



URBAN ENGINEERING

A sustainability paradigm

engineering + urban planning + architecture

Before

Before it becomes a reality, it is a project; before, a thought; before, an idea; before, a possibility; before, a hunch; before, a chance; before, it is a reality.

The challenge and the approach

(BIG) QUESTIONS ABOUT OUR URBAN ENVIRONMENTS

Pollution

Efficiency

Living conditions

Structural stability

Safety

Transportation

Mobility

Emergency escape options

Free ground level

Public space

Lighting, ventilation and views

Community feeling

Do you think building more humane and ecological urban environments would be possible?

THE DIFFJUSTDIFF APPROACH



diffjustdiff explores the real possibilities of architecture and urban planning, starting from simple questions: building another type of city; drastically reducing pollution while improving living standards; guaranteeing structural stability at considerable heights; fostering transport and mobility at different heights; offering multiple escape routes in emergencies; freeing the ground level for public space; providing good lighting, ventilation and views for everyone; and generating a sense of community.

In brief:

- improving structural stability
- safety
- a free ground level
- green mobility (easy, economic, ecological)
- more and better urban public spaces
- better and wider architectural living conditions
- social and community feeling, belonging
- higher quality-of-life standards

... all of this always with modularity and prefabrication in mind.

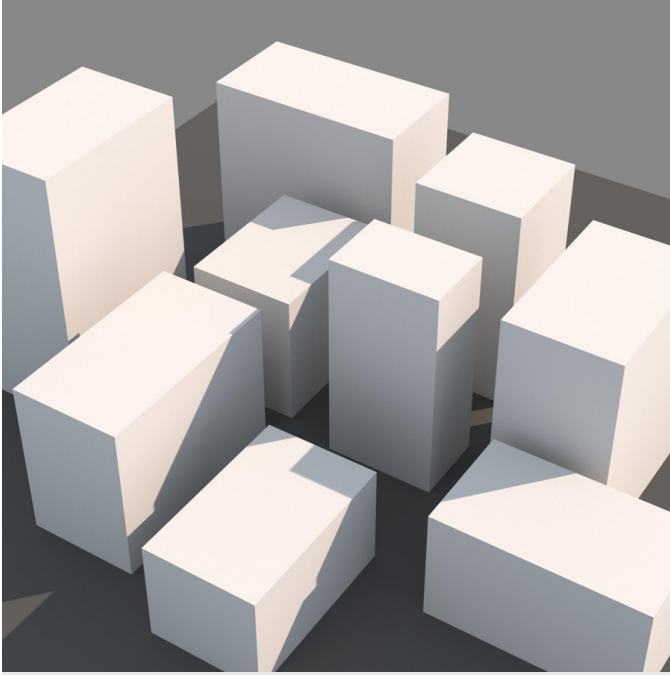
Solutions for the future (and for the present)



The basic, and disruptive, idea of *diffjustdiff* is that **buildings are obstacles** that condition, limit and hinder us: both mobility in general and the quality of public space are affected by them in a negative and permanent way. **The solution we propose is to free the ground level through elevation.** This simple idea also brings a series of further advantages of great importance for safety, stability and quality of life in general.

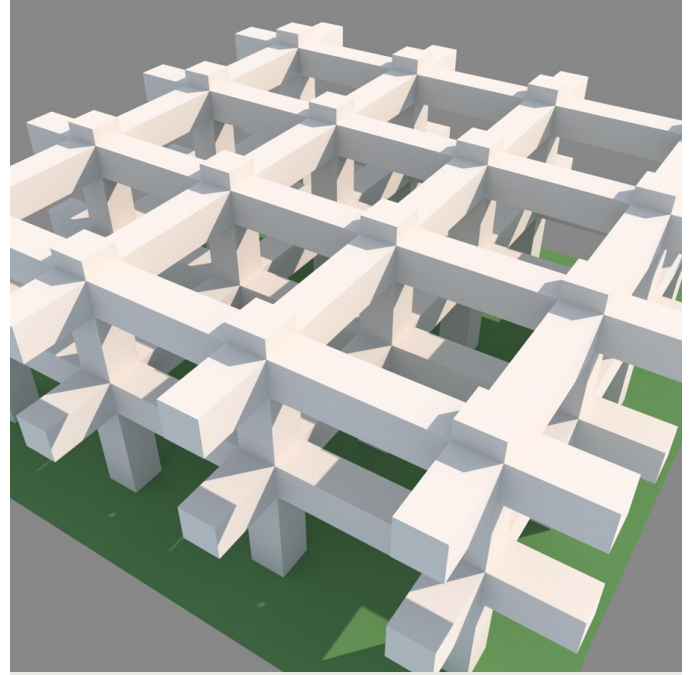
Macro-structures are conceived as a **spatial framework** in which to fit all our needs: something like an **architectural operating system**. The concept also supports the idea of **modular prefabricated cities**, growing according to patterns that are both horizontal and vertical.

Conventional construction vs macro-structures



CONVENTIONAL CONSTRUCTION

- Higher slenderness (long vibration periods)
- Low resistance to horizontal actions (earthquakes, wind)
- Only one emergency escape option: downwards
- Ground-level obstacles (limited public space)
- Intercommunication only at ground level
- Constrained public spaces
- Low social and community feeling, belonging
- Lower living-condition standards
- Low adaptability to topography



MACRO-STRUCTURES

- Low slenderness: short vibration periods (around 1 second)
- High resistance to horizontal actions (earthquakes, wind)
- Multiple escape options: downwards, sideways and upwards
- Free ground level (obstacle-free public space)
- Intercommunication at different heights
- Wide public spaces
- High social and community feeling, belonging
- Higher living-condition standards
- High adaptability to topography

A macro-city forms a single global structural unit that behaves like a low-rise building despite its great height.

Lower slenderness, short vibration periods (around 1 second), higher resistance to wind and earthquakes.

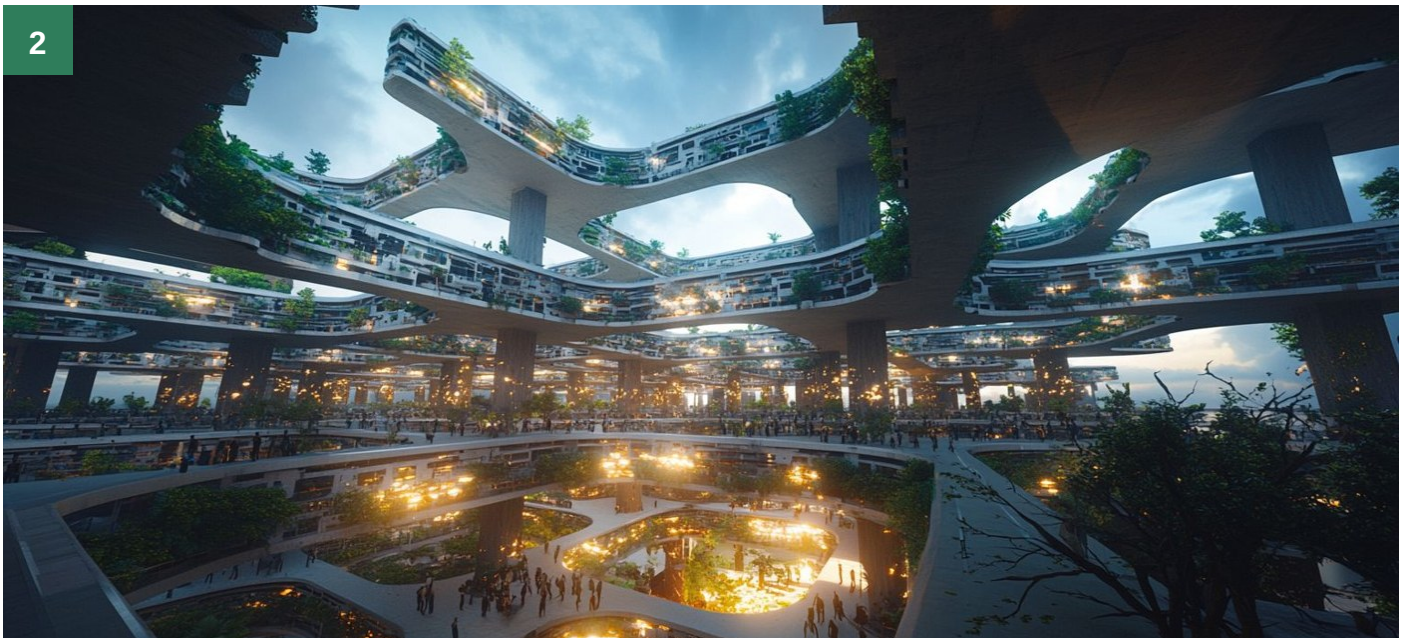
(Big) questions & (short) answers



Would building another type of city be possible?

Yes, by joining engineering, urban planning and architecture to build macro-cities.

Macro-cities bring the three disciplines together in a single design process, which can drastically improve the quality of our urban environments.



Would drastically reducing pollution while improving living conditions be possible?

Yes, by building more efficient, geometric urban environments.

Macro-cities follow specific three-dimensional geometric patterns that can improve communication, transport, mobility, structural stability, safety, public space and general living conditions.

(Big) questions & (short) answers



Would offering multiple escape routes in emergencies be possible?

Yes, horizontal connections at different heights allow multiple escape options.

Because macro-structures connect horizontally at several levels, evacuation can take place downwards, sideways and even upwards in an emergency.



Would guaranteeing structural stability in high-rise construction be possible?

Yes, macro-structures drastically reduce slenderness, which means much greater stability and safety.

A macro-city forms a single global structural unit that behaves like a low-rise building despite its great height. Its short vibration periods (around 1 second) indicate far greater stability and safety than conventional high-rise buildings.

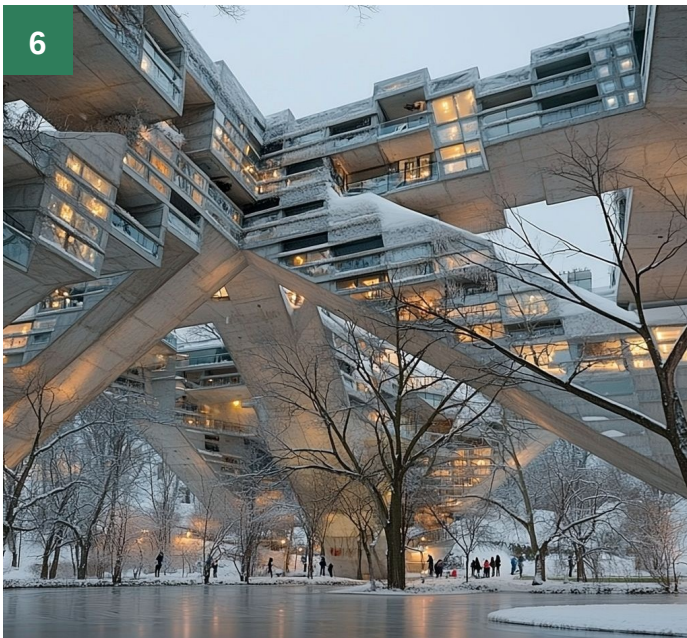
(Big) questions & (short) answers



Would freeing the ground level for public space be possible?

Yes, macro-structures can rest on widely spaced supports, releasing almost the entire ground level.

The ground becomes available for public use, and further public spaces can be added at different heights.



Would good lighting, ventilation and views for everyone be possible?

Yes, macro-structures can offer high-quality lighting, ventilation and views at the same time.

Macro-cities can provide better natural lighting, ventilation and long-distance views for all residents.

(Big) questions & (short) answers



Would generating a sense of community be possible?

Yes, another consequence of the macro-structure.

Macro-cities can provide a sense of unity that helps a community feeling to be shared.

RESEARCH & TRACK RECORD

Research on the **macro-city** concept since 2009. PhD (Cum Laude, 2012), Structural Design Department, School of Architecture, University of Seville: thesis *diS-order*, with a structural behaviour study supporting the feasibility and stability of the proposals. Taught architecture and urban planning at Southwest University of Science and Technology (Mianyang, China). Books: *Hyperirrealism* (Oscar Riera Ojeda, 2020) and the six-volume *realism-s* series on CAD & AI-assisted design.

OPEN TO

- Research partnerships with universities, institutes and engineering firms.
- Pilot sites and feasibility studies with cities, developers and new-town authorities.
- Conferences, exhibitions and publications.
- Dialogue with anyone working on responsible density and the future of urban life.

Let's talk about the cities to come.

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MACRO-CITIES & THE 2030 AGENDA

Alignment with the United Nations Sustainable Development Goals (SDGs)

By lifting the city off the ground and interconnecting buildings at several heights, macro-cities address several SDGs at once: they make urban infrastructure more resilient, cities safer and more liveable, mobility cleaner and the ground available again for nature. The alignments below refer to the official SDG targets.

CORE ALIGNMENTS

9

SDG 9
Industry, innovation and infrastructure
Targets 9.1 · 9.4 · 9.5

- Urban-scale innovation: the ground level is freed and connections are made at several heights.
- Lower slenderness gives greater stability, safety and resistance: resilient, cost-effective infrastructure in the long term.
- Urban modularity enables 'prefabricated cities' built by aggregating modules, saving time, cost and materials.

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SDG 11
Sustainable cities and communities
Targets 11.2 · 11.3 · 11.5 · 11.6 · 11.7

- A compact fabric favours proximity and short trips, and spreads mobility across several levels.
- Multiple evacuation routes and a lower risk of structural collapse strengthen resilience to disasters.
- The freed ground becomes green, inclusive and accessible public space, and the geometry fosters a sense of community.

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SDG 13
Climate action
Targets 13.1 · 13.2

- Better mobility and less need for motorised transport help cut emissions.
- Stable, interconnected structures adapt better to climate-related hazards and extreme events.

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SDG 15
Life on land
Targets 15.3 · 15.5 · 15.9

- Elevated cities achieve the minimum possible spatial interference with natural ecosystems.
- The ground can be kept or restored as continuous habitat, bringing biodiversity into the city.

FURTHER ALIGNMENTS

3

SDG 3 · Good health and well-being
Targets 3.4 · 3.9

Natural light, cross ventilation, far views and green public space for everyone; less traffic and air pollution.

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SDG 12 · Responsible consumption and production
Targets 12.2 · 12.5

Prefabrication and modularity reduce the use and waste of building materials.

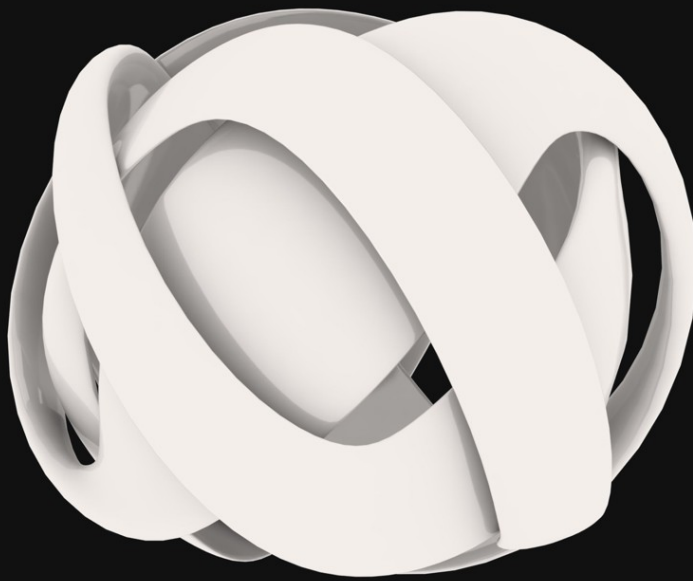
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SDG 17 · Partnerships for the goals
Target 17.17

A proposal that needs, and invites, collaboration between cities, research centres, engineering firms and developers.

Also consistent with the **New Urban Agenda** (UN-Habitat, Habitat III, 2016): compact, well-connected, resilient cities with quality public space.





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