Interrupted Cities and Open Futures:
Architectural Scenario Planning and the Case of Amaravati

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The paper tells the story of the interrupted construction of a new state capital in southern India and the use of a design method -- architectural scenario planning (A-SP) – to envision its possible futures. In Amaravati, economic and political disruptions turned a new city project into a contemporary ruin. Begun in 2016, construction on the capital stopped after three years, leaving infrastructures scattered across 217 km² of appropriated land. Today, the site remains in legal limbo, with foundations, flooded pits and unoccupied concrete towers teeming with plant and animal life in an unplanned rewilding that has deprived 100,000 people of their livelihoods.

Scenario planning was conceived at Shell Oil in the 1960s and has since developed in diverse settings. At the method's heart is the articulation of multiple plausible scenarios dependent on carefully chosen parameters. While competitions and CFPs both can promote diverse visions for a site, they nevertheless are not based on systematically derived, opposed assumptions or viewed outside the framework of an optimal solution.

We re-deploy architecture's capacities beyond a traditional realm of services by using A-SP to envision potential futures for Amaravati. A 2 x 2 planning matrix comprising the either/ or variables of land-use and infrastructural build-out structures our exercise. This matrix produces four-scenarios for a 20-year time frame -- "Village Islands," "Networked Farming," "Suburban Satellites," and "Horizontal City" – each back-cast at 5 year intervals. Plans, sections and diagrams at multiple scales comprise visual narratives for each of the four scenarios, leveraging architecture's capacity for graphic description. This graphic aspect distinguishes A-SP from the written accounts and quantitative data that describe futures in traditional exercises. Although there continue to be developments with graphic spatial interfaces at the GIS and urban scale in recent scenario planning exercises, we argue that architecture's trans-scalar tools and material engagement allow it to more convincingly envision alternatives.

INTRODUCTION[1]

The development of large-scale urban projects continues across the globe despite the risks involved in such schemes. The news media and architectural press herald these new cities almost as often as they report on their failures, the cycle of boom and bust complicating narratives of flow and acceleration that characterized discourses of urban evolution at the turn of this past century.[2] Notable research on instant urban developments and their sometimes-abrupt collapse includes Marcinkoski's study of Spanish bedroom communities left incomplete and abandoned during the 2008 financial crisis; de Graaf and Soler's global catalogue of "Phantom Urbanism"; and Sorace and Hurst's study of Chinese "ghost cities".[3] In these spectral accounts of urbanism's afterlives, weak governance oriented toward political prize-taking and global capital hastened a shift toward speculation and the financialization of land. Despite an understanding of the risks of such schemes, national and regional actors continue to build "cities from scratch," putting aside their immediate environmental and social costs for an uncertain promise.[4]

What has received less attention in these narratives of interrupted cities are the futures of the lands and people left behind. Once the investors, contractors and political leaders assess their losses and move on, what happens to the people and places suspended within that hiatus of interruption? Often times, entire ecosystems are disrupted by concrete and steel waste-lands while pre-existing communities are left with little of what was promised and the impossibility of returning to past ways of life. The uncertainty of what to do raises important questions: about repurposing the remains of infrastructural investments, about how to restore or replace lost livelihoods, and about remediating environments devastated first by haste and then by neglect. These questions also touch on the uncertain nature of large-scale urban development in general. The contingent nature of such projects suggests that imaginations of singular trajectories are insufficient; instead, architects should be able to play a role in reorienting design away from singular future projections— utopian visions or optimal solutions—toward the articulation of multiple pathways that could inform choices at points along a development trajectory.

In this paper, we propose a method—architectural scenario planning (A-SP)—for opening design to a contingent "What if?" that recognizes future uncertainties. Although scenario planning itself is not new as a tool for envisioning futures, we wanted to sharpen architecture's engagement with its functioning in order to take advantage of the way it addresses uncertainty and integrates the interests of diverse stakeholders.

What would an A-SP exercise look like and what specific role does it offer for architecture? We propose, on the one hand, that A-SP is able to leverage architecture's capacity to construct compelling visual and spatial narratives, distinguishing it from traditional scenario planning exercises; and on the other, that A-SP benefits from the structure of traditional scenario planning, setting it apart from what exists of architecture's experiments with scenarios.

Architectural scenario planning also offers architects a chance to contribute a specific expertise to discussions amongst the policy-makers, developers, planners, NGO's and government officials involved with large-scale projects; it shifts the architect's contribution away from the notion of an optimal, singular solution toward the study of plausible scenarios that become discursive platforms for a broader engagement.

We developed A-SP using the interrupted city of Amaravati, a newly planned and quickly abandoned state capital project in southern India. Amaravati's context of uncertainty is marked by three conditions that make it appropriate: significant change to the site is likely although outcomes are not obvious; the timeframe of those changes is medium to long term; and the interests of the implicated communities are heterogeneous.[5] I first provide a summary of scenario planning and the ways in which an architectural approach to this method of projecting futures can be useful. I then describe Amaravati's brief history and the conditions of its ongoing interruption. Finally, I discuss the parameters and outcomes of the exercise itself, detailing four scenarios for Amaravati's future; a concluding discussion opens toward questions raised by the exercise, both for the specific case of Amaravati, and for A-SP's potential role within architectural practice.

UTOPIAS, SOLUTIONS AND SCENARIO PLANNING

In architecture, imaginations of the future are sometimes understood through the no-place of utopia. Hatuka and D'Hooghe argue that the abstracted nature of utopia neglects people's everyday lived realities, while nevertheless serving as a "a tool for social change" where "the goal of projecting vision into the future is to create space for discussion and for the kind of action that may be impossible while immersed in day-to-day struggles".[6] "Scenario" in architecture is generally used interchangeably with "script," "brief," "event," or "program".[7] A-SP uses "scenario" as an alternative utopia in which multiple possible futures play the discursive role of the singular no-place.

Past explorations of scenario planning in architecture have explored this discursive role. For example, in his project "Taking the Country's Side" Sebastien Marot used four alternative scenarios, described in drawings and text, to imagine urban interactions between agriculture and architecture.[8] The scenarios are alternative architectural narratives and act as prompts for rethinking how we understand the rural and the urban. Laura Kurgan's Spatial Information Design Lab looked at how cities invest in social infrastructure that enable transitions from prison to the city.[9] Participants used data and spatial representations to narrate four futures using scenario planning techniques. The landscape practitioner Richard Weller produced seven scenarios for the future of Perth with a matrix defined by horizontal and vertical growth.[10] Evocative drawings narrated scenarios that informed policy choices for Western Australia. Despite these engagements with scenario planning, the teaching and practice of architecture continue to privilege the winning design over the contingent possibility.

While competitions and calls for proposal offer a chance to consider multiple plausible alternatives, their structure is such that the winning solution is given precedence, while other proposals are set aside to support what is deemed to be the optimal vision. Where competing schemes might implicate different paths forward, the potential for a longer-term debate is stymied by a context in which stakeholders have every incentive to support a selected project. This framework also conditions architects to set aside the study of alternatives to arrive at the clarity of a singular solution, meaning that those plausible way forward may not make it out of the office to productively inform larger discussions. With A-SP, we wanted to formalize a method and rationale for architecture's use of scenario planning to make a case for how it can be a mode of practice for addressing the uncertainties of urban futures.

Scenario planning has its origins at the Shell Oil Company in the 1960s and 1970s. Planners at Shell developed structured methods to narrate future possibilities, allowing managers to strategically navigate the shocks of oil crises in 1973 and 1981.[12] Since that beginning, scenario planning has spread to diverse settings and forms. It continues to be an important tool for strategic planning and is studied in schools of business globally. Scenario planning is also used today to consider large scale challenges: for example, the European Future Cities project, United Nations Scenarios for HIV in Africa and the Government of Singapore's national scenario planning efforts through their Centre for Strategic Futures.

While there are numerous approaches to scenario planning, two key aspects are relevant. First, "scenarios are reasonably plausible, but structurally different futures" that are determined, or gamed out, by a causally independent combination of contextual factors.[11] In this sense, scenario planning is not about predicting the future, but rather considering different possibilities for what could happen. The concept of plausibility replaces predictive

Figure 2. Unfinished infrastructure and housing in Amaravati. May 2019. Photo by Author.

forecasts and risk probability. "Plausibilities", or scenarios, are each given a distinct name and guide the process that follows.[13] These distinct scenarios are "structurally" different because they are determined by a combination of contextual factors that are causally independent.[14] While some exercises aim to select an optimal scenario, the goal of the current research is to demonstrate how A-SP can productively lead to multiple visions of the future. As a method of speculation that produces futures rather than a singular vision, A-SP can clarify what is potentially at stake in current day decision making. These futures allow for debate and discussion. They play a discursive role rather than a prescriptive one.

Second, this elaboration takes place through the construction of stories that provide a vivid description of the future identified by the named scenario. Written descriptions and data support these stories in a process that is exploratory and emphasizes an iterative learning about the future.[15] Constructing stories might also make use of planning support systems and computer modelling. Qualitative data gathered through interviews, essays or opinion survey can introduce personal experiences.[16] The construction of stories about the future might also involve a participative process with diverse stakeholders. These stakeholder stories integrate lived experiences that can be the basis for fictions projected into future scenarios. In these different approaches, what becomes important is that a named scenario is given shape through stories that transform the abstraction of the future into specific sets of instances, events and experiences that could take place within them. Stories thus make the plausible real through their articulation of multiple points of view.

Architectural Scenario Planning leverages architecture's capacity for graphic visual representation – plans, sections, diagrams and three-dimensional images – to tell stories. Drawings and spatial representations at multiple scales contribute to text-based descriptions of the future.While scenario planning exercises in urban planning have used interactive, web-based platforms to create spatial representations, these are often hampered by visualizations that most often comprise a single, uniformly schematic scale. A-SP deploys architecture's trans-scalar capacity and moves between visual languages accessible to different types of audiences. Its spatial representations give stories about the future a spatial dimension that brings lived and embodied experience into a different kind of relief.

AMARAVATI

Amaravati was conceived in 2014 to be a new state capital. The city's designated site comprises 217 square kilometres of rich agricultural terrain, bounded to the north by a major river and to the east by a 20-km highway linking adjacent cities—Vijaywada and Guntur—each with nearly one million people. To the west is an important Buddhist site from the 3rd Century BCE that gives the capital its name. The new city was a radical transformation of this complex landscape.

Amaravati depended on investment from a network of lending agencies and local, regional and international investors. The project's development also hinged on the political support of leaders whose authority and mandate was tied to its progress, rendering this leadership's fate intertwined with the capital's own. Three years of construction saw massive capital and material outlays and the transformation of more than 30,000 agrarian tracts—appropriated from farmers and landowners—into real estate parcels. Construction included a one kilometer by one kilometer grid of roads that stretched along the horizon; a capital complex design by Norman Foster + Associates whose foundations were begun; the construction of housing for thousands of government workers expected to live on site; and an array of infrastructural works scattered through the 217 square kilometers. This work proceeded at a frenzied pace to demonstrate the capital's irreversibility and the upheld promises of the political leaders who championed its development.

In 2019, a national election brought a change to this leadership, halting construction. Work on the project came to a standstill. Political infighting and the intervening inertia of pandemic years have meant that little has been done since to negotiate a future for the site.

A number of critical issues coalesce around this uncertainty. The site comprises a rural landscape surrounded by growing peri-urban areas. Its partial transformation—with new roads, half-finished canals and a reconfigured land ownership—means that it is unclear how development will respond to encroaching urbanisation. At the same time, the site supported 100,000 people who today are without either the land that once allowed for their livelihood, or the development promised as key to future income and wealth. While the new political leadership has definitively set aside the possibility of Amaravati's development as a state capital, a complex knot of ownership and responsibility has made it impossible to move forward. This inertia also results from a lack of any alternative vision for the site, occluded as it has been by promise of the original capital scheme.

This context of uncertainty is marked by three conditions that make it an appropriate case study for A-SP: significant change is likely and outcomes are not obvious; the timeframe of those changes is medium to long term; and the interests of the implicated communities are heterogeneous.[17] These intertwined conditions stem in part from the proximity of the site to the two large cities mentioned earlier. The different forces acting on Amaravati mean that pressures for some form of development will dictate a future course. While in the short term, the site's lands remain in an overgrown state that has made possible a spontaneous rewilding whose limits extend to the capital's defined boundary, the pressures on the land make the current situation untenable. Those forces include a diverse range of stakeholders including farmers and landowners with claims to the earlier configuration of agricultural tracts and investors who bought the reconfigured real-estate plots.

ARCHITECTURAL SCENARIO PLANNING

The A-SP exercise is structured with a 2 x 2 planning matrix that generates four, structurally distinct, yet plausible scenarios for Amaravati in 20 years. The "frames" of the four-square matrix are determined by two variables treated as either/or possibilities. For Amaravati, the first variable is the completion (or not) of infrastructural works, including a 500 km primary road network (240km of which was begun) and a flood mitigation system comprising canals, unfinished reservoirs and an in-ground storm water drainage network that is a critical safeguard against increasingly extreme monsoon rains. The second variable concerns the way land is used. Current government restrictions continue to prevent farming from taking place on the land, much of which is degraded. Any return to farming would first have to be allowed by the government, and then implicate a remediation process begun over time or with the infusion of large amounts of capital. The second either/or variable thus comprises the designation of land for farming practices or its continued status as real-estate for commercial, residential and industrial uses. Both possibilities for the future of the land are the subject of passions and contestation, and both plausible. Thus, the planning matrix for Amaravati -- taking infrastructure (Completed/ Incomplete) and land usage (Rural/Urban) as variables -- leads to four scenarios: Networked Farming(C/R), Horizontal City(C/U), Village Islands (I/R) and Suburban Satellites(I/U). These names are meant to be evocative and distinct, setting off an iterative process of investigation that moves between descriptive text and spatial description.

The either/or nature of the variables is such each of the four quadrants is a distinct scenario.[18] The variables represent two factors that have both the highest degree of uncertainty and greatest impact on the site's future. The two variables are also relatively independent of each other, meaning that all four frames are plausible. Finally, the variables implicate spatial and material configurations that can become generative for architectural design. While this either/or approach is reductive—the future would undoubtedly be more complicated—it does lead to the identification of four distinct scenarios that expand an imagination of what is possible on the site. As I will discuss in the conclusion, these imaginations can then be reintegrated as contemporary proposals that precede and catalyse decision making in a more nuanced and specific manner.

Up to this point, the method replicates traditional scenario planning exercises. Three additional aspects make it architectural. First, each scenario is visually represented at the scale of an over-all plan iterated at time intervals between the current day and the scenario target date. Second, selected zones within the synthetic plan are drawn at the scale of the neighbourhood (between 1:500 and 1:1000) and also iterated through time. Zone-drawings may include sectional studies, perspectival images, and other graphic descriptions that compel the imagination. Third, stakeholder stories are described with "mapped" visual representations that supplement written accounts. These
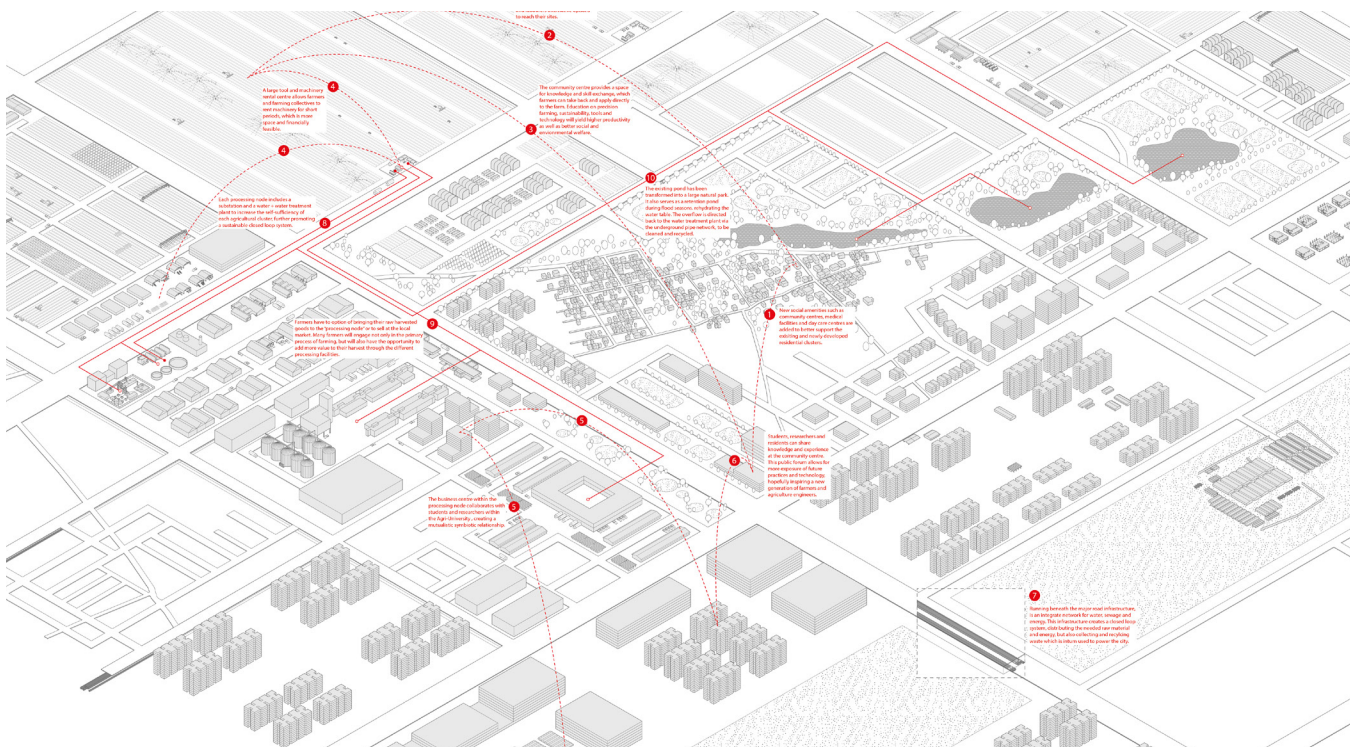
Figure 2. Networked Farming at 2040, showing the integration of agricultural services into an existing village and new developments.

mapped stakeholder experiences are produced for the present day and for the scenario target date. They include traditional "maps" that describe where and how a stakeholder moves through the day, her connections with other people and institutions, community resources available to her, etc. Mapped stakeholder stories visualize relations in time and space. The synthetic plan, zone- drawings, and mapped stakeholder stories enhance descriptive texts. They lend plausibility to scenarios, that, in turn, generate discussion.

The exercise results in four alternate scenarios for Amaravati's future. These are plausible outcomes based on the combination of the two variables described above. Because of this link to choices that are yet to be made today, each scenario represents a set the plausible outcomes of policy choices. Together the four scenarios potentially inform decisions. Because the stories about each scenario are communicated in a visual language using the over-all plan, the zone drawings, and the mapped stakeholder experiences, they are potentially accessible as tools for engaging discussions about the future.

FOUR SCENARIOS
The following are fragments of scenarios elaborated over the course of a one-month period by four research assistants (RAs) working collectively to understand the larger issues of Amaravati, and individually to elaborate their given scenarios.[19] RAs were provided background material on Amaravati's recent history and an introduction to A-SP. Each assistant was asked to

develop an over-all plan iterated at 5/10/20 years, zone drawings and mapped stakeholder experiences. They were otherwise free to develop a graphic language specific to the issues they confronted. Work between scales and with different types of drawings was encouraged but not prescribed. RAs also developed texts to situate their decisions and describe the scenario as they saw it develop. In what became an iterative process, architecture and writing entered into a productive relation. Each accompanying drawing is part of this iterative relation.

NETWORKED FARMING // RURAL LAND USE / COMPLETED INFRASTRUCTURE
As soil health improves and the infrastructure is completed, the harvest becomes more plentiful and demand for processing hubs for cotton, rice and millet increases. Some local processing stations repositioned near fields are transformed into "central processing nodes," increasing their capacity and access to transportation. This encourages more processing companies to move to the area and set up their own nodes. Farming activity no longer takes place only around the periphery of villages, as the completed road network makes it easier for farmers to travel greater distances from work to home.

A new collection point is integrated into the "agro-industrial park." This collection point will be the main site for packaging and distribution, creating a complete logistic supply chain. As the point sits along the main seed road, the export process is
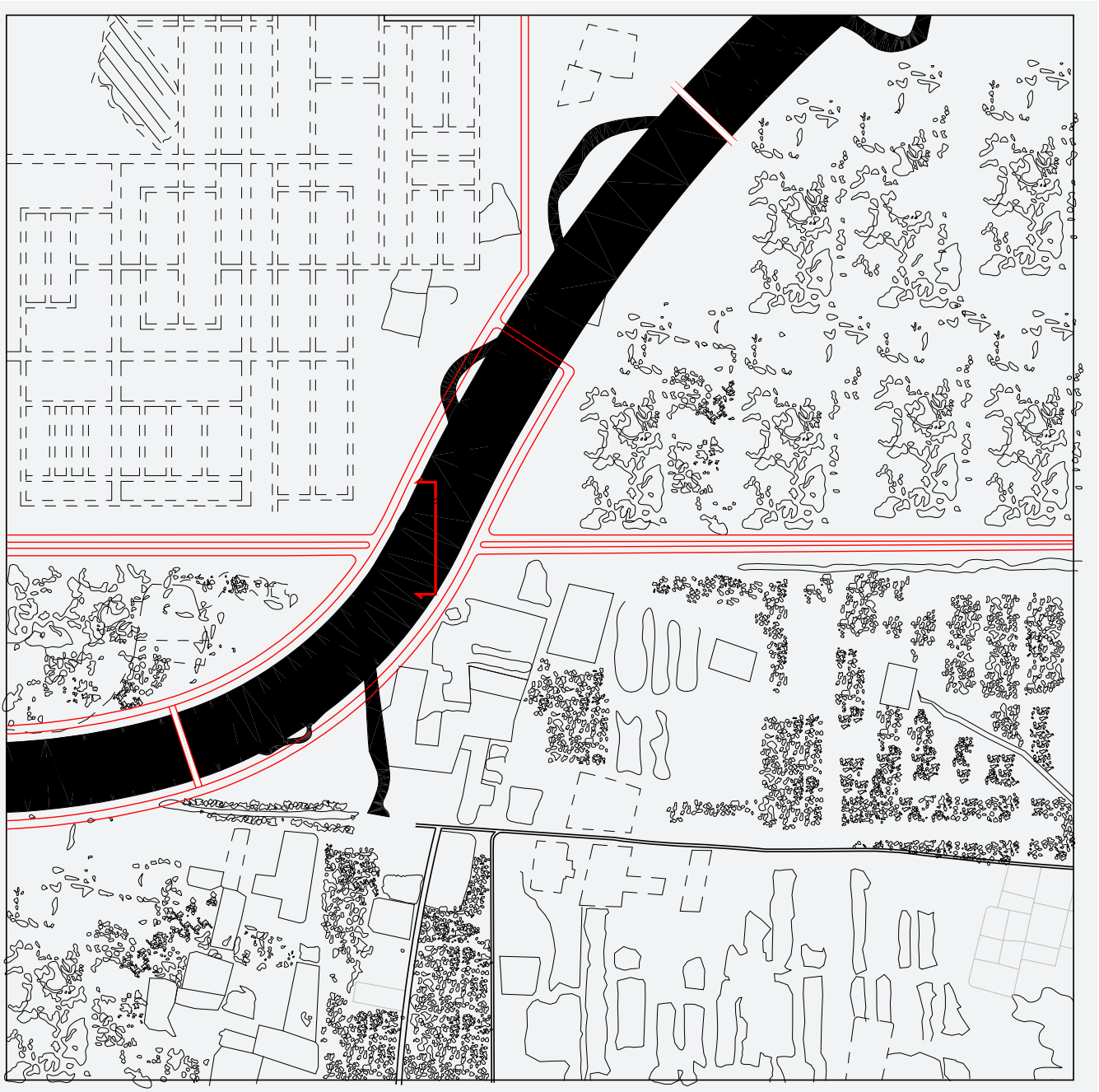
Figure 3. Horizontal City at 2025, showing completed canal infrastructure, unoccupied housing plots and provisional footpath.

directly connected to other major highways (NH-16 and NH-65) and the railway.

Increased mechanization means that farmers can be more productive, making up for the exodus of labor that had taken place in the years that the site lay fallow. Subsistence farmers are able to take on more work with government support, allowing their activity to generate an income. Young people from the villages, who before would leave their farming communities, are returning to take part in the development of growing and distribution infrastructures. The city sees the establishment of an agricultural university on a site that had earlier been set aside for the capital's infrastructure; students are housed in what were to have been apartments for government officers.

HORIZONTAL CITY // URBAN LAND USE / COMPLETED INFRASTRUCTURE

The Horizontal City develops as a bedroom community between the cities to the north and south. With both of these nearly a million-person conglomerations, expanding beyond their borders, Amaravati's development became an alternative to the peri-urban sprawl that characterized those adjacent cities. In order to make Amaravati a viable alternative, work on its infrastructure was restarted, allowing for the completion of roads and train lines connecting to nearby networks and of irrigation channels that mitigated increasingly problematic monsoon floods.

While the Amaravati infrastructure and public amenities were designed for a city of 8 million people, the growth of the reimagined community was expected to only reach 2 million by the end of 20 years. With vast expanses of open space, new strategies for dealing with zones near highways and canals were developed to integrate this vastness into a domestic, suburban scale. The development of road infrastructure also integrated shared modes of mobility, not envisaged in the original plan, with a secondary layer of transport connecting neighbourhoods to arterial roads. This reconfiguration of infrastructure to adapt to the needs of horizontal metropolis offered both challenges and an opportunity to reimagine earlier decisions.

VILLAGE ISLANDS // RURAL LAND USE / INCOMPLETE INFRASTRUCTURE

After 10 years, due to the elderly farmers' retirement, educated sons and daughters decide to return to the village due to improving infrastructure and facilities. With the continuing demand from adjacent cities, the sustainable agricultural methods that were begun as small scale initiatives to remediate the desolated soils have continued, replacing the monoculture practices that existed before Amaravati's conception. Other techniques, such as intercropping systems, also generate healthy and high-quality products that increase allow farmers to increase their income.
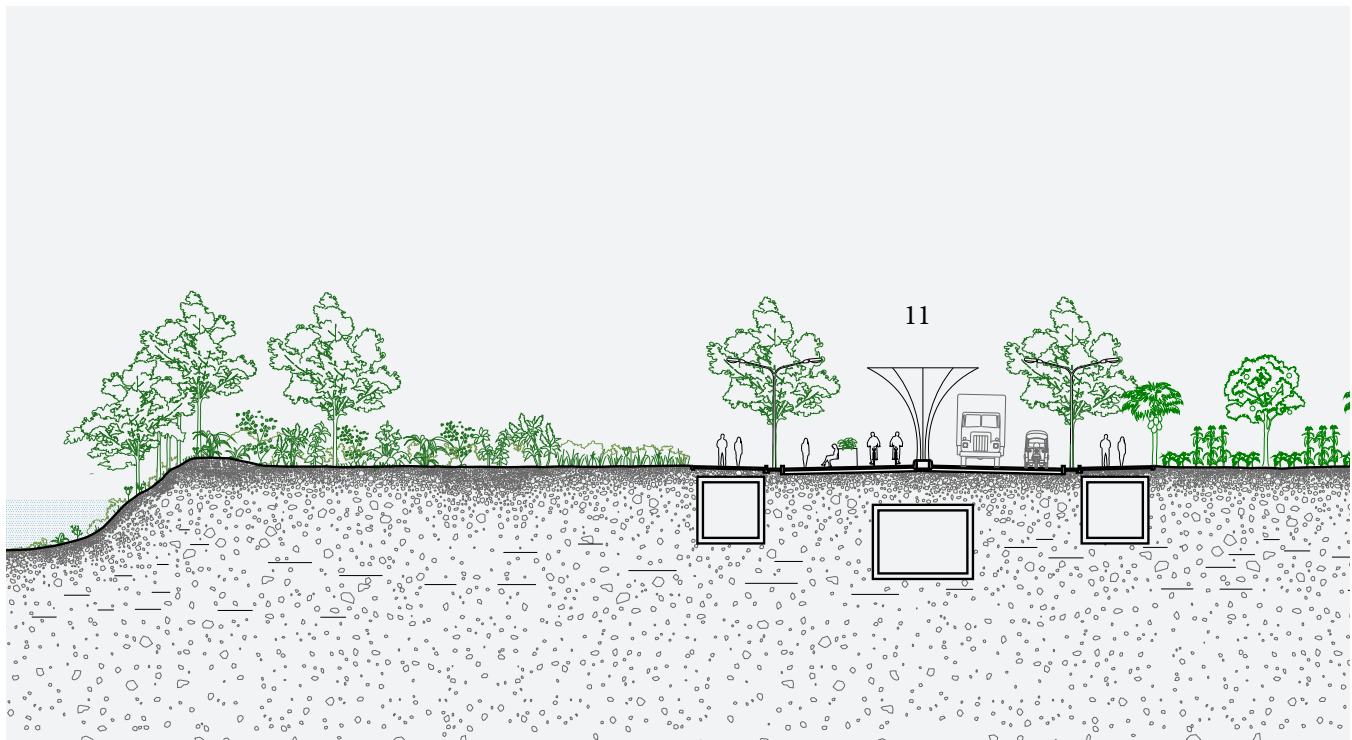

Figure 4. Village Islands at 2040, showing the transformation of infrastructure into multi-modal mobility network.

Fruit trees are planted along streets and at the perimeter of farmland areas, providing sources of green manure and acting as sources of shade for pedestrians walking through the villages or across fields. By 2031, most farmers sell their products directly to consumers on an online trading platform, using the improved village roads to connect to markets at the outskirts of the adjacent cities. This network is now almost completely paved, with maintenance ensured by a cooperative comprising the 29 villages that were originally engulfed by Amaravati. That history led to new forms of local governance that were able to assert the rights of villagers in the face of growth from the adjacent cities.

SUBURBAN SATELLITES // URBAN LAND USE / INCOMPLETE INFRASTRUCTURE

A lack of government support in the years after Amaravati's interruption left infrastructure projects unfinished; at the same time, villagers were forbidden from returning to fields that became overgrown, stripped of top soil and unrecognizable. A wholesale return to farming would be impossible although small-scale efforts to cultivate the land could be found adjacent to any village. Development, as it existed, took place from these village nodes and along a pre-existing network of local roads. This bottom-up development meant that the 29 villages became centers for growth and community development, with new services and investment brought into what were once impoverished rural hamlets. This dynamic had already begun in 2016 with Amaravati's initial announcement, and began again when each village was given autonomy to manage the growth of its surroundings. Unallocated plots of land originally imagined for infrastructure

and administrative projects were also sold on a new market, creating opportunities around villages for new development.

After five years, the reinforcement of the existing rural infrastructure network, attracted a new interest in residential development. Since these communities continued to be less expensive than nearby cities, they became for attractive for commuters who had better access to their workplaces. This along with improved facilities and conveniences attracted peo¬ple from other parts of the region and state looking for more affordable housing options.

CONCLUSION

As mentioned earlier, while the either/or framework allows for four distinct scenarios, it also describes a reductive situation that leaves little potential for initiatives and agencies to be dispersed into smaller scale actions and events across the 217 square kilometer site. In fact, at Amaravati today, there are small pockets of initiative and resistance where local villagers or non-resident landowners have started working with the land in ways that are either not prescribed or require human and capital investment.

Perhaps, rather than thinking of the four scenarios that result from the exercise as alternatives that describe four separate, distinct trajectories, we could imagine that each offers a potential future that can inform choices at smaller scales throughout the site. In the vastness of this space, one could imagine each of the four scenarios taking place in zones spread patch-work across the territory, outisde of a centralizing authority or in reaction to other pressures. What the scenario planning exercise does is to make those futures legible and plausible as possibilities, opening the future to their enaction as a form of resistance to the inertia that currently governs. In the naming alternatives for the future, and telling stories about them, A-SP brings them into a realm of potential.

As a mode of architectural practice, engaging in A-SP would require the support of clients—NGO's, governments, individuals—interested in being equipped with better and more diverse imaginations of what could be. As discussed earlier, this may seem at odds with the mandate sometime ascribed to architecture to problem solve or offer an identifiable vision. On the other hand, it offers the discipline a different kind of role, in which telling stories about and with space, becomes an important kind of expertise that allows others to inhabit these imaginations.
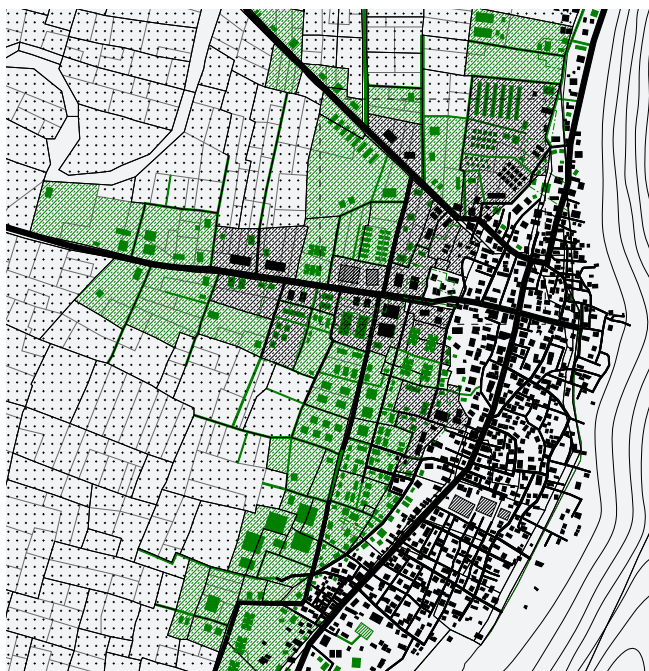

Figure 5. Suburban Satellites at 2040, showing the development of a village along existing roads with new services on the periphery.

ENDNOTES

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19. Chung Bing Sun Lester, Alyssa Tang and Thet Htoo Zin worked on architectural scenario planning for Amaravati. Akshara Khaitan and Fan Xinkai DJ contributed to earlier research on Amaravati that served as the basis for this project.