9.0 Environmental Planning Element

The Environmental Planning Element of the Goodyear General Plan 2003-2013 describes and analyzes the environmental character within the City and provides the foundation for future conservation efforts. Goodyear's continued growth will require consideration of the environmental impacts that will be created. It is important for the City to provide a proactive presence to ensure a healthy and attractive living environment for its existing and future residents.

The Environmental Planning Element is organized into the following four sections to more distinctively communicate the City's future environment-oriented direction:

- Background
- Environmental Planning Goals, Objectives, and Policies
- Conservation and Environmental Plan
- Environmental Planning Element Implementation Activities

9.1 Background

Comprising a year 2003 population of nearly 31,600 residents, the City of Goodyear contains nine percent of its anticipated future buildout population (358,500). In many ways, Goodyear has benefited from high-quality master planned developed neighborhoods, which generally integrate the natural environmental qualities of the area. However, significant future growth in the planning area may create indirect and unintended consequences on the environment including air quality, water quality, noise hazards, and energy demand.

The general geologic features of the planning area are dominated by alluvium-filled rock outcroppings bounded by elongated mountains. Additional geologic landforms comprised of gneiss and granite are located in the central portion of the planning area. Areas surrounding the base of the Sierra Estrella Mountains could require additional site preparation and infrastructure costs due to the shallow soil profile and deep underlying rock.

A total of four soil associations (geographic areas that contain similar soil properties) are located in the Goodyear Planning Area. The majority (55

percent) of the total soils, comprising the Gilman-Estrella-Avondale association contain high lime content and pose minor limitations for crop growth. These soils are generally located on the northern edge surrounding the Gila River, and the southern edge of the planning area. Within the remaining planning area, 15 percent is relatively level and is composed of alluvial deposits suitable for a variety of uses including irrigated crops, pastureland, wildlife habitats, and development. This soil association (i.e., Laveen-Coolidge) is somewhat conducive to roadway construction, yet may require additional base course preparation. Areas composed of high clay content, which promotes shrink-swell conditions, may exist within this association. These soils are generally located in the northern region of the planning area. The Rillito-Gunsight-Perryville association contains more than five percent coarse fragments, reducing its suitability for agricultural production, but creating ideal conditions for commercial and residential development. These soils constitute 15 percent of the planning area and are generally located in its south-central region. The Cherioni-Rock Outcrop association comprises the remaining 15 percent of the planning area and is also located in its south-central area. Steep slopes and a rocky base limit development opportunities and cropland options; however, the land is ideal for passive recreation, rangeland, and wildlife habitats.

The Gila and Agua Fria Rivers are the predominate features of the planning area's natural drainage system. The historic flows of these rivers were primarily the result of upper watershed runoff and snowmelt. Dams and diversion structures built upstream from the planning area to provide irrigation water and flood protection now control these natural flows. Today, both riverbeds are normally dry except during periods of local high seasonal runoff, or when the lack of upstream storage capacity in the dams and diversion structures require water releases. The Agua Fria watershed is approximately 2,340 square miles and drains the region to the north and west of the City including the White Tank Mountains, and intersects with the Gila River at approximately the Litchfield Road alignment. The new Waddell Dam, completed in 1993, controls 1,459 square miles of the upper Agua Fria River and will contain most of the runoff generated upstream of the dam, thus reducing the volume and peak flood flows in the river. South of the Agua Fria/New River confluence, which is located north of the planning area, flooding is primarily due to New River and localized stormwater runoff. Additionally, there are localized areas of surface water in the river due to irrigation practices and discharges from wastewater treatment plants. The

current 100-year stormwater runoff at the Agua Fria/Gila River confluence is estimated to be 48,200 cubic feet per second (cfs).

The Gila River also normally has no flows, except during periods of high seasonal runoff, or when the lack of upstream storage capacity requires water releases. The upstream contributing watershed area is approximately 39,700 square miles, which includes the Salt and Verde Rivers as tributaries. The largest storage facility in this system is Roosevelt Dam, which controls 5,800 square miles of the Salt River. However, the Gila River will still cause significant flood flows. The current 100-year stormwater runoff is estimated at 227,000 cfs at the Agua Fria/Gila River confluence. The largest historical documented flood event occurred in 1891 and the stormwater flows were estimated to be in excess of 275,000 cfs illustrating the magnitude of its drainage shed function.

In the north and central regions of the planning area, Bullard and Cotton Lane Washes intercept a majority of the flows from the White Tank Mountains and convey these flows southerly toward the Gila River.

In the southern portion of the planning area, three major washes (Corgett, Lum, and Waterman) and numerous smaller washes transport surface water northwest from the Estrella Mountains to the Gila River.

Additionally, the Flood Control District of Maricopa County is conducting two studies that include portions of the planning area (SR 303/Corridor White Tanks Area Drainage Master Study, and the El Rio Water Course Master Plan). These studies will identify flooding hazards, help develop corrective measures to the potential flooding problems, and propose stormwater management plans. Additionally, the District is proposing to initiate two additional Area Drainage Master Plans (ADMP), the Estrella and the Rainbow Valley/ Waterman Wash, in the future for the southern region of the planning area.

Currently there are several identified 100-year flood hazard areas within the planning areas as regulated by the Federal Emergency Management Agency (FEMA). These hazard areas include approximately 6,500 acres of the planning areas and have greater than a one percent change of flooding in any given year.

Topography in the Goodyear planning area does not pose significant constraints on development. The majority of the area's land has less than a three percent slope and is ideal for various types of building and general construction. As identified previously, the rocky slopes of the Sierra Estrella Mountains and associated foothills could result in increased development considerations and costs.

The City of Goodyear does not have a local air quality monitoring station located within its planning area. Therefore, measurements documented for Maricopa County must be utilized. The Environmental Protection Agency (EPA) lists the air quality in Maricopa County as serious non-attainment for carbon monoxide, ozone, and particulate matter.

Several environmental Superfund sites exist within the Goodyear Planning Area. These include the Phoenix-Goodyear Airport (PGA) site, and the Western Avenue Plume. The PGA site is addressed as two separate areas, PGA North and PGA South. Unidynamics was a Department of Defense contractor that produced materials that utilized industrial solvents. These solvents were disposed on site from 1963 to 1974, and the contamination was identified in 1981. The site was identified for the National Priorities List in 1983 (Superfund site) by the Environmental Protection Agency (EPA). The contaminants are known as Volatile Organic Compounds (VOC's) and include trichloroethylene (TCE), acetone, and methyl ethyl ketone. Initially limited to the soil, over time the contaminants have leached into the upper groundwater zone to a depth of 120 feet. The second zone, extending from 120 to 240 feet in depth, is considered to be a semi-confining, impervious layer of rock and sediment. It separates the upper zone from the third zone, where groundwater is extracted for potable use. In 1998, perchlorate was also identified on the site. The site owner (Crane Co.) has been working with the EPA to monitor groundwater conditions and is formulating and implementing a cleanup plan for the Superfund site. It is anticipated that cleanup activities will occur over an extended period, but new cleanup technologies may diminish the timeframe.

The Western Avenue Plume includes the land bounded by Riley Drive on the north, the Union Pacific-Southern Pacific Railroad on the south, Dysart Road on the east and the vacated railroad tracks on the west. The historical use of the property for industrial (i.e., auto repair and dry cleaning) facilities may have used tetrochloroethylene (PCE) and disposed it on the property. It has

now leached into the ground. The Arizona Department of Environmental (ADEQ) is in the process of studying the affects of the contamination in the area.

Another environmental issue relates to excessive aviation and vehicular generated noise. These conditions are caused by the approach and departure flight patterns of commercial aircraft from the Phoenix-Goodyear Airport (PGA), military operations (i.e., F-16) of Luke Air Force Base, and the increased traffic volume of I-10 through the planning area. PGA is a reliever airport to Phoenix Sky Harbor International Airport. The facility is owned and operated by the City of Phoenix. In 2001, PGA contained 275 aircraft and accommodated over 142,000 flight operations.

Luke Air Force Base includes a complex of land and buildings sited on 4,200 acres approximately one mile north of the City. Initiating operations in 1941, the base is the world's largest fighter training facility with over 8,000 employees. Home to the 56th Fighter Wing, comprised of eight fighter squadrons, the facility trains all U S Air Force F-16 pilots. Approximately 196 aircraft are assigned to the Wing, completing 38,000 sorties and 50,000 flying hours annually. The majority of departures occur to the south to provide direct access to the Goldwater Gunnery Range. Most of the approaches occur from the north.

I-10 is not only the major vehicular connection between Phoenix and Los Angeles, but is the major east-west corridor for the West Valley. The facility carries between 50,000 and 90,000 vehicles per day (vpd). By 2020 the facility is expected to range from 115,000 to 162,000 vpd. Future noise considerations should be taken into account with the implementation of SR 303 south of I-10.

Water quality issues in the planning area include elevated levels of nitrate and total dissolved solids (TDS). High nitrate levels are attributed to the historical agricultural use of the area as shown in Table 9.1, *City Water Quality, 2001*. The municipal water system currently delivers water with TDS measured at 700 mg/l, exceeding the EPA safe drinking water advisory by 200 mg/l. Delivering water in excess of this advisory will not result in a non-compliance issue with the Arizona Department of Water Resources (ADWR).

The EPA has enacted a new arsenic rule, which will become effective in 2006. Signed in January 2001, the new rule lowers the acceptable levels of arsenic in community and non-transient non-community water supplies to 10 micrograms/liter (mgl). The reduction from the existing arsenic limit of 50 micrograms/liter will, according to EPA estimates, protect over 13 million Americans from long-term cancer and non-cancer health effects. These health conditions result from exposure to waterborne levels primarily of naturally occurring organic and inorganic arsenic.

Table 9.1
City Water Quality, 2001

Substance	Unit of Measurement	Maximum Contaminant Level	Maximum Contaminant Level Goal	Amount Detected	Range (Low-High)	Violation	Source
Arsenic	Ppb	50 (2005) 10 (2006+)	0	0.01	.0084 0.01	No	Erosion Runoff
Barium	Ppm	2	2	0.10	.086 0.10	No	Discharge
Chromium	Ppb	100	100	0.25	.0043 0.25	No	Erosion Discharge
Flouride	Ppm	4	4	0.75	0.19 0.75	No	Erosion Additive Discharge
Nitrate	Ppm	10	10	9.7	4.5 9.7	No	Runoff Leaching Erosion
Trichloro-ethylene	Ppb	5	0	.00065	0.0005 0.0012	No	Discharge
Copper	Ppb	1.3	1.3	0.16	0 homes	No	Corrosion Erosion Leaching
Lead	Ppb	15	0	2	0 homes	No	Corrosion
Bromoform	Ppb	NA		.0025	0.0005 0.0025	No	Chlorine

Source: City of Goodyear, 2002
Ppm-parts per million
Ppb-parts per billion

9.2 Environmental Planning Goals, Objectives and Policies

The goals, objectives, and policies presented in the Environmental Planning Element serve as the City's guide for responsive development and preservation activities and to ensure a safe, healthy community for its existing and future residents. The presented goals are the result of input from the General Plan Advisory Committee (GPAC) and the residents of the City, Community Development Department staff, other City Department staff involvement, and URS's professional assessment.

The Environmental Planning goals respond to the following issues:

- To promote a safe and healthy environment for Goodyear residents
- To create a more environmentally conscious population

The supporting objectives and policies serve as guidelines for implementation activities, which will aid the City in reaching its desired vision.

Goal A: A Community Responsive to the Sonoran Desert.

Objective A-1: Utilize methods and technologies that mitigate/capture solar energy and precipitation.

Policy A-1a: The City shall continue to conduct a site plan review of each new development to encourage potential solar energy/protection.

Policy A-1b: The City shall encourage developers and homebuilders to voluntarily incorporate green building (i.e., environmentally responsible building hay bales, recycled products) principles and practices into their projects.

Policy A-1c: The City shall develop and frequently update its storm drainage master plan to mitigate hazards.

Policy A-1d: The City shall attempt to utilize its captured stormwater for non-potable irrigation needs.

Policy A-1e: The City shall partner with Arizona Public Service (APS) to enhance the use of green power programs (i.e., wind/solar electricity generation) for West Valley customers.

Objective A-2: Utilize drought tolerant vegetation that provides solar relief and water conservation.

Policy A-2a: The City shall continue to strongly recommend the use of vegetation from its adopted plant palette to provide shade, seasonal color, and minimal irrigation needs.

Objective A-3: Incorporate architectural treatments and compatible styles that enhance the positive seasonal attributes of climate.

Policy A-3a: The City shall review and update its adopted Design Guidelines every three years.

Policy A-3b: The City shall investigate the use of roof/building color/paving surface reflectivity and its impact on potential energy efficiency and conservation.

Objective A-4: Minimize the visual impact of development on significant natural features and native vegetation.

Policy A-4a: The City shall develop and adopt sensitive lands guidelines and building envelope standards to minimize development impacts on steep sloped sites.

Policy A-4b: The City shall update its engineering standards to protect steep sloped (e.g., 20 percent or more) areas.

Policy A-4c: The City shall require the salvage of viable native cacti and strongly encourage the in-situ preservation of significant trees (i.e., ironwood, palo-verde).

Goal B: A Community Protected from the Hazards of the Natural and Man-Made Environment.

Objective B-1: Mitigate vehicular and train generated noise.

Policy B-1a: The City shall strongly encourage the protection of residential uses from man-made hazards through the use of berms, landscaping, rubberized asphalt, walls and open space.

Policy B-1b: The City shall strongly enforce the use of building components (i.e., integra block, dual pane glass, insulation, etc.) that reduce aviation and/or vehicular generated noise for impacted residential uses.

Policy B-1c: The City shall strongly encourage the use and enforcement of its adopted truck route to minimize community noise and safety hazards.

Policy B-1d: The City shall implement a synchronized traffic signal system.

Policy B-1e: The City shall locate employment and mixed land uses adjacent to the Union Pacific-Southern Pacific Railroad corridor.

Policy B-1f: The City shall develop a buffering strategy to minimize hazards caused by the adjacency of potentially incompatible land uses (i.e., residential and employment).

Policy B-1g: The City shall identify negative environmental or aesthetic properties, develop a mitigation plan, and investigate/ obtain the financial resources to investigate the removal of these eyesores.

Policy B-1h: The City shall encourage the Arizona Department of Transportation and Maricopa County Department of Transportation to design SR 303 as a below grade high capacity roadway south of the Gila River.

Policy B-1i: The City shall adopt and strongly encourage the implementation of the proposed preferred alternatives identified within the El Rio Watercourse Master Plan, and within

the existing SR 303 Corridor/White Tanks, proposed Estrella, and proposed Rainbow Valley/Waterman Wash ADMP's.

Objective B-2: Minimize the presence of glare in the community.

Policy B-2a: The City shall prepare and adopt a dark sky ordinance.

Objective B-3: Protect the community from military and commercial aviation related hazards and nuisances.

Policy B-3a: The City shall unify and codify noise attenuation standards for residential and employment land uses.

Policy B-3b: The City shall protect the land adjacent to and within the PGA 65 DNL and higher noise contours from incompatible land use encroachment.

Policy B-3c: The City shall protect the land adjacent to and within the Luke Accident Potential Zones (APZ's) and 65 DNL and higher noise contours from incompatible land use encroachment.

Policy B-3d: The City shall require the execution of aviation easements for existing and new owner occupied residential property located within the boundaries of APZ I, APZ II, the 65 DNL and higher and departure corridors.

Policy B-3e: The City shall require developers and homebuilders to post signage within their subdivision sales offices identifying the location of Luke AFB APZs, 65 DNL and higher noise contours and departure corridors as well as PGA Traffic Pattern Area and noise contours.

Objective B-4: Utilize natural drainage washes to convey stormwater and provide community amenities.

Policy B-4a: The City shall continue to utilize and improve natural washes to convey surface drainage through the City.

Policy B-4b: The City shall implement its adopted Parks, Trails, and Open Space Master Plan and the joint use of washes as trailways and natural drainage ways.

Policy B-4c: The City shall partner with the Flood Control District of Maricopa County and other stakeholders to implement the ADMP developed by the Flood Control District and the City within and adjacent to the City of Goodyear's Planning Area.

Objective B-5: Protect public/quasi-public and residential uses.

Policy B-5a: The City shall preclude residential land uses within light and general industrial designated areas to protect the investments of planning area employers.

Policy B-5b: The City shall coordinate with the FEMA and Maricopa Flood Control District to review and update its 100-year floodplain designations every three years.

Policy B-5c: The City shall coordinate with private utility providers to communicate their proposed intentions (in addition to the public participation efforts of the utility provider) for new projects that enhance existing and/or new facilities and/or networks within the planning area.

Policy B-5d: The City shall coordinate with providers to share the results of their long range (50 years+) utility master planning.

Objective B-6: Keep the community clean.

Policy B-6a: The City shall partner with other west valley communities and Maricopa County to coordinate mutually beneficial, long-term solid waste collection, transfer station and landfill planning.

Policy B-6b: The City shall enlist the support of community organizations to enhance areas that would benefit from periodic clean-up programs.

Policy B-6c: The City shall create partnerships with local neighborhoods, businesses, and agencies to develop Adopt-a-Block or Adopt-a-Road clean up programs.

Objective B-7: Recycle increasing amounts of solid and green waste.

Policy B-7a: The City shall partner with other communities in creating an expanded and more economically viable recycling program.

Policy B-7b: The City shall conduct a community survey to understand and anticipate recycling participation levels.

Policy B-7c: The City shall work with private entities to designate and use available transfer station site capacity for a green/recycle diversion facility in the future.

Objective B-8: Reduce the need for fossil fuel use.

Policy B-8a: The City shall implement a connected Neighborhood Electric Vehicle (NEV) street and path system in appropriate locations within the planning area.

Policy B-8b: The City shall work with APS to locate charging stations for NEV and other electric operated vehicles.

Policy B-8c: The City shall implement the Parks, Trails and Open Space Master Plan to encourage bicycle, pedestrian, and equestrian use.

Policy B-8d: The City shall utilize its City Center and Village Center land use categories to facilitate mixed land uses and reduced vehicle trips.

Policy B-8e: The City shall continue to actively plan for the inclusion of transit facilities and services within the planning area.

Policy B-8f: The City shall assist in the location of convenient compressed natural gas (CNG) fueling facilities to preserve the health and safety of its residents.

9.3 Environmental Plan

The Environmental Plan acknowledges the important role a clean and healthy community contributes to its sustainability. This section is divided into five major subsections including:

- Air Quality
- Water Quality
- Energy Conservation
- Aviation and Vehicular Generated Noise
- Environmental Characteristics

Air Quality

The City of Goodyear's fast growth has caused a large increase of vehicular traffic, which is the primary source of pollution throughout Maricopa County. The seasonal agricultural activities in the West Valley also reduce the quality of the air. According to the Environmental Protection Agency (EPA), Maricopa County has three pollutants that do not meet EPA standards including carbon monoxide (CO), ozone (O3), and particulate matter (PM^{10}). In the past year, the EPA has designated the quality of the air as serious non-attainment for all three pollutants.

Specific results for the Goodyear Planning Area are not available as a monitoring station is not located within its boundaries. However, based on the dispersed growth throughout the West Valley, the Maricopa County Environmental Services Department is considering a new air quality monitoring station in the Goodyear/Avondale area. The current proximate stations are located in Maryvale (intersection of 61st Avenue and Encanto Boulevard) and Surprise (intersection of Reems Road and Grand Avenue).

Vehicle emissions generate the majority of air pollution due to the distance between housing and significant job centers in central Phoenix and the predominance of single occupancy vehicles (SOV). Key considerations during the planning process include providing a balance of job opportunities in relation to proximate residential areas, and acknowledging imbalances of regions if the land uses are developed as recommended. Due to the linearity of the planning area and the limited and costly bridging of the Gila River, it is important to provide opportunities to reduce vehicle miles traveled (VMT)

whenever possible. For example, flexible work schedules (i.e., off-peak travel, 4/10 vs. 5/8, etc.) and telecommuting reduce drive times and roadway congestion.

The linearity of the planning area also makes it important for the City to continue developing its multi-modal opportunities. These viable options include commuter rail, light rail or fixed guideway transit, bus rapid transit, neighborhood electric vehicles (NEV's), bike lanes/routes, and multi-use trails. Commuter rail is envisioned to connect major employment centers (i.e., Palo Verde-Downtown Phoenix) utilizing the Union Pacific-Southern Pacific Railroad. Light rail or fixed guideway transit is envisioned for the Mc Dowell Road corridor and the Estrella Parkway corridor. Bus rapid transit is envisioned to be a component of I-10 and SR 303 to provide service to other areas of the valley. NEV's are recommended to primarily serve residential communities in the northeastern region of the planning area, but will be utilized in other areas as well. The City's adopted Parks, Trails, and Open Space Master Plan provides the recommendations for a linked bicycle, pedestrian, and equestrian network in the planning area.

Water Quality

The expansive growth in Goodyear has put pressure on the quality of potable water. The City currently utilizes groundwater for its entire potable needs with wells located in the northern region of the planning area providing high quality groundwater. The only issues for water quality include elevated levels of arsenic, nitrate and total dissolved solids (TDS). Elevated levels of nitrate are an issue north of the Gila River and along the southern edge of the planning area. The nitrate condition is believed to be a by-product of the historical agricultural uses of these areas.

The Environmental Protection Agency (EPA) has established a Secondary Maximum Containment Level (SMCL) water standard for Total Dissolved Solids (TDS) of 500 mg/l, primarily for aesthetic reasons. Currently, the City Public Works Department delivers water at a target TDS level of 700 mg/l by mixing water produced by several wells, which are looped together. As stated previously, delivering water in excess of this standard will not result in a non-compliance issue with the Arizona Department of Water Resources (ADWR). However, the implemented 1997 Water Plan and the organization of WESTCAPS have identified the implementation of a regional treatment facility

that will allow CAP water to be used for potable demands. Introducing treated imported surface water may assist the City to enhance its delivery of high quality water through its existing system.

In addition to factors that occur naturally, there are also several man-made water quality impediments. The PGA North and South, and Western Avenue Plume constitute the three Federal Superfund sites located in the planning area as shown on Figure 9-1, *Man-made Environmental Conditions*. At the PGA site, a significant amount of TCE infiltrated the land over an extended period of time as a result of on-site aviation fuel disposal. Because the pollution migrated prior to its ongoing mitigation, monitoring wells have been placed at strategic locations to measure the extent and depth of pollution migration on a quarterly basis. If elevated levels of TCE are encountered, aggressive measures will be initiated. This site and its related plume area have also been placed on a registry to monitor (on a quarterly basis) the City's groundwater wells near the plume area.

Energy Conservation

The direct and indirect conservation of resources can occur both passively and actively within the planning area. Passive forms comprise the sensitive orientation of land parcels to promote seasonal solar insolation to reduce heating/cooling requirements. It also constitutes using appropriate exterior colors to assist in reducing energy needs. Landscaping is another strategy to promote or reduce solar insolation through the use of differing tree types (i.e., deciduous, coniferous, evergreen). Active conservation measures include the land use/transportation linkage, transportation technology/traffic operations advances, recycling programs, and alternative sources of electricity and use.

The Land Use Plan identifies locations where higher density residential use is located adjacent to or near employment uses. The ability of residents to utilize alternative modes or to reduce vehicle trips minimizes fuel consumption and enhances air quality. The use of NEV's as replacement vehicles for fossil burning fuel vehicles is another way to use "clean" energy. The City is also pursuing a regional recycling program that will reutilize products (i.e., paper, glass, aluminum, plastic, etc.), reduce truck hauling miles, and increase the life of the landfill, while remaining fiscally sound.

Conservation of electrical resources is the most common form of reduced energy needs. Arizona Power Service (APS) promotes numerous programs to conserve energy use. The intent of these programs is to reduce electricity use during peak hours on high temperature days.

Aviation and Vehicular Generated Noise

The Phoenix Goodyear Airport is the only aviation facility located within the planning area. It is a reliever airport and is owned and administered by the City of Phoenix. Through careful planning, the facility has identified its Traffic Pattern Airspace (TPA) and future noise contours. The TPA boundary is defined in accordance with guidelines provided in Federal Aviation Administration (FAA) Order 7400.2D. Arizona Revised Statutes (ARS 28-8486) require public disclosure by the Arizona Department of Real Estate for land within its 60 DNL contour identifying its proximity to the municipal airport and the potential for elevated ambient noise levels on the subject property. This map can be located at http://www.re.state.az.us/airports/airgoodyearnoise.html. The City of Goodyear is continuing to work closely with the PGA to protect its operation and appropriate adjacent development opportunities.

Luke Air Force Base is located approximately one mile north of the City. The facility conducts significant F-16 training operations and provides direct access to the Goldwater Gunnery Range to the south. The base operates with take off and approach flight patterns that transect the City, producing a significant amount of noise. The facility uses its southerly departure route to launch ordnance burdened aircraft most of the time due to the encroachment on its northerly departure route. It is vitally important that the boundaries of its AICUZ (Air Installation Compatible Use Zone) and the provisions of SB 1525 (passed by the Arizona legislature in 2001) and SB 1393 (passed by the Arizona legislature in 2002) are enforced to minimize both noise and accident hazards within the planning area. It is strongly recommended that jurisdictions impacted by high noise levels prepare and adopt noise attenuation guidelines. In addition, establishing appropriate uses within lower intensity contours will allow future flexibility for aviation facility expansion or fleet change, potentially enhancing the economic base of the City and region. The compatible development and/or preservation of the land within the 65 DNL and APZ's will allow the base to continue to accommodate its existing mission (significant West Valley and Metropolitan Area economic engine), and will protect the

Figure 9-1
Man-made Environmental Conditions

facility from the upcoming Efficient Facilities Initiative (EFI), (formerly Base Realignment and Closure (BRAC)) process in 2005.

Vehicular generated noise is also a consideration in the partnership between land use and transportation. I-10 will continue to increase its levels of average daily traffic (ADT) with the approval of significant planned area developments in the Town of Buckeye and unincorporated Maricopa County.

It is important that the City continue to locate employment or high density residential uses to buffer noise, leverage visibility, and provide access. The future implementation of SR 303 north of the Gila River (and alignment designation south of the Gila River) should also be critically evaluated to utilize appropriate land and noise mitigation measures (i.e., noise walls, landscape buffers, rubberized asphalt etc.) to protect proximate lower density residential uses. The potential connection of Rainbow Valley Road to I-10 and the southerly development of the planning area will also increase the vehicular generated noise on this future high volume corridor and should be similarly evaluated for adjacent noise sensitive uses.

Environmental Characteristics

Analyzing the environmental characteristics assists in determining the development suitability of the land within the planning area. Several key environmental attributes were chosen for analysis as layers using a Geographic Information System (GIS) computer program. The examined layers are:

- Topography and Slope
- Soils
- Vegetation and Habitat
- Rivers and Washes

The graphical representation of these characteristics is depicted in Figure 9-2, *Natural Environmental Conditions*.

Topography and Slope

The terrain within the Goodyear Planning Area ranges from relatively flat (less than 3 percent slope) to steep (greater than 8 percent slope). Lands with less than 3 percent slope are generally more suitable for development than lands

with greater slopes. Steep sloped terrain is more expensive to develop due to the existence of rock outcrops and other significant features.

The lands within the Goodyear Planning Area were grouped into four slope categories: less than 3 percent; from 3 to 8 percent; from 8 to 15 percent; and greater than 15 percent. Figure 9-2, *Environmental Characteristics* illustrates the locations and extent of these slopes within the subject area. Significant vertical terrain features occupy the middle portion of the planning area, entering from the east, and include the Estrella Mountains and foothills. These features reach a maximum elevation of 1,780 feet (MSL) and are located primarily in the Estrella Mountain Regional Park to the south of the Gila River and downtown Goodyear.

Table 9.2
Slope Suitability

Feature	Slope Percentage	Slope Attribute	Acreage	Percent of Total Acreage
Slope	0-5%	Minimal Constraints	73,626	69%
	5-10%	Moderate Constraints	33,369	31%
	10-15%	Significant Constraints	353	Less than 1%
	> 15%	Significant Constraints	7	Less than 1%

Source: URS, Inc. and Arizona State Land Department, December 2002.

The results of the slope analysis presented above indicate that slope does not present development constraints for a majority (69 percent) of the planning area. The remaining lands have relatively minor slopes and present minimal, if any, constraints for the remainder of the subject lands. The lands with steep slopes occupy a negligible portion of the total land within the planning area, with a large portion of those features located within the Estrella Mountain Regional Park.

Soils

Soil properties can play a major role in development options, impacting land uses and associated development costs. The United States Department of Agriculture groups soils into "associations" based upon degrees of soil pattern uniformity and the extent of dominant soils in a given area. Association names reflect the dominant soils and are connected by a hyphen. Two main

Figure 9-2
Natural Environmental Conditions

development considerations for soil composition are the effects on erosion and drainage rates.

The soil associations identified in the planning area include: Laveen-Coolidge, Gilman-Estrella-Avondale, Rillito-Gunsight-Perryville, Cherioni-Rock Outcrop. These soils and their associated development suitability ratings are listed from most suitable to least suitable in Table 9.3, *Soil Suitability*.

The Rillito-Gunsight-Perryville soil association makes up 15 percent of the planning area and is located primarily south of the Estrella Mountains and foothills. Gravelly loams and loams are the main soil types of this association. Major characteristics of this soil are high levels of lime and moderate permeability. All three dominant soils pose only slight threats to development of dwellings without basements and local streets and roads although Perryville notes moderate limitations for local roads and streets.

Laveen-Coolidge soils encompass 15 percent of the planning area, primarily located north of the Gila River. The soils are characterized by sandy loams, loams, and clay loams on alluvial plains, generally located two to five miles from the mountains. Laveen soils pose slight limitations on dwellings without basements and moderate limitations for local streets and roads. Coolidge soils pose slight limitations on both dwellings without basements and local streets and roads. Additionally, Laveen-Coolidge soils are suitable for irrigated crops, range, recreation, and wildlife.

Gilman-Estrella-Avondale soils make up 55 percent of the subject area and are characterized by loams and clay loams. Gilman soils have moderate permeability with slow runoff, posing slight limitations on dwellings without basements and moderate limitations on local streets and roads. Estrella soils have moderate permeability. They also demonstrate levels of alkaline ranging from strong to very strong and saline levels from slight to strong which could impact agricultural use. Estrella soils pose moderate limitations to local streets and roads and moderate shrink-swell limitations to dwellings without basements. Shrink-swell refers to the expansion or contraction of the soil as moisture is added or removed. Avondale soils have moderate to moderately slow permeability resulting in slow runoff. These soils contain moderate levels of alkaline, which could impact agricultural use.

The soil association Cherioni-Rock Outcrop also occupies 15 percent of the planning area and is associated with the Estrella Mountains and foothills. Primary soil characteristics include gravelly loam and rock. Six inches of topsoil covering hardpan and andesite bedrock typify Cherioni soils while Rock Outcrop is exposed bedrock. These soils are suitable for recreation, wildlife habitat, and range. Cherioni soils pose severe limitations to both dwellings without basements and local streets and roads.

Table 9.3
Soil Suitability

Feature (Soil Association)	Soil Type	Acreage	Percent of Total Acreage
Rillito-Gunsight-Perryville	Good quality farmland	11,051	15%
Laveen-Coolidge	Moderate quality farmland	11,270	15%
Gilman-Estrella-Avondale	Moderate quality farmland	41,065	55%
Cherioni-Rock Outcrop	Development constraints	10,855	15%

Source: URS, United States Department of Agriculture, and the Arizona State Land Department, December 2002.

Vegetation and Habitat

The vegetation found in the Goodyear Planning Area is indicative of the Sonoran Desert region, and includes those species introduced by local residents for aesthetic and agricultural purposes. The area's natural vegetation is comprised of creosotebush, bursage, cactus, annual weeds and grasses, and mesquite and palo verde trees. The region along the Gila River also hosts a mix of cottonwood-willow, mesquite, and salt cedar. According to the Arizona Game and Fish Department, there are no plant species of special status located in the Goodyear Planning Area. Therefore, the vegetation types noted in Table 9.4, *Vegetation Suitability*, are considered suitable for development. It is important for developers to understand and consider the changing environmental conditions in Arizona. The planning area may contain species that biologists have not yet discovered.

Table 9.4
Vegetation Suitability

Feature	Vegetation Type	Acreage	Percent of Total Acreage	Vegetation Attribute
Vegetation	Saltbush Communities	19,012	26%	No salvage value
	Creosotebush-Bursage Communities	42,611	57%	No salvage value
	Mixed Palo Verde-Cacti Communities	12,100	16%	Moderate salvage value
	Tamarix Disclimax Communities	505	1%	No salvage value
	Mesquite Bosque	11	< 1%	No salvage value

Source: URS and Arizona State Land Department, September 2002.

The Sonoran Desert supports a variety of wildlife, many which coexist with the residents of Goodyear. Mammals such as the coyote, bobcat, kit and gray foxes, cottontail and jackrabbits, and javelins, as well as numerous songbirds, owls, roadrunners, falcons, and eagles roam the desert. Additionally, countless reptiles and lizards occupy the desert floor. The Arizona Game and Fish Department has identified three "special status" animal species within the Goodyear Planning Area. These species are listed in Table 9.5, *Special Status Plant and Animal Species*, and must be taken into consideration during future development planning. Although these species have been identified in the vicinity of the Gila River, animals roam freely in the desert and may occupy other areas throughout the planning area.

Table 9.5
Special Status Plant and Animal Species

Common Name	Description	Habitat	Status
Sonoran Desert Tortoise	Amphibian	Rocky hillsides of Palo Verde and Saguaro	SC, WC
Western Least Bittern	Bird	Close proximity to open water and/or marsh areas with cattails and rushes, or trees and shrubs along shorelines. May be found in Sonoran desert scrub areas.	SC, WC
Yuma Clapper Rail	Bird	Freshwater and brackish marshes	LE, WC
N/A	Vegetation	None identified for the Goodyear Planning Area	

No critical habitat in project area.
SC – Species of Concern
WC – Wildlife of Special Concern in Arizona
LE – Listed Endangered
Source: Arizona Game and Fish Department, December 2001.

Rivers and Washes

The Goodyear Planning Area contains one major water feature, the Gila River, which drains from the east to the west and bisects the subject area. The Agua Fria River, a major tributary to the Gila River, drains from the north to the south and is located just east of the planning area. Numerous dry streambeds and washes are located throughout the area. As a result of cultivated croplands and sparse natural vegetation, natural washes are virtually non-existent in the northern portion of the planning area. However, one poorly defined wash, Bullard Wash, exists between the Gila River and Interstate-10. The southern portion of the planning area contains three major washes (Corgett, Lum and Waterman) and numerous smaller washes. Runoff from the Estrella Mountains could potentially cause flooding and erosion in the area, specifically through temporary streams formed in the ravines, draws, and foothills throughout the mountains.

Development planning should include mitigating the effects of flooding and erosion due to periodic heavy rains. Available development options include dedicating potential flood areas as passive and/or active open space. If development and construction are chosen for the area, reducing flood impacts

with flood abatement construction must be incorporated even though these construction efforts can increase development costs.

According to the FEMA and the FCDMC, numerous 100-year flood areas have been identified in the Goodyear Planning Area. These areas include the Gila River, Bullard Wash, Lum Wash, Corgett Wash, and Waterman Wash, as well as numerous isolated flood pockets along major transportation routes such as Interstate-10 and Maricopa County 85. The floodplain surrounding the Gila and Agua Fria Rivers includes approximately 6,300 acres, the largest in the planning area. The noted areas are reported to have less than a one percent chance of flooding in any given year.

As depicted in Table 9.6, *Natural Water Hazards*, those areas outside of the 100-year floodplain are highly suitable for development while areas within the identified 100-year floodplain are the least suitable for development. Although there is a low flood probability in any given year, development projects within the 100-year floodplain should plan for the negative impacts of such an occurrence. It should be noted that flood control improvements and future development can remove areas from or reduce floodplain hazards. Mitigation efforts may include buffer areas, filling/grading, and reinforced and/or elevated structure foundations. Future structural development within an approximate 800-foot radius of the four major washes and within a ½-mile radius of the Gila River should consider mitigation efforts. The distance for the washes is based upon the largest 100-year floodplain measurement of all the washes – Bullard Wash. The distance for the Gila River is based upon the largest 100-year floodplain area, its intersection with 179th Avenue.

Table 9.6
Natural Water Hazards

Feature	Drainage Characteristic	Drainage Attribute
Natural Water Hazards	Outside the 100-year Floodplain	Low flood hazard
	Within the 100-year Floodplain	High flood hazard

Source: URS, Flood Control District of Maricopa County (August 2002), and 1997 City of Goodyear Water Plan.

9.4 Environmental Planning Element Implementation Activities

The Environmental Planning Element Implementation Activities identify both short- and long-term projects that will achieve the goals and objectives identified previously. A listing of these activities is provided below and organized into both near (1-5 year) and long-term (5-10 year) timeframes to support the 10-year update timeframe mandated by Arizona Revised Statutes (ARS). The activities identified for near-term implementation are further defined in Chapter 12.0, *Implementation Program*.

Near-Term Implementation Activities	Long-Term Implementation Activities
Update/Prepare Water/Wastewater Facilities Master Plan	Develop a Plant Salvage Plan
Implement the White Tanks Regional Water Treatment Plant Project	Develop a Solar Energy Use Plan
Develop Sensitive Land Guidelines	Adopt and Implement Flood Control District of Maricopa County's Area Drainage Master Plans and Watercourse Master Plan
Prepare and Adopt Dark Sky Ordinance	