PERSPECTIVES FROM THE FIELD

Pedaling through the Desert: Taking Walking and Bicycling to the Next Level in Middle East Cities

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Moving into the 21st century's second decade, policy makers and urban planners are well aware of the importance of diverse transportation networks for communities small and large. As climate change, energy, public health, and quality-of-life concerns—all of which link with transportation to some degree—continue to grab our collective attention, cities throughout the world are working to broaden their transport systems to better serve a wider user range. These efforts often include improving nonmotorized transportation options, notably though expansion of walking and bicycling networks. This is obviously not new to some regions (such as Western Europe, where comprehensive pedestrian and bicycle systems have existed for decades); however, the trend is gaining traction around the world. Even in the oil-rich Middle East, communities are becoming increasingly aware of the need for enhanced nonmotorized transport systems to address growing—often chronic—traffic congestion, air pollution, user safety, public health, and other concerns.

Recognizing the need for comprehensive, safe, and comfortable cycling and walking networks, national, regional, and local Middle East governments are embarking on short-range and long-range improvement plans. Notable longer-range efforts include the recently completed Qatar National Bicycle Master Plan and Dubai Bicycle Master Plan, each of which propose ambitious, world-class cycling networks serving a variety of users, including local residents and visiting tourists. At a more focused level, the Dubai Pedestrian Safety and Mobility Action Plan lays out detailed infrastructure and programmatic recommendations to address immediate needs. Ninety miles away, planners are wrapping up the Abu Dhabi Pedestrian Safety Action Plan with similar goals.

Meanwhile, the Abu Dhabi Urban Planning Council, a relatively new agency created to help oversee planning and development in the western United Arab Emirates (UAE), is nearing completion of a master planning effort for three communities. The effort is intended implement a 20-year vision set out in the Al Gharbia 2030 Regional Structure Framework Plan, which provides a multifaceted strategy to accommodate expected heavy population growth in the coming decades.

The master planning efforts focused on the three Al Gharbia communities of Liwa, Mirfa, and Ruwais (see Figure 1). With current populations of roughly 15,000 each, some communities are expected to mature into larger cities with upward of 130,000 residents by 2030. A relatively compact built environment exists in each city today, meaning that while some redevelopment opportunities exist, most growth will occur through urban expansion. This provides both the opportunity to incorporate best planning and design practices in expansion areas, and the challenge of expanding the city's footprint methodically while seamlessly blending older and newer areas to form a cohesive community.

The master plans for Liwa, Mirfa, and Ruwais each include a transportation element, of which a bicycle and pedestrian component was developed. Unlike many communities, where walking and cycling master plans often involve squeezing facilities into the existing urban fabric, this effort provided a tremendous opportunity to create a premier, high-quality system from the start. Each bicycle and pedestrian plan includes an overall vision of a community where walking and bicycling are safe, convenient, and enjoyable travel modes. Fulfilling this vision will require achievement of several supporting goals, objectives, and strategies focused on enhancing pedestrian and bicyclist mobility and safety, and enabling these travel modes to become legitimate and respected means for getting around, even among those who do not walk or bicycle.

Today, pedestrians and cyclists in Liwa, Mirfa, and Ruwais encounter similar opportunities and challenges. Strengths and opportunities include a relatively compact layout with well-connected streets, mixed land uses with walk-friendly and bicycle-friendly activity hubs, the presence of traffic calming to reduce vehicle speeds on local streets, and relatively comfortable weather during fall, winter, and spring. Challenges include fragmented or no sidewalks on many streets, roadways built with few or no pedestrian/bicycle-crossing provisions (which in turn encourage risky behaviors; see Figure 2), aggressive driver behavior, and exceedingly hot temperatures, with high humidity especially during summer months.

Developing a system responding to bicyclists' and pedestrians' needs is as much an exercise in psychology as it is in planning. This involves getting into the user's mind-set. For instance, seasoned, frequent, and confident cyclists commuting to work will likely have different expectations and preferences compared with infrequent riders out for a short recreational trip. It can also be said that everyone is a pedestrian, though these users can fall under numerous categories such as mobility-impaired pedestrians, seniors (who may walk slower and require longer crossing times at intersections), young children (whose cognitive skills may be less developed compared with adults), or persons walking for transportation versus recreation.

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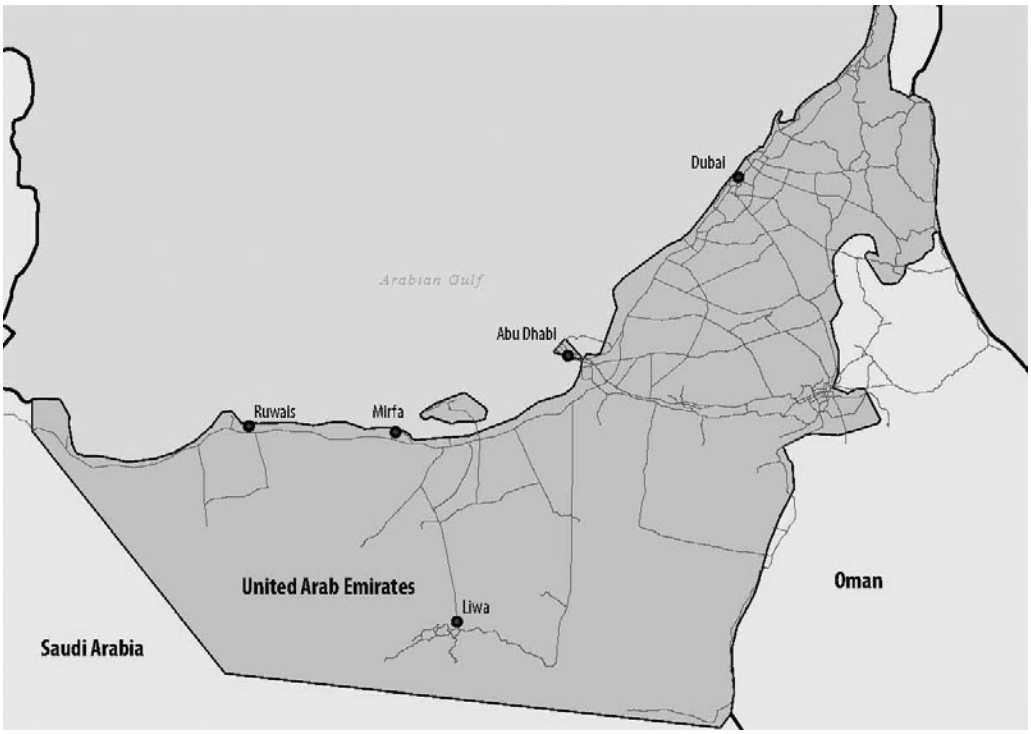

Figure 1. Bicycle and Pedestrian Master Plans were developed for the United Arab Emirates communities of Liwa, Mirfa, and Ruwais.

Identifying user needs also requires an understanding of the local culture and associated behaviors. For instance, aggressive and erratic driver behavior is commonplace on UAE roadways, and this can create safety and comfort issues for pedestrians and cyclists especially if they are forced to share the road with motorists. The existence of such conditions implies that conventional treatments used elsewhere (e.g., striped bike lanes on major roads in the United States) may be less effective here. In addition, a vast economic gamut exists within UAE society, ranging from a sizable expatriate labor force depending on bicycling and walking for economic reasons to a wealthier Emirati population with more travel options. What this means is that in order to truly attract a broad user base, the cycling and walking network must appeal to *choice users* while meeting the needs of those relying on the system out of necessity.

Understanding where users will be traveling and the routes they are expected to follow is equally important to successful bicycle/pedestrian network development. This presented a challenge for the three Al Gharbia communities because the vast majority of user origins, destinations, and routes have yet to exist. The project team overcame this challenge by developing a bicycle/pedestrian demand model incorporating data used for the overall master planning process. Model inputs included user *generators* (e.g., locations of proposed population centers), *attractors* (e.g., locations of potential destinations such as shopping or employment centers), and *barriers* (e.g., higher volume roads that may deter walking and bicycling). Overlaid on one another, the data layers paint a clear picture of where each community should prioritize its nonmotorized infrastructure improvements (essentially where generators, attractors, and barriers overlap).

The Liwa, Mirfa, and Ruwais Bicycle and Pedestrian Master Plans each propose a comprehensive walking and bicycling network connecting existing and future districts while responding to the needs of various user groups. Because most proposed transportation corridors do not yet exist, the project team took advantage of a unique opportunity to design from scratch roadway cross sections fostering a useful and inviting bicycle/pedestrian environment. This includes *cycle tracks* physically separated from motorists on major streets, lower-volume *family friendly* cycling routes on local streets, and a complete sidewalk system with extensive design treatments for safe and convenient pedestrian crossings. Although cities traditionally use street trees and other water-intensive features to enhance the streetscape environment and provide thermal comfort, the location of Liwa, Mirfa, and Ruwais within the Arabian Desert means that water must be used judiciously. To achieve an attractive and comfortable streetscape environment, the physical orientation and width of future streets have been optimized to take advantage of prevailing breezes and sun patterns. Shading will also be achieved through architectural elements such as taller building facades adjacent to sidewalks, and shade structures made of local materials. Other equally important infrastructure pieces include bicycle/pedestrian/transit integra-

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Figure 2. The combination of pedestrian destinations and an absence of formalized roadway-crossing treatments results in risky pedestrian behavior along many United Arab Emirates highways.

tion (e.g., transit-stop infrastructure such as shelters, posted maps, schedules, and rider information) and end-of-trip facilities for bicyclists, including bicycle parking, showers, and changing facilities at work sites.

Building the nonmotorized transportation system is important, but strategies beyond infrastructure improvements are needed for bicycling and walking to truly become *everyday* travel modes. The bicycle and pedestrian master plans present several programmatic recommendations to supplement on-the-ground improvements. These include marketing and promotional efforts (e.g., organized bicycle rides to familiarize residents and visitors with the system), education strategies (e.g., enhancing driver education programs to raise the awareness of bicyclists and pedestrians), and enforcement measures. Finally, each master plan contains an evaluation component that will enable implementing agencies to measure progress over time. Suggested evaluation measures include conducting an annual inventory of bicycle and pedestrian facilities to determine the pace of system expansion, conducting annual bicycle/pedestrian counts and opinion surveys to measure activity trends and attitudes about the system, and collecting and regularly reviewing crash data to identify problem areas and adjust implementation strategies accordingly.

The bicycle and pedestrian master planning efforts in Liwa, Mirfa, and Ruwais reflect a worldwide trend as cities work to diversify their transportation systems. These three cities yield tremendous potential to become the Middle East's premier walking and cycling communities in the coming decades while serving as a planning model for other local, regional, national and international efforts.

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