

Common Currency between Water and Cities

Architecture Education in the Era of Climate Change

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Blurring the boundaries between the disciplines of landscape architecture, urbanism and architecture is the order of the day. The Netherlands has a long tradition of cross-fertilization among the disciplines of landscape architecture, urbanism and architecture.

The enormous wave of urbanization, which is sweeping across the world, is concentrated in coastal regions and deltas, which to varying degrees display a relationship with the Dutch delta landscape. The relation between land and water plays a key role for both. Climate change and the rising sea level place this on the agenda with renewed urgency. The connections between urbanization and landscape development are crucial for being able to face up to this task
– Frits Palmboom.ⁱ

Introduction

This paper addresses the power of higher education to prepare students for roles in revitalizing natural reciprocities between the city and its source of life, water. Hurricane Sandy's blow to New York was a wake-up call to United States architects and politicians that *water and cities* pose major challenges for cities and is a primary *global common currency* in the era of climate change.ⁱⁱ Flood control, clean water, and public space must be integrated into architecture education to engage a broadened understanding of conflicts between urban growth and natural water systems for the city.

My graduate architecture studio researched and designed proposals for the downtown section of the Los Angeles County Revitalization Plan for the Los Angeles River. El Pueblo of Los Angeles was founded a safe distance from the River, with dedicated lands adjacent to the River for agriculture. Its aquifer provided sufficient

water through the first two decades of the Twentieth Century. The rapid growth of the city eliminated its flood plains; the 51-mile River was also paved for flood control,ⁱⁱⁱ exacerbating greater floods. The interdisciplinary topics for this studio investigation required that graduate architecture students don the hats of landscape architects, sociologists, and engineers. Through synthesizing interdisciplinary data, the architecture studio has a process to model design proposals for balanced reciprocities between *Water and Cities*.



Fig.1. Los Angeles River 1897



Fig.2. Paved Los Angeles River Today

The relationship between river ecologies and land use policies is a major factor in urban flooding. Cities exert a major impact on the health of rivers and are the most vulnerable locations for floods and water shortage. Urban rivers have historically been depositories of human waste, toxic chemicals, storm water runoff and agriculture waste. Land use policies that favored real-estate development in flood planes, destroyed riparian boundaries. To control seasonal floods in this Mediterranean type climate, the United States Army Corps of Engineers has converted rivers to engineered aqueducts, moving water more quickly to the ocean. Upstream reservoirs built by the Corp for flood control supported city growth and damaged habitats. Living rivers were thereby transformed to dead rivers. The Dutch water management strategy now is to return space to rivers.

In 1930 the Olmsted Brothers and Harland Bartholomew developed a privately funded plan, *Parks, Playgrounds and Beaches for the Los Angeles Region: A Report submitted to the Citizens/Committee.*^{iv} This investigation proposed that linear parkways be constructed adjacent to the Los Angeles River and its

tributaries as a natural protection from seasonal flooding. This would compensate for insufficient parks and green spaces in the city at a time when the land and roadway construction was still affordable. This comprehensive study was shelved by the Los Angeles County Regional Planning Commission and uncovered at the end of the 20th Century.

Other initiatives for roles in revitalizing city and water and appraisal of the theoretical framework

Beginning in 2000 Pritzker Award recipient Thom Mayne orchestrated collaboration between Art Center, University of California at Los Angeles (UCLA), Southern California Institute of Architecture (SCI-Arch) and Cal Arts, and bringing together the work of students from their respective film and photography, architecture and graphic design departments for design investigations of downtown Los Angeles. Published in *L.A. Now, Volume One* is a compilation of extensive research of Metropolitan Los Angeles; Volume; *Volume Two* presents seven student team design proposals for key districts of the downtown, including a Downtown River Park. Thom Mayne described the value of these studies:

Schools of architecture are necessary to the production of much needed innovation and inspiration in the planning of our cities. The intent of the L.A. Now design studies are to invigorate interest in Los Angeles as a project, promoting downtown as a territory for investigation. We are concerned with projects that instill this interest, from which other ideas will follow.^v

In 2006 Mayne's architecture firm Morphosis was commissioned to develop a design proposal for Los Angeles State Historic Park at a former riverfront train yards near China Town. Mayne's Urban Design commission for the State Historic Park was triggered by the discovery that the railroad was negotiating with a developer for a factory to be built on this land. Mayne's Preface to *Combinatory Urbanism* links his research

studios at University of California at Los Angeles with his professional urban design commissions.

The graduate design studios allowed us to recalibrate an approach that was initially more formal in its emphasis to something more strategic and tactical in its thinking. We believe that it is the responsibility of architects to engage the most difficult urban problems, analyze them objectively, and work uncompromisingly toward the realization of practical and poetic urban solutions.^{vi}

Another academic investigation of the Los Angeles River was initiated in a 1999 SCI-Arch seminar taught by Kazys Varnelis, and was further developed through the Network Architecture Lab of Graduate School of Architecture, Columbia University. *The Infrastructural City: Networked Ecologies in Los Angeles* expands concepts of urban infrastructure to include Watershed, Los Angeles River, Telecommunications, and Props of the movie industry. Varnelis explains that this book might be for a future kind of urban planner, designer, architect, or resident.

This kind of urbanism might very well resemble a hacker, in the best sense, re-imagining how to appropriate the codes, rules, and systems that make up the contemporary city and manipulate them so as to create not a plan but a new kind of urban intervention more appropriate for this century.^{vii}

These academic and professional studies, along with collective activism by ethnically and economically diverse neighborhoods for restoration of the River culminated in the development and estimated budget for the *LA County Master Plan for Revitalization of the Los Angeles River*, now available on the Los Angeles County web site.^{viii}

In fall 2012, I also taught a research seminar, entitled *Water and Cities*, to address flood control, clean water and public space on a global basis. Graduate students from China, India, Saudi Arabia, and the United States with undergraduate degrees in Planning, Landscape

Architecture and Architecture, researched the Yellow and Yangtze Rivers in China; a “trashed” river in Mumbai; Red Sea pollution and Riyadh water conservation in Saudi Arabia; storm water runoff in Atlanta, Georgia’s Chattahoochee River; and cumulative agricultural pollution and flooding the length of the Mississippi River. These investigations highlighted the global crises for flood control and clean water. In addition to this research, these students were assigned to provide potential solutions for these environmental catastrophes. The dialogue during this research reinforced the premise that “Water and Cities” is a *Common Global Currency*. Three of these students are applying the research in this seminar to their Masters of Urban Design thesis through studio-based modeling.

Studio strategies as a formative experience

The Studio Model, described by Clark Kellogg^{ix} uses design tools and problem solving skills that are unique within the architecture design studio; he argued that these processes can serve as models for creative thinking and problem solving in other fields. Creativity, he said, consists of three important dimensions. The first is domain or field specific knowledge. The second is the ability to imagine new possibilities and persistence at problem solving. The third is passion for the work. Kellogg elaborated on the tools as follows:

Synthesizing Information

Design studio teaches one how to value and make judgments about the different types of information. Designers understand filtering, valuing, synthesizing and ignoring information.

Comfort with Ambiguity *is the tolerance for uncertainty or multiple meanings – a key component of virtually all-creative work. For those who are comfortable with ambiguity new insights and solutions are more accessible.*

Visual and Spatial Literacy

Design is a process of creating things twice. The first creation is in the imagination. The second creation is in the real world. Visual and spatial literacy is essential. Spatial literacy includes relationships of space, time, and movement, including insights of how space and place influence human behavior, and this aptitude is a diminishing one in our era.

Modeling/Prototyping/Changing Scales

Modeling, as a problem-solving tool, is a powerful process of informed seeing; the very act of modeling is a process that very often reveals insights and meanings to the problem solver. The companion skill to modeling is working fluidly with the concept of scale; changing scale or changing context is a stunning problem solving skill.

Working Collaboratively

The studio is the learning lab for collaboration within the professional world, and one, which increasingly is interdisciplinary.

The ten-week studio was organized into teams of two students. Foundational research for the studio included the Army Corps of Engineer 30 year paving plan (1934-1964), *County Master Plan for Revitalization of the Los Angeles River, L.A. Now* -- the publication of UCLA architecture research studios directed by Thom Mayne, and case studies of successful river restoration in the city.

Understanding and Synthesizing Information: Student research blurred the boundaries between the disciplines of landscape architecture, urbanism and architecture. Analysis was undertaken at two scales. A macro-scale investigation of the Los Angeles River was focused on natural and some man-made features: topography, watershed area and former flood planes, nature of past riparian edges, green spaces and multi-modal transportation. A micro-scale analysis focused on land use in downtown Los Angeles

Downtown

- The historic footprint of El Pueblo and evolution of the city center.

- The illegible organization of the downtown plan. Reyner Banham attributed the difficult reading of the historic plan to multiple shifting of the Pueblo's Plaza off of the traditional cardinal axis, possibly due to flooding or earthquakes.^x
- Downtown Districts: Historic District, Bunker Hill, China Town, Little Tokyo, Toy and Art Districts, and Boyle Heights' Latino neighborhoods.
- Economic and ethnic equity conflicts between two sides of the River: East Los Angeles and West Los Angeles.
- Disconnection of Downtown from the River.

Transportation

- Pedestrian access and distances between the River and downtown districts.
- Sequence of the river park spaces and bicycle paths from the source of the River in the northern suburb San Fernando Valley, from the Santa Monica Mountains to the Downtown site, and finally to the Pacific Ocean.
- Transportation infrastructure: bridges, freight train from Port of Los Angeles, metro and long distance train lines, light rail, and train storage yards.
- Conflicts between terracing the riverbank and maintaining existing passenger train lines.
- Tradeoffs between train storage yards and expansion of landscaped riverbanks required for restoration – to give space to the river.
- Economic value of train freight lines from the Port of Los Angeles to inland routes.

Watershed

- Percentage of paved surfaces surrounding the site.
- Topography and storm water runoff.
- Comprehending the depth and width of the Los Angeles River.

Visual and Spatial Literacy: Student teams prioritized how the reclaimed riverbank would be utilized for distinct team design concepts.

- Social equity by providing an outdoor concert park on the east bank of the River.
- Strategies for wetland restoration and wildlife corridors.
- Pedestrian and bicycle connections between downtown districts and the river.
- Transit station for the approved California high-speed train.
- Terraced riverbanks to filter storm water rather than direct discharge into the River with multiple viewing platforms overlooking the River.
- Community gardens and a public market to bring the East and West Los Angeles residents to the river for social interaction and commercial gain.

Modeling and Changing Scales: Team concepts were translated to designs for terracing and landscaping the restored river edge through a series of hand-built physical models and scaled river section drawings. The building of physical models was a process of informed seeing, revealing insights and meanings unique to the team.

Student Statement: *Interface*

Jonathan D. Brodheim and Luis A. Burgos



Fig.3. *Interface* at Downtown Los Angeles

The channelization of the Los Angeles River by the Army Core of Engineers has removed the natural riparian habitat. By imposing an intervention as a means to control flooding, the City of Los Angeles has prevented riparian wildlife from migrating to areas where resources necessary to their survival are available. By creating a high-quality interface between a restored, natural riparian habitat edge and the hardscape of downtown Los Angeles, the city can resort to natural methods of flood control

that have multiple benefits. Interface is about amalgamating hardscapes with natural territory. Blending these two seemingly opposing edges allows the Los Angeles River to work with the environment rather than against it. The natural riparian habitat, demonstrates the role of green infrastructure within an urban context.

By adding in a wetland edge condition and expanding on the river's width, this portion of the Los Angeles River can begin to utilize natural methods of flood control. The river's overflow is soaked up by wetland components through small streams that subdivide the sloped terrain into separate bays. Layered adjacent to the wetland is another edge of river riff raff, with a graduated forest edge for the management of storm water run-off. These layers provide a transition between the river and the city. The western edge of the site is dedicated to a green promenade creates the gap of the bicycle trail between Griffith Park, in the Santa Monica Mountains, to Long Beach. A foot trail provides views to the newly restored Los Angeles River.

The studio experience, in which students manage or not to incorporate other elements and analogue cases within the project

The analysis of man-made features was analogous to site research for an architecture assignment, but the additional focus of natural features added a three-dimensional complexity to the study. To achieve a feasible design within a ten weeklong school term, teams were selective with their focus. Student teams designed the restoration of the River more successfully than they described the rationale for the urban connections, essential to an urban design study. During the production of the final presentation, team members divided tasks of model building, perspective drawings, and diagrams of the design logic. The design required working at a large scale for the one-mile length of the River designated in the Master Plan, while considering details of park through close up perspective drawings. Several teams accomplished this seamlessly; the other extreme was relatively incomplete or poorly crafted presentation boards and model. The majority of students praised the studio project for being one of the most exciting studios of their previous four years architecture studies.

Similar to constructed river restorations, partial concrete linings would be required and determined by Civil Engineers and Hydrologists. Urban design solutions were demonstrated through sequential digital close up perspective sketches.

The significance of the studio as a teaching and learning instrument for the future architect

Over the past four decades, in spite of Ian McHarg's urban ecology study^{xi}, architectural commissions for restoration of urban riverfronts has been limited to public space and festive retail. In practice, resiliency and risk reduction for water management of cities requires urban planners to regulate land use and reuse within a geo-hydrological context, governments to calculate fiscal value of natural resources in relationship to increasing expenditures for alternative water supply sources and hard flood protection, and for an educated public actively engage in these discussions. A prime consideration for the public in restoration of urban rivers is: Will the restoration of rivers be an *Urban Renewal* paradigm for diverse cultures as the victims rather than the beneficiaries? The architecture design studio, as seen with Thom Mayne's U.C.L.A. teaching, can play a role in building momentum for these changes.

As an architectural educator my studios have addressed *Water and Cities* in investigations of landscape urbanism and rising sea levels, with subsiding land for coastal cities of the United States. These studies within an architecture program coincide with coastal cities actively investigating strategies to lower risk and engage the public through competitions and academic studies, such as the Dutch collaboration with New Orleans, published in *Dutch Dialogues*. Case studies of urban rivers in the United States and the politics of engineered rivers are presented in *Rivertown: Rethinking Urban Rivers*.^{xii} *Landscape Architecture Magazine* has

featured restoration of rivers and reintroduction of wetlands adjacent to rivers in China and the United States. Town planner, Iain White, characterizes river flooding and lack of clean water in the city to ultimately be the result of irresponsible zoning decisions.^{xiii}

In the larger context of higher education, the Smithsonian Institution sponsored an exhibition entitled *The Phenomenon of Change*. Harold G. An exhibition book contains an essay of educator Harold Shane, entitled "The Role of Education." Shane polled obtained 132 widely respected international scholars in the natural and social sciences who recommended the following:

It was the consensus of these well-informed men and women that young learner - for their survival and for human living - should acquire substantial knowledge regarding; the need to conserve resources; global interdependence; the threat of "ecocide" caused by pollutants, soil erosion, and pesticides; economic trade-offs and equity problems; human vulnerability due to increasingly sophisticated weaponry; problems of information overload, of "info glut" stemming from the media.^{xiv}

In the 1970s an educator would have hoped that studio content and strategies inspired by Ian McHarg's would influence the values of the future architect as public citizen and the architect as a professional. In the Twenty-first century, graduate students would be puzzled if environmental issues, including flooding, clean water and public space, were missing from academic dialogue about the city and physical environment. The architecture design studio has the distinct advantage of hands-on evolution of a design, comparable to educational theorist John Dewey's "learning by doing." Scaled modeling, as a problem-solving tool, is a powerful process for informed seeing; the very act of modeling is a process that very often reveals insights and meanings its own to the problem entire solver.

Notes

i Drawing the Ground – Landscape Urbanism Today: The Work of Palmbout Urban Landscapes, Birkhauser GmbH Basel page 33, 2010.

ii Architectural Record, December 2012.

iii A History of the Los Angeles District, U.S. Army Corps of Engineers, 1898 – 1965, Anthony Turhollow, U.S. Army Engineer District, 1975.

iv Eden By Design, Greg Hise and William Deverell, University of California Press, 2000.

v L.A. Now: Volume Two, Shaping a New Vision for Downtown Los Angeles, University of California Press, 2002.

vi Combinatory Urbanism, Morphosis, Stray Dog Café 2011.

vii The Infrastructural City: Networked Ecologies in Los Angeles, ed. Kazys Varnelis, Actar 2009. page 16.

viii Los Angeles River, Ted Elrick and the Friends of The Los Angeles River, Arcadia Publishing, 2007.

ix Learning from Studio, Clark Kellogg, "Design Intelligence Knowledge Reports", January 2006, Greenway Communications, LLC, Design Futures Council for the American Institute of Architecture for Students.

x Los Angeles: Architecture of Four Ecologies, Reyner Banham, Pelican Books 1973.

xi Design with Nature, Ian McHarg, John Wiley and Sons 1976.

xii Rivertown: Rethinking Urban Rivers, ed. Paul Stanton Kibel, MIT Press 2007

xiii Water and the City: Risk, Resilience and Planning for a Sustainable Future, Iain White, Routledge Press, 2010.

xiv The Phenomenon of Change, "The Role of Education: Curriculum content for changing times," ed. Lisa Taylor, Cooper-Hewitt Museum, Rizzoli, 1984.