MIT OpenCourseWare
http://ocw.mit.edu

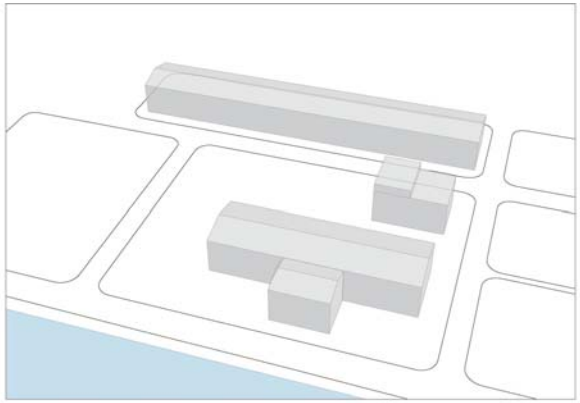
11.307 Beijing Urban Design Studio

Summer 2008

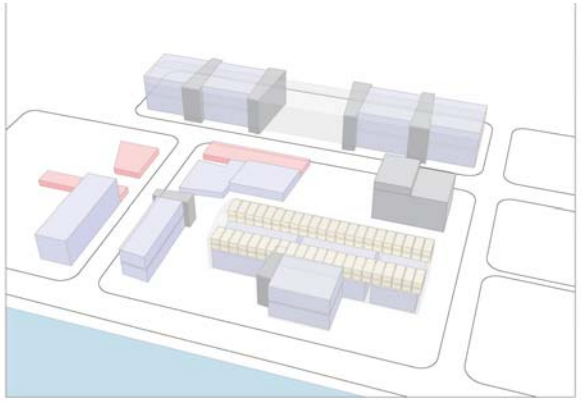
For information about citing these materials or our Terms of Use, visit: http://ocw.mit.edu/terms.

flexible moduling in an environmental framework

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

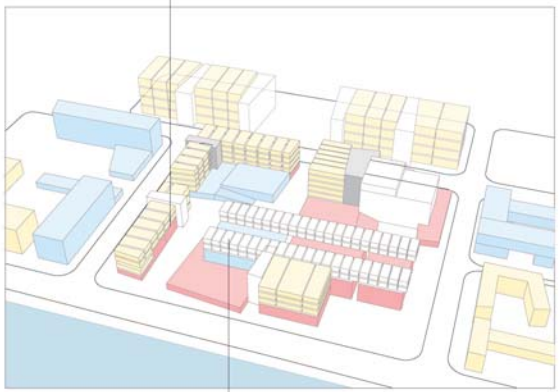


Large existing buildings with adaptable interior space are reserved to first house soil remediation and related industries



As soil remediation moves out of the major spaces, other industrial uses as well as migrant housing will move in provisionally as the rest of the site is developed into industrial and light commercial enterprises

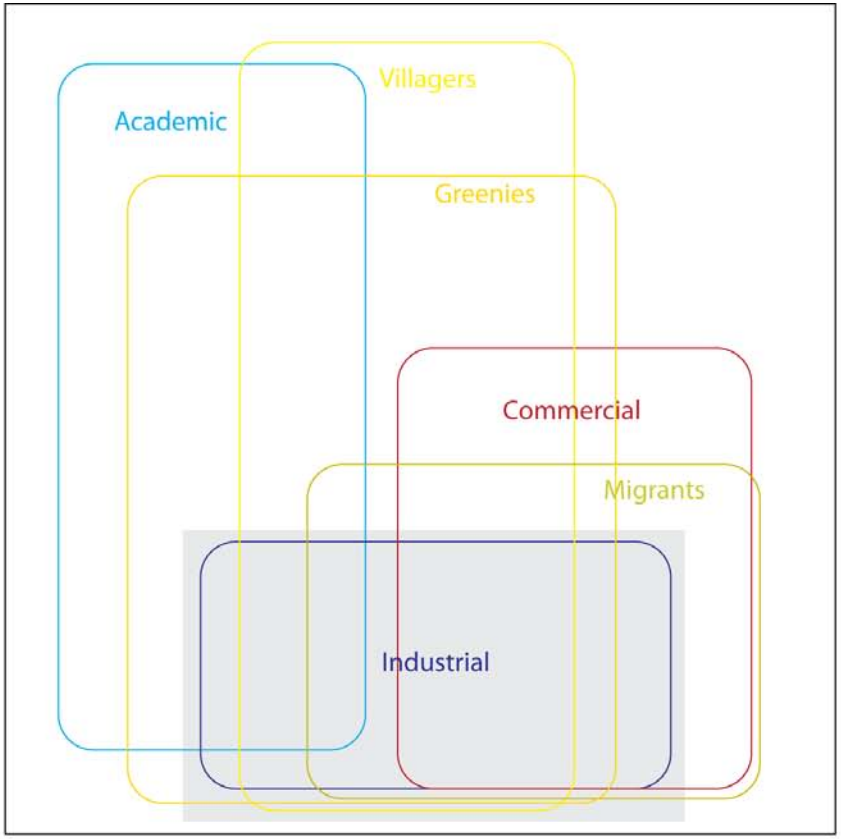
Industrial spaces become commercial and housing



As the remediation activities move elsewhere on the Shougang site, the remaining industrial volume can be broken up into smaller commercial and residential spaces while larger spaces will become civic and entertainment venues.

As migrants move to other parts of the site, their housing becomes middle class apartments

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



Phase 4
- Villagers
- Commercial
- Migrants

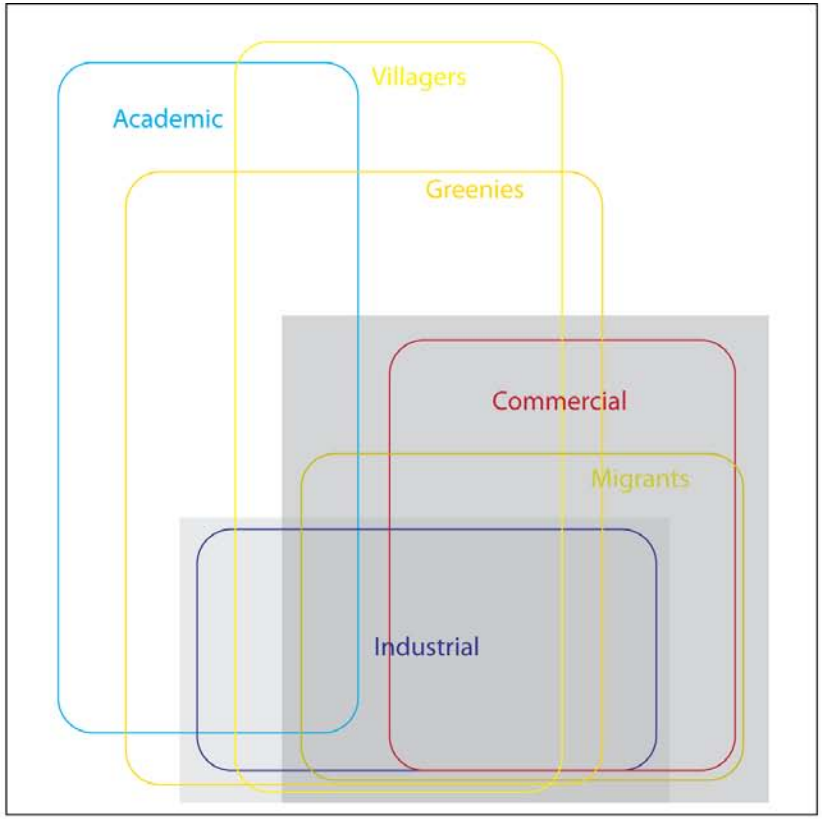
Phase 3
- Academic
- Commercial
- Migrants
- Greenies

Phase 2
- Commercial
- Migrants
- Industrial

Phase 1
- Industrial

Establish critical circulation and extents of build out

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



Phase 4
Villagers
Commercial
Migrants

Phase 3
Academic
Commercial
Migrants
Greenies

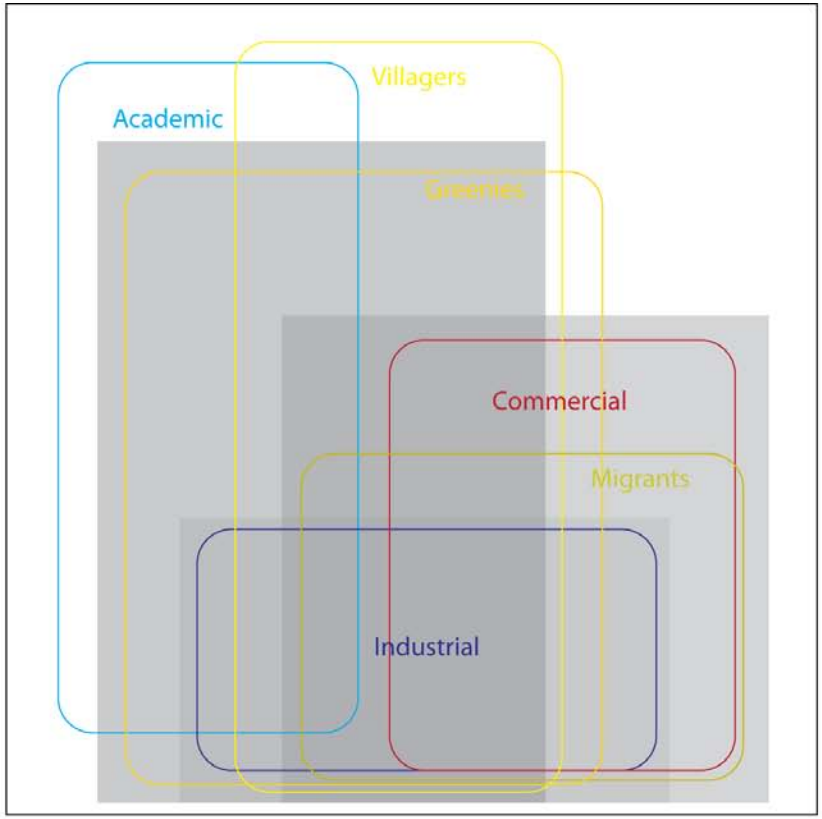
Adapt migrant housing to middle and upper class residences, expand residential higher, convert industrial spaces to academic, commercial or garden apartments and lofts

Phase 2
Commercial
Migrants
Industrial

Establish critical circulation and extents of build out

Phase 1
Industrial

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



Phase 4
Villagers
Commercial
Migrants

Phase 3
Academic
Commercial
Migrants
Greenies

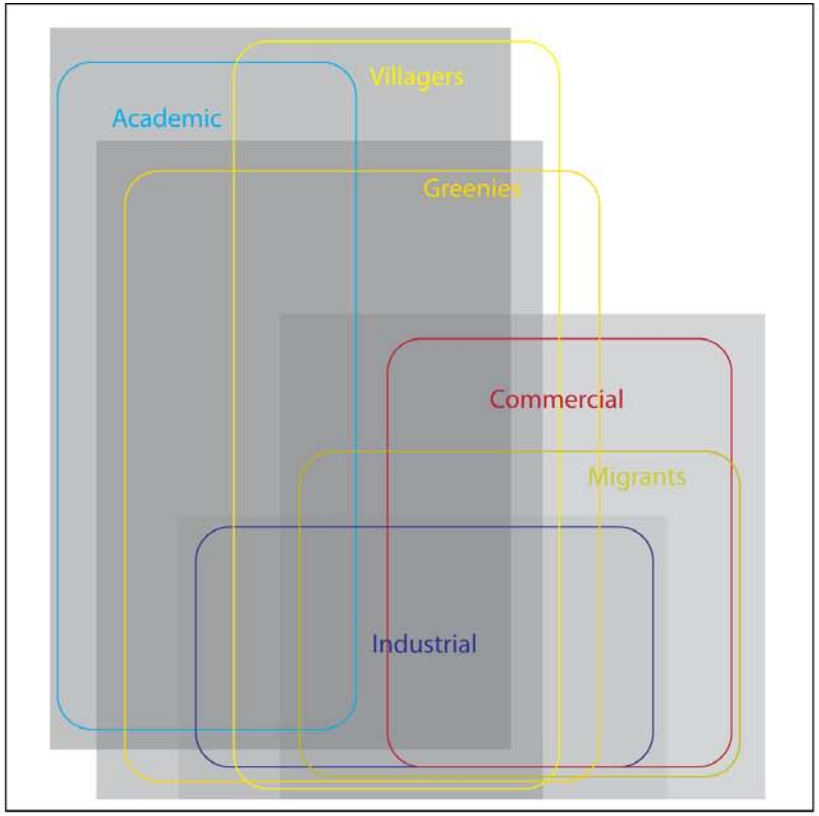
Adapt migrant housing to middle and upper class residences, expand residential higher, convert industrial spaces to academic, commercial or garden apartments and lofts

Phase 2
Commercial
Migrants
Industrial

Establish critical circulation and extents of build out

Phase 1
Industrial

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



Phase 4

Villagers
Commercial
Migrants

Housing is now a mix of middle class dwellings ranging from row houses to apartment blocks within city blocks containing institutional, civic, commercial and light industrial

Phase 3

Academic
Commercial
Migrants
Greenies

Adapt migrant housing to middle and upper class residences, expand residential higher, convert industrial spaces to academic, commercial or garden apartments and lofts

Phase 2

Commercial
Migrants
Industrial

Establish critical circulation and extents of build out

Phase 1

Industrial

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

prototypical development north of the little hot lake

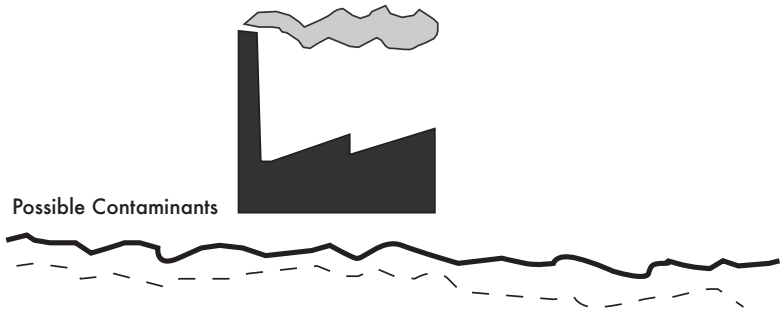
long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

prototypical development north of the little hot lake

long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



Heavy Metals

Arsenic
Cadmium
Chromium
Mercury

Solvents

Paint thinners
Metal degreasers

Petroleum based

Gasoline
Diesel
Motor Oil

Methods of cleaning

Excavation and landfill

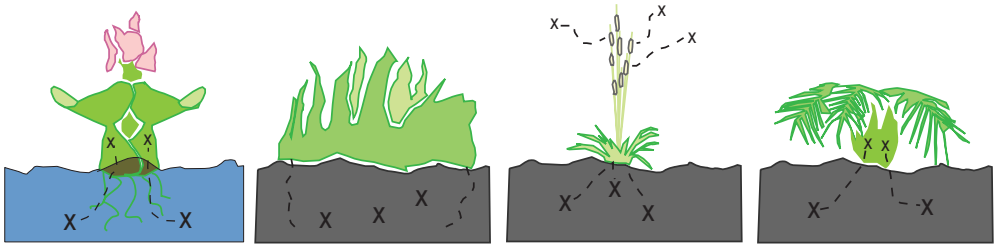
Capping
Solification

Soil flushing
Soil washing

Vitrification
Soil incineration
Thermal desorption

Bioremediation
Phytoremediation

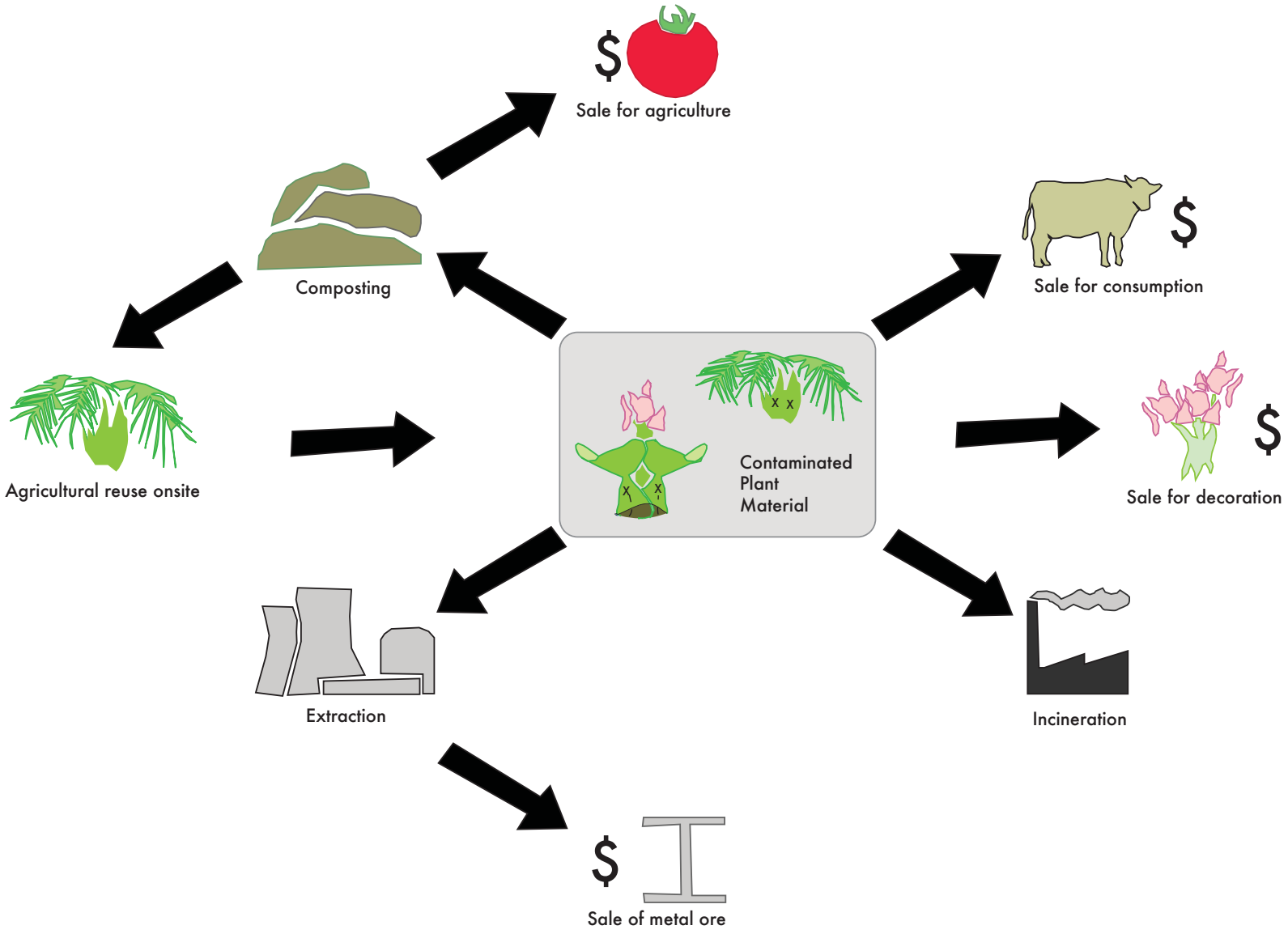
keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



	Rhizofiltration	Phytostabilization	Phytovolatization	Phytoextraction
Mechanics	Hydroponically raised plants placed in contaminated water concentrate the metals in their roots and shoots	Contaminant migration via wind, rain, and grounwater prevented through planting	Plants absorb elemental metals from the soil and biologically convert them to gaseous metals and release them into the atmosphere	Roots absorb contaminants and store them in above ground shoots
Pros	Cost effective for large volumes; applicability to many metals; less need for chemicals; reduced volume of secondary waste; possibility of recycling; appealing to regulators and public	Less expensive; less invasive; easy to implement; aesthetic value; allows for the postponement of action	Minimal site disturbance; less erosion; no need to dispose of contaminated plants; require little maintainence	Cost effective for large areas; reduce in contaminant mass; metals may be extracted from plant material; metal enriched plants may be sold
Cons	Small, slow growing root systems; the need to specilized facilities and expertise	Not appropriate for highly contaminated sites; does not remove pollution; requires soil additives	Less control over path of contaminants; may contaminate air	Slow process; cannot reach deep contamination; must dispose of plants
Affected Contaminants	Chromium, lead, zinc, petroleum hydrocarbons, chlorinated solvents, benzene, ethylbenzene, xylenes	Lead, zinc, copper, selenium, trichloroethelene, mercury, arsenic	Arsenic, Mercury, Selenium	Variety of solvents, Zinc, nickel, cadmium, lead, titanium, chromium
Plants	Water hyacinth, duckweed, pennywort	Grasses	Cattails, tabacco	Sunflower, indian mustard, Chinese brake fern
Alternative	Rhizodegradation			Phytodegredation

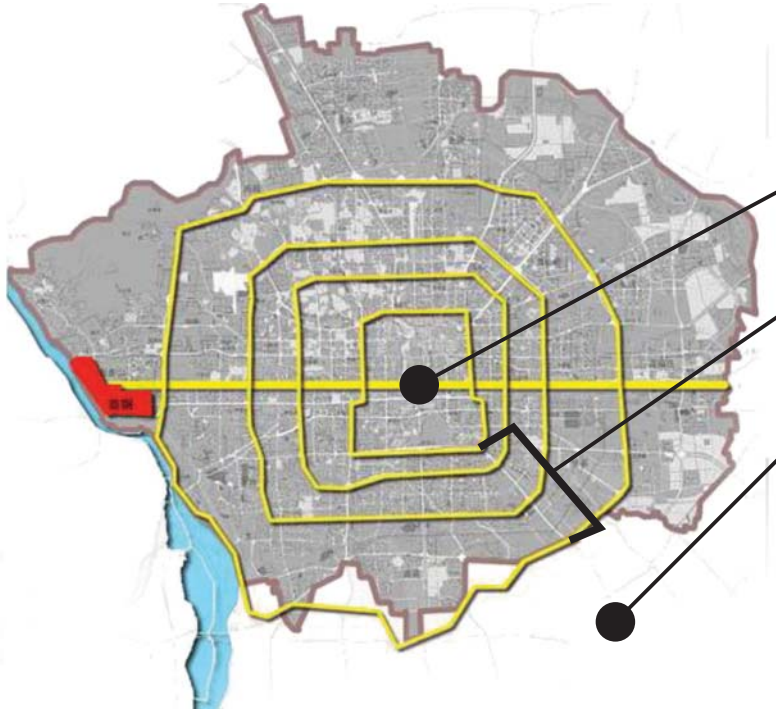
keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

phytoremediation by products



long narrow strip

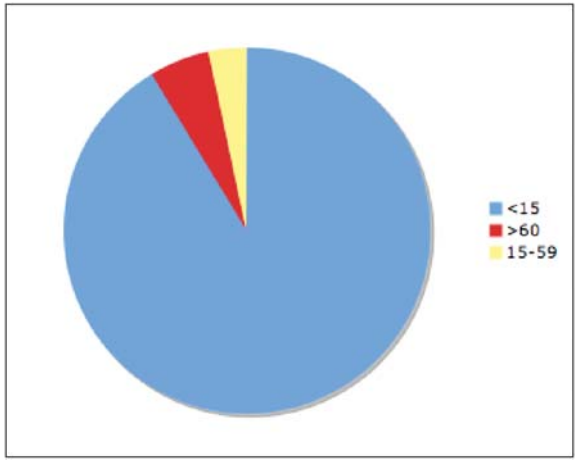
keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



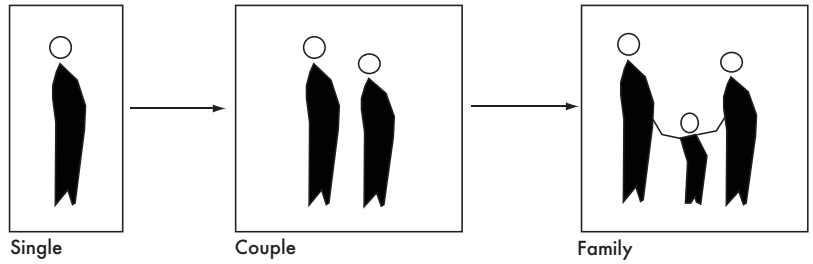
40,000,000

Downtown	372,000	91%
Suburban		
		55.9%
Surrounding Villages	1,431,000	35%
	2,208,000	

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



Implications:
Facility needs change as individuals form families



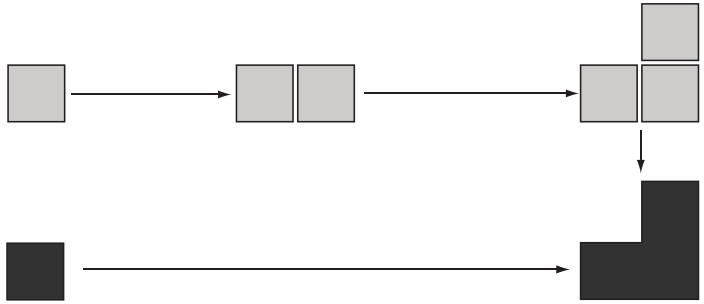
Space Requirements

20 sq m

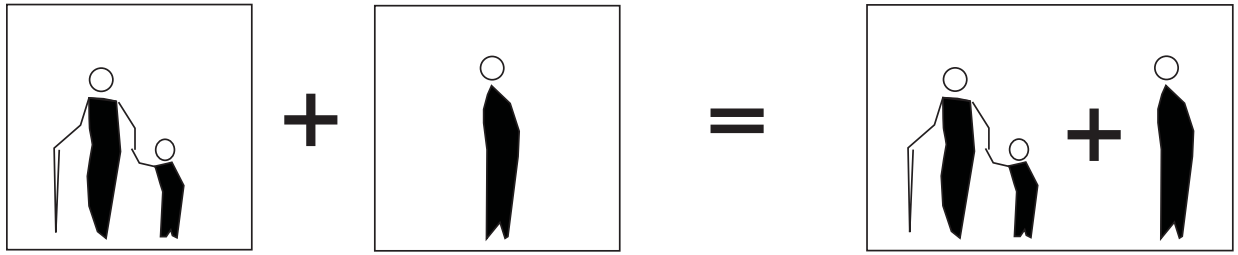
40 sq m

60 sq m

Housing



Family unit



Shougang family

Age ranges:
Under 15
50-80

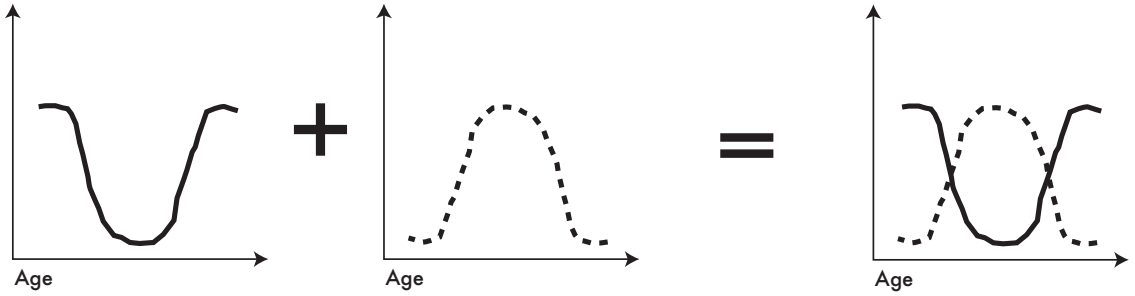
Migrant

Age range:
15-39

New “family” group provides mutual support

Shougang family provides migrants with low rent
Migrant provides family with labor
Both provide emotional support

Distribution



Shougang family

Migrant

New family group

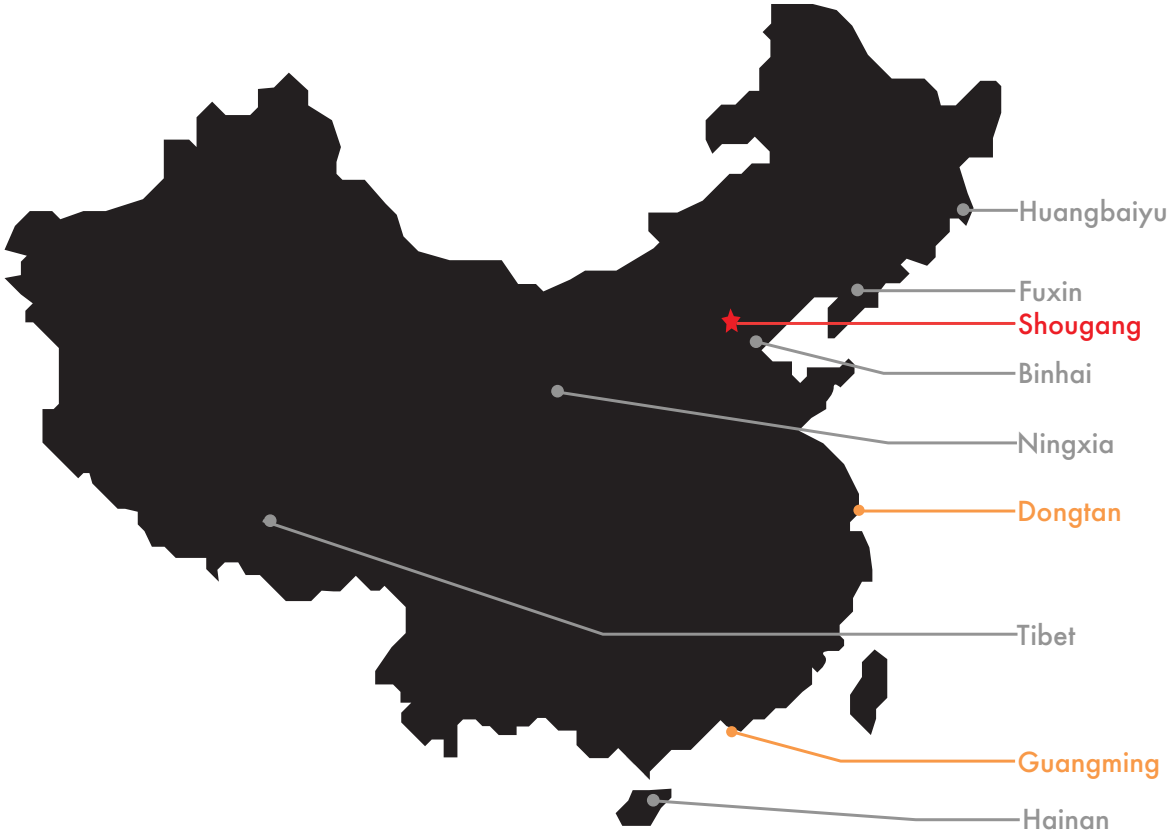
keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



In 2005 the Chinese government proposed building 5 ecocites.

Dongtan

Self sustaining community near Shanghai
500,000 people by 2030
Criticized as an elite community focused towards ecological commuters

Guangming

Self sustaining community near Shenzhen
7.92 sq km area
Farmland incorporated in landscape and buildings

- Communities with wind or solar initiaves
- Chinese government sponsored ecocites
- ★ Proposed socially conscious ecocity

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

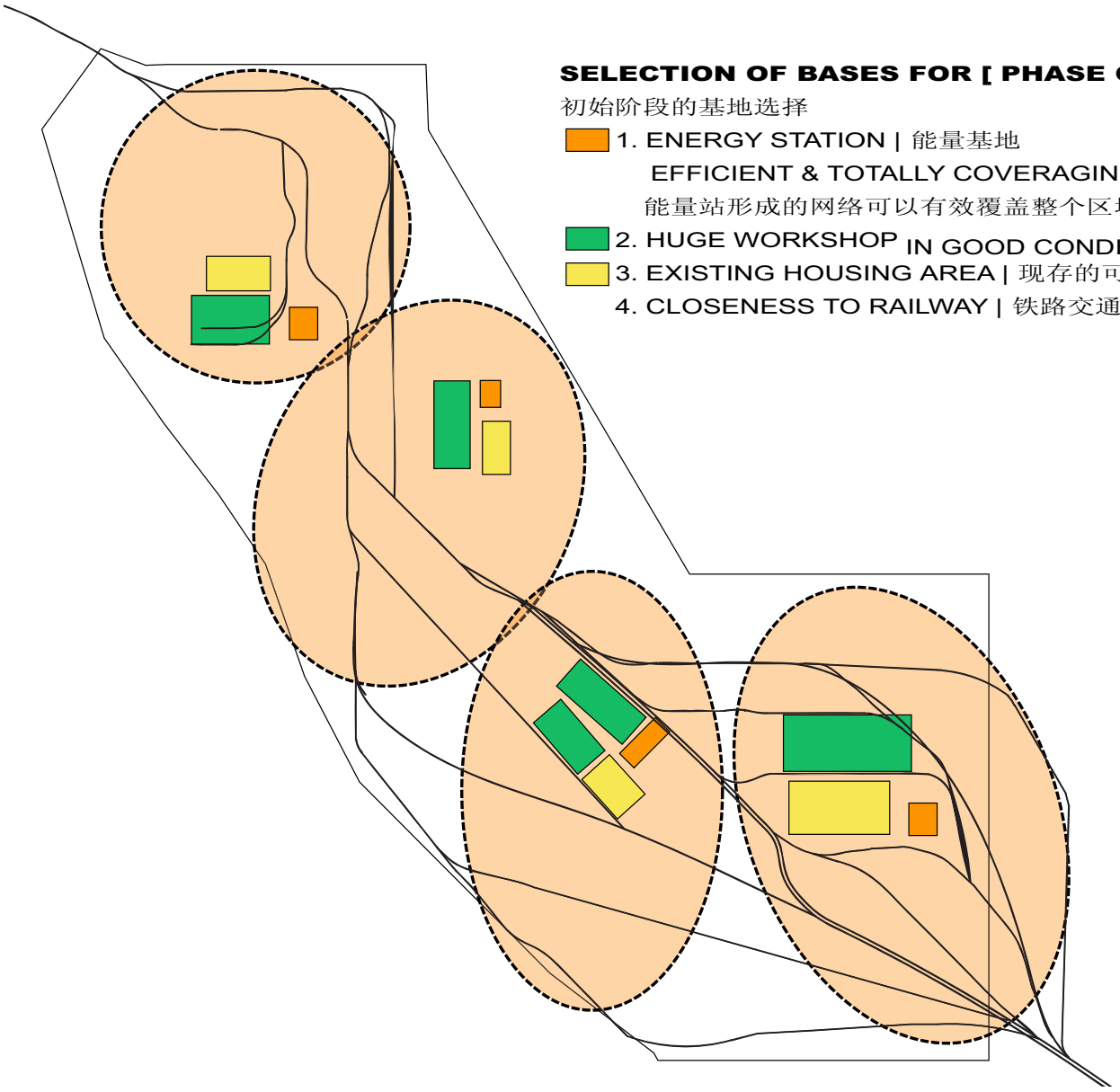
long narrow strip

everyone can remediate their share

environmentally conscious living on any scale

one soil, one dream

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



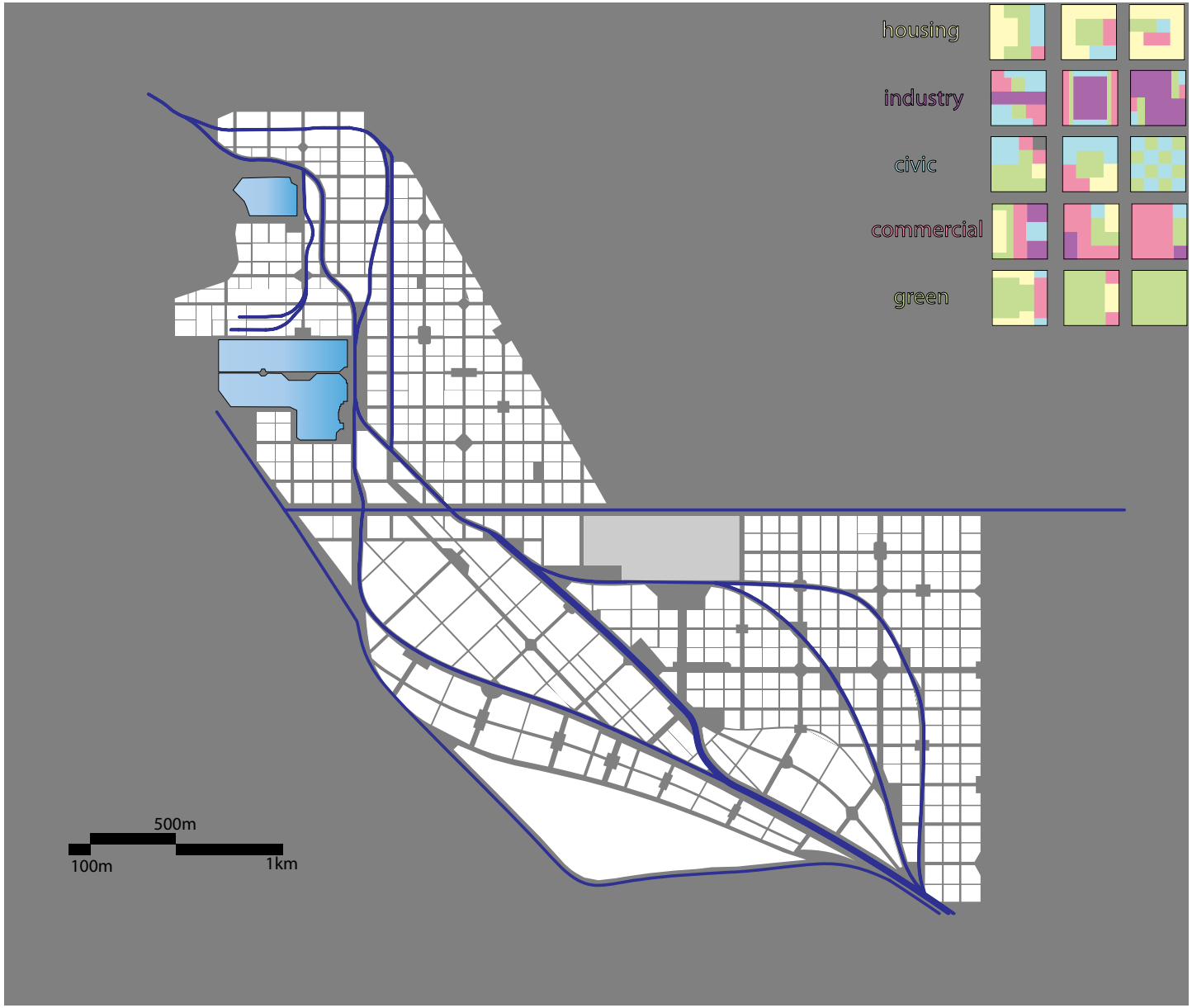
SELECTION OF BASES FOR [PHASE O]

初始阶段的基地选择

1. ENERGY STATION | 能量基地
   EFFICIENT & TOTALLY COVERAGING NET
   能量站形成的网络可以有效覆盖整个区域
2. HUGE WORKSHOP IN GOOD CONDITION | 质量好规模大现有厂房
3. EXISTING HOUSING AREA | 现存的可居住区域
4. CLOSENESS TO RAILWAY | 铁路交通的可达性

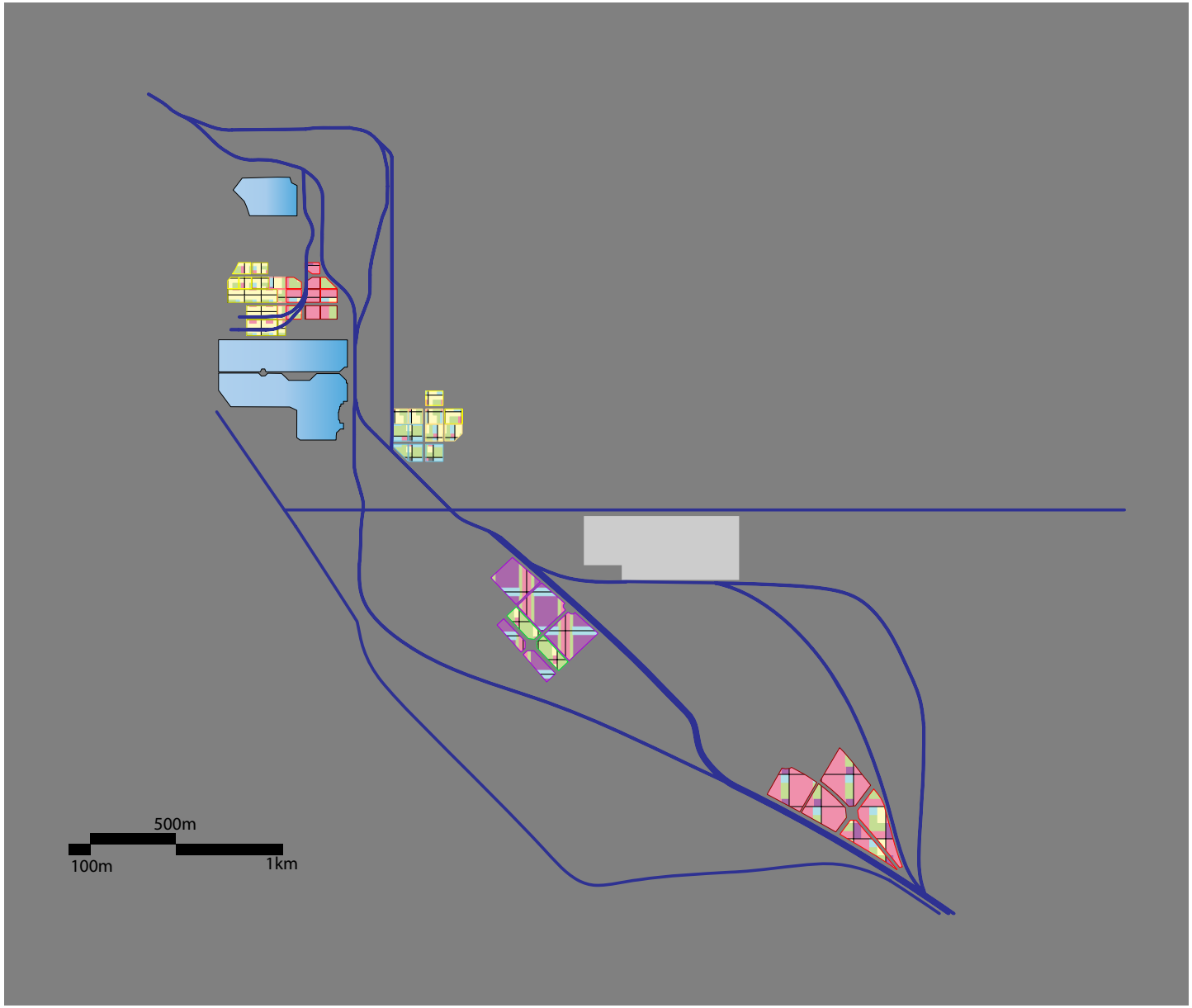
keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



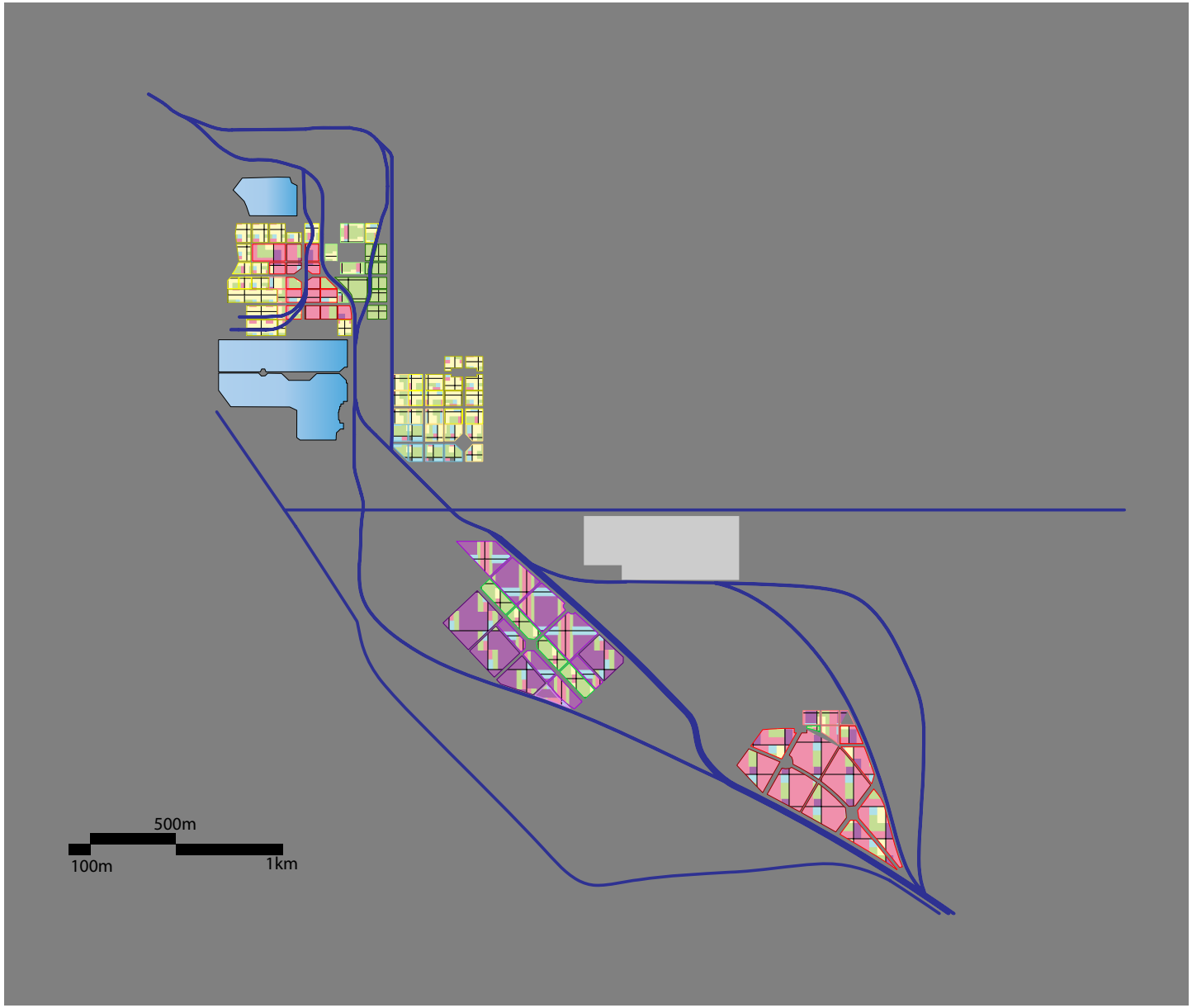
long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



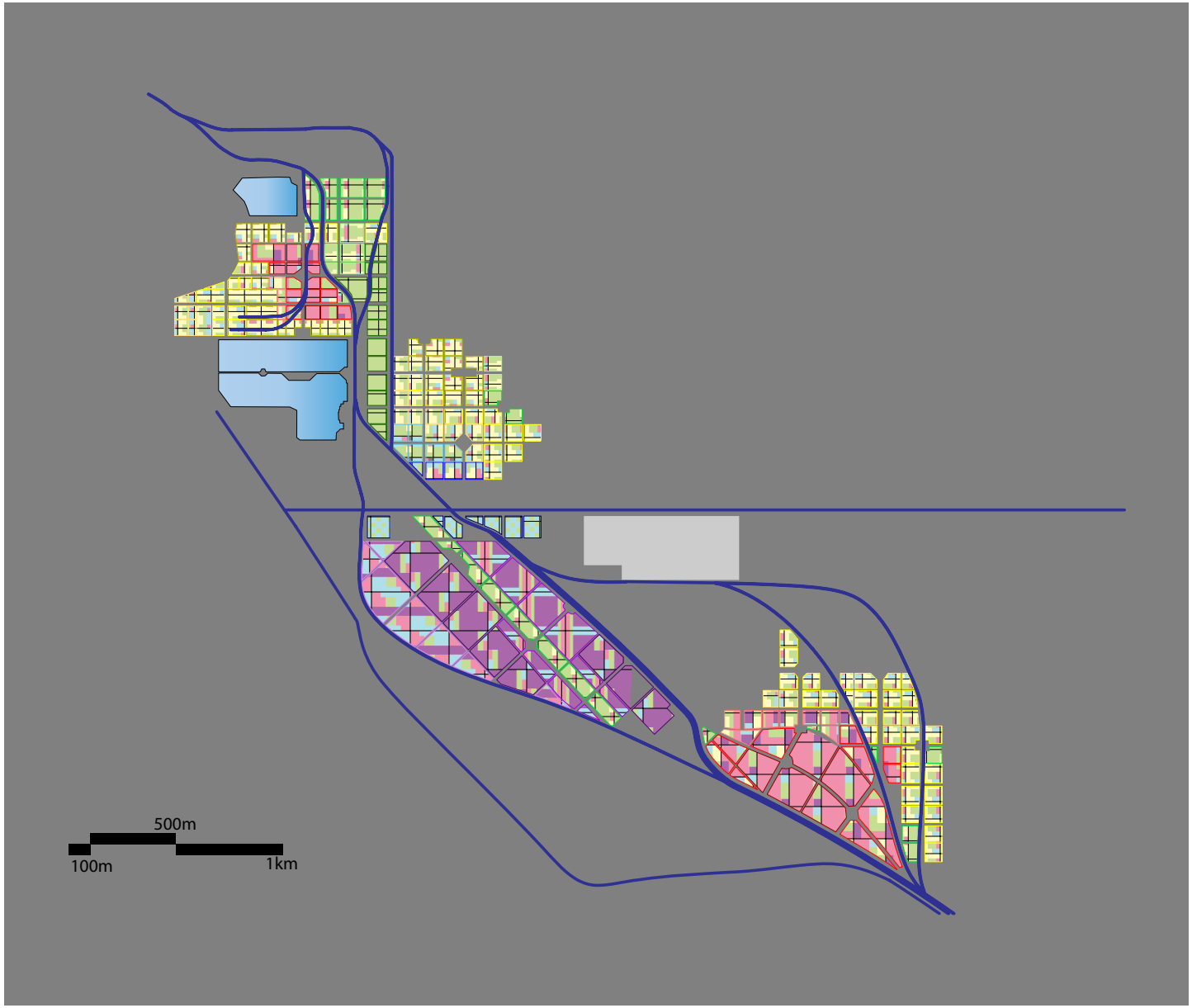
long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



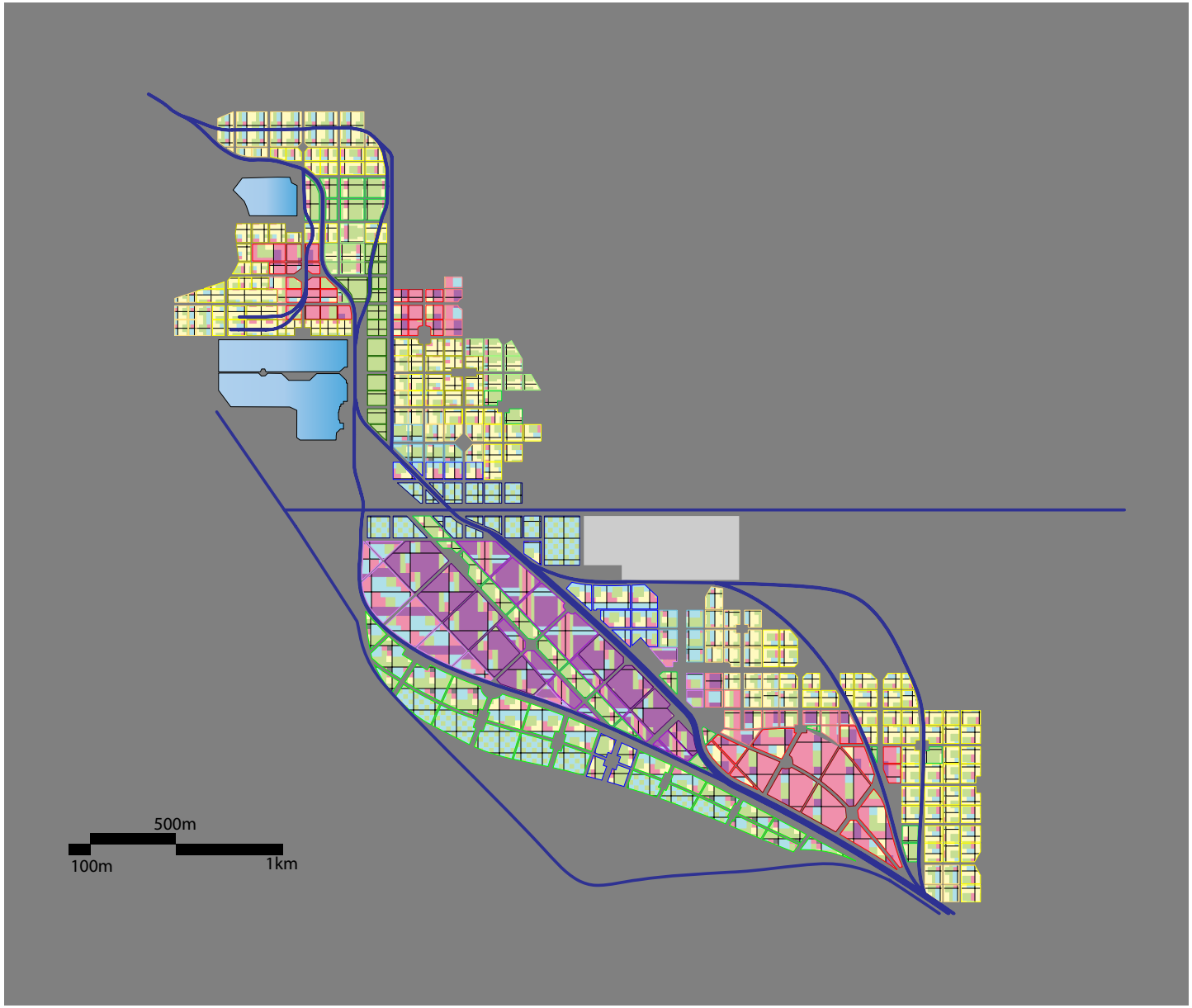
long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



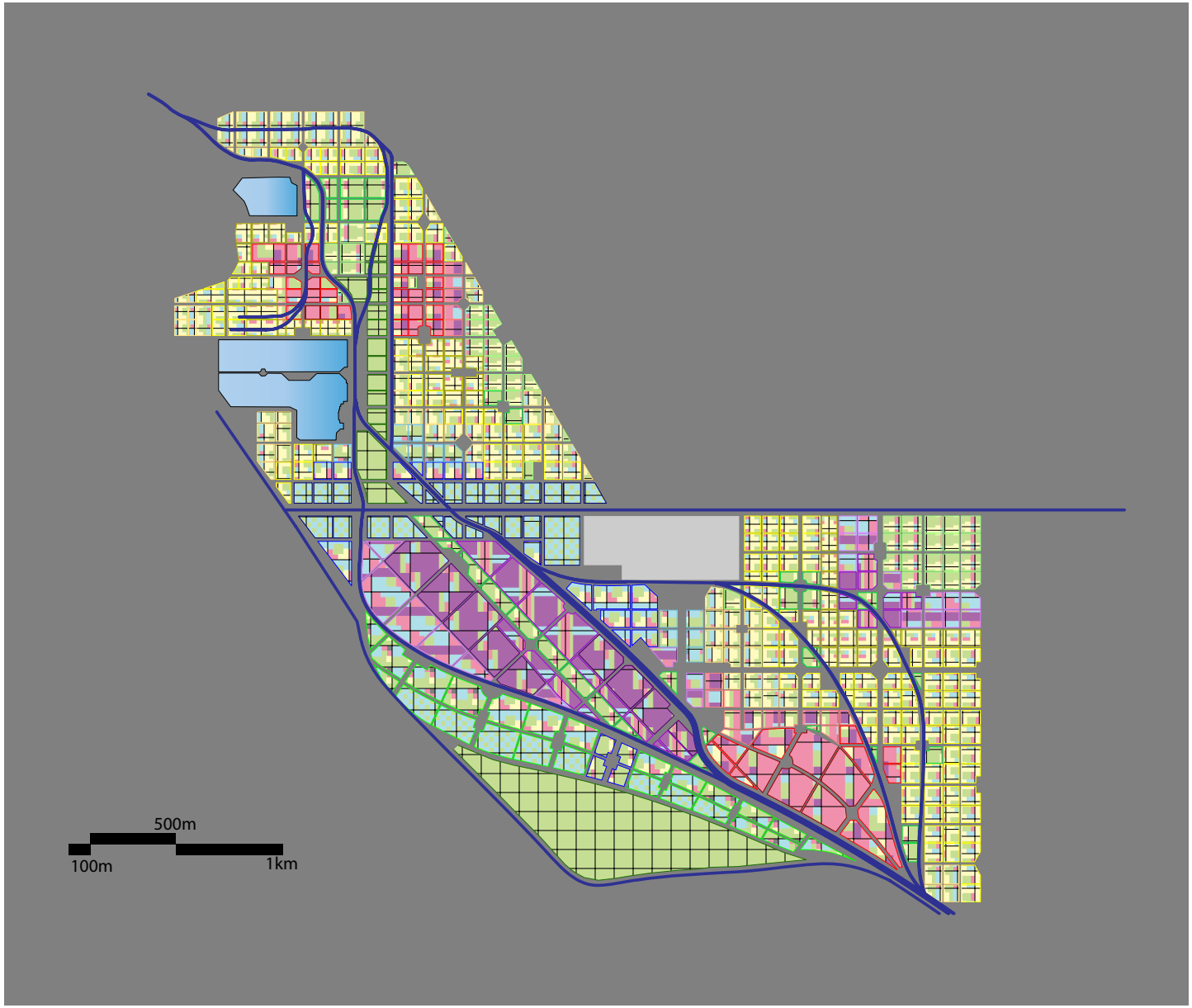
long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



long narrow strip

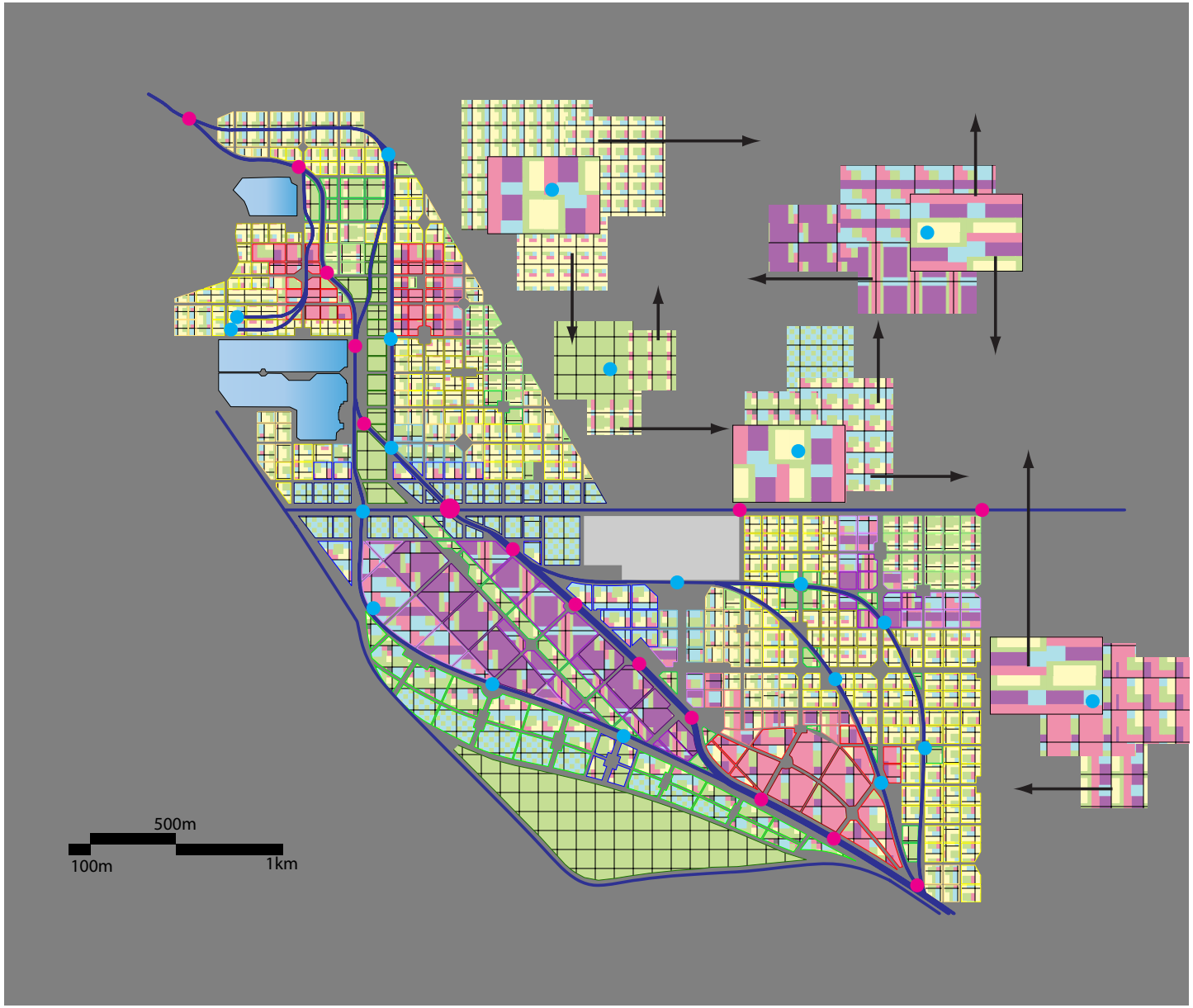
keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



long narrow strip

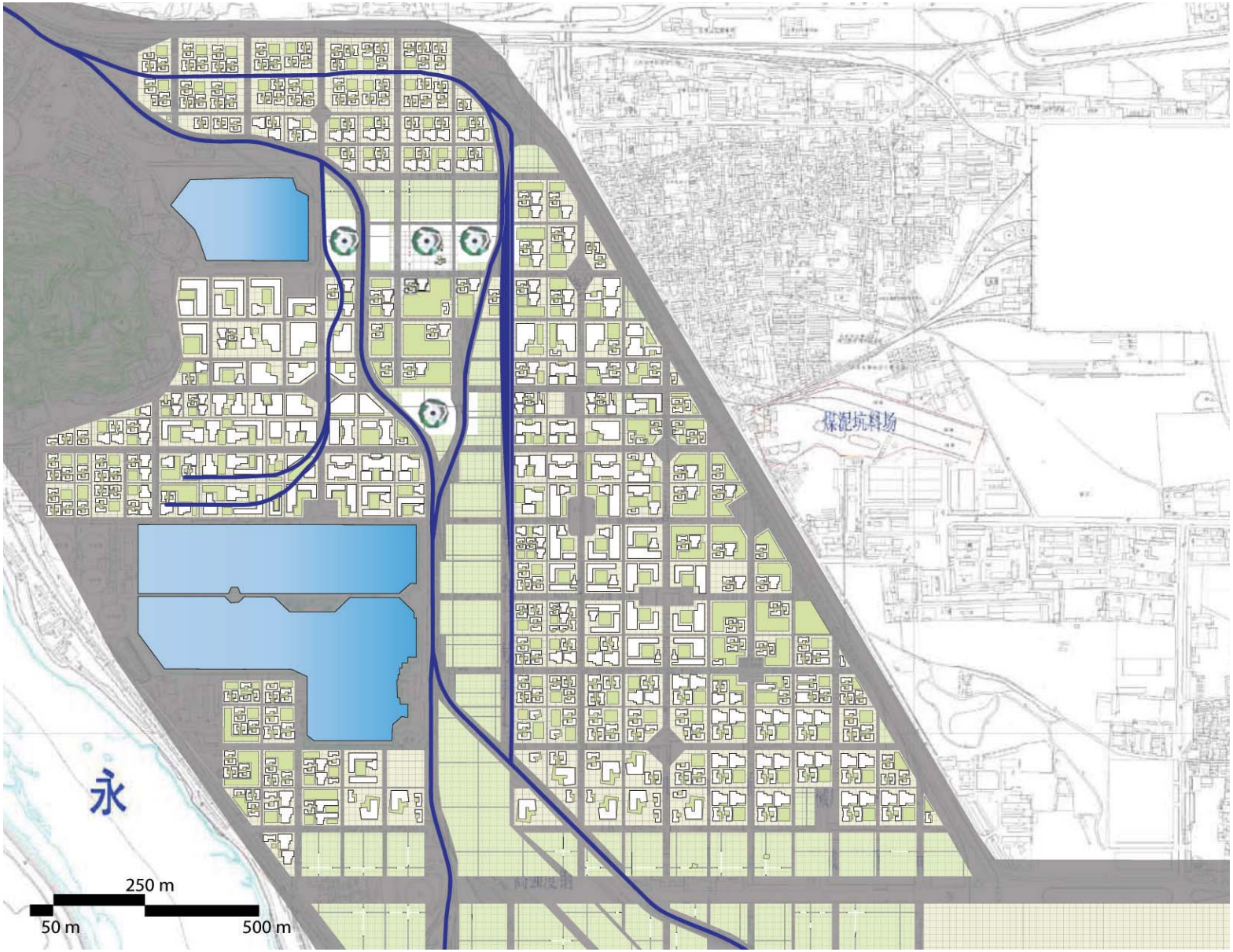
keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

land use of 20 km squared

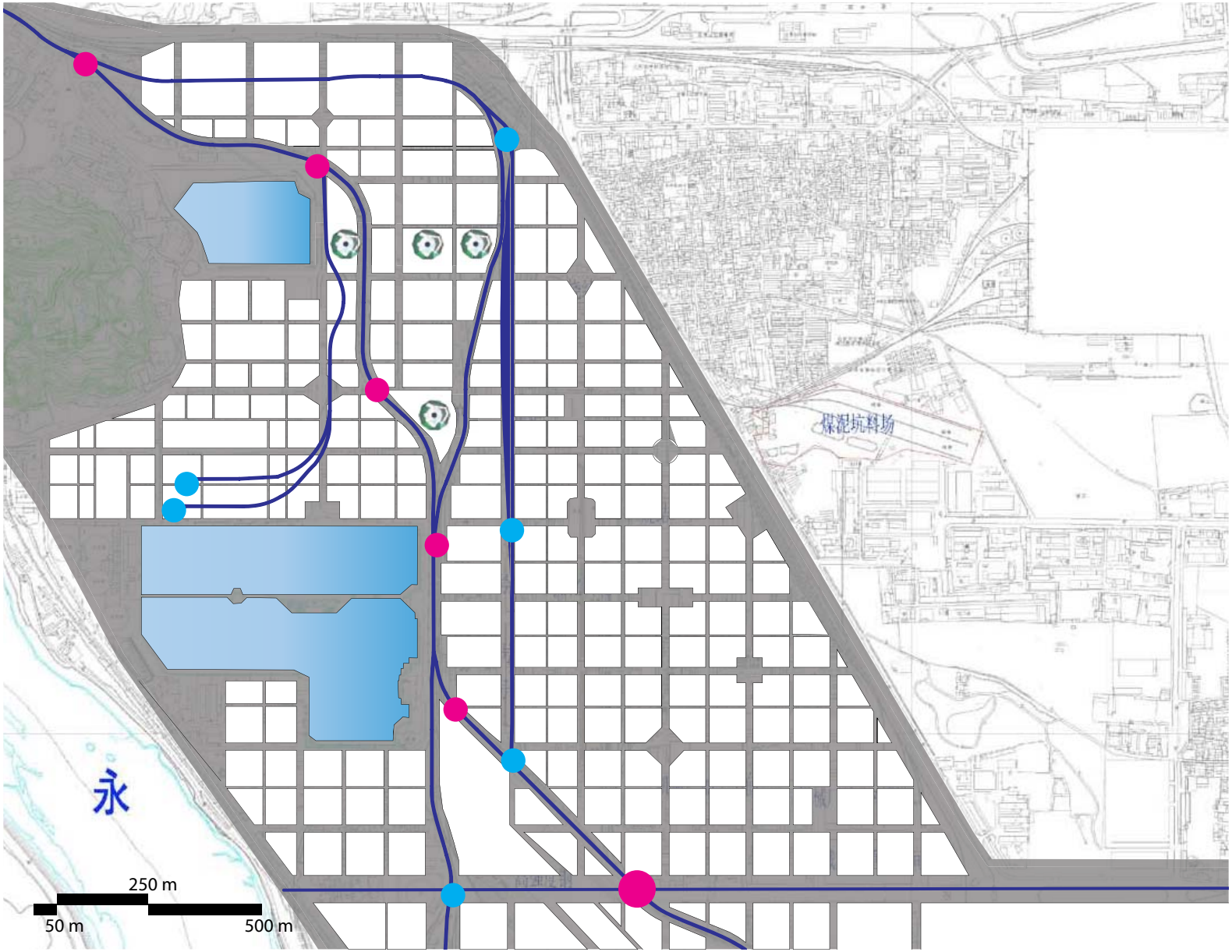


long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

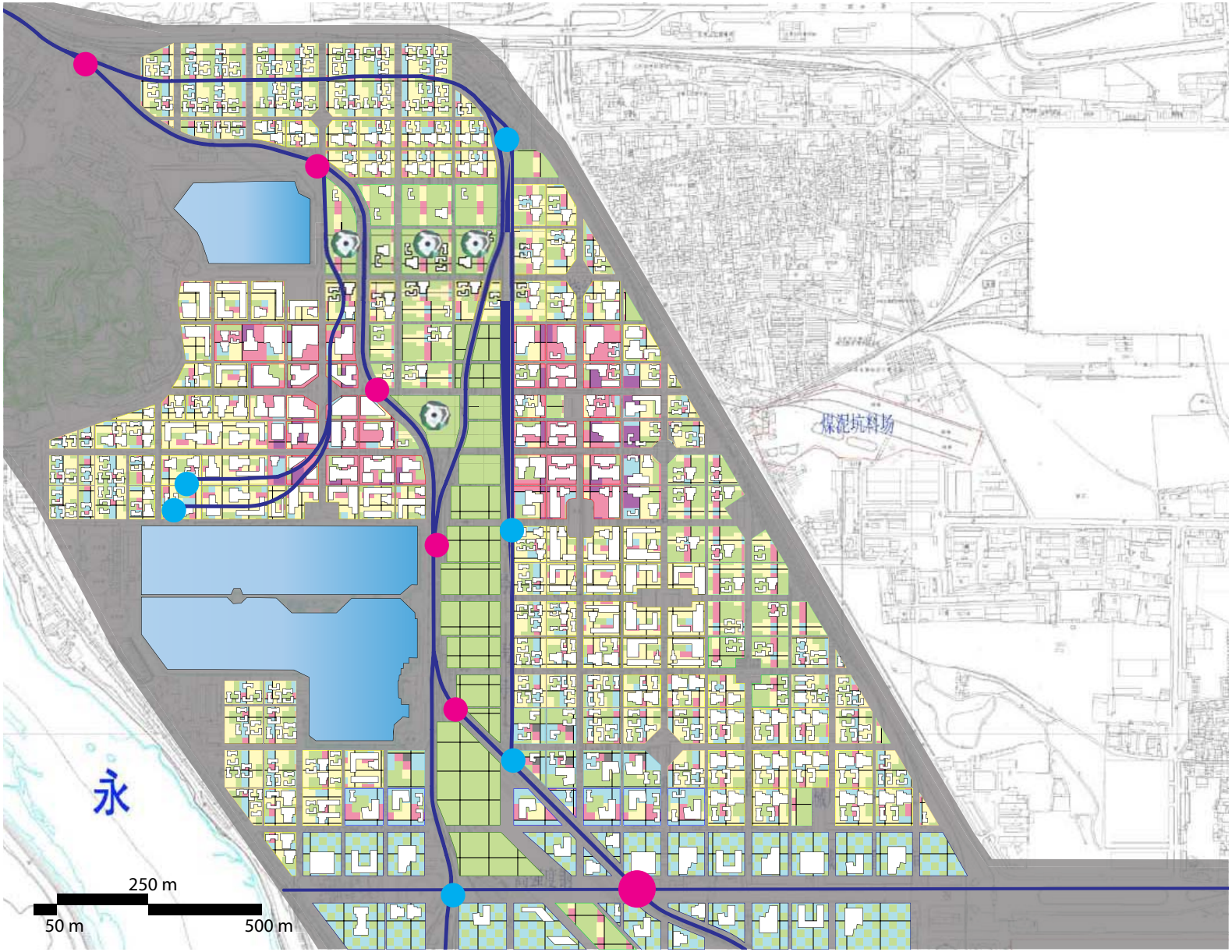


keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



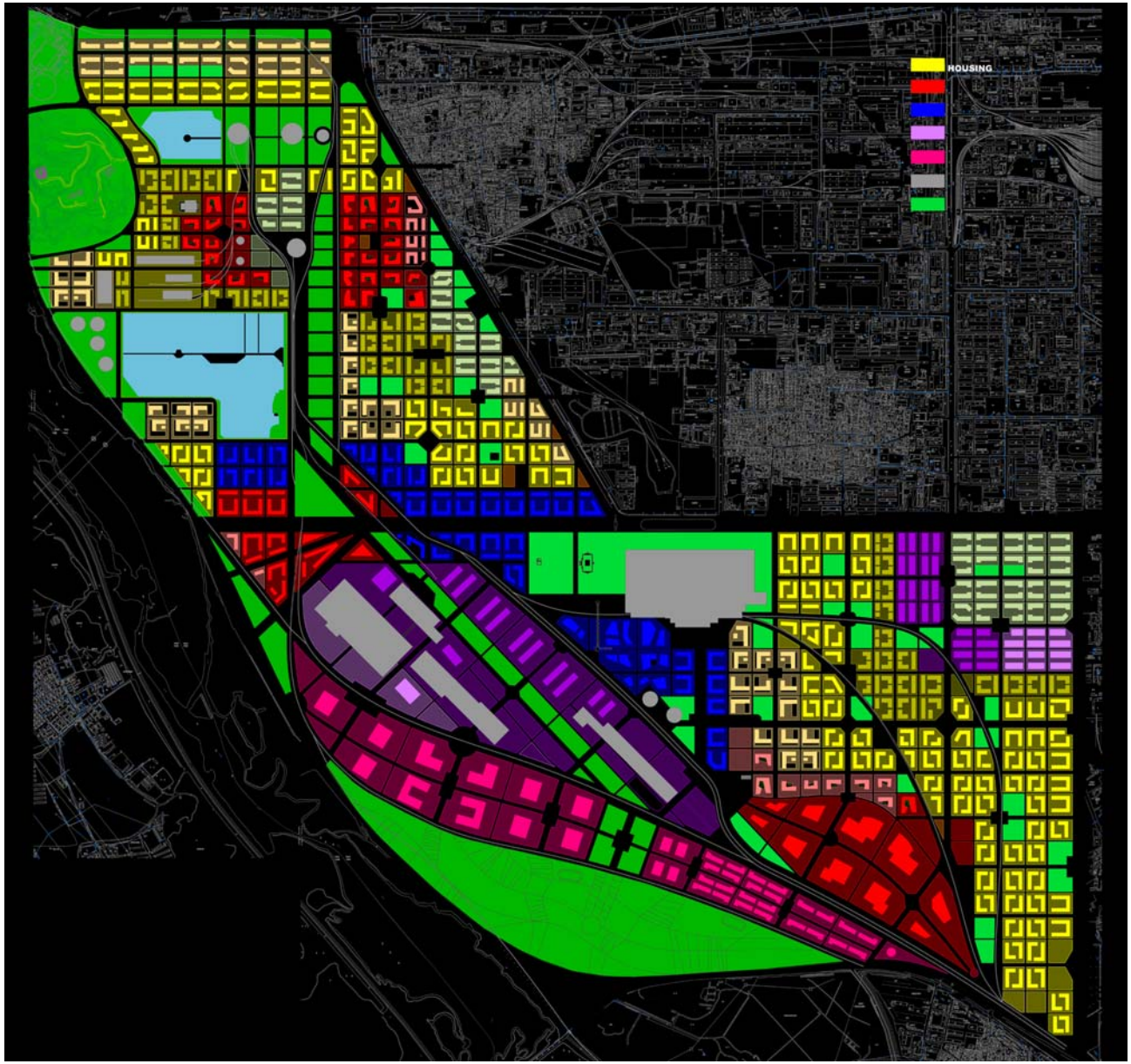
long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



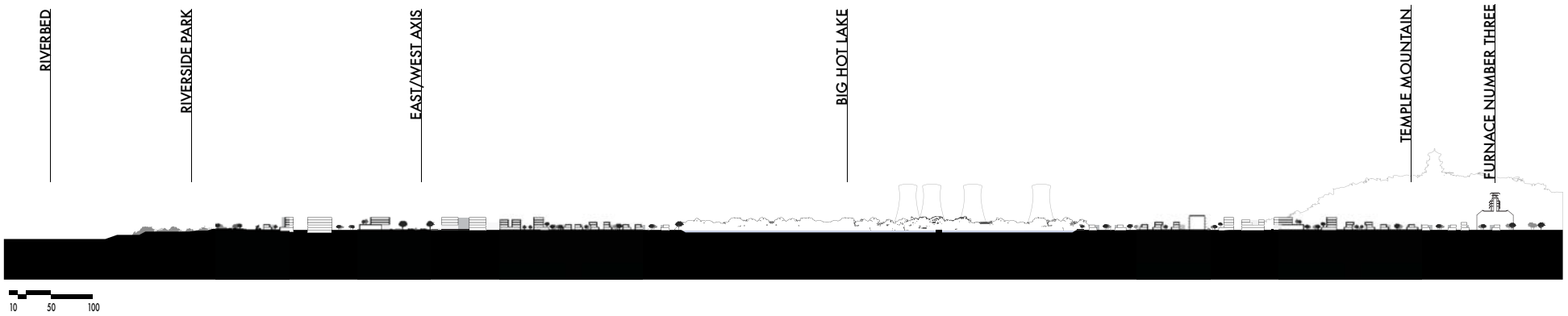
long narrow strip

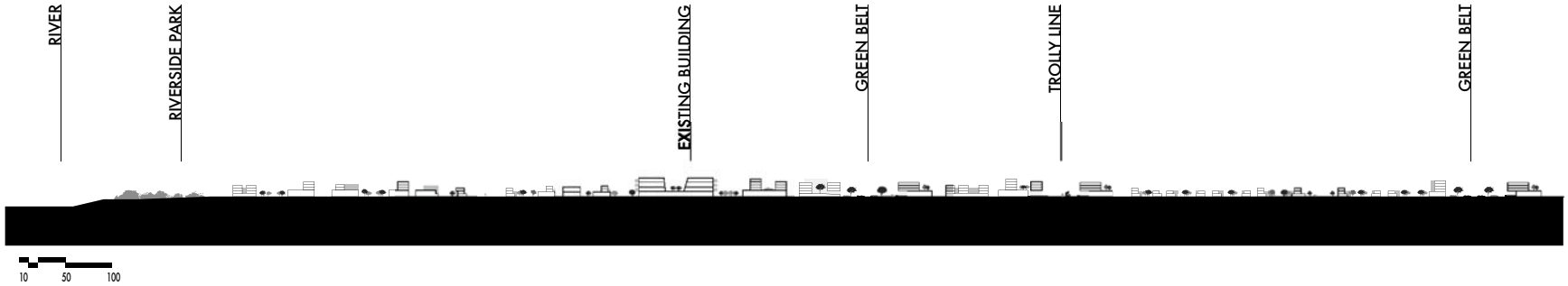
keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

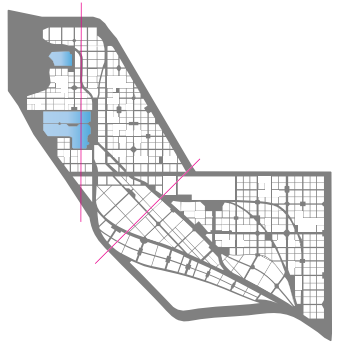


keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

prototypical site sections





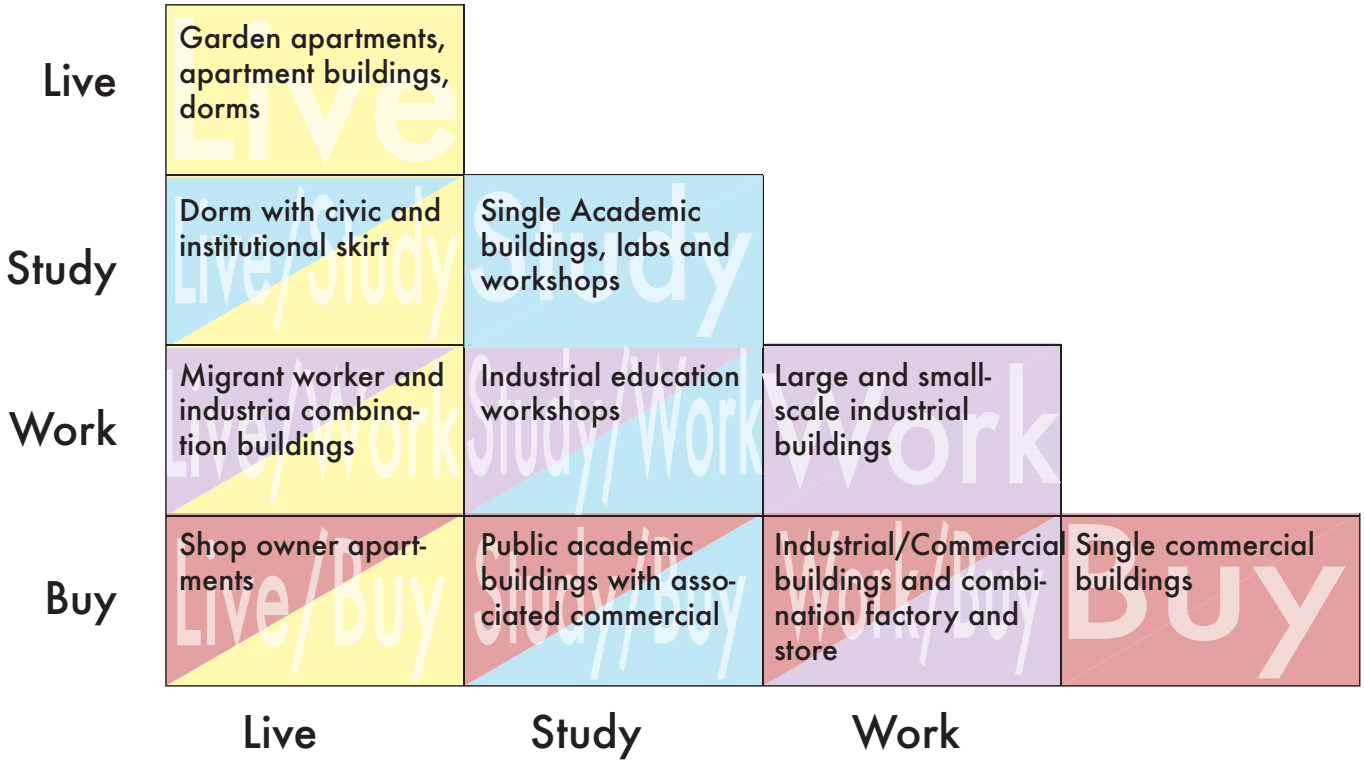


long narrow strip

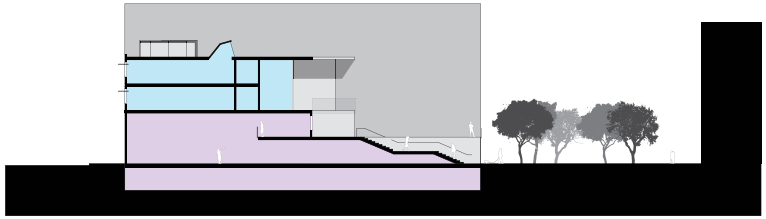
keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

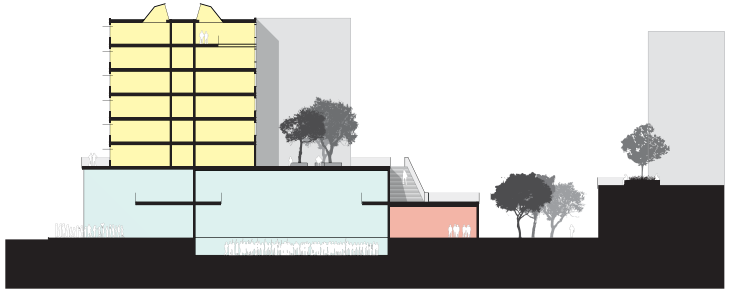
Mixed Use

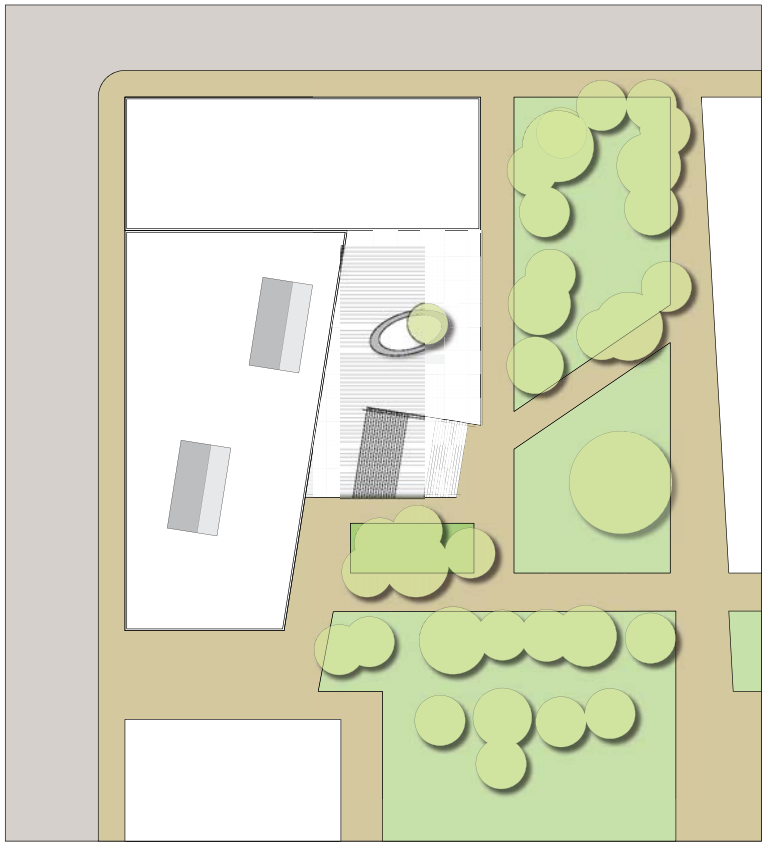
The success of a mixed use block depends on the logical integration of varied programs at the architectural scale. While not every combination may result in a new architectural prototype, understanding the way that two distinct programs will interact is crucial to plan a system of growth based on flexible modules whose function is constantly changing.



keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

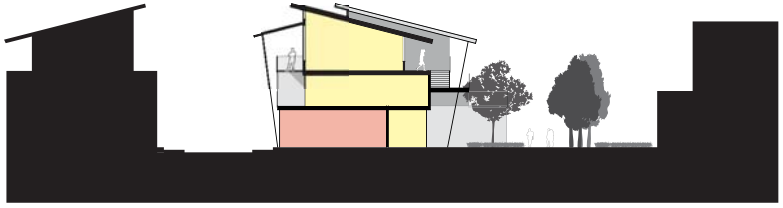






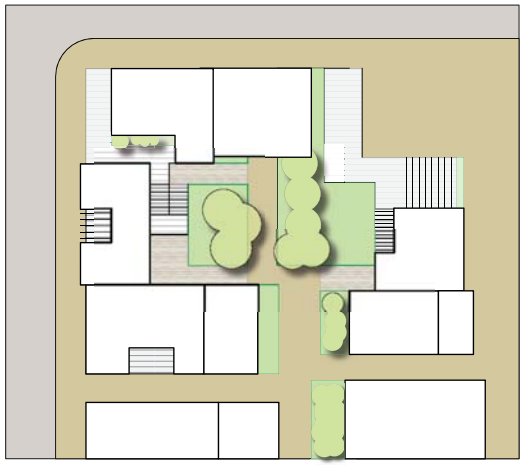
long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



1 5 10

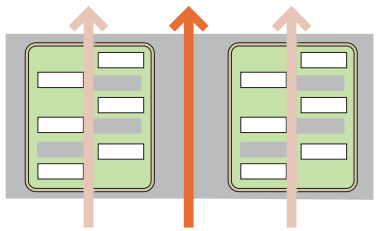
1 5 10

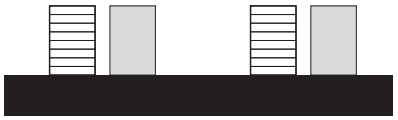


long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

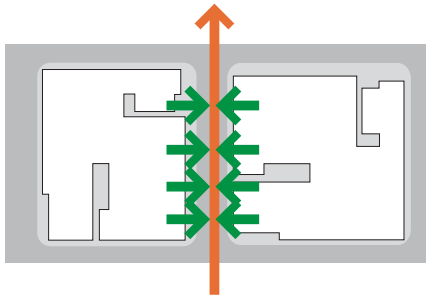
diagram of mixed use building typologies

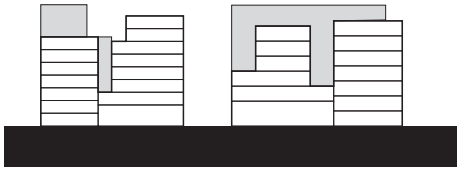




Beijing

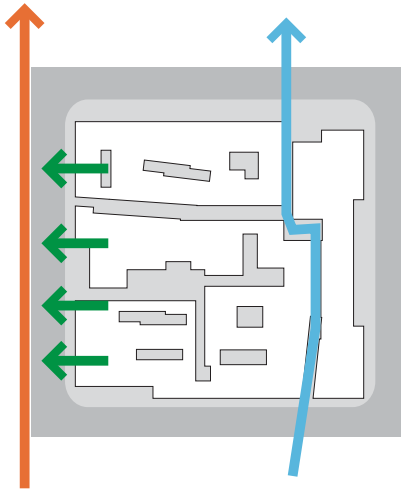
Currently in Beijing, and around the Shougang site, the city has developed according to the tower in the park pattern, where there is little hierarchy in terms of road width or treatment between circulation within and between developments. Generally and programmatic uses are not mixed and the space between the towers are reserved for parking and limited recreation.





New York

The hierarchy between roads and alleys is extreme in New York City. There is little public access through or into the block, rather major and minor circulation are organized by the surrounding streets. Commercial fronts the surrounding streets exclusively or develops upward within the building. Programs are striated and stacked through the building, but not mixed.

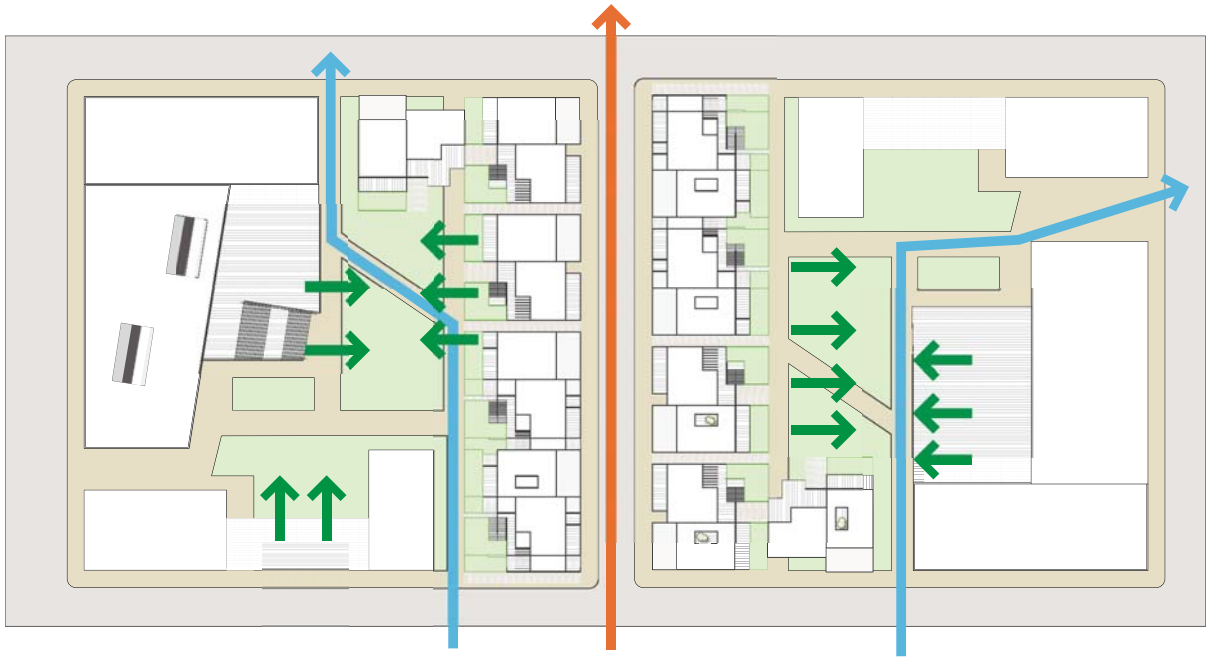


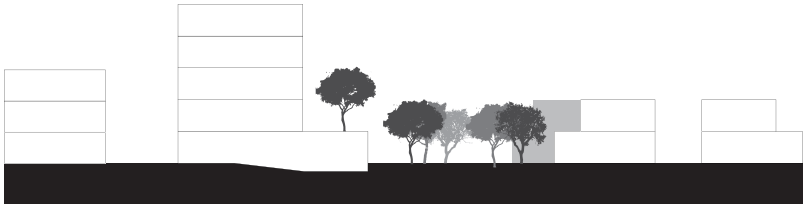
Hutongs

In the hutongs there is a clear hierarchy between public and semi-public circulation. Commercial fronts the surrounding streets, which are busier and more direct. Individual houses are accessed from serpentine lanes that create spaces for semi-private functions.

long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

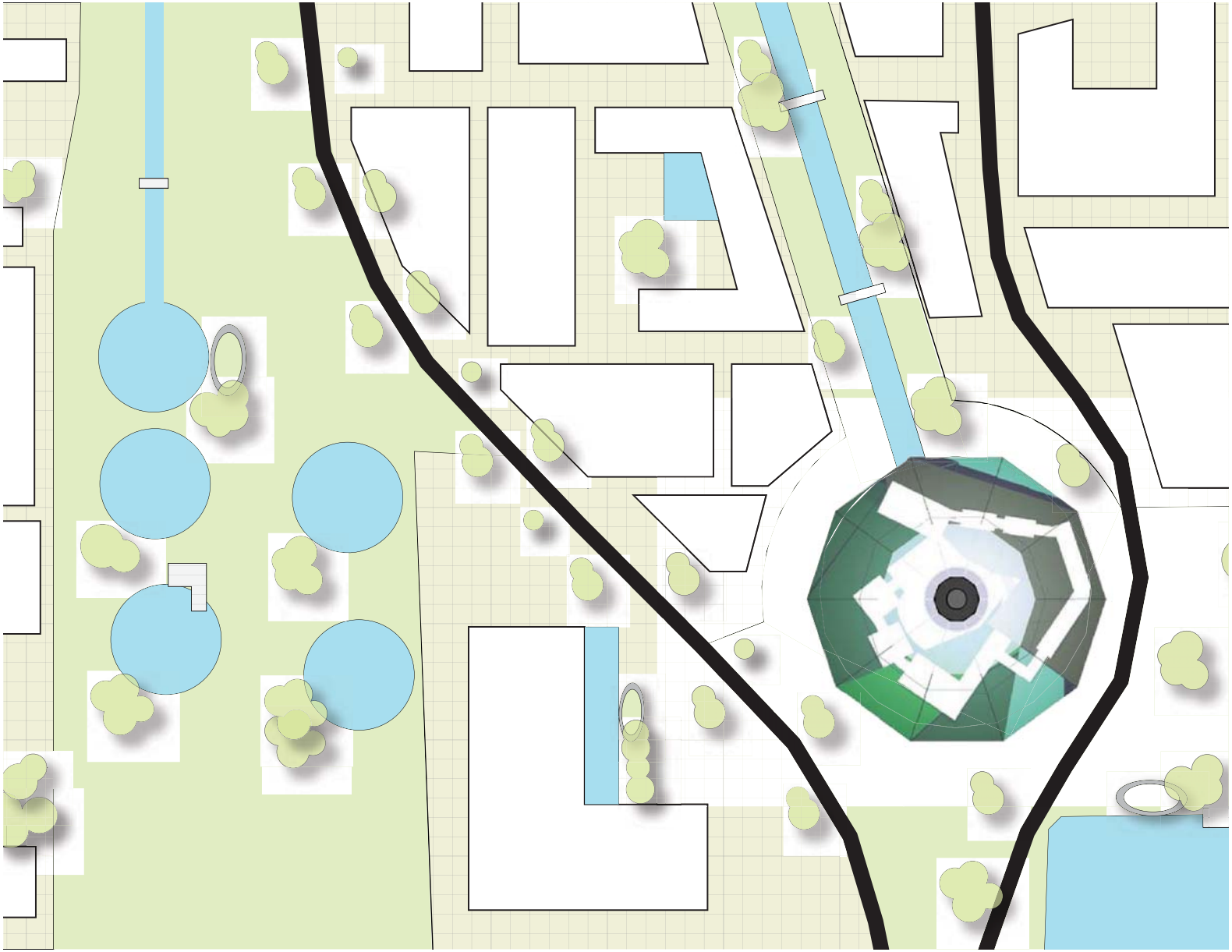




Shougang

The intention of this project was to develop a new typology of block that combines elements from contemporary urban models as well as more traditional, human-scaled precedents. In order to create flexible modules that could adapt to any combination of mixed uses within the block, the main circulation is directed through the center of the block, serving as access, greenspace and buffer between the program elements. The surrounding streets are linear and direct to facilitate bicycle and small vehicle traffic, but are narrower and more closely resemble alleys. An architecture that steps down towards the center of the block and crenallates provides more surface area for commercial frontage as well as the opportunity for semi-private spaces in front of residences.

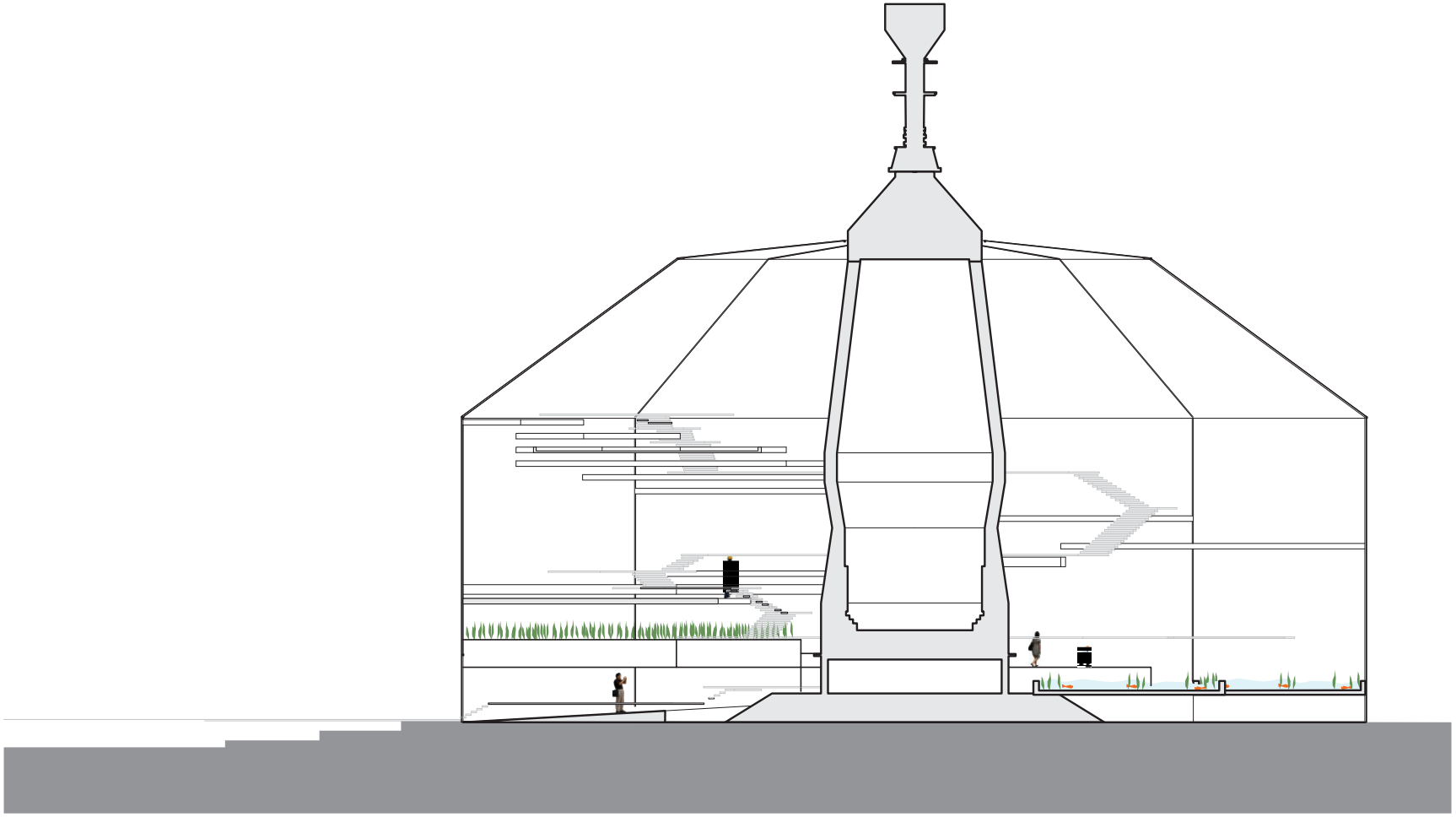
keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



long narrow strip

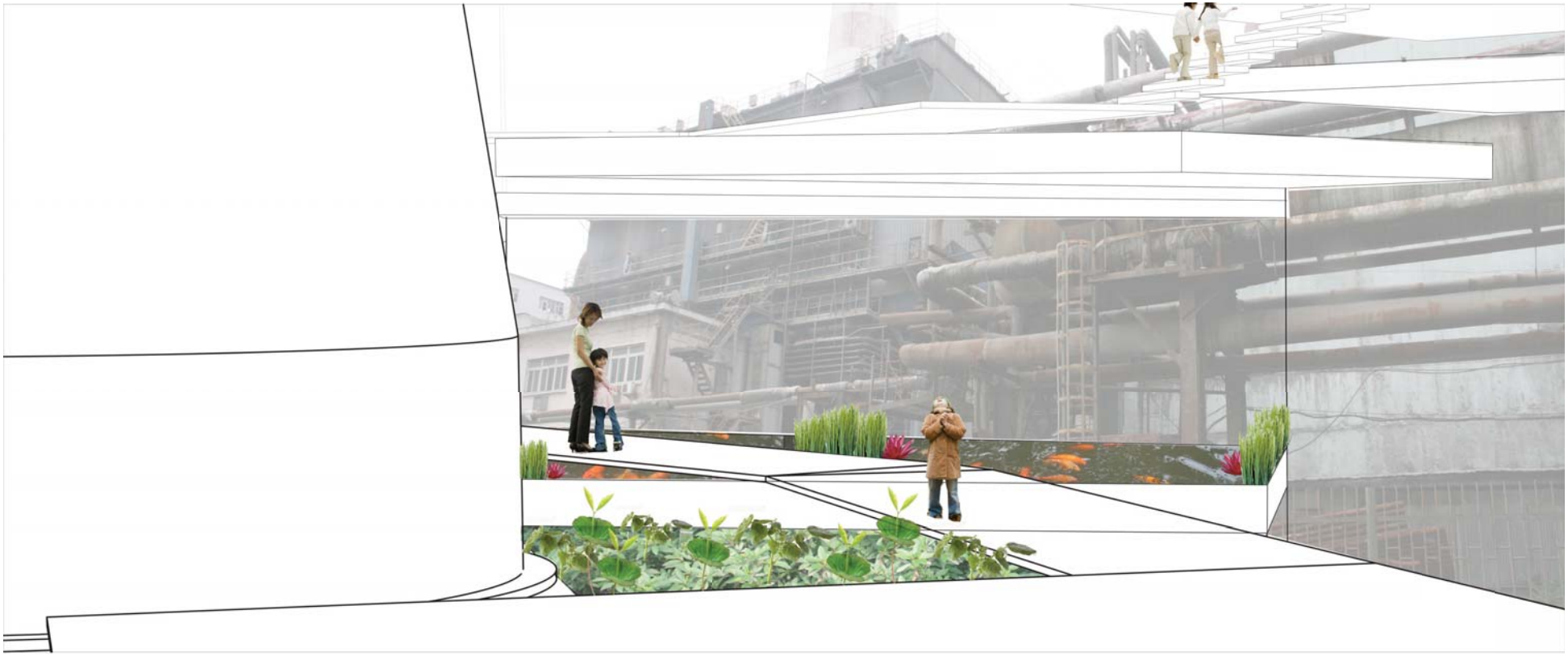
keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

furnace # 4 as a living machine - section



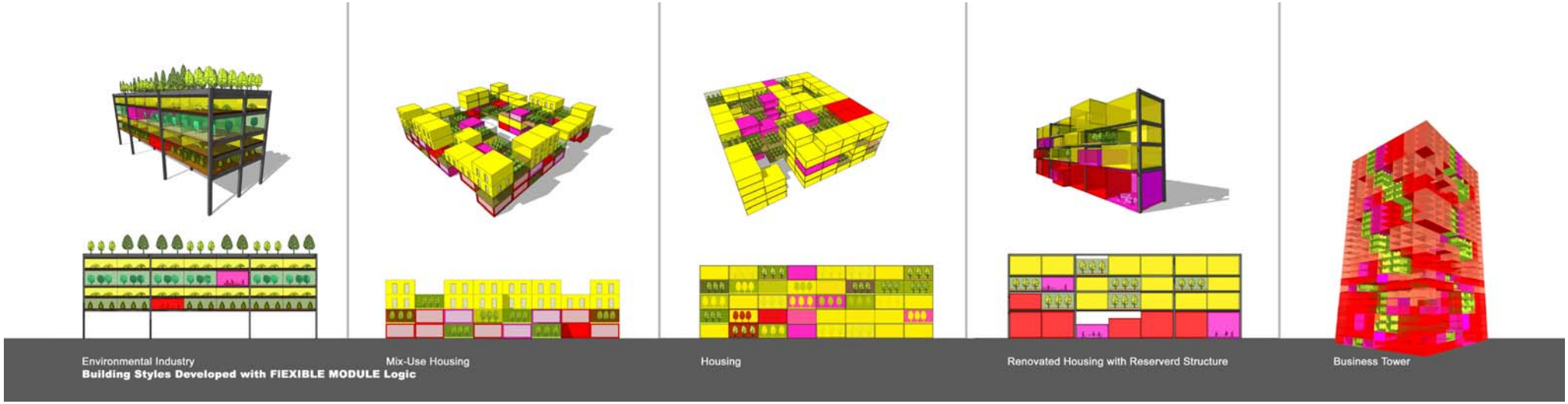
long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

flexible module building styles

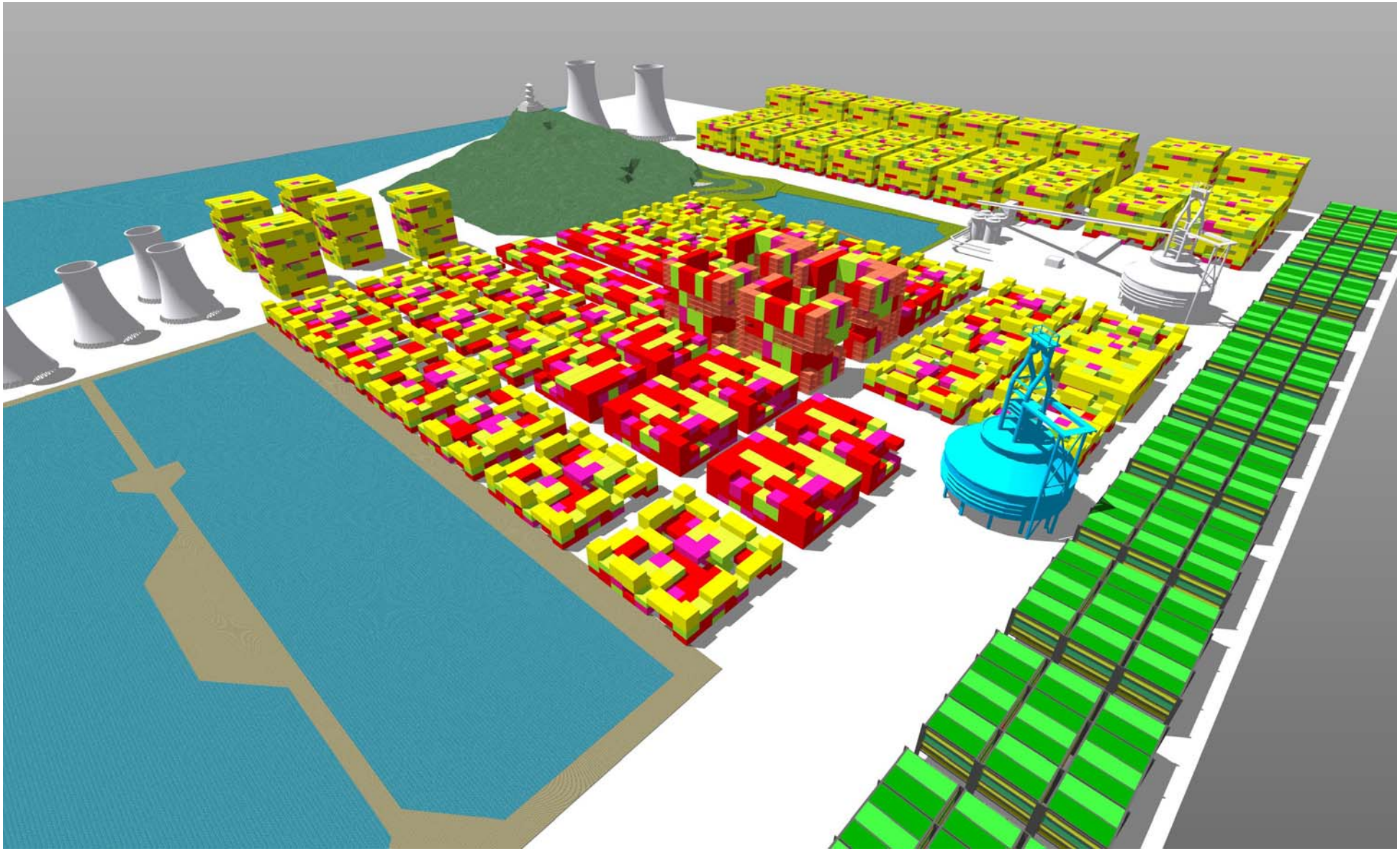


long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

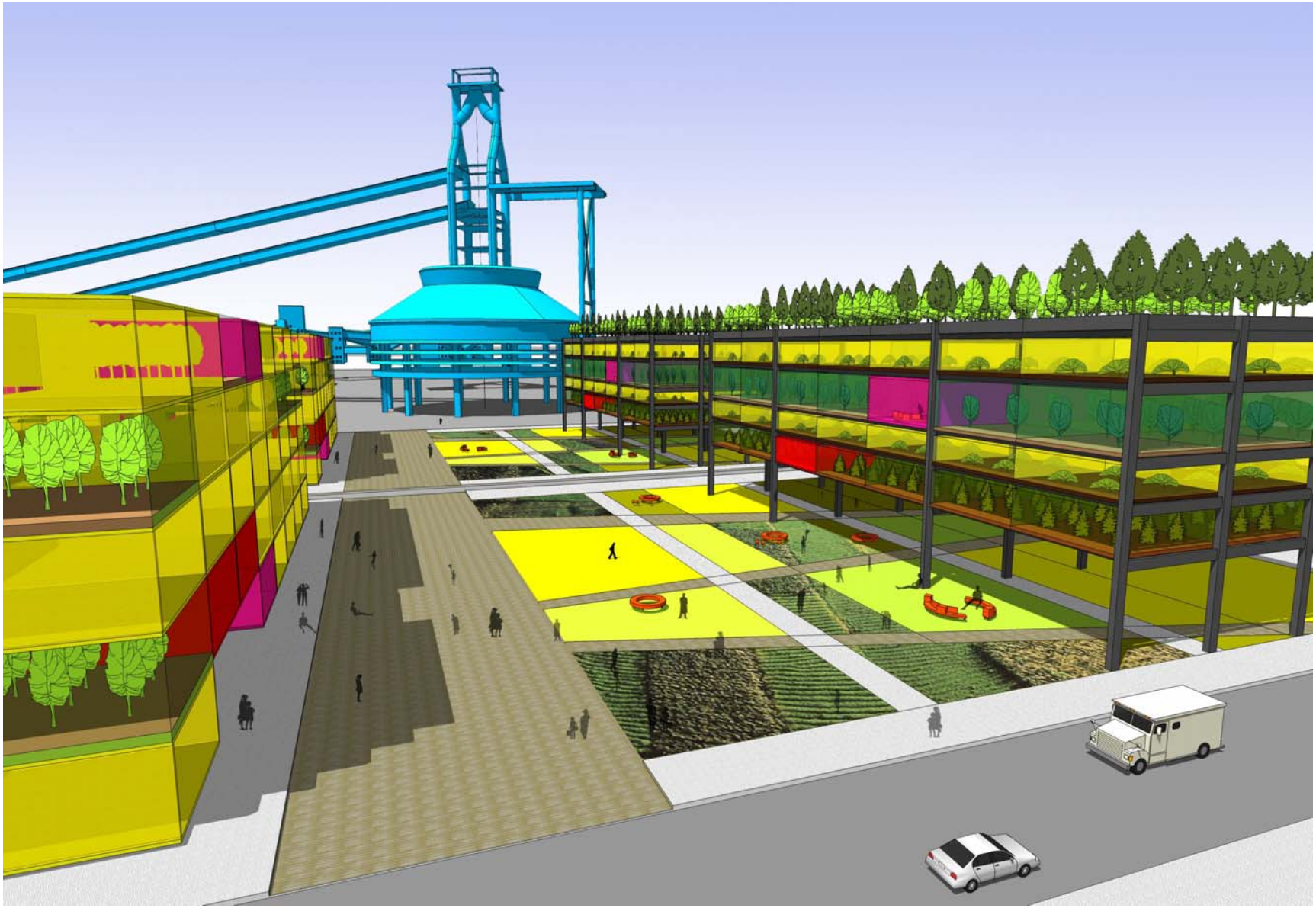
keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



long narrow strip

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond

keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond



keith case - zhang ruoxi - ma xiaoying - kristina katich - marissa grace desmond