

Natural Environment

7

Introduction

A healthy and productive natural environment is essential to ensuring a sustainable local economy. Since individual activities can alter the community environment, for better or worse, environmental considerations are common evaluation criteria for public activities. The integrity, reasoning, and understanding that we bring, as a community or as individuals, to the work of community-building will test whether we can, in the words of writer Wallace Stegner, "...create a society to match our scenery."

This chapter focuses on the natural environment, which is defined as the physical conditions of a given area, including, but not limited to, land, topography, agriculture, open space, flora and fauna, sand and gravel resources, air quality, surface and ground water, wetlands and riparian areas, floodplains, noise, light, and climate. This chapter also introduces considerations including conservation, energy, waste, and land development in addition to development constraints such as the wildland-urban interface, floodplains, potential liquefaction during an earthquake, and earthquake faults. This Growth Policy emphasizes protection of environmentally-sensitive areas by encouraging urban development where appropriate and with lower density or minimal development in areas with environmental constraints.

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General Overview

Helena has a dry climate with approximately 11.2 inches of precipitation a year, with an overall annual average daily temperature of 45.4° F. Recent local data and climate projections show average temperatures rising, resulting in smaller snow packs, earlier spring runoff, smaller volumes of water available within the watershed, lower mid-summer flows, and greater frequency and intensity of wildfires.¹ The City has been active in developing and advancing policy related to climate change, leading to the creation of a Climate Change Task Force in 2008 and subsequent Action Plan; adoption of the Paris Climate Accord goals in 2017, proposing that the city prepare an annual report documenting activities implemented to reduce greenhouse gas emissions, and other measures.²

The City of Helena works with an extensive list of regulatory agencies in the environmental arena to protect air and water quality, conserve energy and wildlife, and minimize weeds. This list includes the:

- Environmental Protection Agency (EPA);
- Federal Emergency Management Administration (FEMA);
- The U.S. Army Corps of Engineers;
- Montana Department of Environmental Quality (DEQ);
- Montana Department of Natural Resources and Conservation (DNRC);
- Montana Department of Fish, Wildlife and Parks (FWP);

The City also currently engages several environmental and development advisory committees, including the:

- City-County Health Board;
- Helena Consolidated Planning Board;
- Helena Zoning Commission;
- Helena Open Land Management Advisory Committee;
- Helena Non-Motorized Travel Advisory Council;
- Helena Citizens Conservation Board;
- City-County Parks Board;
- Water Quality Protection District Board.

Several local and statewide nonprofit environmental organizations also assist the City with their expertise and volunteers with recycling, tree-planting, weed management, energy conservation, etc.

¹ *Montana Climate Change Action Plan, November 2007*; <https://deq.mt.gov>

² *Helena Climate Change Task Force Action Plan, 2009*

Land & Topography

Helena is situated on the southern edge of Lewis and Clark County, approximately mid-way between Glacier and Yellowstone Parks. The City sits on the southern end of the Helena Valley, which still contains agricultural uses. There are five lakes within a 30-minute drive, and Helena is surrounded by timbered mountain ranges that contain sites of former mining activity conducted during the late 1800s.

Much of the Helena valley floor was in agricultural use prior to residential and commercial development. Ten Mile Creek and Prickly Pear Creek cross the valley on their way to Lake Helena. Lands along these creeks contain riparian areas and 500-year floodplains. They may have high groundwater (less than ten feet depth to groundwater) or have a higher susceptibility for liquefaction during an earthquake (see Development Constraints Map, included in this chapter as Figure 7.05). Both creeks as well as other riparian areas provide important wildlife habitat.

Residential development extends south and southwest beyond City limits to the Lewis and Clark/Jefferson County line. In some areas, the Helena city limit boundary extends to the Lewis and Clark/Jefferson County boundary. The city abuts forested hills to the south, providing an aesthetic backdrop with Mount Helena on the southwest and Mount Ascension on the south – both geographic and visually prominent landmarks. This area provides habitat for moose, elk, and mule deer, and includes federal land ownership (BLM and Forest Service) interspersed with private land.

The South Hills area has slopes of 15% to 30% with occasional pockets of 30% to 90% and carries a high to severe fire-risk rating (see Figure 7.06). Fire protection issues are a concern in the wildland-urban area, which may limit future subdivision activity.

Open Spaces

Open space is defined as “...any open piece of land that is undeveloped (has no buildings or other built structures) and is accessible to the public.”³ Helena’s greatest natural resources include its wooded backdrop and open spaces. These areas provide not only aesthetic value, but also wildlife habitat and recreational opportunities – including city parks such as Mt. Helena and Mt. Ascension, state and federal lands, and privately held lands — some of which are preserved through conservation easements.

Threats to open spaces include wildland fires, noxious weeds, private development, and over-use as recreational lands. Forest management, including thinning densely wooded areas and the use of conservation easements, are known to help preserve open space areas.

³ United States Environmental Protection Agency (EPA), <https://www3.epa.gov/region1/eco/uep/openspace.html>



Figure 7.01 – Residents value Helena's rural, open-space character as much as they do its mountainside setting. (Image: SCJ Alliance, Inc.)

The City has taken an active role in preserving these areas through various activities such as thinning parklands. Most recently, the City acquired the “Whyte property,” a 72-acre open space acquisition through cooperation with Fort Harrison and the Prickly Pear Land Trust (PPLT), which the City intends to manage for recreational and buffering (housing “defensible space”) functions.

The Public Lands map (Figure 7.07) identifies areas surrounding the City that are owned by the City of Helena (including parks, open lands and the golf course), the State of Montana, Forest Service, and the Bureau of Land Management.

Environmentally-sensitive areas should be protected against overuse, and regulations should be maintained that protect open space areas. This plan’s objectives framework supports continued efforts to manage and sustain Helena’s open space lands.

Sand & Gravel Resources

Gravel is an important component in many construction activities and is essential for future development in the area. Gravel extraction can be noisy and dusty and include extensive truck traffic, which can conflict with other land uses. Balancing the need for gravel and the pressure to provide land for homes to accommodate the incoming population can be difficult but is important.

There are no gravel open-cut mining operations within the Helena City limits, and such operations are not permitted by current zoning. Operations of this nature are close to Helena — west of McHugh Lane, east of Alice Street, west of Wylie Drive, and south of Canyon Ferry Road. Their close proximity to the City could influence land-use decisions for properties located near the gravel operations but within the City. Once

gravel extraction has been completed, some of these properties may eventually be annexed and converted to other uses.

Figure 7.08 shows three locations of existing gravel operations within the Growth Policy study area boundary as yellow. Other gravel operations exist in the Helena area, but are located outside the study area.

Plants & Animals

Plants

The Montana Natural Heritage Program (MNHP) identifies one sensitive flowering plant species of concern in the area surrounding Helena.⁴ Most of Helena’s plant materials (flora) have been intentionally planted as people have developed individual properties. Since the area receives less than twelve inches of rainfall a year, landscaping that incorporates drought-tolerant and deer-resistant plants is supported in this plan’s objectives framework and in adopted standards.

Nuisance and noxious weeds are a concern in Helena. The City of Helena works closely with the Lewis and Clark County Weed Board to enforce noxious weed control, and City code defines noxious and nuisance weeds and identifies property owners’ weed-control responsibilities. The County has adopted a weed-management program that reviews the distribution and abundance of each noxious weed species known to occur within the district, and specifies herbicide management goals and procedures. The City’s weed-management program generally refers to nuisance weeds if they are a fire hazard. State law also requires a re-vegetation plan for subdivisions; these are submitted to the County Weed Board for approval.

Noxious weeds - Plants that have been imported from other areas, so they have no natural biological controls. As a result, they may often out-compete and displace many native plants.

Montana Plant Life website, <http://montana.plant-life.org/>

Animals

Helena’s natural environment includes diverse wildlife (animals that are not domesticated or tamed) and their habitat.⁵ It may also include areas essential to the conservation of species protected by the Endangered Species Act or of special interest or concern to the State of Montana.

⁴ Lesser Rushy Milkvetch, *Astragalus convallarius*; distribution in Montana is limited to the Helena Valley vicinity and an area in extreme southwest Montana in Beaverhead County. The species has been and continues to be negatively impacted by development in the Helena area.

⁵ Wildlife habitat is defined as an area containing the complex of environmental conditions essential to wildlife for feeding and forage, cover, migration, breeding, rearing, nesting, or buffers for those areas.

Mule deer have made their home inside the City in addition to the surrounding areas. The deer have presented conflicts for some residents by eating their ornamental landscaping or by occasional aggressive behavior.

In addition to deer, the adjacent mountains to the south also provide habitat for elk, coyotes, mountain lions, foxes, occasional black bear and moose, along with numerous birds and non-game animals. Sandhill cranes have been reported within the northern part of the City and northeast of the City. Antelope have been observed in the grassy areas located to the southeast, east of I-15. Riparian areas provide important wildlife habitat and wildlife travel corridors and contribute to the community's sense of place. Wildlife management issues will continue to be a development consideration for subdivisions and annexations as the City grows in the future.

Winter air quality in the Helena valley is dominated by the effects of frequent air inversions, which can trap pollutants like wood smoke under air masses of different temperatures. The Health department monitors air quality conditions closely during the period from November 1 to March 1 and enforces no-burning rules during poor air quality episodes.

Species protected by the Endangered Species Act or of special interest or concern to the State of Montana or the City of Helena should have their habitat preserved. In the area surrounding Helena, the Montana Natural Heritage Program has noted two mammals in the "Sensitive" category and one mammal as "Threatened" or "Special Status" (Canada lynx); two amphibians as Sensitive; and 11 birds, with seven identified as Sensitive and one Threatened or Sensitive (bald eagle).

Rural areas are more conducive to wildlife and wildlife habitat than are urban areas. Although urban areas are not intended to preserve wildlife habitat, certain natural features, such as wetlands, stream corridors, and similar high-value habitats are irreplaceable and should be preserved and buffered as much as possible. These areas may provide a variety of wildlife habitat as well as recreational, water quality, and safety values, such as flood control.

Encouraging subdivisions within the City's Growth Policy study area, including in proposed neighborhood centers, provides housing and development opportunities within an urban setting, reducing development pressures on surrounding rural areas and rural wildlife habitat. Urban density development is not intended to meet the habitat needs of larger wildlife such as deer, moose, or elk or of predatory species such as bear, mountain lions, or coyotes.

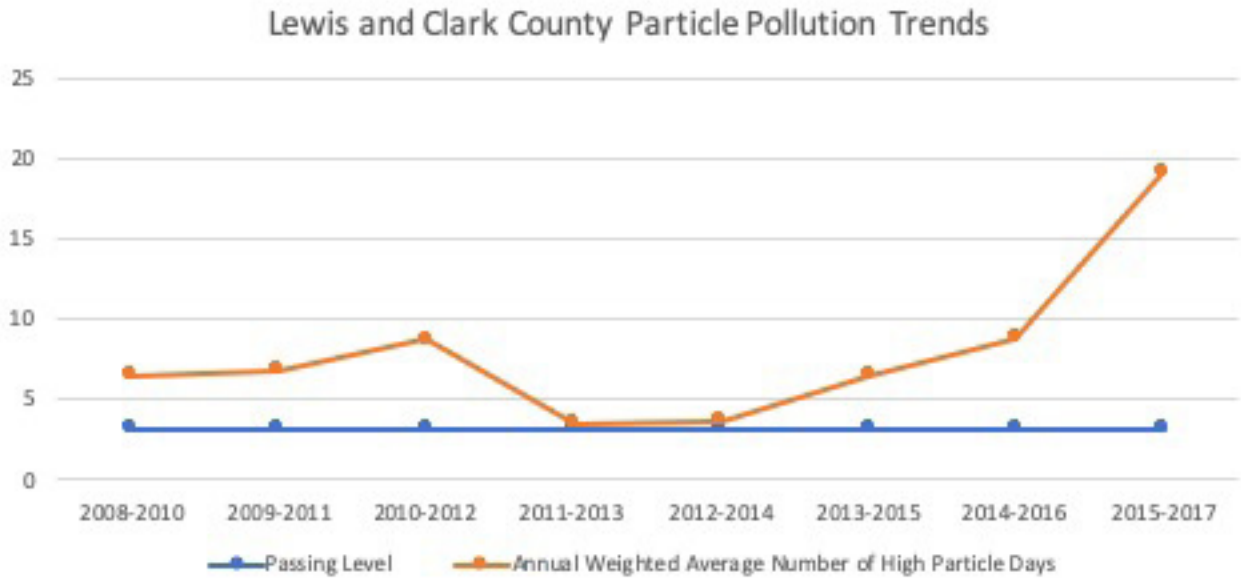


Figure 7.02 – Air Quality Trends (Source: American Lung Association)

Air Quality

Helena and its residents are directly affected by the air quality in Lewis and Clark County. Helena’s air quality is generally good because of winds that scatter pollutants. Yet air inversions occasionally occur during winter, creating poor air-quality days until the wind disperses wood smoke, dust, particulates, and pollutants.

However, as Figure 7.02 displays, recent trends show a spike in the number of days with high particle counts in the county. This is mainly due to the forest fires that have become more common in recent years, causing more “poor” air quality days during the summer months. In fact, has not passed the American Lung Association’s acceptable level of per-year high-particulate days since 2008. The most recent numbers from 2015-2017 show that particle pollution trends are worsening, and at an accelerating rate.⁶

Certain groups, such as children, older adults, and people with lung diseases like asthma and cardiovascular (CV) disease, are especially vulnerable to the effects of air pollution as shown in Table 7.01 from the American Lung Association’s “State of the Air 2019” report. The table displays the groups considered “At-Risk” by the American Lung Association, and the number of Lewis and Clark County residents in each category.

⁶ American Lung Association, <https://www.lung.org/our-initiatives/healthy-air/sota/city-rankings/states/montana/lewis-and-clark.html#>

Table 7.01 – Air Pollution & Groups at Risk

| At-Risk Group | County Residents |
|----------------------|-------------------------|
| Pediatric Asthma | 1,252 |
| Adult Asthma | 4,817 |
| COPD | 3,390 |
| Lung Cancer | 35 |
| CV Disease | 4,106 |
| Diabetes | 4,266 |
| Poverty | 5,474 |
| Under Age 18 | 14,599 |
| Age 65 and older | 12,239 |

Source: American Lung Association's "State of the Air 2019" report - <http://www.stateoftheair.org>

The Montana Department of Public Health & Human Services (DPHHS) operates one continuous air-quality monitoring station in Helena, in cooperation with the Montana Department of Environmental Quality (DEQ). During the winter of 2007-2008, DEQ contracted with the University of Montana Center for Environmental Health to conduct a source apportionment study for fine particles in the (ambient) air 2.5 micrometers or less in size (known as PM 2.5).⁷ A similar, more recent study has not been conducted, nor has research taken place beyond the winter months.

In response to wood smoke particulate issues, the Lewis and Clark Public Health Department monitors air quality conditions closely during the period from November 1 to March 1 and enforces no-burning rules during poor air quality episodes.

Improving air quality, including particulate pollution may be addressed in numerous ways, including:

- Increased vegetation — particularly trees in city parks and open spaces, and landscaping on individual properties and in boulevards — may help offset the negative effects pollutants have on air quality. Trees also provide a cooling benefit which helps offset some of the heat gain from paved parking lots;
- Land use patterns, especially those promoting urban densities and residential development in close proximity to employment and services, reduce vehicle miles traveled and promote more efficient use of land, infrastructure, and the transportation network. As a result, the potential for air pollution can be reduced,

⁷ <https://www.lccountymt.gov/health/environmental-services/air-quality/fine-particulate.html>

and development pressures on the natural environment can be lessened.

- Wildfire control, through prevention and management techniques described elsewhere in this chapter and as supported in this plan's objectives framework.

Water

The City of Helena is located in a semi- arid region and receives an average annual precipitation between 11 and 12 inches. Water is vital to the health, economy, and quality of life in Helena – as well as for the larger region. It is necessary not only for commercial and household uses, fire suppression and recreational activities but also for the surrounding forest health, wildlife preservation, and maintaining viable agricultural lands.

This section introduces Helena's water resources, including maintaining its overall quality and ongoing supply. The City's water infrastructure, including distribution and treatment of wastewater and stormwater facilities, is addressed in Chapter 5: Public Facilities & Services.

Water Supply

In addition to precipitation, surface and ground water provide an important source of water to the Helena area. Sources of surface water in the Helena area include Prickly Pear and Ten Mile Creeks and their tributaries and the Missouri River, which feeds Canyon Ferry, Hauser, and Holter Lakes. Ground water is present throughout the Helena area at varying depths. The Helena Valley aquifer is the primary source of ground water. High ground water is usually associated with nearby water bodies and underground springs.

The primary sources of Helena's potable municipal water are the Missouri River, the Upper Ten Mile watershed, and the Eureka well. Water rights for wells in the Helena valley provide an un-utilized secondary source. Public and private wells provide untreated water for uses not requiring potable water, such as some manufacturing and irrigation activities. These sources provide a stable supply of water for the community, although the City must remain vigilant in maintaining these resources.

Missouri River

The Army Corps of Engineers regulates the Missouri River, an important waterway for many states, and evaluates multiple demands for this water, including municipal water supplies such as Helena, hydro-electric, agriculture, shipping, and industry uses, to name a few. The Bureau of Reclamation (BOR) regulates the Canyon Ferry Reservoir on the Missouri River.

The City has a 40-year contract with the Bureau of Reclamation, which reserves 11,300 acre-feet per year from the Canyon Ferry Reservoir for the City's use. This contract expires in 2045, but is renewable upon written request and mutually agreeable terms. The City currently utilizes approximately 3,000 acre-feet of water per year from this source.

Water is pumped from the Canyon Ferry Reservoir and channeled to an above-ground holding facility, the Helena Valley Regulating Reservoir, located south of York Road. The water is then piped to the Missouri River Water Treatment Plant (MRWTP).

Upper Ten-Mile

The City of Helena owns the first and second water rights on Ten Mile Creek. Water from this watershed is piped to the Ten Mile Water Treatment Plant. If needed, additional water can be added to this treatment facility from the Chessman and Scott reservoirs located south of the community of Rimini. This network provides the City with approximately eight million gallons of water per day.

The City depends on the Ten Mile Creek watershed and the Chessman Reservoir for much of its water supply, but the forest health in that vicinity is in decline. Pine beetle infestations and reduced rain fall have weakened and killed many of the trees, heightening the fire risk and endangering City water infrastructure. Sediment and algae growth also can affect the Chessman Reservoir. In 2008, the Ten Mile Watershed Collaborative Committee (TMWCC) was appointed by the City to evaluate issues related to this watershed. The TMWCC developed a number of recommendations to protect this important resource and maintain the water system infrastructure. Some of the action items recommended include removal of vegetation in proximity to structures, modification/replacement of the fire-vulnerable parts of the flume with metal pipe and explore the development of a pre-sedimentation basin to minimize the effects of sediment on the Ten Mile treatment facility. Protecting and maintaining this water source will include forest thinning to reduce the fire threat and continued maintenance of the reservoirs, including incorporating the latest technology to control algae growth.

In addition to being a source of the City's potable water, Ten Mile Creek is an important habitat for aquatic species and area wildlife. Maintaining adequate flow helps to sustain this important feature, but it can also impact how much water the City can utilize from this watershed. The City, in conjunction with Montana Department of Fish Wildlife and Parks (MFWP), is working to balance the conflicting interests which are reflected in a Memorandum of Understanding (MOU) between the City and MFWP.

Ground Water

The City utilizes ground water from the Eureka well to serve a relatively small portion of south-central Helena's potable water needs. This water requires minimal treatment and is pumped into the Hale water storage tank at less than 400 gallons per minute. Use of well water is also

permitted in the City for some manufacturing uses and uses not requiring potable water.

The City of Helena has water rights for ground water wells in the Helena Valley that could be utilized if future expansion dictates need for that source, particularly for irrigation purposes. These water rights could expire if not utilized by 2025. Future utilization of ground water for municipal use may have to take into consideration impacts on that source by other users. Unlike City residents who are connected to the municipal water system, residents living outside of the City typically rely on ground water from wells for their potable water. Ground water is available at varying depths throughout the Helena Valley. This less regulated and relatively easy-to-obtain water promotes growth in the areas surrounding Helena. A number of factors can influence the quantity of ground water in a given area: the number of wells, extended drought conditions, and the functioning of recharge areas. Some areas, such as portions of the north hills and west of Green Meadow Drive, have experienced a lowering of the water table.

The *Helena Valley Groundwater Vulnerability Mapping Project*⁸ found that, in addition to precipitation, significant sources of recharge in the Helena Valley include:

- *Infiltration of streamflow;*
- *Infiltration of irrigation water through the irrigation canal network in the valley;*
- *Infiltration of excess applied irrigation water.*

Agricultural users in the area transport surface water via a network of canals from the Missouri River and local streams through the valley to water their fields. This irrigation network helps to recharge the area's ground water supply. As more of the Helena Valley is converted from agricultural uses to residential and commercial uses – which reduce the amount of water from irrigation – the hydrology of the area could be affected. A copy of the City's Aquifer Sensitivity Map is presented in this chapter as Figure 7.09.

Future Availability

Although the City has adequate water supply at this time, the population of Helena and the surrounding areas is growing. Future needs should be evaluated on a regular basis, with actions taken to ensure that Helena will always have sufficient and economical water, and that other water-dependent uses, such as recreational activities, forest health, wildlife preservation, and maintaining viable agriculture lands, are balanced with urban uses.

One way to promote future availability of adequate water supply is to make land-use and development decisions that promote efficient use of water infrastructure and resources. A number of other mechanisms can

⁸ *Helena Valley Groundwater Vulnerability Mapping Project, Trihydro Inc. for Lewis and Clark County, 2008.*

increase future water availability, such as water conservation, reuse, and more efficient use of water resources; drought-resistant landscaping; and means that increase the City's access to water sources. Compact, higher density development also reduces water consumption compared to more spread out or larger lot developments.⁹ Each of these mechanisms are supported in this Growth Policy.

Promoting activities that reduce the use of water will help reduce the amount of water the City will need in the future, including:

- Conducting educational and incentive programs that promote efficient water fixtures and appliances, encourage fixing leaks, and effective irrigation practices for residential and commercial uses;
- Promoting environmentally-sensitive landscaping and gardening including drought-resistant "xeriscaping";
- Promoting water reuse, such as grey-water utilization and rain barrels that capture rainfall for future irrigation use.

Climate change that increases average temperatures in the area may result in less rainfall, increased evaporation and dryness, and reduced stream flow at certain times of the year, which could affect ground water recharge. Regardless of systemic concerns, various actions may be taken to help preserve ground water levels, and this Growth Policy includes support for this objective. Potential implementing actions include:

- Protecting recharge areas by reducing impervious surface development, allowing more water to percolate down;
- Annexation of property and connection to the City's municipal water system could help reduce the number of wells in the area, reducing the amount of ground water being removed;
- Better regulation and protection of ground water rights to help maintain ground water availability to existing users.

The 2009 Helena Climate Change Action Plan details a number of grave threats to Helena's future water supply, citing downward trends in snowpack, earlier runoff and higher frequency of wildfires. Since that time, the City has adopted many of the report's recommendations, and climate change and conservation-related objectives are included in this updated Growth Policy. Copies of the 2009 plan are available from the City.

Water Quality

Although water quantity is very important, water quality also plays an important role in influencing the character of Helena and the surrounding area. In addition to providing a source of municipal water, surface water in the Helena area provides water for industrial uses, agricultural irrigation,

⁹ *Growing Toward More Efficient Water Use: Linking Development, Infrastructure, and Drinking Water Policies* (EPA, 2006); *Protecting Water Resources with Higher-Density Development* (EPA, 2006).

History of Impacts to Helena Area Water Quality

To a large extent, current water quality in the Lake Helena watershed is a result of man's activities within the watershed over the last 100 to 150 years. In the mid-1800s, mining activity increased following the discovery of gold and other minerals in the mountains around the Helena Valley. At the same time, the earliest miners and homesteaders began diverting water from Prickly Pear, Ten Mile, and Silver Creeks to irrigate land for crops. The watershed's hydrology and water quality experienced a period of rapid change because of these land development activities. Today, several hundred abandoned mines are present in the watershed, and these continue to influence basin hydrology and water quality.

In 1907, the hydrology of the Helena Valley was further altered with the completion of Hauser Dam and Reservoir on the Missouri River north of Helena. As the reservoir filled, the low-lying wetlands of Prickly Pear and Silver Creeks flooded to form Lake Helena. In 1945, an earthen causeway and control structure was built to separate Hauser Reservoir and Lake Helena, allowing the two to be regulated independently.

Between 1940 and 1970, extensive logging occurred in the Lake Helena watershed, primarily in the western portions of the watershed along the Continental Divide where the most valuable timber was located. During this period, equally extensive road networks were built to harvest and transport the timber. Many of the stream impacts observed today are remnants from these earlier activities.

Population growth and the associated infrastructure have also permanently altered the landscape and will continue to play a role in defining water quality in the Lake Helena watershed. Since the 1950s, population growth in Lewis and Clark County has averaged approximately 15 percent per decade. In summary, the water quality conditions and problems present today in the Lake Helena watershed are a function of past and present land uses.

Source: Framework Water Quality Restoration Plan and Total Maximum Daily Loads (TMDLs) for the Lake Helena Watershed Planning Area: Volume II – Final Report, 2006

animal habitat, fisheries, aquatic habitat, and recreational opportunities. Groundwater is the sole source of drinking water for most of the people in the vicinity who live outside the City of Helena including more than 27,000 people in the surrounding areas. Based on a 2010 analysis of well and septic permits, the Helena Valley aquifer provides water through approximately 5,700 domestic wells and 71 public water supplies. Mitigating the impacts to water quality is a constant challenge, including issues related to:

- Municipal wastewater outflows;
- Failing septic systems;
- Aging wastewater treatment facilities;
- Wetland and waterway encroachment;
- Erosion;
- Agricultural, timber and mining uses.

Many of the above topics are treated primarily in Chapter 5: Public Facilities & Services. Topics directly related to maintaining the quality of Helena's water resource are introduced in this section.

Sources of Water Degradation

The Helena area watershed is impacted by a number of pollutants; two of the more significant ones are nitrogen and phosphorus. The following is a breakdown of sources for the Lake Helena Watershed total nutrient loading of nitrogen and phosphorus:

- *Agriculture** 108 Tons/yr. (27%)
- *On-Site Septic* 102 Tons/yr. (25%)
- *Municipal* 53 Tons/yr. (13%)

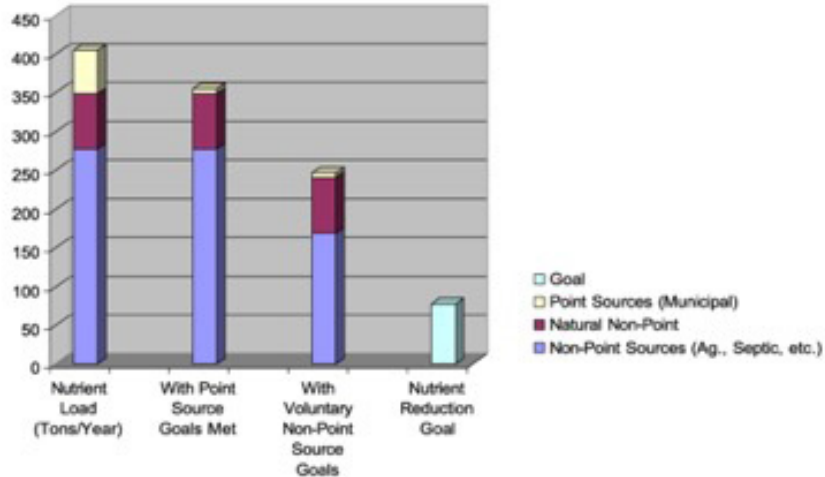


Figure 7.03 – Lake Helena Watershed Nutrient Loading Goals (Source: “Framework Water Quality Restoration Plan and TMDL’s for the Lake Helena Watershed Planning Area”, MDEQ, 2006)

* Includes Helena Valley Irrigation District

As shown in Figure 7.03, the DEQ plan established goals to reduce these nutrient loads.

This graph also illustrates that even with the City of Helena meeting their nutrient reduction goals, there would still be significant nutrient pollution from non-point sources such as agricultural uses, septic systems, and naturally occurring sources. For more on Helena’s wastewater treatment facilities and oversight on existing septic systems, see Chapter 5: Public Facilities & Services.

Nonpoint Source Water Contamination

The DEQ’s most recent Integrated Water Quality Report concluded that nonpoint source pollution, such as agriculture, commercial/industrial sites, septic systems, transportation, etc., is the leading cause of surface-water impairment in Montana and accounts for approximately 90% of the degradation problems in streams and 70% of the lake problems. Helena’s Wastewater Treatment Facility and stormwater system are classified as point sources and must follow strict regulatory guidelines for discharge into surface waters – unlike most non-point sources.

Septic Systems – Subsurface wastewater treatment systems (SWTS), more commonly referred to as “septic systems”, consist of a septic tank, a distribution system, and drain field. A properly working system can remove or greatly reduce bacteria, viruses, and environmental pollutants such as phosphorus, but is not as effective at removing nitrogen from wastewater. In areas sensitive to nitrogen loading, different levels of treatment may be required. Septic systems can have a significant impact on groundwater quality and are identified in the Lake Helena study as increasing nitrogen loading in the Prickly Pear Creek and

Ten Mile sub-watershed, and in Lake Helena. Based on GIS data utilized for City mapping (Figure 7.10) there are about 13,751 septic permits in the Helena Valley and surrounding area. Pollutants from septic systems migrate into the ground water, contaminating wells needed for potable water. It is important that wells for potable water be monitored and tested regularly to assure the quality of that water, and septic systems should also be adequately maintained.

Agriculture – Agricultural uses have been identified as the major source of water degradation in the state and as a major contributor to reduced water quality in the Helena area. This use contributes to nutrient loading, metals, and sediments in area surface waters.

Commercial/Industrial – Contamination from commercial and industrial uses also leaches pollutants into the ground water. Arsenic and selenium from the Asarco lead smelter in East Helena have been found spreading in the groundwater north/northwest from the smelter. These plumes have the potential of contaminating wells in their path.

Two of the best methods of preserving water quality are to eliminate the source of contamination or to reduce the output of pollutants. For example, connecting homes with failed septic systems or failed lagoons to the city wastewater treatment system would improve the quality of water in that area. However, such a solution is not always feasible. In situations where elimination is not possible, mitigation should be explored.

Riparian Areas

Riparian areas, vegetative buffers and wetlands play an integral part in improving and maintaining water quality. Streams can be affected by pollutants from activities such as wastewater discharge, septic systems, animal waste, construction, road maintenance, agricultural uses, old mines, and lawn care, as well as by unnatural stream bank erosion, which can significantly reduce water quality. Protecting riparian areas also protects habitat for fish and wildlife.

Riparian areas are vegetative buffers of land that border creeks, rivers, or other bodies of water and provide safeguards for water quality. The roots of trees, shrubs, and native grasses hold soil in place along banks of rivers and streams, reducing the potential for bank erosion and deposition of sediment in streams and rivers. Native vegetation along the banks of rivers and streams and within floodplains slows the movement of flood waters and helps disperse the flood waters, giving water time to percolate into the soil and recharge underlying ground water.

Trees and shrubs adjacent to rivers and streams provide shade, reducing and moderating water temperatures. Extreme fluctuations and high water temperatures harm fish and other aquatic life. Riparian vegetation in floodplains and along rivers and streams acts as a natural filter to remove sediment and other contaminants from stormwater runoff, which can adversely affect water quality.

For example, nitrate/nitrite levels in shallow groundwater can be reduced before reaching surface water through uptake by the roots of plants in vegetated buffers and by bacteria that live in water-saturated soils, which convert nitrates/nitrites to harmless nitrogen gas (a process called denitrification). Stream vegetated buffers are typically effective at short-term control of phosphorus that is bound to sediment particles.

Montana's *Non-point Source Management Plan*¹⁰ identifies locally-adopted water body setbacks as important Best Management Practices to protect and improve water quality from non-point source pollution. Non-point sources of pollution in urban areas include parking lots, streets, and roads where stormwater picks up oils, grease, metals, dirt, salts, and other toxic materials. In areas where crops are grown or in areas with landscaping (including grassy areas of residential lawns and city parks), irrigation and rainfall can carry soil, pesticides, fertilizers, herbicides, and insecticides to surface water (rivers, lakes, streams, etc.) and groundwater.

Establishing and protecting water body setbacks and riparian areas can help maintain and improve area water quality. Various studies indicate that vegetative buffers can filter out the ammonia, fecal coli form, nitrates, nitrogen, pesticides, phosphorus, and sediment. The effectiveness of the buffer as a vegetative filter depends on its width.

The criteria for determining riparian buffer width include the value of the resource, the site and watershed traits, slope, intensity of adjacent land uses, soils, and desired buffer functions. From a water quality perspective, the most effective buffers are flat. When slopes are steeper, the width of buffers should be increased to allow more opportunity for the buffer to capture pollutants. See City of Helena regulations for detailed buffer requirements.

Although vegetated buffers with woody plant species (trees and shrubs) and native grasses are both effective at trapping pollutants, those with woody plants provide the most effective water quality protection.

Lewis and Clark County and the City have adopted water body setbacks and guidelines for vegetative buffers in their subdivision regulations to protect water quality and other natural resources. These County setbacks range from 50 feet to 250 feet with buffers ranging from 30 feet to 100 feet, depending on the type of water body or wetlands. These regulations are one mechanism to reduce the impact development might have on critical water resources.

Wetlands

A number of wetland areas might be affected by development in the Helena area. Wetlands are locations where the combination of soils, water,

¹⁰ Watershed Protection Section. 2017. *Montana Non-point Source Management Plan*. Helena, MT: Montana Dept. of Environmental Quality.

and vegetation produce swamps, bogs, and similar areas. Wetlands can improve water quality in a number of ways, including:

- Support for vegetation that buffer floodwaters, reducing erosion during floods;
- Storage of water during flooding followed by slow release of water, reducing peak flood flows and downstream flood damage. Stored water infiltrates into the ground, providing recharge to aquifers. This ground water recharge is, in turn, released back to adjacent surface waters such as streams, providing water during low flow periods.
- Trapping of sediments and toxins, filtering polluted runoff, and absorbing excess nutrients. Wetlands trap and help break down nutrients and man-made, water-borne contaminants, such as those from sewer systems and stormwater runoff.

Protecting wetlands is essential to protecting water quality. Increased development affects riparian and wetland areas, but establishing setbacks that limit development within a certain distance of such features can help protect them. For areas where it is not feasible to retain wetlands, relocation may be a viable option. To preserve riparian areas and wetlands, these areas – including setbacks – could count toward a residential subdivision’s parkland dedication.

Other mechanisms that could preserve wetlands and riparian areas include conservation easements to protect recharge areas and larger features and drainages; overlay zoning for sensitive areas; and an inventory of sensitive areas such as water bodies, riparian areas, wetlands, and watersheds so that they can be better protected. Preserving these sensitive areas can also help to protect wildlife and aquatic habitat dependent on the area watershed and preserve critical ecological areas.

Environmental Issues

Wildfires

Wildland fires taking place in recent years have made clear the immediate threat such events pose to Helena’s urban areas. These fires, are a near yearly occurrence and can spread – or had the potential to spread – into the Wildland-Urban Interface (WUI), threatening many homes and prompting evacuation orders. Fires near population centers have increased levels of awareness and spurred efforts to mitigate wildfire dangers in WUI settings. A map depicting the relative degrees of wildfire hazard in and near Helena City Limits is presented as Figure 7.06 in this chapter.

Beyond the costs of fighting wildfires, the loss of property and potential loss of life, the secondary effects of a wildland fire are also significant,

including loss of wildlife habitat, air quality, and soil erosion, the spread of noxious weeds, flash flooding and landslides. Such areas may not return to pre-fire conditions for decades.

Recommendations from past committees are reflected in this Growth Policy and in various regulatory documents, helping manage the landscape with a defined set of treatments.¹¹ For instance, City code mandates fire-retardant roofs and vent requirements for all new roofing and in some cases reroofing projects throughout the city.

Vulnerable Areas

South Hills

Helena contains a forested area along the South Hills to the south and southwest, with a portion of the South Hills sharing a border with the Helena National Forest. This area is approximately seven miles long and traverses from Interstate 15 to Mount Helena and beyond. The width of this area is difficult to define due to the various fuel types and structures that intermix or intermingle across this area.

Wildland-Urban Interface (WUI) – An area where houses or businesses, or where humans and their development, meets or intermixes with wildland or vegetative fuel.

Ladder Fuels – A firefighting term for live or dead vegetation that allow a fire to climb up from the landscape or forest floor into the tree canopy. Common ladder fuels include tall grasses, shrubs, and tree branches, both living and dead.

The portion of the South Hills located within and adjacent to Helena contains many of the conditions associated with a WUI setting. This area has a Ponderosa Pine-type forested area with an understory of Douglas Fir intermixes and grasses, as well as varied topographical features. The predominant uses of this area are residential and recreational open space. The South Hills also serves the community as a valued view-shed and community backdrop.

Helena is vulnerable to wildfire along the South Hills due to a number of factors including the accumulation of fuels from beetle-killed trees; urban development; the wildland setting; varied topography,

and areas that are difficult to access. As population and recreational uses increase along the South Hills, the number of fires and potential fire impact may increase.

¹¹ 2009 Ten Mile Watershed Collaborative Committee

Helena WUI

The southern portion of Helena is located in the WUI and has the potential for human / environment conflicts including wildland fires. Fires in the WUI are more likely to occur in the presence of:

- *Accumulation of fuels on the ground and extensive stands of trees providing “ladder fuels”;*
- *Extended periods of drought;*
- *High seasonal temperatures and winds;*
- *Development-related fuel sources, such as wood shake roofs;*
- *Human activity.*

Helena’s WUI has also seen significant issues associated with pine beetles, which leave trees vulnerable to a deadly fungus. As a result, significant portions of surrounding forests include dead stands of trees, increasing the potential for wildfire. Remaining dead trees may also create safety hazards for anyone walking in the area. The Urban Standards Boundary has been enlarged to incorporate sections of the WUI to better facilitate the establishment of joint standards with Lewis and Clark County.

Noise & Light

Excessive noise and light can be forms of pollution, impacting quality of life, public health and community value. As such, this Growth Policy includes objectives supporting ongoing reduction in noise and light pollution, including future updates to regulations or other implementing actions.

Noise

City Code restricts outdoor noise by identifying acceptable noise levels, unlawful noise, and penalties for violations. Highways, airplanes, and trains can be noise generators. The 2004 Montana Department of Transportation (MDT) Traffic Noise in Montana: Community Awareness and Recommendations for a Rural State identified significant areas for traffic noise in Helena. Major traffic-noise impact areas include I-15, the railroad corridor, and most of the major arterials including Custer Avenue; 11th Avenue; Broadway; Benton Avenue, and some parts of Montana Avenue. Minor traffic-noise impact areas include US Highway 12; Last Chance Gulch/Cedar Street; Prospect Avenue; Roberts Street, and some parts of Montana Avenue. Other noise impact areas may develop as the community grows, and this plan’s objectives framework supports ongoing efforts to monitor and address such places.

To guide future land use decisions and noise-abatement measures, the following lists noise-sensitive land uses, as identified in the 2008 MDT

report *Growing Neighborhoods in Growing Corridors: Land Use Planning for Highway Corridors*:

- *Residences;*
- *Hospitals;*
- *Nursing homes;*
- *Daycare centers;*
- *Schools;*
- *Hotels and motels;*
- *Places of worship;*
- *Public meeting rooms and auditoriums;*
- *Libraries.*

Light

The wonders of the night sky – including constellations, galaxy clusters, meteor showers and the occasional aurora borealis – are a natural resource that may be diminished by urban lights. Although maintaining this resource to the greatest extent possible can help maintain the quality of life in Helena, a balance between pedestrian safety, deterring criminal behaviors and enjoyment of the night sky must be considered.

The public’s desire to improve night-sky views resulted in the 1999 adoption of a lighting ordinance that encourages lighting practices and systems that minimize light pollution, glare, and light trespass while maintaining nighttime safety, utility, and security. Public input provided during the update of this document suggests further progress be made to improve night-sky visibility, in concert with functional and safety-related lighting needs.

Airport & Military

Montana law identifies requirements for airports as they affect land uses (67-7-201 MCA). Figure 7.11 shows the boundaries of Helena’s Airport Noise Influence Overlay District, including part of the north-central and northeastern portion of the City, and extending east of the Helena Airport into the county. The City’s Zoning Ordinance prohibits the following uses in the Airport Noise Influence Overlay District:

- Hospitals;
- Convalescent homes and related health-care facilities;
- Multi-family rental housing intended primarily for the elderly;
- Schools;
- Libraries; and theaters;
- Indoor or outdoor performing arts facilities.

Military operations can create noise and present safety concerns for nearby communities due to aircraft operations and training exercises. Such activities may adversely affect the surrounding community, especially for development in close proximity to the military base. Conversely, encroaching development may create over-arching access, noise and safety concerns that make base operations incompatible with their surroundings, leading to closure.

The City of Helena recognizes and values the benefits associated with Fort Harrison operations, and this plan's objectives framework supports ongoing, collaborative efforts to identify and implement actions that retain the base over the long term, providing mutual benefit to the Fort's essential mission and to the local economy. The Urban Standards Boundary (USB) has been amended to remove Fort Harrison and adjacent areas due to Lewis and Clark County adopting low density residential zoning consistent with the Joint Land Use Study (JLUS).¹²

Development Constraints

Helena's Development Constraints Map (Figure 7.05) identifies certain environmental issues within and up to 4.5 miles outside City Limits that influence the location of land uses and related development standards.

This map shows the general locations of floodplains (blue), liquefaction areas (brown)¹³, and wildland-urban interface areas (red) deemed more susceptible to risk of wildfire.

The map also identifies the Airport Noise Influence boundary (yellow). Areas that may be more easily served by City water and sewer is shown



Figure 7.04 – The Helena Regional Airport enjoys a long-standing partnership with the U.S. Military, and hosts an Air National Guard helicopter hangar facility, among many other activities. (Image: SCJ Alliance, Inc.)

¹² Figure 3.10 depicts the extents of the JLUS Military Affected Area.

¹³ Liquefaction areas are lands prone to decreased structural support during an earthquake, due to high groundwater and/or soil types.

(purple) boundary; this boundary is also proposed for the urban standards area. Two of these development constraints are addressed in the following sections.

Floods

The Development Constraints Map shows the 100- and 500-year floodplain locations along Ten Mile and Prickly Pear Creeks. Ten Mile Creek is located within a mile north and northwest of the city, bordering an area that could be developed in the future. The floodplain along Prickly Pear Creek extends through East Helena and continues north and east of the airport. These areas tend to have higher groundwater than property located farther from the floodplains. Some limited floodplain areas are located within City limits.

The City of Helena has adopted a Floodplain Ordinance and building codes to address construction standards that will affect the identified floodplain areas as the City grows to the north and northwest. Development is prohibited in the 100-year floodplain, while development in the 500-year floodplain requires buildings to be elevated without basements.

Earthquakes & Liquefaction

Helena is located in Seismic Design Category D for earthquake potential. In 1935, Helena received extensive damage from a series of significant earthquakes and aftershocks. Occasional earthquake activity has been felt in the area since that time, and another large earthquake is anticipated.

Additionally, a large portion of the Helena Valley has been identified as susceptible to liquefaction, shown on the Development Constraints Map as low, moderate, and high susceptibility. A geotechnical analysis is currently required by the City during preliminary plat application, and on a case-by-case basis for building permits, helping provide site-specific liquefaction potential.

Because of the earthquake potential associated with the Seismic Design Category D designation, certain building code standards are required for all construction. Compliance with these building codes means buildings will better withstand earthquakes and the accompanying liquefaction.

Resource Conservation

Resource conservation is a well-established objective in Helena's Growth Policy and underpins many of the City's implementing regulations. The 2011 Growth Policy detailed several topics related to energy conservation,

two of which are copied below. Other adopted objectives which also help conserve resources are noted here:

- Improvements to pedestrian and bicycle connectivity, reducing auto dependency and improving public health;
- Higher-density and infill development patterns, reducing motor-vehicle miles traveled, reducing land consumption and greatly improving service efficiencies;
- “Green Building” design and operations, saving building materials, energy and water. In Helena, new buildings designed with LEED (Leadership in Energy and Environmental Design) standards may receive incentives such as increased building height, lot coverage or density bonuses.

Recycling

Recycling is strongly supported by Helena residents as a way to divert waste from disposal to a useful economic resource with an environmental benefit. Recycling in the greater Helena area includes non-profit, private and government operations. The City transfer station currently accepts steel cans, aluminum cans, newspapers, magazines and corrugated cardboard, used motor oil, telephone books, and container glass for recycling. The City also contracts with Helena Recycling for low-cost pickup services, typically added to customer water bills.

The City’s recycling program produces glass aggregate that can be processed locally and used for landscaping or fill material. Pavement millings (recycled asphalt) can be used for street overlays, parking lots, and fixing potholes.

Composting

Composting efforts provide a means to reduce Helena’s waste stream while enriching the soil. The City operates a large composting area near the landfill. Resulting compost is then “recycled” in City landscaped areas parks. This practice also extends the landfill’s lifespan, effectively removing compostable materials from the waste stream.

Climate & Climate Change

Scientific studies indicate the earth is getting warmer and will continue to do so well into the future. Issues center on the speed and severity of the impacts and whether policies for mitigation and adaptation can be adopted with implementing actions.

It is generally believed that increased concentrations of greenhouse gases in the atmosphere boost the greenhouse effect – which traps solar warmth in the lower atmosphere. Due to the volume of greenhouse gases (GHG) emitted over the past century, scientists believe that the effects of human-induced global warming cannot be eliminated. Regardless,

reducing the rate and volume of GHG emissions is targeted, helping lessen dangerous impacts on ecosystems, weather patterns and human health. Because the built environment is a primary contributor to GHG emissions, good planning is a key implementation step in addressing climate change.

Montana has and will continue to be affected by climate change. According to a 2007 Governor-prompted study, Montana’s electricity generation, heating needs, commerce, agricultural practices, and transportation needs accounted for 0.6% of the GHG emissions in the United States in 2005. The state’s forests, cropland and rangeland provide a vast terrestrial “carbon sink” that helps balance the state’s emissions. However, a 14% increase in GHG emissions from 1990 to 2005 moved Montana from a net carbon sink to a net carbon emitter, and the state now averages net emissions of approximately 12 million metric tons of carbon dioxide equivalents per year. Montana’s rate of GHG emissions per capita is nearly double the national average. The reasons for this are varied, but include the state’s large fossil-fuel production industry, substantial agricultural industry, large distances for transportation, cooler climate, and low population base.¹⁴

Objectives Summary

This Growth Policy presents goals and objectives that address the full range of environmental issues seen in Helena.

In terms of protecting the natural environment, the community understands its value in economic development – as an attraction for businesses and tourists – as well as its essential role in sustaining Helena’s character and quality of life.

Climate change issues are addressed as well, advised by recommendations included in the 2009 Helena Climate Change Action Plan.

In so doing, Helena’s objectives describe a means of balancing things like air and water quality, outdoor recreation, energy conservation, hazard reduction, and habitat preservation with growth. Environmentally-related objectives include:

- Protection of ground and surface waters through the use of buffers and mitigation measures for development near ground and surface waters, water bodies, drainages, floodplains, riparian areas, and wetlands;
- Reduction of cut- and fill work associated with road or building construction, helping alleviate erosion, reduce stormwater

¹⁴ *Montana Climate Change Action Plan: Final Report of the Governor’s Climate Change Advisory Committee, 2007.*

drainage and the spread of weeds, and minimizing negative visual effects;

- Direction of urban development within the city and in close proximity to employment and services, helping:
 - *Reduce vehicle miles traveled;*
 - *Decreasing air pollution;*
 - *Providing more efficient use of land;*
 - *Improving efficiencies regarding service and transportation networks;*
 - *Reduce development pressures on sensitive areas and the natural environment;*
- Subdivision objectives that encourage non-motorized infrastructure and connectivity to neighboring uses and features;
- Coordination with Lewis and Clark County and other agencies to direct development in and near Wildland-Urban Interface areas.

In these and in many other ways, the City of Helena seeks to integrate development with its growth as a community that is climate-adaptive, climate change resilient and thriving, preserving and enhancing our local environment. These factors are, on a fundamental level, the basis for maintaining the attractiveness, livability, and economic vitality of our community.

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■ Natural Environment Goals & Objectives

Goals

[G.06] Protect and enhance the quality of Helena’s natural environment, conserving resources for the benefit of present and future generations.

Discussion: A hallmark of Helena is its mountainside setting, including forested hillside backdrop and open-space lands. In concert with other plan goals and policies directing growth, this goal supports the preservation of scenic and open space areas, urging creative employment of tools such as land trusts, rights-purchasing or exchanges, or other appropriate strategies.

[G.07] Provide an adequate and stable supply of safe and economical water to all users in the Helena community, while protecting the quality of both ground- and surface-water in the Helena area watershed.

Discussion: City livability, health and value are fully dependent on clean, safe and sustainable water supplies. This goal underscores Helena’s commitment to maintaining both supply and quality of ground and surface water, recognizing them as essential to the community’s survival.

[G.10] Plan for and establish types and quantities of land uses in Helena supporting community needs, neighborhood centers, aesthetics and the City’s long-term sustainability.

Discussion: Cities exercise considerable influence over land use, in turn influencing the type and character of development, patterns of growth, and the short and long-term financial impact of growth on the local economy. Consequently, this plan supports the allocation of land use types, supporting features and facilities sufficient to achieve overall plan objectives.

[G.11] Coordinate with adjacent jurisdictions and agencies, including East Helena, Lewis and Clark County, Jefferson County, and Broadwater County on issues that have regional impacts.

Discussion: In the past, Helena was a more centralized, independent place. Today, the City’s fortunes and that of its residents depends on a set of dynamic, inter-dependent relationships between East Helena, Lewis and Clark, Jefferson and Broadwater Counties, and other agencies and forces that shape the region. Over the course of this plan’s life cycle, it is expected that inter-agency collaboration will become even more important. Accordingly, this plan’s goal and objectives framework supports actions building the economic health and resilience of the region as a whole, especially as it relates strategically to the unique qualities Helena residents enjoy.

Objectives

- [O.12] Promote and maintain development of a diverse housing stock, helping to:
 - Minimize depletion of natural resources;
 - Reduce land consumption and demands on the physical environment;
 - Provide housing options for all residents;
 - Optimize infrastructure use;
 - Prepare Helena to meet emerging needs.
- [O.26] Consider and implement ways to reduce nutrient discharges from Helena’s wastewater treatment plant and its stormwater system to meet regulatory standards, including enforcement of the Stormwater Ordinance and erosion control requirements.
- [O.27] Promote efficient use of community infrastructure, services and resources, including efforts to:
 - Increase energy efficiency;
 - Reduce vehicle trips;
 - Maintain air quality;
 - Minimize noise pollution.
- [O.28] Continue to authorize connection of County residents with failing septic systems or lagoons to City treatment facilities, when compatible with Helena’s Growth Policy and its discharge permit.
- [O.29] Promote energy efficiency and the use of renewable energy in new and existing development, minimizing impacts on natural resources and the environment through measures including, as appropriate:
 - Development standards;
 - Land use regulations;
 - Public/private partnerships;
 - Public education;
 - Tax or other monetary incentives.
- [O.30] Manage provision and use of recreational facilities to protect the integrity of environmentally-sensitive areas.
- [O.42] Promote transportation facilities and land use patterns that support resource efficiency and reduce the output of greenhouse gasses.
- [O.50] Support local and regional efforts to conserve energy, promote recycling and reduce solid waste.
- [O.51] Protect and sustain irreplaceable natural features such as wetlands, stream corridors, and similar high-value areas that provide wildlife habitat, recreational opportunities, improved water quality and safety values such as flood control.

- [O.52] Encourage ‘green’ building and renewable energy investments, helping promote:
- Provision of local jobs;
 - Increased property values;
 - Reduced energy costs;
 - Helena’s long-term sustainability.
- [O.53] Preserve habitat areas identified by the Endangered Species Act or as important to wildlife identified by the State of Montana as species of conservation concern.
- [O.54] Minimize conflicts between wildlife and human development, especially in areas abutting wildlife habitat.
- [O.55] Minimize environmental degradation in areas with challenging physical and environmental characteristics, such as steep slopes, watercourses, drainage ways and wetlands.
- [O.56] Encourage use of technologies and techniques that direct light downwards, minimizing intrusive or excessive glare, reducing energy use and optimizing “dark sky” conditions in Helena.
- [O.57] Minimize cut-and-fills on slopes resulting from road or building construction.
- [O.58] Reduce the spread of invasive plant species in Helena, including requiring City operations or contracts to include weed-free materials and construction methods.
- [O.59] Support the State in its efforts to monitor levels of water-based invasive species and promote programs that reduce their spread.
- [O.60] Promote the planting and protection of trees citywide, helping:
- Beautify and enhance community value;
 - Provide shade and comfort;
 - Affirm Helena’s association with the outdoors and its historic origins;
 - Provide wildlife habitat.
- [O.61] Promote landscaping guidelines that:
- Maintain or restore native trees and vegetative cover;
 - Support locally-compatible species diversity;
 - Re-vegetate disturbed areas;
 - Beautify streets, entry corridors, roadways and parking lots;
 - Help calm traffic;
 - Help treat and address stormwater issues.

- [O.62] Mitigate and adapt to climate change, supporting sustainable practices including:
- Development of programs and projects to address sustainability and climate change such as, in order of priority, source reduction, reuse, recycling of materials to achieve zero waste;
 - Tracking of available indicators including temperature, precipitation, snowfall, days below freezing, and incorporation of photovoltaics into public and private infrastructure.
 - Support for local food production, including community gardens, healthy food preparation and ecologically sound gardening practices that, composting, reduced water, synthetic fertilizer, and pesticide use;
 - Educational efforts to increase awareness, explain benefits and promote voluntary efforts addressing climate change, carbon-neutral lifestyles, and related topics;
 - Educational efforts regarding mitigation techniques for development in fire- and flood- prone areas.
- [O.63] Promote water conservation efforts in Helena, reducing the need for infrastructure expansion.
- [O.64] Evaluate subdivision impacts to ground and surface waters, drainages, floodplains, riparian areas and wetlands, incorporating adequate buffers or requiring appropriate mitigation, including, but not limited to, stormwater treatment and discharges to improve wetland viability.
- [O.65] Protect the Ten Mile watershed as a key part of the municipal water supply, restoring those parts of the watershed that have been impaired by human activity.
- [O.66] Promote sustainable practices for water resource preservation, supporting multiple uses of area waters, including:
- Recreational activities;
 - Forest health;
 - Wildlife preservation;
 - Maintaining viable agricultural lands.
- [O.67] Promote reducing impervious surfaces, thus increasing infiltration through the soil, which helps regenerate groundwater and remove pollutants.
- [O.68] Encourage the use of xeriscape landscaping, grey water, rain barrels, and other mechanisms to reduce demand on potable water and the amount of effluent.
- [O.76] Support land use patterns that:
- Promote compatible, well-designed development;
 - Foster the long-term fiscal health of the community;
 - Maintain and enhance resident quality of life;
 - Implement related master plans and/or facility plans.

- [O.82] Encourage development patterns and proposals that promote efficient use of City infrastructure and resources.
- [O.88] In making annexation decisions consider the following factors:
- Master plans for water, sewer, transportation, parks, schools and emergency services;
 - Provision of necessary rights-of-way and easements;
 - Studies that evaluate environmental and public service factors;
 - Timing that supports orderly development and/or coordinated extension of public services;
 - Ability to leverage existing facilities, minimizing expansion or duplication of facilities;
 - The Urban Standards Boundary (USB);
 - Growth Policy goals and objectives.
- [O.95] Encourage and support citizen involvement with City boards, commissions, and civic organizations.

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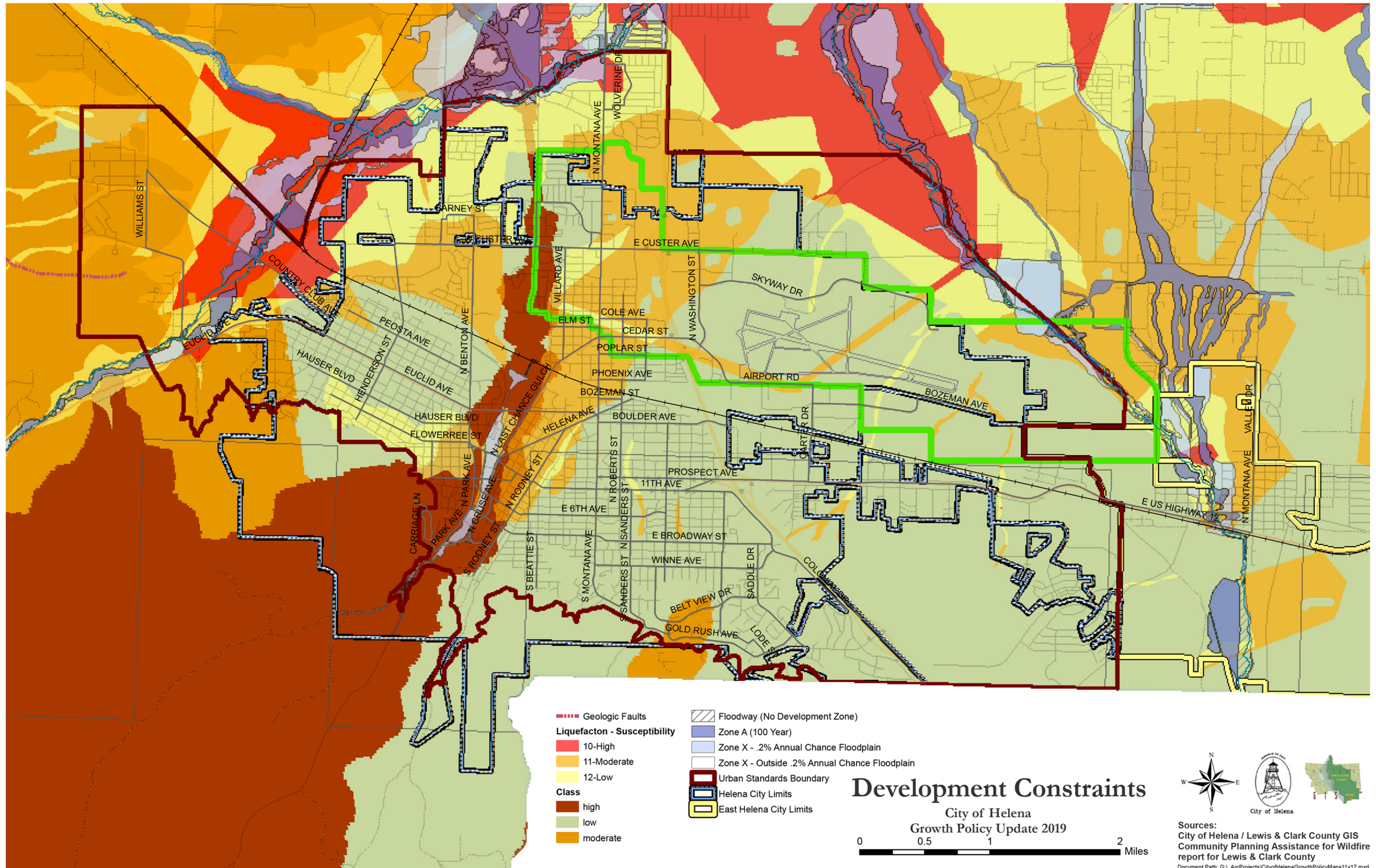


Figure 7.05 – Development Constraints map (Image: City of Helena)

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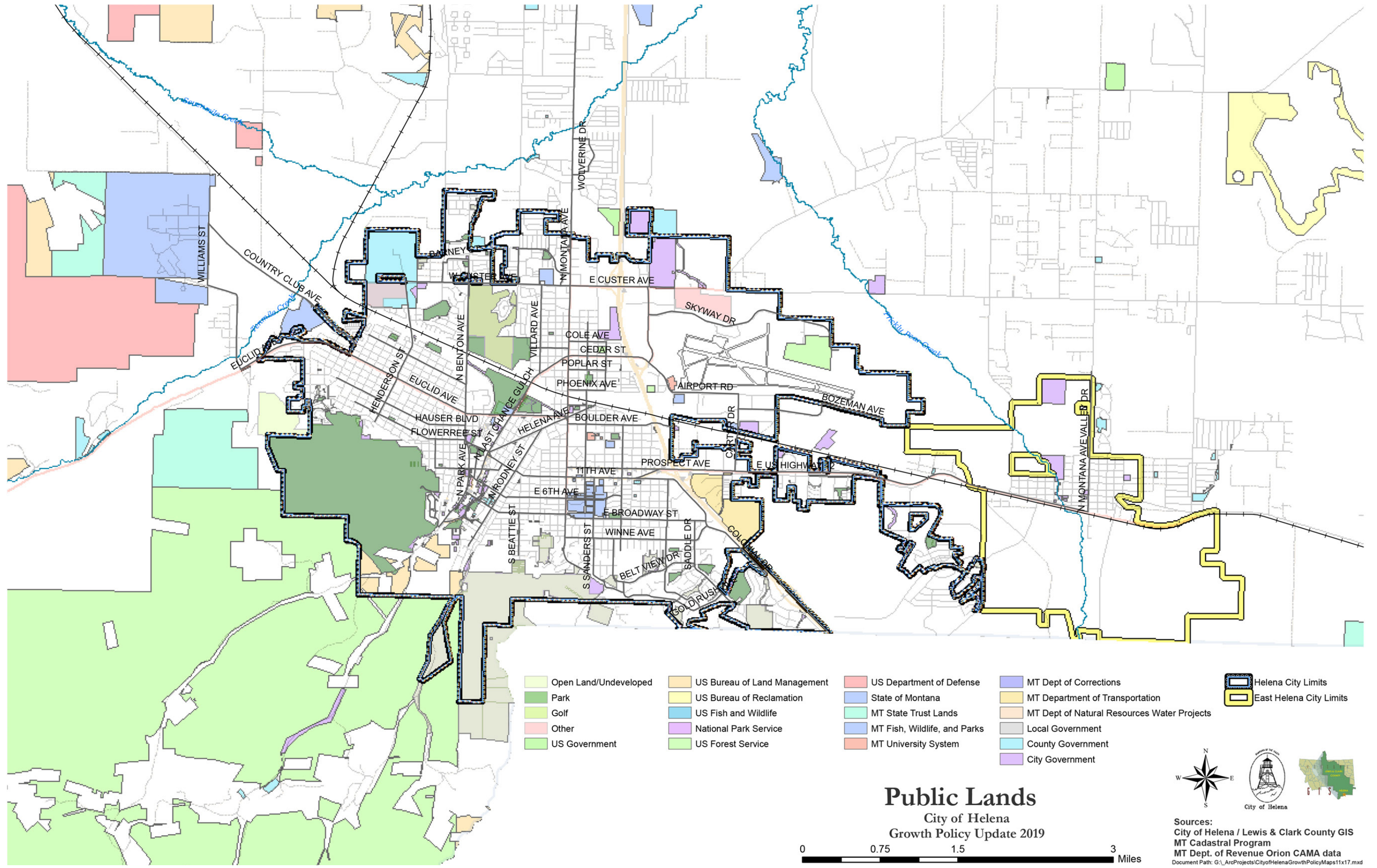


Figure 7.07 – Public Lands map (Image: City of Helena)

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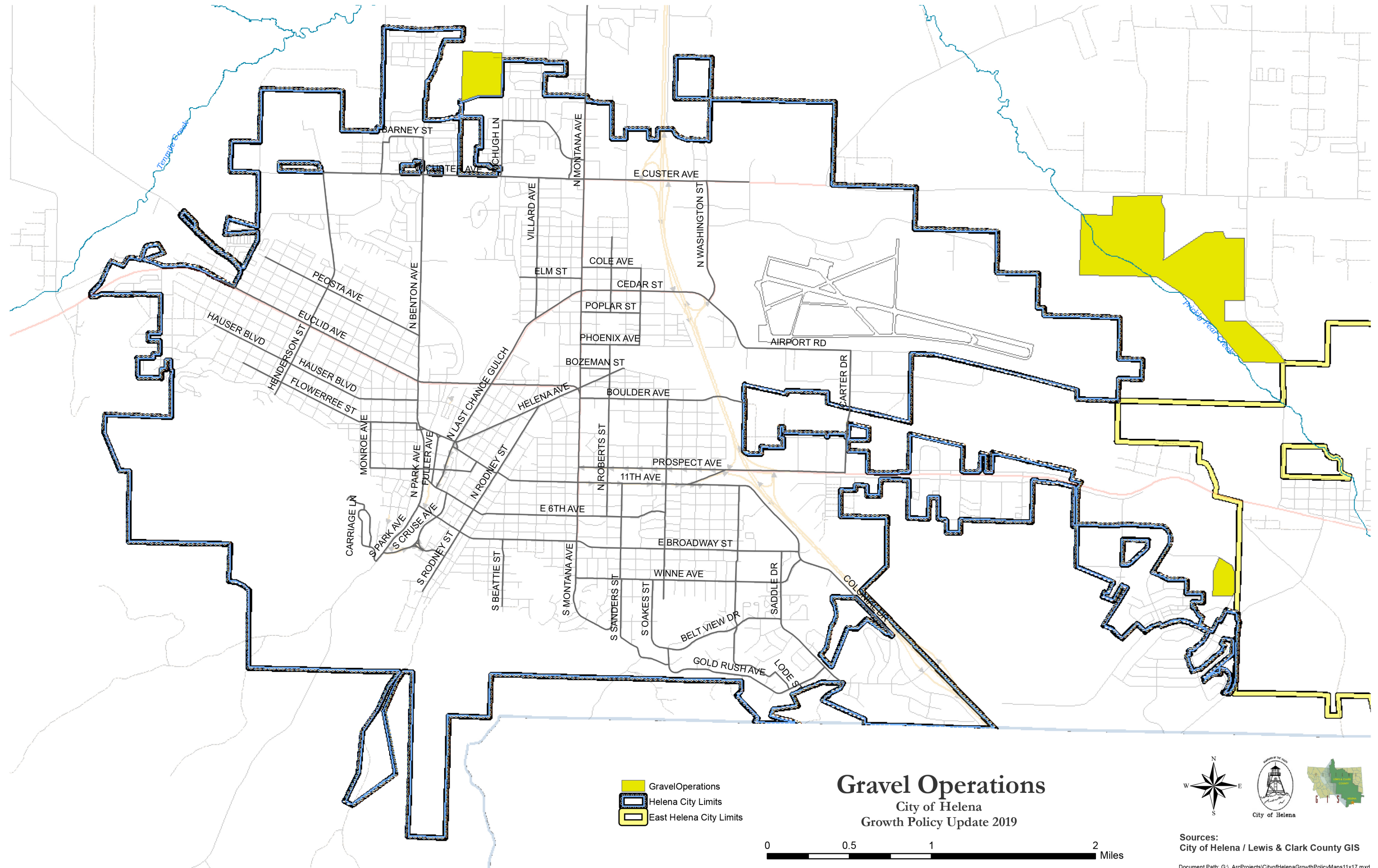


Figure 7.08 – Gravel Operations map (Image: City of Helena)

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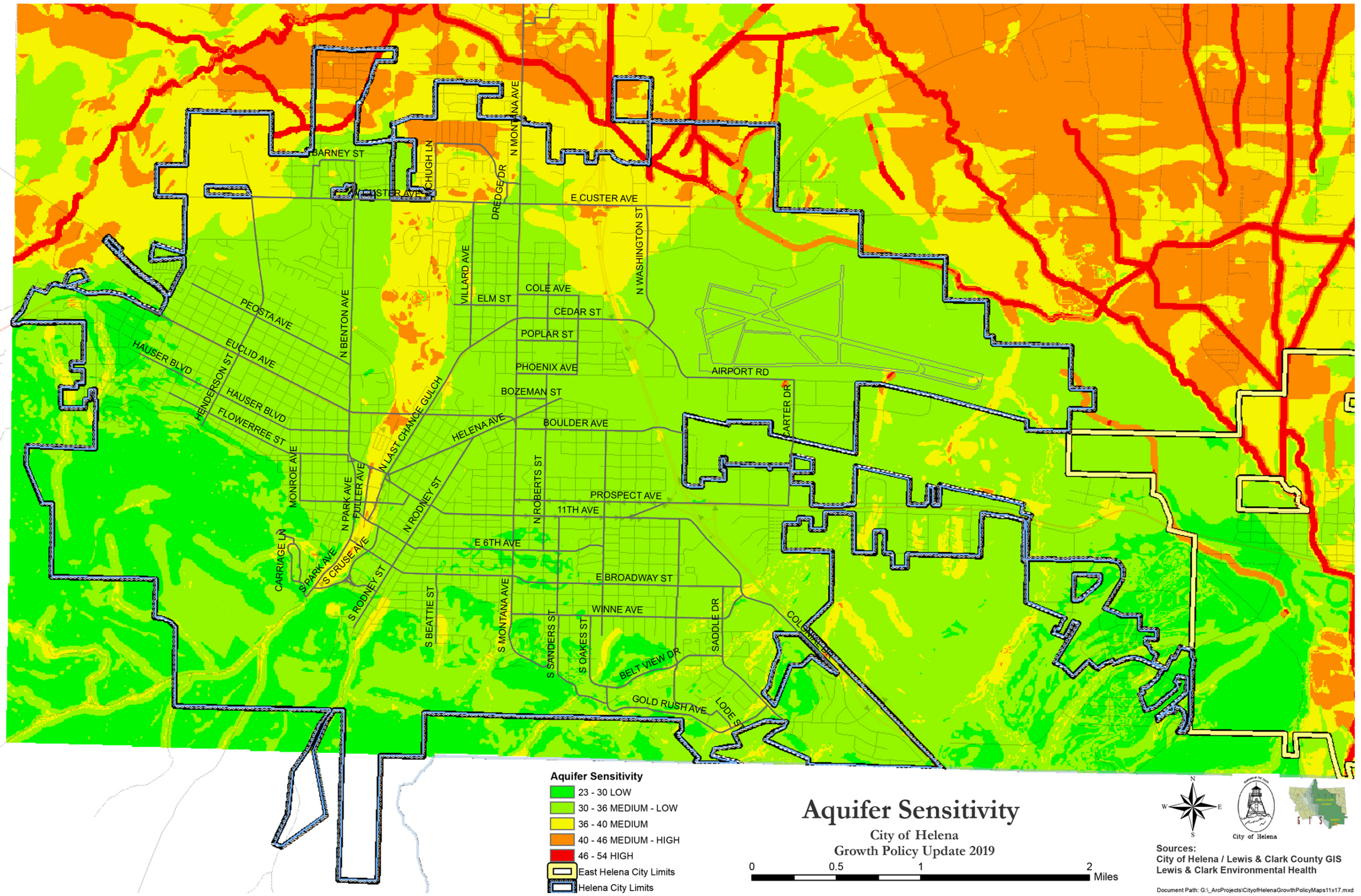


Figure 7.09 – Aquifer Sensitivity map (Image: City of Helena)

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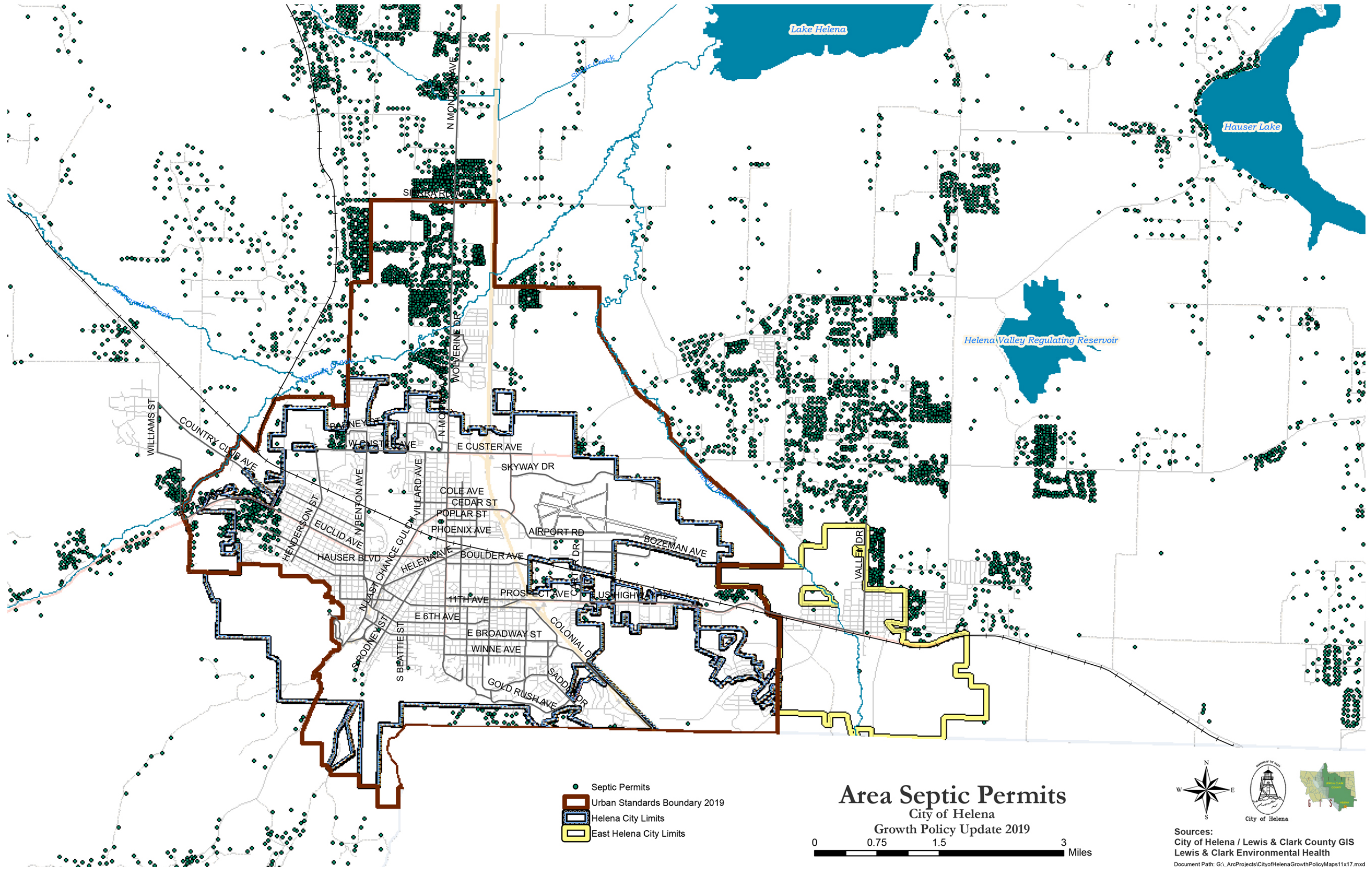





Figure 7.10 – Area Septic Permits map (Image: City of Helena)

Sources:
 City of Helena / Lewis & Clark County GIS
 Lewis & Clark Environmental Health
 Document Path: G:_ArcProjects\CityofHelenaGrowthPolicy\Maps11x17.mxd

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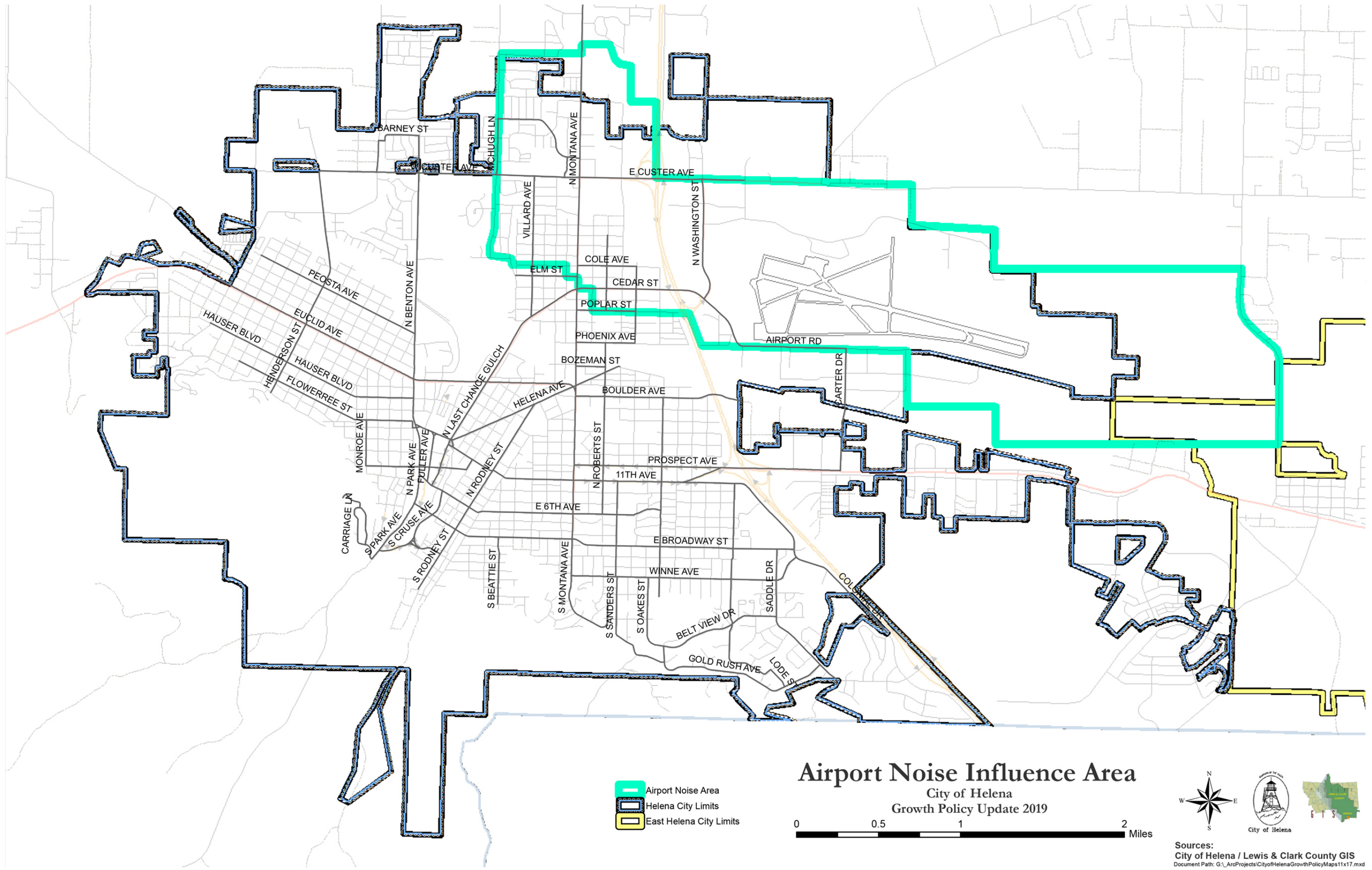


Figure 7.11 – Airport Noise Influence Area map (Image: City of Helena)

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