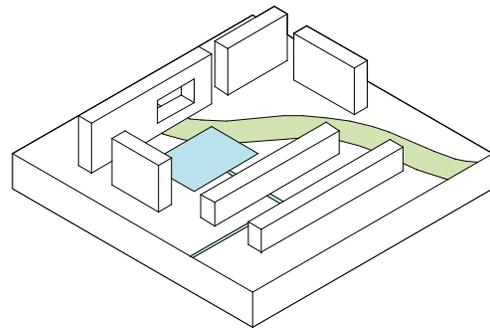


RE-INVENTED ENCLAVE 1

This project takes as its inspiration the many enclaves of walk-up slab buildings that blanket Jinan and much of China. As we learned from our study of Dong-Cang and other enclaves in Jinan, the simple, repetitive urban form is actually quite energy efficient. This is due partly to the buildings which have no elevators and orient south to receive good sunlight and ventilation. An equally significant factor is that the neighborhoods have been adapted over time to improve the private and public living space of the residents, and to mix in uses—shops, schools, health centers,

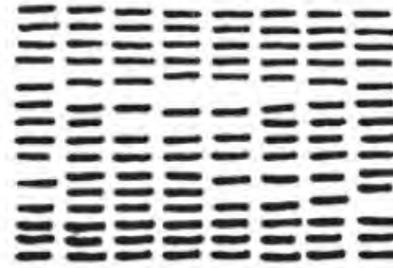
restaurants—reducing travel and making the enclaves both more livable and energy efficient. The Reinvented Enclave leverages the good aspects of the typology to create a more advanced urban form. The scheme embraces simplicity and repetition, but introduces site features that break the uniformity of the system. These involve changes in topography, wind courses, water courses, and nodal spaces that serve multiple needs. Vehicular traffic is deemphasized while providing for bikes and pedestrians. Finally, the building type has been reinvented to make more diverse, livable, and efficient dwellings.



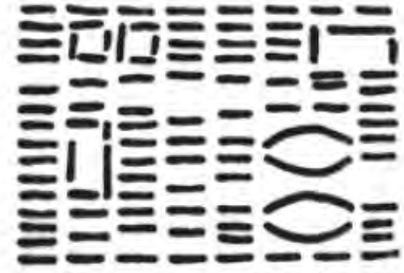


3.2. Overview rendering showing landscape and architecture adaptations allowing water and wind flows respectively

TYPICAL ENCLAVE



REINVENTED ENCLAVE



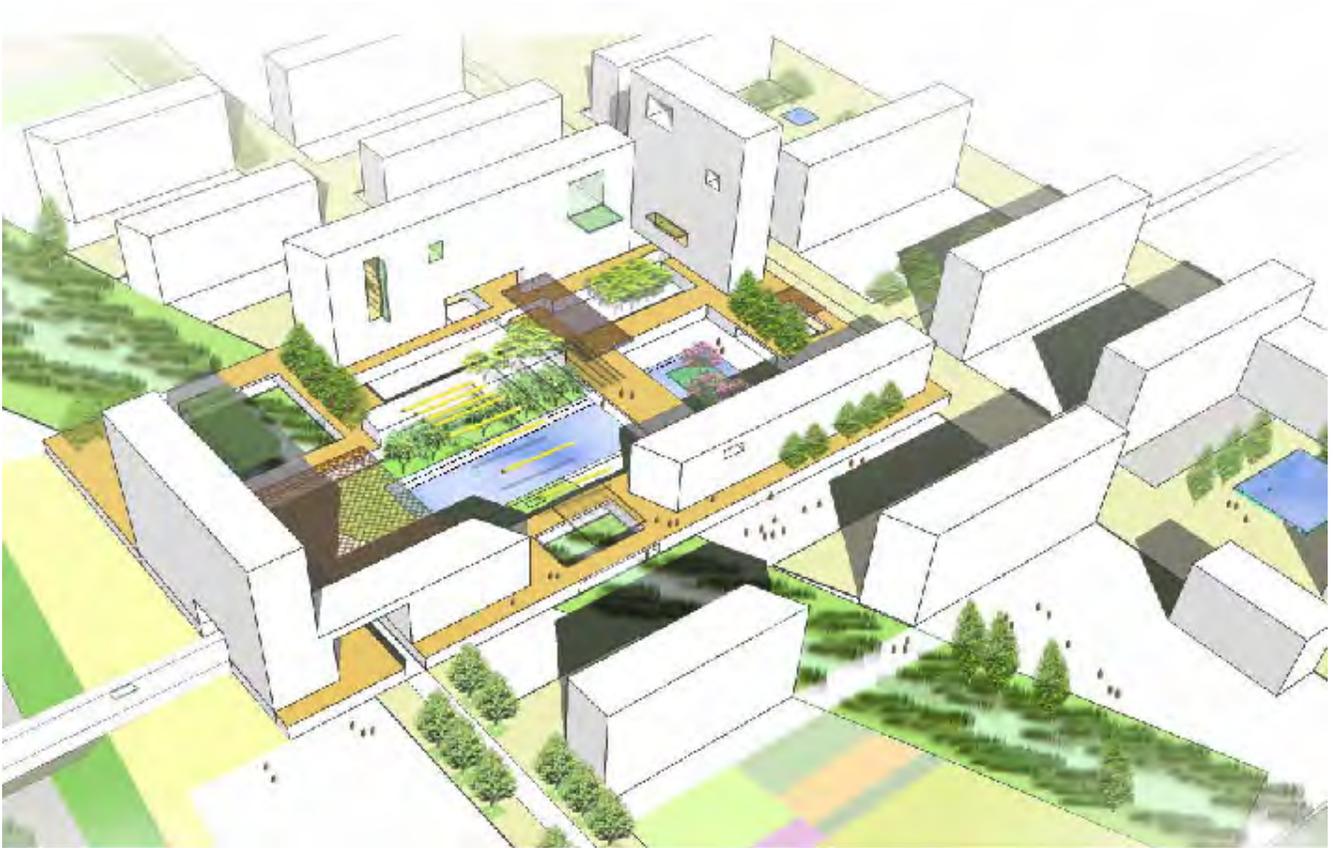
SITE ORGANIZATION

Generative ideas for the form are apparent in the neighborhood scale plan. A semi-grid of blocks provides the framework for horizontal slab buildings facing south. These are interrupted by wind and water features which introduce diversity and a higher level of organization to the site. A wind course and greensward cuts through the entire neighborhood, funneling summer breezes from the southeast that are cooled by water features. These water features in turn provide focal points for organizing “village centers” in the landscape, much as the ancient settlement of Jinan clustered around natural springs.

Day-to-day activities and amenities are clustered within these mixed-use village centers, accessible within a 5-10 minute walk from surrounding residences. The centers are connected by larger roads, but only limited parking is offered on site to encourage use of an extensive network of exclusive pedestrian and bike paths. Overall, the system blends a familiar type of housing and lifestyle with a higher level of amenities, technology, and energy consciousness.



3.3. Neighborhood plan



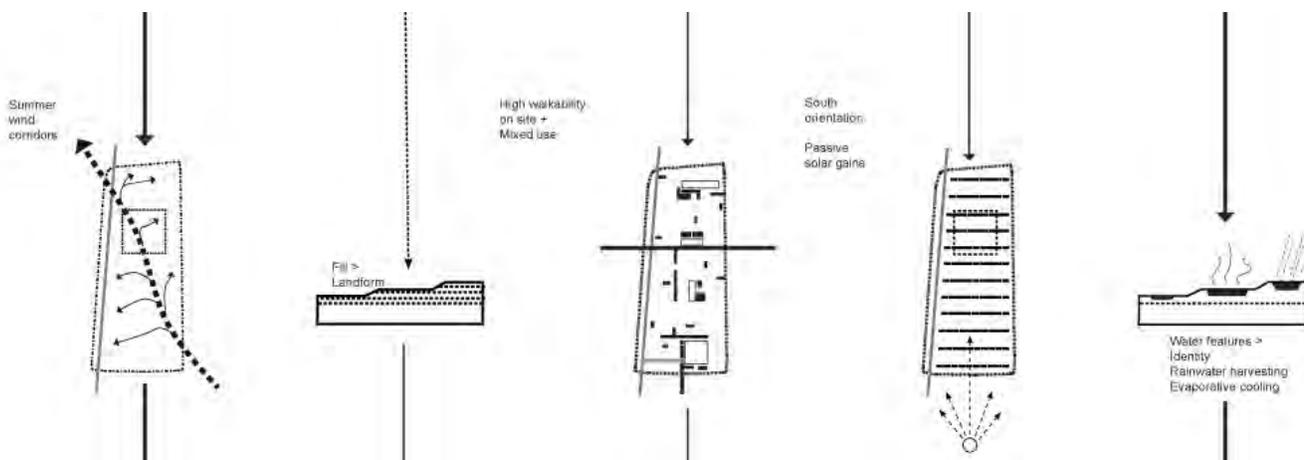
3.4. Bird's eye view of a building cluster surrounding an open space intended to mitigate the heat island effect

The view of a “village center” illustrates how these various features come together. The building cluster is organized around a body of water set within an outdoor community space. During the summer, evaporation fed by southeast winds contributes to a pleasant microclimate. During the winter, the water acts as a thermal mass warming outdoor spaces. Trees are complemented by a system of movable canopies that provide shade (or sun) and collect solar energy. Taller buildings on the north side of the cluster prevent cold northeast winter winds from entering the space, while shorter buildings located on the south side admit sunlight. Each center has a different character. One may serve the entire neighborhood with offices, markets, shopping, a movie theatre, cultural institutions, and school. Others would be more locally oriented, including such services as a kindergarden, health center, post office, and convenience store.

A key feature of the concept is to create an artificial topography on the site and reduce its embodied energy by making innovative use of construction debris. Currently, the site is covered with a deep layer of rubble left from the demolition of prior buildings and roads. Typically, such rubble is trucked away and either deposited in landfills or reclaimed as construction material, requiring an enormous expenditure of energy. The Reconsidered Enclave project proposes an alternative approach of reclaiming the rubble on site to form gabion building blocks and to re-shape the topography.



3.5. Existing site rubble



3.6. Energy strategies at the neighborhood level



3.7. Neighborhood bird's eye view showing how the aggregate urban form can serve to funnel and harness predominant winds



3.8. Neighborhood bird's eye view showing how the aggregate urban form can serve to funnel and harness predominant winds

As illustrated in the section, the rubble would be graded to gradually slope from a high point on the north edge of the site to the natural grade at the southern edge and covered with clean earth. The resulting landscape would augment natural water flows, but also reinforce the desire for greater exposure to desirable southern winds and sunlight. In the design, water serves as a functional cooling feature as well as an aesthetic landscape element. The slope of the new ground provides a gravitational path for rainwater collection and gray-water infiltration across the site, reducing water consumption while increasing the amount of quality habitable outdoor space. As secondary benefit of using the rubble as fill, is that it greatly reduces the need to excavate for below-grade infrastructure, basements, with further saving in embodied energy.

These site moves, aggregated with the building and cluster design discussed above, result in an integrated form-energy system in which all the elements work together. As seen in the view, the greensward crosscutting the site serves multiple purposes: providing space for outdoor recreation and living (outdoor living rooms); a path for pedestrians and bicycles; a channel for natural water flow, integrated wetlands, and recharge; and a funnel for desirable southeast summer winds to help cool outdoor and indoor rooms. Five large wind turbines are strategically placed to harness predominant winds and mark the most important community spaces. These serve as symbols of the project.

ARCHITECTURE AND SPACE BETWEEN

This same integrated approach has been taken in the design of buildings and associated outdoor areas. Natural ventilation, and passive solar principles guide the building form. All are single loaded, and most are oriented south and spaced according to required sun-angle design regulations. Echoing the site theme, buildings are designed to naturally harvest rainwater and channel it by gravity to cool interior spaces. As illustrated in the view, small-scale water elements located on balconies and outside south-facing windows create a building-scale microclimate through evaporative cooling. The same water may be used to irrigate small gardens and green roofs, further moderating indoor temperatures and giving the buildings a distinctive appearance. On the interior, movable partitions allow for spatial flexibility while maximizing cross ventilation. Transom windows and adjustable elements remove warm air during the summer, or allow cool breezes to enter, part of a permeable façade system that can be adjusted to the climate and weather.

As seen in the section, buildings and adjacent spaces are designed to work together. Rain and grey water from the buildings and run-off from site are collected in pools, cleaned by natural means and recycled for use in the project. These same water features provide an amenity for the public environment. Moveable sun-screens shade the lower levels of buildings and adjacent outdoor spaces and double as solar collectors. The whole works as a lining machine to reduce resource consumption and enhance livability.



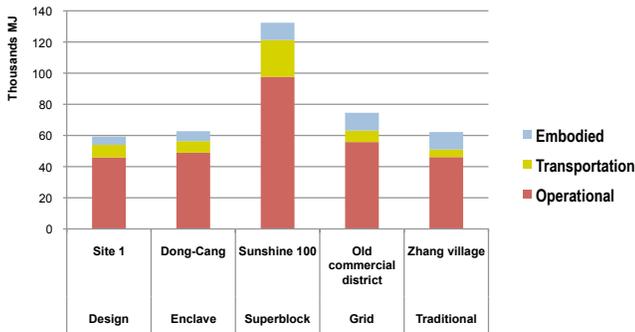
3.9. Detail of a typical building and its energy harvesting formal features



3.10. Cluster section illustrating water catchment area achieved through ground plane manipulations

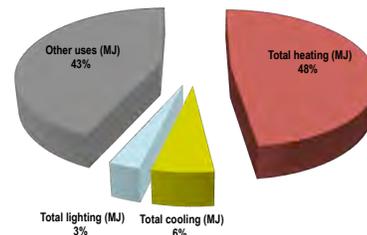
KEY FORM-ENERGY CONCEPTS: RE-INVENTED ENCLAVE

- The new urban form improves upon conventional enclave developments which are simple and monotonous but basically energy efficient.
- Site-wide features and “village center” nodes are introduced to add diversity and service community needs. Mixed uses in the village centers are convenient to residences and reduce the need for travel.
- Rubble that currently exists on the site is reused to configure topography and as a building material to save embodied and operational energy.
- An artificial sloped topography transforms the landscape to augment natural hydrological flows. The use of the rubble not only eliminates the need to excavate for below-grade parking structures but also acts to accentuate the benefits of wind and water ecological functions.
- The form of the new ground facilitates rainwater collection and greywater infiltration and remediation, therefore reducing water consumption.



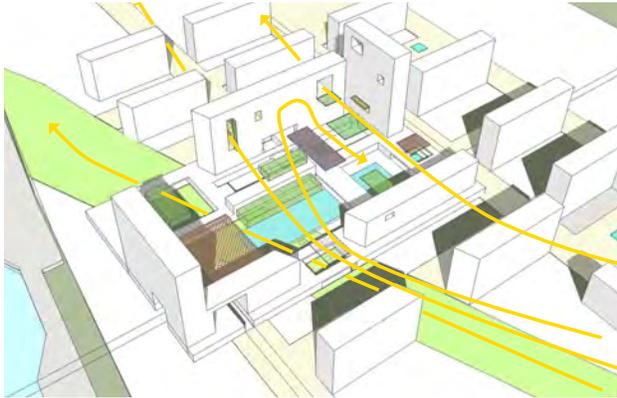
3.11. Annual energy consumption per Household (MJ)

- The urban form channels desirable south-east summer winds through the site to facilitate natural ventilation, while blocking undesirable cold north-east winter winds.
- The wind corridor also forms a greensward crosscutting the neighborhood, providing space for integrated wetlands, water features, and public open space amenities.
- Five large wind turbines generating electricity are strategically placed along the wind corridor to harness energy and mark important community places.
- Buildings are single loaded and most are oriented east-west and spaced according to required sun angle design regulations. Unique water and wind features incorporated into the design create a beneficial micro-climate.
- Reduced vehicular circulation is achieved through limited vehicular accessibility, an extensive bike and pedestrian system, and easy accessibility to all day-to-day needs.



3.12. Annual operational household energy consumption by use

WIND - SUMMER



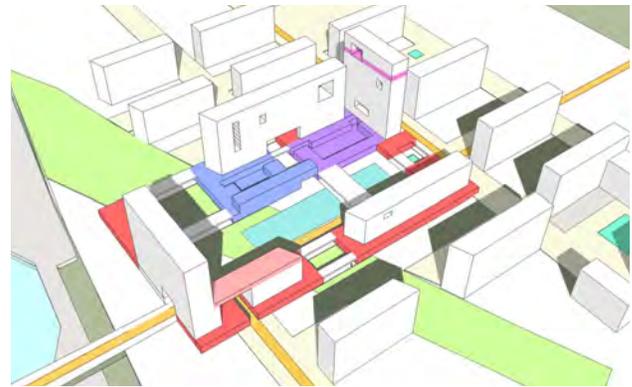
WINTER



WATER



MIXED USE



SUN-MOVEABLE SHADING

