MVRDV: Innovative and Sustainable Problem-Solvers

EMMA VINELLA-BRUCHER Carleton College

May 15, 2016

“Capacity, quality, efficiency, ecology.”
– Winy Maas, on the firm’s architectural goals

Although internationally recognized as leaders in sustainable design, the architects of the design firm MVRDV—Winy Maas, Jacob van Rijs, and Nathalie de Vries—do not actually consider themselves to be sustainable architects. As van Rijs says, “it’s dangerous to get a label. We look at sustainability in a broader way.”1 Instead, they focus on architecture as a device that shows the direction a city should go. However, the vast majority of people, myself included, would argue that the firm’s forward-thinking, problem-solving principles point directly to the architects’ sustainable nature. Although they may not consider sustainability to be a crucial component in their design, it is noticeable in almost every project the firm has worked on. The sustainable design movement is often characterized by broad idealism and technological prowess, two concepts embedded within the firm’s design values.2 As a result of our current climate crisis, architects are being forced to face climate change head-on, and MVRDV addresses this as a pressing challenge. MVRDV’s innovative design techniques, as well as their dedication to constructing within the limits of the constraints and available data, place the firm at the forefront of the sustainable architecture movement.

Maas sees the firm’s role as architects as something different from merely designing buildings—he sees them as “philosophers, artists, sociologists, environmentalists, and realists who happen to be good with a pencil and ruler.”3 He states that “everyone is a city-maker...but to make a fantastic city, a combination of collective and individualism is needed. When you want to create or enlarge the potential of your surrounding landscape or coastline, collective and environmentally sustainable investigations need to be made.”4 Maas recognizes that the way in which architects form urban spaces will affect a society’s culture for years to come, indicating that design is a political issue that can help form the direction of a society. By thinking about how architectural designs can influence and improve society, the architects of MVRDV act as problem-solvers, tackling both existing and potential issues in creative ways. In this paper, I will demonstrate MVRDV’s unique approach to sustainability by exploring the firm’s use of data, their focus on constraints such as space, their efforts to rebuild, and their work to proactively address future problems. Sustainable design necessitates prioritizing problem-solving, not just for now, but for the future. This emphasis is embedded into each and every MVRDV project, solidifying the firm’s place as one of the top sustainable architecture firms in the world.

Using Architecture to Solve Problems

Can the art of building solve problems created not by nature alone but by the very ways in which we have historically tried to conquer its potent forces? And on a more

2Marcus
4“Beating Urban Sprawl"
practical level, can architecture provide structures that are more logical, just, and useful than those now seemingly ordained by the economic and political powers that be?
- Aaron Betsky

As architects, Maas, van Rijs, and de Vries have a duty to solve problems, as this is what architecture is intended to do. Maas himself has a very unique outlook on the role of the architect: “We are the ones that can visualize the situation of the earth, of cities, of environments. We are the ones that with that visualization can communicate it. So we have a sincere role in this act that is maybe more and more given towards politicians, economists, and planners, instead of us.”

This societal role is critical, as it is their duty to come up with creative ways of designing both individual buildings as well as cities so both can function to the best of their ability. Because a majority of the problems we are experiencing today are due to climate change, this is the demon they are now facing. The inventive ways in which they find solutions to both solve problems caused by climate change and to prepare cities for the future are what make MVRDV a truly sustainable firm. MVRDV is a leader in a world that requires architecture to address the challenges caused by a continuously changing climate. This label stems largely from the firm’s unique approach to architecture: beginning each project with extensive research into every aspect of the project’s design.

Solving Problems Through Data

The way in which MVRDV approaches problems is unique in this day and age. When beginning a new project, the firm gathers information on all the factors that could conceivably play a role in the site’s design and construction—everything from zoning laws, building regulations, and technical requirements to client wishes, climatic conditions, and the political and legal history of the site. They see these rules and regulations not as limitations to their creative freedom, but as “the well-spring of invention.”

Rather than shying away from the challenges presented by these constraints, the firm uses them to their advantage. Using data-heavy, research-driven methodology, MVRDV is able to create buildings that conform to the precise needs and limits of every individual site. The firm has created many different computer programs, among them Functionmixer, which, when given all the parameters of a particular construction site, “crunches the numbers to show optimal building shapes for any given set of priorities (maximizing sunlight, say, or views, or privacy) and pushes limits to the extreme, where they can be seen, debated and, often, thoroughly undone.”

Rather than simply satisfying the desires of a single party involved in the design process as most architects do, the architects at MVRDV address the spatial consequences of the desires of all stakeholders, confronting them and opening them up for debate. This careful attention to the details and limitations of a particular project site is what makes MVRDV so uniquely successful.

MVRDV’s emphasis on using data can be seen in their 1999 project entitled Metacity/Datatown (See Figure 1). Datatown is described by Maas as “a city that wants to be explored only as information; a city that knows no given topography, no prescribed ideology, no representation, no context. Only huge, pure data.” MVRDV is no stranger to optimization software, but the concept

---

5 Reed Kroloff and Aaron Betsky, “A Newer Orleans: Six Proposals,” Artforum International 44, no. 7 (2006), ProQuest
8 Frey
9 Frey
of Datatown takes the importance of data usage even further. Based entirely on an extrapolation of Dutch statistics, the data comes together to form an “unbroken environment,” a virtual city. Datatown envisions a self-running city of 400 by 400 kilometers housing a population of 241 million people, resulting in a density four times that of the Netherlands. This installation demonstrates how the use of databases and research can be applied to issues of planning, especially when it comes to political decision-making. This research and design methodology is key to making important decisions regarding space and land use, and helps the firm produce more sustainable results.

Performing Under Constraints

Even early on in their careers, the architects at MVRDV realized just how difficult it could be to create both what you wanted and needed given the constraints of a project or building site. The first housing project MVRDV completed, the 1997 WoZoCo building in Amsterdam-Osdorp, The Netherlands, faced limitations on building height and width (See Figure 2). The lot was intended to hold 100 housing units for elderly inhabitants, but could only fit 87 of these units within the site’s restricted footprint. Faced with this constraint, MVRDV set out to reach this housing goal without further imposing upon the surrounding area. In order to achieve this, the remaining 14 apartments were hung off the side of the main structure of the building, growing horizontally without taking up any additional space on the ground. Due to such technological innovations, this housing project not only met and exceeded all its goals, but also earned the title of the social housing project with the lowest building costs in all of Amsterdam. This initial setback due to the building lot’s limitations eventually led to an innovative and unique solution, one that now inspires visitors from all over the world.

Another project which was designed in response to strict spatial criteria was their 2010 Pushed Slab office building in Paris, France (See Figure 3). The site restrictions in this area only allowed for a slab-shaped building 150 meters long and 21 meters wide. In order to accommodate these spatial limitations as well as to provide extensive views and open spaces, MVRDV “pushed” [the slab]

---

until it [broke], then twisted and pushed [it] to the south."  

By taking a typical building shape and quite literally putting a spin on it, the firm was able to create a practical and aesthetically pleasing structure. This building is just another example of how ingenious MVRDV is when it comes to facing difficult requirements in the field.

![Figure 2: WoZoCo Building, 1997.](image)

![Figure 3: Pushed Slab, 2010.](image)

Winy Maas often discusses the “envelope” of every project—the constraints imposed by the building codes of each site. He states that while this envelope often limits creativity, it is also “critical” to the design process. Within the framework that has been set for the project, he believes there is “always room to maneuver. There are always the obvious choices to be made...but there are opportunities to be critical of that framework as well.”  

In approaching these limitations head on rather than passively as the majority of today’s architects seem to, MVRDV produces innovative building designs that play with different variables, rather than being constrained by these limits.

**Tackling Issues of Space**

“I would like to stress that densification is a contemporary trend not only in terms of urbanism, but also in respect to many other domains as well. Technologies allow us to densify our use of the earth. Knowledge systems operate by building up data, becoming denser and denser. Our global status is, in a way, about densification as well. We travel more, we create new situations, we want to do more, and all these desires lead to an

---

enormous densification beyond just the physical growth of the population. I don’t think that densification has stopped yet, and I doubt that it ever will, aside from some major disaster. But instead of looking at this process in a negative light, we try to understand it and use it as a tool. We try to find the possible adventures, discoveries, and unexpected occurrences that are a result of densification, and understand them optimistically.” — Winy Maas

One of the most pressing societal issues of our time is that of space. Our population has already surpassed seven billion inhabitants and continues to grow exponentially. In 2008, 50% of the world’s population lived in cities. By 2050 that number is expected to increase to 75%. In Europe, where MVRDV is located and houses many of its projects, the percentage of the population living in urban areas is estimated to jump to a whopping 90% by 2020. That day is quickly approaching, necessitating architectural design that addresses this sooner rather than later. We need to do something about it quickly. MVRDV recognizes the need to provide housing for all of these people, and designing city growth that is able to accommodate them.

As writer Darcy Frey recognizes, “Maas was not the first architect to protest the unsightly sprawl that humans have left over much of the earth’s surface, but he may have been the first to suggest that we preserve what’s left of our finite planetary space by creating ‘vertical suburbs’.” MVRDV is widely known for their efforts to expand cities vertically, rather than horizontally, in order to conserve what limited space we have left. They promote the unique idea of manufacturing space as a way of dealing with extreme population density and the need for open land, by “condensing [the] landscape on the floors of a building and reproducing them endlessly toward the sky.” Maas believes that when planning for the future, it is necessary to “design buildings that have a higher population density but are also easier to live in.” Instead of simply cramming everyone into existing living spaces, it is necessary to find better ways to accommodate the masses, maximizing the amount of available land while building ever upward.

With their 2008 Eco-City Montecorvo, located in Logroño, Spain, they were able to fit 3,000 housing and social units onto only one percent of 140 acres of land (See Figure 4). This allowed for all 130,000 inhabitants to have a place to live, while still enabling them to enjoy the beautiful

---

16Maas
17Frey
18“Beating Urban Sprawl”
19Frey
20Frey
21“A Group of Socially...”
landscape. This land use plan allows for minimal impact on the natural surroundings, as well as lower building costs. This urban plan transformed the city into a sort of “eco-park” that provides recreation, beauty, and unlimited energy. The city also boasts a neutral carbon footprint, as all necessary energy is generated by a combination of solar and wind power. These windmills cover two hills on the far side of the region, acting as both a landmark and source of electricity for the development, giving residents a unique sense of identity. By incorporating the issue of space directly into the city plan, MVRDV accommodates large numbers of people while still having a minimal impact on the landscape.

But MVRDV believes that none of these changes will be possible unless we begin shifting the way we think about cities. They argue that all things needed to sustain a city of one million people can be contained within a 2 by 2 by 2 kilometer cube; the problem is simply that most people would not be willing to live under such conditions. As van Rijs says, “many people hate cities but most human beings live in one. As architects we have a special responsibility to make living in cities and under dense circumstances not just habitable but preferable.” Therefore MVRDV has been working on coming up with new, creative mass housing without making it uncomfortably cramped. This innovation extends to other land uses as well. With its Pig City plan from 2001, they conceptualized creating skyscrapers filled layer by layer with pig farms (See Figure 5). The concept of building upwards in order to house more offices or people is nothing new; what is new is the notion of building a structure like this solely for farm animals. This project addresses our growing dependence on animal meat as well as limited amount of available grazing land. By having less land area devoted to the farming industry, we are able to use what is conserved for other uses.

Restoring What Has Been Lost

Figure 6: New Orleans Lower 9th, 2007.

The architects of MVRDV have worked on many projects regarding restoration of not only individual buildings, but also entire cities. One of their most well-known projects of this sort is

---

22 “Beating Urban Sprawl”
23 “A Group of Socially…”
their contribution to the Make it Right Foundation’s efforts to rebuild the Lower 9th Ward of New Orleans after it was hit by Hurricane Katrina. Over 70% of New Orleans remains abandoned today. As author Reed Kroloff recognizes, “New Orleans is going to be a mess for a long time. And that’s the context against which any rebuilding will begin.” After this horrible tragedy, architects turned their attention to helping New Orleans “transform itself into a successful Newer Orleans—a smaller, more compact, and more beautiful city that would use its natural setting and cultural heritage to enhance viable neighborhoods and attract both new businesses and residents.” The goal of the Make it Right New Orleans project was to “design a building that can survive another flood, as well as drastically cut the utility bills of its occupants.” As per usual, MVRDV went above and beyond this call. They designed five different types of buildings, each lifted above the ground in a different way with the risk of flooding in mind. Through each lifting act, a shady spot below the house is produced, allowing for a cooling buffer and inducing natural ventilation of the house. These included two designs that displayed the firms’ trademark wit: one v-shaped home which allowed occupants to seek refuge in an elevated area, and another which floats. While some critics of these designs say they “already looked flood-damaged, perhaps even uninhabitable,” the five building designs were created with one thing in mind: preventing another disaster like the post-Katrina flooding. As Maas himself says, “if the waters are going to come, let them come. Let’s do it. Let’s just turn and face it.”

The firm also worked on another project in New Orleans that addressed the issue of floods, this time in a different manner. Commissioned by the Netherlands Architecture Institute to develop “visions for symbolic and shared spaces for New Orleans,” MVRDV created a structure that could accommodate the community’s needs while also keeping them safe from water. After seeing a young schoolgirl’s drawing of a people walking to the top of a hill in the middle of floodwaters, MVRDV was inspired to design an artificial hill which could serve as a collection of school and community spaces. Because it was built above sea level, this hill could also serve as higher ground should the floods return. As Kroloff says, “the building is permeated with a sense of whimsy underpinned by an acknowledgement of the terrible events that took place here...meant to both revitalize a community and serve as a safe haven should the levees ever fail again.” Their efforts in the Lower Ninth Ward allow previously deserted land to become productive again.

Another project that addresses the need to make land that is currently not being used effectively suitable for living is their Long Tan Park from 2004. This project is located in a heavily mined area in Liuzhou, China. The limestone mine has cut five of the nearby mountains in half, creating inefficient land use as the mountains now stand abandoned. In an effort to reclaim this land, MVRDV has built homes into the destroyed mountains, allowing them to work with the natural topography. The placement of this housing also protects these damaged mountains from further erosion with the added benefit of increased light and ventilation to each home. By carefully mapping what types of mountain terrain can support different building structures, this ensures that the project takes advantage of the natural landscape to the best of its ability. In this project MVRDV demonstrates what it does best—using innovation to convert misused space into something useful.

---

25 Kroloff
26 Kroloff and Betsky
27 Marcus
29 Marcus
30 Frey
32 Kroloff and Betsky
Preventing Future Problems Before They Happen

MVRDV also seeks to address problems of the future by revamping urban planning techniques. They believe that by designing better city layouts and infrastructure, we can prevent problems before they happen. Especially in an age of climate change with drastic consequences, it is important for us to craft cities with the future in mind. Often urban planners only consider present day needs, but MVRDV designs for the future.

One of the most extensive urban planning projects the architects at MVRDV have worked on is the 2008 Grand Paris plan for the Greater Paris area in France (See Figure 9). The theme of this project is “more”: more ambition, more optimism, more density, more efficiency, more ecology, and more compactness. This is accomplished by tackling 17 separate “interventions” addressing accessibility, densification, infrastructure, green spaces, and much more. When this project is completed, it will transform Paris into one of the “densest, most compact, and therefore sustainable high quality cities in the world.”34 By redesigning the way Paris functions, MVRDV is taking steps to help the city continue to grow in both population and cultural amenities, all while controlling the city’s expansion and avoiding future issues related to sprawl.

Another future-oriented project the firm has worked on is their 2007 Power Center in Gwanggyo, South Korea (See Figure 10). The initial design for the urban hub features a mix of public, retail, culture, housing, offices, and leisure areas, all of which would typically “sever any connection with nature.” However, MVRDV decided to change this. In their 160-acre project, the firm smoothly incorporates this metropolitan area into the hills and lake that surround it. TIME Magazine credits their creation as one of the top 100 green designs, saying: “The rarefied world of design is embracing the environment as never before. Top architects are implementing revolutionary methods...behind the scenes, trailblazing executives are taking big risks to make it happen—beautifully.” This connection with nature can be clearly seen in every aspect of the city-center’s design. By structuring every building as a series of rings stacked on top of one another, terraces are directly built into each floor in order to allow for natural, outdoor life. Additionally, the greenery that covers the entire outside of the structures improves climate and ventilation, as well as reducing energy and water use. By merging city with nature, the city itself “becomes a kind of landscape.”

Learning to accomplish this is essential when planning for the future, especially in regards to how cities will function.

The Firm and Sustainability

The variety of projects which MVRDV tackles, whether they be center for the elderly facing spatial constraints or homes that needs to be able to survive a flood, all have one goal in mind: solving problems. While at the beginning of the firm’s career most of these problems involved simple site restrictions or clients’ needs, many are now caused by climate conditions out of their control. With projects such as helping to rebuild New Orleans post-Hurricane Katrina, or figuring out how major cities can efficiently and comfortably house their growing population, MVRDV is now facing an external, uncontrollable threat: climate change.

Maas himself recognizes that climate change has “significantly influenced [their] work, especially in relation to agriculture and its relationship to urban patterns in the way it influences water and temperature systems.” Because many of the projects the firm works on today do not only solve problems, but plan for the future and prevent problems before they happen, understanding every aspect of the system and surrounding environment is essential. This is where MVRDV’s dedication to data analysis comes in, as their practice of assessing every inch of the site and every variable that could potentially influence their work helps the architects create a structure that will work not just today, but for centuries to come. For Maas, van Rijn, and de Vries, building sustainably means “freeing up the land by building up, retaining green space, and finding ways to live in the countryside sustainably.”

Although MVRDV perhaps did not begin as a sustainable architecture firm, they are most certainly one now. Their dedication to creating innovative solutions is especially important in this day and age. Maas believes that sustainable architecture is “about space and alternately it’s about our planet. What can we do with it, what can we add to it, and how can we change that matter. And how can we turn it into something that makes sense and has future.” This is exactly what this firm accomplishes with each and every one of their projects. Whether building a new office building or completely redesigning a major European city, the innovation and thoughtfulness that MVRDV brings to each and every project is what makes them sustainable designers. MVRDV’s

---

36-“Power Centre”
37-“Power Centre”
38-Maas
39-Beating Urban Sprawl
40-Basulto
designs are efficient and practical. We need more innovators like them if we are going to make the world a more livable place for all.
Bibliography


“Pig City.” MVRDV. http://www.mvrdv.nl/projects/181_pig_city/#.

“Pushed Slab.” MVRDV. http://www.mvrdv.nl/projects/PUSHED_SLAB/#.

“WoZoCo.” MVRDV. http://www.mvrdv.nl/projects/wozoco/#.