same goes for the private

parties. People who were familiar with the world of houseboats had to get used to stricter rules and regulations, dictated by the Building Act. Not all landlubbers were familiar with the specific features of living on the water. There have been problems with regard to angle, depth, inadequate entrance boards, oversized gardens and terraces, amongst many other things. Not all ark constructors were capable of solving these problems.

Private builders were informed in different ways about the possibilities and requirements. They received a handbook that covered as much as possible, but did not give an answer to all problems that occurred. The municipality had created a helpdesk where the owners of the plots could go if they had additional questions, and issued a newsletter with updates for the handbook and other information. In 2006, the handbook was provided only in print. Because of this, not all plot owners passed the book

on to their architect. This is one of the reasons why some of the houses did not meet all requirements. Besides, the stringency of the prescriptions and suggestions in the handbook was not always clear.

Unclear information on the side of the municipality has occasionally led to misunderstandings. For instance, not everyone was aware of the experimental character of Waterbuurt. Water quality issues turned out to be even more prone to misunderstandings, as the municipality is not in charge of water management and does not possess all knowledge required. Some problems were due to an attitude too indifferent on the side of the residents, who did not always consider the consequences of their actions with regard to, for example, fire safety of water quality. The most extreme case of negligence was the person who bought a plot and only later found out that he had bought a plot of water instead of land.



# BUILDING ON WATER IS POSSIBLE

## IN CONCLUSION

Walking around the jetties of Waterbuurt, feeling the influence of the calm inner lake and looking at the enjoyment of people swimming in the water or relaxing on the roof terraces, one understands that it was all worth the effort. Living on the water is possible, even in high density and in an urban environment. There have been initial problems, sure, but most of them are not visible and will not be necessary the next time.

Next time, people can fall back on previous experiences, for instance when it comes to developing the jetties. This turned out to be as complicated – if not more complicated – as the construction of the houses themselves. They were very costly, but in an urban environment jetties are absolutely indispensable in open water. Piers would have taken up too much space, and if the houses had only been built along the banks, a high density could not have been reached. Every new district will ask for its own design, but thanks to the knowledge gained in IJburg, the specifications can be established more quickly, in more detail and more accurately. Utility companies know better where they stand now, and emergency services can draw upon their experiences.

A lot had yet to be discovered in Waterbuurt. That turned the development into an adventure, with all insecurities and surprises that go with it. The process was one of constant balancing between security and flexibility. Residents demand security on issues such as the public space surrounding their living

environment, whilst the municipality needs flexibility in order to deal with the new experiences during construction and after completion. Conversely, private commissioners ask for flexibility in the requirements for their home, even if this affects aspects on which the municipality wants to offer security, such as water management and cohesion in public spaces. Residents of Waterbuurt feel a strong connection with their environment. They live in a special place and make full use of this. Most of them have explicit ideas about their home and their neighbourhood, also in the western part where the houses were built on a project base, and they claim the space to realise their ideas. Restrictions they do not understand are not easily accepted.

A similar friction between security and innovation exists in the collaboration with utility companies. Probably the most important lesson from experience for similar projects in future is the following: make sure all organisations that play a part in the building process are already involved at an early stage. Let them think about what this special assignment demands of their work process and how the project can stimulate their own innovative capacities. The parties involved in management and maintenance have to be involved from the start as well, particularly when it comes to the costly dredging work under the houses and the management and maintenance of the jetties. This way, additional costs and cost savings become apparent at an early stage and can be processed in the exploitation plan.



In the eastern part of Waterbuurt, the experiment of building on the water went hand in hand with the experiment of private commissioning. Over the last couple of years, quite a lot experience has been gained in this area, but around 2000, when the plans for Steigereiland began to take shape, it was still in its infancy. A clear and complete distribution of information to private builders on the land is a difficult task already, let alone on the water where not all problems and misunderstandings could be foreseen. Take, for instance, the dimensions stated in the building envelope, which were clear and objective in itself, but which still led to a large number of discussions about marginal cases. Detailed, well-explained instructions and a specialised helpdesk are not too great a luxury, and neither are thorough inspections.

The question remains whether the residents on the inner water live in a house or on a boat. In other

words, is the residence immovable property or not. When it comes to comfortable living, the labelling makes no difference, but for the construction and the financing, it does. It would be a good thing if clear criteria were formulated regarding the status of building on water.

The experiment has not only yielded an entirely new floating residential area, but also a lot of knowledge. But building on water is not supposed to remain roaming in the regions of experimentation for years on end. Surprises cannot be excluded. To the contrary, they will almost certainly occur, like they do with the construction of urban areas on land. But the scope of these surprises will be considerably smaller if all expertise and involvement is organised as well as possible from the outset of the project, and if there are fixed standards and criteria to fall back to. That provides certainty and makes the work easier, and therefore quicker for everyone.

## COLOPHON

This is a collective publication of the Ontwikkelingscombinatie Waterbuurt West and Projectbureau IJburg of the Municipality of Amsterdam.

### EDITORIAL

Hugo van Ballegooijen, *Projectbureau IJburg*  
Ton van Namen, *Ontwikkelingscombinatie Waterbuurt West*  
Ingrid Spikmans, *Projectbureau IJburg*  
Arthur van der Vegt, *Ontwikkelingscombinatie Waterbuurt West*

### TEXT

Peter Paul Witsen, *Westerlengte*

### PHOTOGRAPHY

Roos Aldershoff: cover (back)  
Primabeeld/Marcel van der Burg: page 4, 14 (bottom), 26  
Ilse de Jong: page 21, 35 (right), 38  
Luuk Kramer: cover (front), page 6, 13, 15 (2x), 19, 36, 39, 40, 41, 46  
Floris Lok: page 28  
Ton van Namen: page 5, 12, 14 (top), 24, 27, 29, 33 (4x)  
Daniel Nicolas: page 17, 31, 43  
Mirande Phernambucq: page 3  
RoVorm Uitgevers/Pictures from Above: page 8  
Arthur van der Vegt: page 18, 22, 34 (2x), 35 (left), 45, 48

### LAY-OUT

Andre Klijsen, *Villa Y*

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Zwaan Printmedia

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Michelle Reijtenbagh

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Herman Horsman, *Monteflore Vastgoed bv*  
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Marlene Rienstra, *Ontwikkelingsbedrijf Gemeente Amsterdam*  
Marlies Rohmer, *Architectenbureau Marlies Rohmer*  
Marco van Vemden, *Waternet*  
Frans van Vliet, *Ontwikkelingsbedrijf Gemeente Amsterdam*

This publication is primarily intended to inform and inspire future promoters of floating projects.

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## Parties involved

### GOVERNMENTS:

#### *Municipality of Amsterdam:*

- Projectbureau IJburg
- Ontwikkelingsbedrijf Gemeente Amsterdam (Development Department)
- Dienst Ruimtelijke Ordening (Planning Division)
- Ingenieursbureau Amsterdam (Engineering Office)
- Dienst Milieu- en Bouwtoezicht (Environmental and Building Department)
- District Council Amsterdam East (previously Zeeburg)

#### *Water Board Amstel, Gooi and Vecht:*

- Waternet (joint implementing body of municipality and water board)

### DEVELOPERS:

#### *Ontwikkelingscombinatie Waterbuurt West:*

- Waterhuis bv (a collaboration of Monteflore Vastgoed bv and Woodstone & Sparkey bv)
- Housing corporation Eigen Haard

#### *Various private parties*

### DESIGNERS:

- Municipality of Amsterdam, Dienst Ruimtelijke Ordening – urban development concept
- Villanova Architecten – execution urban development West and jetties
- Architectenbureau Marlies Rohmer – dike houses, pile dwellings, floating houses West
- Dok Architecten, Liesbeth van der Pol – Kadegebouw
- Various architects – floating houses East



# FLOATING AMSTERDAM

Municipality of Amsterdam, Projectbureau IJburg  
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