



FLUIDRA



**WATER IN
ARCHITECTURAL AND
LANDSCAPE DESIGN**

from artificial lagoons
to ornamental fountains

WATER IN ARCHITECTURAL AND LANDSCAPE DESIGN:

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to ornamental fountains

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INTRODUCTION

Water has been an **essential element in architectural and landscape design** for millennia, a **timeless element** whose relevance continues to this day.

Captivating civilizations across history with its aesthetic appeal and symbolic significance, water features have always represented a deeply transformative element for any project. From the ancient **Hanging Gardens of Babylon** to the majestic **aqueducts** of the Roman Empire or the intricate water **gardens of the Alhambra** in Spain, water in architecture has left an enduring legacy on the built environment.

In contemporary design, integrating water into leisure facilities and urban landscapes continues this tradition, offering benefits that **extend far beyond mere aesthetics**. The Jewel Changi Airport in Singapore or the mesmerizing water walls of the Gardens by the Bay illustrate this potential: modern water installations that act as a refreshing gathering point where connection to the natural elements generates truly impactful experiences and add value to a high-impact project.

Modern architecture seamlessly weaves water into the fabric of spaces, creating experiences that are functional, sustainable, and breathtakingly beautiful. As such, current water feature design is able to harness the deep impact of water features and their capacity to foster **a connection to nature and well-being**, while also ensuring the installation remains **sustainable and efficient** for operators via new technologies and design trends.

Keep reading for an in-depth guide to understand the **deep transformative potential of water features** and the **keys for designing the right type of water facilities** for a high-impact project.



02

HOW WATER TRANSFORMS SPACES, COMMUNITIES AND URBAN DEVELOPMENTS

Whether it's the tranquil ambiance of a reflective pool that invites contemplation, a vibrant fountain that celebrates community spirit, or a state-of-the-art swimming pool that promotes health and well-being, water features can transform ordinary spaces into extraordinary destinations.

When well-designed, water features go beyond mere ornamentation, offering recreational opportunities but also a refreshing meeting place and a chance to connect with nature even in urban areas.

Here's a close look at how water features can transform spaces, communities and urban developments:

2.1 A sanctuary for calm and well-being

Well-designed water features create spaces that **inspire and promote well-being**.

By providing cooling opportunities and appealing to the senses (the sound of trickling water, the scenic waterfront vistas...), water features can generate an oasis-like area where serenity and comfort take center stage.

2.2 A space for community

From a social standpoint, water features are capable of **becoming gathering places**, fostering community interaction and enhancing the overall livability of urban areas. By providing natural cooling opportunities and chances to engage in social encounters, they set a fertile ground where people naturally want to gather and take a pause, promoting community interaction and social cohesion.



2.3 A wise investment for economic development

Water features also have the capacity to enhance the livability of urban areas, contributing to economic development by boosting property values.

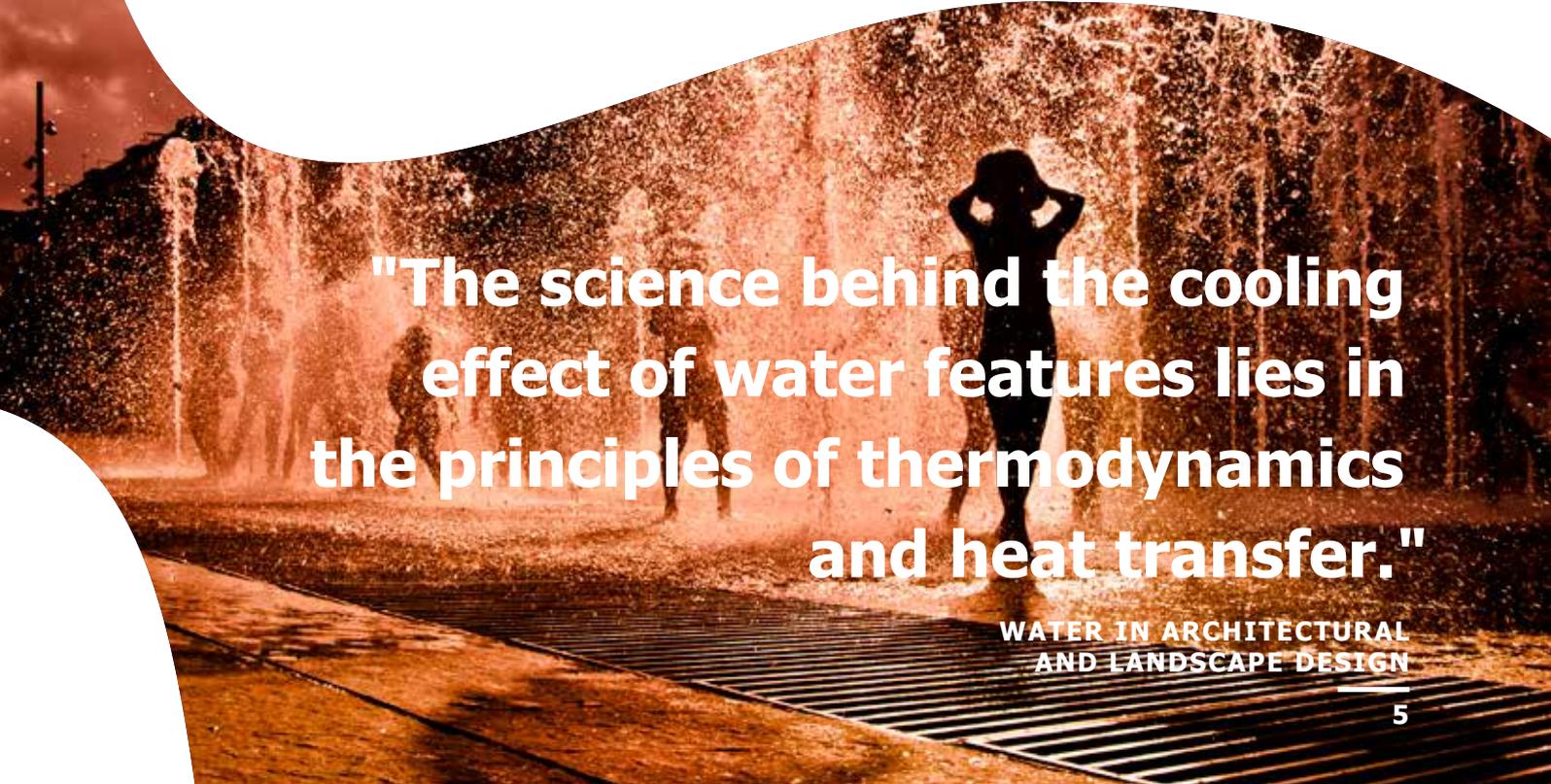
Additionally, water features are also famously capable of acting as a tourist magnet, with the **Trevi fountain** in Rome, the **Fountains of Bellagio** in Las Vegas and the **Magic Fountain of Montjuic** in Barcelona all being examples of this.

As such, water features are capable of **transforming a previously generic, and less-traveled urban space** into a more pleasant and stimulating environment that more people want to visit.

2.4 A sustainable option that mitigates urban heat naturally

From an environmental perspective, the mitigation of **urban heat islands** stands out as a key benefit in this context. This phenomenon occurs as concrete and asphalt surfaces absorb and retain heat, resulting in elevated temperatures compared to surrounding rural areas. A phenomenon that has detrimental impacts on public health, infrastructure, and the environment, and which sees an ally in well-designed water features.

The science behind the cooling effect of water features lies in the **principles of thermodynamics and heat transfer**. Water has a high heat capacity, meaning it can absorb and store large amounts of heat energy. When water is exposed to the sun's radiation, it absorbs heat, causing it to evaporate. This process of evaporation requires energy, which is drawn from the surrounding environment, including the air and nearby surfaces. As a result, there's a **temperature decrease** in the surrounding air and surfaces, leading to a cooling effect.



"The science behind the cooling effect of water features lies in the principles of thermodynamics and heat transfer."

As water in fountains moves, it enhances the efficiency of heat transfer compared to stagnant water. This is because moving water facilitates **convective heat transfer**, whereby heat is transferred from the warmer ground to the cooler air above.

Across the world, water fountains and other aquatic facilities **provide an opportunity for people of all ages to cool down**, by dipping their feet in the water, passing through the jets of a deck fountain, or just by splashing their faces to freshen up.

A notable real-world example of the cooling benefits of water fountains can be found in the city of **Singapore**, which has implemented an **extensive network of water features**, including fountains, ponds, and waterways, as part of its urban planning strategy. By strategically placing water fountains into public spaces, Singapore has successfully mitigated the urban heat island effect, creating a more **comfortable and livable** urban environment.

2.5 Water features as an education opportunity

Initially introduced with **dry-deck fountains**, this idea has evolved to include a wider range of **interactive water features**. With the incorporation of playful elements such as water mills or interactive jets, these fountains can provide learning opportunities on physics and environmental science, from energy principles to the water cycle and sustainability.

These features effectively **bridge the gap between play and education**, making the learning process more enjoyable, while also fostering a culture of ecological responsibility. Some examples of water features that offer learning opportunities include:

- **Big water screws** to lift water can illustrate how screws work and how we can move water uphill with less effort. A great way to link water education and physics.
- **Water levers and pulleys** that change the water flow, learning about force and how machines work, while encouraging problem-solving.
- **Mini hydro wheels:** a small water wheel can show how we can turn water flow into energy and learn about renewable energy.
- **Touch-sensitive jets and water mazes** can demonstrate fluid dynamics and cause-and-effect, illustrating flow, pressure, and resistance.
- **Rain curtains with variable intensity:** by adjusting the fountain's intensity, visitors can explore precipitation patterns and their impact on water cycles and its management.



03

THE TOP WATER FEATURES TO ELEVATE YOUR ARCHITECTURE OR LANDSCAPING PROJECT

3.1 Swimming pools

Swimming pools remain a staple in residential, resort, fitness and community designs. These oases offer a respite from the daily grind, providing opportunities for **exercise, relaxation, and socializing**.

Key design parameters for swimming pools

In contemporary architecture, swimming pools should aim at **seamless integration** into the surrounding landscape, creating a harmonious blend of nature and human-made structures.

Additionally, modern pool designs are able to **activate top energy efficiencies**, utilizing advanced filtration systems and sustainable materials to minimize **environmental impact and operational costs**. We explore the key opportunities for sustainable design in water features below in this ebook.



3.2 Fountains

Fountains have transcended their utilitarian origins, evolving to become sophisticated installations that blend **artistic expression** with **engineering ingenuity**. Such is the case of interactive water displays, synchronized with light and sound, which have become focal points for **enhancing ambiance in public spaces**.

Beyond their aesthetic appeal, fountains play a crucial role in promoting environmental health. They aerate water, improving its quality, and help **mitigate the urban heat island effect** by cooling the surrounding air. Additionally, the soothing sound of flowing water can mask the harsh noises of urban environments, creating more tranquil and inviting spaces.

From tranquil backyard ponds to bustling urban fountains, the **diversity of design choices** ensures that every space can be enhanced with the beauty and functionality of water fountains. Among the top options today, the following stand out:

- **Vessel or basin fountains:** perhaps the common fountain design, they feature a base or basin design that collects water, preventing splashing, and typically adorn urban parks and gardens, often adding ornamental sculptures.
- **Waterfalls:** integrated into parks and urban areas, they utilize variations in terrain height to simulate natural cascades. Beyond their aesthetic allure, they produce soothing sounds and captivating visual spectacles, enhancing the ambiance.
- **Dry-deck fountains:** common in modern cities, they feature multiple jets emerging from zero-depth pavements. These fountains create refreshing atmospheres, serve as meeting points, and offer playful interaction opportunities for children.
- **Water mirror fountains:** installed at ground level, they create motionless sheets of water, evoking elegance in gardens and parks while also fostering relaxation.
- **Floating fountains:** floating fountains are among the most popular choices for gardens and green spaces. Their resemblance to natural springs creates a refreshing and cooling ambiance, making them an ideal choice for enhancing outdoor environments. Floating fountains can also be conceived as **large-scale watershows** in rivers or lakes, creating a meeting space in which to admire water choreographies.



Key design parameters for fountains

Modern fountains often incorporate **intricate plumbing systems** and powerful **pumps**.

When it comes to sizing, the **size of the pond or basin** significantly influences the appropriate fountain size. Achieving a balance is key here: overly large fountains can dominate small ponds, creating a cluttered appearance, while small fountains may fail to make a visual impact in larger bodies of water.

Fountain size also dictates the **patterns** it will create. Mismatched sizes could lead to excessive water dispersion, potentially depleting the pond. Thus, prudent evaluation of pond size is essential in selecting appropriate fountains for gardens or parks.

Particular care must be dispensed when it comes to **lightning systems**. Powered by high-performance LEDs and advanced optics, these enhance fountains' allure during nighttime, adding interest to evening fountain displays.

Modern fountain lighting designs present long-lasting, user-friendly solutions, effectively illuminating various fountain types with every nozzle pattern included. Each distinct light fixture offers **customizable colors, speeds, and brightness levels**, allowing for dynamic visual effects tailored to any setting.

Beyond aesthetics, there are **significant biological benefits** to operating fountains throughout the night. During nighttime, oxygen levels in water bodies decrease as photosynthesis slows, leading to reduced oxygen production. Additionally, natural wind and wave action typically diminish during nighttime. Running aeration equipment, including fountains, **helps maintain healthy oxygen levels**, supporting aquatic life.



3.3 Artificial lagoons

Artificial lagoons have emerged as a popular way to bring the beauty and serenity of beaches to landlocked areas. An attractive addition to **resorts, residential communities, and urban centers**, they provide a welcomed escape from the stress of urban life and quickly become a stand-out feature for high-end projects.

These expansive bodies of water offer **various recreational activities**, from swimming and kayaking to paddleboarding and sunbathing. As such, they offer more than just a beautiful view: they provide a place for recreation with a variety of activities and services, transforming any development into a slice of paradise.

But it's not just about aesthetics: it's about business, too. Lagoons are a significant draw for potential guests, **increasing property value** and generating a **strong return on investment**.

Lagoons offer a **highly marketable amenity** that attracts tourism and enhances the user experience, and which can be adapted to different geographical situations and climatic conditions. Whether opting for freshwater or saltwater systems, the **flexibility in lagoon design** allows for customization based on the location and target market. Meanwhile, a strategic integration of **technical systems** ensures that operational efficiency is maintained while the aesthetic appeal of the lagoon becomes a key draw for visitors and residents.

All in all, artificial lagoons represent **safe and serene water environments** for families to enjoy, free from strong currents, sharks, jellyfish, or other environmental hazards. Additionally, the inclusion of **promenades and restaurant areas** offer **further entertainment options** for guests, while also generating **increased business opportunities** for operators.

In fact, for real estate and hospitality developers, a man-made lagoon can significantly **enhance the revenue, marketability, and value of a property**. The lagoon stands out as a unique luxury feature that attracts users, buyers, and investors looking for premium amenities. In fact, [studies have shown](#) that both surrounding services and properties near water features typically **command higher revenue**, making lagoons a strategic investment.



With the key sustainability measures we explore below in this article, man-made lagoons also become an influential project that aligns with today's environmental values..

Design parameters for artificial lagoons

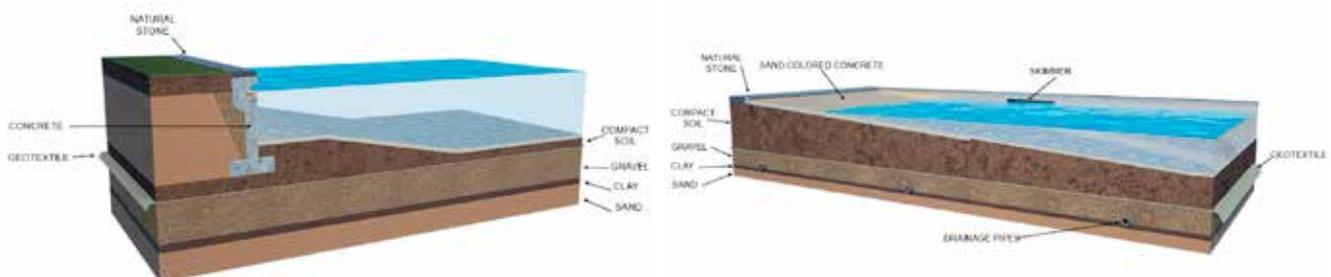
Creating a successful artificial lagoon requires careful consideration of various design and engineering elements. From the shoreline to the placement of technical equipment, every aspect plays a crucial role in the lagoon's functionality, aesthetic appeal, and long-term sustainability.

- **Beach zones and perimeter walls**

Fluidra's man-made lagoons feature distinct solutions to create an appealing shoreline, providing both beach zones and "pool-type" perimeter walls. To accommodate a wide range of activities, Fluidra lagoons usually feature a maximum depth range between 1.5 and 2 meters, with a waterproof PVC liner on the bottom.

The beach zones replicate a natural shoreline, providing a gradual slope into the water, which enhances user safety and creates **an inviting transition from land to water**, invoking the feeling of a natural paradise. This solution provides water tightness with a double layer of protection, formed by a concrete base and a liner installed on top of the concrete or underneath.

The **perimeter walls**, typically located in deeper sections, provide structural integrity, supporting the lagoon's shape while helping to define specific areas for different uses, such as swimming or wading, as well as restaurant and bar areas. This solution is composed of a concrete wall and an optional stone coping.



- **Optimized piping and water return systems**

A critical aspect of Fluidra's engineering innovation is the **optimized piping system**, which improves hydraulic efficiency and **reduces energy consumption**. Wall and bottom nozzles circulate water throughout the lagoon, ensuring complete and uniform water circulation. This even distribution of water helps to avoid stagnation and maintains water quality, supporting the overall performance of the lagoon's filtration and disinfection systems.

By optimizing the piping layout, Fluidra minimizes pressure losses, which is particularly important in large-scale projects. This approach results in a more energy-efficient system, **reducing operational costs** while ensuring the water's pristine condition.

- **Strategically located technical rooms**

Fluidra strategically places **multiple small technical rooms** around the lagoon. This is a key engineering strategy to house critical equipment such as pumps, filters, and control systems: by distributing technical rooms in proximity to specific lagoon areas, it's possible to reduce the length of required piping, further decreasing friction losses and energy use.

Additionally, these technical rooms are thoughtfully integrated into the surrounding landscape to remain hidden from view, maintaining the lagoon's visual appeal while ensuring easy access for **maintenance and operational efficiency**. This approach is particularly beneficial in **high-density developments**, where space is at a premium and mechanical systems need to be discreet.

- **State-of-the-art filtration and temperature control systems**

These are in charge of ensuring that the water remains pristine and enjoyable throughout the year, regardless of actual climate conditions. We discuss these further down the article as an example of optimized design for top efficiencies and minimizing maintenance.

3.4 Wellness centers

Water has long been recognized for its therapeutic properties, with modern wellness centers embracing this knowledge.

Mineral springs, thermal baths, and hydromassage beds offer a range of **health benefits**, including improved circulation, reduced stress, and pain relief.

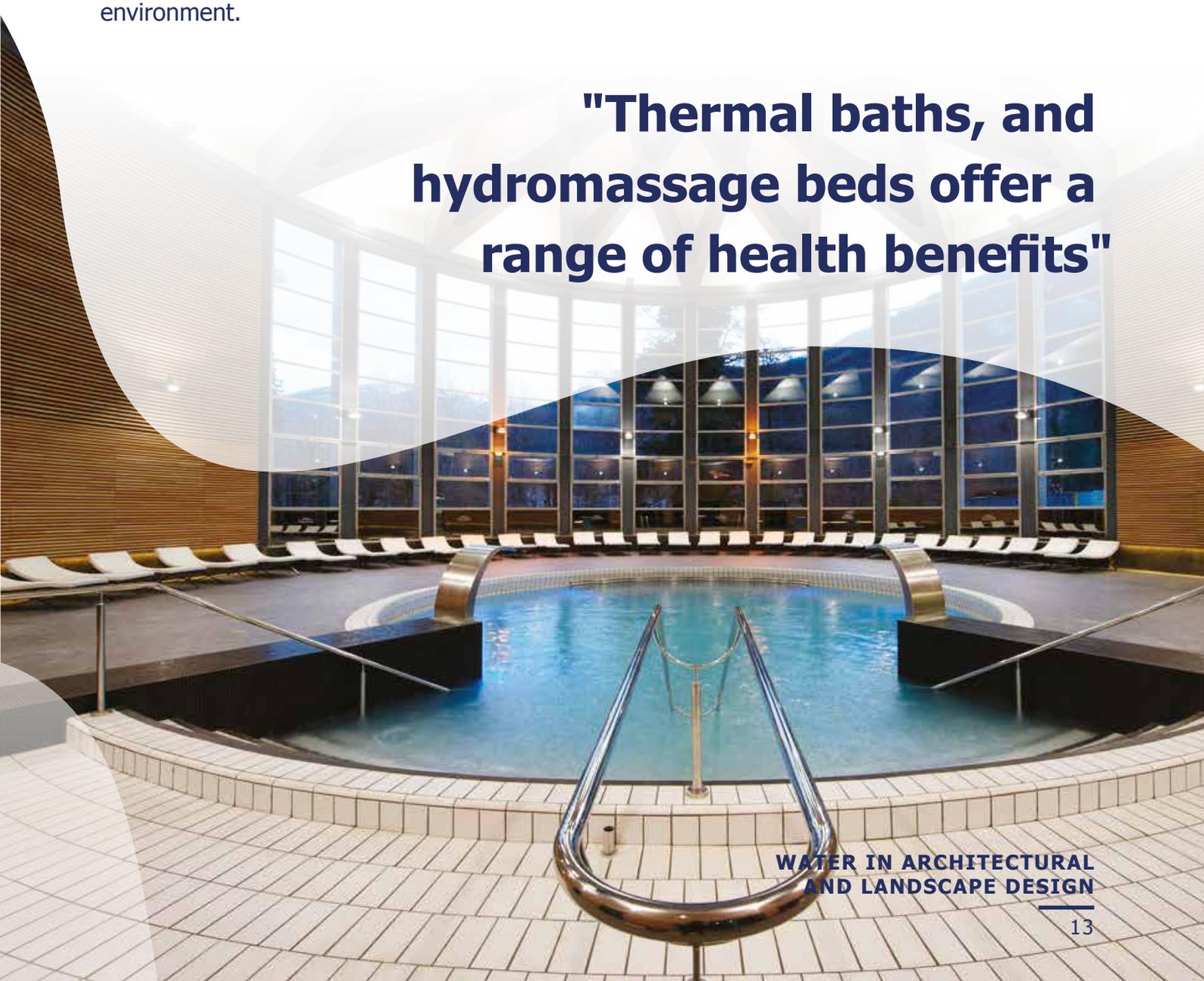
Design parameters for wellness centers

The design of these aquatic spaces is crucial, as the **aesthetics and ambiance** play a significant role in creating a relaxing and appealing experience for users. As such, wellness centers require careful design notions, which must be tailored to the specific water features incorporated into the facilities.

For instance, **hydrotherapy pools** often utilize strategically placed jets and varying water temperatures to target specific muscle groups and promote relaxation. **Thermal baths**, on the other hand, harness the natural heat of geothermal sources to offer a soothing and therapeutic experience.

Additionally, from a general perspective, the design of these facilities must consider factors like **acoustics, lighting**, and the **use of natural materials** to create a serene and calming environment.

"Thermal baths, and hydromassage beds offer a range of health benefits"



3.5 Themed aquatic facilities

Themed pools and customised pool spaces stand out among the current options in water features. They tend to be part of more complex and extensive design and conceptualisation processes, such as those related to large resorts, high-end campsites and water parks.

In themed pools, **concept design** is fundamental, an architectural and design process that seeks to align spaces with each project's requirements and potential uses. This requires the cooperation and integration of a **wide range of experts and disciplines**, with the aim of delivering efficiency and sustainability for each project while also crafting unique themed water features that add value to both guests and operators.

From **safari-style** to **tropical Polynesia** areas or **pirate adventure zones**, the possibilities are endless, and can be paired up with adjacent services with the same design style including restaurants, bars, or shops. Great conceptualisation and design also open the door to provide a wide variety of services, including **water shows, music spectacles, water parks, swimming pools and ornamental features**.

All in all, it's about building a **cohesive experience** aimed at exceeding customers' expectations and feeding their fantasy of being part of a themed experience.

Among the benefits of themed water features, the following stand out:

- **Differentiation:** themed water areas remain a surefire choice to stand out and deliver a memorable experience for users. From a marketing perspective, this is the ultimate winning formula, as these users are likely to become promoters and loyal customers.
- **Capturing market niches:** themed pools offer the possibility to create spaces directly aimed at target audiences and specific customer profiles, from children and families, to adult couples, young people...
- **Customer retention:** themed water features are designed to retain customers for an extended period of time, as they see their experience enhanced. Typically, the addition of a number of profit-making activities (such as shops, restaurants, sports activities, water shows or other services) can increase turnover and retention.

"the possibilities are endless, and can be paired up with adjacent services with the same design style including restaurants, bars or shops"



04

AN IN-DEPTH LOOK AT WATER FEATURE DESIGN

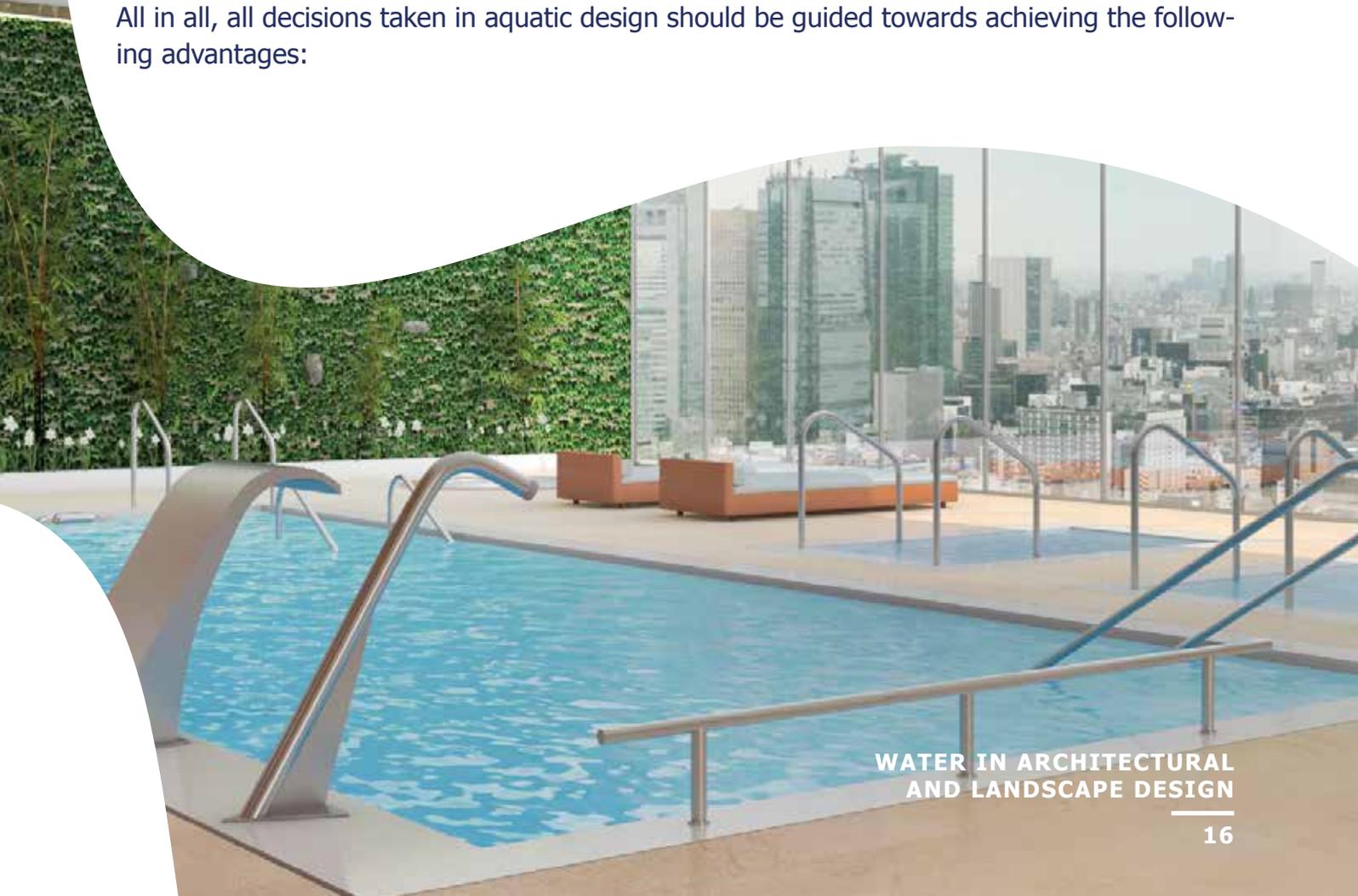
4.1 Why thoughtful design in water features matters

An aquatic installation has the potential to become the **heart and soul** of any space. However, it takes the right combination of **professionals, technologies and expertise** working in sync to achieve an innovative, reliable and sustainable aquatic project that stands out and remains efficient in the long term.

From this perspective, aquatic design represents a **foundation** for the whole project, providing a solid ground from which a successful aquatic installation can be built upon.

The sheer number of decisions and their mid and long-term processes can be intimidating when undertaking such work. As such, the right approach to aquatic design provides a **holistic perspective** for considering all significant aspects in a project. These include the project **aesthetics** and architectural appeal of aquatic spaces; its **sustainability** and **energy-efficiency**; the most adequate **manufacturing** and **construction** processes; and the incorporation of **technologies** and **automated smart features**.

All in all, all decisions taken in aquatic design should be guided towards achieving the following advantages:



- Optimal **performance** of installations, which remain reliable, efficient and durable.
- **User satisfaction and safety.**
- **Added-value** for commercial businesses seeking to boost their economic performance and accelerate the Return on Investment (ROI).
- **Low environmental impact.**
- Optimized **maintenance** operations.

When aquatic design informs **every stage** of a project, the work of engineers goes alongside the **architects, public authorities, developers and stakeholders** involved to achieve the goal.

4.2 The 4 stages of aquatic design

The most successful aquatic design projects are implemented employing a **360° approach**. Applied from the very beginning of a project's conception, this perspective implies clients and expert teams **work hand in hand** during all of its stages with a common goal: to achieve an efficient installation that's economically feasible and adds value to users and operators.

Following a step-by-step process where consulting, engineering and design take the lead also guarantees compliance with **international standards**, meeting construction **deadlines** and using the adequate **technologies** for each particular project.

1. Consultancy

This first stage includes the preliminary **feasibility** studies, general **space distribution** and **user circuit definition**. Starting right from the very first meetings between clients and designers, experts must ensure they get an accurate idea of the kind of project their client has in mind.

2. Concept Design

The Concept Design stage is where **unique, innovative ideas** are put forward. At the same time, it's crucial to remain in line with the technical and financial framework set out in the project brief.

3. Developed Design

At this stage, aquatic solutions and technologies are **integrated to final designs**. This involves both defining the requirements for the technical rooms and providing the information needed to draw up an estimate for the project.

This is the right moment to examine the feasibility of modern construction techniques such as **modular pools**, as well as to suggest the **pool equipment options** that can be incorporated for enhanced efficiency, among other things.

4. Detailed Design

At this point, the design team is in charge of developing every aspect of the aquatic solution. This includes all required **units, systems and accessories**, as well as managing any work in other environments.

As a result, the solution is modeled and the entire aquatic project is documented, including the location of all equipment and elements, the project's **construction details, floor and section plans**, as well as detailed lists of **materials** and the **PIM (Project Information Model)**.

4.3 Project management: the last step for a successful aquatic design

While project management is not strictly a part of design, it's a key step to ensure **perfect plan execution**.

Moving on from design to implementation, the **correlation** between aquatic design decisions and the project final execution will be vital. That's why it's advisable for project management to be **integrated from the very beginning**.

This key role belongs to the **Project Manager**, a person responsible for planning, managing and leading a team's work and resources in order to successfully meet the project's objectives. In other words, the Project Manager successfully **turns an aquatic design project into reality** by managing the installation and supervising the work end-to-end.

The PM's main tasks include **scheduling, coordinating, monitoring** and providing **support** from start to finish to all the different parties involved in the project, all while complying with the highest **quality standards** and within the established timeframes. Among his key roles it's also becoming the **contact point** for the client.

"The correlation between aquatic design decisions and the project final execution will be vital"



4.4 Key factors for achieving great water feature design

Designing aquatic facilities that match your brand

The modern hospitality industry has evolved to offer **varied experiences** for users. The winning formula means each hotel and resort develops their swimming pool as a **manifesto for their approach to hospitality**.

This means all amenities and stylistic choices, including the possibilities in location and atmosphere, must remain **coherent and aligned with their target customers' desire**. In order to do so, there are at least 2 factors that can act as guiding principles any design decision:

- **The business' architecture and style:** it's important for water features to match all previously existing architecture options (or ideas of them) in terms of aesthetics.

For instance, a modern building decorated primarily in inox and glass and a simple colour scheme could add some minimalistic options, such as a **lap pool**, a **zero edge pool**, or even an **outdoor spa pool**. In terms of design, a glass or **stainless steel pool** will fit into a modern setting, while marble tiling can enhance the ambience of a pool area.

However, an example of matching aquatic features for more traditional or rustic types of infrastructure could be **ornate spas and relaxation pools outdoors**, with matching terracotta stone designs; or wood decking for a chalet-style hotel. Some operators could opt for a sleek, modern spa design, which sits separately from the rest of the hotel; however, to emulate a mountain chalet, a wooden, warm-hued spa design would fit perfectly.

Water features should also be made to match the business' overall style and branding. From **indoor vessel fountains**, to a **water show, cascades**, and **dry deck fountains**, all provide a multifunctional, dynamic and refreshing environment that can be made to match each space's aesthetics and act as a brand signature.

- **Available space:** small spaces can maximise their opportunities choosing adequate water features. For instance, a **lap pool** can be a great leisure option for any type of customer, from regular tourists to business travellers. Properties with reduced indoor space could choose a **vitality pool**, a **sauna** or a **hot tub**. Alternatives for small spaces also include **rooftop pools** or **single lane lap pools**.



Designing that prioritizes sustainability

The integration of water in architecture is not just about aesthetics: it's also about the project's sustainability and social responsibility. Advancements in installation techniques ensure **minimal disruption** to the surrounding environment and a minimal environmental impact, seeking energy efficiency and **minimizing water consumption**.

In fact, sustainable design can be applied to water features in various ways. **Water recycling systems, rainwater harvesting,** and the use of **solar-powered heating and filtration systems** are just a few examples of how architects and engineers minimize environmental impact.

Artificial lagoons represent a prime example of how some of the key sustainable design principles can be applied to make a difference:

- Fluidra's water treatment systems, particularly our high-efficiency pumps and filtration systems, offer **significant water conservation benefits**. These filters' low water consumption, combined with the energy-efficient design of the pumping and circulation systems, reduce the lagoon's environmental footprint. This makes man-made lagoons a viable option for projects focused on sustainability and green building standards, balancing luxury and environmental responsibility.
- -Additionally, Fluidra's innovative use of smaller, decentralized technical rooms and optimized piping systems significantly reduces the space required for mechanical installations. This not only maximizes the available land for development but also **decreases the lagoon's overall energy consumption**.

Incorporating technology for top efficiencies

Technological advancements continue to push the boundaries of what's possible in aquatic design. However, technology is not applied in a vacuum or as an end in itself, but serves the purpose of **achieving a project's overall goals** such as operating efficiently, both in environmental and economical terms.

As such, the **Building Information Modeling (BIM)** brings together information related to geometry, space, geographical location, costs, sustainability, life cycle, infrastructure maintenance and all components, allowing for a 360° perspective.

The advantages of BIM methodology are all related to this model's capacity to **anticipate construction processes** and potential issues. Compared to traditional design approaches, the benefits of a project guided by BIM models include:

- Optimization of **investment decisions** by comparing functionality, scope and costs.
- Generation of a **comparative analysis for environmental options**, comparing energy and environmental requirements in order to choose the most adequate solutions.
- Facilitating **collaborative developments** where design and construction teams are able to work in sync, having visibility of the project's development and installation data, from the design phase to its construction, use and maintenance.
- Improving **quality assurance** and **data sharing**, resulting in a streamlined process.

Other methodologies, such as **CFD (Computational Fluid Dynamics)**, are based on numerical computational models that are able to simulate **fluid behavior**. Through this methodology, it's possible to **predict** the evolution of the **physical-chemical characteristics** of water, such as speed, temperature, and other variables, accessing valuable information for aquatic design decisions.

Finally, **Virtual Reality** is implemented once the final design is completed and before the construction phase begins. At this crucial stage, virtual reality systems generate an **immersive experience** of the future aquatic installation using rendered images and 3D designs, bringing the project to life beyond what earlier, conventional drafts were able to do.

Design that prioritizes water quality and low maintenance

The best design practices for water features prioritize water quality and ease of maintenance alongside aesthetic appeal.

**"Technology serves
the purpose of achieving
a project's overall goals"**

As an example, let's look at the comprehensive strategies employed by Fluidra for ensuring water quality and top maintenance in artificial lagoons. A **360° approach** to maintenance and management that encompasses **water recirculation, filtration, disinfection, and replenishment** through a series of technologies and strategies, including:

- An **advanced aspiration and impulsion system** maintains the highest water quality standards. Water is aspirated through a combination of surface skimmers and bottom drains, ensuring both floating debris and settled sediments are removed. Typically, around 70-80% of the water is aspirated from the surface via skimmers. The remaining 20-30% is drawn from the lagoon floor via bottom drains, preventing the buildup of heavier particles and ensuring complete water circulation.
- Once collected, the water is directed to the **filtration systems**, including sand or regenerative media filters (e.g., perlite). Sand filters combine water and air during the backwashing process, reducing water waste by up to 50% compared to conventional systems. Regenerative filters use significantly less water—around 2 liters per filter per backwash cycle—making them a highly sustainable option.
- After filtration and disinfection, the water is returned to the lagoon through **impulsion nozzles located along the walls and base of the lagoon**, promoting thorough circulation and preventing dead zones. This step culminates the entire water treatment process, from aspiration through disinfection, which typically takes 6 hours (although this time can vary depending on the size and design of the lagoon).
- **Disinfection water treatment** is different for freshwater and saltwater lagoons. In the case of **freshwater lagoons**, it is typically managed using **chlorination systems** similar to those employed in swimming pools. In addition, UV disinfection systems are often installed to provide a secondary treatment layer.
- Meanwhile, **saltwater lagoons** rely on **electrolysis** to generate chlorine naturally from the salt dissolved in the water. An environmentally-friendly process which eliminates the need for chemical storage and handling. Additionally, saltwater systems are often supplemented with UV treatment to enhance disinfection and reduce chemical use.
- In both cases, water is continuously monitored and adjusted through **automated control systems**, ensuring consistent quality and compliance with health regulations.
- **Water replenishment** is crucial for compensating for evaporation and maintaining water levels. On one hand, freshwater inputs are **regulated to minimize waste** and ensure the lagoon remains within optimal operational parameters; in the case of saltwater lagoons, replenishment requires adding water and balancing salinity levels.

This example illustrates how optimal design choices can **make a difference in water quality** but also on the project's overall operational costs and environmental impact. However, each particular water feature will require a tailored approach to design that understands the project's needs and fulfills its full potential.

05

UNLOCKING THE POTENTIAL OF WATER FEATURES FOR HIGH-IMPACT PROJECTS

Across the text, we've seen how well-designed water elements offer a **lasting value for high-impact projects**.

From elevating an area's **economic potential and interest**, to contributing to **community creation** and **mitigating urban heat**, water-based facilities are currently transforming projects of all scales around the world.

As the emphasis on the quality of built environments and the need to differentiate grow, water features stand out for their **unique capacities** to enrich users' experiences and any area where they are installed. A potential deep-rooted in human history and that still holds true today, enriched by the possibilities offered by technological advancements towards further efficiencies.

At the heart of fulfilling water features' potential is **optimal design**, which encompasses not only water features' aesthetics, but also aims at maximizing efficiencies while reducing their environmental impact too.

This is where **Fluidra** comes into play. We develop **innovative, highly technical and sustainable water solutions** that match our clients' vision and needs.

By providing **one-of-a-kind water feature design** rooted in cutting-edge methodologies and technologies, our water facilities put sustainability and energy-efficiency at the forefront. This results in water features that generate **unique end-user experiences**, elevate any architecture and landscape project and **accelerate ROI** for operators.



- [How water in architecture transforms space, communities, and urban development](#)
- [Creating a slice of paradise with man-made lagoons](#)
- [Designing floating fountains for gardens and parks](#)
- [Water fountains: advantages for urban development](#)
- [Nurture water education and environmental awareness with refreshing, fun fountains](#)
- [Aquatic design: the key to a successful installation](#)
- [Themed pools: the campsite ideas leading the sector's transformation](#)
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