YRP

YAMUNA RIVER PROJECT

ANNUAL REPORT 2019 - 2021

YRP

YAMUNA RIVER PROJECT

ANNUAL REPORT 2019 - 2021

Tulane School of Architecture

Tulane University

SCHOOL OF ARCHITECTURE
UNIVERSITY of VIRGINIA

UNIVERSITY of VIRGINIA

YRP

YAMUNA RIVER PROJECT

The Yamuna River Project is an inter-disciplinary research project seeking to study the revitalization of urbanity and ecology of riverine and coastal cities which began with the Yamuna River in New Delhi.

New Delhi–as the capital city of the world's largest democracy, with a population of almost twenty million–faces an unprecedented challenge: its sacred river, the Yamuna, is one of the most polluted in the world. The entire quantum of fresh water flowing into New Delhi is redirected to fulfill the fresh water requirement of the city. From the Wazirabad barrage where it enters the capital city, to the Okhla barrage where it exits, the Yamuna consists of only treated and untreated sewage and other toxic effluent. The water is rendered "dead", with zero oxygen, posing serious health hazards to the citizenry of New Delhi.

In 2019, the Yamuna River Project expanded the study of the water crisis and urbanity in different scenarios in the rapid development of India. Since the Fall of 2019, the teams focused in studying the fragile urbanity of the capital city of Rajasthan, Jaipur. The 3.7 million inhabitants of this desert city, projected to be 5 million by the year 2030, face a loss of traditional water soaks through lakes and ponds and a scarcity of additional water sources to support them. The loss of ecological territory - to unplanned growth, and the increasing encroachment on the fragile environment, has undermined the already scarce water sources. In the summer of 2019, Jaipur - now dependent on the supply of piped water from the distant Bisalpur dam, was 25 days from Day Zero - the point where there would be no fresh water available to the city.

YRP continues parallel work in Delhi, developing in further depth the work represented in the book (Yamuna River Project: New Delhi Urban Ecology, ACTAR 2018) focusing on revitalizing the Yamuna river and recovering it's connections to Delhi's urban fabric by developing a comprehensive vision and strategic interventions in two key areas of the city:

1. The main tributary of the Yamuna: the Najafgarh drain. Examining a portion as case study to extract lessons for the entire drain.
2. The connection between New Delhi and the Yamuna, particularly in the Lutyen's zone where the connection with the river was never resolved.

Both cities have unprecedented and urgent crises of ecological inequality, posing serious threats to the health of the entire populations. These can only be resolved by sustained remedial action, encompassing all the complex components of the city: social, cultural, health, economics, ecology, public space, public facilities, housing, governance, and infrastructure.

The Yamuna River Project which began as a catalyst for the urgent recovery of the Yamuna and its tributaries builds publicly accessible bodies of information and expertise, and develops multi-disciplinary visions of what alternative futures could be. This collaborative methodology, applied to New Delhi and Jaipur, has been evolving as a study of urban ecological imbalances which can further be utilized to understand and propose solutions to the complexities of river and water stressed cities around the world. The impact in the ground is taking the form of changes in governance, construction work of regenerative models, new criteria for the New Delhi 2041 Master Plan, and other aspects of public awareness.

https://yamunariverproject.wp.tulane.edu

YRP

YAMUNA RIVER PROJECT

06 / Contents

YRP

YAMUNA RIVER PROJECT

DIRECTORS' MESSAGE

The Fall Semester in 2019 witnessed our first cross-institutional, collaborative studios – students and faculty from the UVA School of Architecture and the Tulane School of Architecture, traveled to India, visited Yamuna project sites in New Delhi, and spent a week in Jaipur, Rajasthan, engrossed in site visits, meetings with public officials and collection of data, to assimilate a proposal for the mitigation of water scarcity in Jaipur. Meetings with our diplomatic partner – the Embassy of Spain in India and the Ambassador – Jose Ramon Baranano – enabled our teams to gain a nuanced understanding of the tremendous possibilities, and some of the challenges, of our research-led design efforts in India. A workshop and meeting with the Deputy Chief Minister of Rajasthan – Sachin Pilot – clearly articulated the respect that the YRP methodology had gained among the political leadership in India.

For the Fall Semester in 2020, despite the challenges posed by the pandemic, another group of UVA students and faculty returned (virtually!) to Jaipur, to continue the urban analysis and to propose design strategies that would enable the Jaipur polity to commence a policy review of environmental remediation strategies in the city. In the Spring Semester of 2021, students and faculty from Tulane University have returned (again virtually) to New Delhi, and continue deepening the analysis of the current conditions and possible alternative futures for the Najafgarh Drain corridor. A new site – the Central Vista – the heart of the capital city and the defining political and urban axis of New Delhi – has been engaged for a reconsideration of its urban density and potential to finally become a democratic and inclusive portion of the city. This shall prove to be an especially critical studio: the present redevelopment plans for this site, proposed by the government, remain oblivious of the ecological remediation potential. In both cases, the findings aspire to inform the discussions and development of the 2041 Delhi Masterplan, recently announced.

While global attention has been riveted on the vicissitudes of the pandemic, the unrelenting advance of climate change related disasters continue to sound a call for action. In February 2021, extreme glacial melting in the Himalayas, caused a portion of the mammoth Nanda Devi glacier to shear off, triggering an avalanche and a deluge in the Alaknanda and the Dhauliganga river systems. The resulting flash flood washed away several Indian hydroelectric stations, killing more than 150 people in the span of a few hours. As we write this summation of our combined annual report for 2019-2021, hundreds of acres of Himalayan forests are ablaze, and Indian officials in the state of Uttrakhand are summoning assistance from across the nation to help bring the conflagration under control.

In India, we have witnessed the horrific plight of migrant labor - our own fellow citizens who have spent their lives propelling our economies, working in our cities, driving our buses, cleaning our streets, delivering our packages and constructing our buildings. In the early weeks of the sudden announcement of the lockdown, millions of these daily wage workers were trapped in their urban slums, without work, without wages, without provisions, and without the means to go back to their villages. The lockdown exposed their vulnerability and made it transparent for us all. India will not easily forget the harrowing scenes of millions of families, walking hundreds of kilometers, to go 'home'. Civil society activists have written that hundreds perished on their journey – victims of disease, starvation, and exhaustion. Urbanization delivered no lasting solutions for them. Even before the pandemic, their access to clean water and sanitation was negligible. Asked to remain isolated at home, and ordered to wash hands frequently with soap, could only be a perceived by them as a cruel joke – when home is an overcrowded and unsanitary slum, and water is rationed in milliliters.

Over the many years of YRP research findings, we have repeatedly emphasized our urgent conclusion to embed low-income housing, with drinking water and sanitation infrastructure, as a critical urban component of the sustainable city. The exhibition and lectures on our work, make claims on our governments to make this action a priority. The results are now perceptible, and Indian urban policy is steadily acknowledging the fact that urban and environmental planning must include the provision for low-income housing in the megacities of India. The rest of essential criteria developed by YRP research teams and individuals are also guiding some essential actions, most especially the already mentioned 2041 Delhi Masterplan, announced with the focused in the basic framework of YRP: the ecological recovery of the riparian system as public space and slow mobility corridors, including parks, wetlands and basic public amenities, as well as affordable housing. This is a stark contrast with the plans in 2014 -amusement parks on the Yamuna River floodplain- in an unprecedented impact of an academic research project.

In 2021, the continued dissemination of the YRP methodology, and an appreciation for the project research, gained traction across significant policy influencers in India. In 2020, in addition to the roster of YRP lectures across several academic institutions in India, Pankaj was invited to deliver keynote addresses to the Confederation of Indian Industry leadership conclave in Udaipur, to the Rotary Club International – North India chapter, and was requested to conduct a private briefing for the Water Resources Minister in the Government of Delhi – Mr. Satyendra Jain. During this meeting, Mr. Jain stated that many of our recommendations were being adopted by his government, especially in the streamlining of governmental agencies exercising control over water resources, and in terms of the urban development of certain areas of the city.

From the pandemic emerges the possibility of an empowering generosity – to facilitate intervention in urban geographies that need our help the most. We can use this crisis to focus our resources, our tools and methodologies, and serve two concurrent goals – the preservation and restoration of urban ecology, and the sustenance of the millions of urban poor who have often been neglected in the development of our cities. The mandate for the next stage of our work is clear.

Inaki Alday
Pankaj Vir Gupta
Brian P. Owensby

YRP

YAMUNA RIVER PROJECT

DIRECTORS

IÑAKI ALDAY
Co-Director, Yamuna River Project
Dean and Koch Professor of Architecture, Tulane University School of Architecture
Founding Principal, aldayjover arquitectura y paisaje
ialday@tulane.edu

Iñaki Alday was Chair of Architecture at the University of Virginia School of Architecture from 2011 - 2016. Since 2016, he has been the Co-Director of the Yamuna River Project, the first pan-university grand challenge project at the University of Virginia. In July of 2018, Alday joined the Tulane University School of Architecture as Dean. Both in the academic appointment and in the design practice of aldayjover arquitectura y paisaje, Iñaki Alday promotes a new attitude in front of the professional and academic challenges on the transformation of our environment. He believes that the role of Architecture and Architects is interdisciplinary and integrates scales, that there are new non-traditional programs as hybrid infrastructures, and in the necessity of establishing new social and environmental ethics are some of today's challenges that need to be met with a global vision.

PANKAJ VIR GUPTA
Co-Director, Yamuna River Project
Professor of Architecture, University of Virginia
Founding Principal, vir.mueller architects
pankaj@virmueller.com

Pankaj Vir Gupta is Professor of Architecture at the University of Virginia and Co-Director of the Yamuna River Project. With a Bachelor of Science in Architecture from the University of Virginia (1993), and a Master of Architecture from the Graduate School of Architecture at Yale University (1997), Gupta practices as founding principal at vir.mueller Architects in New Delhi since 2003. Gupta is a registered architect, licensed to practice in the United States, and as a member of the Council of Architecture in India. He has received awards from the American Institute of Architects, the Foundation for World Education, the George Nakashima Foundation for Peace, the Graham Foundation for Advanced Studies in the Fine Arts, and the Fritz-Höger Award for Excellence in Brick Architecture. Pankaj Vir Gupta has taught at University of New Mexico, Arizona State University, the University of Texas at Austin, the School of Architecture and Planning in New Delhi, and the Center for Environmental Planning and Technology Ahmedabad.

BRIAN OWENSBY
Co-Director, Yamuna River Project
Director, Center for Global Inquiry & Innovation, University of Virginia
Professor, Corcoran Department of History, University of Virginia
bpo3a@virginia.edu

Brian Owensby is professor of history in the Corcoran Department of History at the University of Virginia. His scholarly work has ranged from social and political history in nineteenth and twentieth-century Brazil, to legal and imperial legal history in seventeenth-century Mexico. He is completing a book on the transformation to an economy of gain in the context of the encounter between Europeans and indigenous people in colonial Paraguay. The working title is 'Ambivalent Transformations in the Land without Evil'. Owensby is also an attorney and practiced corporate law in the 1980's.

"From the pandemic emerges the possibility of an empowering generosity – to facilitate intervention in urban geographies that need our help the most. We can use this crisis to focus our resources, our tools and methodologies, and serve two concurrent goals – the preservation and restoration of urban ecology, and the sustenance of the millions of urban poor who have often been neglected in the development of our cities."

- The Directors

YRP

YAMUNA RIVER PROJECT

ADVISORY COUNCIL

STEPHEN MULL
Vice Provost for Global Affairs, UVA

Ambassador Stephen D. Mull is Vice Provost for Global Affairs at the University of Virginia. In this role he is the primary lead on global relations at the University, responsible for developing a strategic vision, designing outreach, and overseeing international activities. Steve will oversee institutional development of global partnerships and develop a wide array of services, programs, experiences, and strategic partnerships that promote global imagination within the university community. Mull has served in a broad range of U.S. national security positions, most recently as Acting Under Secretary for Political Affairs at the U.S. Department of State, working as the day-to-day manager of overall regional and bilateral policy issues, and overseeing the bureaus for Africa, East Asia and the Pacific, Europe and Eurasia, the Near East, South and Central Asia, the Western Hemisphere, and International Organizations.

RUSSELL KATZ
Architect, Developer, Managing Director of MOMIDC

Architect and developer Russell Katz is the Managing Director of MOMIDC, a real estate firm focused on the design, development, ownership and management of environmentally conscious properties in the Washington, DC region. Russell is driven by the belief that environmentally sustainable, beautifully designed projects can be financially successful. He guides MOMIDC's selective project choices and oversees the operation of the firm's portfolio, which currently includes 350,000 square feet of multifamily residential, retail and office space, as well as 185 acres of conserved woodlands.

IAN BAUCOM
Dean of the College of Arts and Sciences, UVA

Ian Baucom came to the University of Virginia after serving 17 years in Duke University's Department of English as a professor and as the director of the John Hope Franklin Humanities Institute. Since arriving at UVA in the summer of 2014, Dean Baucom has led a series of initiatives within the College and Graduate School of Arts & Sciences. He is overseeing an ambitious hiring campaign that, in the midst of a generational turnover of esteemed faculty, aims to bring upwards of 200 new tenured and tenure-track faculty to the College. Baucom is emphasizing the importance of recruiting at the highest level of excellence and enhancing the faculty's diversity to build on the College's historical strengths and to ensure its future for generations of students to come. Baucom is also guiding the College's efforts to revise its undergraduate curriculum for the first time in four decades, starting with the new curriculum pilot that will launch in the 2017-18 academic year. In addition, he is working with the College's leadership team to develop creative initiatives in global, digital and cross-disciplinary studies.

ILA BERMAN
Dean, School of Architecture, UVA

Berman received a bachelor of architecture with high distinction in 1983 from Carleton University in Ottawa, Canada, where she graduated top in her class and received the Lieutenant Governor of Ontario Medal for Design. She went on to earn a Master of Design Studies degree in 1991, followed by her Doctor of Design in 1993 in architectural history, theory and criticism, both from Harvard University's Graduate School of Design. Berman is an architect and theorist whose research explores the relationships between contemporary culture and the manifold material and spatial practices in architecture, urbanism and landscape. In addition to her teaching and administrative duties at Tulane, Berman founded and directed the URBANbuild program, a multi-scaled two-year program facilitated by a HUD grant to support the urban rehabilitation and revitalization of New Orleans in the aftermath of Hurricane Katrina. She was also involved in multiple university-community partnerships that included her appointments on the Cityworks Board of the American Institute of Architects and the Mayor's Bring New Orleans Back Commission.

SCOTT BERNHARD
Associate Dean for Academics, TuSA

Scott Bernhard is the Mintz Professor of Architecture at the Tulane School of Architecture in New Orleans where he has been a member of the faculty for more than 26 years. Scott has served as both Associate Dean and Interim Dean of the School and was Director of the Albert and Tina Small Center for Collaborative Design (formerly Tulane City Center) from 2007 to 2012. He is the recipient of numerous teaching awards including the President's Award for Excellence in Graduate and Professional Teaching the Inspirational Teacher Award and the Excellence in Teaching Award, University-wide honors bestowed by Tulane. He was the 1995 Tulane School of Architecture Professor of the Year, and won the Malcolm Heard Teaching Award in 2001, in 2007 and again in 2012. He is a licensed Architect and principal of a small, collaborative, research and design practice focused on building in the climate and context of New Orleans.

JOHN ECHEVERRI-GENT
Associate Professor, Politics, UVA

John Echeverri-Gent's books include The State and the Poor: Public Policy and Political Development in India and the United States (University of California Press, 1993) and Economic Reform in Three Giants: U.S. Foreign Policy and the USSR, China, and India (Transaction, 1990) which he co-edited. His published articles focus on the political economy of development and comparative public policy. His currently completing a manuscript entitled "Politics of Markets: Political Economy of India's Financial Market Development in Comparative Perspective". He serves as treasurer of the American Institute of Indian Studies and as a member of the editorial board of Political Science Quarterly. He has chaired the American Political Science Task Force on "Difference and Inequality in Developing Societies."

DEBJANI GANGULY
Director, Institute of Humanities and Global Cultures
Professor of English, UVA

Debjani Ganguly is Professor of English and the Director of the Institute of the Humanities and Global Cultures (IHGC) at the University of Virginia. She works in the fields of world literature, post colonial studies and South Asian Studies. Her research interests include the contemporary Anglo-phone novel, literary forms in the new media age, literature and human rights, caste and Dalit studies, language worlds in colonial/post colonial South Asia, and Indian Ocean literary worlds from 1750-1950. In recent years, Debjani has researched the links between globalism, information technology, ethnic violence and humanitarian connectivity through the genre of the novel, the result of which is a book with Duke UP entitled "This Thing Called the World: The Contemporary Novel as Global Form" (2016). She is the author of "Caste, Colonialism and Counter Modernity" (2005) and co-editor of "Edward Said: The Legacy of a Public Intellectual" (2007) and "Rethinking Gandhi & Nonviolent Relationality: Global Perspectives" (2007). She co-edits with Ato Quayson and Neil Ten Kortenaar The Cambridge Journal of Post colonial Literary Inquiry.

KAREN MCGLATHERY
Lead Principal Investigator, Virginia Coast Reserve LTER
Director, Resilience Institute
Professor, Department of Environmental Sciences, UVA

Karen McGlathery is a Professor of Environmental Sciences. She received her B.S. from Connecticut College and her Ph.D. from Cornell University. Before coming to UVA in 1996, Karen was a Research Associate at the University of Copenhagen and the National Environmental Research Institute in Denmark. Since 2004, McGlathery has served as Director of the Virginia Coast Reserve Long Term Ecological Research (VCR LTER) program. She also is a member of the Science Council and Executive Board of the National LTER Program. The VCR LTER program is one of 25 in the nation funded by the National Science Foundation to study long-term change in marine and terrestrial ecosystems. A specialist on effects of environmental change, including climate, sea-level rise, eutrophication and species invasions in coastal marine ecosystems.

"The Yamuna River Project is an outstanding example of the potential, and one might even say the obligation, of public universities in this increasingly global age. By promoting cooperation across disciplines and borders, our students and scholars in the Project are proving themselves to be extraordinary knowledge partners for both policymakers in India and the broader community around the world in common efforts to clean up the world's water supply. "

- Ambassador Stephen Mull

Vice Provost for Global Affairs
University of Virginia

YRP

YAMUNA RIVER PROJECT

2019 - 2021 CALENDAR OF EVENTS

JAN

Buro Happold, a global engineering firm with expertise in comprehensive sustainability consultancy, joins the YRP as a technology partner. Led by New York based partner, Wolf Manglesdorf, and principal, Tim Christ. Buro Happold's engineering teams offered expertise and project inputs to the Fall 2019 design studio at UVA.

FEB

YRP presentation to the newly elected Deputy Chief Minister of Rajasthan - Mr. Sachin Pilot. As India's largest state, Rajasthan faces extreme urban challenges exacerbated by climate change.

MAR

Yamuna River Project symposium with project partner Tulane University, held in New Orleans. Faculty and experts from UVA and from Tulane exchanged presentations and deliberated on future opportunities and collaborations based on the Yamuna River Project methodology.

APR

The Government of Rajasthan request the assistance of the Yamuna River Project team to develop a Climate Change Remediation - Urban Action Plan for the state.

Bahar Dutt - award wining Environmental Journalist in India, appointed as a Yamuna River Project fellow for a three month term. Bahar brought communications expertise to develop an enhanced profile for the YRP in India.

MAY

The Embassy of Spain in India signed an MoU for a five year collaboration on Urban Remediation with the Government of Rajasthan. The European Investment Bank agreed to support this towards the upgrading of civic and urban infrastructure in Rajasthan.

Darcy Engle appointed as the YRP research fellow at UVA for 2019-2020.

Monisha Nasa joins the YRP as Research Assistant Professor at the Tulane School of Architecture for 2019-21

SEPT

YRP Instructor Maria Gonzalez Aranguren presented the YRP at the UVA School of Architecture Centennial Celebrations.

YRP Co-Founder and Co-Director Pankaj Vir Gupta invited to speak at the Common Room Foundation in Delhi.

"The YRP: Re-Centering New Delhi, A Piece of the City" wins ARCHITECT Magazine's 2019 Studio Prize. This studio was co-taught by professors Pankaj Vir Gupta and Maria Gonzalez Aranguren.

Iñaki Alday, Co-Director of the Yamuna River Project presented the Yamuna River Project at the International Conference for Sustainable Cities in São Paulo sponsored by World Bank

OCT

YRP Co-Founder and Co-director Iñaki Alday speaks at ETSAB Barcelona School of Architecture

UVA School of Architecture + Tulane University School of Architecture joint trip to India
Meeting with Spanish Ambassador José Ramón Barañano, Mr. Sachin Pilot, Deputy Chief Minister of Rajasthan, Jaipur planning department and Ratish Nanda, CEO of the Aga Kahn Trust for Culture among others.

The Common Room Foundation, hosts an event, Circular Cities - 101 Regeneration where Inaki Alday, Co-Founder and Co-Director of the YRP invited to speak about the role of urban regeneration in the successful transformation of a city.

NOV

Pankaj Vir Gupta, Co-Founder and Co-Director of the YRP, invited as the keynote speaker at Uncertainty 2019 Administrators Conference, an event hosted by Tulane University in New Orleans and Co-Chaired by Dean Iñaki Alday, to present the YRP work and discuss the urban ecology of the Yamuna River concerning the city of Delhi.

DEC

UVA School of Architecture and Tulane University School of Architecture, Rajasthan Cities Final Studio Reviews where students analysed urban and ecological challenges of Jaipur and designed and proposed test projects to re-mediate these challenges.

Pankaj Vir Gupta, Co-Founder and Co-Director of the YRP, speaks at MIT as part of the Aga Khan Program for Islamic Architecture.

JAN

Pankaj Vir Gupta, Co-Founder and Co-Director of the YRP, invited to speak at the American Embassy School in New Delhi discussing the relationship between ecology and the city using Delhi and its relationship with the Yamuna as a case study.

FEB

Iñaki Alday, Co-Founder and Co-Director of the Yamuna River Project, presents YRP at a Workshop on Urban Resilience attended by the Mayors of the most significant cities of Saudi Arabia organized by the World Bank in Riyadh.

MAR

Essay titled "Un Futuro Esencial" by YRP Directors Inaki Alday and Pankaj Vir Gupta featured in Arquine No. 91 (Latin American Architecture Magazine) in alignment with the Mextropoli Festival in Mexico City.

APR

YRP work featured in article in the MIT Technology Review titled "India's Water Crisis is Already Here. Climate Change Will Compound It"

SEP

YRP Co-Founder and Co-director Iñaki Alday speaks at Mextrópoli 2020, an architecture festival in Mexico City, titled (Un)sustainable City. The relationship between urban planning and architectural design with the conditions imposed by the climate crisis was at the center of the festival program.

NOV

YRP Co-Founder and Co-director Iñaki Alday speaks at the Productive Urbanism conference in Valencia.

YRP

YAMUNA RIVER PROJECT

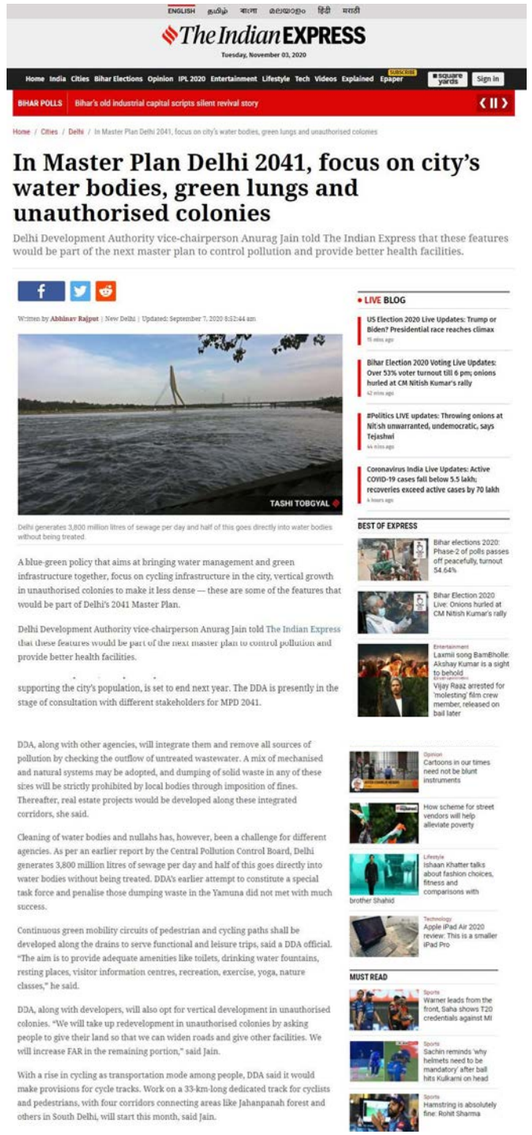
PUBLIC IMPACT

The Yamuna River Project has been committed to communicating our research and engaging the public realm in a transparent manner. During the 2019-2021 years, this effort resulted in several discussions, lectures, and public events in India and the US.

The article titled "In Master Plan Delhi 2041, focus on city's water bodies, green lungs and unauthorised colonies" published on September 7th 2020 in the Indian Express was the most direct (if explicitly unacknowledged) testament to the impact of the YRP in the formulation of the arguments for the 2041 master plan for New Delhi.

MEDIA COVERAGE

MIT Technology Review
ARCHITECT Magazine
The Journal of Landscape Architecture, India
JoLA Journal of Landscape Architecture NPR
Archdaily
The Wall Street Journal
Virginia's Public Radio
The Millenium Post
Press Trust of India
India Today Education
The Asian Age
Hindustan Times
Hindustan Times Online
ABC Sociedad
The Hindu Business Line
Business India
UVA Today
The Times of India
The Indian Express
Business Standard
Governance Now
The Pioneer
The Economic Times
Metalocus
The Guardian
Flussbad Berlin



ENGLISH தமிழ் বাংলা മലയാളം हिंदी मराठी

The Indian EXPRESS

Tuesday, November 03, 2020

Home India Cities Bihar Elections Opinion IPL 2020 Entertainment Lifestyle Tech Videos Explained Epaper Sign in

BIHAR POLLS Bihar's old industrial capital scripts silent revival story

Home / Cities / Delhi / In Master Plan Delhi 2041, focus on city's water bodies, green lungs and unauthorised colonies

In Master Plan Delhi 2041, focus on city's water bodies, green lungs and unauthorised colonies

Delhi Development Authority vice-chairperson Anurag Jain told The Indian Express that these features would be part of the next master plan to control pollution and provide better health facilities.

Written by Abhinav Rajput | New Delhi | Updated: September 7, 2020 8:52:44 am

TASHI TOBGYAL

Delhi generates 3,800 million litres of sewage per day and half of this goes directly into water bodies without being treated.

A blue-green policy that aims at bringing water management and green infrastructure together, focus on cycling infrastructure in the city, vertical growth in unauthorised colonies to make it less dense — these are some of the features that would be part of Delhi's 2041 Master Plan.

Delhi Development Authority vice-chairperson Anurag Jain told The Indian Express that these features would be part of the next master plan to control pollution and provide better health facilities.

supporting the city's population, is set to end next year. The DDA is presently in the stage of consultation with different stakeholders for MPD 2041.

DDA, along with other agencies, will integrate them and remove all sources of pollution by checking the outflow of untreated wastewater. A mix of mechanised and natural systems may be adopted, and dumping of solid waste in any of these sites will be strictly prohibited by local bodies through imposition of fines. Thereafter, real estate projects would be developed along these integrated corridors, she said.

Cleaning of water bodies and nullahs has, however, been a challenge for different agencies. As per an earlier report by the Central Pollution Control Board, Delhi generates 3,800 million litres of sewage per day and half of this goes directly into water bodies without being treated. DDA's earlier attempt to constitute a special task force and penalise those dumping waste in the Yamuna did not met with much success.

Continuous green mobility circuits of pedestrian and cycling paths shall be developed along the drains to serve functional and leisure trips, said a DDA official. "The aim is to provide adequate amenities like toilets, drinking water fountains, resting places, visitor information centres, recreation, exercise, yoga, nature classes," he said.

DDA, along with developers, will also opt for vertical development in unauthorised colonies. "We will take up redevelopment in unauthorised colonies by asking people to give their land so that we can widen roads and give other facilities. We will increase FAR in the remaining portion," said Jain.

With a rise in cycling as transportation mode among people, DDA said it would make provisions for cycle tracks. Work on a 33-km-long dedicated track for cyclists and pedestrians, with four corridors connecting areas like Jahanpanah forest and others in South Delhi, will start this month, said Jain.

• LIVE BLOG

US Election 2020 Live Updates: Trump or Biden? Presidential race reaches climax

Bihar Election 2020 Voting Live Updates: Over 53% voter turnout till 6 pm; onions hurled at CM Nitish Kumar's rally

#Politics LIVE updates: Throwing onions at Nitish unwarranted, undemocratic, says Tejashwi

Coronavirus India Live Updates: Active COVID-19 cases fall below 5.5 lakh; recoveries exceed active cases by 70 lakh

BEST OF EXPRESS

Bihar elections 2020: Phase-2 of polls passes off peacefully, turnout 54.64%

Bihar Election 2020 Live: Onions hurled at CM Nitish Kumar's rally

Entertainment
Laxmii song Bam Bholle: Akshay Kumar is a sight to behold

Vijay Raaz arrested for 'molesting' film crew member, released on bail later

Opinion
Cartoons in our times need not be blunt instruments

How scheme for street vendors will help alleviate poverty

Lifestyle
Ishaan Khatter talks about fashion choices, fitness and comparisons with brother Shahid

Technology
Apple iPad Air 2020 review: This is a smaller iPad Pro

MUST READ

Sports
Warner leads from the front, Saha shows T20 credentials against MI

Sports
Sachin reminds 'why helmets need to be mandatory' after ball hits Kulkarni on head

Sports
Hamstring is absolutely fine: Rohit Sharma

Hindustan Times

The Najafgarh drain carries 60% of the river's total pollution load. The Yamuna Rriver Project aims to help the city re-imagine and transform the river

BURHAAN KINU/HT PHOTO

Re-imagining the Yamuna river can help transform it

We must create a sanctuary within the megacity of Delhi, with the people as integral to the rejuvenation design

PANKAJ VIR GUPTA

Throughout the long Delhi summer, a trickle of the city's sewage and waste run-off feeds the Yamuna. To re-envision the river, a team of experts comprising urban ecologists, architects from the university of Virginia and government experts have worked for six years to devise a workable solution. The result—the Yamuna River Project (YRP)—proposes a synergy between India's capital city and the river. To understand the problem, an analogy with the thermometer seems apt: if the mercury reads 103 degrees Celsius fever on your thermometer, does it mean the thermometer is sick or it's your body? The Yamuna is the barometer of the city's cleanliness; it is simply recording what the city is doing to it. That's why the Yamuna question needs to be reframed.

As one of the most rapidly urbanising megacities, Delhi confronts serious challenges, reveals inadequacies in planning, urban design and social equity. Over the past decade, it has become increasingly evident that no single entity—the elected or appointed—has the experience to resolve rapid urban degradation. A plethora of municipal agencies, often working at crosspurposes, and with little accountability, fail to address the synthetic nature of the city.

The YRP aims to help the city and its citizen re-imagine and transform the river. Over the years, multiple agencies have made some progress in cleaning it. The Delhi Jal Board has started integrating in its designs the urban design and planning strategies. The Delhi government has taken a critical first step in consolidating the agencies dealing with water, flood control and irrigation under a single-point leadership structure.

The YRP has sought to engage with this multifaceted approach. What

to create a sanctuary within the megacity. Unlike other river restoration projects, the YRP design proposition sees people as integral to the rejuvenation.

The Najafgarh drain carries 60% of the river's total pollution load. While it may seem ambitious to restore it to its previous avatar as a perennial river, there are spatial paradigms that could help commence the ecological and urban remediation. Some of the key recommendations of YRP are the development of a holistic new urban design master plan for Delhi which proposes solutions for low-income housing, mixed-use neighborhoods, proper sanitation and solid waste management infrastructure, and integrates pedestrian mobility with public transport. All this would be centred on an ecological commons—the Yamuna floodplain riparian zone—as the green spine of the city.

Complementing the work of municipal agencies in establishing new sewerage treatment plants, we imagine a simultaneous deployment of urban catalysts, which will result in a dramatic improvement of lives in some of the city's most impoverished areas along the drain. Affordable housing with water and sewerage connections linked by a network of pedestrian paths would enable the upgrade of the slums already existing on the sites. These would be supplemented by community amenities, thoughtfully designed to provide local residents with a range of permanent infrastructure, such as bazaars, schools, playgrounds, clinics, libraries. They would enhance the value and the spatial experience of life along the Najafgarh drain. With the elimination of contamination in the drain, 70% of the pollution entering the Yamuna will be eliminated. And the citizens will enjoy a park in the heart of their city. Thus, urban and ecological remediation will occur in tandem. The world's fastest growing 10 cities (in the period between 2019 and 2035) have one thing in common: all of them are in India, and average an annual growth between 7% to 10%. Collectively, we hope to facilitate a development strategy in which urbanisation becomes a restorative platform for citizens to once again walk along the Yamuna.

Pankaj Vir Gupta is an urban architect and prof

OPED by Co-Founder and Co-Director Pankaj Vir Gupta appeared in India's leading English newspaper, the Hindustan Times, that has a daily circulation of over 2.4 million readers.

MIT Technology Review

"India's water crisis is already here. Climate change will compound it."
- James Temple, 2019

Image by Saumya Khandelwal

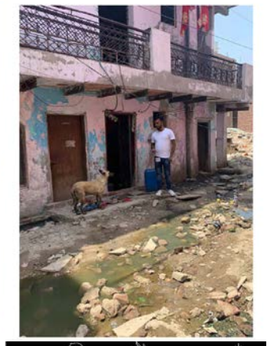
YRP

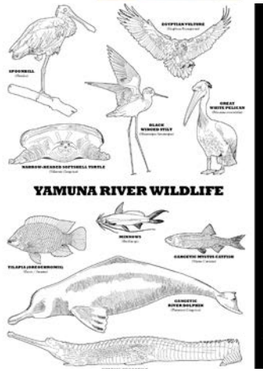
YAMUNA RIVER PROJECT

PUBLIC IMPACT

YRP Co-Director Pankaj Vir Gupta was invited to be the guest editor for an issue of Motherland - a theme-based journal of thoughts, ideas, and unexpected narratives on India. Exploring the trends, subcultures, and issues shaping the country, the magazine provides a fresh perspective on contemporary Indian culture and has been in circulation since 2010. Previous issues have covered a range of topics like what freedom looks like in modern India, the contemporary world of Indian prisons, eco-tourism and the unique way in which contemporary Indians engage with the idea of ecology, stories about the Indian transgender community, bollywood and pop culture etc. An excerpt from the March issue by Rana Das Gupta reads as follows:

"It is remarkable, today, how many people spend years in Delhi without ever laying eyes on the Yamuna. No one ever proposes an outing to the river, as is normal in so many other cities — and if they did it would not be clear how one would get there: the water is bizarrely difficult to find. This fact is of some use to the great number of Delhi's homeless, who are rebuffed from the city proper by all manner of stern regimes: the tracts of land by the Yamuna are so neglected that one can construct a residence there without much interference. But it is rough living, for the same reason: and even the poorest generally spurn it. Though space is frantically exploited in this heaving city of twenty millions, the spiny wasteland between the orbital road and the chemical river is largely deserted. The architectural orientation adopted by the British seems in fact to have led to mass riverine denial. On those occasions when people visit the river to deposit the ashes of loved ones, they proceed robotically with the ritual, as if the Yamuna had not become a stinking sewer. This sewer stands at the centre of a vast and complex system of water supply and waste, for whose contemporary crisis it stands as the most conspicuous symbol."





YRP

YAMUNA RIVER PROJECT

PUBLIC IMPACT

Excerpt from interview: Iñaki Alday on the Climate Crisis:

First, start by rethinking our footprint. In this sense, we have to stop expansion that generates more impermeable soil, forces more displacements, and increases the energy expenditure of buildings with little occupancy and much exterior surface that lose heat or cold. Then densify our cities to be more energy-efficient and socially more diverse and rich. We have known this for a long time, but now the urgency converges with the habits of the new generations that return to the city, they do not want to own cars and value urban social life. In the great crisis of 2008, for example, in the United States, city centers did not lose value or population while many suburbs sank.

"Both society and architects must accept the change, instead of pretending that the rivers are stable, that the temperature is constant throughout the year or that the gardens look like static photographs that comfort us with a sense of false naturalness. In the construction of the urban space, the inclusion of different users, the "in situ" management of energy and the control of excess and shortage of river water must prevail."

Second, we have to innovate in the design of public spaces and buildings. We need public spaces that absorb water from rain and floods, created ecological wealth and recharging the water table. Spaces that change during the seasons and adapt to the weather; that is, the opposite of the artificial grass gardens that we find today in dry climates, or the large paved or concreted pavements that raise the air temperature and generate floods during storms. As for buildings, innovation should seek air conditioning solutions, for example, by absorbing the sun in cold climates or absorbing shade in hot ones; the opposite of the generic glass buildings that we see today in any city on the planet that aspires to 'be modern'.

"Inaki Alday on the Climate Crisis: The Planet is At the Limit of Collapse"
- Interview by Fabian Dejtiar, 2019

Image by Randhir Singh

Climate change is the great urgency for humanity. How and who it will affect first is the next issue. The answer is: to the most vulnerable populations socially and economically. The fight for social justice is becoming social-environmental justice for populations that are suffering from floods, droughts, pollution and other effects. This population does not have the resources to adapt their homes to the new weather conditions, to migrate or to have a decent life in a new place if they move. There are already places in the world with extreme pollution levels where only those who cannot live elsewhere live, and this effect will be extended including 'mega capitals' like New Delhi, in India. We are creating black holes where life expectancy and infant mortality have medieval ratios. These are real problems.

Architecture has two unique qualities: on the one hand, it places in the space all the complexity of the disciplines mentioned before, overlapping them and making them interact. On the other hand, it is the only field capable of creating alternative scenarios, which can be evaluated and towards which society as a whole can go.

Iñaki Alday reviewing student work in the at Tulane School of Architecture, New Orleans.

YRP

YAMUNA RIVER PROJECT

YAMUNA RIVER PROJECT BOOK REVIEW

Excerpt from YRP Book Review in (JoLA) Journal of Landscape Architecture:

"Worldwide, contemporary urbanization highlights a clear departure from cities' intimate ties to the very landscapes that gave rise to them. Centuries of dependence, appreciation and negotiations have made way for control, dominance and exploitation. The book Yamuna River Project: New Delhi Urban Ecology focuses on the plight of Indian rivers, where urbanization and modernization have erased 'lifelines' from citizens' memories.

... The massive scholarship on which the volume is based defies the singular (often degenerated) representation of Delhi through its cartographic simplicity, allowing the book to negotiate well, both as an 'atlas' and 'chronicler' of the city. The publication extends beyond its perceived audience of urbanists by stimulating interdisciplinary debate. It should be on the desks of not only students and educators, but also politicians and city administrators who are seeking a comprehensive methodology with which to tackle the various urban challenges our cities are facing...

The Yamuna River Project focuses on interpreting the disturbed, complex and constructed 'nature' of a single city, but the volume does nto specify a theoretical perspective, advocating the spirit of ecologists such as Ian McHarg and Anne Whinston Spirn. The authors emphasize, however, that cities cannot be excluded from the natural systems upon which their survival and stability depend.


BOOK REVIEWS

Iñaki Alday, Pankaj Vir Gupta
Yamuna River Project: New Delhi Urban Ecology
ISBN 978 1 945150 67 8
New York & Barcelona, ACTAR Publishers, 2018
392 pp., 826 colour illustrations
maps and graphics
€ 45 (cloth)

Review by Adrian Mooren, University of Leuven

Worldwide, contemporary urbanization highlights a clear departure from cities' intimate ties to the very landscapes that gave rise to them. Centuries of dependence, appreciation and negotiations have made way for control, dominance and exploitation. The book Yamuna River Project: New Delhi Urban Ecology focuses on the plight of Indian rivers, where urbanization and modernization have erased 'lifelines' from citizens' memories. Where the area around the Yamuna River was once abundant with vast floodplains, imperial palaces, lush gardens and public access to the water, today the river quietly disappears as it enters Delhi, only to reappear laden with sewage, adding extensively to the downstream water pollution. In the contemporary context, the Yamuna and Ganga Rivers, the two essential lifelines of the vast Gangetic flood plains, are extensively controlled, manipulated and engineered by the cities they pass through. The various national and state programmes, policies and capital investments to clean them have so far resulted in few changes toward the improvement of their appalling environmental conditions.

The book Yamuna River Project: New Delhi Urban Ecology by Iñaki Alday and Pankaj Vir Gupta [based at Tokyo University and University of Virginia respectively] documents the 'Yamuna River Project' (YRP) that the two authors co-direct, and arrives at a critical moment for Delhi. Building upon the emerging interests in urban resilience, the volume marks the end of five years of interdisciplinary investigation of an urgent environmental rejuvenation of the Yamuna River and opportunities for restoring the city's forgotten associations with its landscape. The volume advances through the methodology of applied research, combining landscape urbanism and interpretative mapping with an approach synonymous to the scholarly works of Annapurba Mukher and Dilip Da Cunha. Their scholarly works on Bangalore's water bodies[1] and Mumbai's estuaries[2] reveal the contestations and opportunities inherent to the city's characteristic landscape and its urbanization. Yamuna River Project continues this scholarship towards regenerating the city of Delhi, which is overwhelmed by enormous amounts of solid waste, sewage and air pollution.

The book amalgamates the existent and often missing fragments of information on Delhi's

NOTES

1 e-Gaadi 2018, Park Politics: International Conference, 'Theme', http://e-laadi.archi/archive/, accessed 25 July 2018.

one of the most polluted rivers, the volume's critical perspective and manifesto-like format combine interrogation, activism and collaboration. It argues for a strong vision of urban landscape that is distinct, transformative and urgent, yet rooted in Delhi. Reintroducing the Yamuna River (and various water bodies) as an integral part of the built environment, the volume encashes and re-renders the utilitarian and aesthetic purposes of the river, where riverine urbanism once peaked within Delhi,[3] where for centuries, the river and its floodplain have served a central feature in the daily life of Delhi's inhabitants—perhaps one day the Yamuna will be returned to its proper role' (p. 236). The only possible shortcoming is the absence of a detailed study of the Yamuna basin and the impact of climate change on it. The brief description of the geographical, geological, and climatic origins of the Yamuna River and its basin leaves room for further explorations of the living entity that remerges to sustain the populated floodplains further downstream of Delhi. Here, along with the Ganges River, the orchestrated human fluxes result in one of the densest riverine urban areas, an aspect scientifically captured by Anthony Acciavatti in his research of the cities and flood plains of the Ganges River.

Among the surge of discussions [and political actions] about the environmental rejuvenation of Indian rivers, the Yamuna River Project book presents a critical discourse within a larger

NOTES

1 See: www.yamunariverproject.org.

2 Annapurba Mukher and Dilip Da Cunha, Deccan Traverses: the Making of Bangalore's Terrain (New Delhi: Rupa & Co., 2006).

3 Annapurba Mukher and Dilip Da Cunha, ROAM: Mumbai in an Estuary (New Delhi: Rupa & Co., 2014).

4 Ian L. McHarg and Lewis Mumford, Design with Nature (New York: American Museum of Natural History, 1969).

5 Ann Whinston Spirn, The Granite Garden: Urban Nature and Human Design (New York: Basic Books, 1984).

6 Wytske Dramstad, James D. Olson and Richard T. T. Forman, Landscape Ecology Principles in Landscape Architecture and Land-use Planning (Washington, DC: Island Press, 1996).

7 Jyoti Pandey Sharma, 'Revisiting the Dunes [River] Urbanism in the Delhi Triangle', in: Dunes Way (ed.), River Cities, City Rivers (Worthington, DC: Dumbarton Oaks Research Library and Collection, 2018), pp. 118.

8 Anthony Acciavatti and Rahul Mehrotra, Ganga Water Machine: Designing New India's Ancient River (New York: Applied Research Design Publishing, 2015).

9 'Yamuna River Project: New Delhi Urban Ecology Selected by ISAIA as One of the Top 20 Architectural Books of 2018', http://yamunariverproject.org/2019/01/yrp-book-wins-dam-prize.html, accessed 15 October 2019.

climate change on it. The brief description of the geographical, geological, and climatic origins of the Yamuna River and its basin leaves room for further explorations of the living entity that remerges to sustain the populated floodplains further downstream of Delhi. Here, along with the Ganges River, the orchestrated human fluxes result in one of the densest riverine urban areas, an aspect scientifically captured by Anthony Acciavatti in his research of the cities and flood plains of the Ganges River.

Among the surge of discussions [and political actions] about the environmental rejuvenation of Indian rivers, the Yamuna River Project book presents a critical discourse within a larger paradigm of reimagining cities. It is a hybrid of empirical studies and experimentations and pushes the boundaries of design by research, at the same time introducing innovation in methodological approaches and expansion of knowledge for the future of cities. The book fascinatingly makes extensive use of historical and contemporary descriptive images and photographs, interpretive maps and other visualizations of projective regeneration. The scientific nature of translating such enormous urban complexities has led to Yamuna River Project: New Delhi Urban Ecology being honoured as one of the best urban studies books of 2018 by the prestigious Frankfurt Book Fair and the Deutsches Architekturmuseum [DAM].[9] It concludes with a large-scale vision, not only offering design led strategies, but also a renegotiated and reimagined relationship of the city with its main river. These strategies, linked to designing of architec-

NOTES

1 See: www.yamunariverproject.org.

2 Annapurba Mukher and Dilip Da Cunha, Deccan Traverses: the Making of Bangalore's Terrain (New Delhi: Rupa & Co., 2006).

3 Annapurba Mukher and Dilip Da Cunha, ROAM: Mumbai in an Estuary (New Delhi: Rupa & Co., 2014).

4 Ian L. McHarg and Lewis Mumford, Design with Nature (New York: American Museum of Natural History, 1969).

5 Ann Whinston Spirn, The Granite Garden: Urban Nature and Human Design (New York: Basic Books, 1984).

6 Wytske Dramstad, James D. Olson and Richard T. T. Forman, Landscape Ecology Principles in Landscape Architecture and Land-use Planning (Washington, DC: Island Press, 1996).

7 Jyoti Pandey Sharma, 'Revisiting the Dunes [River] Urbanism in the Delhi Triangle', in: Dunes Way (ed.), River Cities, City Rivers (Worthington, DC: Dumbarton Oaks Research Library and Collection, 2018), pp. 118.

8 Anthony Acciavatti and Rahul Mehrotra, Ganga Water Machine: Designing New India's Ancient River (New York: Applied Research Design Publishing, 2015).

9 'Yamuna River Project: New Delhi Urban Ecology Selected by ISAIA as One of the Top 20 Architectural Books of 2018', http://yamunariverproject.org/2019/01/yrp-book-wins-dam-prize.html, accessed 15 October 2019.

various urban interventions in the form of citywide infrastructure since the 1970s century. It combines the results of extensive fieldwork investigations in order to present a comprehensive cartographic description of Delhi, well organized in four chapters: 'Delhi's Urban History', 'Delhi Urban Layers', 'Delhi and its Water Bodies', and 'A Vision for Delhi'. Combining references from folklore, historical maps, aerial images and various urban master plans, the opening two chapters carefully construct the city's urban growth, starting from its mediaeval tenth-century citadels up to the present complex urban structure. They further deconstruct the spatial relationships between the city and its landscape by elucidating the various layers of socioeconomics, ecologies, mobility and governance, thus providing a precise analysis of the contributors of the different infrastructures to the degenerating environmental condition of the city. The series of interpretative maps offer a simultaneous and scalar reading of the spatial, social, infrastructural and ecological networks, and emphasize the city's landscape provisions for the exclusions of its contemporary urbanity. Through the scholarly cartographic work, the book underlines its most important analytical contribution of interpreting the conflicts of Delhi's various infrastructures. It not only reintroduces the forgotten landscape of the city-its streams, water bodies, the river and its encroached floodplains-but also documents the vast 'existing' and often 'missing' public infrastructure (p. 42-60), systematically exposing invisible topologies of spatial and hydraulic segregation among the citizens of Delhi. As the authors explain: 'In refusing to create a vision for this critical relations of the city's drainage system with the Yamuna River. Functioning simultaneously as 'linear' spines and 'capillary' networks, these drains and sub-drains establish the structural 'armature' to gradually build up the various landscape-led remediation strategies, anchored by the spine of the Yamuna River: 'If you look beyond the waste and ignore the smells, Delhi's sub-drains, or Nullahs become a pastoral landscape. Existing alongside density of the city they are hidden from view, offering respite and the potential for a new system of green public infrastructures which connect the city' (p. 147).

The concluding chapter, 'A Vision for Delhi', promises significant optimism; combining the dynamic process chronicled in previous chapters, it re-engages the river for the ecological and economic benefits, appealing for a sustainable management regime in the city. Anchored by the spine of the Yamuna River, the 'vision' that the volume proposes is 'tactically activated' by nine ecologically robust design scenarios that combine themes of ecological restoration, housing and infrastructure demands, and new public functions. These themes appropriate the existing contexts to achieve river rejuvenation—a concept non-existent in urban environments—and to build the inherent resilience of the city versus crisis management. The scenarios 'Najafgarh Drain as the Delhi's East-West Spine', 'Sub-Drains as Linear Parks', and 'The Yamuna Floodplain Recovery' provide the essential ecological functions at the city scale. Performing as 'regional infrastructure', they integrate bioremediation, daylighting of drains, decentralized water management and recharge, linear public parks, and floodplain recovery to improve the overall water quality. The 'Decentralized Infrastructure' and 'Social Housing' scenarios respond to the two overwhelming crises faced by the city: the infrastructural access and migration inflows into the city. Surgically inserting solid-waste and waste-water infrastructure, these scenarios provide flexible and resilient systems at lower capital costs within the largely 'informal housing colonies' once excluded from formalized planning processes. Acknowledging the housing deficit, the scenario on social housing introduces hybrid housing programmes along the bridges and multimodal interchanges along the river. The scenarios named 'The Yamuna River Commons', 'Hybrid Infrastructure', 'Neighbourhood Public Amenities', and 'Heritage Revitalization' introduce the much-needed community programmes at the smallest scales in the form of educational and spiritual services, markets, pedestrian bridges, multimodal stations, parks and community and women's-only facilities. According to the authors, the scenarios offer 'typological proposals that test the validity of the general strategies, provides deeper insights and explore ways to incrementally implement a larger vision of the city . . . and identify specific sites that represent typical situations and deal with the full complexity of Delhi's urban condition' (p. 162).

The Yamuna River Project focuses on interpreting the disturbed, complex and constructed 'nature' of a single city, but the volume does not specify a theoretical perspective, advocating the spirit of ecologists such as Ian McHarg and Anne Whinston Spirn. The authors emphasize, however, that cities cannot be excluded from the natural systems[4] upon which their survival and stability depend.[5] Presented with profound analytical and graphical novelty, each of the proposed scenarios visualizes the city-level public assets enhancing biodiversity and advancing the learnings of landscape urbanism in redefining the city. These scenarios re-engage the city with its landscape, reintroducing the abilities of the landscape to restore the city's natural ecology and providing the much-needed programme for fostering active cooperation and public action.

The hybrid form of the book as a monograph, technical report, cartographic atlas and manifesto is woven together by its methodology. The book captures the dynamic and participatory works of the Yamuna River Project, outlined with captivating maps, illustrative plans, perspectives and photographs. Each chapter is equipped with a short introduction, with a greater emphasis on the various spatial scales, patterns and patches of ecology[6] present in Delhi's urban landscape. Yamuna River Project: New Delhi Urban Ecology prescribes an ambitious 'ecological design-led' agenda by analysing Delhi's complex multi-stakeholder context; it offers multidisciplinary action by integrating urban planning, infrastructure hydraulics, socioeconomics, landscape, ecology and urban design. Providing an innovative methodology for analysing complexities of regional territories, both the project and the book contribute to the new wave of resilience and adaptation thinking within contemporary [landscape] urbanism. The project proposes a framework for public sector-led regeneration that stresses the social and economic potential of urban ecology, based on the idea of design being participatory. Unravelling the complexities of

YRP

YAMUNA RIVER PROJECT

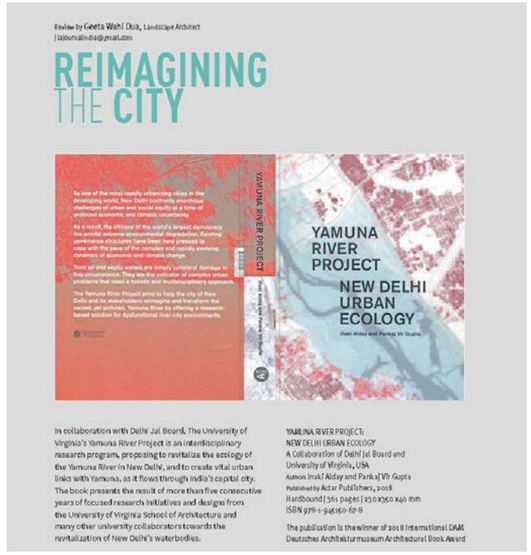
YAMUNA RIVER PROJECT
BOOK REVIEW

Excerpt from YRP Book Review in the Journal of Landscape Architecture in India:

"... In A Vision for Delhi, the infrastructure study becomes part of a design brief to envision and conceptualize possibilities to counter related issues. Imagined in carefully identified specific sites, the proposals while imbibing diverse knowledge and awareness about the crucial urban aspects, conceptualize environmentally and socially relevant and sensitive places – sludge Remediation Park, water Remediation Park, sub-drain seasonal park, decentralizing waste infrastructure, landfill remediation, Biodiversity Park, social housing, hybrid infrastructure, neighbourhood amenities and heritage revitalization schemes.

Promoting the idea of social prosperity as equal to ecological stewardship, the riverfront is visualized as a vibrant public spaces network, with public access and addressing ecological and cultural needs of the city and its citizens. The City's historic drains are imagined as a connected green public infrastructure while the need of a holistic approach is emphasized to re imagine them. Many of the concepts, impressively rendered, show directions of new possibilities of hope and change.

Yamuna River Project, New Delhi Urban Ecology is a unique collaboration between authorities and academia. By extending a branch of collaboration, it acknowledges and respects the forgotten role played by our government authorities in managing these urban networks, while working at grass root levels on daily basis. It brings to the forefront, the expertise of professionals, who are able to identity relevant concerns, interlinked networks and visualize new contexts of better environments. Their effort is backedby interdisciplinary and research enabled by a vibrant academic environment. The book serves as a role model for undertaking many such studies, for exploring avenues of change, improvement and transformation of Indian cities which are at present grappling with serious environmental issues."




Two natural features of river Yamuna and Ridge forest have defined the environmental character of the city of Delhi since its first settlement came into being. With dropping ground water levels, polluted river, reducing forest cover due to unregulated growth and urbanisation of a fast growing Indian metropolis, the city is battling multiple battles on various fronts. A seat of power with a complicated governance structure, it has been a challenge to formulate and execute crucial policy decisions, especially related to environment to improve the situation.

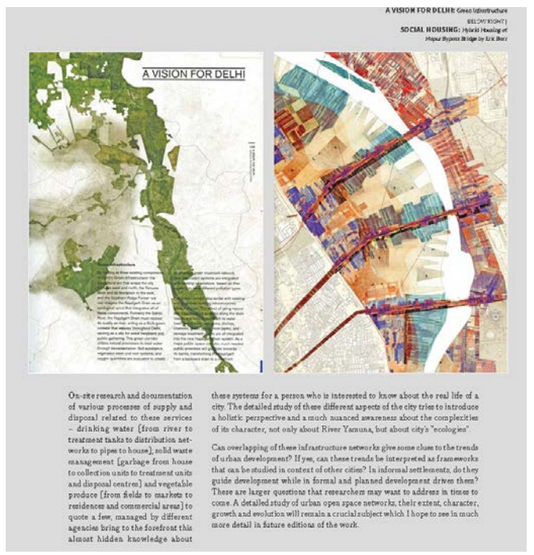
In this context comes the Yamuna River Project, New Delhi Urban Ecology. As part of an ongoing research work by University of Virginia, US, an independent research university that acts as a multidisciplinary think tank in collaboration with Delhi Jal Board, local government agency responsible for upkeep and maintenance of the water supply system of the metropolis, the research, in the form of a book, explores the environmental situation of the city from multiple perspectives while attempting to formulate a vision to explore potential avenues for change and transformation.

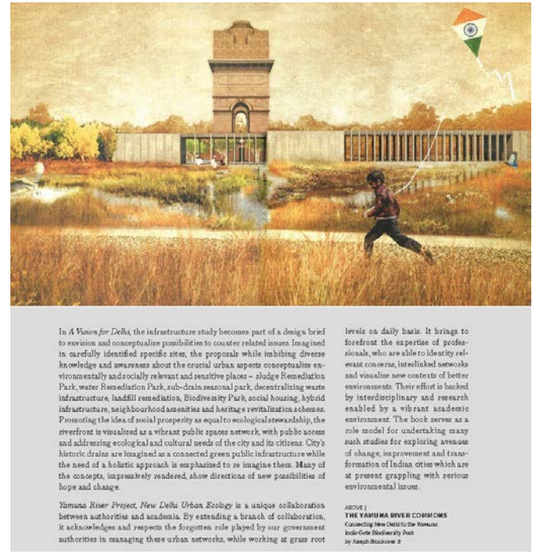
"The project methodology questions and investigates the causes and origins of Delhi's environmental situation from many perspectives — historic, social, technological and cultural. It proposes speculations — holistic interventions that define systematic urban strategies and generate new typologies that respond to the specificity of Delhi."

—Inaki Alday and Pankaj Vir Gupta, An Essential Future [Introductory Note]

The book is divided into four sections — *Delhi's Urban History, Delhi Urban Layers and Delhi and its Water Bodies*, and *A Vision for Delhi*. The introductory section traces the process of evolution of various historic settlements when they shared a close relationship with the natural features of hills, forest and river. Guided by natural topography, these settlements shifted from hills of Aravalli in south to floodplains of river Yamuna on the east in a time span of several centuries. Traditional systems of water harvesting with wells, *baolis*, tanks and lakes soon gave way to canals and later under British, to modern water supply and treatment system. The research acknowledges these important milestones in the urban history of the city. In the post independence scenario, some staggering figures show the scale of population growth and expansion leading to serious environmental issues concerning natural resources, health and hygiene. For example in seven decades, urban area has increased from 66.50 sqkms [in 1911] to 2,109 sqkms [in 2011]; 17% of the population doesn't have piped water system; there are more than 2000 illegal tankers supplying water to these areas through ground water extraction; as against around 4000 official tubewells, there are 4,65,000 illegal borewells that supply millions of litres of water; out of nine, seven districts are over exploiting ground water at an average rate of 170%; around 40% of the Delhi residents are not connected with planned sewage system; out of 83% of solid waste collected, accumulated at four landfills [with three exceeding height of more than 40mts.] and out of these, only 29% is treated.

The research also holds responsible city's various Master Plans for "their failure to provide a strategic vision which addresses Delhi's Urban complexities, Endangered ecologies and exponential urban growth." The observation attains a special significance in context of the current discourse in urban planning and urban design circles. In light of the crumbling infrastructure of Indian cities under various pressures, there is now a strong emphasis on the concept of localized development - a bottom up approach instead of the conventional top down. Acknowledging various forms of urban growth [unauthorized, regularized, slums etc.] other than the planned one in the city brings hope for a realistic and pragmatic discourse.





YRP

YAMUNA RIVER PROJECT

STUDIO PRIZE

Now in its fifth year, The Studio Prize by ARCHITECT Magazine, celebrates excellence in design education by recognizing thoughtful, ethical studio courses from accredited architecture schools around the world. The students enrolled in the winning courses receive a cash prize from a $25,000 purse furnished by the program's exclusive sponsor, Sloan. Every year, a studio with a focus on sustainability, specifically water conservation, is singled out as the winner of the Sloan Award.

In 2019 and 2020, the Yamuna River Project studios titled "A Piece of the City" and "The Rajasthan Cities Project: Jaipur" respectively were one of the six recipients of this award. The studios were taught by Professor Maria Gonzalez Aranguren and Professor Pankaj Vir Gupta at UVA and tackled unprecedented and urgent crises of ecological degradation and urban inequality, posing serious threats to the health of entire populations, through developing a comprehensive vision and strategic interventions. This is the first time that a design studio has been recognized in two consecutive years.

ARCHITECT Magazine Sept 2019 Cover featuring YRP Student Work

YRP

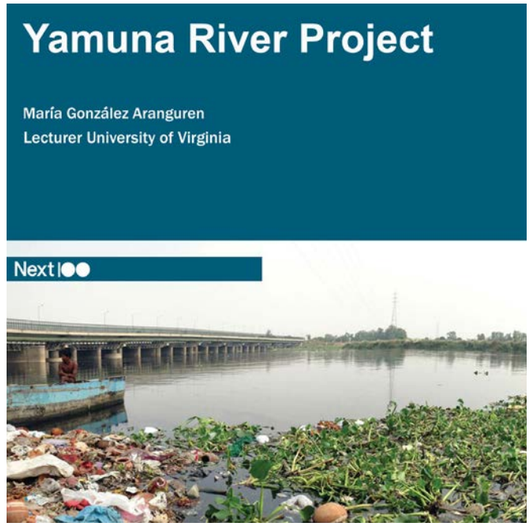
YAMUNA RIVER PROJECT

EVENTS

UNIVERSITY SCHOOL OF ARCHITECTURE, CENTENNIAL CELEBRATION

CHARLOTTESVILLE, 09.07.19

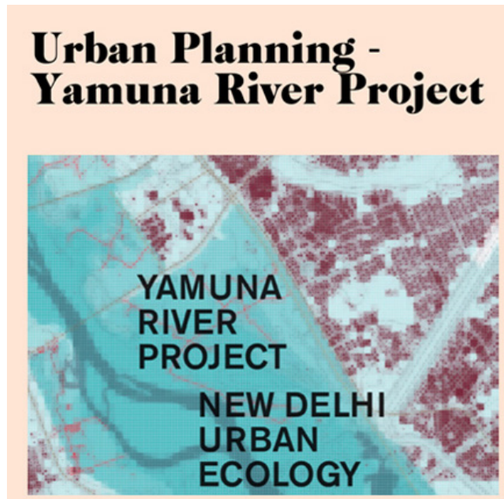
This year was the hundredth year for University of Virginia's School of Architecture. As part of this celebration various lectures and events took place showing alumni and guests the spirit and work of the school today. Within this celebration, YRP Co-Instructor, Maria Gonzalez Aranguren, presented the work of the past six years of the Yamuna River Project, highlighting student work, faculty research, government and other collaborations, awards, and current and upcoming work of the YRP. The discussions, in collaboration with other urban research project professors, informed alumni and students of the methodology and cross-disciplinary global engagement of the YRP.



URBAN PLANNING - YAMUNA RIVER PROJECT

NEW DELHI, 09.13.19

In September of 2019 Pankaj Vir Gupta, Co-Director of the Yamuna River Project spoke at the Common Room Foundation in New Delhi. He discussed what Urban ecology means in the context of New Delhi with a special focus on the Yamuna River Project and proposing questions such as; What are the broad contours of a holistic approach that can guide concrete interventions to improve the life of the city? How should different levels of government work together? Is it possible to project a more inclusive vision of city life? etc. The Yamuna River Project is uniquely positioned to confront these critical questions on urbanity and its intersection with an increasingly fragile ecology



CATALYSING SUSTAINABLE URBAN FUTURES

SÃO PAULO, 09.16.19 - 09.20.19

The 3rd Global Meeting of the Global Platform for Sustainable Cities and the 2nd International Conference for Sustainable Cities was jointly organized by the Sustainable Cities Program, the Global Platform for Sustainable Cities and the City of São Paulo. The event brought together government leaders, city professionals, civil society, international organizations, and global private sector experts to explore how we can plan, fund, and implement sustainable development paths for our cities. Iñaki Alday, Co-Director of the Yamuna River Project discussed the Yamuna River Project and the architect's role in catalyzing the urgent recovery of river-cities with multidimensional challenges.

Pankaj Vir Gupta presenting at the Common Room Foundation in Delhi, September 2019.

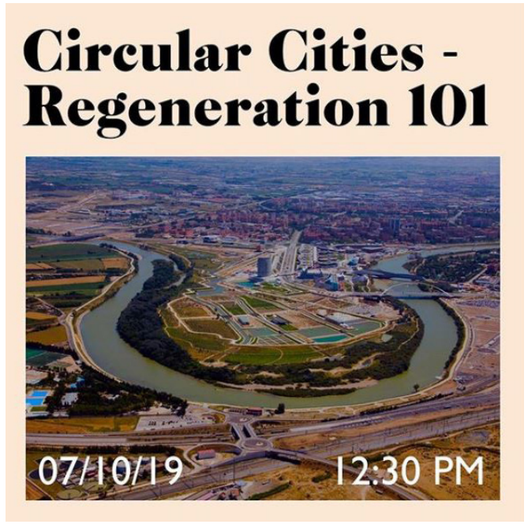
EVENTS

Iñaki Alday presenting at the 3rd Global Meeting of the GPSC in São Paulo, September 2019

CIRCULAR CITIES - REGENERATION 101

NEW DELHI, 10.07.19

The Common Room Foundation, New Delhi hosted an event about the circular cities and how urban regeneration contributes to resolving the social and ecological urgency. It is a non-profit platform that encourages to bring together the multifaceted ideas and people in promoting an alternative mindset to a better future. At the event, Inaki Alday was invited to present the Yamuna River Project and share views about the objective of the research in revitalizing the existing condition of the river Yamuna and its complex relationship with the denizens of the city. The talk further discussed how the research-based strategies are also aiming to speculate the role of various disciplines such as architecture, civil engineering to produce a solution for the river-cities with multidimensional challenges.



UNCERTAINTY 2019 ADMINISTRATORS CONFERENCE

NEW ORLEANS, 11.07.19

The Tulane University hosted the conference at Royal Sonesta Grand Ballroom, New Orleans to develop a dialogue about the crucial role of designers in creating an efficient framework of the rapidly changing world. In extension to the theme of the event, the university invited Pankaj Vir Gupta as a keynote speaker to express his concern about the responsibilities of academic institutions in creating vital ecological centers for the cities. He also spoke about the Yamuna River Project and its confrontation with the dilemmas of the urban sprawls and unplanned city expansion. Professor Alday was the Co-chair and host of the annual conference.

AGA KHAN PROGRAM FOR ISLAMIC ARCHITECTURE LECTURE AT M.I.T.

MASSACHUSETTS, 12.11.19

In December of 2019, YRP co-founder - Pankaj Vir Gupta - was invited to lecture at the Massachusetts Institute of Technology, hosted by the Aga Khan Program for Islamic Architecture. His lecture - titled “Architecture - between Ecology and History” presented a synopsis of the urban condition confronting contemporary practitioners of architecture in India. He discussed how his practice, vir.mueller architects, has sought to engage with the materials and methods of traditional construction, and redeploy them in the making of modern architecture. He also presented the research of the Yamuna River Project, and invited the audience - architecture students and faculty - to engage with the project research and propose possible collaborations.

EVENTS

ETSAB SCHOOL OF ARCHITECTURE
BARCELONA, 10.15.19

The ETSAB Barcelona School of Architecture invited YRP Co-Founder and Co- Director Iñaki Alday for a Lecture on October 15, 2019. Professor Alday focused the masterclass in how to formulate -or reformulate-"the research question" in a design proposition. Together with several architectural investigations, the Yamuna River Project was presented as a methodology of inquiry and research in complex urban conditions.

URBAN RESILIENCE WORKSHOP
RIYADH, 02.04.20

Iñaki Alday, Co-Founder and Co-Director of the Yamuna River Project, presented at a Workshop on Urban Resilience attended by the Mayors of the most significant cities of Saudi Arabia organized by the World Bank in Riyadh in February 2020. Other participants of the workshop included several high ranking officials of the World Bank's Urban, Social and Rural development branch as well as external international experts. Professor Alday presented several architectural investigations along with the Yamuna River Project and advocated a holistic approach towards building city resilience with nature.

MEXTROPOLI
MEXICO, 07.09.20

YRP Co-Founder and Co- Director Iñaki Alday spoke at Mextrópoli 2020, an architecture festival in Mexico City, titled (Un)sustainable City. The relationship between urban planning and architectural design with the conditions imposed by the climate crisis was at the center of the festival program. Professor Alday presented his research on the natural dynamics of river systems and advocated the need to stop 'protection' and switch to 'negotiation', Integration of flood and river dynamics in the urban public space, public space as a performative hydraulic infrastructure, hybridity in infrastructures to create urban assets and opportunities for social public space and urban ecologies in order to integrate changing conditions and eliminate the tipping point of the 'catastrophe'.

PRODUCTIVE URBANISM
VALENCIA, 11.20.20

The Congress of productive urbanism was held in Valencia on November 20-21, 2020. The conference set the development rules and basic principles of the new urban planning of the 21st century. The event included presentations, webinars and round tables with international experts. The goals of the congress are to evolving urban planning towards a new, more balanced and sustainable urban model that is agile, dynamic, and ecologically respectful, defined as PRODUCTIVE URBANISM: a residential, industrial, tertiary and logistical urbanism that has a finalist character in relation to land consumption, using that which is strictly necessary. Iñaki Alday, Co-Founder and Co-Director of the Yamuna River Project was invited to present at the conference.

YRP

YAMUNA RIVER PROJECT

RESEARCHERS

MICHAEL ALLEN
Assistant Professor, Department of Religious Studies

ERIC FIELD
Director of Information Technology, School of Architecture

PETER DEBAERE
Associate Professor, Darden School of Business

DANIEL EHNBOM
Associate Professor, Department of Art History

GUOPING HUANG
Assistant Professor, Department of Urban and Environmental Planning

WU-SENG LUNG
Professor Emeritus, Department of Civil and Environmental Engineering

ANDREW MONDSCHEIN
Assistant Professor, Department of Urban and Environmental Planning

BALA MULLOTH
Assistant Professor, Batten School of Leadership and Public Policy

SPENCER PHILLIPS
Lecturer, Environmental Economics

SHANKAR NAIR
Assistant Professor, Department of Religious Studies

MATT REIDENBACH
Associate Professor, Department of Environmental Sciences

MRIGANKA SAXENA
Yamuna River Project Fellow, 2018

VICTORIA SHEN
Assistant Professor, Woodrow Wilson Department of Politics

BAHAR DUTT
Yamuna River Project Fellow, 2019

RICHA VUPPULURI
Yamuna River Project Fellow for Doctoral Studies

MARIA GONZALEZ ARANGUREN
Lecturer, School of Architecture, Co-Instructor of Yamuna River Project Research Studio

YRP

YAMUNA RIVER PROJECT

RECENT RESEARCH

DELHI COGNITIVE MAPPING
Andrew Mondschein
Department of Urban & Environment Planning, UVA

AIR QUALITY POLICY REFORM
Victoria Shen
College of Arts & Science, Department of Politics, UVA

REVITALIZING THE YAMUNA RIVER: SOCIAL ENTREPRENEURSHIP APPROACHES
Bala Mulloth
Batten School of Leadership & public policy, Department of Public Policy , UVA

ANALYSING THE QUALITY OF DAILY COMMUTES TO IMPROVE TRANSPORTATION PLANNING
Eric Field
School of Architecture, UVA

BEHAVIORAL FRAMEWORK IN URBAN INFRASTRUCTURE
Richa Vuppuluri
PhD Constructed Environment & Behavioral Science, School of Architecture, UVA

BASELINE GREENHOUSE GAS EMISSIONS & SYSTEMS MODEL DESIGN
Spencer Philips, Jane Hammaker & Rhaude Dahlinghaus
School of Arts & Science, Department of Economics

SACRED RIVER, MODERN METROPOLIS: MAPPING RELIGIOUS SITES ALONG THE YAMUNA IN DELHI
Michael Allen
College of Arts & Sciences, Department of Religious Studies, UVA

RELIGIOUS REPRESENTATION OF THE ENVIRONMENT
Shankar Nair
Department of Religious Studies, College of Arts & Sciences, UVA

STORMWATER MANAGEMENT MODELING
Matt Reidenbach & HanaThurman
College of Arts & Sciences, Department of Environmental Sciences, UVA

TOWARDS ZERO WASTE - DELHI WASTE MANAGEMENT SYSTEM RESEACH
Zhilan Song + Xiang Zhao
School of Architecture, Department of Landscape Architecture, UVA

YAMUNA RIVER WATER QUALITY MODELING
Winston Lung
School of Engineering & Applied Science Department of Civil & Environmental Engineering, UVA

HISTORICAL ANALYSIS OF YAMUNA DEVELOPMENT
Abeer Saha
College of Arts & Sciences, Corcoran Department of History, UVA

SPATIAL DATA ANALYSIS
Guoping Huang
School of Architecture, Department of Urban & Environmental Planning, UVA

PAST RESEARCHERS

Mahesh Rao
Batten School of Leadership, UVA

Peter Debaere
Darden School of Business, UVA

IDENTIFYING THE REPRESENTATION STRUCTURE OF MINORITY GROUPS AND THEIR ROLE IN REVITALIZING THE YAMUNA
John Echeverri-Gent
College of Arts & Sciences, Department of Politics, UVA

Tim Winchester
School of Architecture, UVA

Dan Ehnbom
College of Arts & Sciences, UVA

YRP

YAMUNA RIVER PROJECT

RECENT RESEARCH

ANDREW MONDSCHEIN
SCHOOL OF ARCHITECTURE
DEPARTMENT OF URBAN &
ENVIRONMENTAL PLANNING

DELHI COGNITIVE MAPPING

In the cities of the developing world, the same path or neighborhood may represent walkable access to opportunities, a forced march through toxic air, or both, depending on individual and community context. Thus, while transportation researchers attribute significant benefits to walking, the same facets of cities that increase walking rates, such as high densities and convenient access to destinations, have also been found to exact a toll in terms of safety, exposure to emissions and noise, and mental well-being. In Delhi, India – with neighborhoods along the Yamuna River as our focus –

We investigate how daily travel and environmental hazards such as air emissions, water quality, and noise, intersect to shape individual well-being across the region's neighborhoods.

We use an online cognitive mapping survey tool to collect, map, and analyze the effects of mobility, the environment, and well-being, as they are distributed socio-spatially across the city. Work on the Delhi Walkability and Environment Survey was presented at the Environmental Design Research Association Conference, May 2019. Two papers are in process on results of the survey, one on the associations between walking and wellbeing in Batla House and Bhalswa Dairy, and the other on the concept of mobility dissonance drawing on the experience of daily mobility in environmentally compromised settings.

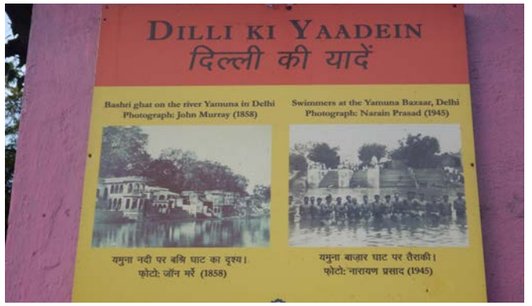
MICHAEL ALLEN
COLLEGE OF ARTS AND SCIENCES
DEPARTMENT OF RELIGIOUS STUDIES

SACRED RIVER, MODERN METROPOLIS: MAPPING RELIGIOUS SITES ALONG THE YAMUNA IN DELHI

The Yamuna River is the second largest tributary river of the Ganges and the longest tributary in India. The Yamuna, also known as the Goddess River, has a high religious significance within the communities which surround it as it is connected to beliefs surrounding Krishna, a major Hindu deity, and is found in other religious Hindu texts. This significance results in location of several religious sites along the Yamuna River, many of which are undocumented.

The goal of the project is to better document the religious sites and further understand the roles of those who manage and visit these religious sites.

The first phase of the project involved travel to Delhi to map, photograph, and document the diversity of the religious sites along the Yamuna. Some religious sites have been separated by developments along the river in recent years. For this research project, only sites where the Yamuna is in the physical presence rather than where it is a memory are considered. The typologies include but are not limited to temples, mosques, ashrams, and shrines from Hindu, Muslim, Sikh, and Buddhist religions. The second phase of the project will investigate the role of the Yamuna as it interacts with the visitors and caretakers of these religious sites. As the recording of these sites continues the geotagged documentation will be embedded into a map and uploaded to internet to increase the accessibility of these religious spaces.



YRP
YAMUNA RIVER PROJECT

RECENT RESEARCH

ABEER SAHA
COLLEGE OF ARTS AND SCIENCES
CORCORAN DEPARTMENT OF HISTORY

HISTORICAL ANALYSIS OF YAMUNA DEVELOPMENT

In the 1950s, the river Yamuna in Delhi was still a place to go swimming on a regular basis. Even as late as the 1970s, many residents of India's capital would bring picnics and spend the day on the banks of the river. In recent times, however, as Sarandha Jain exhorts: "the [Yamuna] water that leaves Delhi is not even fit for animal[s]." Seemingly abandoned by the millions who worship its divinity, estranged from those who depend on its waters, Delhi's Yamuna has become one of the most toxic rivers on earth. But how did it get to be this way and why was nothing done to save it from this fate?

This research will consider the urban developments that took place in Delhi, along the Yamuna, and the legislation of India's Water Prevention and Control of Pollution Act in the post-colonial period.

By studying Delhi's historical newspapers for developments on the Yamuna, this project will be sensitive to the social and cultural valence that the Yamuna has taken on in public discourse since India's independence from British Raj. This paper will demonstrate that the current state of the Yamuna is not simply the result of inefficient bureaucracies and overloaded water treatment facilities, but is tied up with the priorities and narratives of capitalist development. Therefore, no technical fix alone will be sufficient to revive the Yamuna to its previous vitality. What will emerge, through this study, is a synthetic narrative of Yamuna's place in Delhi over the past sixty years; exploring the ways in which the Yamuna is both seen and unseen in the lives of the millions that live by it.

SHANKAR NAIR
COLLEGE OF ARTS AND SCIENCES
DEPARTMENT OF RELIGIOUS STUDIES

RELIGIOUS REPRESENTATION OF THE ENVIRONMENT

This project aims to utilize the Yamuna River Project grant for two separate enterprises, both related, in different ways, to the Yamuna River and issues of broader environmental concern in South Asia.

The first is an article-length study of four versions of the famous Hindu tale, the Rāmāyaṇa. Three of these Rāmāyaṇas were composed by Hindus, and one was authored by a Muslim poet, spanning four different South Asian languages. The research compares and contrasts these four versions of the Rāmāyaṇa, examining the varying ways that the four poets aestheticize the natural landscape (rivers, forests, clouds, etc.) in pursuit of different moral ends.

The aim is to better grasp historical modes of South Asian moral reflection upon the environment in order to better communicate present-day environmental crises to contemporary South Asians.

The second project is the formulation of a new undergraduate seminar, "Islam, Science, and the Environment." This course will survey the history of the natural sciences within Islamic civilization, with a particular emphasis upon environment-related discourses. The Yamuna River will serve as a recurring case study throughout the seminar. The course was taught in Spring 2020, and then again in Spring 2021. The article "Moral Knowing through Aesthetic Knowing: Landscape, Ethics, and Aesthetic Theory in Three Versions of the Rāmāyaṇa." is under review for publication.

YRP

YAMUNA RIVER PROJECT

RECENT RESEARCH

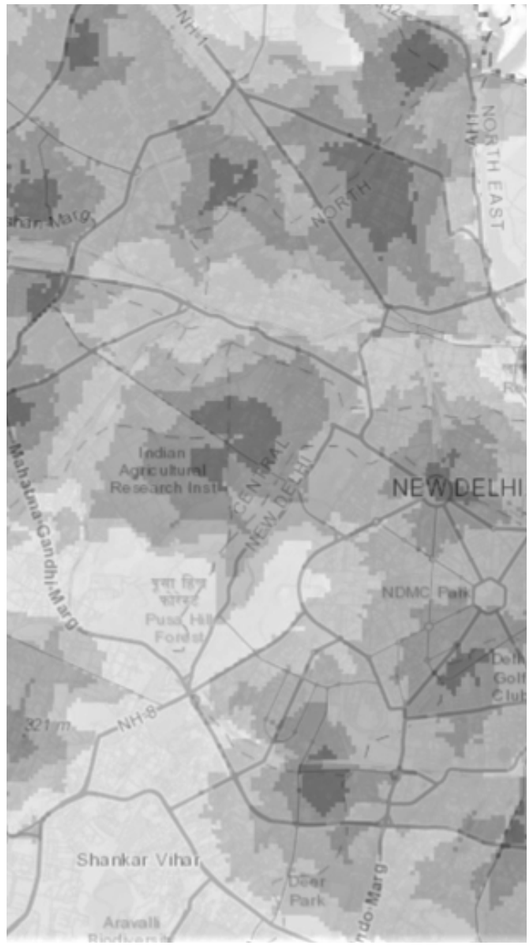
GUOPING HUANG
SCHOOL OF ARCHITECTURE
DEPARTMENT OF URBAN & ENVIRONMENTAL PLANNING

SPATIAL DATA ANALYSIS

The urbanity of Delhi is a complex knot where varied degrees of formal and non-formal infrastructure are intertwining, making it challenging to see and understand how these systems work together.

The current research focuses on how to bring geographical level system thinking and spatial thinking to understanding Delhi's complexity through a series of nested-scale spatial analyses.

Great effort has been made to develop rich spatial data sets for investigations into the urban structure, transportation service, and landscape ecological pattern. Acquired or developed new data sets include 2001 census data, improved multi-modal transportation network, bus stops, drainage map, normalized difference vegetation index data from Landsat, land use map, and more. These new data sets have been constantly added to https://gis.arch.virginia.edu/Yamuna/ website for visualization and to be further used by students and researchers working on urban India projects across the University and beyond. .



VICTORIA SHEN
COLLEGE OF ARTS AND SCIENCES
DEPARTMENT OF POLITICS

AIR QUALITY POLICY REFORM

Recently, Delhi notoriously became the world's most polluted city after going off the charts of the Air Quality Index (50-100), registering at 999. This is a critical factor of urban life to study as air pollution in India is responsible for the deaths of 1.5 million people every year. For perspective, this is the fifth largest killer in India - resulting from chronic respiratory diseases and asthma. Currently, much of this pollution in Delhi comes from motor vehicle emissions, Badarpur Thermal Power Station, crop burning, fires at Bhalswa and other major landfills, and a lack of monitoring and reaction by authorities.

Under the umbrella of the Yamuna River Project, this project, entitled "Air Pollution Governance in Indian Cities," seeks to uncover the incentives that contribute to urban air quality in India and derive policy insights into curbing rampant air pollution.

These derivatives can be presented to officials of Indian cities as opportunities to save their citizens from the pollution which is currently suffocating their citizens. Pictured is an air quality monitor in New Delhi from February 2019.

YRP

YAMUNA RIVER PROJECT

RECENT RESEARCH

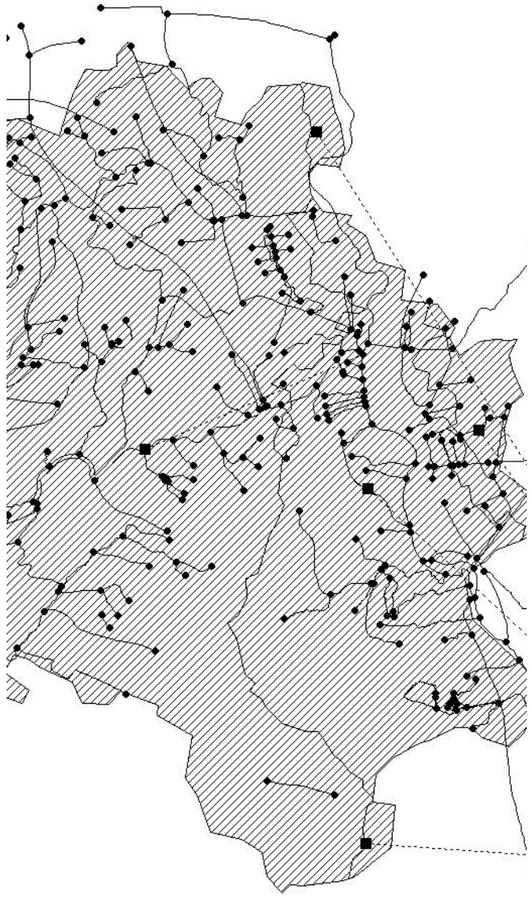
MATT REIDENBACH & HANA THURMAN
COLLEGE OF ARTS AND SCIENCES
DEPARTMENT OF ENVIRONMENTAL SCIENCES

STORMWATER MANAGEMENT MODELING

Delhi's rapidly-growing population has led to a depletion of water quality and quantity in the Yamuna River and associated groundwater system, making it important to understand the city's hydrology. We are using EPA's SWMM (Storm Water Management Model) to model the flows of storm water in Delhi. SWMM is a dynamic rainfall-runoff simulation model, and is particularly useful for modeling urban systems. The model routes runoff from Delhi's major sub catchments through the city's extensive drainage system and then through the Yamuna River, and utilizes GIS-based inputs such as elevation and land cover.

This research is being used to determine Delhi's current water resources and to predict how changes in climate, infrastructure, or other factors will alter the city's future hydrological system.

The data gathered through this research project will provide a conclusive report which can be presented to government officials and this information can be further incorporated into student and faculty research projects through the YRP.



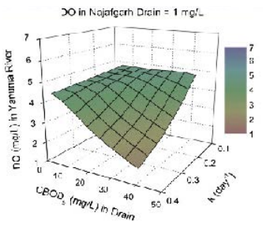
WU-SENG, LUNG
SCHOOL OF ENGINEERING AND APPLIED SCIENCE
DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING

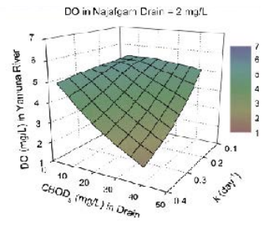
YAMUNA RIVER WATER QUALITY MODELING

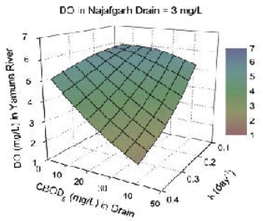
The water quality modeling study began in the fall of 2015 A comprehensive data gathering and analysis effort was completed in October 2015, having identified data gaps for the modeling effort. In the meantime, a preliminary water quality model of a 25-km length of the Yamuna River near Delhi was completed. A trip to Delhi took place in January 2016 to fill the data gap with additional data from the Central Pollution Control Board (CPCB) of the Indian government for model calibration use.

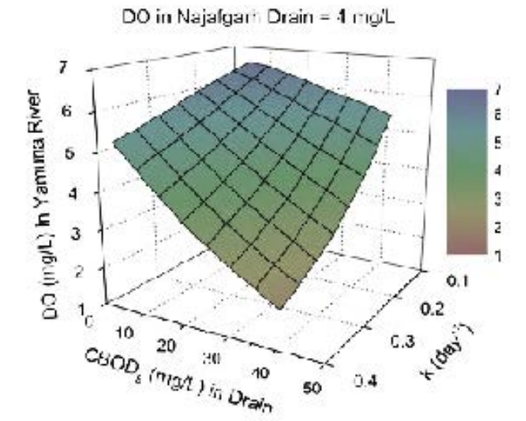
The Najafgarh Drain is the single most significant source of pollutants (i.e. BOD) to the 25-km stretch of the Yamuna, responsible for the water quality deterioration near Delhi. The study has since expanded the model to include the Najafgarh and its supplemental drain, called for in the MoU signed in July 2016 between UVA, and Delhi Water Board.

A comprehensive sampling effort to collect field data in the Drains was conducted in spring 2017, providing additional data to calibrate the model. Figure 1 shows that 90% reduction of the BOD (the main pollutant from domestic wastewater in the Delhi area) would be needed to raise the DO levels to meet the water quality standard of 4 mg/L in the river.









YRP

YAMUNA RIVER PROJECT

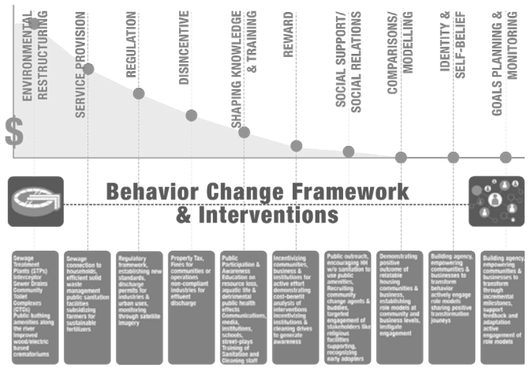
RECENT RESEARCH

RICHA VUPPULURI
SCHOOL OF ARCHITECTURE
PHD CONSTRUCTED ENVIRONMENT & BEHAVIORAL SCIENCE

BEHAVIORAL FRAMEWORK IN URBAN INFRASTRUCTURE

In the case of New Delhi, local governance systems are responsible for infrastructure delivery, yet the political processes for creating such infrastructure are often unidirectional. Grassroots efforts to mediate the urban-planning process and cultivate collective agency thus often fail.

The premise of the research is that urban visions to revive the river fail because there is a lack of integrated effort towards transforming socio-cultural and professional behaviors.



Recent conferences and publications funded by YRP grant:

Prolonged water woes of Mumbai's urban drains: What are decision-makers missing? (paper)

Association of Collegiate Schools of Planning (ACSP) Annual Conference (forthcoming) October 2021, Miami FL (co-author, Bassett M. Ellen)

Socio-behavioral framework for ecologically strained urban ecosystems: Exploratory insights from New Delhi and Mumbai, India (paper)

Association of Collegiate Schools of Planning (ACSP) Annual Conference, November 2020, Toronto, CN (virtual)

SPENCER PHILLIPS, JANE HAMMAKER & RHAUDE DAHLINGHAUS
SCHOOL OF ARTS AND SCIENCES

BASELINE GREENHOUSE GAS EMISSIONS & SYSTEMS MODEL DESIGN

Implementing the goals and designs of the Yamuna River Project (YRP) may have positive implications for both greenhouse gas emissions and for climate change vulnerability in the National Capital Region.

Changes in wastewater treatment, solid waste management, and land use in theYamuna River floodplain could reduce net emissions of key greenhouse gases. The same measures could also produce benefits and co-benefits in the form of enhanced ecosystem services such as protection from flooding, aesthetic and recreational value, and improved nutritional and health outcomes for residents.

To quantify these potential effects, the YRP's Climate Change research team is undertaking a two-phase effort. In the first phase, reported here, we estimate GHG emissions from and associated with the land use, water treatment, and waste management processes that are the primary subject of the YRP. In the second phase, we will construct a forward-focused systems model for exploring scenarios for changes in those processes envisioned by the YRP as well as those already described or implemented by other processes. This model will encourage experimentation, communication, and dialog about how various efforts can contribute to reductions in net GHG emissions, reduced vulnerability to climate change.

Figure 3a. Status quo Sustainable Solid Waste Management, Delhi

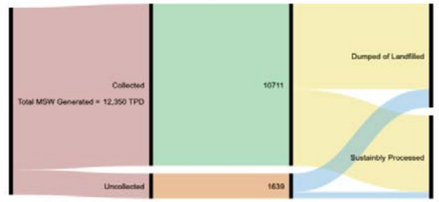
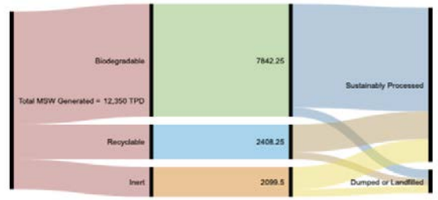


Figure 3a. Zero-Waste Solid Waste Management, Delhi



Source: Hammaker APP 2019, data from Annepu, 2012; MCD, 2017.

YRP

YAMUNA RIVER PROJECT

UVA - TULANE RESEARCH TRIP

In October of 2019, 25 graduate and undergraduate students from University of Virginia School of Architecture and Tulane University School of Architecture traveled to India together for a 10 day research trip. The students spanned the disciplines of landscape architecture, architecture, and urban planning. The trip was coordinated by the instructors and researchers of the studios; Pankaj Vir Gupta, Inaki Alday, Maria Gonzalez Aranguren, Monisha Nasa, and Darcy Engle.

During the trip, students from the schools collaborated, exchanged, and expanded their research on the city of Jaipur. They began the trip with a presentation of research progress and interests and divided themselves to travel around the city and investigate deeper these areas.

Students had the opportunity to visit a wide variety of sites around the city including informal settlements, Amber Fort, Tal Katora Reservoir, Nahargarh Fort, the historic Walled City, the Darvyavati Riverfront and Sewage Treatment Complex among others.

Student discussing housing in the city with local resident

UVA and Tulane Students and Faculty at Haus Khas in Delhi

Students and Faculty at the new Dravyavati Sewage Treatment Plant Facilities

Students visiting the historic Tal Katora Reservoir

Students visiting an informal settlement

YRP

YAMUNA RIVER PROJECT

STUDENT TRAVEL TESTIMONIALS

GAELLE GOURMELON, M.L. Arch, UVA

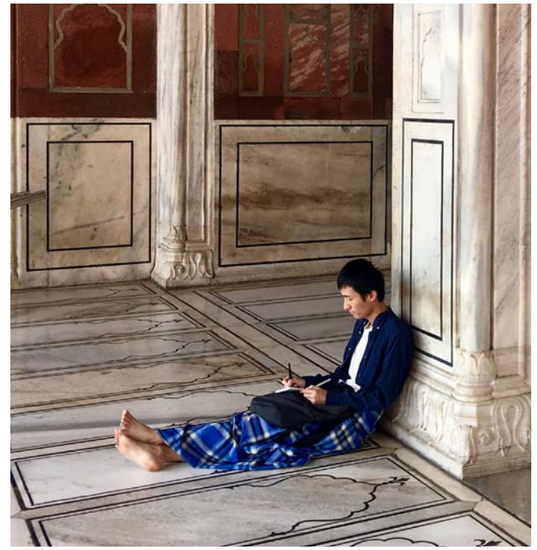
Our studio trip to Jaipur was life-changing. Nothing could have replaced a visit with my own eyes, ears and nose to truly understand how the spaces we are investigating are claimed, inhabited, and navigated. India cannot be understood through satellite images and on-line descriptions. Without going there in person, how could I have known that the green patch I was eying for a project was already inhabited by roaming cows, abandoned toilet infrastructure, and thriving aquatic vegetation? How could I have expected that smells can render seemingly passable corridors into pedestrian barriers? How could I have heard the pride of someone for a place that I had previously dismissed? Our trip to Jaipur for the Yamuna River Project Studio changed not only the way I think about my project and its possible implementation, but also the way that I see opportunities for landscape architecture in low resource communities internationally.

EVAN WARDER, M. Arch, TU

Having the opportunity to travel to Jaipur and experience first-hand the vibrant life of the city with its many complex issues was a transformative moment for me in this studio. The physical realities of Jaipur's density provided insight that mapping, satellite images, and online research could not fully realize. Jaipur's overlapping streets and markets were not comparable to western cities and forced the design solutions to engage another layer of complexity and intensity. My trip was not only a crucial aspect of this studio, but was essential to my development as a designer and fellow citizen of the world.

CHENJIE XIONG, M.U.E.P., UVA

I would never know the real daily life in India without physically being there. Before going, I was about to focus on developing water harvesting strategies for Indian cities because of its severe water scarcity especially in Jaipur. But when I was there, I was shocked at the severe gap between the poor and the rich. I realized that it is impossible to improve people's lives there by only collecting and providing more water, because the very basic water treatment and sewage infrastructures are still not accessible by many people. Solid wastes and waste water were disposed on streets and the Amanishah River without management, resulting in pollution and poor living conditions. It was these serious issues that pushed me to devote myself to the project and try hard to really help the city to be better.



MARY KATE GRAEFF, B.S. Arch, UVA

The opportunity to travel to India for the Yamuna River Project studio was without a doubt the most impactful thing I have ever done while at the University of Virginia. Seeing the city of Jaipur was crucial to my understanding of the project, but the experience changed my life in ways much larger than a single studio project. Having experienced for a short time a culture so beautiful and unique was entirely transformative in the way I view architecture, cities, and people. I was able to understand the congested streets, pollution in the air, lack of air flow in the dense urban fabrics. Before the visit, these feelings were things I could have only imagined. As a design student, being able to feel the reality brings a validity to our projects which would be non-existent through research from a distance.

YRP

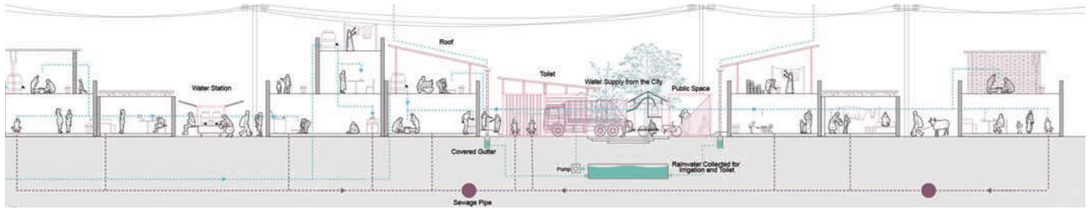
YAMUNA RIVER PROJECT

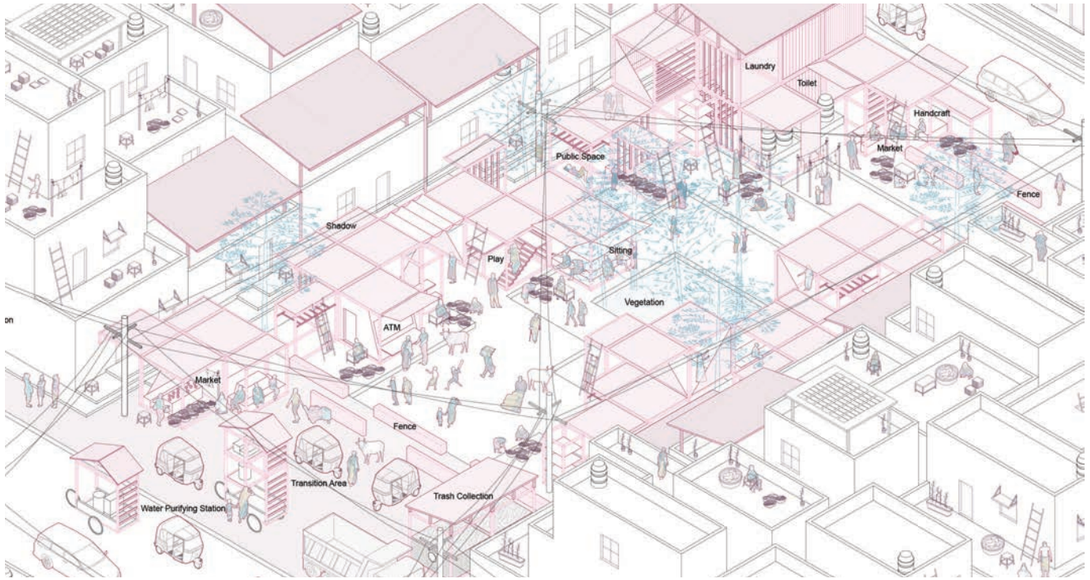
ARCHITECTURE, LANDSCAPE ARCHITECTURE AND URBANISM PROJECTS

DECENTRALIZED WATER COLLECTION

CHENJIE XIONG

The site area comprised of approximately 8000-9000 households and during the monsoon season , the region experiences 80% water loss due to the presence of impermeable surfaces. Only 52% of the households have access to treated tap water and 17% are connected to the closed drainage. The project envisions an alternate method to manage water by considering the basic water infrastructure in relation to the water life cycle and the rainwater harvesting strategies. These systems are introduced into the urban fabric by integrating water management with the public spaces in the community.

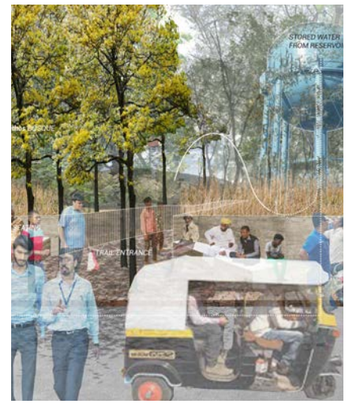


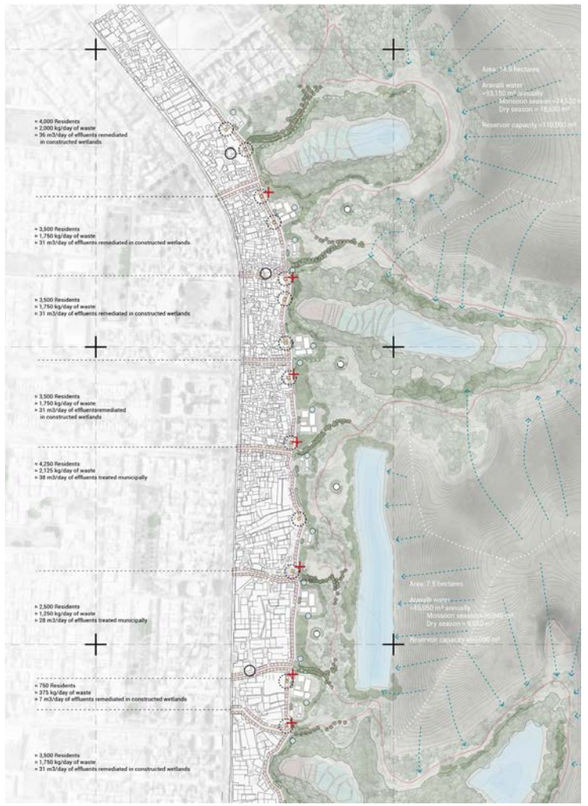


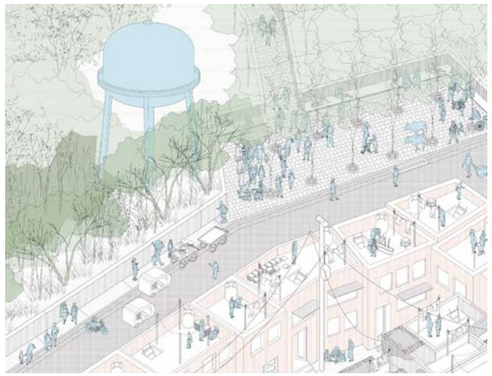
ARAVALLI HILLS WATER COLLECTION

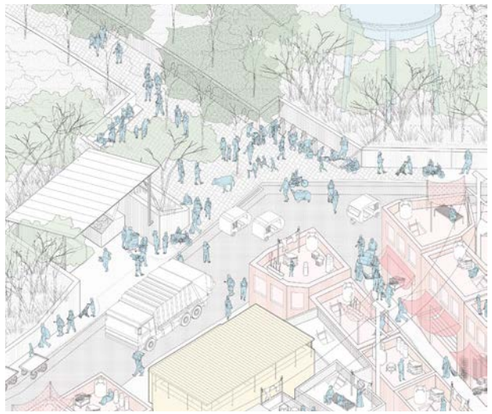
NICK WITTKOFSKI

This project aims to do two things, one to collect and protect the relatively clean storm water accumulating in the roughly 250 acres of this portion of the Aravalli watershed, used to both recharge the aquifer as well as distribute to the neighboring communities during the dry season. Second, it respects the estimated 35,000 residents right to inhabit the land in which they presently reside, but dictates that the waste and effluents they produce cannot undermine the sanctity of the water.









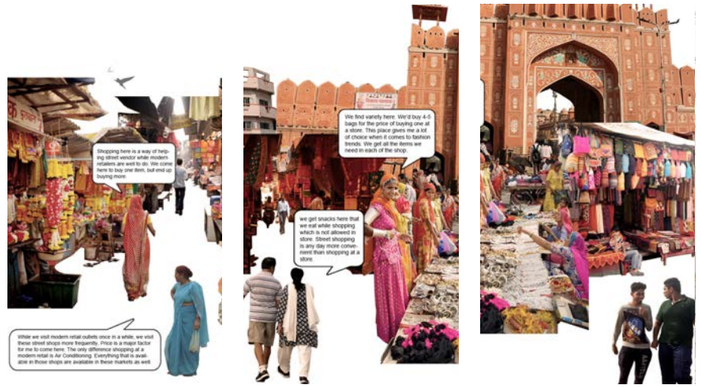
YRP

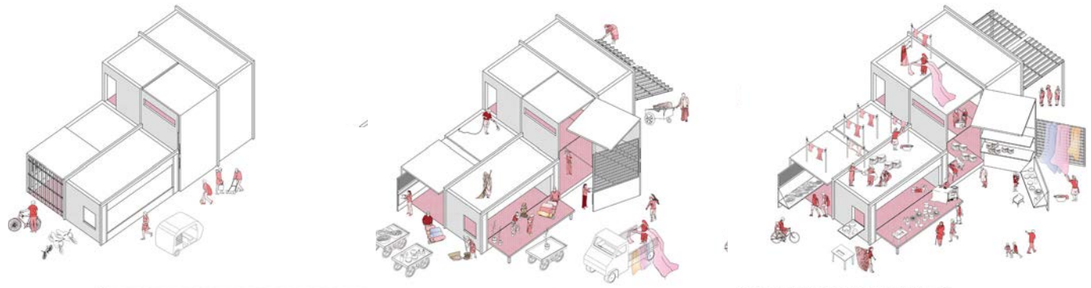
YAMUNA RIVER PROJECT

MARKETS JAIPUR

WENYAN YU

In analyzing the markets of Jaipur, the spatial complications became apparent from the observations about selling of products in the threshold or the street. This expansion space which acts as display space, circulation, parking space and several others becomes a web of tangled programs. The design proposition looks at the shortcomings of the network of market spaces in the city, identifying where and how a diversity of retail spaces can be integrated and more widely accessible. Further, the project offers a catalogue of spaces where the typical and related functions of market spaces in Jaipur can unfold.





5:00 AM. The merchant arrives at the market.

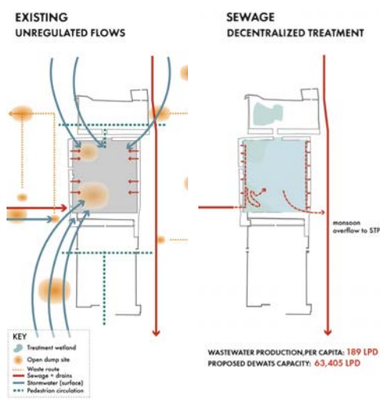
6:00 AM. Open prefabricated platforms and folding walls, place goods, and clean the shop.

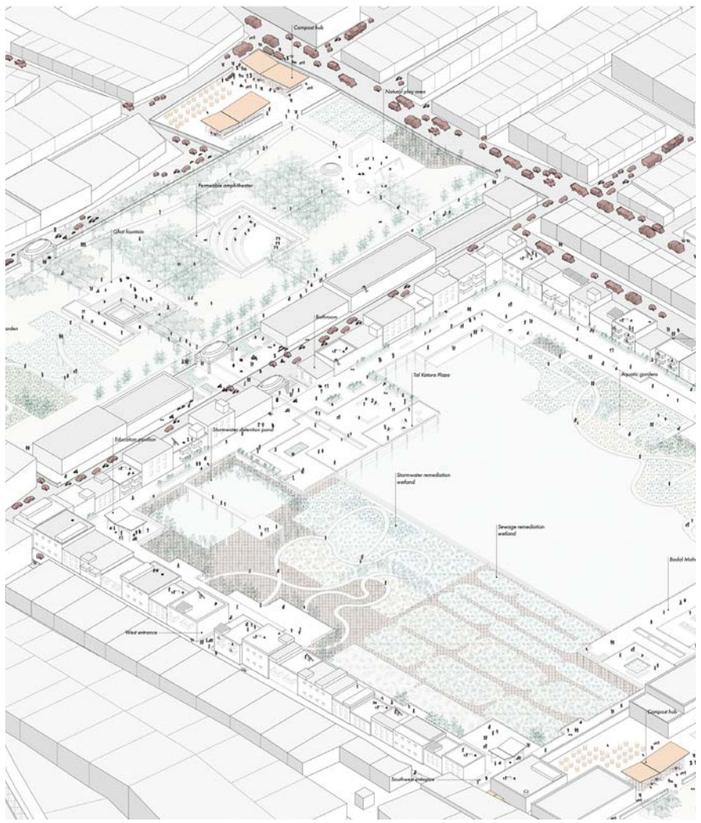
11:00 AM – 8:00 PM. Business hours.

TAL KATORA RESERVOIR RESTORATION

CHLOE SKYE NAGRAJ

The project proposal utilizes the renewal of Tal Katora, Jaipur's historic reservoir, as a vehicle to address the larger urban systems of solid waste, sewage and storm water management. This system based approach will be essential to the revitalization of Tal Katora: introduction of strategically sited decentralized waste and sewage infrastructure in the neighborhoods surrounding the 14 acre site. The circulation lays emphasis on the center line of the city that the site was designed around, renewing the strong linear connection to the historic core of the walled city functionally and experientially.





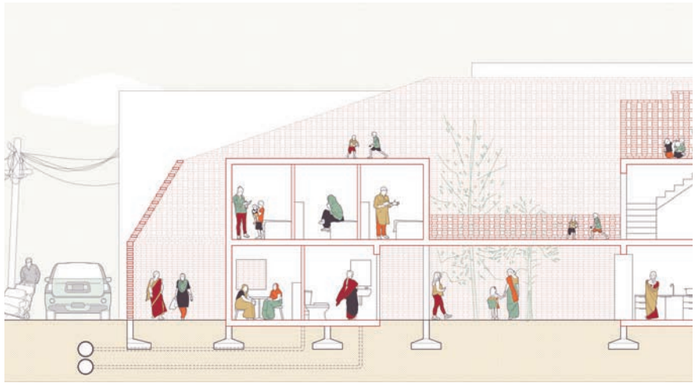
YRP

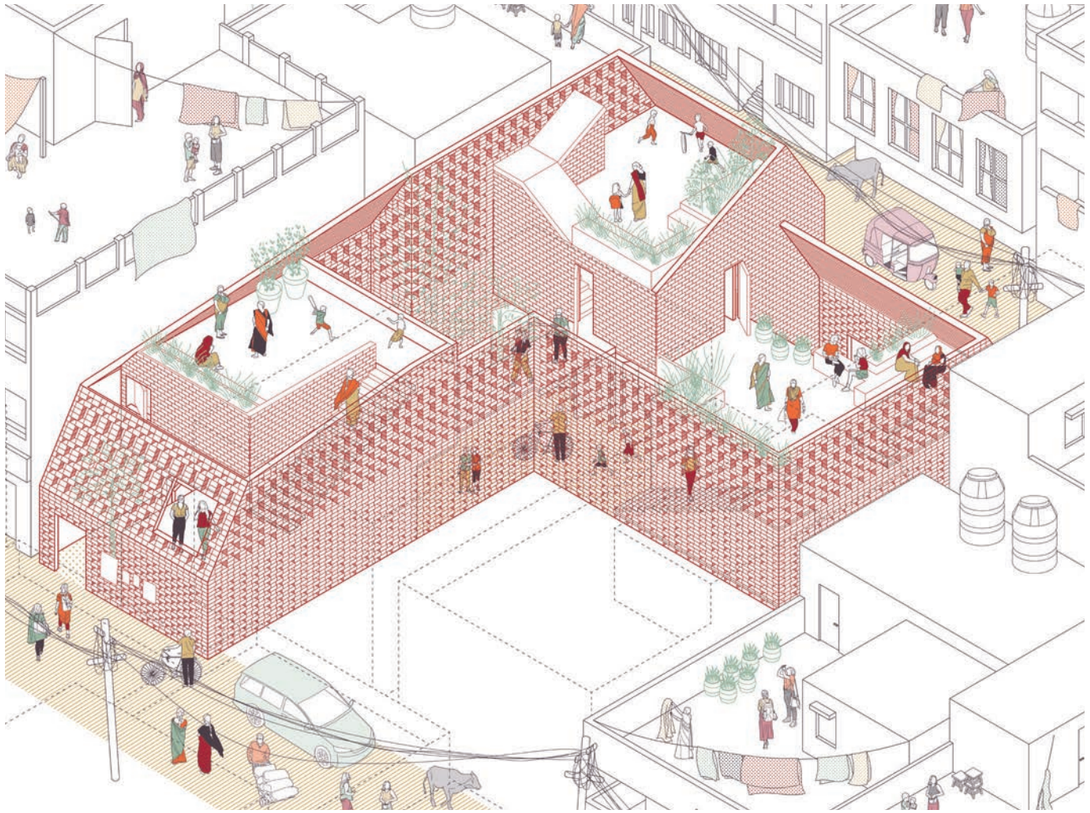
YAMUNA RIVER PROJECT

JAIPUR WOMEN AND CHILDREN'S CENTER

AUDREY LIU

The proposal evolved by examining healthcare, education and safe spaces for women and children in the city of Jaipur. Each of these prototypes include a collection of programs which can be rearranged depending upon the scale of the space available. The exterior walls have varied levels of perforation to enable light and sir to circulate into the space. A new network is proposed which fills out the existing through mapping of the spaces that lacked the access to healthcare and educational facilities.

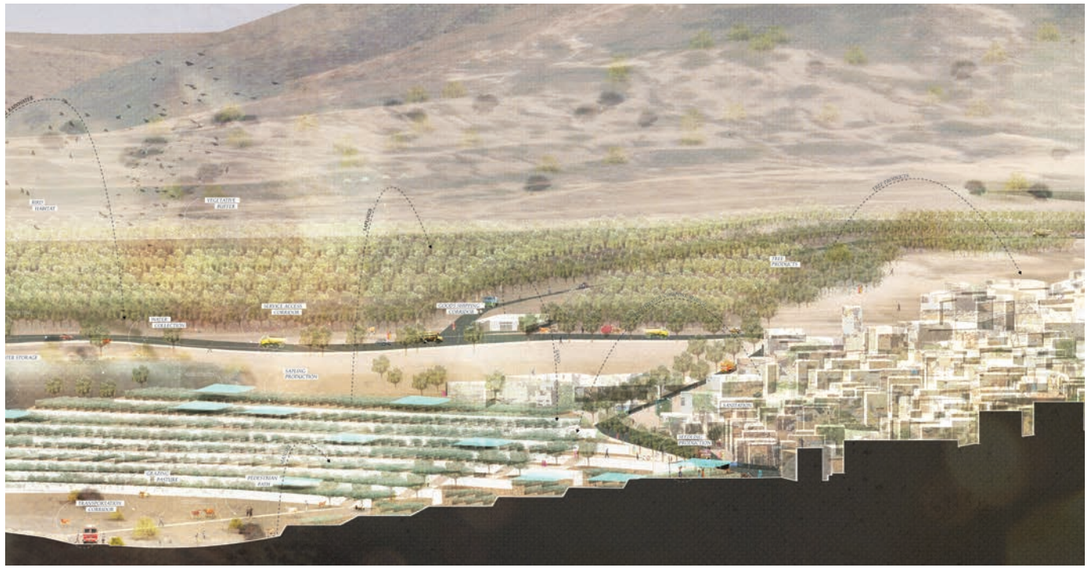




REFORESTATION NURSERY AND WETLAND

GAELLE GOURMELON

The project aims to economically support the informal community of Ram Nagar and integrate the ecology of the site with urban context of India. The proposal establishes a phased assembly of systems organized primarily through a combination of working nursery and wetland. By utilizing the locally available resources and by generating employment opportunities, the project synergizes interconnected feedback loops of strategic government investment, socio-economic opportunity, new socio-ecology and community legitimization.



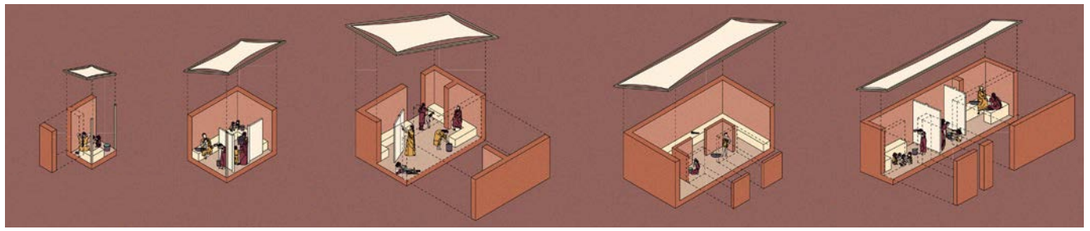
YRP

YAMUNA RIVER PROJECT

BATHHOUSE JAIPUR

MARY KATE GRAEFF

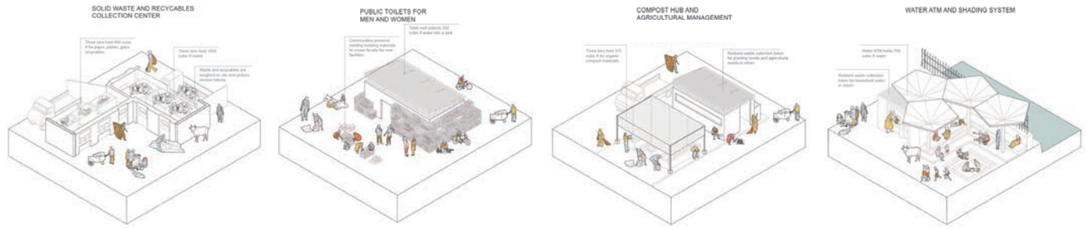
The research laid its focus on the past and present bathing practices in low income communities. Also, the site visit to Jaipur formed the base information for a responsive proposition of the bathing facility. It is transformed into a space where people can bathe themselves and their children, do laundry and use a restroom all at an approachable distance from their homes. In the proposal, the series of facilities is located on the east side of the Aravalli Hills designed to use run-off water from the monsoon.

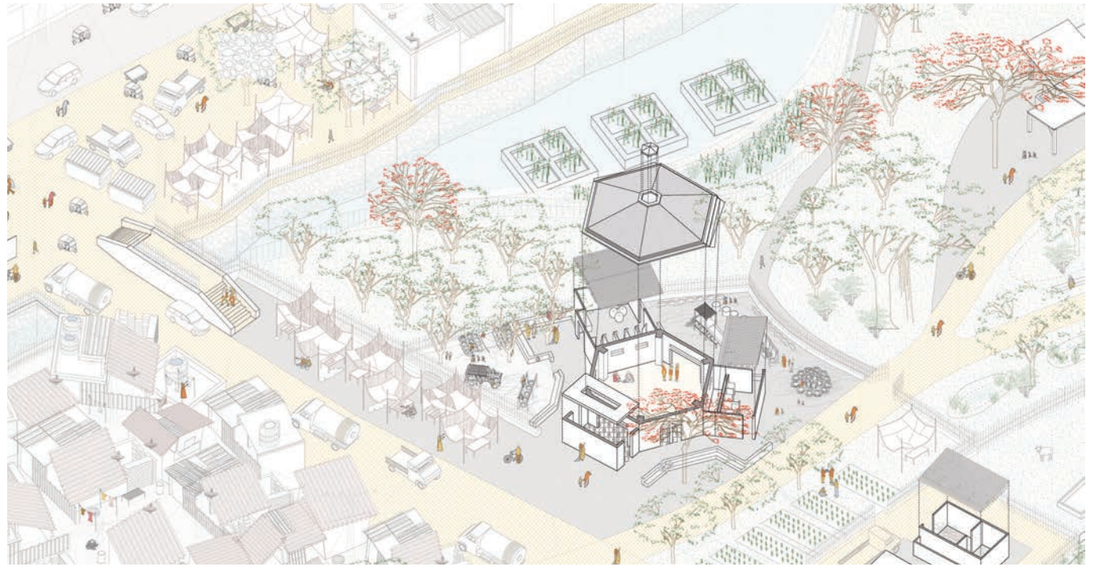


REVITALIZATION OF THE AMANISHAH NALA

QINMENG YU AND ALLIE TA

The environmental degradation, poor infrastructure and encroachment of slum neighborhoods are inevitable consequences of rapid urbanization, both physically and demographically. The Amanishah Nala drain is critical to the water and sewage management of Jaipur as it connects the upward stream from Aravalli hills to the downward stream of the Dravyavati river. In response to the context, the proposal aims to revitalize the Amanishah Nala and help in extracting the solid waste and grey water with incremental installation of public amenities helping Jaipur to recover the underused resources





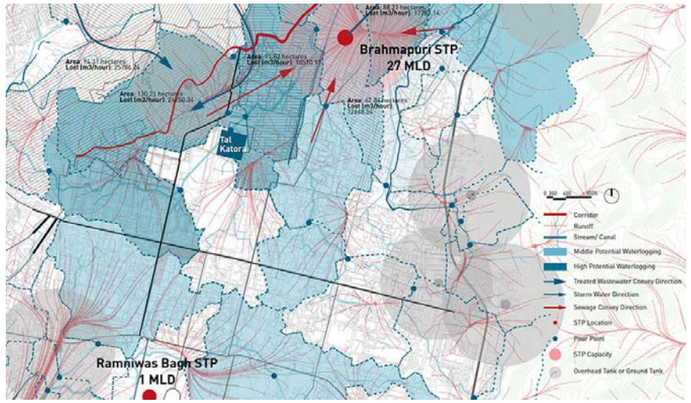
YRP

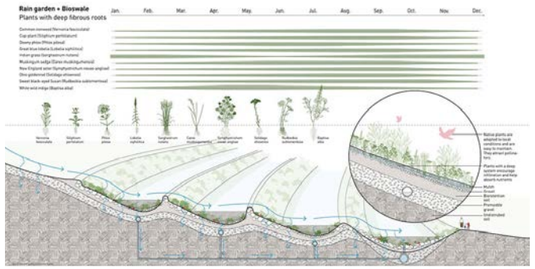
YAMUNA RIVER PROJECT

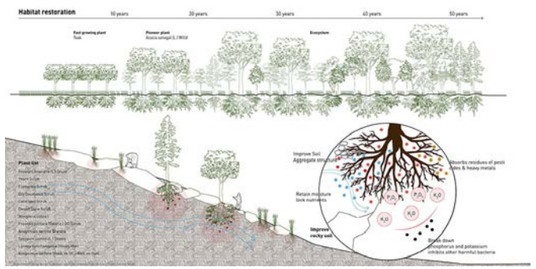
GREEN CONVERGENCE: RESILIENT CORRIDOR FOR JAIPIUR

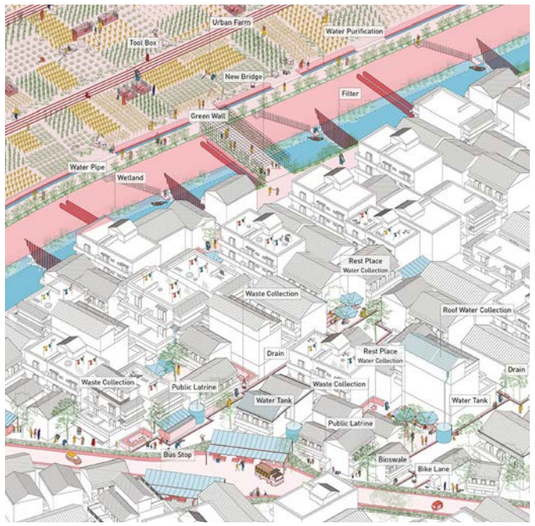
CHAOMING LI | XUEFEI YANG

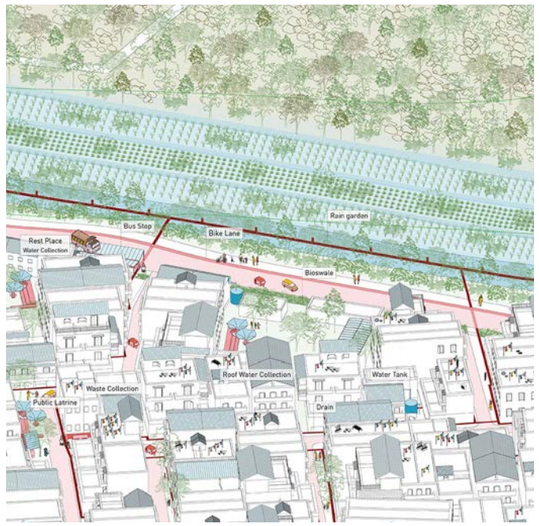
The project aims to create an ecological corridor with a circulatory system for water and waste employing a decentralized solid waste system. The measure will enhance the resiliency of the city through combining different systems into one and increasing areas of green space. The project also considers economic value, created from introducing tourism and food production, as a potential output which can enhance the future of Jaipur.







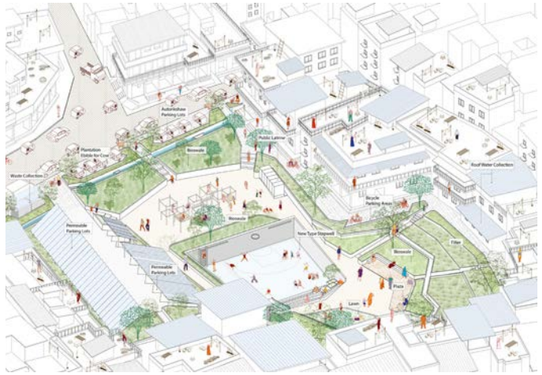


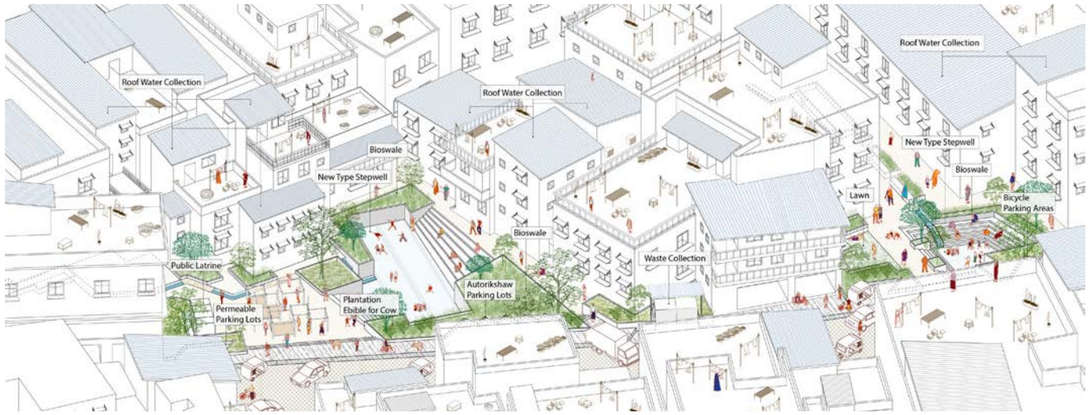


REDEFINITION STEP WELL PUBLIC SPACE

JIAJING LYU

The project proposes a new public park prototype which engages low lying areas that flood during the monsoon due to lack of permeability in the city. The public park borrows the concept from the traditional step-well system in India and combines with bioswales and various plantations to establish an area that not only collects water and replenishes the ground water system but also provides public activity spaces.





Fall 2019 Final Review, University of Virginia, School of Architecture

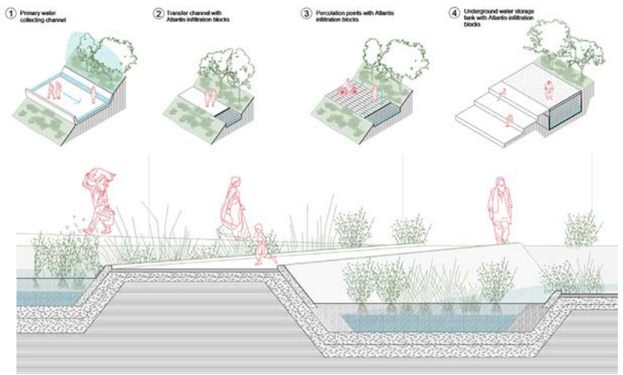
YRP

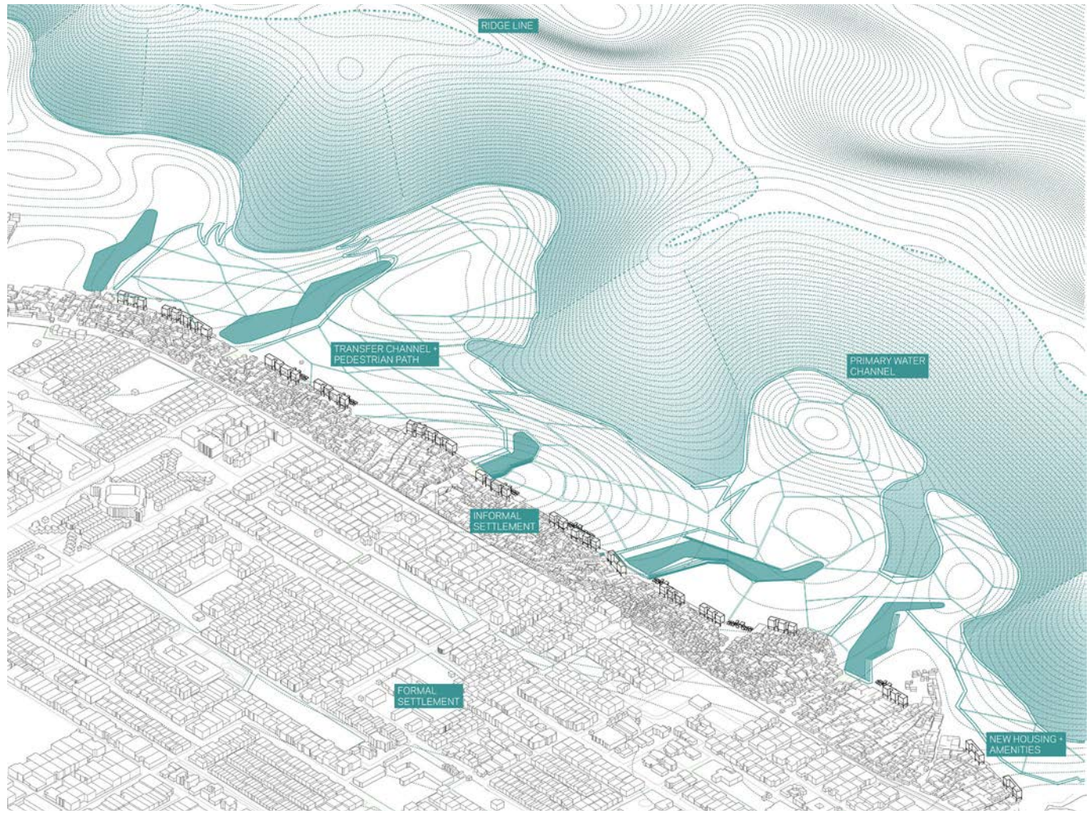
YAMUNA RIVER PROJECT

THE GREEN BELT: MOUNTAIN EDGE

THEA SPRING AND ANDREW PORTEN

Located in the densest part of Jaipur, lack of infrastructure and dilapidated systems, depleting groundwater levels, and exponential population is amongst the major concerns of the city. The proposal integrates two systems: collection of rainwater and distribution of resources through a canopy system and the second as a central water tank. These collection canopies provide public functions like market space and bathrooms and can be used for shading in the hot months. The goal is to about returning the value of the public streets to the citizens and providing easy access to all the resources needed for urban life.

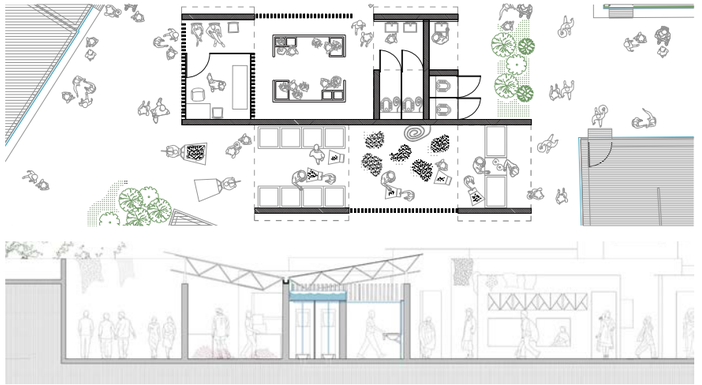


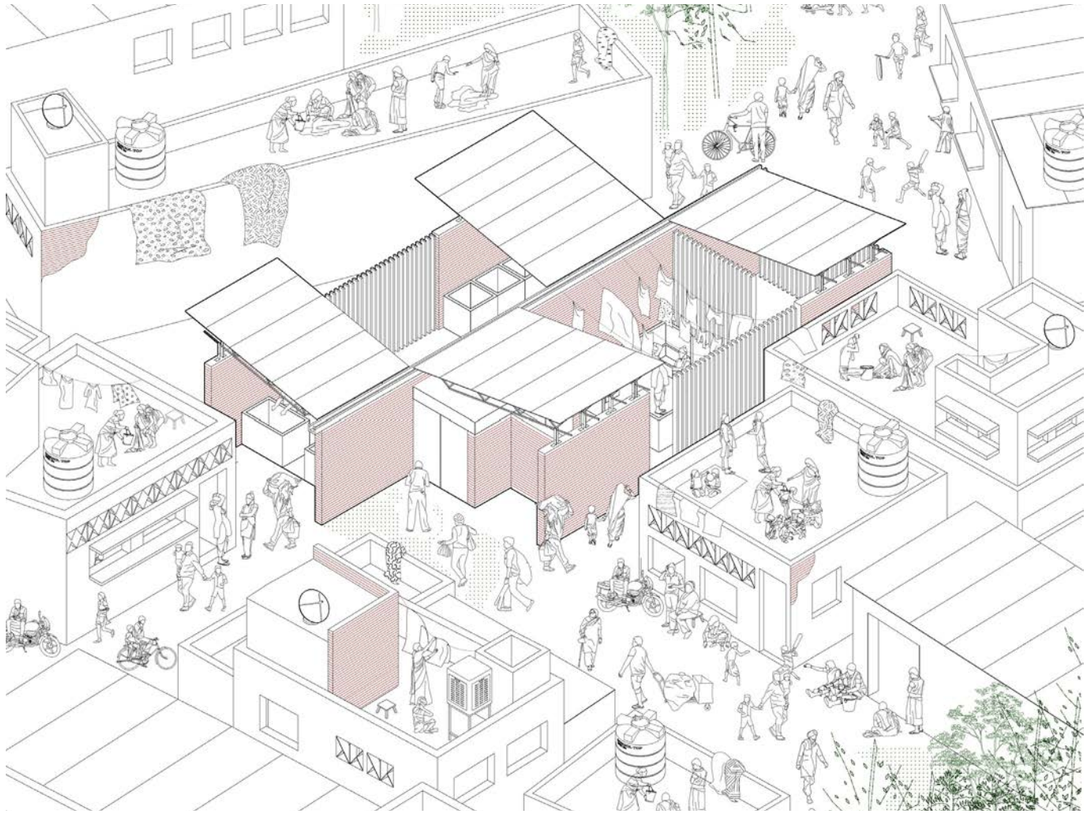


SOLID WASTE MANAGEMENT

AUSTIN HOGANS

The project proposes a modular communal bin system that deals with waste segregation while providing public spaces & amenities such as bathrooms, community room, laundry, clinics for women and children etc. at the neighborhood level. A system of public incentives are introduced to organize the waste collection network of the city.





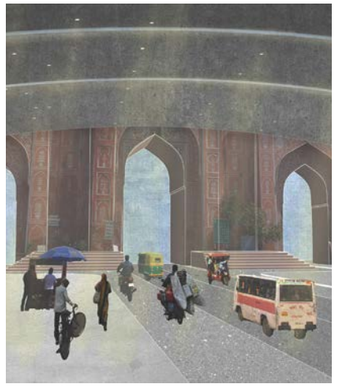
YRP

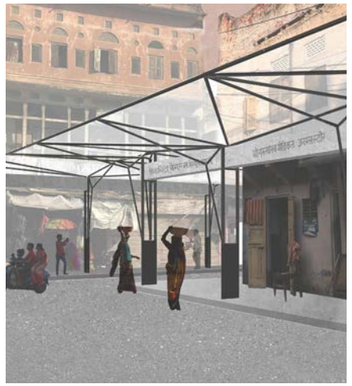
YAMUNA RIVER PROJECT

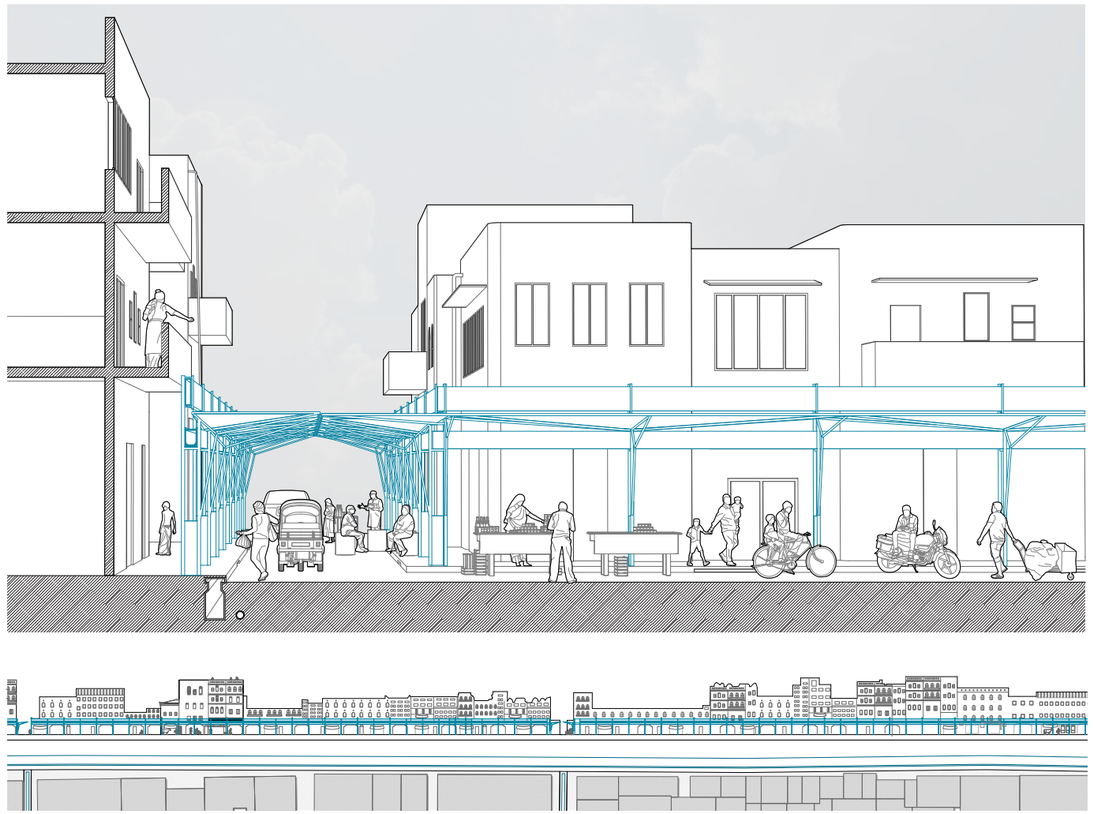
WATER SAFETY: WATER HARVESTING

CASEY LAST AND EVAN WARDER

The project proposes to create a new rainwater collection system in the Walled City of Jaipur. Water from roofs, collected by tapping into existing pipe networks is directed along the street and brought to a series of water tanks. Hybridized light weight structures provide public space and amenities for citizens of Jaipur along with introducing a new infrastructural spine.



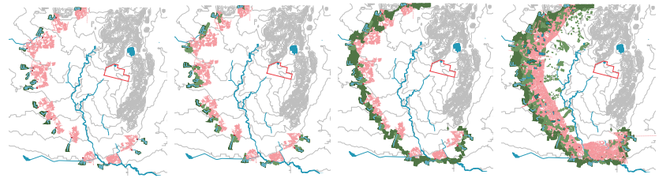


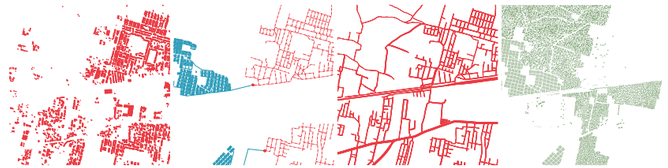


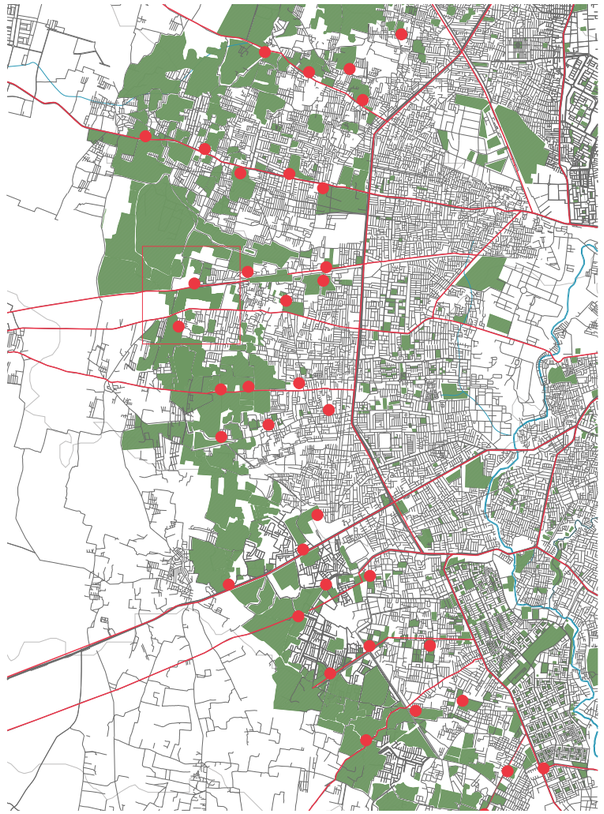
THE GREEN BELT: AGRICULTURAL EDGE

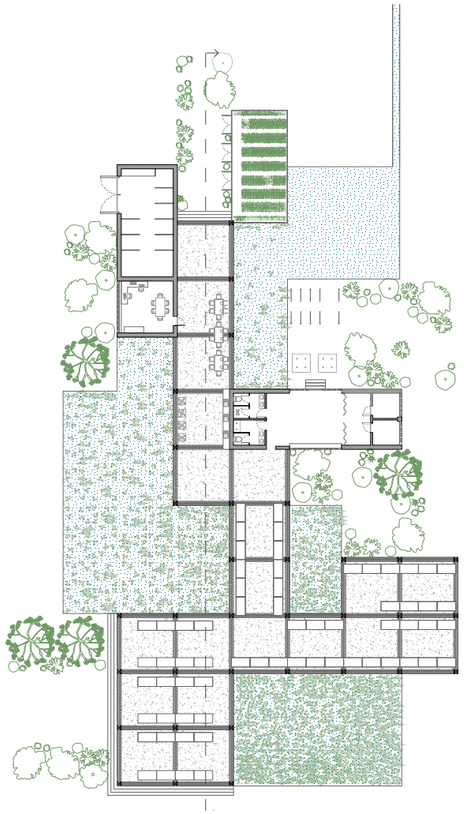
EMILY Z. KNOLLENBERG AND KATHARINA

The green belt along the agricultural edge of Jaipur addresses several urban issues. Through this process, the western agriculture edge of the city emerged as a critical region that would benefit from a creative intervention that would act as an amenity to residents in the periphery of the city. The systems facilitated by the creation of a green belt focuses to regulate urban sprawl, increase public green space, decentralize sewage coverage, decreased strain on existing infrastructure, increase access to locally grown produce, climate controlled food storage, and improved community spaces.









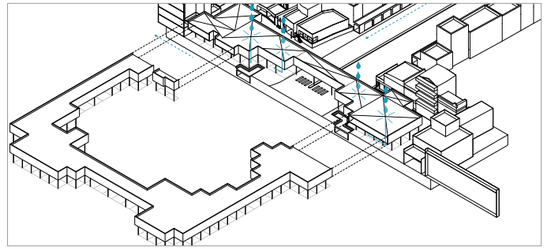
YRP

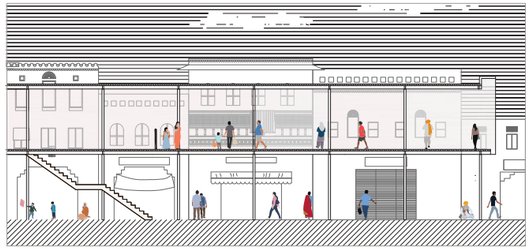
YAMUNA RIVER PROJECT

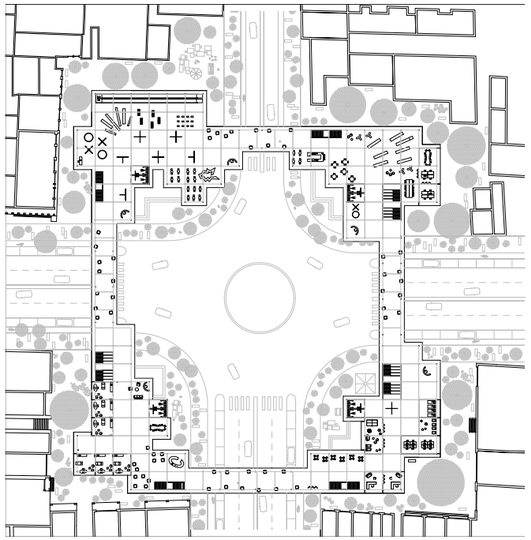
WATER SAFETY: WATER HARVESTING

ADRIAN EVANS

Located in the densest part of Jaipur, lack of infrastructure and dilapidated systems, depleting groundwater levels, and exponential population is amongst the major concerns of the city. The proposal integrates two systems: collection of rainwater and distribution of resources through a canopy system and the second as a central water tank. These collection canopies provide public functions like market space and bathrooms and can be used for shading in the hot months. The goal is to about returning the value of the public streets to the citizens and providing easy access to all the resources needed for urban life.



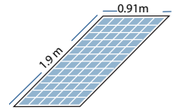




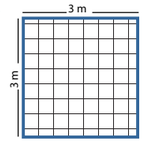
DISTRIBUTED SOLAR NETWORK

WALID SHAHEEN

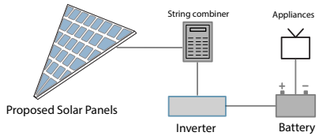
The project proposes to create a distributed hybrid power network in Jaipur at the neighborhood scale. By creating a new typology of public space with a solar roof system to reduce the carbon emission and dependability on non renewable sources of energy. The system imagines an alternative to the existing centralized energy network.



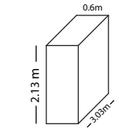
18 square feet
400 Watt/hour
Solar Panel



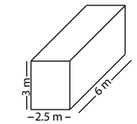
1kW = 100 square feet



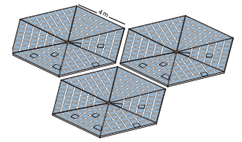
1MW Solar PV power plant = 100,000 square feet = 2.5 Acres
1MW/ 400 Watt panel = 2,500 panels

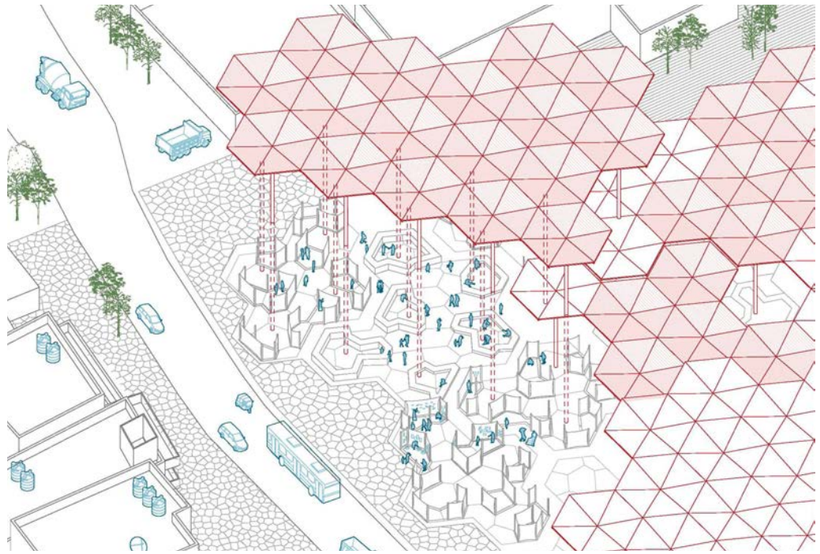


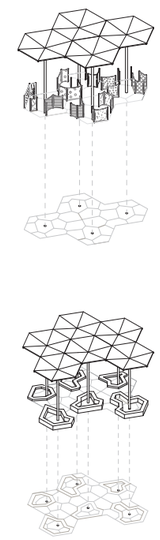
500 KW Capacity Inverter

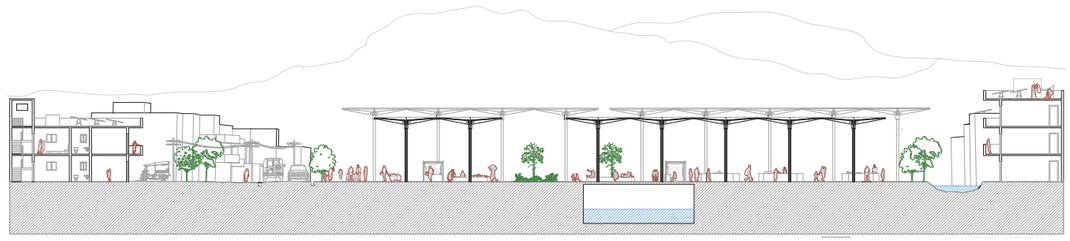


1MW- 3MW
Storage Capacity Battery









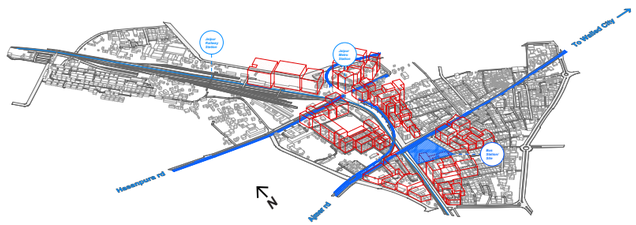
YRP

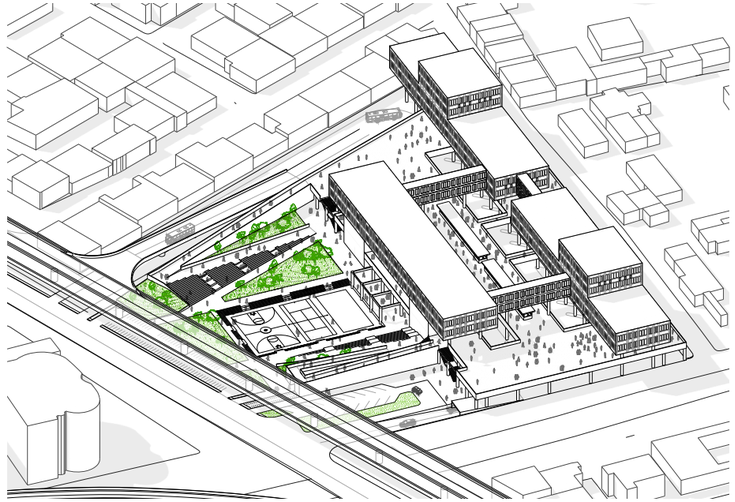
YAMUNA RIVER PROJECT

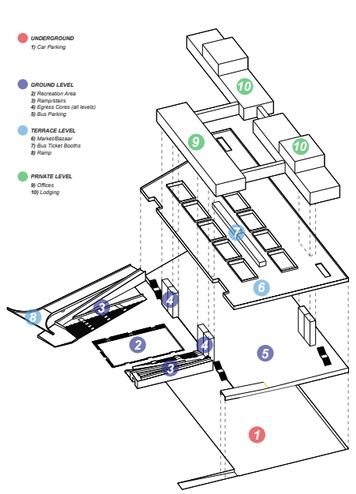
THE JAIPUR ROUTE: MOBILITY

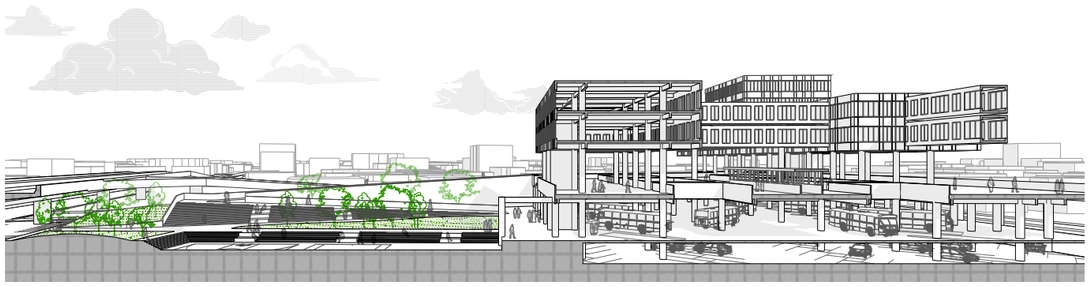
MICHAEL HEITZ

The project proposes a series of interventions to improve the city's mobility. Specifically, re-purposing the current Jaipur bus station into a bus depot, public market, recreation space, and hostel. This plan envisions a new central section of the city through accessible public transportation and public engagement leading to economic growth in the surrounding area.





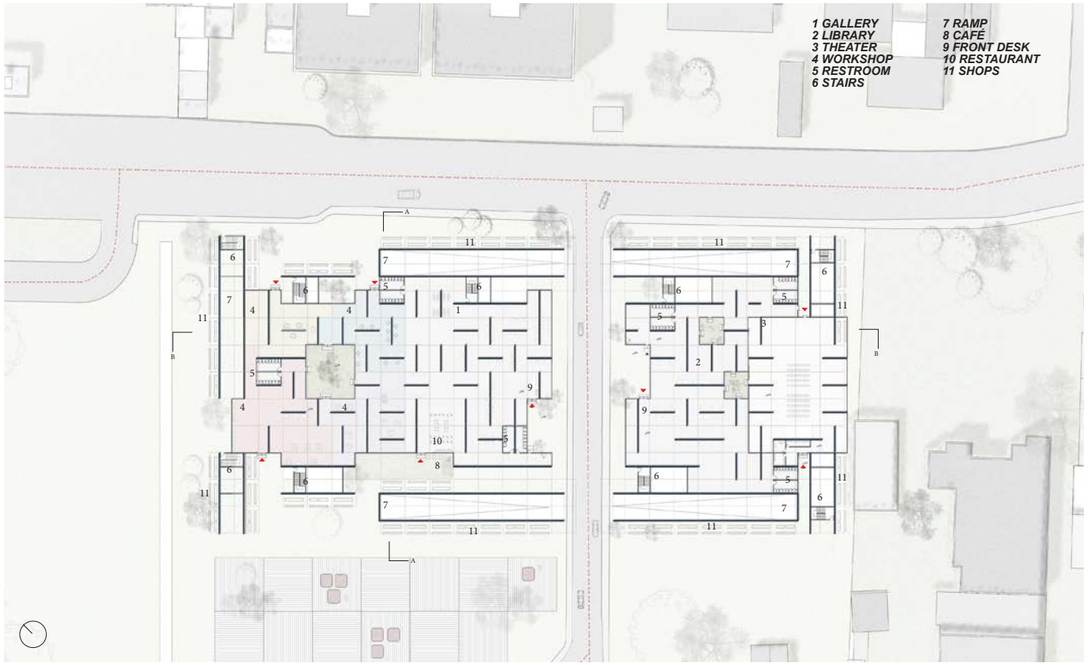


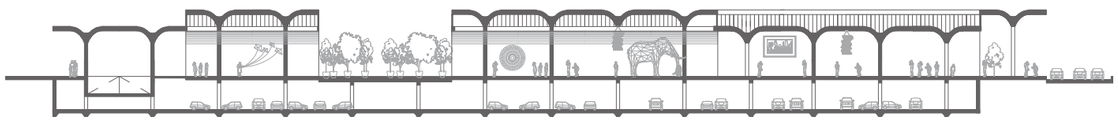


THE JAIPUR ROUTE: CULTURE & ECONOMY

XIA LI

The project aims to leverage the rich history of local craft in Jaipur to create a cultural infrastructure that seeks to promote tourism. A derelict plaza in the form of the roof of a parking lot near the walled city is revitalized to create cultural and civic infrastructure for citizens of Jaipur. The program includes multipurpose spaces, galleries and workshops to support local artisans, markets, public restrooms and performance spaces.





YRP

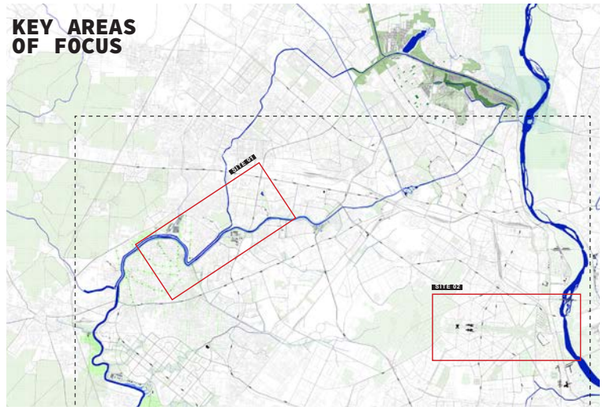
YAMUNA RIVER PROJECT

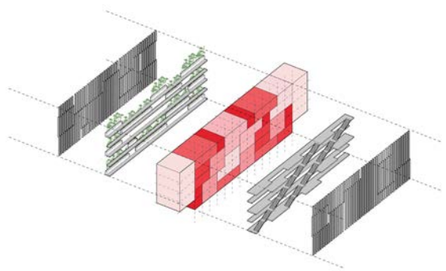
SPRING 2021

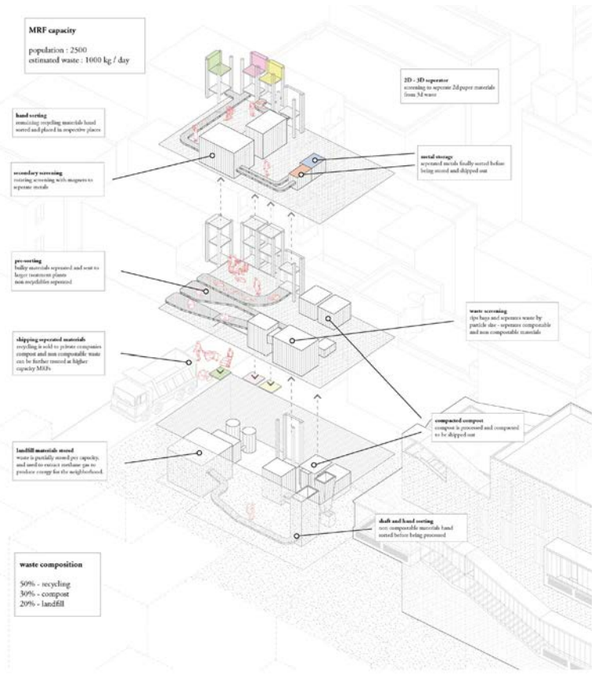
In the Spring 2021 semester, the Yamuna River Project research is focusing on revitalizing the Yamuna river and recovering it's connections to Delhi's urban fabric by developing a comprehensive vision and strategic interventions in the following two key areas:

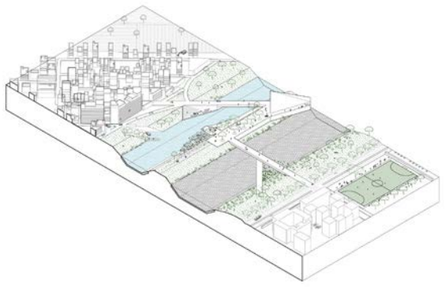
1. The main tributary of the Yamuna: the Najafgarh drain. Examining a portion as case study to extract lessons for the entire drain.

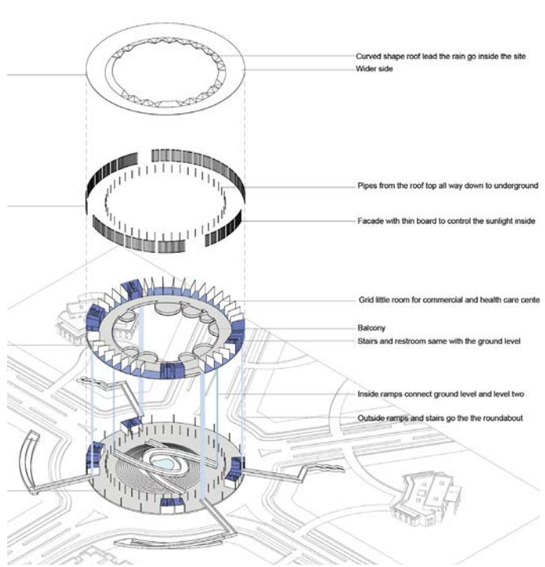
2. The connection between New Delhi and the Yamuna, particularly in the Lutyen's zone where the connection with the river was never resolved.

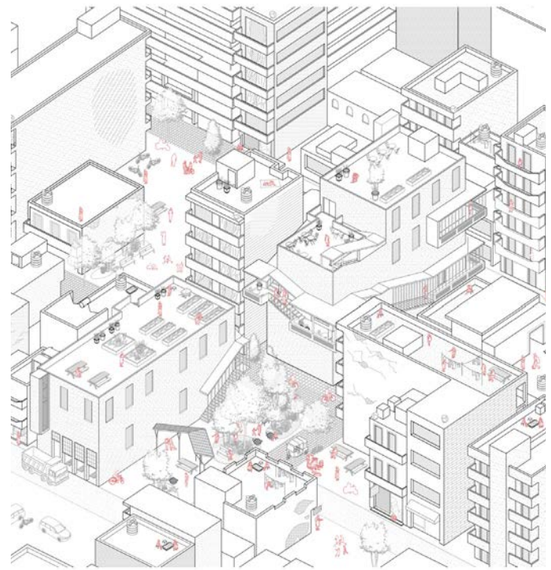


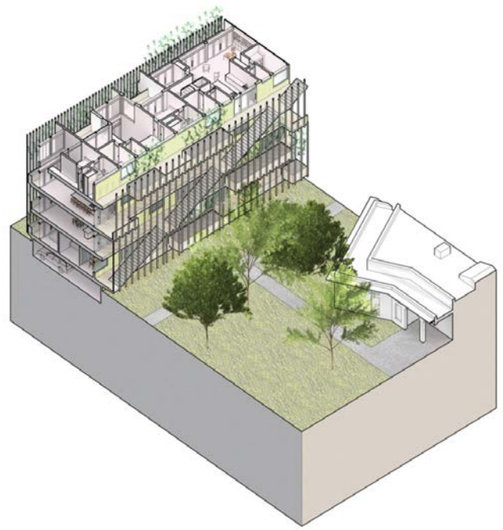


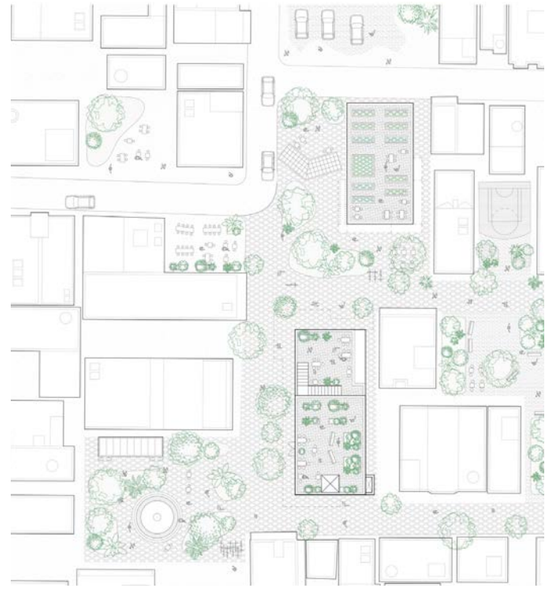












Fall 2019 Final Review, Tulane School of Architecture,. Photograph by Monisha Nasa

YRP

YAMUNA RIVER PROJECT

RESEARCH STUDIO, UNIVERSITY OF VIRGINIA SCHOOL OF ARCHITECTURE

STUDENTS FALL 2019

KARIM EL ARABY
B.Arch.

EMMETT DEBREE
B.Arch.

ZHILU WANG
M.L. Arch.

JIAJING LYU
M.L. Arch.

GRACE DOUTHIT
B.Arch.

GAELLE GOURMELON
M.L. Arch.

ALEJANDRO DI NAPOLI
B.Arch.

EMILY ZEKANY
B.Arch.

MARY KATE GRAEFF
B.Arch.

CHLOE SKYE NAGRAJ
M.L. Arch.

ELISABETH LIBERATORE
B.Arch.

MARK TAO
B.Arch.

AUDREY LIU
M.Arch.

HUIRU SHEN
M.L. Arch.

XUEFEI YANG
M.L. Arch.

TAYLOR THOMPSON
B. Arch.

NANCY WANG
B. Arch.

CHENYANG XIA
B. Arch.

STUDENTS FALL 2020

BIYU CHEN
M.L. Arch.

CHAOMING LI
M.L. Arch.

GENESIS G. RODGERS
B. Arch.

TEACHING TEAM

MARIA GONZALEZ ARANGUREN
Lecturer, School of Architecture,
Co-Instructor of Yamuna River
Project Research Studio

DARCY ENGLE
Research Fellow of Yamuna River
Project Research Studio

PANKAJ VIR GUPTA
Professor, School of Architecture
Co-Director, Yamuna River Project

RESEARCH STUDIO, TULANE UNIVERSITY SCHOOL OF ARCHITECTURE

STUDENTS FALL 2019

ADRIAN M. EVANS
M.Arch.

XIA LI
M.Arch.

CASEY LAST
M.Arch.

AUSTIN B. HOGANS
M.Arch., MSRED

MICHAEL J. HEITZ
M.Arch.

WALID M. SHAHIN
M.Arch.

EMILY Z. KNOLLENBERG
M.Arch., MPS

EVAN WARDER
M.Arch.

KATHARINA TOMISATO
M.Arch., MSRE

THEA SPRING
M.Arch.

ANDREW PORTEN
M.Arch.

STUDENTS SPRING 2021

ZACHARY BRAATEN
B.Arch.

XIA LI
M.Arch.

NICHOLAS GEORGE
B.Arch.

KAREEM ELSANDOUBY
M.Arch.

ELLIOT MOREAU
B.Arch.

DANIELLE SHEERINGA
M.Arch.

SEAN TICHENOR
B.Arch.

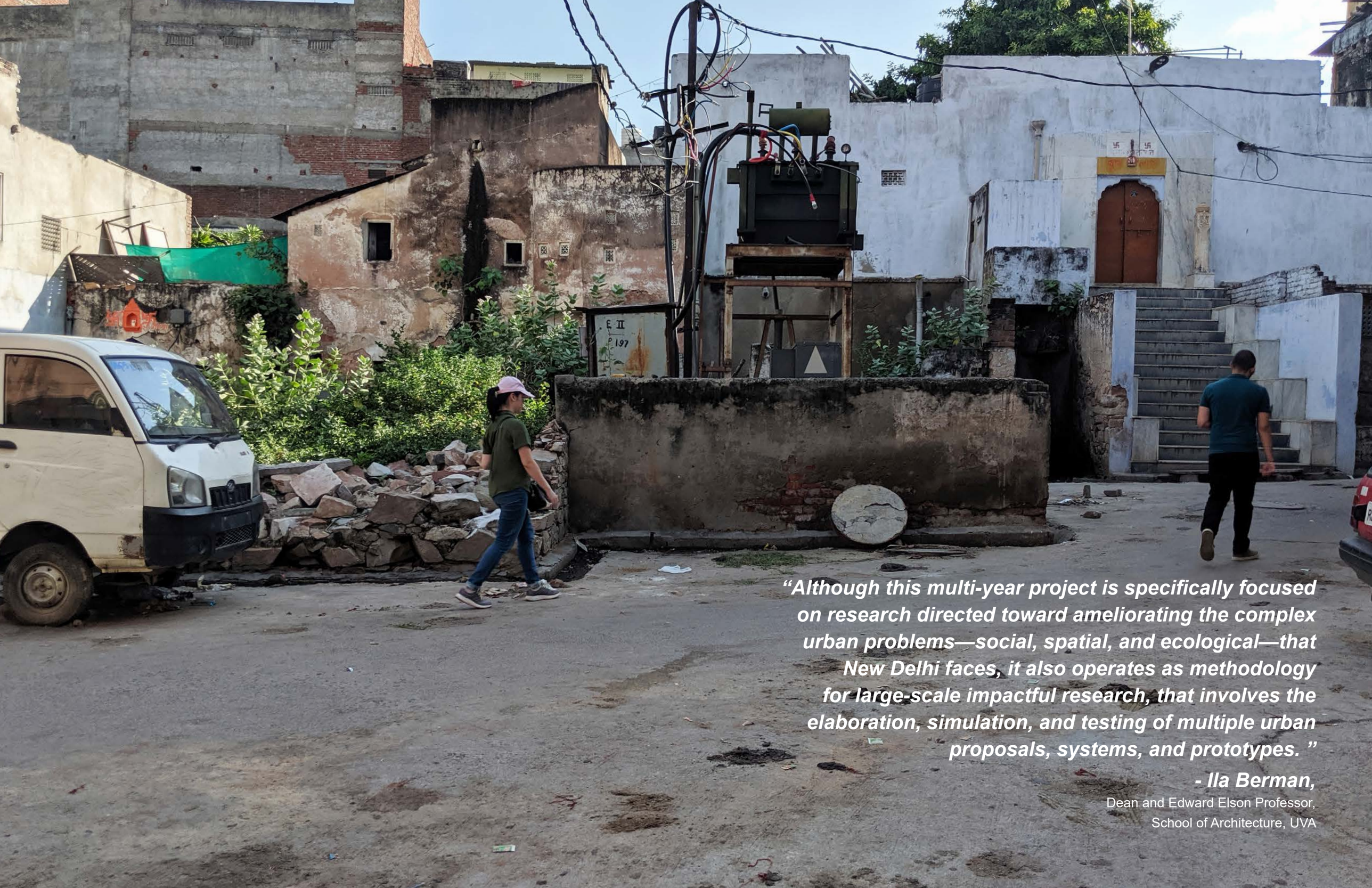
BHUMIKA SHIROLE
M.Arch.

TEACHING TEAM

INAKI ALDAY
Dean and Koch Professor of
Architecture, School of Architecture
Co-Director, Yamuna River Project

PANKAJ VIR GUPTA
Professor, School of Architecture
Co-Director, Yamuna River Project

MONISHA NASA
Research Assistant Professor,
School of Architecture



“Although this multi-year project is specifically focused on research directed toward ameliorating the complex urban problems—social, spatial, and ecological—that New Delhi faces, it also operates as methodology for large-scale impactful research, that involves the elaboration, simulation, and testing of multiple urban proposals, systems, and prototypes. ”

- Ila Berman,

Dean and Edward Elson Professor,
School of Architecture, UVA

YRP

YAMUNA RIVER PROJECT

STUDENT PROJECT AWARDS

HONOR AWARD AND FEATURED PROJECT
JOSEPH BROOKOVER JR., M. ARCH 2016

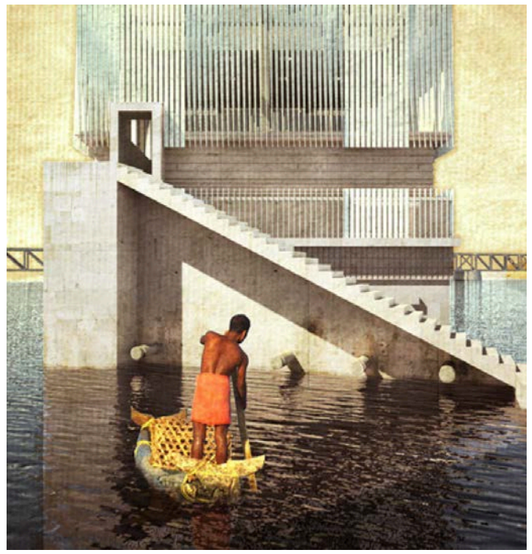
RE-CENTERING DELHI: CULTURAL TRANSECT FOR INDEPENDENT INDIA

In 2016, Joe received the Honor Award from the American Institute of Architects, Virginia Chapter for the Unbuilt Awards for his project with the Yamuna River Project studio "Re-Centering Delhi: Cultural Transect for Independent India". His project looks to give new identities, memories, and relationships to central New Delhi through the re-examination of the 1920's masterplan.

In addition to the Honor Award, Joe's project was featured on KooZ/Arch: A Visionary Platform for Architecture running out of Architectural Association in the UK. This platform features student work with strong conceptual bases and which is represented in a unique and interesting way.

KooZA/rch
A visionary digital platform

AIA Virginia



HONOR AWARD
VIDA SHEN., M.L. ARCH 2018

HYBRID INFRASTRUCTURES: SEWAGE TREATMENT AND MARSH REGENERATION

In 2018, Vida received the American Society of Landscape Architects, Virginia Chapter, Honor Award for her project "Hybrid Infrastructures: Sewage Treatment and Marsh Regeneration". This project addresses one of the most critical ecosystems in Delhi which faces serious waste and water quality issues in conjunction with the Coronation Pillar Sewage Treatment Plant which dumps effluents and dirty water into the marsh. Vida's project proposes a hybrid sewage treatment system to feed the drying marsh and supply the drain and Yamuna River with clean water while also reconnecting the city to the marsh. Constructed wetlands are used to restore the decaying marsh, replenish the surrounding water bodies and aquifer, thus providing people with a multi-functional wetland as a new public space.

ASLA VIRGINIA

MULTIPLE AWARDS AND HONORS
DARCY ENGLE., M. ARCH 2019

APPROACHING SANITATION: A TYPOLOGICAL RESPONSE TO THE STUDY OF BATHROOM INFRASTRUCTURE IN DELHI, INDIA

Darcy's research began by understanding where the sources of pollution to the Yamuna River were coming from. Specifically focusing on human waste and how the river comprised of high percentage of fecal matter due to a lack of well-constructed and reliable infrastructure between the starting point of the toilets and the endpoint of sewage treatment plants. She studied existing typologies of public bathrooms in the city from the standpoints of functionality to accessibility and analyzed and identified locations where there was the greatest need for bathrooms and other sanitation facilities. From the findings of this research, she proposed a series of public bathrooms and bathing facilities ranging in scale from x-small to x-large and demonstrated how they could be situated in a series of typical urban public spaces.

In 2020, Darcy's project was selected by the platform Rethinking the Future for an Educational Award. In the same year, her project received High Commendation by Archisource in the Environmental Category for researching and proposing solutions to a critical and contemporary environmental topic which is too often overlooked.

In 2019, Darcy's project was selected by the World Architecture Community to receive the Student Architecture Honor Award and by the Architecture Masterprize for the Student International Architectural Design Award for specifically focusing on human waste. In addition, her project was submitted and honored in the 2019 ARCHITECT Magazine Studio Prize and was featured on the cover of the September 2019 Issue.

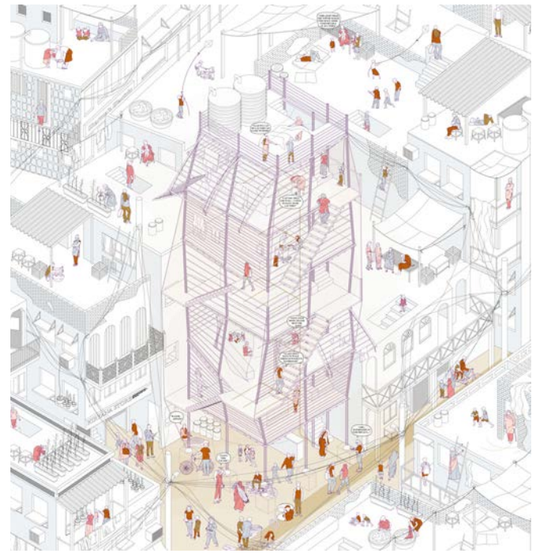
Archisource

Rethinking The Future

ARCHITECT
THE MAGAZINE OF THE AMERICAN INSTITUTE OF ARCHITECTS

World Architecture Community

ARCHITECTURE MASTERPRIZE



YRP

YAMUNA RIVER PROJECT

STUDENT PROJECT AWARDS

MERIT AWARD AND STUDENT AWARD

CHRISTIAN KOCHUBA, M.L. ARCH 2019

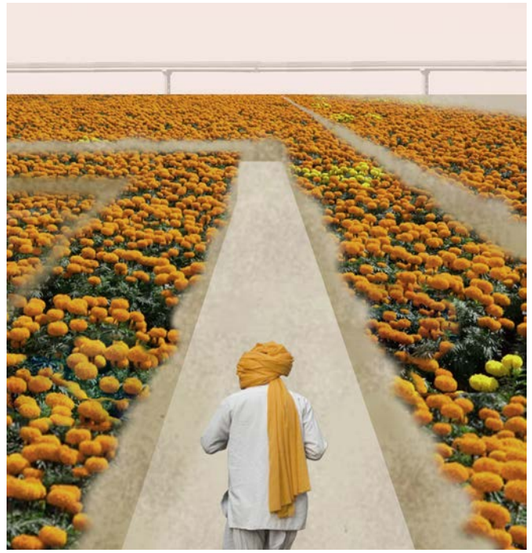
AGRI-GHATS: NEW DELHI'S EDUCATIONAL AGRICULTURAL SPINE

In 2019, Christian's project was selected as a student award recipient was honored at the SARA NY design awards ceremony held on June 18, 2019. His project imagines Delhi which has a powerful and sustainable relationship with its food, its soil, and its river. An entire community which prospers as farmers increase healthy yields through agricultural best practices, and residents interact daily with their local productive ecologies.

He also received the American Society of Landscape Architects Virginia Chapter, Student Award for his proposal that focuses at re-imagining as an emptied drain corridor into a clean organic agricultural space.

SARA NY

ASLA VIRGINIA



MERIT AWARD

CONG NIE & HANGYU SHI., M.L. ARCH 2019

AT THE HEART OF NEW DELHI: ORCHESTRATING A NEW SUSTAINABLE WATER ECOLOGY

Cong Nie and Hangyu Shi were selected for a 2019 American Society of Landscape Architects (Virginia Chapter) Student Merit Award for their proposal developed for the fall 2018 Yamuna River Project Research Studio. Their proposal addressed the sacred river of New Delhi - the Yamuna - that suffers from severe pollution combined with human encroachment of its floodplain which has set off a chain-reaction of threats to the city, including drinking water shortages, flooding, in addition to, pollution. Their design proposed a new urban-scale water treatment park that relieves pressure on engineered systems through green infrastructure insertions. In order to reset a resilient ecology, the circulation of people and water are interwoven together calling for community integration, floodplain restoration and awareness.

ASLA VIRGINIA

FEATURED PROJECT IN STUDIO PRIZE

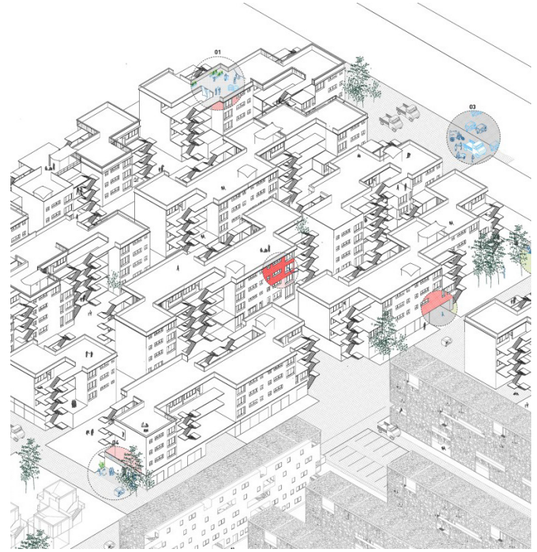
KATHERINE RUSH, M. ARCH 2019

MIXED-USE SOCIAL HOUSING FOR THE YAMUNA

In 2019, Katherine Rush's proposal was honored as part of the ARCHITECT Magazine Studio Prize Submission and Award. Katherine's project rethinks high-density residential typologies in the Delhi region, proposing a user-controlled "gradient of privacy" that can change over the course of each day. An analysis of existing low-income housing in New Delhi showed that many residents of dense informal settlements live with only 1 to 5 square meters of space per person. With stackable furniture, movable partitions, and terraces and courtyards shared by neighbors, this model provides 8 to 10 square meters per person, while giving residents more agency over their surroundings.

ARCHITECT

THE MAGAZINE OF THE AMERICAN INSTITUTE OF ARCHITECTS



STUDENT HONOR AWARD

WENYAN YU, M. ARCH 2020

RETHINKING JAIPUR'S MARKETS

Wenyan received the Student Honor Award from the World Architecture Community for her proposal which looked at urban market spaces in the city of Jaipur. She researched these spaces understanding their urban context, specifically looking at the increasing population of market users, absence of basic facilities within market spaces and dense traffic movement creating conflicting situations for the street markets. In response to these existing conditions, her design focuses on creating adaptable modules that provide various types of shaded market spaces which can transform based on the needs of vendor. In addition, daily essential services were integrated into the market design such as waste removal, electrical access, bathroom facilities, and delivery and pedestrian transportation.

World Architecture Community

YRP

YAMUNA RIVER PROJECT

STUDENT PROJECT AWARDS

STUDENT AWARD

MARY KATE GRAEFF, B.S. ARCH 2020

BATHHOUSE PROTOTYPES: JAWAHAR NAGAR, JAIPUR

In 2020, Mary Kates's project was selected as a student award recipient within the 34th cycle of the World Architecture Community Awards. WAC is an online platform which recognizes and awards excellence in cross disciplinary design projects from around the world.

Mary Kate's project incorporated rich, place-based research, examining water shortage in this desert city, access to sanitation in low-income communities, and historic methods of water collection in the city. Read further into Mary Kate's project below.

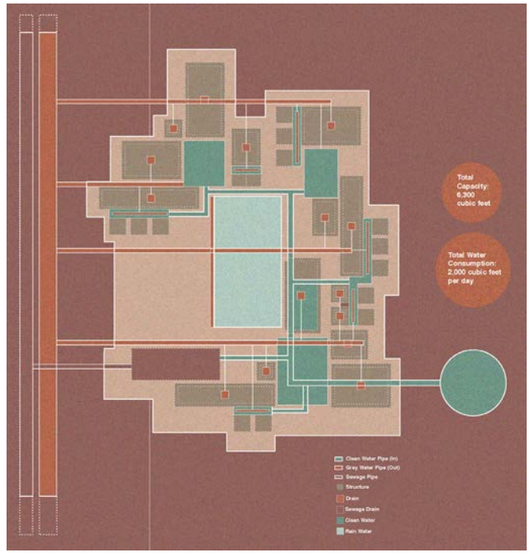
The city of Jaipur faces an extreme water shortage, due in part to the insufficient collection of rainwater during monsoon season, and the contamination of the groundwater supply through pollution and illegal wells. As part of the research we documented many cases of people bathing near the communal water source, and the necessity for a more accessible, private, and sanitary space for bathing became obvious.

Drawing on the historic methods used in the city for bringing water down from the mountains, the most logical placement for such a facility is along the base of the Aravali hills, in the space where the edge of the city meets the landscape. The water will flow from the new catchment systems in the mountains above and will be stored in a series of tanks that will then provide water to the facilities as needed.

This system provides an opportunity to not only conserve and reuse water used for bathing and laundry purposes, but ensures the safe removal and treatment of contaminated water and reduces the need for illegal wells.

This facility provides both a necessary, and socially nurturing, environment for the members of the community. These bathing facilities are intended to provide not only clean and easy means to shower, but to create a place where women and children can go to take care of daily needs in a safe, relaxing, and socially engaging environment. The facilities will provide access to not only bathing facilities, but laundry spaces, toilets, and sanitary products.

World Architecture Community



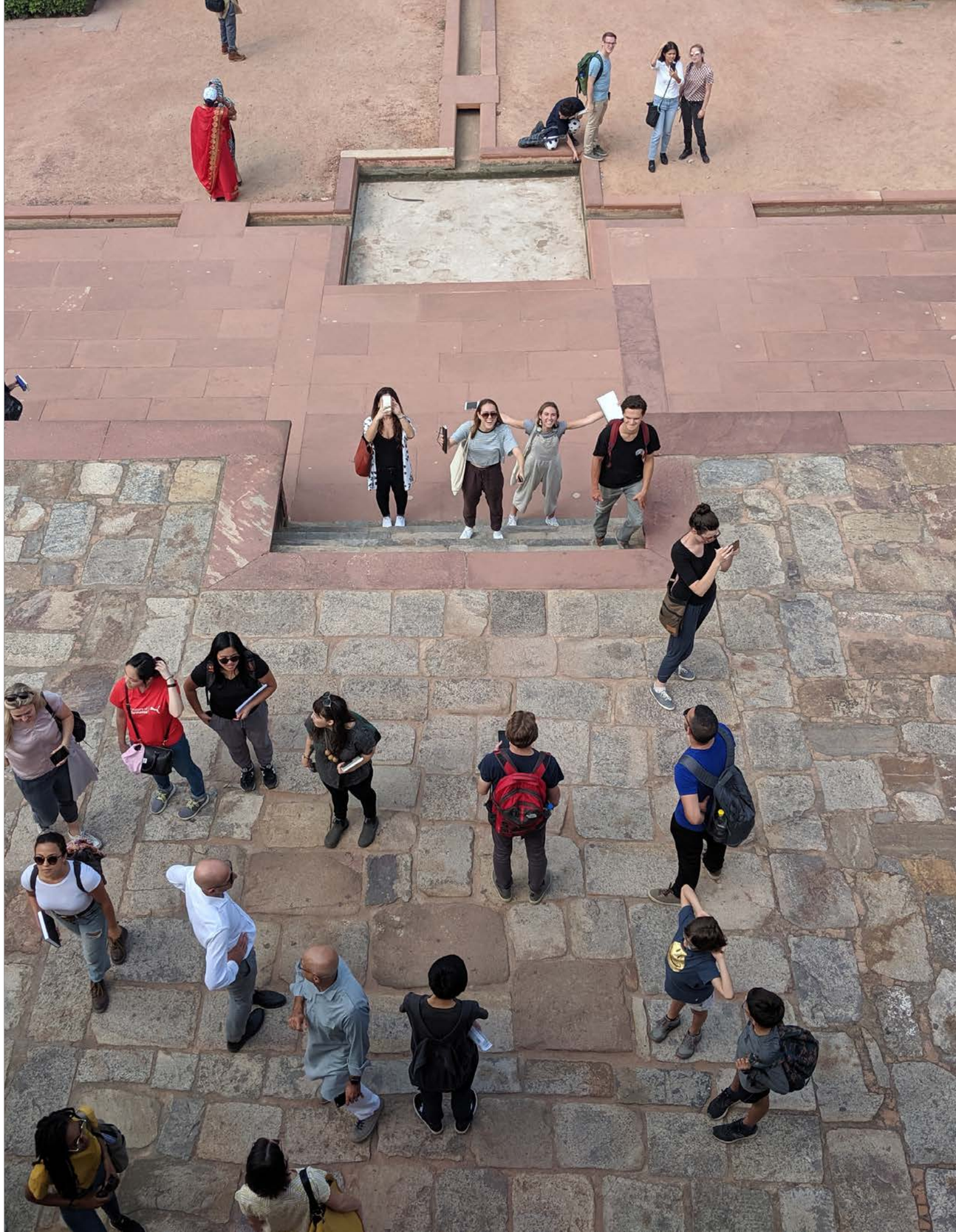
YRP

YAMUNA RIVER PROJECT

EXTERNAL GRANT APPLICATIONS

Over the last few years, the Yamuna River Project has been applying for external funding from various sources. Some of the applications for grant money that were submitted in the year 2019-20 are listed below.

Year	Amount Requested
2019	
2020 Great Places Awards EDRA	Honor
WRI Award	$25,000-$250,000
2020	
Course Development Prize ACSA	$50,000
Upjohn Research Initiative AIA	$30,000
Graham Foundation grant	$10,000
Studio Prize 2020, Architect Magazine	Honor
SOM Foundation Research Fellowship/ Research Prize	$80,000
Templeton World charity foundation award	$5,000,000



YRP

YAMUNA RIVER PROJECT

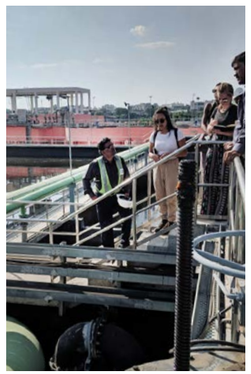
YAMUNA RIVER PROJECT ENGAGEMENT

2
ACADEMIC INSTITUTIONS

In 2019, the YRP expanded to Tulane University to broaden and strengthen its reach as a global research project.

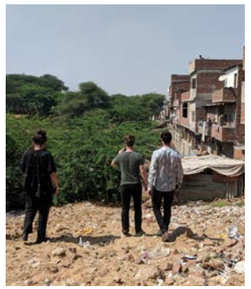
8
YEARS OF RESEARCH

The 2019-2021 academic year marked the fifth year of the Yamuna River Project as a pan-university project after three years of being based at the school of architecture.



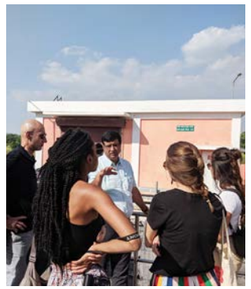
6
UVA SCHOOLS ENGAGED

YRP currently engages with six schools at the University of Virginia. These include; the School of Architecture, the Darden School of Business, the Frank Batten School of Leadership and Public Policy, the College of Arts and Sciences, and the McIntire School of Commerce.



11
ACADEMIC DEPARTMENTS

Within the schools, eleven academic departments are engaged. These include Architecture, Landscape Architecture, Urban and Environmental Planning, Religious Studies, History, Environmental Sciences, Politics, Business, Commerce, and Policy.



67
FACULTY ENGAGED

Over the course of the six years, the YRP has engaged 67 faculty across the university through reviews, courses, research projects, research trips, symposia, and more.

14
FUNDED RESEARCHERS

The YRP is currently funding 14 unique research projects being performed by faculty and of the eleven engaged departments and outside researchers from India and the United States.

203
STUDENTS ENGAGED

Over eight years of the Yamuna River Project, 203 students have been engaged through a variety of courses from research studios at the University of Virginia and in 2020 expanding to students at Tulane University.

9
RESEARCH TRIPS TO INDIA

The Yamuna River Project has facilitated nine research trips to India. The research studio from the School of Architecture has taken a 10 day research trip to India as part of its course for the past six years. Three summer research trips have been facilitated open to students across grounds.

148
STUDENTS TRAVELED TO INDIA

The research trips have taken 148 students to India. The students are joined or engaged by current YRP researchers before, during, and/or after their trip to India to further enhance and enrich their engagement with the YRP.