

TERRAIN MANAGEMENT

The terrain management plan for the Village is designed to mitigate the effects of stormwater runoff, soil erosion, and/or wildlife habitat loss that could otherwise result from new development.

To date, Commonwealth Conservancy has engaged a number of local and national land restoration and “regeneration” specialists and organizations to inform its development planning work. Locally, Commonwealth has engaged EarthWorks Institute, Regenesys, the Santa Fe Conservation Trust, the Trust for Public Land, and a number of independent consultants (e.g., Bill Zeedyk, Andrew Jandáček, Steve Vrooman) to minimize the deleterious effects of new development and to inform a restoration program for the Galisteo Basin Preserve. Specific strategy recommendations include the following:

Stormwater Runoff

Stormwater runoff will be addressed through a combination of “low impact design” and “traditional engineered” solutions.

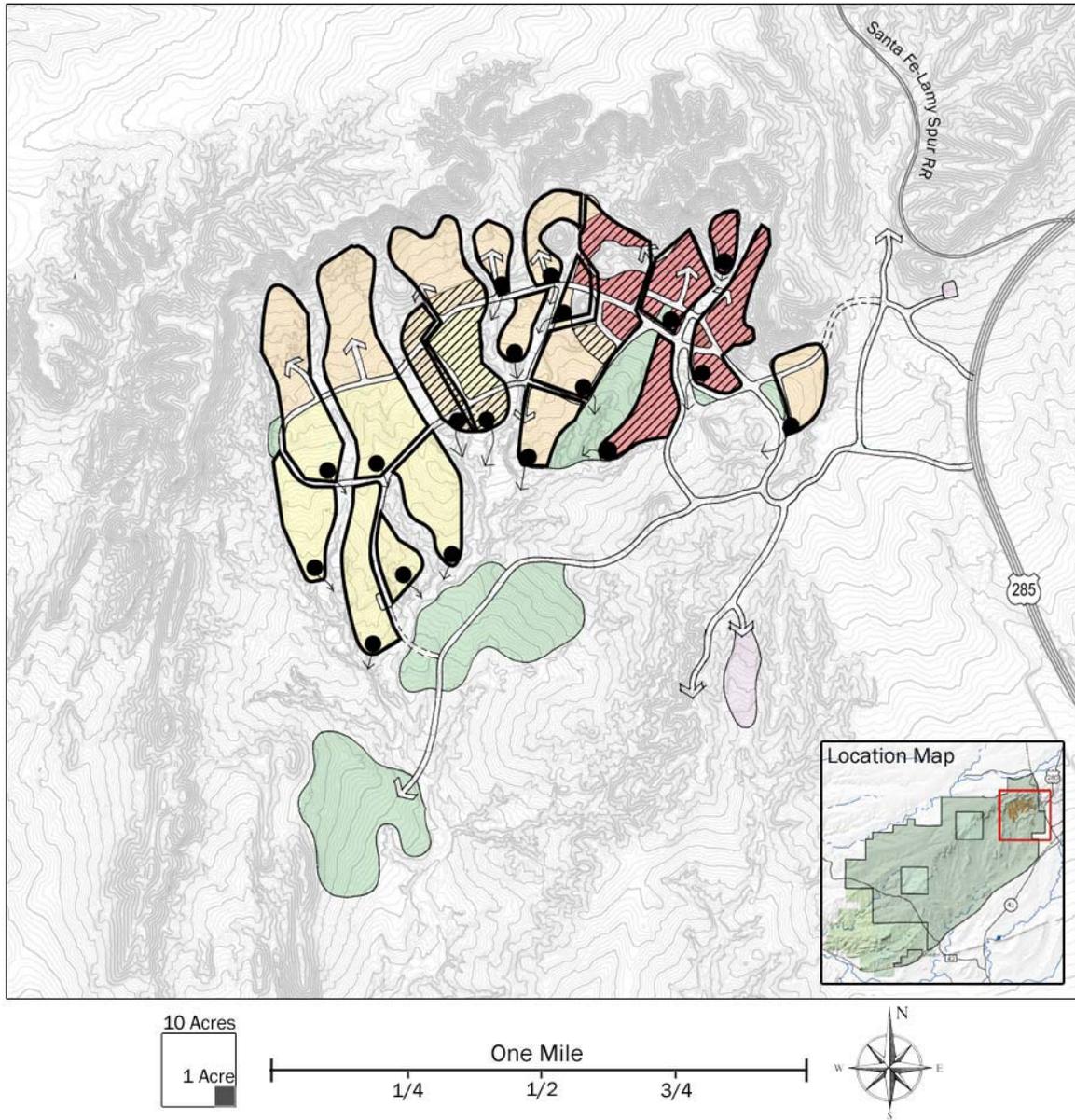
1. Low impact design (LID) solutions attempt to mimic natural systems to reduce the volume, increase filtration, and modulate the release of stormwater from a proposed development area.
2. Traditional engineered solutions often include the design and construction of manufactured structures and systems such as gutters, drains, culverts, and detention ponds.

The Village’s LID approach to stormwater runoff will include a number of techniques, strategies, and integrated management practices. These are likely to include:

- Compact design that limits the scale and extent of impervious cover across a site (i.e., rooftops, roads, patios)
- Bioretention cells and rain gardens (i.e., swales, constructed wetlands)
- Amended soils (i.e., restored soils to maximize absorptive capacity)
- Green roofs
- Rooftop rainwater harvesting (to reduce flow and increase evapotranspiration)
- Runoff dispersion (i.e., water spreaders)
- Pervious pavement
- Distributed subsurface storage (i.e., tray collection systems under playfields)

Figure 4.J

Stormwater Plan



- Legend**
- Drainage Shed Boundary
 - Controlled Discharge to Arroyo

Stormwater infiltration plays an important role in replenishing groundwater resources. Properly designed and implemented, infiltration strategies can effectively filter and remove non-point source pollutants, as well as reduce surface runoff volumes and flow rates that exacerbate erosion and sediment transport in arroyos. Given the important influence that the Arroyo de los Angeles plays in sediment loading within the Galisteo Creek, LID approaches to stormwater management could demonstrably improve the shallow groundwater resources of the Preserve, as well as visibly reduce downstream erosion and “headcutting” in the region’s drainage system.

Where LID methodologies cannot be productively employed -- due to physical constraints or regulatory limitations -- more traditional methods will be combined with LID techniques. In either case, the ultimate destination of collected storm water runoff will be an existing arroyo. Figure 4.J indicates preliminary locations of controlled stormwater discharges to arroyos. At these locations, runoff will be carefully deposited into an arroyo through means that will be integrated into the arroyo/headcut restorations (discussed below). Discharge measures may include runoff dispersion, energy dissipation etc, all designed to ensure that runoff joins the arroyo at its flowline (rather than over its side) and in a manner that creates no erosion. Storm water detention may be integrated into arroyo restoration at these locations as well.

Figure 4.K

Integrated Management Practice	The Village at Galisteo Project Objective									
	Stormwater Management			Water Use	Habitat Potential and Visual Amenity		Social	Building Efficiency		
	Control peak runoff rate	Promote Infiltration and Groundwater Recharge	Provide stormwater treatment	Reduce runoff volume to predeveloped conditions	Store water for potable/ non-potable use	Improve aesthetics	Creates habitat	Recreation/ Accessible Open Space	Insulation/ protection	
Compact Design/Less Imperviousness	Good	Good	Not Applicable	Good	Not Applicable	Moderate/Has Potential	Good	Good	Not Applicable	
Bioretention Cells/Rain Gardens	Good	Good	Good	Good	Not Applicable	Moderate/Has Potential	Moderate/Has Potential	Not Applicable	Not Applicable	
Amended Soils	Moderate/Has Potential	Moderate/Has Potential	Moderate/Has Potential	Good	Not Applicable	Moderate/Has Potential	Moderate/Has Potential	Moderate/Has Potential	Not Applicable	
Vegetated (Green) Roofs	Good	Not Applicable	Not Applicable	Good	Adversely Impacts	Good	Moderate/Has Potential	Moderate/Has Potential	Moderate/Has Potential	
Rooftop Rainwater Harvesting	Moderate/Has Potential	Moderate/Has Potential	Not Applicable	Moderate/Has Potential	Good	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
Dispersion of Runoff	Moderate/Has Potential	Good	Moderate/Has Potential	Moderate/Has Potential	Not Applicable	Not Applicable	Moderate/Has Potential	Not Applicable	Not Applicable	
Pervious Pavement	Good	Good	Good	Good	Not Applicable	Moderate/Has Potential	Not Applicable	Not Applicable	Not Applicable	
Distributed Subsurface Storage	Good	Good	Moderate/Has Potential	Good	Moderate/Has Potential	Not Applicable	Not Applicable	Moderate/Has Potential	Not Applicable	

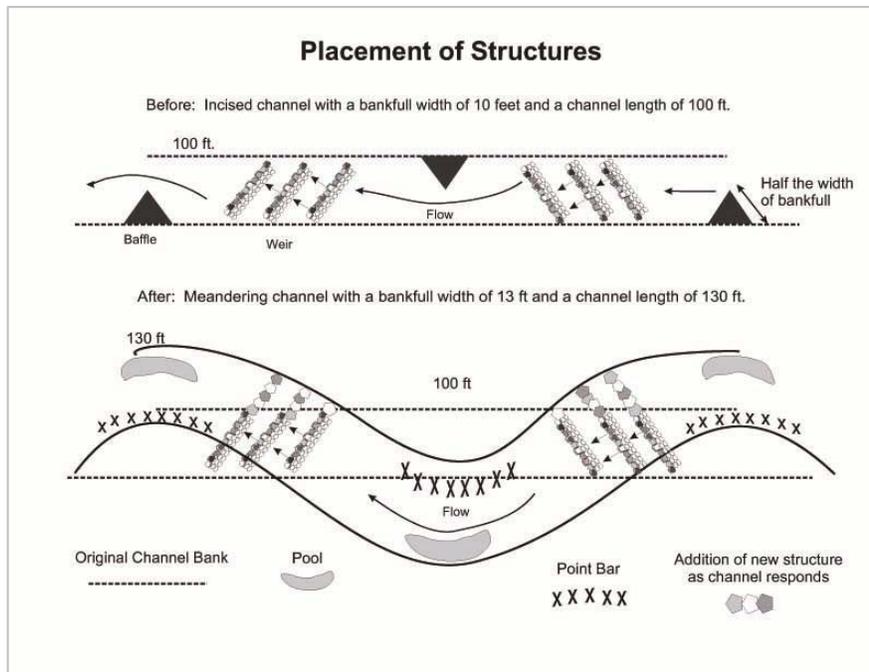
Erosion Control + Arroyo Restoration

To minimize the risk of erosion control, Commonwealth Conservancy engaged Andrew Jandáček and Steve Vrooman to assess the soil, vegetation, and water flow conditions in the Village basin area. A summary of their findings is provided in Section 3 – Hyrdrology of this submission, and their full reports are included in the Technical Reports + Appendices.

Relative to erosion control, the Jandáček /Vrooman study focused on: (i) the form and shape of Village sub-watersheds; (ii) estimated water runoff volumes; (iii) vegetative cover and “canopy gap” measurements; and (iv) arroyo migration rates (i.e., erosion at the uppermost point of an arroyo).

LID erosion control strategies involve a range of techniques and approaches. They include the methodologies noted in the Stormwater Management section above, as well as adequate buffers to arroyos and other natural drainage features. They also implement “downstream” solutions such as “induced meandering” – a technique that involves restoring an arroyo’s water flow pattern to a serpentine, meandering form, rather than allowing high water volumes to exacerbate incising and undercutting erosion.

Figure 4.L



**Wildlife Habitat
Conservation and Habitat
Regeneration**

The terrain management plan for the Village development will involve the following wildlife conservation and habitat regeneration strategies:

- Protect winter range for antelope and mule deer populations
- Designate a majority of the Galisteo Basin Preserve as permanent open space – with conservation easement overlays that bolster the stewardship resources of the project
- Develop properly buffered trails and migration corridors
- Link adjoining public lands to the wildlife corridors of Cañada de la Cueva, Cañada de los Alamos and San Marcos Arroyo.
- Site lower-density Village basin lots as buffers near areas of the Preserve so as to support higher densities and a greater diversity of wildlife species
- Designate building envelopes on all Village basin lots to minimize the disruption of wildlife habitat, native groundcover vegetation, and existing soil and drainage patterns
- Restrict fencing along perimeter lots that adjoin wildlife migration corridors and winter range areas

In addition, the Village development standards and design guidelines described in Section 5 will:

- Encourage development clustering to maximize the productivity and connectivity of habitat corridors
- Limit fencing to 42" maximum height and 18" minimum kick space.
- Require new landscape material outside building envelopes to be drought tolerant, native, and selected from a list of plant species that are “less palatable” or non-palatable to wildlife
- Encourage replanting of wildlife food species and plant species that enhance critical habitat
- Prohibit the installation and require the complete removal of noxious plants and weeds
- Require builders to employ "best practices" grading techniques including incremental phasing/reparation, dust controls, “grading limit” fencing
- Limit modifications to natural drainage ways
- Design drainage structures so wildlife can be easily accommodated
- Prohibit exposed dumping and composting (covered

composting will be permitted)

- Require that residential trash is kept inside house or garage until the morning of trash collection. Require trash containers that have attached lids
- Require that dogs and cats are constrained when outside the Village boundaries
- Prohibit contractors from bringing dogs to construction sites
- Prohibit off-road motorized vehicles (four-wheel drive vehicles, snowmobiles, and motorcycles) on trails and within open space areas except for construction, emergency, and maintenance vehicles
- Include wildlife educational materials and an acknowledgment of wildlife presence and the potential for property damage in homeowners' documents

LANDSCAPE DESIGN + CONCEPTS

The diversity and color of the community's landscape will distinguish the Village as a place of vitality and beauty. With the introduction of people into the Village development area, the prairie complex and pinon/juniper forest that dominate the landscape will become more cultivated, and the plant materials will likely include a richer palette of native species.

The allowable landscape palette for the Village will be largely native and drought tolerant. Detailed standards will require that most areas of landscape be irrigated with treated effluent during a garden's "establishment period" of 18 months to three years. The plan objective will be to create a diverse and visually interesting landscape, without requiring significant quantities of water.

Plant materials will be selected for compatibility with local indigenous plant communities and drought tolerance, as well as their color and texture. Homeowners will be strictly limited in the area of turf and number of exotic plant materials they may use to vegetate their lots. Plant materials that are not compatible with the native or near-native appearance of the community will be limited to areas behind courtyard walls. The total area of allowable landscaping will be controlled by the use of a water budget allocated to each homeowner for landscape improvements.

Community plantings -- such as street trees and landscaping within parks and major open space areas -- will be planted with native or near-native materials and will utilize temporary irrigation to assist establishment. Irrigation will be limited or eliminated after the establishment period. Plant material will be evaluated in terms of how well it enhances the community architecture, existing landscape character and how it encloses or links activity areas within The Village.

Micro climatic influences will also be important factors in community and residential planting schemes. Protection from the intense summer sun, allowance for passive solar heat gain in winter, and wind breaks during the spring will guide the design and execution of landscape plans.

Plants that require little maintenance will be favored over those requiring frequent spraying and pruning. Special attention will be given to appropriate plant spacing, as this will reduce excessive pruning.

Undeveloped lots or portions of lots outside designated building envelopes will not be irrigated or use exotic plant materials. These areas can be enhanced with approved plant materials such as shrubs, grasses, or wildflowers consistent with the overall community concept and habitat program.

Plantings that obstruct long distance views or short distance sight lines from key community amenities will be avoided.

In the arroyos and drainages, native trees, shrubs, and grasses will be selected for their wildlife habitat value, as well as for their appearance and drought tolerance. Within the Village center, arroyos will be improved with “one-rock dam” structures that capture water and soil in the alluvium. As the water resources of the Village are enhanced with restoration and regeneration strategies and techniques, small wetlands can be established and cottonwood bosques created. Relatively simple additions to the habitat values of the Village drainages can reasonably be expected to generate a tremendous increase in bird and mammal populations and visitation.

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PHASING PLAN

Given the uncertainties associated with the real estate industry -- unpredictable market behavior, erratic absorption rates, rising financing and construction costs, and unforeseen infrastructure needs -- the initial phase of development for the Village can be envisioned with greater confidence than can later phases.

Residential development will be modest during 2007-09 in the Village center and Neighborhood residential areas (i.e., 55 to 70 units per year), allowing medium density residential (i.e., Neighborhood housing) to be introduced early in the project's lifecycle. Subsequent phases (2010-14) involve construction of high-density Village homes in and around the Village center (25 du) and single-family detached Basin homes in western and the southwestern development envelopes.

Row houses, live-work lofts, and new commercial units would be developed in the Neighborhood zone near the base of the Lamy Crest during the middle and later phases of the project (i.e., 2010-18).

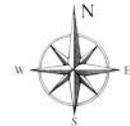
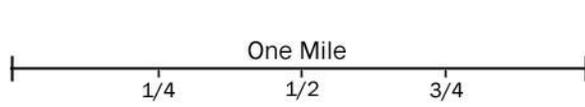
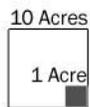
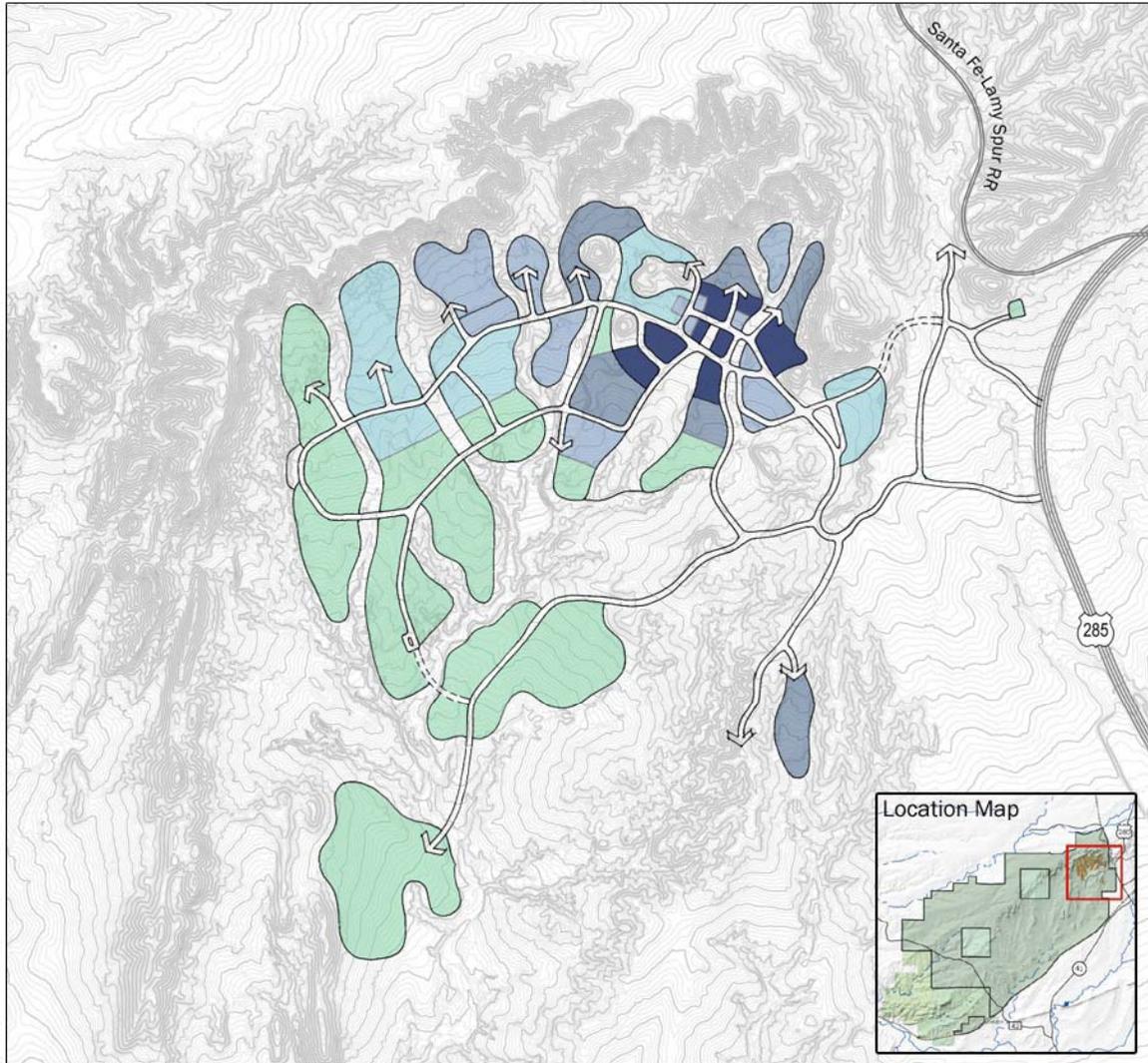
Inclusive housing units would be developed in each phase of construction. During the initial development period, 10 to 20 units of inclusive housing could be constructed. During the mid-term (2010-14), more than 100 units are anticipated. The remainder will be phased with increasing intensity between 2015 and 2018.

Phase One (2007-09): The first phase of development is projected to include a mix of 110 to 140 residential units including: 10-15 +/- Homesteads, single family custom and production homes, row houses, and multi-family condominiums. The first phase will address roadway improvements to Astral Valley Road and Thornton Ranch Road, in addition to associated landscape and entry improvements. A sales center and café will be developed within the Village center. Additionally, the charter high school is proposed for development in the Village center. Utility systems to support this phase will include: wells, an initial storage tank, water distribution lines, the initial phase of the waste water treatment system, and related storm water management structures serving the Phase One development area.

Later Phases (2009-2020): The rate and distribution of development after the initial phase of construction will be determined by the market's response to the project, regional economic conditions and construction efficiencies. According to Commonwealth Conservancy's market studies, the demand for housing of this type, associated with a community with ambitious high environmental values, in this location of Santa Fe County should be absorbed at a rate of 65 to 100 units per year. As noted in the community housing section of this document, the housing mix will include a broad range of price points to serve a diverse buyer population.

Figure 4.M

Phasing Plan



Legend

- Phase 1 (Village Center & Neighborhoods - 2007-2009)
- Phase 2 (Village Center % Neighborhoods - 2009-2011)
- Phase 3 (Village Center & Neighborhoods - 2010-2014)
- Phase 4 (Neighborhoods & Basin - 2013-2017)
- Phase 5 (Neighborhoods & Basin - 2015-2020)