A dialogue for sustainability: people, place and water

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Abstract

Isleta Boulevard runs north and south through the South Valley, a semi-rural community adjacent to, and southwest of, Albuquerque, New Mexico. USA. As a part of a road improvement program planned for the Boulevard, the Bernalillo County Public Works Department and the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) have given particular attention to storm water management. The drainage plan focuses on water detention strategies, with surge ponds along the roadway, as well as a fourteen acre detention site.

Residents of South Valley took great interest in how both the road and the drainage system were to be designed and built, and voiced the concern that a sustainable model for the road development should enhance economic activities, historic character, neighborhood values and quality of life along the corridor and in the neighborhoods. In response to an initial proposal developed by the civil engineering consulting firm doing the road improvement project for the County, residents were adamant that they did not want detention or surge pond sites to become `big holes' in their community landscape.

In order to address these issues the County engaged the Resource Center for Raza Planning and the Landscape Architecture Program, both of the School of Architecture and Planning at the University of New Mexico. The research and design team worked with the community, public agencies and the project engineering consultants to develop a sustainable solution that fulfills the needs and aspirations of the community, meets the engineering performance specifications for land drainage and flood control and provides an environmentally responsible alternative to urban water management. The result is a design that makes land drainage infrastructure a rich landscape and a neighborhood amenity, and the project is now in the preliminary stages of construction.

Discussion

The word sustainable, some would argue, has been over-used and misappropriated to the point where its meaning has become too malleable, and its use as a fundamental concept of making places in responsible and intelligent ways has been compromised. This paper describes sustainability as a true multifactored process that assimilates social, technological, political, environmental and economic elements, and finds a dynamic balance among these. The case study in which this is explored must be set within a context of ideas concerning the relationship between infrastructure, landscape and culture, and within the social empowerment of citizen participation.

Infrastructure and sustainable design

The development of technologies and their applications in the late eighteenth and nineteenth centuries held out the promise of a healthier, happier, and more perfect existence than, until then, had only been imagined. The landscapes of technology, the machines, artifacts, spaces of technological production and critical services, were held in awe and reverence. These were landscapes of the technological sublime (Nye, 1995) and were painted, photographed, written about and celebrated within the popular culture. The great era of public works in America from the late 19th century until the 1930's saw bridges, roads, dams, canals, stone viaducts, reservoirs and lighthouses as landmarks of human achievement and progress, the conquest of nature and the control over human destiny (Ellul, 1980; Leiss, 1990).

As populations and technological complexity increased, the criteria of efficiency and optimization became dominant in the design of urban environments. In the period following World War II, the social celebration of a technologically enhanced environment faded in the reality of highly artificial and utilitarian systems that operated increasingly out of sight and out of mind. Somewhere during that time the term `public works' shifted to the more technocratic term `infrastructure' (Bruegmann, 1993), with `infra', the Latin word meaning `below'. Energy, water supply, land drainage and waste management were designed and installed as separate, isolated and arguably unsustainable systems in the urban environment (Strang, 1996; Lyndon, 1996). While these systems have become the standard in many developed regions, they lack both ecological and humanistic perspective. Strang (1996) stressed the potential for infrastructure to add to the urban experience, and to shape urban form. He suggested that the biggest gains could be made in re-thinking single purpose infrastructure systems, and promoting multi-use systems that incorporate both social and ecological functions. Dunham-Jones (1994) pointed out that reducing infrastructure to purely functional criteria does not allow for the possibilities of systems that recognize humans and their cultural expression. Morrish and Brown (1995) called for infrastructure that also plays a role in the urban landscape providing collective identity and urban legibility. Thayer (1995) argued that when we edit out the

essential systems that support our daily lives we are left with facade and illusion, and we lose the sense of the interconnectedness between natural, social and technological systems. Steiner (1996) said that putting place back into infrastructure cannot be a superficial endeavor, but must make connections to the "deep structure" of a region; that is, to the full range of natural, cultural, spatial and temporal characteristics that make the region what it is.

There is a consistent thread through all of these writings of missed opportunity, ill conceived notions of efficiency, and the profound social, cultural and ecological possibilities in reconstructing infrastructure as a part of a complex, interconnected urban network. Urban systems including energy, transportation, waste treatment, water delivery, storm water and flood control all hold the possibility for becoming multi-functional components of a landscape that embodies social, cultural, environmental and economic sustainability.

Public participation

There are also missed opportunities when public infrastructure is designed without full consideration of its impact on the public that will use it. Infrastructure development, whose origins addressed health and safety needs, is not only key to community and economic development, but transforms the meaning of place. "It is both the seminal role that public works play in social formation and their ubiquitous influence in our everyday lives, that make an understanding of public infrastructure policy important" (Perry 1995:2). Roads, drainage ponds, and water and sewer systems, for example, can be built in a way that either enhances or destroys a community. Public participation has the potential to be the difference in how a public works project transforms the landscape. The politics of infrastructure development, therefore, involve questions that extend beyond engineering or fiscal considerations.

Public participation at a neighborhood scale has been the subject of theorists interested in how social movements shape the formation of urban space (Castells 1983 and Kling and Posner 1990). While every neighborhood mobilization may not constitute a social movement, the concept of *community* "is a powerful one that draws on deep human desires and commitments" (Kling and Posner 1990: 30). These values are often in contradiction to the logic that pushes through infrastructure projects focused on engineering and economic factors. Public participation raises the ante, so to speak, for what is possible in infrastructure design, including establishing dialogue that reflects the engineering, the economic, and the community values.

Background: Isleta Boulevard improvement project

The South Valley area in Albuquerque, New Mexico, has a rich history dating back to the settlement by the Tiwa Pueblos around 1200 AD. and Spanish settlement in 1598. A major north-south route that allowed trade between indigenous peoples was named the Camino Real (Royal Highway) by Spanish settlers. Later named Isleta Boulevard, the road was also an early segment of

Route 66. Today, the road still serves as an important transportation route into the South Valley and south to Isleta Pueblo.

Current land use patterns and the architectural character along and surrounding the Isleta Boulevard corridor reflect rich and distinct historical periods and cultural practices, creating the corridor's uniqueness. Land uses along this section of Isleta Boulevard include residential, commercial, community services, schools, and vacant property. Isleta Boulevard continues to serve as an economic corridor for the South Valley and surrounding communities.

Planned road improvements to Isleta Boulevard also include a drainage system to manage floodwater on Isleta and in surrounding neighborhoods. The drainage plan comprises a fourteen acre (6.4 hectare) detention basin at a Countyowned site, formerly known as Sanchez Farm, located approximately seven hundred feet (245 meters) from Isleta, and a number of surge ponds to be located along the Isleta route.

The South Valley has an active citizenry that took great interest in how both the road and the drainage system were to be designed and built, and how they would affect the landscape of their community. Residents are interested in enhancing economic activities, historical character, and quality of life in the South Valley neighborhoods, and were adamant that that these goals be met with respect to both the road improvement and the drainage system.

The Bernalillo County Public Works Department and the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA), managers and sponsors of the project, were aware that, based on preliminary engineering drawings, residents were concerned that the detention basins would become "big holes" in the neighborhood. In order to address these concerns and to implement a process in which the neighborhood residents participated in the outcome of the drainage project, the County contracted with the Resource Center for Raza Planning (RCRP), a Center in the School of Architecture and Planning at the University of New Mexico. RCRP, along with the Landscape Architecture Program in the School, agreed to facilitate a community visioning process and develop design strategies for both Sanchez Farm and for one of the surge pond sites along Isleta Boulevard. These designs would acknowledge the desires of the residents and the environmental imperatives of water and landscape, while meeting the engineering needs and constraints set out in the drainage plan.

Project team method

The project team began their research by working simultaneously on three areas of investigation. One thrust was to understand fully the drainage strategy and engineering specifications, and the economic/legal/political context in which the project was being carried out. The project managers and their engineering consultants provided the researchers detailed information on the drainage plan design, as well as legal requirements of water distribution in the arid New Mexico environment. Meetings were held with other actual and potential stakeholders in the project such as the residents whose land was adjacent to affected sites and

community-based organizations who could ultimately be caretakers of the large Sanchez site.

The second thrust was to study the Sanchez and surge pond sites. In addition to site visits the researchers collected information on soils, topography, vegetation and surrounding land uses. Maps, air photos and other relevant documentation were analyzed.

The third thrust, essential to the success of this project, was a visioning process carried out with the community. If the drainage sites were to be more than unsightly holes, we needed to determine the potential function and meaning of the sites to neighborhood residents. The facilitators created a scenario ten years into the future and asked a series of questions to elicit participants' comments regarding how they ideally saw their community evolving. We then asked participants to elaborate on concepts and statements that they had offered such as "small town atmosphere", a "good quality of life" and "unique" qualities of the South Valley. In further discussion, we asked participants to focus on the sites in question, and to envision the ways in which these would function and how they would become a part of their vision to serve the community.

The Project Team then merged the community's vision with flood control needs, engineering requirements, sustainable water management goals, and site factors, to develop a design concept for each site. A public meeting was held for residents, authorities and political representatives to present the draft design proposals and to discuss issues that would lead to changes and revisions in the preparation of a final design. The elaboration of data and results that follow focus on the large detention basin, or Sanchez Farm site.

Data

General system design and specifications

The catchment area for the land drainage was to include the Isleta Boulevard road surface with its new curb-and-gutter design, as well as the low-lying neighborhoods adjacent to the road. The system was designed for the one hundred year storm event. Water was to be collected in catch basins in and around the road and delivered through a forty-eight inch (1220 mm) storm sewer to the Sanchez site. Surge ponds located strategically along the road would prevent road flooding in extreme events. Ideally the design of the system would have incorporated overland flow to encourage maximum infiltration, but the researchers were bound to work with the system as designed to the point at which the storm water enters the Sanchez site. The retention capacity requirement of the Sanchez site was 64 acre-feet (77,700 cu.m.). According to state law water can be held on the site for a maximum of ninety-six hours. The forty eight inch outlet would enter the site at approximately nine feet (2.74 meters) below grade in order to achieve the drainage gradient in this flat valley region. At the point of entry there would be a port structure that would capture the large amounts of trash that finds its way through the storm sewers. At the low end of the site pumps were to

be installed to pump out excess water through an eighteen inch main to the Rio Grande.

Sanchez Farm site

The Sanchez Farm property (Fig. 1) has a long history of agricultural production and animal husbandry and for over two hundred years exemplified the economy, traditions and culture of the South Valley area. The fourteen-acre (5.67 hectares) site is surrounded by private properties and has no access to the east west and south, and is bordered by Arenal Road to the north. An acequia (irrigation ditch) runs along the east side and the site has some water rights from the acequia. Water rights permit a certain amount of water to be extracted from the irrigation ditch each year. The amount depends on the size of the site, and whether any of the precious rights had been sold off in the past. The site slopes at about two percent from north to south. The silty-clay-loam flood plane soils are well drained.

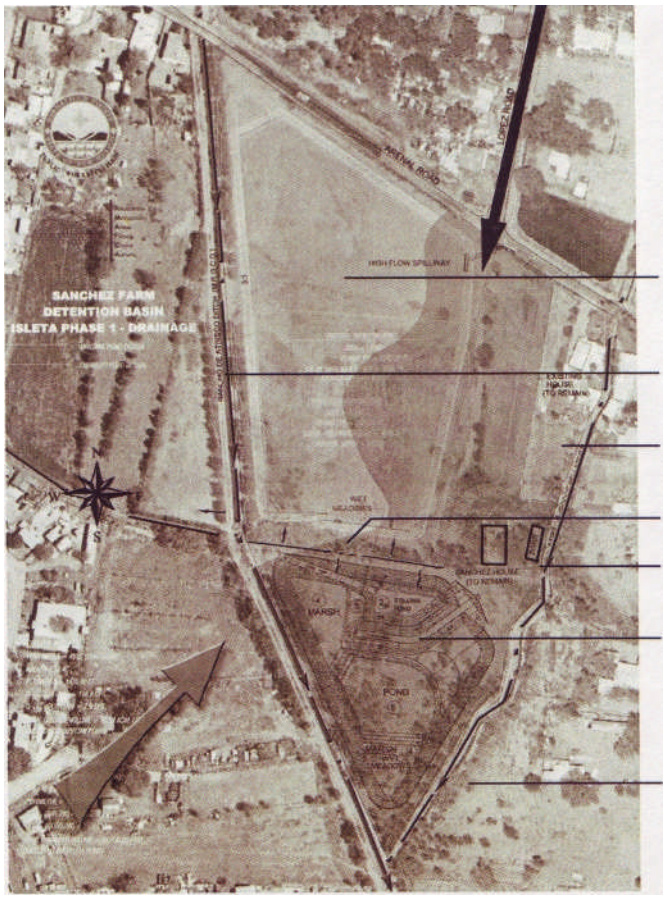

Fig. 1 Sanchez Farm site analysis

The vegetation is comprised of weedy pioneer species covering recently disturbed areas, some native grasses and shrubs, a line of cottonwoods along an old lateral ditch, and a significant population of pioneer Siberian Elms at the South end. The site is entirely bordered by Siberian Elms. The water table is quite high at twelve to thirteen feet (3.96 meters). The old Sanchez house on the east side of the site is in very poor condition, having gone through two fires. Some feel, nevertheless, that the building has historic importance.

Community vision

The researchers were able to develop three categories of residents' responses that began to articulate their needs, aspirations and preferences for the way in which the Sanchez detention site was to be developed. These categories addressed how the site would function, the general visual and aesthetic character and particular elements that might be incorporated in the site design to address programmatic and visual conditions.

In terms of function the residents wanted the Sanchez site to be an enjoyable public open space with low impact activities (not sports fields). They felt that some of the space could be used for some form of community agriculture, and they also wanted to have areas that would become good habitat for a diversity of bird and animal species. They felt that these various uses could provide educational opportunities.

In terms of character, they wanted to see a peaceful, calm site that would be like an oasis. The site would have sufficient vegetation to differentiate various spaces and to provide an attractive visual environment. Although they wanted the site to reinforce the existing character of the South Valley, they wanted it to be unique and different from their back yards, and to stimulate a sense of discovery.

Residents' suggestions for specific landscape elements and features that would achieve functional and qualitative goals were to incorporate gathering areas, to make water visible in some areas, to provide opportunities for outdoor classrooms, to develop some form of interpretive program, to use sufficient trees and other vegetation, and to incorporate public art.

Site development

The challenge for the project team was to develop a strategy for site development that satisfied the engineering specifications and the residents' views and desires, while working with the site environment and carrying capacity, and implementing sustainable methods of water management and landscape design. The cost of the project was, as always, an important consideration.

Sustainable storm water management

In order to hold the sixty-four acre feet of water required for the one hundred year storm event the site needed to be excavated and recessed. The preliminary engineering drawing had shown a basin with relatively steep, constant slopes

around the perimeter, and this technique for recessing resulted in the site being perceived as a large hole. In order to address the situation the design team modulated the slope around the edges, with some areas being gentle to allow for easy and comfortable access, and others being steeper. The varied topography around the edge added visual complexity and interest, as well as providing friendly and inviting entry points for site visitors.

Basic sustainable storm water management practices became the generative principles for the design of the site structure. These principles were to maximize distance and area over which water flows in order to allow as much infiltration as possible, to use vegetation to filter out contaminants and act as sponges for water absorption, and to slow water down as much as possible thereby increasing infiltration as well as reducing damage and erosion.

The basin was designed with four terraces that drop from north to south. The storm water sewer outflow was located at the north end of the site, rather than towards the south end as had been shown in preliminary engineering drawings. This allowed for a longer distance of travel once the water was on site, and meant that less feet of forty eight inch pipe was required, thereby reducing costs. The water was directed through the site in a bioswale that was designed to slow down the flow and to absorb most of the water in an average storm event. Water that made it through the bioswale would circulate through the last terrace that was planted with thirsty cottonwoods and willows, mimicking the riparian forest of the Rio Grande. A solar pump would deliver any remaining back up to the top three terraces where it would support the landscapes developed there.

Response to the community

Water pumped back up the terraces, as described in the paragraph above, along with gravity-fed water from the acequia, were identified as the sources of supply to support the landscape that has been developed on the site. Each of the four terraces were designed as different `gardens' that comprise a community open space.

The top terrace has been named the *art garden.* Water drawn from the acequia drops into a basin and flows along an elevated wall-channel from which it is distributed to various parts of the garden. The water supports tree bosques and herb gardens, planted in a formal composition. Visitors will be able to sit under the shade of trees, listening to the trickle of water, enveloped in the fragrance of herbs.

The second terrace down has been designed as *a fruit orchard.* The orchard will be managed by a community agricultural education group, but would still function as public space.

The third terrace down has been designed as an *open area* for picnicking, social gathering and informal events. It will be planted with a drought-tolerant grass mix with dryland tree species surrounding the edges.

The fourth and final terrace has been designed as *a public forest* of cottonwoods, willows and other Rio Grande riparian species. The forest will become an ecological education area for the community.

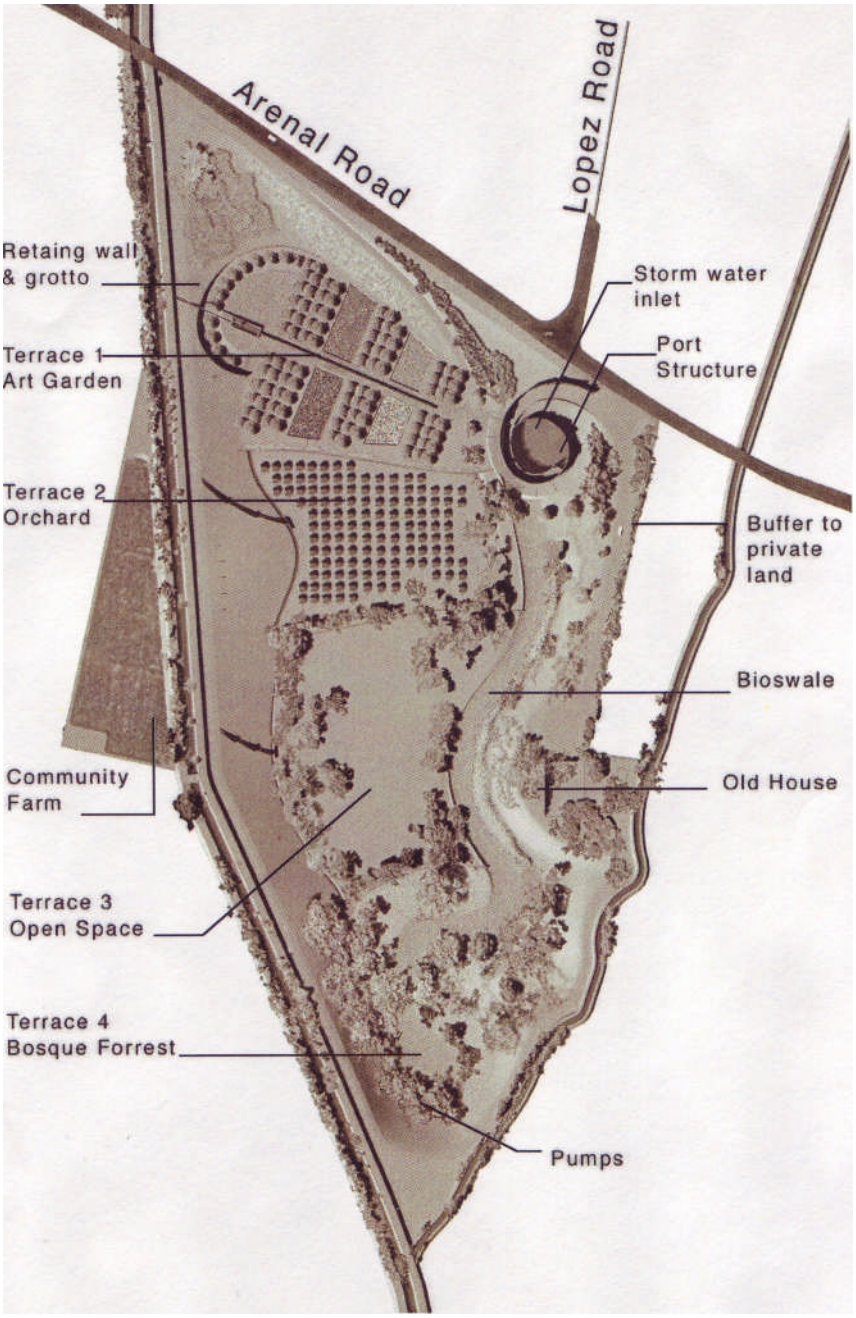

Fig. 2 Design plan for detention site / open space

Conclusions

The research and design team for this project developed a solution that is workable, sustainable and attractive, bringing community aspirations and engineering requirements together with ecologically-based urban water management. The process demonstrates multi-factored sustainability that achieves a dynamic balance among a complex set of issues and constituencies. As a university-based research team, faculty and students had the opportunity to work together on issues of mutual interest and disciplinary importance. The community, public administrators and the landscape were beneficiaries.

The results of the study, when presented, were embraced by residents and County administrators. Both of these groups participated in the process, and felt that they had some ownership of the outcome. The process was a productive collaboration among residents, community groups, planners, landscape architects and public agencies to make flood control infrastructure an environmental benefit and a neighborhood amenity.

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