

ECOLOGICALLY REGENERATIVE DEVELOPMENT AROUND A PROPOSED HIGHWAY CORRIDOR

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A DYNAMIC NEW VISION FOR LIFE IN THE WEST

Natural resource management is becoming a critical aspect of new, expanding cities and towns in the 21st century. Natural resource planning for large-tract development provides the local jurisdiction with high quality lifestyle opportunities for their citizens and visitors. That high-quality lifestyle includes leaving viewscapes in tact; use of inter-modal transportation options to maintain air quality; collection of rain water for riparian preservation; diverting stormwater to drywells for subsurface water storage; preserve and maintain native grass and tree species to prevent erosion and reduce fire hazard; enhance wildlife habitat in and around human habitation. Planning communities around resource management allows for economic development to



Figure 1

advance in a manner that does not deplete resources such as water, soil and air.

From a natural resource perspective, one approach is to preserve natural resources is to plan communities around sensitive species of flora and fauna and to preserve riparian areas. Like the proverbial canary in the coal mine, maintenance of suitable habitat for sensitive and prized species of animals and plants are visible indicators of our own habitat health. Depletion of sensitive species implies that there are stressors in the environment that can or will affect the human habitat in ways we cannot yet perceive. But with proper planning, the adverse impacts to our habitat can be prevented. Highway corridors can now provide opportunities

with local governments to study our environment and develop a baseline of impacts that will allow for the sustainability of the natural habitat. This vision involves a community partnership between local jurisdictions (led by the metropolitan planning agency), state and federal agencies, and the landowners in the area.

This vision proposes ways to regenerate those eco-systems affected by highway corridors and the impacts associated with urban growth surrounding them.

STRATEGIC HIGHWAY PLANNING

When planning for highway corridors 5-20 years in the future, State DOT's must adapt their designs for roadway development to match changing land use schemes and realities. The updated Second Strategic Highway Research Program (SHRP2), operating under the auspices of the Transportation Research Board (TRB), provides the strategy and framework for natural resource management integrated into the highway corridor plan. SHRP2 defines their vision underpinning their research as a process *"to develop a scientifically supported, outcome-based approach that would facilitate efficient and effective transportation planning, regulatory decision making and capacity development while maximizing opportunities for the long-term conservation and enhancement of ecosystem functions at multiple scales"* [TRB, 2012]. SHRP 2 proposes to achieve better environmental outcomes from regional transportation planning borrowing from pilot studies advanced by the Integrated Eco-logical Framework (IEF) of previous studies [FHWA, 2009 and TRB, 2012]. Several steps in the framework focus on resource status to integrate conservation, natural resource, watershed, species recovery, and state wildlife action plans into the corridor planning process. Under SHRP2, this is accomplished through the establishment of a Regional Ecosystem Framework (REF) in which to assess transportation effects on ecosystem development through a local partnership committee.

As a result, the integration of the ecological framework into the corridor planning creates long-term stable plans and organized developments interspersed with conservation easements as wildlife habitat corridors. By initiating planned development around natural resources, re-design and re-evaluation of the environmental documents is minimized and predictable prior to construction. This approach also presents cost advantages by incorporating design with natural resource management early into the corridor study with local government/public participation.

By integrating local land use planning into the NEPA process, FHWA and state DOT's can participate more confidently in the issues considered most dear to the local community as expressed through their land use plans. This process is already in force, partially. For example, 4(f) properties are currently considered in the NEPA consultations even if they are outside the Right-of-Way (ROW). Certain cultural concerns are also addressed even if outside the ROW. Impacts to downstream property owners and wildlife habitat are considered during design and construction. Public transportation needs and traffic plans are based on local density projections, types of land use in an area (residential versus commercial or industrial). These issues are not confined to the ROW. So, the state DOT and the FHWA already participate in local community interests and seek ways to accommodate those issues in highway design. The new MAP-21 process provides some direction in merging the NEPA process with local land use plans that coordinates natural resource management, lifestyle considerations, and open space/habitat connectivity into the corridor studies [TCAPPP, 2012].

Currently, the DOT's tend to leave the actual land use/land development to chance and merely respond to that haphazard long-term development scenario. This can cause costly mitigation measures and compensation to landowners for purchase of properties in and around the ROW. Long-term planning with the local authorities allows for predictable land uses along and crossing the ROW and preserves those features in the landscape valued by the community.

LOCAL COMPREHENSIVE LAND USE PLAN

In the initial phase of their study, the Ecosa students looked to the guiding vision as stated in the Yavapai (AZ) County Comprehensive Plan which *“is to provide a flexible and adaptable approach to managing growth while respecting the values of our past, to achieve our common goals, and to plan for a future that enhances our high quality of life while protecting a permanently sustainable natural environment.”* (Yavapai County, 2012)

As the study progressed, the students began to assemble relevant land use plan goals stated in the Draft 2012 Yavapai County Comprehensive Plan. These goals and recommendations are presented in the general, transportation and environmental elements of the Plan and summarized below. Goals in red represent those most related to resource management.

Goal 1: Maintain compatible land use formations. (page 27)

Objective a: Promote compact form developments, which reduce reliance on natural resources.
 Objective b: Support Planned Area Developments that balance housing and flexible land uses with multiple modes of transportation and open space to enhance sustainability and preserve air quality.
 Objective c: **Encourage energy-saving and efficient design proposals to preserve open space, ecological regeneration, biodiversity, and habitat connectivity.**

Recommendations (page 28)

- **Locate compatible land uses along major transportation corridors designated in Regional Transportation Plans.**

- Encourage and support integrated approaches ranging from legal subdivisions for low density projects to master planned communities where a mix of uses or housing types is proposed.

- **Promote open space preservation with emphasis on land dedication, clustering, density transfer, buffers between communities, and non-development easements.**

- Encourage communities to create Vision Statements that reflect how they see their

communities developing and where appropriate land uses such as commercial, industrial and large scale renewable energy projects may be appropriately located.

- Promote policies that encourage regulated development over lot splitting to the extent the laws governing the County allow.



Figure 2

- Support legislation that discourages unplanned lot splitting while still protecting the rights of individual property owners.
- Consider potential conflicts with unregulated activity when reviewing development proposals.

Recommendations for Long-Term Transportation Element (page 45)

- Continue to coordinate planning and communication efforts between Yavapai County and other transportation and land use agencies including the utilization of studies from wildlife management agencies to mitigate impacts on wildlife corridors.
- Adopt processes that ensure adequate review of future development, including continuing of County/State cooperative review process for proposed development in Yavapai County, including unregulated lot splitting, as it relates to adequate access and potential transportation corridors.
- Incentivize multi-modal connectivity in new development.
- Codify allowance of public transit facilities.
- Continue to construct new infrastructure to standards that encourage safe multimodal opportunities.
- Review new development for consistency with current regional transportation plans and standards that may include access control measures identified in the regional plans.
- Adopt Land Use policies that promote appropriate Land Use categories as they relate to high volume traffic corridors and intersections.

Land use plan goals for environmental protection are:

Recommendations

- Promote water recycling from industrial, agricultural and energy production.
- Promote approved methods of recharge or rainwater harvesting for new development.
- Promote graywater harvesting, efficient plumbing and other methods of water harvesting, such as rainwater catchments, catchment basins and passive water harvesting in cases where technologically feasible.
- Promote willing seller/willing buyer transactions that result in the transfer of development rights to preserve the Verde River and other major waterways. (*wildlife/habitat corridors?*)
- Encourage protection and creation of recharge areas.

ECOSA PLAN FOR DEVELOPMENT AROUND A HIGHWAY CORRIDOR

The area north of Prescott and Prescott Valley was chosen by the Ecosa Institute as a study area for ecologically regenerative development around a proposed highway corridor as part of their curriculum for a certification program [Ecosa, 2012]. It is an area suited for the Ecological Framework process of the SHRP2 Program because of its rural, resource-rich geography and inter-dependent local jurisdictions forecasting rapid growth in the near future. There are many similarities in this region to some of the locations in the earlier pilot studies conducted by the TRB through SHRP 1 [FHWA, 2009]. The planning area is located on the CYMPO Map (Fig. 3) at the heart of a triangle formed between Prescott Valley, Prescott and Chino Valley (red and blue square south of Chino Valley). It encompasses a rural area with broad rolling grasslands at a modestly high elevation surrounded by mountains with a semi-arid climate (Figures 1 and 2). Prescott and Prescott Valley are projected to experience high population growth which is projected to be mostly north of the two towns [Yavapai County, 2012].

The Ecosa Plan (Figure 4) incorporates all the major elements of the Yavapai County Comprehensive Land Use Plan in its “Vision for Life in the West.” By considering wildlife corridors, habitat management, rainwater harvesting, groundwater recharge, and maintain the broad views of the landscape, this Plan integrates the ecological components of the undeveloped land into the human needs for housing and transportation.

The Ecosa Plan recognizes the Regional Eco-System Framework required under SHRP 2 as one that links habitat for a variety of animals that live on the high grasslands but can also meander in and out of the Granite Dells riparian area or as far south as the Watson Lake Park area.

Development is concentrated around the a proposed corridor with sufficient open space for either

recreation (horseback riding, hiking, biking, etc) and not a constraint on the flagship species the Pronghorn. So, the proposal formulated by the Ecosa Institute collaborates with other local groups in establishing a watershed-based approach to land development and water quality enhancing features.

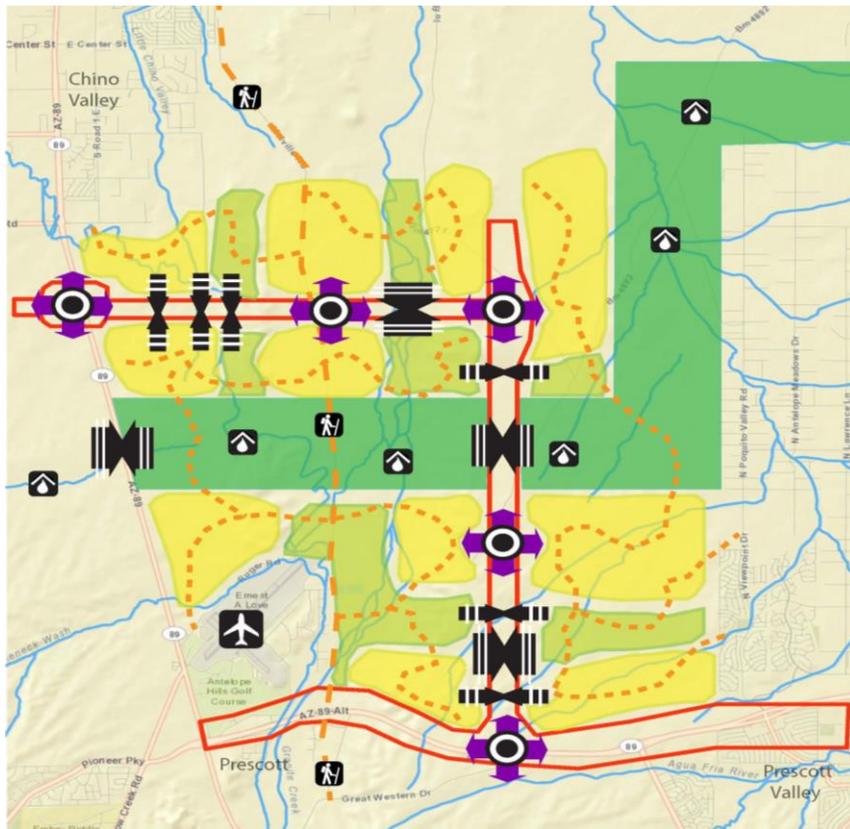


Figure 4

The easement (green band in center of Figure 4) is a visionary concept within the Ecosa Plan which is based on the supposition that land swaps between government organizations and private landowners, outright purchases by private non-profits for conservation easements, and donations by private landowners can be combined to form a corridor across this part of

the County. The conservation easement could be formed as a conservation “bank” where entities outside the Prescott area can negotiate to purchase land in exchange for land near their enterprise, allowing for its expansion as a financial benefit to landowners and the local economy.

Small “village” or compact mixed use developments are presented in yellow and include a mix of residential, industrial and commercial spaces like a self-contained small town. They are located close to or along the corridor alignment to allow for maximum creation of open space between the smaller “village” developments. The orange-dotted lines are conceptual alignments for recreational and intermodal bicycle trails that link the small “village” developments together.

All of these concepts for environmental protection are presented through land use plans already approved by the public as the kind of development they would embrace. In addition to community response, they conform to the wording in the Executive Order and the research sponsored by the TRB as elements necessary to protect and enhance the natural resources around any new highway corridor. Ecosa's proposal goes a step further in that it regenerates the eco-system by using the land developed for humans to recharge the water supply aquifer, enlarge and enhance riparian habitat along the major drainage of the watershed, allows a variety of habitat for migratory species to flourish, and provides options for transportation that reduces impacts on air.

As a result of a regional eco-system type of framework for planning around highway corridors, Ecosa has presented a plan where the eco-system is not negatively impacted, habitat is allowed to regenerate and flourish, water supply is sustained, air quality is retained as now with the sky visible at night, and recreation is enhanced along trails in a natural setting providing interaction with the species the public desires to protect.

BIOGRAPHICAL SKETCHES

As a graduate of the College of Mines at the University of Arizona with a Bachelor's Degree in Geological Engineering, **Charles Budinger** has worked as an environmental specialist in groundwater investigations for low-level radioactive waste repositories, tunnel projects for stormwater conveyance, local municipal stormwater compliance and watershed management activities. Mr. Budinger is currently employed as an Environmental Coordinator for ADOT in the Prescott District. Mr. Budinger has served on several local citizen committees including a Mayor's Committee on Vision for Water in 2050 in Prescott, the Granite Creek Watershed Improvement Council and the Mayor's Committee for the Evaluation of Watson Lake.

Antony Brown is the Director and Founder of the Ecosa Institute. He has over 40 years' experience working on sustainable architecture and urban design. He has taught sustainable design and planning at the college level and has lectured at universities around the United States and abroad. As Director of the Ecosa Institute he continues to develop an innovative new approach to educating students and graduates in the role of sustainability in design. He has attracted a number of leading architects, designers, scientists and writers to the Ecosa Institute to meet with students, review their work, and discuss their approach to sustainable issues. Students now come to the Ecosa Institute from around the world to supplement their design education. Mr. Brown has worked as an architect in London, Boston and San Francisco, has been a magazine editor and written numerous articles for magazines for which he has won press club awards. He has received awards for his book illustrations including illustrations in "Nature Notes" and "The Ecology of the Grand Canyon." He founded an award-winning graphic design company and has an architectural practice where he has promoted concepts of sustainability throughout his career.

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