

Williams *et al.* (2000) point out that ‘a prerequisite to achieving sustainable urban form is knowing what it is’. To realize the ‘sustainable city’ there has to be a clear and commonly held concept of what it will look like, how it will function and how it will change over time. In a review of several books on the topic of ‘sustainability’, Steven Moore writing in the *Journal of Architectural Education* (2000) points out that there are substantial differences in the use of the word. Neither, he explains, ‘do the terms “eco-tec”, “green”, “regenerative”, “ecological”, or “bio-climatic” architecture provide a more precise meaning’. He gives examples of several viewpoints: Catherine Slessor, *Eco-Tech* (1997), argues that the ecological hypothesis is a style. Steele in *Sustainable Architecture* (1997) believes that the ecological hypothesis is a political and economic doctrine. David Lloyd Jones in *Architecture and the Environment* (1998) argues that the ecological hypothesis requires retrieval from the radical fringe. In *The Technology of Ecological Building*, Klaus Daniels (1997) focuses on a set of empirically tested construction practices.

The term sustainability used in this chapter straddles several of the above meanings, and represent the ideas of a group of civic activists, including several well-known urbanists and designers³ who are lobbying to make Lower Manhattan a more livable place. Concepts of sustainability included people and buildings, pollution, urban form, transport, communication, legislation, and public investment.

Human sustainability

Thousands of people rushed to the destroyed area to help in the rescue attempt and to recover the bodies of the dead. Remains were found of approximately 39% of those who died when the buildings were destroyed. The explosion vaporized bodies, sections of the buildings, furnishings and equipment, mixing all into a fine white dust that penetrated every micro-inch of the surrounding offices, dwellings, and stores. No scientific analysis or regulatory standards exist for mitigating its impact on air quality. The WTC fires continued to burn for almost 3 months after the attack.

Consequently, human sustainability set the public tone, beginning with the recovery efforts in Lower Manhattan. It was paramount in discussions with thousands of rescue workers, residents, employees, and families of the victims. So too were

issues like eco-sustainability, carbon dioxide (CO₂) emissions, and stringent environmental guidelines for air pollution caused by transporting the debris during the 9-month-long rescue efforts.

Infrastructure for people

Lower Manhattan is a city within a city. It is the third largest downtown in the USA after Midtown Manhattan and Chicago. Prior to September 11, the residential population was almost 42,000 residents and growing. Consequently, R.Dot defined 'infrastructure' to mean an armature that integrates all of the public parts of the community. The rationale was that *people* are its consumers. The types of infrastructure that are needed in Lower Manhattan must come from the habits and values of those who will use it: residents, employers, employees, visitors, and tourists. Infrastructure must be able to accommodate the needs of the present, while being flexible enough to change with the future needs of the area's neighbourhoods.

This definition stemmed from the belief that the functions of infrastructure are driven by people's activities: eating, sleeping, communicating, interacting, conducting business, pleasurable pursuits, making art, partaking in or watching performances, thinking, playing, sports, travelling or relaxing. People create neighbourhoods, which evolve from their activities, needs, values, and desires. To demonstrate how these activities affect ideas about infrastructure and land use, industrial designer Roland Gebhardt, co-chair of R.Dot's infrastructure committee, created a series of 'experience maps' showing how people in different lines of work used the city's infrastructure (Figure 10.6). This showed that 'cities have to be places where people want to live. Unless cities are perceived as high-quality environments, there is little chance that they will ever be sustainable' (Williams *et al.*, 1996).

Transportation

Lower Manhattan is one of the most concentrated business districts in the world, but its transportation infrastructure has not been substantially upgraded for nearly six decades. However, 80% of all trips to the area are made via public transport. Rivlin and Scanlon (2002) point out that 'transit enhancements will be the most important determinant of the