CASE STUDY: Gila River Indian Community

The Gila River Indian Community (GRIC) is an Indian reservation in south-central Arizona, that is home to about 12,500[1] Community Members of both the Akimel O'odham (Pima) and the Pee-Posh (Maricopa) tribes. With a land area of nearly 584 square miles, the Community is made up of seven districts along the Gila River. Located just to the south of Phoenix, the Community includes commercial and industrial developments, hotels, casinos, along with a variety of residential developments and housing types.

The Community has multiple programs for housing assistance and financing. The Department of Community Housing (DCH) and the Department of Housing Development (DHD) provide for construction of both Community and federally funded new home construction, and repair and maintenance of existing federally funded housing stock. They also manage, certify, and inspect federally funded rental housing, and provide education and housing counseling services. The Tribal Projects Department oversees the GRIC Capital Improvement Projects, and is committed to transforming the way buildings within the community are designed, built and operated, enabling an environmentally and socially responsible, healthy and prosperous environment that improves the quality of life.

Green Building Practices

The Great House (Sivan Vah'Ki) earthen building at Casa Grande National Monument. *Photos: David Eisenberg*

Sustainable building has been practiced in the community for hundreds of years. For example, the Great House (Sivan Vah'Ki), is a multi-story earthen building at the Casa Grande National Monument that is at least 650 years old. Honoring and protecting the land, water, environment, and all living beings clearly predate the development of green building and sustainable development programs.

Notable GRIC projects over the past few years have included several green buildings, such as the Gila River Indian Community Utility Authority's US Green Building Council LEED (Leadership in Energy and Environmental Design) Gold certified office, and Gila River Health Care's Viola L. Johnson Administration Building on the Hu Hu Kam Memorial Hospital campus, also built to LEED standards. Another is the American Institute of Architects award-winning Hashan Kehk District 2 Service Center/ Multipurpose Building. Through these projects the Community developed experience in building to higher energy and environmental standards, which matched their commitment to building more energy efficient and healthy housing in the Community.

[1] Inter Tribal Council of Arizona http://itcaonline.com/?page_id=1158


Gila River Indian Community Utility Authority building and interior. *Photos: David Eisenberg*

A review of model house plans led to suggestions for future design modifications. Discussions with the GRIC housing experts also revealed many positive aspects of current practice, such as support for Community Members who wish to build in traditional ways using traditional materials, techniques, and designs. The staff also expressed interest in and support for innovation and flexibility, seeking to enable the most sustainable and appropriate building and development that they could, while maintaining health, safety, and affordability.

Green Building Codes

The Gila River Indian Community first adopted building codes in the 1960s and has updated them regularly since. The building codes that were in force in 2015, when EPA began its GRIC Green Building Project under the *Making a Visible Difference in Communities Initiative* (MVD) were the 2006 versions of the International Code Council's codes (I-codes) with some local amendments. The GRIC staff was well into the process of developing recommendations to the Tribal Council for the next update of their building codes, moving from the 2006 to the 2012 I-Codes. The codes already adopted made the GRIC building code energy efficiency requirements more stringent than required by the State of Arizona.

Learning about the Community's well-developed plan review and inspection processes and their existing experience with green building projects, the GRIC Green Building MVD project shifted to furthering the Community's commitment to more sustainable building and development by introducing EPA's Tribal Green Building Toolkit and online Tribal Green Building and Code resources. The program also provided


GRIC Hashan Kehk District 2 Service Center/Multipurpose Building. *Photos: David Eisenberg*

technical assistance in reviewing and making recommendations for their code update process, as well as other regulatory and guidance tools that could help support the Community's sustainability goals.

Code and ordinance recommendations included codes and standards for alternative building systems such as straw bale, light straw-clay, earthen building materials, construction, solar energy systems, guidance for rainwater harvesting, grey water systems, a dark sky ordinance, resources for green and arid-climate infrastructure best practices. (*See specific recommendations and links at the end of the Case Study*)

GRIC new homes are energy efficient and will have desert-friendly landscaping. *Photo: David Eisenberg*

In addition, a draft resolution regarding the tribe's commitment to culturally appropriate green building and sustainable development was prepared.

In 2016, a half-day Tribal Green Building Workshop was hosted by U.S. EPA and the Gila River Indian Community for regional tribes to share information about using EPA's Tribal Green Building resources. The workshop was also an opportunity to showcase the Gila River Indian Community's accomplishments and programs, and as important, their commitment to evolving and sharing their best practices.

Community Involvement

Building & Safety
Procurement
Land Use Planning & Zoning
Communications & Public Affairs Office
Wild Horse Pass Development Authority
Tribal Historic Preservation Office
Cultural Resource Management Program
Pima Leasing & Financing Corporation
Department of Public Health
Gila River Casinos
Gila River Fire Department
Community Members

GRIC Staff leading a site tour of homes under construction as part of the technical assistance provided by EPA's MVD initiative. *Photo: Gila River Indian News/Christopher Lomahquahu*

Non-Community Involvement

U.S. EPA Region 9
HUD Southwest Office of Native American Programs
Inter-Tribal Council of Arizona
Development Center for Appropriate Technology
Booz Allen Hamilton

GRIC Building Codes Recommendations

- 2015 IRC Appendix R: Light Straw-Clay Construction. Light straw-clay is a construction method similar in many ways to the traditional "sandwich house" building method, using clay and straw to pack into the walls of a structural frame.

- 2015 IRC Appendix S: Straw Bale Construction. This is a viable building system for both hot and cold climates and uses locally available materials to create a very energy efficient and climate-change beneficial walls.

- 2015 International Solar Energy Provisions and Commentary. This code package contains the complete solar-energy-related provisions and referenced solar standards from the 2015 International Codes, as well as the NFPA 70: 2014 NEC® provisions related to solar energy in one document. http://shop.iccsafe.org/codes/2015-international-code-commentaries/2015-isep-code-and-commentary-1.html

- 2015 International Performance Code for Buildings and Facilities. This code is a prescriptive code and is useful in allowing new and alternative designs and methods of construction.

- 2009 New Mexico Earthen Building Materials Code:
  http://164.64.110.239/nmac/parts/title14/14.007.0004.htm

- For Community members who might want to build with other earthen wall systems, it might be helpful to have on hand ASTM E2392-10 Standard Guide for Design of Earthen Wall Systems.
  https://www.astm.org/Standards/E2392.htm

- City of Tucson amendments to the 2012 IRC related to Gray Water Piping:
  https://www.tucsonaz.gov/files/pdsd/permits/Gray_Water_Ordinance11089.pdf
  https://www.tucsonaz.gov/files/pdsd/codes-ordinances/Grey_Water_Options_FINAL_.pdf

Recommendations for Additional Ordinances Beyond Building Codes

- City of Tucson Rainwater Harvesting Ordinance:
  https://www.tucsonaz.gov/files/water/docs/rainwaterord.pdf

- For reference, City of Tucson Water Harvesting Guidance Manual:
  https://www.tucsonaz.gov/files/transportation/2006WaterHarvesting.pdf

- City of Tucson Policy for Street Trees Watered by Stormwater Runoff, included in their Green Streets Active Practices Guidelines (PDF)

- City of Tucson Solar Readiness Ordinance:
  https://www.tucsonaz.gov/files/pdsd/pdfs/GreenBuilding/june17-08-311.pdf
  https://www.tucsonaz.gov/files/pdsd/permits/Solar_Ready_Summary.pdf

- City of Tucson/Pima County Outdoor Lighting Code – dark-sky ordinance to reduce light pollution:
  https://www.tucsonaz.gov/files/pdsd/codes-ordinances/2012_outdoor_lighting_code_.pdf