

## APPENDIX B: LITERATURE REVIEW OF LAND USE AND CONSERVATION TOOLS FOR PROTECTING OPEN SPACE IN HENDERSON, NEVADA

Open space protection largely pertains to patterns of land use. The Comprehensive Plan establishes the community's pattern of future land uses, which are represented in a future land use map. Tools are then employed to effectuate its land use plan. Chapter 4's strategy for protecting the City's open space resources is composed of a range of planning tools, regulatory tools, and administrative approaches. The City of Henderson already has many tools at its disposal that can further open space protection, namely a zoning map, the Hillside Development Ordinance, and the Sensitive Lands Overlay. As noted in the Action Plan, the future land use map and zoning map should be updated to acknowledge the community's interest in the landmark projects shown on the Open Space and Trails Framework Map.

As there are hundreds of tool variations available, some tools may be more effective and appropriate than others. This Appendix begins by presenting a brief bibliography of encyclopedic references on tools and their applications. This is followed by case studies of how peer cities have used these tools as part of a comprehensive strategy to protect community resources, with particular attention to sensitive lands and the edge zone.

### Encyclopedic References

**Levy, John M. Contemporary Urban Planning. 2003.** 6th ed. *New York*: Prentice Hall. Chapter 9: The Tools of Land-Use Planning is a useful primer on the two broad categories of actions by which a community can shape its land use pattern: regulations (land use controls) or incentives (public capital investments).

**Utah Critical Land Conservation Committee. Land Conservation in Utah: Tools, Techniques, and Initiatives. January 1997.** Available at <http://governor.utah.gov/planning/CriticalLands/white.htm>. This study includes relevant discussion on the role of private conservation organizations such as land trusts, and the conservation of private lands. The concluding sections, Land Conservation Tools and Techniques and Appendix A: Open Space Tools Matrix, describe the application, pros, and cons of several of the tools recommended in the City of Henderson Open Space and Trails Plan.

**City of Peoria. Desert Lands Conservation Master Plan. 1999.** Available at <http://www.peoriaaz.com/planning/Docs/Publications/DesertlandsPlan99.pdf> Section 11: Desert Conservation Techniques, identifies a complete palette of desert conservation techniques and assesses their feasibility in achieving specific goals based on cost (both short- and long-term), ease of implementation (both technically and politically), legality, degree of cooperation required with other agencies or political jurisdictions.

### Case Studies

#### Case Study #1: Explorations at the Edge

Joseph Ewan and Michael Underhill at Arizona State University were asked by the City of Phoenix to explore strategies and designs along the edge of the new Sonoran Desert Preserve. They found that an overall physical strategy, or "Edge Coordination Plan," for the Phoenix area is needed to coordinate development at the Edge that will protect the rich desert environment within the preserve while creating high quality urban development within the edge region. Because a viable strategy must address a change in traditional land use development patterns, it may best fit within an element of the City's Comprehensive Plan. Otherwise, it could be developed as a stand-alone land use Subarea Plan at a higher level of specificity addressing the interface between locations where protected open space will abut future development, and address the broad range of concerns unique to the Edge condition.

A viable strategy must include, at a minimum, the following three components:

1. **An Analysis of the Physical Condition of the Landscape**, including an analysis of damaged areas and ecological processes that must be maintained.

A thorough understanding of the physiography of protected open space at the Edge is required prior to responsible planning and urban design policy-making. The assessment should examine the land as a mosaic of ecosystems and life zones, in order for planning and development to respond to the natural environment in a way that ensures its ecological integrity. Priority should be given to patches of wildlife biodiversity and the habitats and corridors necessary to sustain them. Physical processes, such as the hydrological regimes of washes and floodplains, should be permitted to continue or be restored where necessary, in order for dependent biotic functions to continue. Areas that have been disturbed by human uses, such

as OHV use, grazing, agriculture, or previous development should be identified as they may represent opportunities for more intense recreational uses, more intense development, or restoration. Identifying such valuable areas is critical to good planning and should play a significant role when making land use decisions at the scale of the Edge.

2. **Appropriate Public Uses Adjacent to Open Space**, including a comprehensive trail plan, a tiered system of access points, visual access, and public land uses.

Once natural resources have been prioritized for conservation, public recreational uses can be better planned to facilitate exploration of the desert without inviting damage to sensitive areas. The trails plan should take into account the features of interest within the preserve, together with the system of access points, public transportation, and adjacent streets and land uses. Providing fewer well-planned and well-placed access points is preferable to many poorly developed access points that promote trail blazing and spider-web trails. All access points should be mapped and developed at the appropriate regional, community, and neighborhood scale.

Another type of access to provide is visual access, which sometimes even reduces the need for direct physical access points. The planning of scenic routes and the context-sensitive design of roads to optimize views while preserving open space resources (especially wildlife corridors) should be a key element. Locating parks with views to the open desert can enhance park users' experiences, act as buffers, and absorb heavy uses and active recreation on more developed sites. Combining parks and trailheads will also allow facilities to be shared and the trailheads to be more visible to the adjacent communities.

Other appropriate public uses include community centers, fire stations, police substations, and schools with the intent to promote public uses at the Edge that can instill appreciation for the beauty, diversity, and wonder of the open space resource. A sense of public access to taxpayer-purchased open space is imperative.

3. **Private Development at the Edge**, including appropriate architecture and housing typologies.

As described above, views into the desert are crucial elements to consider. Coordinating community centers, parks, schools, and interpretive areas at the Edge will depend upon close collaboration with private developers. In all areas, and particularly in higher density areas, public architecture should be compatible with the desert and should set an example for private development. Native colors, native plants, local materials, and forms and art indigenous to the region seem to be more palatable adjacent to the natural environment.

The private, detached single family home is the most common form built at the edge of public land, a use that lends a feeling of privatization over immediately adjacent open space. Suggestions regarding how developers might build housing near the desert edge is perhaps the most controversial point of discussion at the edge, because it deals with the apparently incompatible interplay between embraced American concepts of privacy and community. Higher-density housing may be recommended at select points along the edge—density that is coordinated with nonresidential development to increase the feeling of an active community in harmony with the natural environment.

In order to change the traditional building practices at the edge, substantial cooperation between developers and the public sector will be necessary. Incentives and regulations, rather than voluntary compliance, will yield the greatest results. Phoenix is developing a weighted crediting system and design review guidelines to promote creativity while ensuring quality at the edge.

Case Study #2: City of Phoenix Sonoran Desert Preserve Edge Treatment Guidelines

This document also provides very specific design guidelines for treatment of the boundary of the Sonoran Desert Preserve for residential, commercial and other zoned land uses that approach the open space edges.

Open edge treatment encourages the sense of ownership of the Sonoran Desert Preserve from the greater community, rather than only those located at the edge. Facilities such as parks, schools, recreational facilities and retention areas allow both visual and physical access to the preserve. Typically, these are separate parcels, where they would provide no edge credit to developers. By allowing them to be included in a master plan for open edge treatment, siting at the edge is encouraged.

Where rezoning occurs adjacent to the Sonoran Desert Preserve, encourage development on slopes than ten percent, consistent with the General Plan, to maintain the Preserve as a visual amenity for all citizens and to maintain connectivity between mountains within the same range. Where private lands intersect the boundary, at least 60% of the linear edge must be open for public access to the Preserve, in accordance to the preserve's intended use as a visual and recreational amenity for all.

Case Study #3: Scottsdale, Arizona's Citizen's Guide to Environmentally Sensitive Lands

Purpose

The purpose and intent of the Environmentally Sensitive Lands Overlay (ESLO) is to identify and protect environmentally sensitive lands in the City of Scottsdale and to promote public health and safety by controlling development on these lands. The ordinance supercedes a previous Hillside Protection Ordinance. It requires that a percentage of each property be permanently preserved as Natural Area Open Space and that specific environmental features be protected, including vegetation, washes, mountain ridges and peaks, to assure appropriate development.

Goals and Major Components

The ESLO was established in order to:

- Encourage the protection of unique and sensitive natural features in the Upper Sonoran Desert, including but not limited to the mountains and hills, large rock formations, native landscape, archeological and historical sites and significant washes.
- Encourage development that blends with the character and nature of this special desert setting.
- Protect the public and property from the special hazards that can be found in this desert setting.
- Minimize the costs to build and maintain the public infrastructure necessary to sustain the use of the land.

Intensity of Development

The intensity of development is the amount of land use and building that occurs within a specific amount of land area. For residential land uses this is typically measured in units (residences) per overall gross acreage of the property and is referred to as density. The amount of use and development that is allowed decreases as the slope of the land increases (becomes steeper).

Open Space Requirements

In the ESLO there are requirements for providing Natural Area Open Spaces (NAOS). NAOS areas are either natural desert that have been undisturbed by development activity or where development has restored the desert terrain and vegetation to its natural condition. These open spaces are generally different than those required by the underlying zoning districts, but in some cases it may be possible for an open space area to meet requirements for both the ESLO and zoning district requirements.



#### Case Study #4: Phoenix Desert Character Overlay District

This Plan states three implementation tools aimed at integrating the “desert character” into development in the northeast area of the City. It also focuses on conservation of:

- Wildlife habitat and corridors,
- Undisturbed wash corridors,
- View corridors, and a
- Network of trails.

In addition to the General Plan Amendment which established a cap on residential densities and the goal set leading to the Sonoran Desert Preserve, the Plan called for development of zoning overlay districts for the three identified Desert Character Areas – the Desert Preserve, Rural Desert, and Suburban Desert.

The overriding purpose of the Overlay is to guide development that will blend with the undisturbed desert rather than dominate it. Residential density for Subdistrict A is limited to 1.2 dwelling units per acre (du/ac). This area is characterized by numerous undisturbed wash tributaries to Cave Creek Wash and pristine Sonoran Desert vegetation. It is the intent of the Overlay in Subdistrict A to provide regulatory guidelines for compatible development which will provide a transition from Arizona Preserve Initiative land (open space) to more developed areas.

Subdistrict A is strictly limited to large lot residential development with a minimum lot size of 35,000 square feet. Development of the lots will be based on use of building envelopes with area outside of the envelope maintained in an undisturbed natural state. Areas that experienced prior disturbance are addressed by guidelines allowing revegetation.

Subdistrict B provides a range of densities from 2-5 du/ac. With a requirement that 50 percent of any parcel be maintained undisturbed desert, it is envisioned that true cluster development will be

the predominant development style in Subdistrict B. Allowances are made to allow attached residential product with a range of heights to enhance the potential for successful cluster development.

The Overlay addresses a number of items that are currently not addressed elsewhere by city ordinance or policy, setting new standards and criteria for development. The more universally applicable elements include the use of a site analysis for the siting of developable areas, establishment of criteria for the conservation of wash corridors, clear definition of the use of building or construction envelopes, building height in the context of the desert vegetation, and residential cluster development. Regulations and design guidelines work together to provide development that will be compatible within the context of the Sonoran Desert. The Plan further discusses specific design guidelines for building height envelopes and residential cluster housing.

The City of Phoenix Municipal Code, Section 653 – Desert Character Overlay Districts implements this north land use plan, defines the nature of development while maintaining undisturbed areas, and provides guidance for new development to occur within the context of the fragile undisturbed desert. The key to successfully maintaining interconnected undisturbed desert and washes, lies in analysis of individual subdivision sites before laying out the design of streets and lots.

#### Case Study #5: City of Peoria, Arizona Desert Lands Conservation Overlay

Prior to adoption of the General Plan, efforts to protect natural resources had already begun with the City Council’s adoption of the Desert Lands Conservation Master Plan in 1999. This plan focused the city’s conservation efforts by identifying a set of programs and policies to provide open space, parks, recreation corridors, and protection of culturally or environmentally unique or sensitive areas in Peoria. The Peoria City Council is considering a new Desert Lands Conservation Ordinance that would set new guidelines for new developments in sensitive areas. Planning efforts are working to the benefit of all Peoria, not just communities that have yet to be built. Since adoption of the Desert Lands Conservation Master Plan, the City Council has (through the zoning process) negotiated over 3,600 acres of open space, mountain preserves, and parks either already dedicated or designated for dedication to the city for the enjoyment of all Peoria residents.

The purpose of the Desert Lands Conservation Overlay (DLCO) is to identify and protect the unique and environmentally sensitive Sonoran Desert lands in the City and to promote the public health, safety and welfare by providing appropriate and reasonable controls for the development of such lands. The DLCO is intended to:

- Identify sensitive desert conservation features and resources.
- Protect and preserve Peoria’s distinctive desert landscapes and wildlife habitats for the enjoyment of current and future generations.
- Protect people and property from hazardous conditions characteristic of environmentally sensitive lands and their development.
- Integrate conservation design into the development of sensitive desert lands and employ development standards and guidelines that equitably balance conservation and development objectives.

In addition, the DLCO is intended to implement the goal, policies and objectives of the Desert Lands Conservation Master Plan (DLCMP). The overlay establishes a holistic approach to evaluating the environmental conditions of each site that allows both City staff and the development community a better basis for determining conservation areas. The overlay also establishes criteria for determining conservation priorities based on the potential to expand or extend a regional open space corridor, the opportunity to provide a link to an existing or future trail system, the possibility of expanding an existing open space, or the possibility of creating a buffer zone between different intensities of uses.

The DLCO establishes standards and design guidelines for development within desert areas and adjacent to conservation areas. These regulations and guidelines vary by landform type in order to address the three distinctive types of geography (desert floor, bajada and hillside) found in the Peoria desert areas.

The DLCO focuses on conserving the following sensitive features:

- **Cultural Resources:** Prehistoric and historic sites identified according to standards established by the State Historic Preservation Office. Includes artifacts such as rock walls, etc.
- **Isolated Peaks:** The prominent peaks which jut out of a typically flatland area. These are landmark features whose rugged vertical form contrasts sharply with the horizontal ground plane.
- **Mountainous Areas:** Areas such as the Hieroglyphic Mountain Range which include numerous peaks, rugged topography, steep slopes and small v-bottomed washes flowing out of the area.
- **Plateaus:** An extensive land area characterized by slopes leading to a relatively level surface and situated at a uniformly higher elevation than adjacent land on at least one side.

- **Primary Peaks:** Prominent peaks that are visual landmarks from various points of view and rise at least 400 feet above the surrounding base elevation.
- **Riparian Vegetation:** Native vegetation that grows where there is a concentration of sustainable drainage water resulting in larger plants, greater species diversity and greater density.
- **Riverine Area:** Environmentally diverse riparian areas associated with the New River and Aqua Fria Rivers and Major Washes (see Wash, Major below).
- **Rock/Boulder Formation:** Formations including escarpments, cliffs or pinnacles which consist of exposed rock faces with limited vegetative cover.
- **Significant Vegetation Area:** Generally located adjacent to a wash or other source of water and best maintains the character of the site when protected in place.
- **Significant Vegetation Specimen:** A native tree with an 8" or greater caliper trunk and multi-trunk in good health, a saguaro over 20 feet in height and/or multiple arms or crest or other unusual configuration in good health, or other mature protected species, such as Ocotillo.
- **Skyline Ridge:** Ridge lines and ridge line complexes which are visible from existing and/or planned collector and arterial roads and meet a number of other specific conditions.
- **Spring:** A permanent small stream or source of water coming out of the ground.
- **Talus Slope:** A slope strewn with a layer of loose rock debris, usually over unconsolidated soils.
- **Unstable Slope:** A slope that exhibits one or more of the following conditions: boulder collapse, boulder rolling, rock falls, slope collapse and talus slopes.
- **Wash, Major:** Washes that because of its size is more riverine in character than secondary washes.
- **Wash, Primary:** Wide, sand bottom washes that carry drainage from a relatively broad watershed and are fed by a number of smaller tributary washes.
- **Wash, Secondary:** Tributaries to the significant washes and the rivers.
- **Wildlife Corridor:** Pathways or habitat linkages that connect discrete areas of natural open space otherwise separated or fragmented by topography, changes in vegetation, and other natural factors in combination with urbanization.
- **Wildlife Habitat:** Locations where native wildlife has a tendency to congregate due to provision of food, shelter and/or water.

#### Desert Lands Conservation Report

The Overlay requires that a comprehensive report be submitted as part of a rezoning, platting site plan or building permit request that reviews existing conditions and site and project characteristics. For projects larger than 10 acres, this shall be the Desert Lands Conservation Report (DLCR). Projects of 10 acres or less may submit a Master Conservation Plan (MCP). The master conservation plan includes identification of conservation features, native plants, and landscape character. If a development request is being proposed on a property for which an existing DLCR is on file with the City, the Planning Manager shall determine what information, if any, needs to be updated. Note that the development of a single-family custom home shall not require a Desert Lands Conservation Report or Master Conservation Plan. The developer of a single-family custom home shall indicate on the site plan the location of conservation features to be preserved.