

BUILDING SUSTAINABLE  
HOUSING ON THE  
U.S.-MEXICO BORDER:  
INSIGHTS FROM TECATE,  
BAJA CALIFORNIA

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***Hemalata C. Dandekar***



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The SCERP project culminated in a technical report titled *Housing and Sustainable Communities in Rapidly Urbanizing Border Regions*. The report emphasizes an analysis of existing housing in informal communities and the technical options for building sustainable housing which can serve to mitigate the negative impacts of informal housing settlements on the environment. This monograph draws heavily from, and builds on, this report. It organizes the findings so that they are accessible to a lay and concerned audience. It also contextualizes the challenges and possibilities of building sustainable housing in the border region within trends and concerns regionally and nationally.

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## Introduction



Increasing attention is being given within the United States of America to its border with Mexico. While such issues as national security in the post-9/11 era, securing the border against illegal immigration, and effects of the North American Free Trade Agreement (NAFTA) on bilateral trade have been dominant nationwide, in the Southwest region of the U.S. there is also recognition of the impact of the rapid growth of the informal communities which have emerged on the border. This phenomenon, which has social, spatial, and environmental aspects, is only partially understood. The quantity and quality of the housing in these communities is of particular concern. The report *Current Housing Situation in Mexico 2005*, which takes a macro, national, look at the housing sector in Mexico, particularly its finance, states that “Despite the huge efforts made in 2004 to make housing more accessible, there is still a significant sector of the population that remains unattended—specifically, families in rural or informal sectors.” The report emphasizes the continued need for housing people with low incomes and states, “New housing technologies related to environmental sustainability and energy saving, such as water-saving systems, systems for recycling grey water and sewage water treatment, electrical and thermal energy savers, among others, must be incorporated.” The report fails however, to mention approaches in building design and construction which also achieve significant long-term energy efficiencies and contribute to savings in water utilization and energy consumption. These approaches are referred to in the planning and architecture literature as “green” and sustainable. They have been embraced at city and state levels in the U.S. and incentive structures for their adoption are in place. The Pacific Northwest Pollution Prevention Resource Center (PPRC) is an excellent source of information on good examples and the City of Scottsdale Green Building Program is one case of a



Figure 1: El Rincon and El Descanso colonias in Tecate – by the U.S.-Mexico Border



Figure 2: Sustainable Park Designs for El Rincon and El Descanso, Tecate

voluntary regulatory and incentive structure that has proved effective for the specific city context. A few cities such as Boulder, Colorado have instituted mandatory green building requirements.

Green technologies are just one facet of building sustainable housing. Sustainability is context and site specific and is derived from an understanding of technical factors such as climate, soil and vegetation type, water and materials availability; social factors such as culture, history, community and class; economic factors such as productive capacity, skills and income; and organizational factors such as structures of governance regulation and the status and power of resident groups. Given a supportive context, sustainable housing can be attained through judicious choices in the design of the housing units themselves; in their orientation and configuration of layouts; in the materials of construction and their assembly and finish; and in the choice and location of landscaping and ground cover. Furthermore, choices leading to sustainability need to be made by institutions in both the private and the public sectors and by individuals and the community. In short, building sustainable housing requires multiple actors and multiple commitments.

This monograph details the results of research intended to introduce sustainable housing approaches into an informal community or

*colonia* (see Chapter Two, p.15 ) settled on the railroad right of way in El Rincon, city of Tecate, Baja California, Mexico. The research was conducted by a team of faculty researchers and graduate students and supported by the Southwest Center for Environmental Research and Policy (SCERP). The research led to an understanding of the social, cultural, demographic, and economic factors affecting housing choice in this community, and the physical conditions and construction methods used in the current housing stock. It then considers a variety of factors that contribute to construction of sustainable housing, including design principles and materials selection. Finally, it describes two prototype sustainable houses that were built on the basis of these principles and outlines the characteristics for designing such housing in *colonia* communities such as in El Rincon.

The history of this inquiry illustrates the complexity of such an enterprise and the necessity of bringing all potential stakeholders and players together for success. The El Rincon *colonia* community presented itself as a site for investigation of housing needs through a serendipitous set of encounters. The Tecate River, part of the Tijuana River Watershed, runs through the city, defining its urban image and form. Its historical character of being a natural source of pristine water has been threatened. The river corridor was

designated in the city plan as an area needing significant attention. River water was dammed upstream rendering the river dry as it entered the city. Grey water and discharges into the riverbed made for a polluted water flow downstream. In 2003, Fundación La Puerta sought advice from the Department of Landscape Architecture at California State Polytechnic University, Pomona. Faculty and graduate students developed a document titled “Tecate River Park: A Framework for an Urban River Environment in Tecate, Mexico.” Building on this project, officials from the City of Tecate and the Director of Fundación La Puerta approached the School of Planning and Landscape Architecture (SPLA) at Arizona State University (ASU) for technical assistance in addressing the problem and opportunities of the Tecate Riverfront, a project for which no public resources or relevant skills were available within the city.

Six design solutions for two urban eco-parks along the river were developed in a SPLA Landscape Architecture Studio at ASU in Fall Semester of 2003. Two sites, El Rincon and El Descanso, were selected according to the Urban Development Plan of the City of Tecate. As a result, a monograph entitled *Urban Eco-Parks in Tecate, Baja California, México* was developed (Dandekar et.al., 2004) which was used as a decision-making tool by the City of Tecate and as a funding instrument by Fundación La Puerta and was awarded the ASLA Arizona Chapter Professional Design Award in Fall 2004 in the Communications Category (Figure 2).

In the process of executing the work, the research team was asked by the residents and community leaders in the El Rincon neighborhood to develop strategies for improvement of their housing and settlement. At the time, community residents were very hopeful that they would acquire the right to land on which their homes were located. In anticipation of acquiring land tenure they hoped to initiate the process of consolidating and upgrading their houses. There was a compelling possibility of evolving design solutions which would aid in developing informal housing in ways that made for long term sustainability. The El Rincon

neighborhood was an attractive study site because it had a significant housing need and a mobilized active community with strong leadership which was committed to obtaining improved housing and settlement security. Residents lived in substandard housing on land fronting the Tecate River on the western outskirts of the city which was the railroad right-of-way. Lacking legal tenancy but having political support from representatives on the City Council of Tecate, the neighborhood appeared to be on the way to obtaining security of land tenancy. Residents were planning to make home improvements and upgrade following legalization of land tenure. They were interested in, and thus offered an opportunity for, implementing the findings of this research in prototype housing constructions which could be designed with stakeholder input.

Post-election changes in the composition of the Tecate City Council in 2005 resulted in changed agendas for the City and new leadership and mission for the Department of Urban Administration. The El Rincon community’s aspiration to legalize their land tenancy and engage in housing consolidation was no longer supported by the Tecate City Council. Instead, the Council moved to level, regrade and redesign the river banks near the community, making access to that area more difficult. Construction of prototype housing units exemplifying sustainability attributes in El Rincon was no longer feasible.

The findings of the research continue to have relevance for communities such as El Rincon where residents seek to better their quality of life by improving their housing and surroundings in ways to reduce ongoing energy costs. Finding ways to improve, upgrade and construct housing in *colonias* so as to make it sustainable and energy efficient will serve not only to improve the quality of life of *colonia* residents but to reduce the negative environmental impact of human settlement growth in the region. The technical analysis completed on housing in El Rincon, and the design approach that was delineated was applied by graduate student assistant Ernesto Fonseca, working with the Stardust Center for Affordable Housing in the design and construction of two prototype housing units in

Guadalupe, Arizona and Nageezi, New Mexico, which are presented here; other prototypes constructed on these sustainability principles are also mentioned.

There is great potential on both sides of the U.S.-Mexico border to move prevailing housing construction practices toward more sustainable, low environmental impact modes. There is a range of shelter and settlement activity in the private and the public sectors. If government policy and regulatory practice could encourage adoption of the principles delineated here and in other cited work for building housing to enhance environmental sustainability, the reduction in energy costs would benefit not only homeowners but would also improve the quality of life for all residents in the U.S.-Mexico border region.

Through the case study investigation of the housing and infrastructure realities in El Rincon, this monograph develops information of interest to those individuals and communities designing and constructing sustainable, energy efficient, low environmental impact housing in the entire region. It seeks to facilitate the design and building of housing and human settlements that are energy efficient, design appropriate, economically feasible, minimize impacts on the environment and fulfill the desires and aspirations of the local community. It addresses the particular realities and concerns of housing construction for lower-income families. This is the segment of the population which is particularly addressed in the assessment of trends in housing construction and in the examples offered to illustrate sustainable construction approaches. An inventory of technical information related to community planning, housing design and construction is provided. It is hoped that this information is useful for lay stakeholders engaged in housing and community construction and development. The goal is to assist in the making of appropriate technical choices in layout, building envelope, materials, and utilities and infrastructure that will lead to construction of more sustainable housing and community settlements.