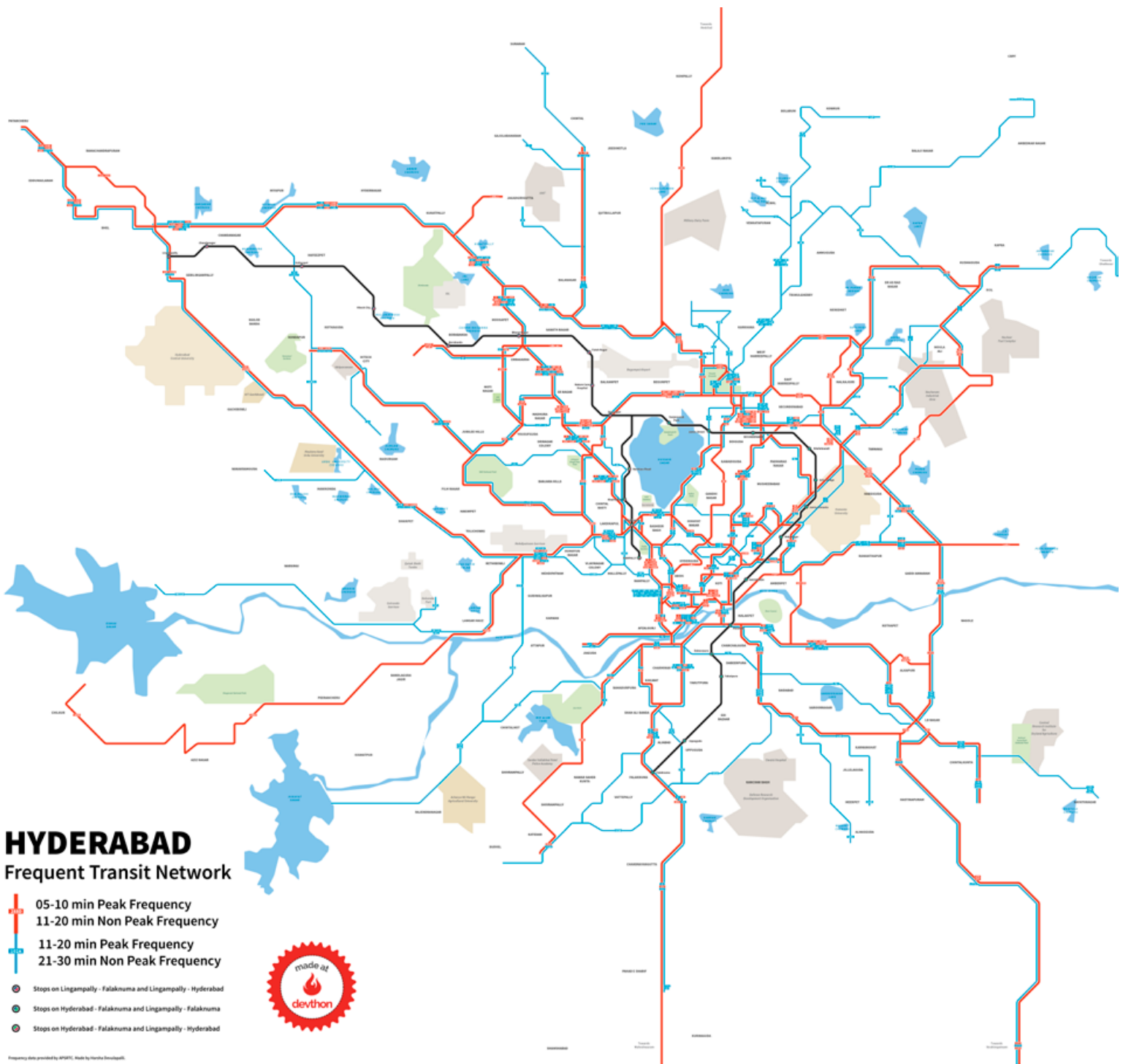# A Civic Mapping Project in an Indian Megacity
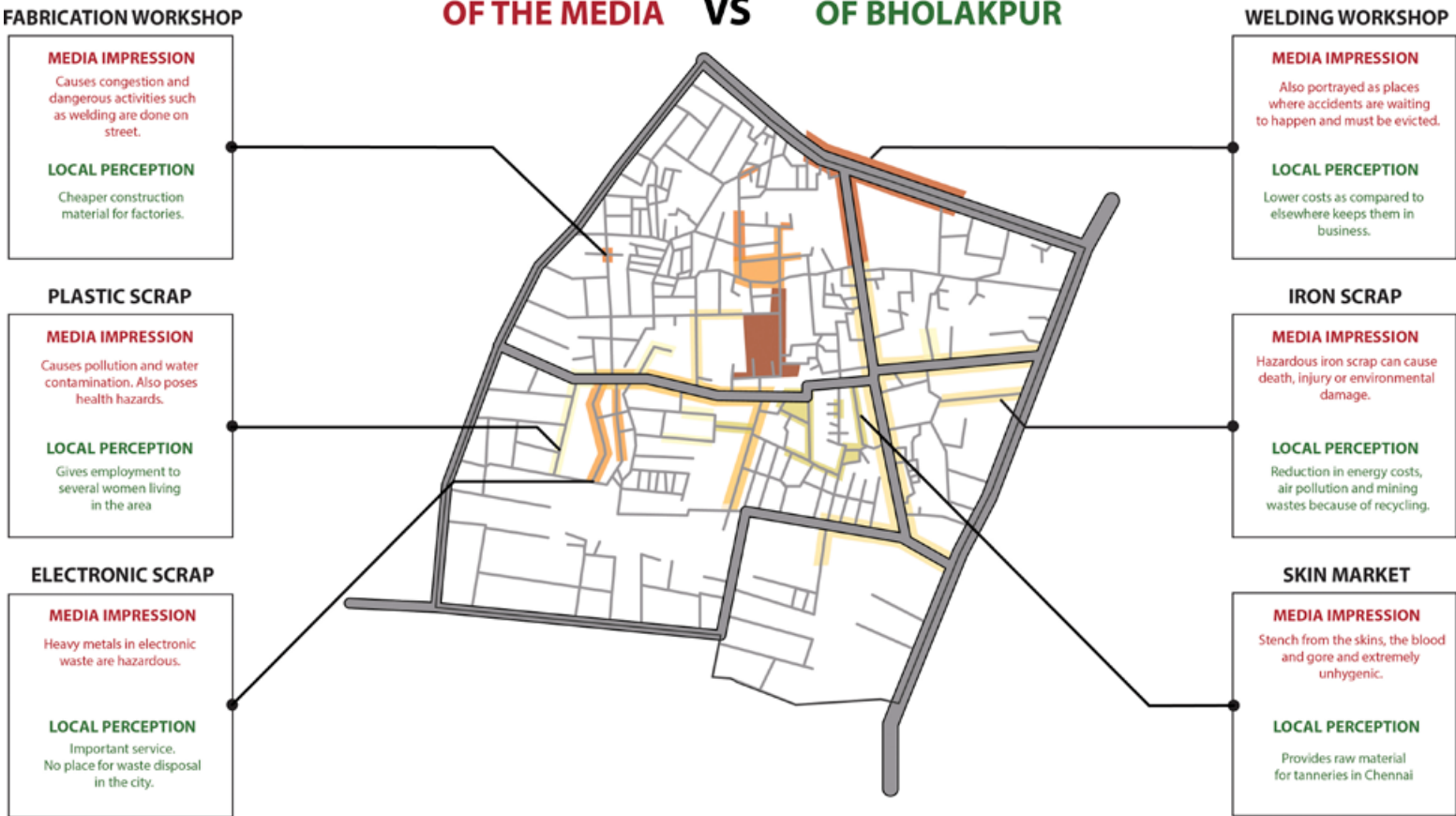## The Uses and Challenges of Spatial Data for Critical Research

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HYDERABAD
Frequent Transit Network

Hyderabad Urban Lab (HUL) looks at cities as a complex set of relationships consisting of relations of production, social relations, and relations between citizens and governments. HUL began in mid-2012 with the aim of conducting research on urban issues in a way that bridged the gap between academic urban research and life at the grassroots. Since the beginning, HUL has experimented with cartography and connected this to both, research and pedagogy. HUL makes maps but also advocates to both, the government and citizens, for a richer cartographic engagement within the city. Over the years HUL has held mapping workshops with a variety of stakeholders, and even school children.

Occurrences in cities are the result of numerous relationships coming together at multiple scales of space and time. As Dennis Wood (2010) says, one can portray these intersections by bringing together selected things onto a common plane. It is the plane and the propositions that make the map. As Peter Turchi (2004) puts it, maps are no different from literature in the sense that they attempt to explain human realities. It is the privilege of the cartographer to select what is included and what isn't. Thus, maps in general are assertions of the state of the world which cartographers desire. This is why maps are tools of power. The state, which in many countries holds exclusive rights over mapping, can choose to portray certain versions of reality while omitting others. Corporations with large amounts of spatial data, too, hold great power over the way the world is increasingly being perceived and experienced through digital maps. In this context, practices of critical mapping stand outside the norm of using maps to declare sovereign power or to facilitate consumption. They, in fact, talk back to this power and help citizens or communities to represent their own geographies.

Since its inception, HUL has used critical mapping as a core methodology in research, a key tool in engaging with various urban stakeholders, and also as an essential component of its pedagogic outreach. Having undertaken a wide variety of mapping projects and teaching workshops, our practice itself has deepened rigorously. Here we present, with examples from our work, four of our key mapping practices, the principles that direct them, the practical difficulties we face, and the reasons why we are committed to working with open data and crowd-sourcing.

Community Mapping
Maps of Bholakpur's Scrap Markets

HUL's earliest project was to build a digital tool in order to enable collaborative research with the community in a historic neighbourhood called Bholakpur – a former hub for leather tanneries, and today a hub of scrap markets. The motivation was to understand the political economy of the markets, and also to revalorize the neighbourhood in terms of its dynamics and economic productivity, which the government neglects.

Members of the community responded eagerly and played a major role in facilitating the process. They helped us to collect GPS tracks and to identify the key objects being represented in the map. The community members quickly understood the utility of the map and that they had ownership over it. The idea that community mapping might be an empowering process was affirmed by maps drawn to contest the government's view of Bholakpur.

Having ownership over these maps also enables the community to make claims on their own knowledge of the place. Bholakpur's scrap markets have been facing pressure from the government and are threatened with eviction. This pressure is a result of popular perceptions regarding persistent water contamination in the area and their connection to the presence of the scrap market. With the help of maps, local field workers are able to identify specific locations in the neighbourhood in which contamination is persistent. This data can then be collated with the locations of scrap processing units and their runoff. The spatial data was able to demonstrate that there was little or no correlation between water contamination and the presence of scrap markets. An ability to work with maps and spatial data has given residents of the neighbourhood leverage in negotiating with governments and NGOs working in the area.

Crowd-Sourcing Data – Bus Frequency Map
The Andhra Pradesh Road Transport Corporation (APSRTC) runs most of the city buses in Hyderabad, but does not have a public database of all bus routes and time schedules in the city. After extensive cleaning of a rather faulty list of bus stops and bus routes acquired from the APSRTC, the result was the first geospatial database of bus routes in Hyderabad.

The map generated from this database is usable for citizens but it also helps us to understand transit deprived areas in the city. With this base map, we asked: how do people travel in areas with no transit available? We presumed that the answer was represented in shared auto rickshaws. As an experiment, we put out a public call for people to contribute share auto rickshaw routes they knew. Within 8 hours, we had details on 85 routes in the city. Adding all of these routes to the existing frequency network map further enhanced the public database on mobility in Hyderabad.

Public Audits Using Maps – Map of Public Toilets
Public audits and fact-finding missions have long been a useful methodology employed by activist groups, and other civil society organisations in India for holding the government accountable over the rights of citizens. We believe that the addition of maps as a tool will be invaluable to this methodology.

The current government of India announced that sanitation would be one of its priorities. While the government was targeting attitudes of people towards open defecation, we published our map in order to put these attitudes in the context of the available infrastructure. Hyderabad, a city of more than 6 million people, has only 186 public toilets. Our map highlights the unjust and sparse distribution of toilets in the city. Another focus of our dynamic map is to show the inequality between available toilet facilities for men and women. The data was collected through a public audit conducted by the HUL team and some volunteers.
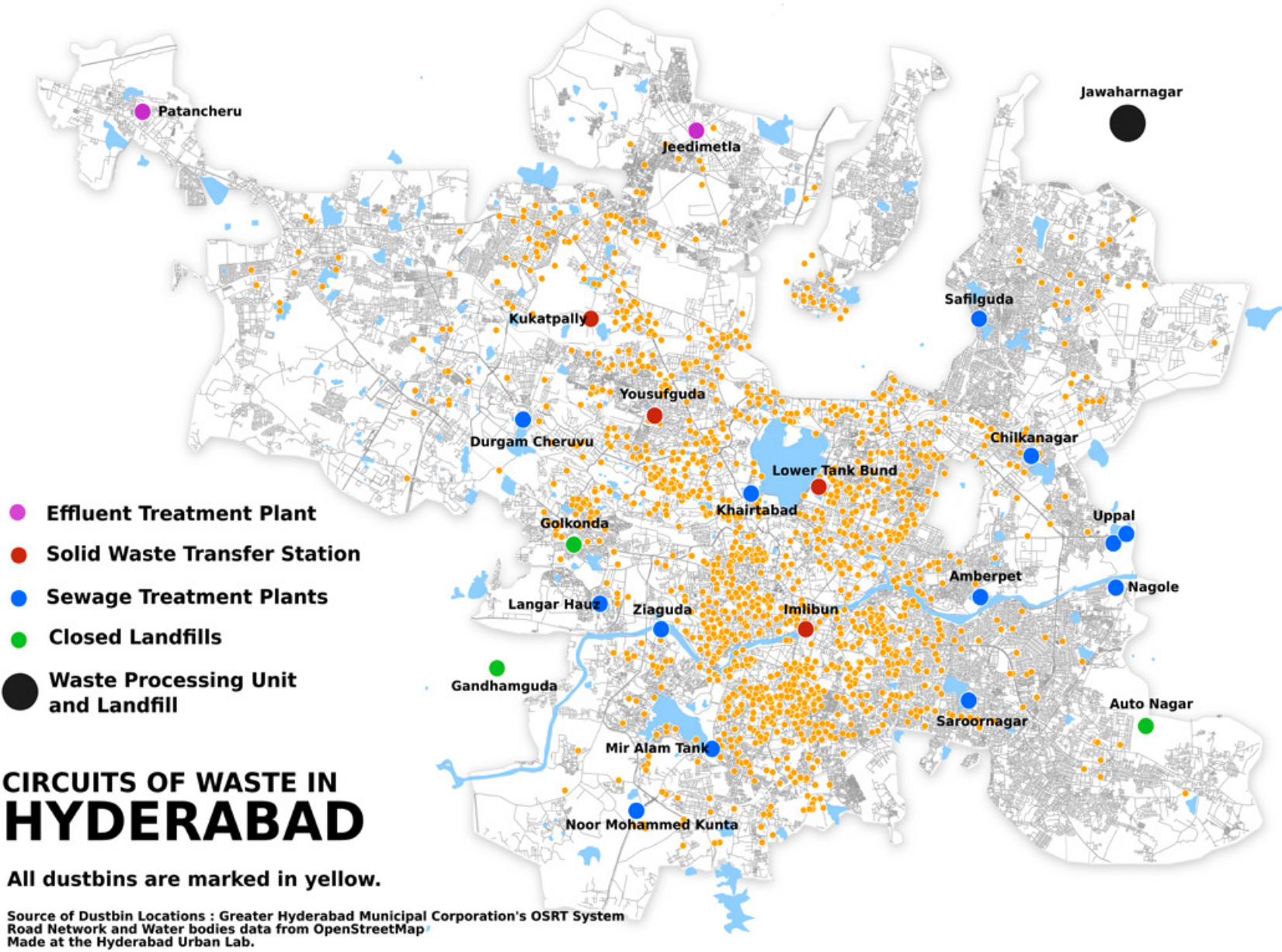
Our map also illustrates the perverse outcome of an incentive for free advertising on the outer walls of toilets provided to private contractors for building new public toilets. As a result, 50 new toilets were constructed. However, many of them were located at squares which were already served by a public toilet, sometimes they were built just adjacent to old ones, while leaving many areas of the city still unserved. Perplexed by this choice of location we supplemented our mapping exercise with an audit of some of these toilets. We found that the incentive structure meant that private contractors built toilets where their visibility as billboards would be greatest Although the incentive was extended with good intentions, poor monitoring of the outcomes resulted in inadequate, sometimes redundant outcomes with respect to the goal of expanding access to public toilets. Many of our mapping exercises are conducted in this audit modality with which we hope to be able to persuade the government to plan public amenities and implement policies with greater care.

Cleaning Up Public Data
Atlas of Slums in Hyderabad
Most cities in the developing world such as Hyderabad, tend to have data in closed and archaic formats which impede interoperability. They also lack inventories to keep stock of multiple datasets across space and time (e.g. it is hard to find any data on pre-1990 municipal wards for Hyderabad). The periodic realignment of administrative boundaries and enumeration blocks makes it especially hard to build cohesive datasets over time. Uncertainty about data rights is another major problem. These issues often represent obstacles for anyone interested in doing research in these cities.

In a bid to transform Hyderabad into a "slum-free city" (real world-class city), the city government was going to conduct a count of all the slums in its jurisdiction, which amounted to 1476. As is common, this task was outsourced to a private company. Unbelievably, the task was conducted within 30 days and with a budget of just 1.8 million rupees (roughly 23000 Euros). We highly question the validity of this information and the legitimacy of how the data was collected. In any case, some data was produced. Although there are some glaring inconsistencies, the map gives us the only available representation of slums in Hyderabad, and more importantly, this is a representation of how the government itself sees the "slumscapes" of the city.

An atlas of maps depicting various characteristics of recognised slums in Hyderabad, was put together through a painstaking process of cleaning this inconsistent data. By sharing these maps with the government we wish to inform them about the possibilities for analysis and planning offered by clean spatial data. Through regular articles and interventions at consultation meetings, we are trying to push the government towards improving their data

Effluent Treatment Plant

Solid Waste Transfer Station

Sewage Treatment Plants

Closed Landfills

Waste Processing Unit and Landfill

CIRCUITS OF WASTE IN
HYDERABAD

All dustbins are marked in yellow.

Source of Dustbin Locations : Greater Hyderabad Municipal Corporation's OSRT System
Road Network and Water bodies data from OpenStreetMap
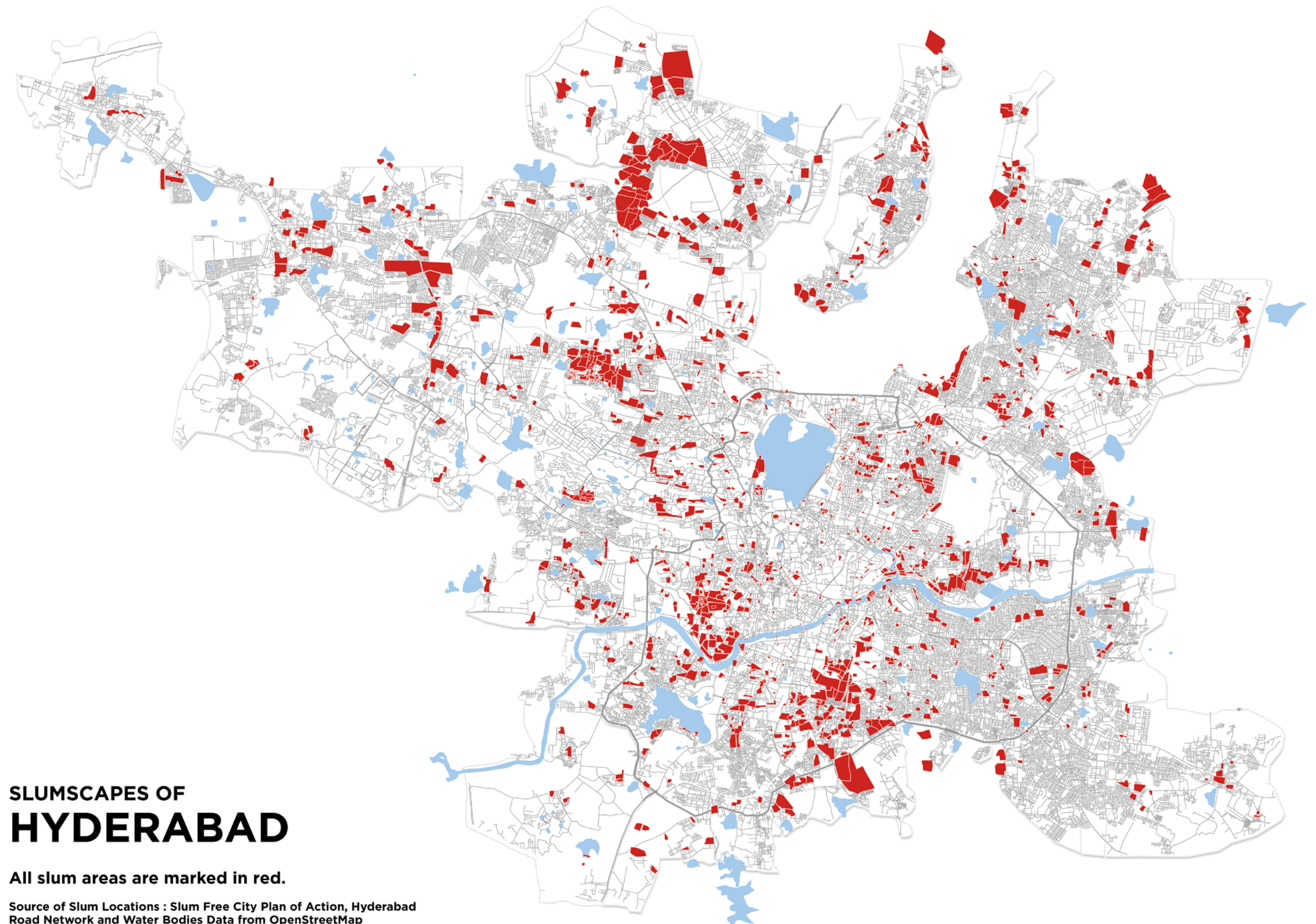Made at the Hyderabad Urban Lab.

practices. This is a long-term project because we believe that apart from civic mapping projects, public data itself should be publicly accessible in general.

Conclusion
Being in the open domain, our maps have constantly elicited new questions and new proposals from the citizens looking at them. It is evident that the general ethos to support the fruitful use of open data and the employment of practices of crowd-sourcing is already present in our city. With each new project, we try to tap into that ethos. With each workshop, we try to further encourage it. With each engagement, we try to extend the conviction that planning cities can be a more democratic exercise.

References
Turchi, Peter. Maps of the Imagination: The Writer as Cartographer. San Antonio: Trinity University Press, 2004.
Wood, Dennis. Rethinking the Power of Maps. New York: The Guilford Press, 2010.

SLUMSCAPES OF
HYDERABAD

All slum areas are marked in red.

**Source of Slum Locations : Slum Free City Plan of Action, Hyderabad
Road Network and Water Bodies Data from OpenStreetMap
Re-made at the Hyderabad Urban Lab.**