

Before. Enormous clay dikes. The water's not welcome. Windmills spinning. Land reclaimed. The villagers rejoice. Then disaster strikes: 13, 14 January 1916. The Zuiderzee Flood: dikes broken in dozens of places. Then 31 January, 1 February 1953. The North Sea Flood: 1,835 people killed, mostly in Zeeland. The answer: bigger dikes, longer series of sluices, high-tech storm surge barriers. Keep that water out. And it's worked.

For now.
Last month: the 75th anniversary of the completion of the Afsluitdijk—six years of dredging the Zuiderzee for clay and piling it onto a 32-kilometre-long sea barricade. Also last month: the ten-year anniversary of the completion of the massive Delta Works project—nearly 50 years in the making; all vulnerable areas well covered. But waters continue to rise. Tomorrow's answer: let it in.
So what's happening today?

Getting your feet wet
Outside, a light summer rain is falling. Quiet, soft, warm, wet. Inside, phones are ringing, plans are examined, designers are working behind computers and drawing tables. Energy, incentive, buzz. This is Waterstudio.NL, the small cluttered workspace in Rijswijk where architect Koen Olthuis and concept

LIVING ON WATER CAN KEEP US DRY AS NEW TECHNIQUES MERGE WITH OLD. BUT NOTHING BEATS STYROFOAM. DON'T FEAR THE OCEAN, MOVE IN AND SET UP CAMP. IT'S TIME TO MAKE FRIENDS WITH AN OLD FOE.

BY MARK WEDIN
ILLUSTRATION BY MAARTEN VAN MAANEN

developer Rolf Peters focus on building on water—the only firm that does so exclusively. Five years ago, they were not taken particularly seriously. But things have changed.

"In the Netherlands, we simply need more space," says Peters. "Our rigid system is not enough. What we've done in past years is to build higher and stronger dikes. But it's not possible to continue solely in that direction. We could create more polders, reclaim more land, but new areas cost a lot of money, and they create huge environmental changes which may not be positive. We have to accept the realities of what is to come."

And what he and Olthuis expect to come, is water. Lots of it. But this, of course, is no secret. The government

recently pinpointed 200,000 hectares of land to be used as flood basins. Agencies are drawing lines which declare where water should be best let in. And the idea of reserving areas for the simultaneous use of water and housing is becoming widely accepted as not only practical and smart but also damned appealing.

"Many people love to live on the water," says Peters. "In IJburg, there's lots of space. A total of one hundred twenty floating homes will be built there. The first thirty-five we're planning to build already received requests from four hundred fifty people to live there. We have no concern about people adjusting to life directly on the water. In Germany, I can imagine it would be more difficult. They're accustomed to living in moun-

tains and on sand."

But lowlanders aren't the only ones getting into the act. Reporters from around the world regularly arrive at Waterstudio.NL's office to hear about the latest inspiration for floating habitation. City planners and investors—both here and abroad—are requesting a slew of studies, designs and solutions needed for building on water. In Amsterdam, this includes a floating car park in the IJ and an entire floating apartment complex, with plenty of shared space for the residents to mingle. But the latest, biggest assignments come from boomtown Dubai, where Peters and Olthuis regularly travel to discuss plans for hundreds of floating homes, a floating and rotating hotel tower, and an enormous floating cruise ship terminal.

"In general, large city planning is difficult in the Netherlands," says Peters. "Almere-Pampus [see box] will take fifteen years. That's not a problem, it's just more time. But in Dubai, there are fifty thousand projects going on. They want it, and they're going to get it."

Understandably, when a rich sheik in Dubai shows interest in building dream projects—particularly ones that incorporate environmentally friendly ideas—Olthuis and Peters jump at the chance. "Dubai is this big oil country," says Olthuis. "You think: they're Arabs and

they have more oil than anyone. But they don't want to use it. They have us working on homes with solar panels, clean water emissions, converters that make salt water into drinkable fresh water. It's not because that's our business, but that's what was requested."

Of the many projects being commissioned off the coast of Dubai, Olthuis is planning a particularly eye-catching, water-treading mosque. Made of light, hollow concrete, all of the walls and pillars will have streams of seawater continuously pumped through them. "It's forty-five degrees right now in Dubai," explains Olthuis. "The water is twenty-eight degrees. If you pump it through the walls, the temperature inside can drop to thirty degrees, meaning the air conditioning has to work that much less."

It's easy to get caught up in the excitement of his work. One can imagine whole new divisions of societies, entire cultures that dwell on water, other groups that live in the trees; man once again learning to truly live with nature, yet retaining our modern conveniences. "Well, I wouldn't go that far," he smiles. "I don't think there will be a separation of land and water. I believe in floating cities that will be in addition to normal cities, where you don't see the border between land and water. When you drive from a land road onto a floating road, it should

feel just as stable. You should not even realise you've left the land. It's just like everybody walking around on these little islands and buildings resting on wooden piles in Amsterdam. Nobody thinks about it because it feels and looks so stable."

Then he brings up an aerial view of Tokyo on his computer, where, because of limited space and a populous society, they've also begun expanding into the water. "The price per square metre is very high in Tokyo," he says. "But they also know that in sixty years, the population will be less. You could build floating homes there today, and then in sixty years, perhaps float them to another country where the population needs them."

Step and toss

Naturally, with these sorts of efficient solutions, the big boys are getting into it too. Megaconstruction company Dura Vermeer recently initiated Bouwen met Water, a research project based in Hoofddorp, which culls the expertise of 15 various partners, including engineering firms and governmental agencies. "We're trying to make a neighbourhood of houses combined with water storage," says researcher Steven de Boer. "We're focusing on one of the deepest polders, Haarlemmermeer, as our pilot location.

In fifteen years, there will be twenty thousand new houses there and three million cubic metres of water storage, if necessary."

Depending on the levels of water around the country, the government plans to divert water into this polder whenever necessary, rather than the old method of blocking out the sea and continuously pumping out excess water from the land. In other words, they're making the system more flexible and, in a sense, more natural.

"Part of the area will be designated for the houses, and part for the water," explains De Boer. "But there will also be overlap between the two. Parties are now drawing up where that overlap will be, and we're working on housing solutions that remain durable with the changing water levels."

According to De Boer, there will always be one metre of water in certain areas of Haarlemmermeer. But at times, it will rise as high as three metres. "Some of the houses will be partly floating, which is very attractive to a percentage of housing customers. Naturally, people like to live in a nice area with lots of water. The disadvantages are that it can be a bit wobbly because of the movements of the water. And connecting floating houses to fixed roads, gas and electricity is harder and more expensive.

So, we're currently working on different techniques to keep the advantages without the disadvantages. We also plan to build many of the homes on our new invention: hollow dikes."

These hollow dikes serve the same purpose as the old clay-based variety, but are basically large, empty concrete boxes, which means lower cost and more efficient use of space. "Rather than [putting] a dike by the water and then houses behind it, we simply put the two together," explains De Boer. "The hollow dike could essentially be the bottom floor of your house. There could also be a row of eight houses sitting on concrete dikes, then a separating green area, and another row of houses."

Of course, it's not only planning and speculation. A few years back, Dura Vermeer built a floating 800-square-metre greenhouse in Naaldwijk, which, for research and demonstration purposes, was completely constructed on the water. "The basics of building floating platforms are very simple," explains De Boer. "First you add blocks of Styrofoam. Each block is strong enough to hold a man. So you just throw the first piece onto the water, step onto that, then throw another piece. When you're finished, you add concrete. So your building site is also your floating structure." Dura Vermeer, along with Unidek, has patent

ed this building method, calling it FlexBase. Though, undoubtedly, you could easily devise your own variation of building with Styrofoam and concrete that would not infringe on their copyright. Or, try replacing the concrete with soil.

Soft hydroponics

For around 15 years, a group of floating enthusiasts here in Amsterdam have continued the work of artist Robert Jasper Grootveld by building friendly, floating gardens. "Grootveld believes in soft building," explains Arno Baan, who, along with Ellen Wierda, organises the funky blue-green initiative, Drijvende Tuinen. "When you talk to architects, they're trained in thinking hard. That's normal construction: drill screws into wood, make holes; but you're actually damaging the materials. And they're completely rigid. After working with Grootveld, I'm trained in thinking soft. Each rope you tie, each net you wrap around, you're not damaging anything, but making the whole stronger and naturally flexible. If you want to live on the water, you need to be flexible."

Their floating gardens use the simplest of materials: Styrofoam blocks held together by strong netting and ropes. Then they spread a layer of soil across the top, plant seeds and let nature take its course. "It looks easy, but the technique of tying it all together is something that you have to learn," says Baan.

Their durability is flawless. Since Grootveld started building them in the '60s, not one has ever capsized. "He did a lot of tests with them during storms," recalls Baan. "They will never sink. One square metre of Styrofoam can hold five-hundred kilograms of weight before it starts to sink. So you can imagine, this one we're standing on now is twenty-four square metres. I'm not sure of the maths, but to sink it would take a lot."

'THEY WILL NEVER SINK. ONE SQUARE METRE OF STYROFOAM CAN HOLD FIVE-HUNDRED KILOGRAMS OF WEIGHT BEFORE IT STARTS TO SINK.'

As Baan talks, and this reporter does silent calculations (for those of you still counting, it comes to 12,000 kilograms), his dog leaps from the sidewalk onto the floating garden, sniffs at a bush, then curls up in the sun. "Standing here, your mind thinks it's land, you feel grass and earth under your feet, but you're floating."

Taking advantage of its portability, they install small motors on each one, taking rides through the canals. "Last year, we put a tent on one and stayed on it overnight. It was my own portable campsite. You can have BBQs on them, grow vegetables, anything. And it's only sixty euros a year to get a sticker to park

it in the canals. It's the cheapest land in Amsterdam."

A short bike ride down the Zeeburgerkade reveals a couple of older and larger verdant floaters. Baan points at one that's overflowing with plants and even a couple of trees—one of them reaching seven metres in height. "We're just trying to let that one get as wild as possible," smiles Baan. "We put forty-thousand kilograms of soil on it and the

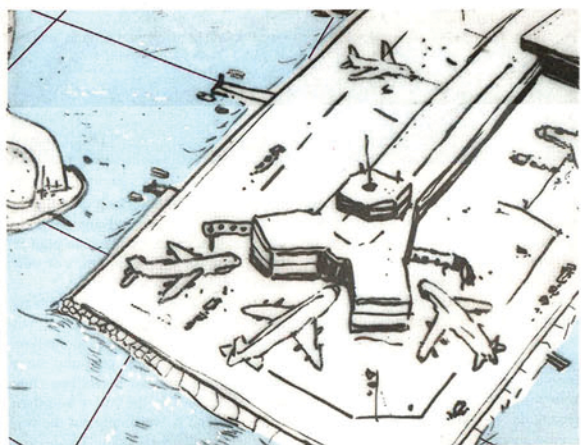
rounding neighbourhood. 'This is what I'm talking about with soft and hard building,' says Baan. "We wanted to make the entrance out of the same material [as the garden's foundation] but the city offered to install this wooden plank. It's held together with screws and bolts. It was well made, but after seven years, it's falling apart because it's not flexible enough."

This particular garden was built seven years ago and finished in five weeks. "The gemeente gave us the money to do it and we had ten people working on it. It's nice, because we can have projects with people who don't know what to do with their lives. They do this, and then they know."

Once on the floating ground, it's lush and lovely. With a thick enough layer of soil, a hedgehog could make a very happy home here. "The only wildlife I've seen so far was a goose that made a nest once," recalls Baan. "It's funny though, we're standing on soil with trees, floating on the water, and under us is the Piet Hein Tunnel, with cars driving by."

It's hard to say what the area will look like in a hundred years, but Baan expects the floating garden to last that long. "They never sink, and the polystyrene doesn't rot. The only thing I think I'll do is turn it around after a few years, so the other side can get some sun."

www.drijvendetuinen.nl

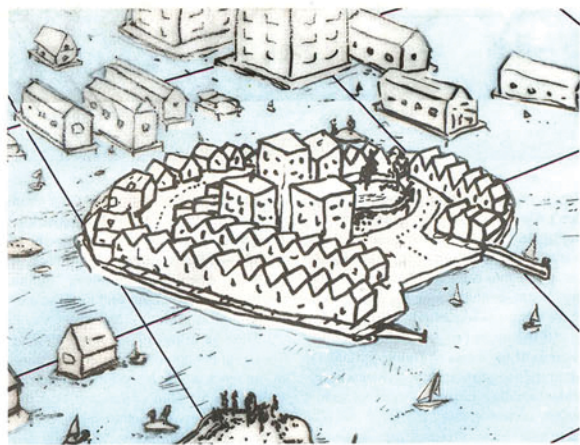


STATIONARY AIRCRAFT CARRIER

In about ten years, Johann van den Noort, director of Van den Noort Innovations, expects to begin work on an entire floating runway in the North Sea for Schiphol Airport. "It's a big project," he explains, "so it's not something you're going to complete in one or two years. And we have to wait on various government institutions." According to Van den Noort, he proposed runway, estimated at a cost of 14 billion euros, is far cheaper than the previous idea of building a whole new island to handle the growing number of airplanes. And it's far less destructive to the environment. Floating a runway on the water surface has no influence on the sea

bottom, or on the sea for that matter. It's made completely of concrete, so it won't attract birds in the same way as a normal island. Obviously, birds don't like aeroplanes."

The fact that it floats makes it vastly more efficient. A fixed island would require various runways in different directions, allowing for planes to land safely depending on the wind direction. This would mean the island had to be enormous. But the floating runway can rotate 360 degrees on a central axis, adjusting its landing direction for any wind condition. "It's all very possible to build," says Van den Noort. "There's interest in it, and we're working on it."

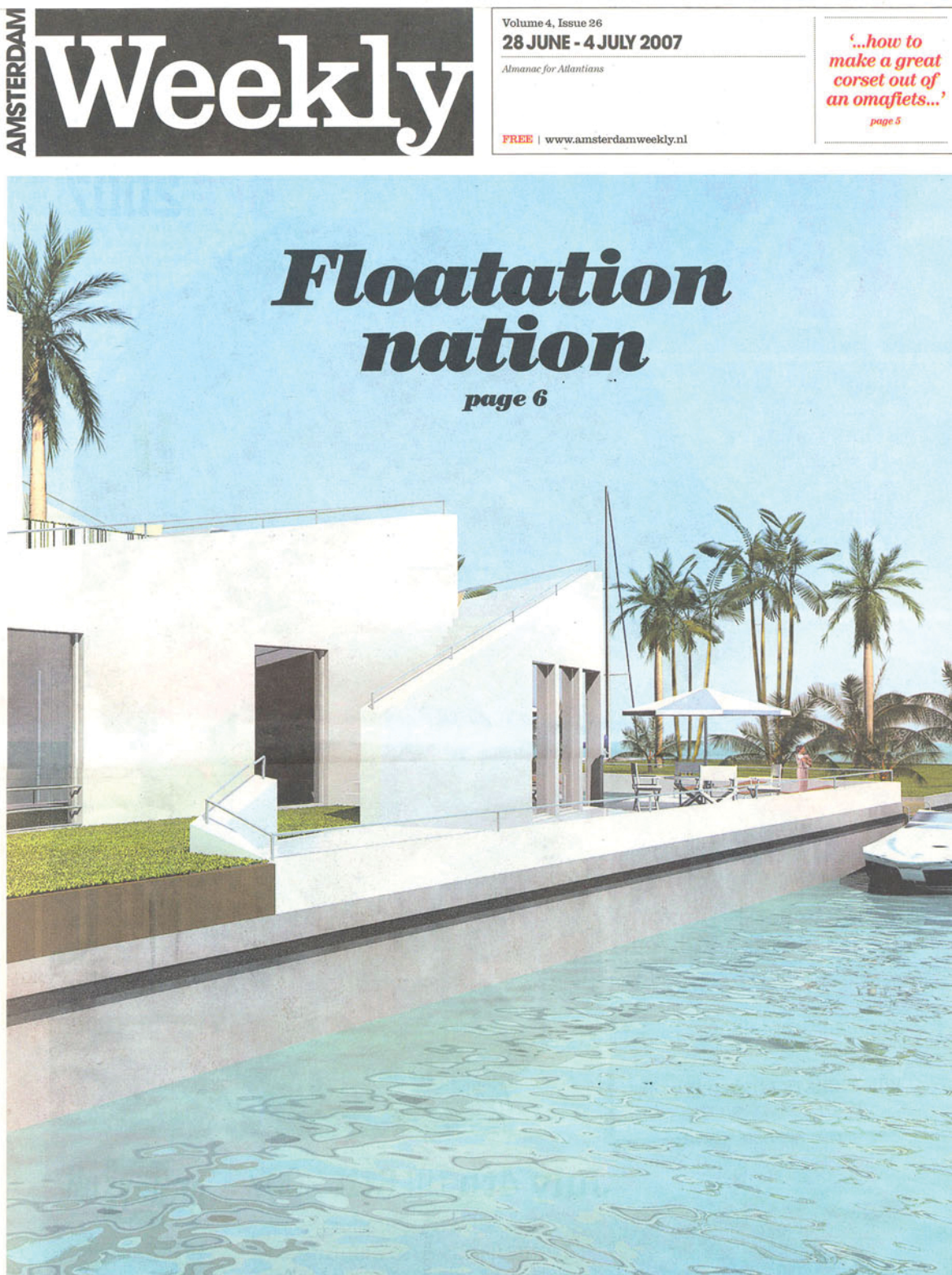


ALMERE-PAMPUS

An entire floating neighbourhood, with 35,000 houses, is being planned for the extension of Almere, called Almere-Pampus. With 42 kilometres of coastline, the city was a likely candidate. "I think it'll be a really exciting way of living," says Jacob van Rijs, director of MVRDV, the architecture firm that will design it. "It'll have a kind of permanent vacation feeling." Of course, this early in the process, it's difficult to know exactly what it will look like—discussions only began four months ago. "It's all unclear now, things like costs and dates," says Van Rijs, "but the general expectation is that [the beginning of construction] is foreseeable in the next decade."

Naturally, a project this large is rife with variables. "We wanted it to trigger discussion—and it did. Some people were very excited; they said it was exactly what they wanted. Others started screaming, what about the birds, that sort of thing. We just want to be realistic. It may look as if we could start tomorrow—the basic construction is fairly easy. But there are many hurdles—permits, environmental issues. So we're continuing research."

Regardless of how they tackle the topics, we can expect a self-supporting village residing, literally, on the water. "Our focus is on the structure of the housing together. It will be a genuine floating community."



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