

## **Reflexive Thermae**

ACSA-AISC Student Design Competition, Aquatic Center, May 2006

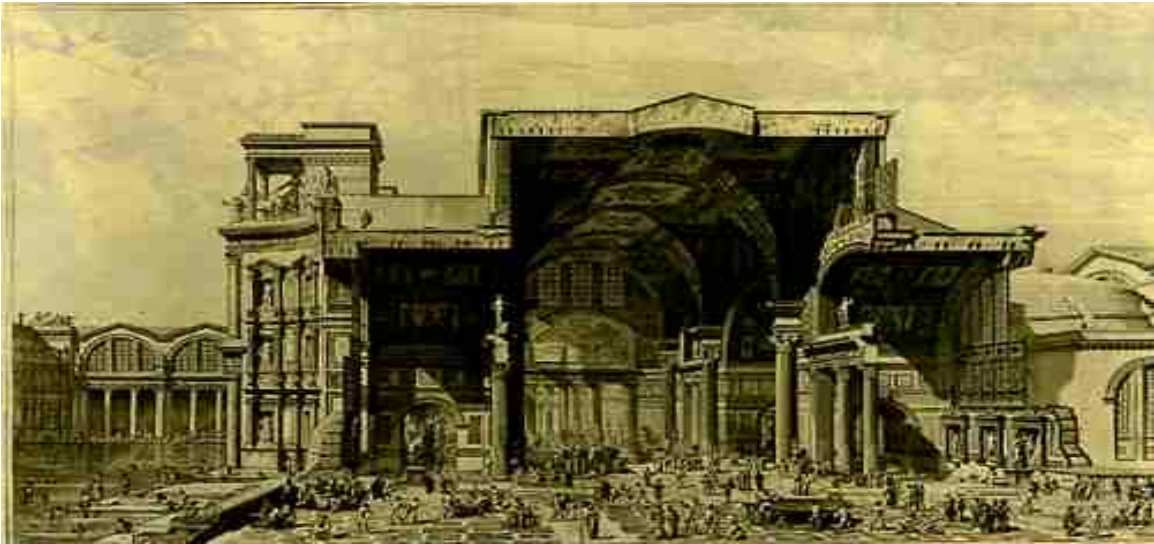
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Increased consciousness of the rising rates of stress, obesity and heart disease amongst the citizens of First World countries has led to a great deal of emphasis on the role of exercise in maintaining healthy lifestyles – particularly in urban areas. Amongst the most effective and enjoyable forms of exercise is swimming. Swimming is a superior form of exercise that reduces dangerous stress on joints and bones, while maximizing a strenuous aerobic workout<sup>1</sup>. It is surprising, then, that a recently published report by the City of Toronto claims that pool usage in the Greater Toronto Area is significantly lower than most other urban centers in Canada and the United States<sup>2</sup>. Granted that its health benefits are widely known, and that 97% of Torontonians live within 3km of a public pool, the study does not fault lack of awareness or access, but rather the architecture of the pools themselves. The study suggests that a primary reason for the lack of usage is the generally poor quality and unattractiveness of Toronto's public indoor pools.

Taking this analysis of Toronto's pool system as a starting point, Reflexive Thermae seeks to build a new type of aquatic center that is fully integrated into the life cycles of a community. Beginning with a study of ancient Roman public baths (Thermae) the design draws upon their role as a vital civic hubs and places of daily ritual. Reflexive Thermae considers contemporary examples such as the Diamond and Schmitt's Toronto YMCA, as well as MVRDV's Sloterpark Swimming Pool as examples of aquatic centers that mix program in interesting ways and with compelling adjacencies. Rather than hermetic and mono-functional, this project will attempt for an integrative and dynamic approach to building pools. Similarly, a unique structural system that is assembled from unitized space-frame shells allows for dramatic and exciting spaces to unfold within the building.

The Roman Thermae approached bathing as a communal ritual. Most citizens lacked the luxury of indoor plumbing, and were forced to use the state-run Thermae as their primary means of good hygiene<sup>3</sup>. However, their use went well beyond pure practicality. In fact, the thermae were vital vessels for a wide range of social and business activities. Most large thermae took up several city blocks and contained “sports centers, parks, libraries, little theatres for poetry readings and music, and great halls for parties – a city within a city”<sup>4</sup>.



Although widely perceived in modern times as mere hedonistic enclaves, the baths housed a variety of social functions that modern man enjoys – albeit in a condensed and urban fashion. While the baths themselves demonstrated a great deal of architectural innovation, they are more significant for their programmatic cross-fertilization. As such, they serve as a useful model for future urban aquatic centers.

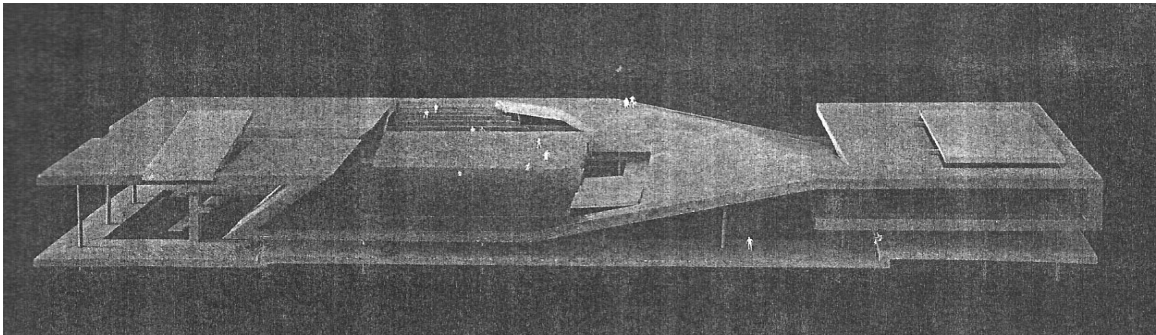
Of contemporary aquatic centers, the closest example of a successfully integrated and complex center is Diamond and Schmitt’s Toronto YMCA. The building contains two pools, an auditorium, gymnasium, classrooms, daycare, offices, restaurant, and other sports facilities at one location. The building is constructed as five different types of structure, each giving articulation to the activities that take place within. According to the architects, the “gymnasium,

training pool and large pool are conceived as public spaces or interior piazzas” connected by two perpendicular axis or internal streets<sup>5</sup>. Therefore the building can be characterized as a collage of structures, linked by a single unifying element in the internal streets. These streets allow for some visual penetration into the adjacent programmatic spaces and give a sense of activity and motion to patrons within.

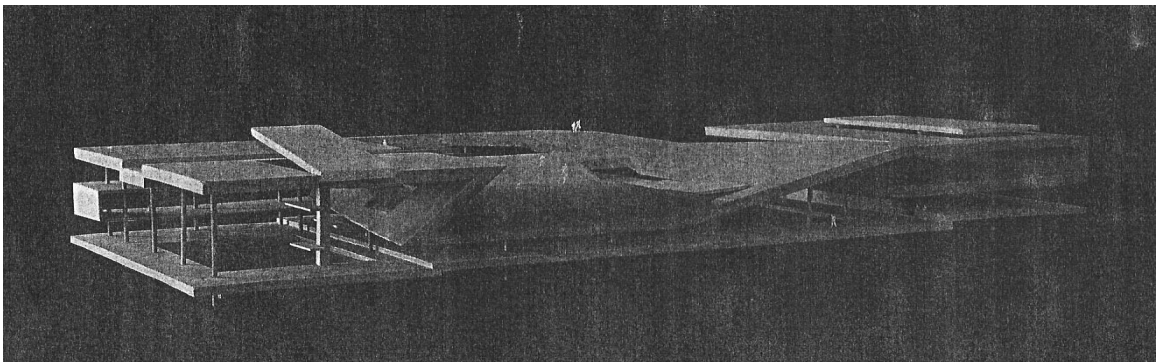


This project successfully created a walking narrative of sequenced spaces both in plan and section. From this project, I was able to draw two important features into my own: one programmatic and one formal. Similar to the Roman Baths, the Toronto YMCA attempts to integrate a variety of program into itself as to sustain a critical mass of activity and energy. According to the architects, this YMCA has the highest use rate for its members of any YMCA in Canada. This can be attributed to the variety of draws that bring patrons into the building. It can be expected, therefore, that an increase in the usage of any one particular feature would have a spill-over effect into the others and increase general usage. Formally, the complex programmatic interrelationships are sustained through a degree of visual penetration via the public circulation corridors. However I believe that my project will attempt to offer a more permeable face to the street and offer select visual penetration from the street as well as the

interior of the building, therefore baring the internal activity to the public and conveying a real sense of energy and vitality. This coincides with some of the conclusions reached by the Toronto Department of Parks and Recreations when they suggest that one reason for the lack of swims-per-capita is the generally poor visibility or “advertisement” that the facilities offer to the street. Therefore, a degree of spectacle is necessary to engage the passer-by and suggest to the surrounding community that the facility is truly open to the public.



MVRDV's competition entry project for the Sloterpark Swimming Pool in Amsterdam represents another approach to the design of an aquatic center that seeks for programmatic interpenetration and signature architecture. MVRDV deploys a strategy of “stacking” programmatic elements as opposed to Diamond and Schmitt’s horizontally linked “streets and piazzas”. The entire building is conceptualized as a “recreational landscape”<sup>6</sup> in which the folding floor plate generates a variety of sectional conditions and thus supports different activities below. Organizationally, the folds in the floor allow for visual penetrations throughout the structure, including a dramatic dip in the roof that cups a large suspended swimming pool that is closed off on one side with structural glass.



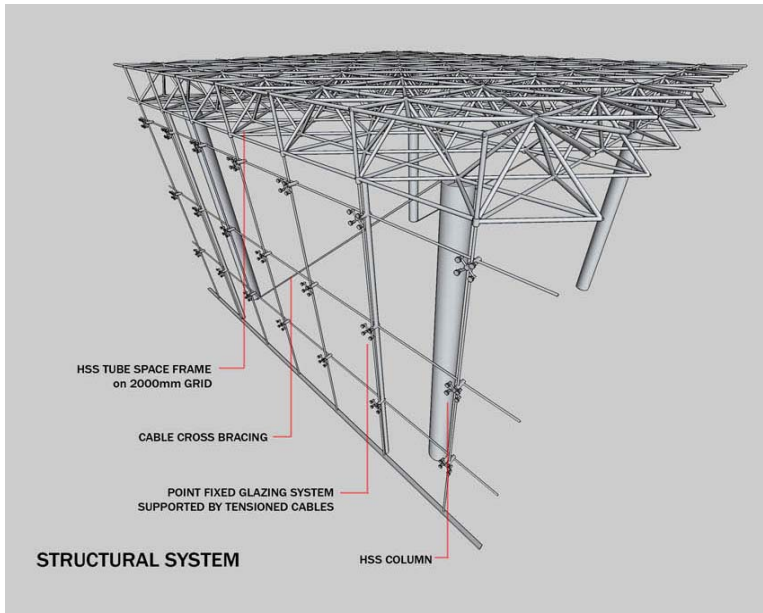
While the concept of folding floor plates is often overwrought with esoteric theory and currently a dated architectonic concept, the spatial results are often spectacular, as in this project. A number of double-to-triple height spaces contains hovering enclosures that include classrooms, squash courts, eating areas and other programmatic interventions beyond the base swimming pool. As such it would provide a great sense of activity when you are within the space, as well as communicate that energy outwards to the surrounding community through its extensive use of glazing. In terms of steel construction, although the project was never brought beyond the competition phase, several structural steel ideas were included in the proposal. The building is primarily supported by a grid of HSS steel column that hold up suspended box girders. Several very large girders are used to support the hanging swimming pool. In fact, MVRDV proposes that the steel is placed right in the suspended swimming pool – thus the very structure of the building becoming a strikingly foreign element in the aquatic landscape. However I believe there is a significant lack of lateral bracing present to hold up such large masses.

Therefore with the ideals of the civic Roman Thermae in mind, I developed a scheme that integrated structural concepts from the MVRDV project, and programmatic ideas from the Diamond and Schmitt YMCA.

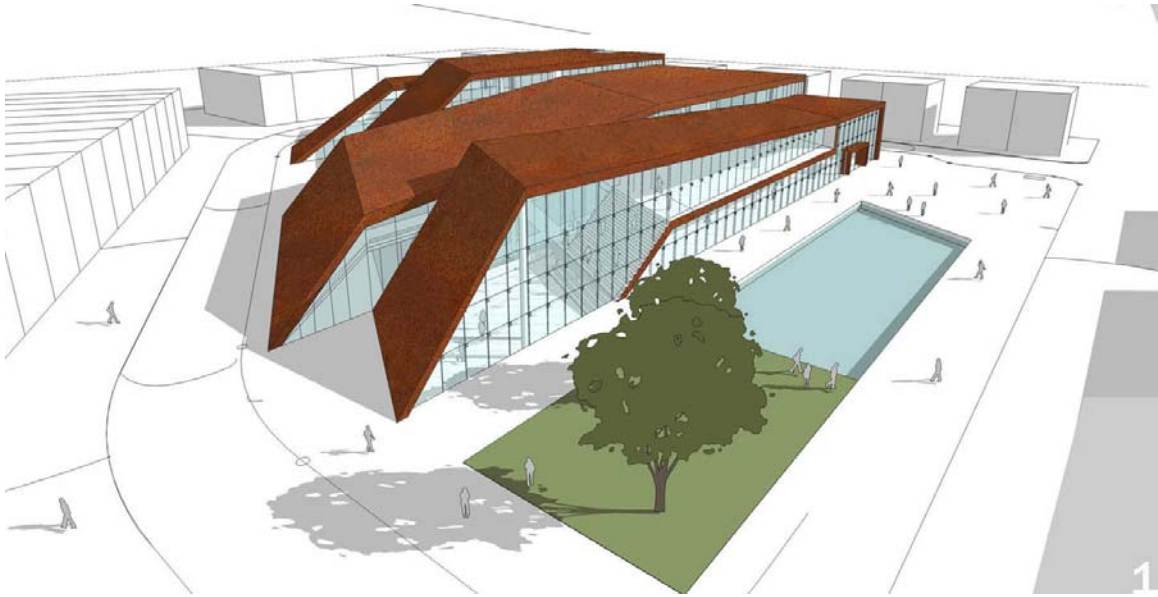


Beginning with the MVRDV base concept, I decided that the most efficient way to adapt that structure into something constructable with a maximum effect was to deploy a unitized space-frame system supported by HSS Steel Columns and laterally braced by cable stays. The space frame is a custom fabricated system made of round HSS pipes, constructed in a shifted box pattern, that are cut and welded together at each node. With a span of 1/25 the structural system

accommodates the 12-30m spans in all directions with depths of between 500-1200mm. Due to the absence of shear walls along the east-west axis (to permit visual transparency throughout the building), tension cables are used to prevent east-west lateral movement. To achieve similar transparency, the glass on the main façade and between the pool and the gymnasium is constructed with point fixed “spider” clamps and tension wires to support the system and provide wind-load resistance.



Organizationally, the building sets up a promenade from a park forecourt with exterior seasonal wading pool/skating rink, up through the main atrium and around the east of the building. The large program is organized in East-West bands, moving from the public atrium, to the pool, to the gymnasium. Across the upper level of the building, the shell of the roof folds in on itself and creates multi-functional public rooms that interpenetrate the main volumes of the building. Each roof shell is articulated as to play off of the geometry of its neighbours and allow generous amounts of light into the building. Similarly, they cut away from one another to provide views of interior activity to the surrounding community.



I found this competition to be very helpful in sharpening my understanding of the synergy between concept and structural design, as well as furthering my understanding of the social and civic issue surrounding public swimming in our city and its implications on health. Architecturally, it is difficult to navigate between the desire for radical programmatic intentions and the physical scaffolding to do it, but this type of exercise was fruitful in allowing me to discover those intricacies.

## END NOTES

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<sup>1</sup> <http://en.wikipedia.org/wiki/Swimming>

<sup>2</sup> <http://www.toronto.ca/parks/torontopools.htm>

<sup>3</sup> <http://en.wikipedia.org/wiki/Thermae>

<sup>4</sup> <http://www.cyberbohemia.com/Pages/massbathing.htm>

<sup>5</sup> <http://www.dsai.ca>

<sup>6</sup> El Croquis 86. "Mvrdv 1991-1997" [p56-63]