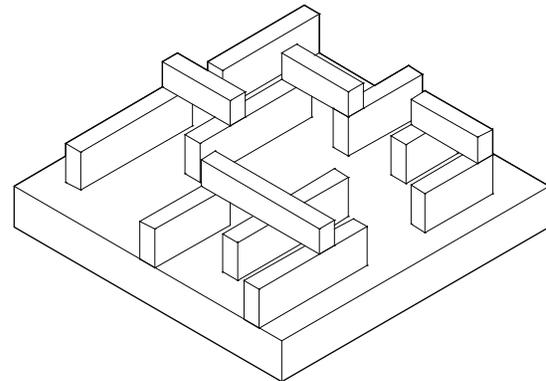


CRISS CROSS 3

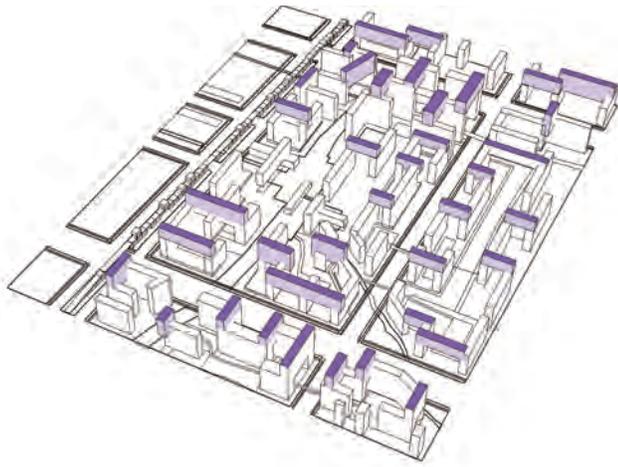
The proposal for a new central business district illustrated in this prototype offers an alternative model to contemporary high density city design in China. Inspired by the “Old Commercial Center” of Jinan, which is organized on a rectilinear grid, CrissCross integrates land uses within a new building envelope formed from a hybrid of east-west and north-south structures.

Lower level north-south structures contain offices, commercial functions, and all of the employment opportunities found in business center. These are connected at the upper levels by east-west residential structures. This enables residential development—which must orient south—to coexist with commercial development yielding a highly integrated and efficient urban matrix.





3.27. The Linked Slab building, the basic unit of the Criss-Cross cluster typology



3.28. A heterogeneous grid of perpendicular buildings

GENERATIVE IDEAS

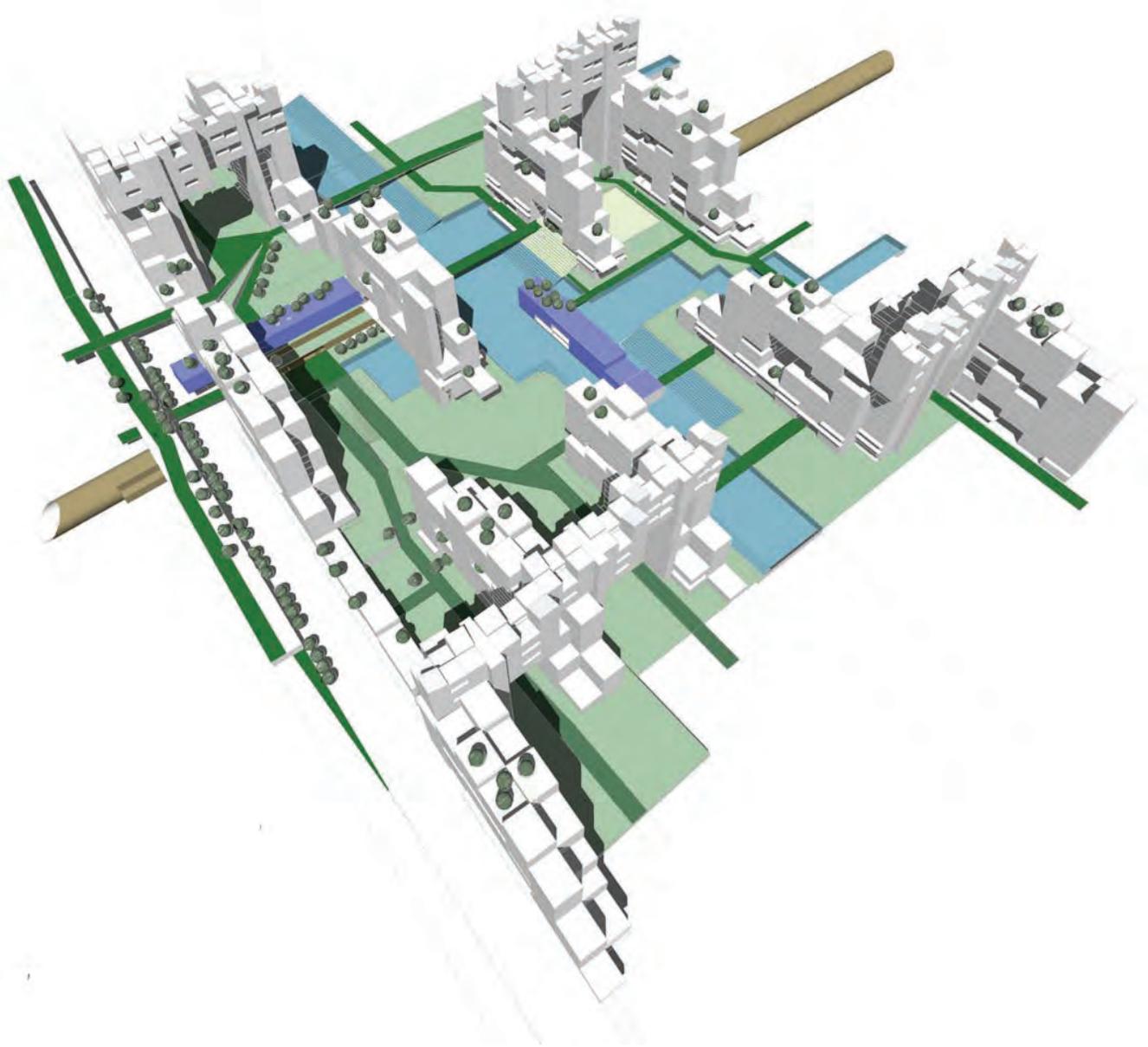
The mixing of a central business district with a substantial residential community—including supporting institutional and civic programming—creates the potential for a vibrant environment that is inhabited throughout the day and night by various user groups. Nodes are created within the Crisscross form to support different civic functions. For example, the plan illustrates a regional cultural center for Jinan, organized around a transit stop and major water feature at the center of the site. The center is linked to other community nodes by the main canal and intersecting east-west branches. These waterways break down block sizes without the addition of vehicular roads and organize a network of pedestrian and bicycle paths that connect the clusters. The emphasis on pedestrian and bike circulation creates the potential for a scenario



3.29 Site plan showing N-S slabs and suspended E-W links

in which biking or walking is actually more time-efficient than driving. Additionally, the canals organize a rainwater collection and grey-water reclamation system across the site to provide useable water for urban agriculture.

Other major site features are illustrated in the diagrams. Commercial buildings are oriented north-south in the southern portion of the site, allowing southeastern summer winds to penetrate the development. Atop the commercial buildings, east-west oriented residential wings become gradually taller from south to north across the site to capture maximum sunlight. In the northern area, the orientation of commercial structures also becomes east-west to block winter winds.



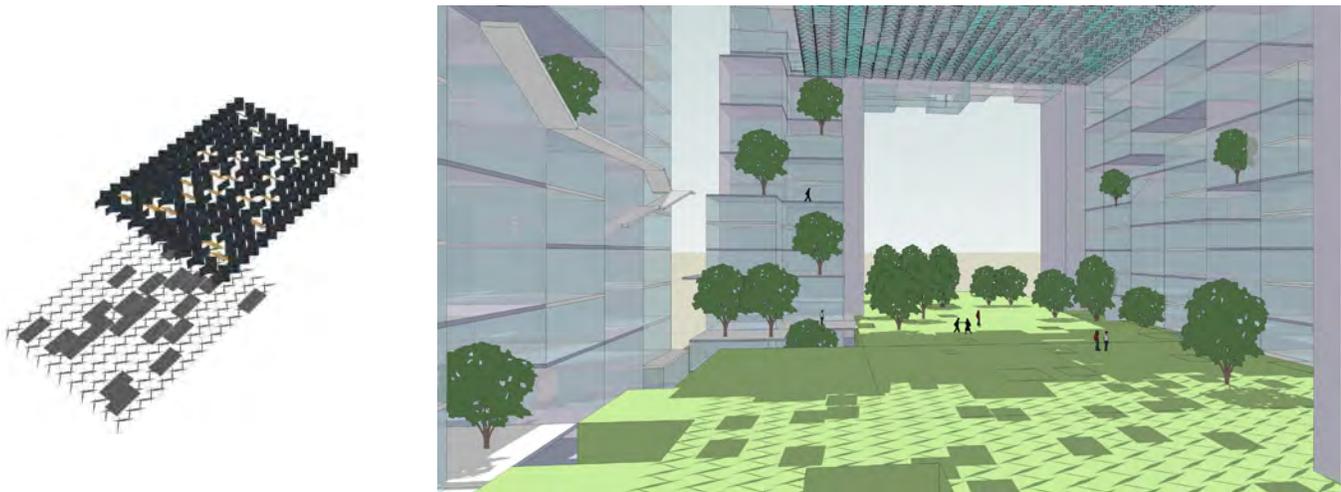
3.30. Bird's eye view showing green spaces, non-motorized circulation and a finely textured building envelope



3.31. Section showing the distinct levels at which outdoor life takes place at the variation of the ground plane



3.32. Section detail



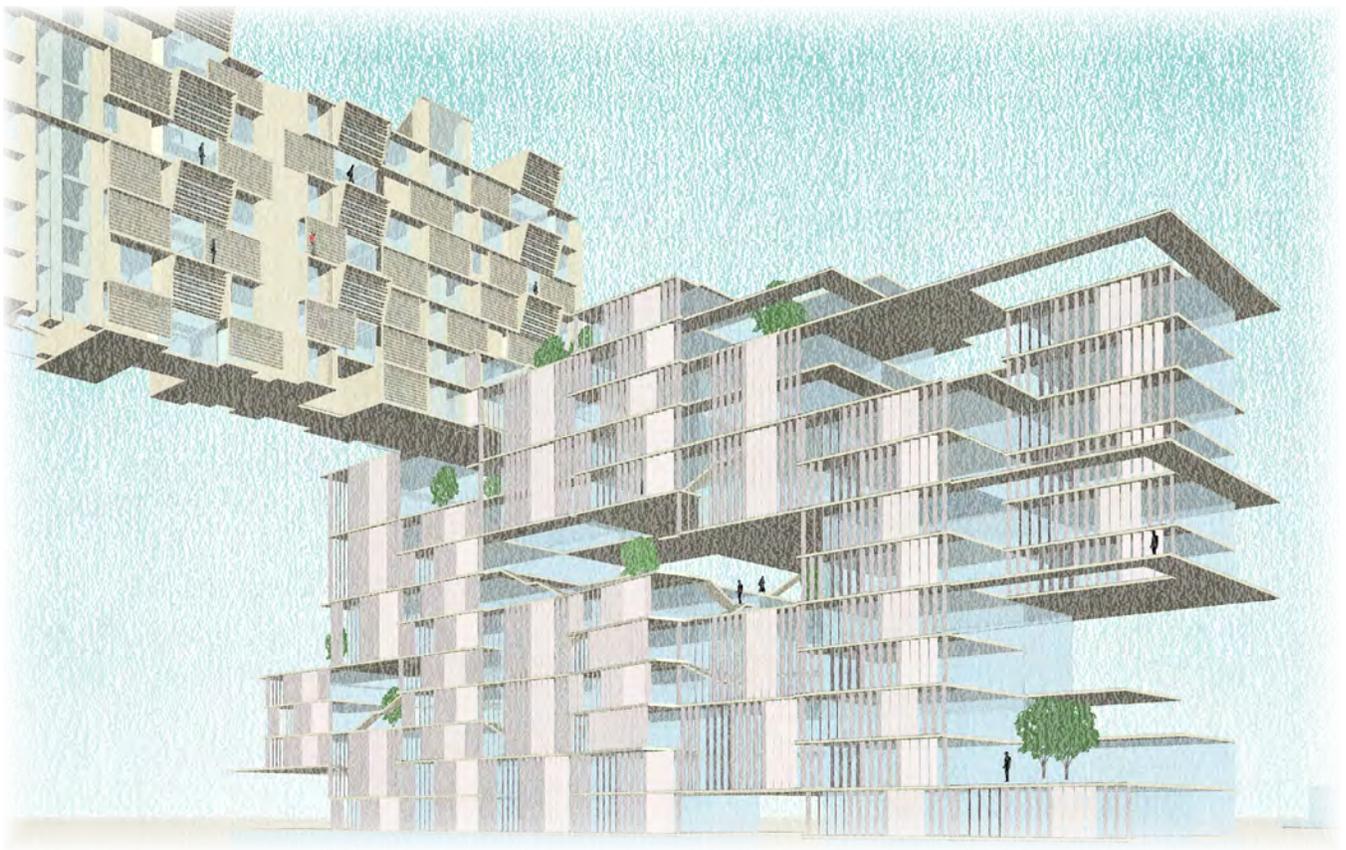
3.33. Public space. Shading devices also serve as solar collectors

Both man-made and natural ecological systems support new ways of living and working that reduce incentives to use the automobile yet increase time-efficiency between neighborhood centers and transit stops. Parking, accessible only from roadways along the perimeter of the site, is located in ground-level garages that underlie each of the clusters. The ground level garage structures reduce the need for excavation and ventilate naturally, lowering embodied and operational energy costs. Their roofs are planted to

create raised courtyards designed to offer recreational opportunities and landscape elements that moderate the microclimate.

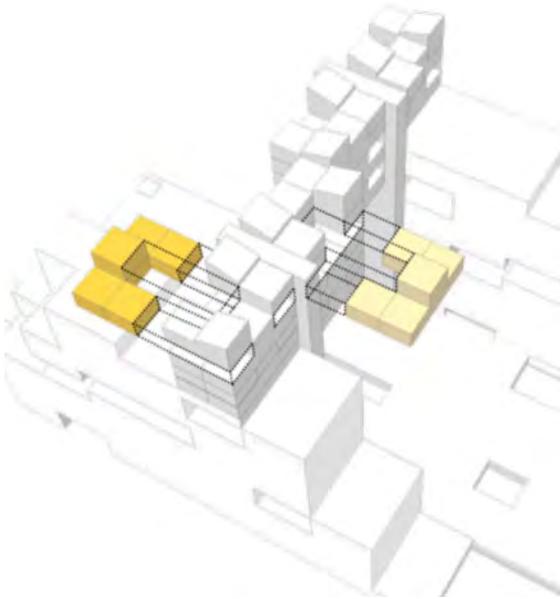
BUILDINGS AND SPACES

The building articulation suggests perforated and terraced building structures that increase ventilation across not only individual buildings but the overall site. On the building scale, vertical louvers are incorporated along the east and west facades of commercial and



3.34. Detail of the meeting point between a slab building and the elevated link

office building structures to shade interior spaces from sunlight. Correspondingly, horizontal louvers are incorporated along the north and south facades of residential building structures. The elevations designed for all units optimize cross-ventilation.



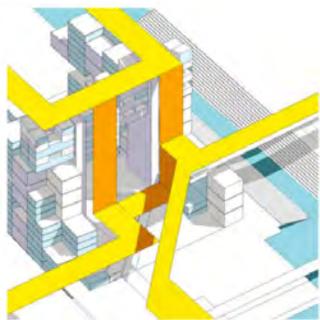
3.35. Individual units assemble into a whole.

On the site scale, a system of moveable shades cool and protect open spaces in the clusters. The CrissCross form creates a variety of outdoor spaces for public, semi-public, and private activity. Outdoor green spaces of various sizes, introduced at multiple elevations and integrated with design elements that capture rainwater, support opportunities for agriculture, horticulture, and community recreation. The interaction of the outdoor with indoors spaces, the interplay of canals and greenways and considerations for sunlight exposure and natural ventilation are the driving forces behind the design.

The buildings create a three-dimensional urban environment including all of the functions of living. As shown in the diagram, retail, service uses and parking occupy the lower levels of the complex. Office and institutional spaces come next, concentrated in the north-south wings. Residential apartments are located at the top, linking the complex together. In between the residential and office wings are “live-work” units designed to service the growing trend toward at-home employment. Living and working units are designed to be flexible over time and to optimize sunlight and



3.36. Different sectional layouts of individual units



3.37. Circulation

3.38. Axonometric showing assemblage of distinct unit types

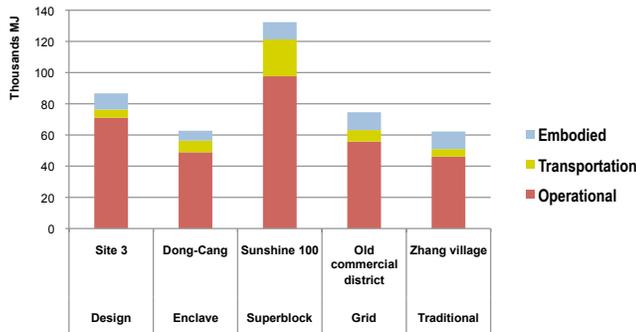
natural ventilation. To respond to the unique needs of the Chinese household, where multiple generations often live in one apartment, the units are designed to allow transformation over time. Vertical transportation and movement is shared by all the uses, creating a complex but efficient 3-D public realm

The CrissCross prototype achieves an FAR of over 4.0 and much better energy performance than observed in typical high-rise developments in Jinan, yet it provides all of the mixed use metropolitan lifestyle found in the Old Commercial Center; in sum: a new urban center for the 21st century.

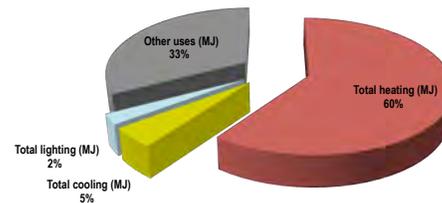
KEY FORM-ENERGY CONCEPTS: CRISS-CROSS

- Vertically integrated urban uses are incorporated with a new hybrid building envelope formed by the intersection of east-west and north-south structures. The resulting high-density form is highly integrated and efficient, promoting a livable, vibrant 24 hour urban environment.

- East-west oriented residential wings are situated atop commercial buildings to allow maximum daylight exposure.
- Commercial buildings are oriented north-south in the southern portion of the site to allow southeastern summer winds to penetrate the development, while on the northern portion of the site, programs and placements are reversed to block northern winter winds.
- Buildings become gradually taller from south to north across the site in order to capture maximum sunlight.
- Flexible and temporal spaces adapt to changing needs across seasons and over time.
- Nodes of activity in the community are connected by the canal system, which also defines a bicyclist and pedestrian transport system that emphasizes the non-vehicular transportation
- The canal system also accommodates rainwater collection and grey-water reclamation to support new endeavors in urban agriculture.

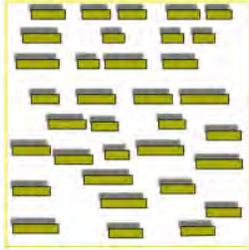


3.39. Annual energy consumption per Household (MJ)



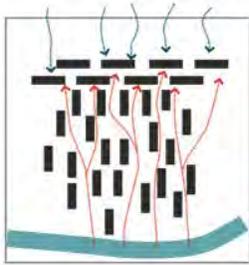
3.40. Annual operational household energy consumption by use

SITE SCALE



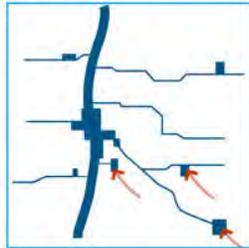
Residential facades face north and south to ensure natural daylight for residents.

住宅向北朝南为了确认日光的渗入



Building masses are oriented north-south at the southern portion of the site to allow south-eastern breezes to penetrate the site in the summer. Buildings oriented east-west along the northern edge block northern winter winds.

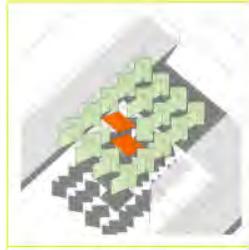
地段南部，建筑设计为南北向，如此可使东南风在夏季渗入建筑群。位于地段北边的建筑为东西向，用来阻挡冬季的北风。



Large pools of water to the south-east of each neighborhood passively cools wind as it passes over.

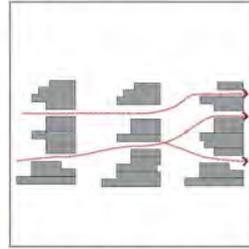
东南处的大型水池无形中为通过的风降温。

CLUSTER SCALE



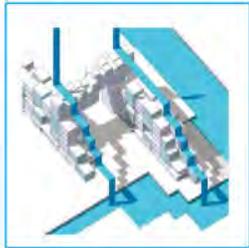
Courtyards can receive a canopy structure of photovoltaic and shade panels. Panels are oriented to let light through during the winter, block light in the summer, and capture solar rays throughout the year.

广场上方将有一个伞盖状的遮阳板。遮阳板的设计会使冬天的阳光可以射入，而阻挡夏日的阳光。



Buildings are perforated at multiple levels to increase natural ventilation through the site.

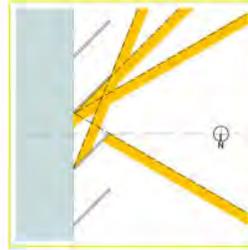
建筑的穿孔设计以及多阶段设计增强真个地段的自然通风系统。设计的独立的住宅和办公单元可由开窗处进行通风。



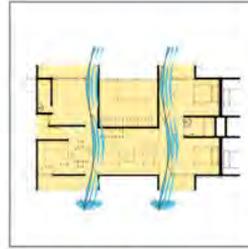
Building terraces capture and filter rainwater, and canals store water to be used at a later time.

梯田状建筑可存储和过滤雨水，储存于水渠之中，以备后用。

UNIT SCALE



Commercial facades are enclosed with vertical louvers, while residential facades receive a horizontal louver treatment. 商务区正面为垂直遮阳板，住宅区则设计为水平遮阳板。



Individual living and working units are designed with floor plans and fenestration to allow for natural ventilation.

建筑的穿孔设计以及多阶段设计增强真个地段的自然通风系统。设计的独立的住宅和办公单元可由开窗处进行通风。



SUNLIGHT
日照设计



WIND
通风设计



WATER
水体设计

3.41. Overview of energy strategies and their physical embodiment