

Wildcat Creek Floodplain Management Plan

For Communities Along Wildcat Creek



Wildcat Creek Watershed Working Group

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TABLE OF CONTENTS

LIST OF TABLES	4
LIST OF FIGURES	4
1.0 INTRODUCTION	5
1.1 DESCRIPTION OF THE AREA	5
1.2 PURPOSE OF THE FLOODPLAIN MANAGEMENT PLAN	6
2.0 DEVELOPMENT PROCESS OF THE FLOODPLAIN MANAGEMENT PLAN	9
2.1 FLOODPLAIN HAZARD ASSESSMENT	9
2.1.1 FLOOD HAZARDS: WILDCAT CREEK FROM KANSAS RIVER TO SETH CHILD RD.	12
2.1.2 FLOOD HAZARDS: WILDCAT CREEK FROM SETH CHILD RD. TO SCENIC DR.	15
2.1.3 FLOOD HAZARDS: VIRGINIA-NEVADA TRIBUTARY	18
2.1.4 FLOOD HAZARDS: CICO TRIBUTARY	21
2.1.5 FLOOD HAZARDS: LITTLE KITTEN CREEK	24
2.1.6 FLOOD HAZARDS: ROLLING HILLS TRIBUTARY	27
2.1.7 FLOOD HAZARDS: MANHATTAN TO KEATS	29
2.1.8 FLOOD HAZARDS: KEATS TO RILEY	31
2.1.9 FLOOD HAZARDS: WILDCAT CREEK HEADWATERS	34
2.2 PUBLIC INVOLVEMENT PROCESS	35
2.2.1 WILDCAT CREEK WATERSHED AREA WORK GROUP	35
2.2.2 OTHER PUBLIC INVOLVEMENT	36
3.0 GOALS AND OBJECTIVES SHARED BY THE COMMUNITIES	39
3.1 GOAL: DEVELOP A COLLABORATIVE APPROACH	39
3.2 GOAL: PROACTIVELY MANAGE AND REDUCE FLOOD RISK	39
3.3 GOAL: PROTECT AND PRESERVE THE NATURAL RIPARIAN ENVIRONMENT	39
3.4 GOAL: OBTAIN A BALANCE BETWEEN DEVELOPMENT NEEDS AND FLOODPLAIN	40
3.5 GOAL: IMPROVE PUBLIC UNDERSTANDING OF THE FLOOD RISKS	40
4.0 STRATEGIES AND TOOLS	41
4.1 STRATEGY: MODIFYING HUMAN SUSCEPTIBILITY TO FLOOD HAZARDS	41
4.1.1 TOOL: LAND USE POLICIES AND REGULATIONS	41
4.1.2 TOOL: DEVELOPMENT POLICIES - MORATORIUM	41
4.1.3 TOOL: FLOOD WARNING SYSTEMS	42
4.1.4 TOOL: FLOOD PROTECTION OF STRUCTURES IN THE FLOODPLAIN	43
4.1.5 TOOL: PROCESS FOR RELOCATION OR REMOVAL OF STRUCTURES	44
4.2 STRATEGY: MODIFYING THE IMPACT OF FLOODING	44
4.2.1 TOOL: INFORMATION AND EDUCATION	45
4.2.2 TOOL: FUTURE CONDITIONS MODEL	46
4.2.3 TOOL: FLOOD INSURANCE	46
4.2.3.A TOOL: COMMUNITY RATING SYSTEM	47
4.2.4 TOOL: TAX ADJUSTMENTS	47
4.2.5 TOOL: EMERGENCY RELIEF	47
4.2.6 TOOL: POST-FLOOD RECOVERY PROCESSES	48
4.3 STRATEGY: PRESERVING AND RESTORING ENVIRONMENTAL QUALITY	48
4.3.1 TOOL: WETLANDS PROTECTION AND RESTORATION	48
4.3.2 TOOL: EROSION AND SEDIMENT CONTROL	48
4.3.3 TOOL: WATER QUALITY ENHANCEMENT	49
4.3.4 TOOL: ENHANCEMENT OF RECREATION AND EDUCATIONAL OPPORTUNITIES	49
4.3.5 TOOL: PRESERVATION OF CULTURAL RESOURCES	51
4.4 STRATEGY: MODIFYING FLOODWATERS	51

4.4.1 TOOL: STORMWATER DETENTION AND RETENTION BASINS	51
4.4.1.A TOOL: ADDITIONAL STORMWATER POLICIES	52
4.4.2 TOOL: LEVEES, FLOODWALLS, AND LANDFORMS	53
4.4.3 TOOL: CHANNEL ALTERATIONS, DIVERSIONS, AND BYPASSES	53
4.4.4 TOOL: PUMP STATIONS	54
5.0 ACTION PLAN	55
5.1 ACTION ITEMS	55
5.2 DESCRIPTION OF ACTION ITEMS	55
5.2.1 ADOPTION OF THE WILDCAT CREEK FLOODPLAIN MANAGEMENT PLAN	55
5.2.2 ESTABLISH A CITY AND COUNTY DEVELOPMENT COORDINATION PROCESS	55
5.2.3 AMEND THE RILEY COUNTY HAZARD MITIGATION PLAN	57
5.2.4 RESEARCH AND FORM A DRAINAGE DISTRICT	57
5.2.5 DEVELOP A COMPREHENSIVE FLOOD HAZARD MITIGATION PLAN	57
5.2.6 ADOPT THE WILDCAT CREEK FUTURE CONDITIONS FLOOD MODEL	58
5.2.7 RESEARCH AND ADOPT HIGHER STANDARD FLOODPLAIN REGULATIONS	58
5.2.8 DEVELOP A WILDCAT CREEK RECREATION PLAN	59
5.2.9 DEVELOP A COMPREHENSIVE PUBLIC OUTREACH PLAN	59
5.2.10 RESEARCH AND UPDATE DEVELOPMENT POLICIES AND REGULATIONS	59
5.2.11 ADOPT STORMWATER DETENTION/RETENTION POLICIES	60
5.2.12 JOIN THE COMMUNITY RATING SYSTEM	60
5.2.13 MAINTAIN AND EXPAND THE EXISTING FLOOD WARNING SYSTEMS	60
5.3 MONITOR, EVALUATION AND CHANGES TO THE FLOODPLAIN MANAGEMENT PLAN	60
6.0 REFERENCES	63
7.0 DEFINITIONS	65
8.0 APPENDICES	67
APPENDIX 1: MAPS	69
APPENDIX 2: FORT RILEY MEMO	103
APPENDIX 3: HOLEMAN MEMO	107
APPENDIX 4: CITY & COUNTY ADOPTION DOCUMENTS	119

LIST OF TABLES

TABLE 1. FLOOD HISTORY	11
TABLE 2. FLOOD DATA, WILDCAT CREEK FROM KANSAS RIVER TO SETH CHILD RD	15
TABLE 3. FLOOD DATA, WILDCAT CREEK FROM SETH CHILD RD. TO SCENIC DR	17
TABLE 4. FLOOD DATA, VIRGINIA-NEVADA TRIBUTARY	21
TABLE 5. FLOOD DATA, CICO TRIBUTARY	24
TABLE 6. FLOOD DATA, LITTLE KITTEN CREEK	27
TABLE 7. FLOOD DATA, ROLLING HILLS TRIBUTARY	30
TABLE 8. RECORD OF PUBLIC MEETINGS	37
TABLE 9. ACTION ITEMS, GOALS, AND RECOMMENDATIONS	56

LIST OF FIGURES

FIGURE 1. WILDCAT CREEK WATERSHED	7
FIGURE 2. FLOOD RISK MANAGEMENT CYCLE	7
FIGURE 3. EFFECTIVE FLOODPLAINS IN WILDCAT CREEK	9
FIGURE 4. INDEX MAP SHOWING SUB-WATERSHEDS OF WILDCAT CREEK	10
FIGURE 5. LOCATION OF THE LOWER REACH OF WILDCAT CREEK	12
FIGURE 6. EFFECTIVE FLOODPLAIN OF THE LOWER REACH OF WILDCAT CREEK	13
FIGURE 7. PRELIMINARY FLOODPLAIN OF THE LOWER REACH OF WILDCAT CREEK	14
FIGURE 8. LOCATION OF THE MIDDLE REACH OF WILDCAT CREEK	16
FIGURE 9. EFFECTIVE FLOODPLAIN OF THE MIDDLE REACH OF WILDCAT CREEK	17
FIGURE 10. PRELIMINARY FLOODPLAIN OF THE MIDDLE REACH OF WILDCAT CREEK	18
FIGURE 11. LOCATION OF THE VIRGINIA-NEVADA REACH	19
FIGURE 12. EFFECTIVE FLOODPLAIN OF THE VIRGINIA-NEVADA REACH	20
FIGURE 13. PRELIMINARY FLOODPLAIN OF THE VIRGINIA-NEVADA REACH	21
FIGURE 14. LOCATION OF THE CICO REACH	22
FIGURE 15. EFFECTIVE FLOODPLAIN OF THE CICO REACH	23
FIGURE 16. PRELIMINARY FLOODPLAIN OF THE CICO REACH	24
FIGURE 17. LOCATION OF THE LITTLE KITTEN REACH	25
FIGURE 18. EFFECTIVE FLOODPLAIN OF THE LITTLE KITTEN REACH	26
FIGURE 19. PRELIMINARY FLOODPLAIN OF THE LITTLE KITTEN REACH	27
FIGURE 20. LOCATION OF THE ROLLING HILLS REACH	28
FIGURE 21. EFFECTIVE FLOODPLAIN OF THE ROLLING HILLS REACH	29
FIGURE 22. PRELIMINARY FLOODPLAIN OF THE ROLLING HILLS REACH	30
FIGURE 23. EFFECTIVE FLOODPLAIN OF WILDCAT CREEK: MANHATTAN TO KEATS	31
FIGURE 24. PRELIMINARY FLOODPLAIN OF WILDCAT CREEK: MANHATTAN TO KEATS	32
FIGURE 25. PRELIMINARY FLOODPLAIN OF WILDCAT CREEK: KEATS TO RILEY	33
FIGURE 26. PRELIMINARY FLOODPLAIN OF WILDCAT CREEK: RILEY TO HEADWATERS	34
FIGURE 27. EXAMPLE STEPS FOR REDUCING FLOOD RISK TO ACCEPTABLE LEVELS	43
FIGURE 28. LOCATION OF WILDCAT CREEK STREAM GAUGES	45
FIGURE 29. BRIDGE WARNING LIGHTS ON WILDCAT CREEK	47
FIGURE 30. WILDCAT CREEK IN THE NWS PREDICTION SERVICE	50
FIGURE 31. WILDCAT CREEK FLOOD STRUCTURE	51
FIGURE 32. FEMA FLOOD INSURANCE BROCHURE	52
FIGURE 33. PHOTO OF SILT FENCE	53
FIGURE 34. COMMUNITY PARK LOCATIONS	54
FIGURE 35. JUNE 16, 2010 FLOOD AT SCENIC DRIVE BRIDGE	61

Wildcat Creek Floodplain Management Plan

For Communities Along Wildcat Creek

1.0 Introduction

The Wildcat Creek Floodplain Management Plan is a living document for the local communities to use to manage flood hazards along Wildcat Creek. Managing these flood risks is a shared responsibility of the local communities, the county, the state, and federal agencies. This management plan was originally sponsored by the City of Manhattan, Riley County, the Kansas Hazard Mitigation Team, and the U.S. Army Corps of Engineers (USACE). The endeavor began as part of the USACE Silver Jacket program.

The Wildcat Creek Floodplain Management Plan should be considered a sub-part of the Riley County Multi-Jurisdiction Hazard Mitigation Plan, which is the local comprehensive emergency response and mitigation plan. The Hazard Mitigation Plan was approved by the Federal Emergency Management Agency (FEMA) on April 15, 2011, and was adopted by the Riley County Board of Commissioners on February 15, 2012 (Resolution 021511-D). The inclusion of this floodplain management plan, including the findings and the specific action items (and their timing), are an important hazard mitigation element for the Wildcat Creek flood hazards in the watershed. Future updates to the Riley County Multi-Jurisdiction Hazard Mitigation Plan should reference the Wildcat Creek Floodplain Management Plan as one of the pillars supporting the joint efforts and work towards a county that is more resilient to disasters. The Wildcat Creek Floodplain Management Plan will be a living document that will be regularly updated on an annual basis. Both plans are important for supporting the State of Kansas' broad, state-wide hazard mitigation efforts.

1.1 Description of the Area

Wildcat Creek flows towards Manhattan, Kansas, which has an area of approximately 16 square miles. In 2000, the population was 44,831, which represented an impressive growth of nearly 19% over the 1990 population of 37,712. In 2010, the population increased to 52,281 (16.6% growth). The City went from being the ninth-largest in Kansas to the eighth-largest, passing Lenexa (in the Kansas City metro area).

The broader Riley County area had a 2000 population of 62,843 and a 2010 population of 71,115. The community is dominated by two public institutions: Kansas State University, with about 24,000 students and 3,000 employees, and the U.S. Army's Fort Riley (just west of the city) with a base population of more than 18,500 assigned soldiers and over 25,000 family members. The number of active duty personnel at Fort Riley has increased substantially as a result of Congressional recommendations. Manhattan is also the primary service and retail center for several counties in the area, with more than 100,000 people being served. The City is situated along U.S. Highway 24 and State Highways 18 and 177, which link the area to Interstate 70.

Manhattan is located near the Kansas River with several major tributaries that connect in the vicinity of the City. The Big Blue River is on the east side of the City and the County, connecting to the Kansas River south of the City. The United States Army Corps of Engineers' (USACE) Tuttle Creek Reservoir is sited to the north of Manhattan on the Big Blue and is the eastern border of Riley County. Tuttle Creek is a major lake in the Kansas River basin lake system, which is critical to the USACE flood risk management mission for both the Kansas and Missouri Rivers. To the west is the USACE Milford Reservoir along the Republican River.

The 99-square mile Wildcat Creek watershed lies between the two USACE reservoirs mentioned above and flows through the western portion of the City and the southern portion of the County, emptying into the Kansas River. On the western edge of the watershed is a 34-square mile portion of the Fort Riley Military Base. The area within the basin is primarily rural and agricultural. Manhattan lies at the southeastern tip of the watershed: a point that receives all of the upstream rainfall. The confluence of so many rivers makes public awareness of flooding hazards an important issue (see Figure 1).

The challenging economy of the Great Recession has not slowed the westward push of development in Manhattan, known regionally as the “Little Apple.” The Manhattan Regional Airport is flourishing, with several flights each day to Chicago and Dallas. In addition, Fort Riley continues to be a strong presence as the home to the First Infantry Division and the new Irwin Army Hospital. Most notable to the development challenge is Kansas State University, the current site of the Biosecurity Research Institute, and the future National Bio- and Agro-Defense Facility (NBAF) which could add 300 new jobs to the area. Manhattan includes a centrally-located downtown and commercial area, which includes a regional shopping mall, major retailers, a conference center, and many businesses. Neighborhoods are generally located to the west of the downtown area, and a light industrial area within the eastern half of the City, which is located in Pottawatomie County. Since growth is strong, and proximity to potential flooding sources is high, any flood hazard mitigation efforts, including actions as well as plans for actions (such as this document), can be well justified with the public and political leaders.

1.2 Purpose of the Floodplain Management Plan (FMP)

The purpose of the FMP is to lessen the damaging effects of floods, maintain and enhance natural floodplain assets, and make effective use of water and related land resources within the floodplain. A community or a coalition of communities with a FMP in place will be more sustainable regarding its floodplain.

Sustainability means addressing the cumulative effects of development within and upstream of the floodplain. Sustainability also refers to the community being resilient to the natural occurrence of floods, because the community is able to avoid the impacts of flooding to its citizens and economy. An effective FMP should result in continued consideration of the flood hazard on the use of land and water resources in the floodplain, and provide benefits to the public and all levels of government, including:

1. Reducing loss of life, injury and hardship due to floods;
2. Reducing flood-related damages;
3. Reducing public expenditures for construction of additional flood damage reduction measures, emergency response actions, and post-disaster assistance; and,
4. Preserving and enhancing natural floodplain values for fish and wildlife habitat along with their attendant benefits of groundwater recharge, moderation of floods, water quality improvement, and reduced erosion and sedimentation.

A FMP attempts to balance benefits obtained from use of the floodplain with potential losses arising from such use. The comprehensive nature of such a plan stresses consideration of the full range of structural and non-structural measures potentially useful in achieving these objectives. The concepts contained in this guidance were developed to closely follow the 1994 Unified National Program for Floodplain Management.

Effective management of both floodplains and floodwaters, with sound policies, using appropriate physical features, allows the government to break the cycle of damage, rebuild, and achieve a sustainable flood risk management cycle (see Figure 2).

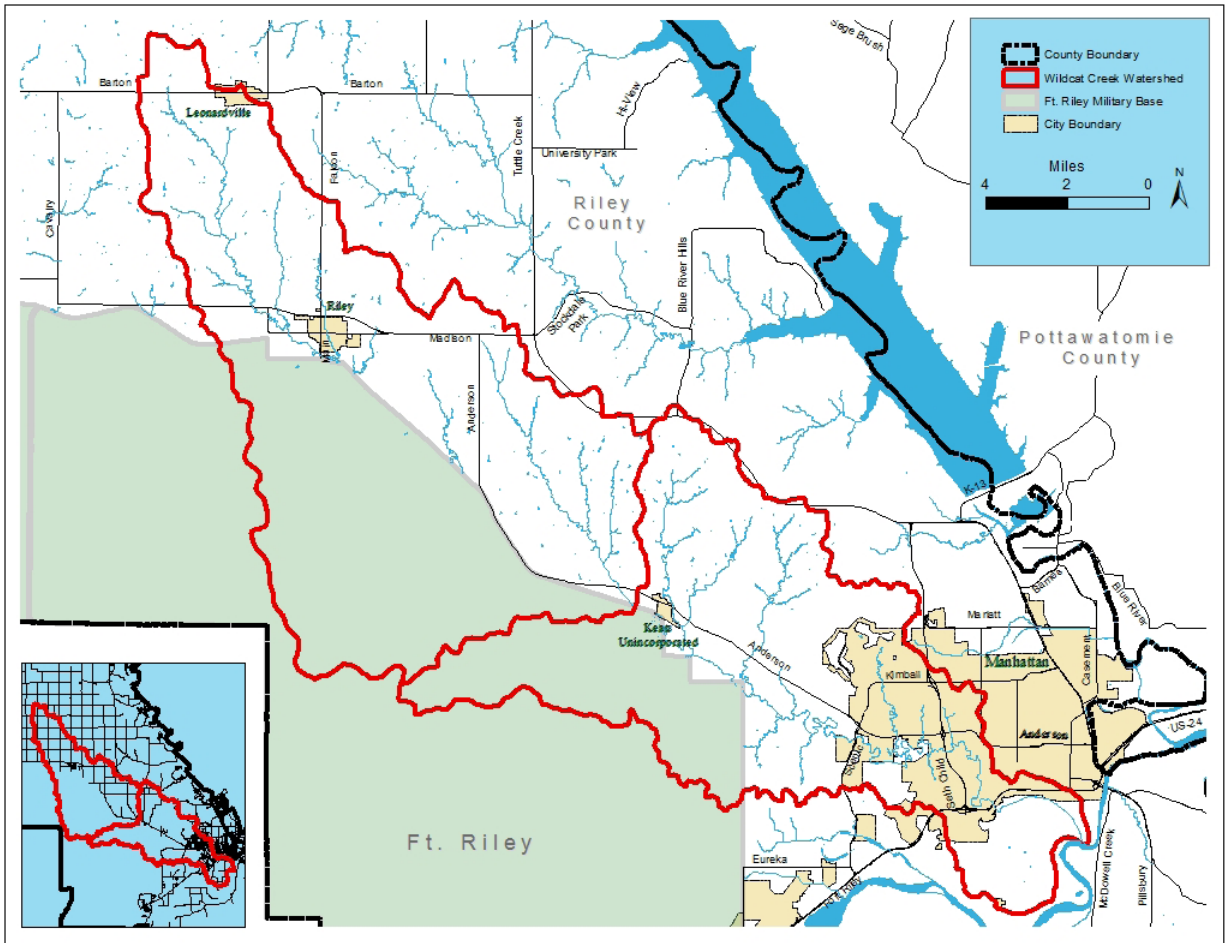


FIGURE 1. WILDCAT CREEK WATERSHED.

The local, state, and federal planners have prepared this FMP in similar fashion to the Federal standards. These standards originated with the Executive Order 11988, which began unified floodplain management in 1977. The standards are consistent with Public Law 104-303 of the Water Resources Development Act (WRDA) of 1996, which amends Section 402 of the WRDA of 1986 (also see 33 U.S.C. 701b-12; 100 Stat. 4133). The FMP has components that comply with the USACE planning guidance for floodplain management plans (USACE 2), as required when a cost share construction project has been started using the USACE funding for a project with flood risk management as a project purpose. In this case, no construction project or construction funding was involved; however, the Silver Jacket program authorized a pilot project for establishing an FMP that mirrors the standards. More importantly, this FMP meets the minimum standards for the Federal Emergency Management Agency's (FEMA) Community Rating System (CRS), Section 510 as described in the CRS coordinator's manual (FEMA, 2007).

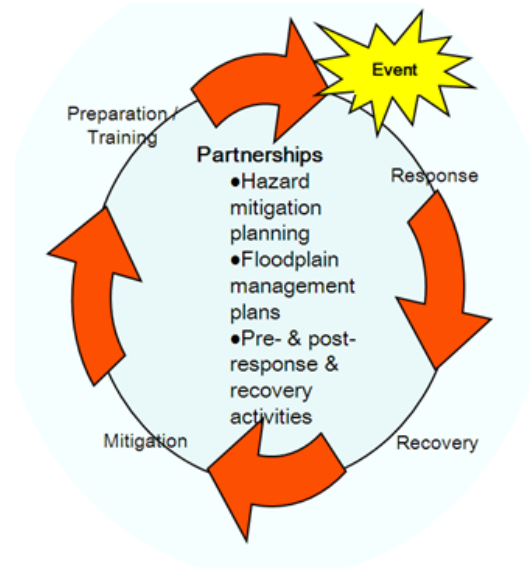


FIGURE 2. FLOOD RISK MANAGEMENT CYCLE.

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2.0 Development Process of the Floodplain Management Plan

The documentation of the process used to develop the FMP is described in this section. This includes a complete assessment of flood hazards, whether for loss of life or property damage. The process of developing the plan also includes records of meetings and public involvement activities.

2.1 Floodplain Hazard Assessment

Numerous reports and studies exist that describe the problems associated with flooding along Wildcat Creek. The References section near the end of this report presents a bibliography of these resources. The following sub-sections describe the flood hazards for different reaches along Wildcat Creek.

Areas susceptible to flooding along Wildcat Creek are rural residential areas in the County, southern Keats and the western and southern sides of Manhattan, which are along the stream and in the adjacent floodplains.

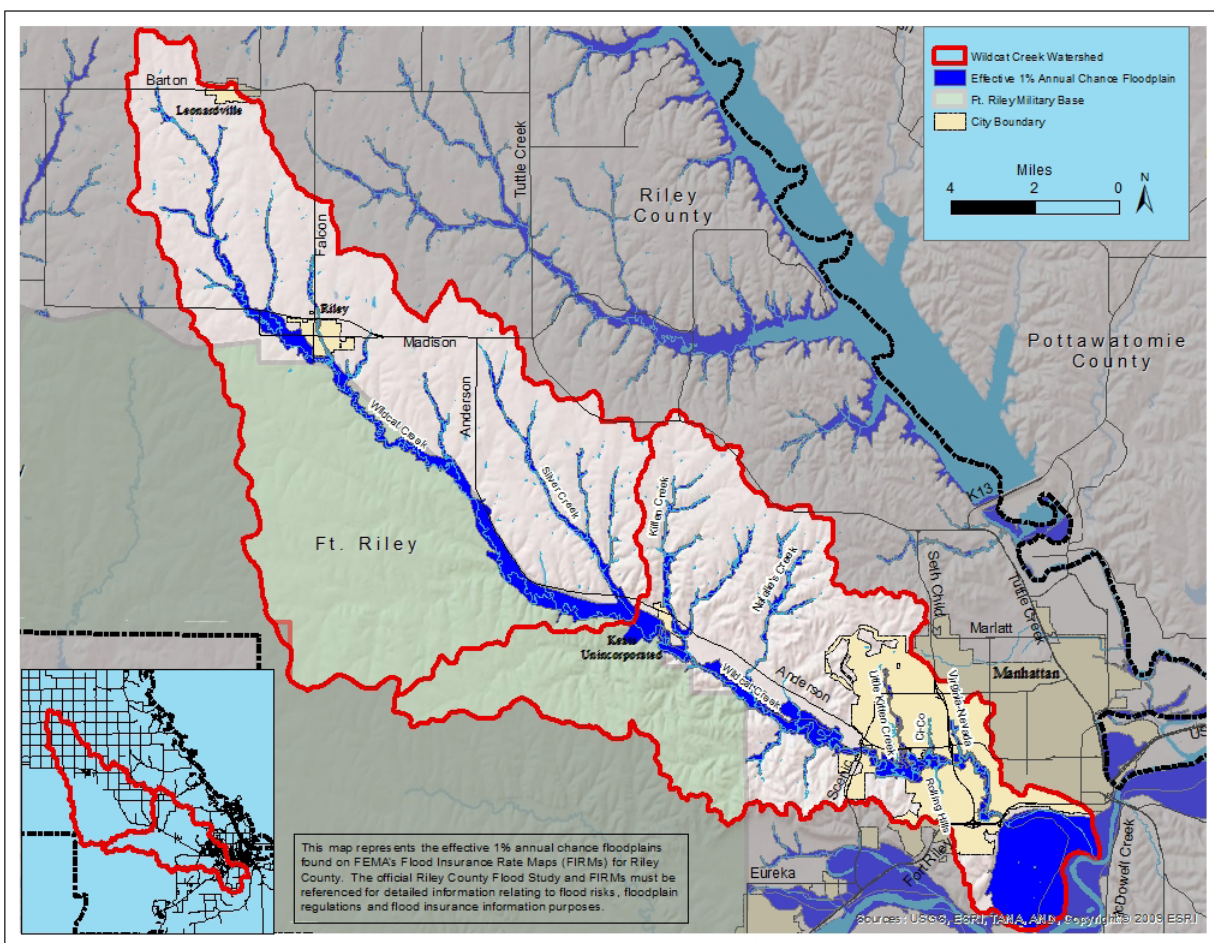


FIGURE 3. EFFECTIVE FLOODPLAINS IN WILDCAT CREEK (RILEY COUNTY FLOOD STUDY, 2005).

The primary references for flood hazards are related to FEMA work products. The Flood Insurance Study (FIS) for Riley County, Kansas (FEMA) provides a good assessment of flooding. A revision to that study is expected in 2014 using Digital Flood Insurance Rate Maps (DFIRMs). This section presents both the current information from the FIS and DFIRMs, as well as information from the preliminary results of the flood study revision for Riley County in maps and in the risk assessment process.

The preliminary results include a detailed flood model of the Wildcat Creek watershed based on its complete build-out using the Manhattan Urban Area Comprehensive Plan's Future Land Use Map.

The Riley County Hazard Mitigation Plan (HMP) (April 15, 2011) also identifies flood hazards, which are further described in the sections below. Section 4.4.2 of the HMP provides Jurisdiction Profiles for the community. The Flood Hazard Profile for Unincorporated Riley County rates the hazard posed by Wildcat Creek. According to the HMP, the impact of upstream development in unincorporated Riley County on downstream constituents is a serious consideration for unincorporated Riley County. The Flood Hazard Profile for this vicinity of Wildcat Creek indicated an evident risk to property identified at the western border of the City of Manhattan: Manhattan Flood Profile states:

"A review of the FEMA FIRM for Manhattan indicates the areas most susceptible to flooding occur along two designated flood zones identified as Zones A, AE, AH, and Zone X. The first flood zone is located along Wildcat Creek which enters Manhattan on the west city boundary along Anderson Avenue and moves east-southeast until joining the Kansas River. There were no major population centers or improvements identified within this flood zone up to the levee located along the southeast side of Manhattan that protects an area identified as Zone X. The levee protected area begins along Fair Lane at Denison Avenue, and trends north-northeast to Bertrand Street and Highway 24. Notable population areas were identified within this protected area (Riley County Hazard Mitigation Plan, p.99)."

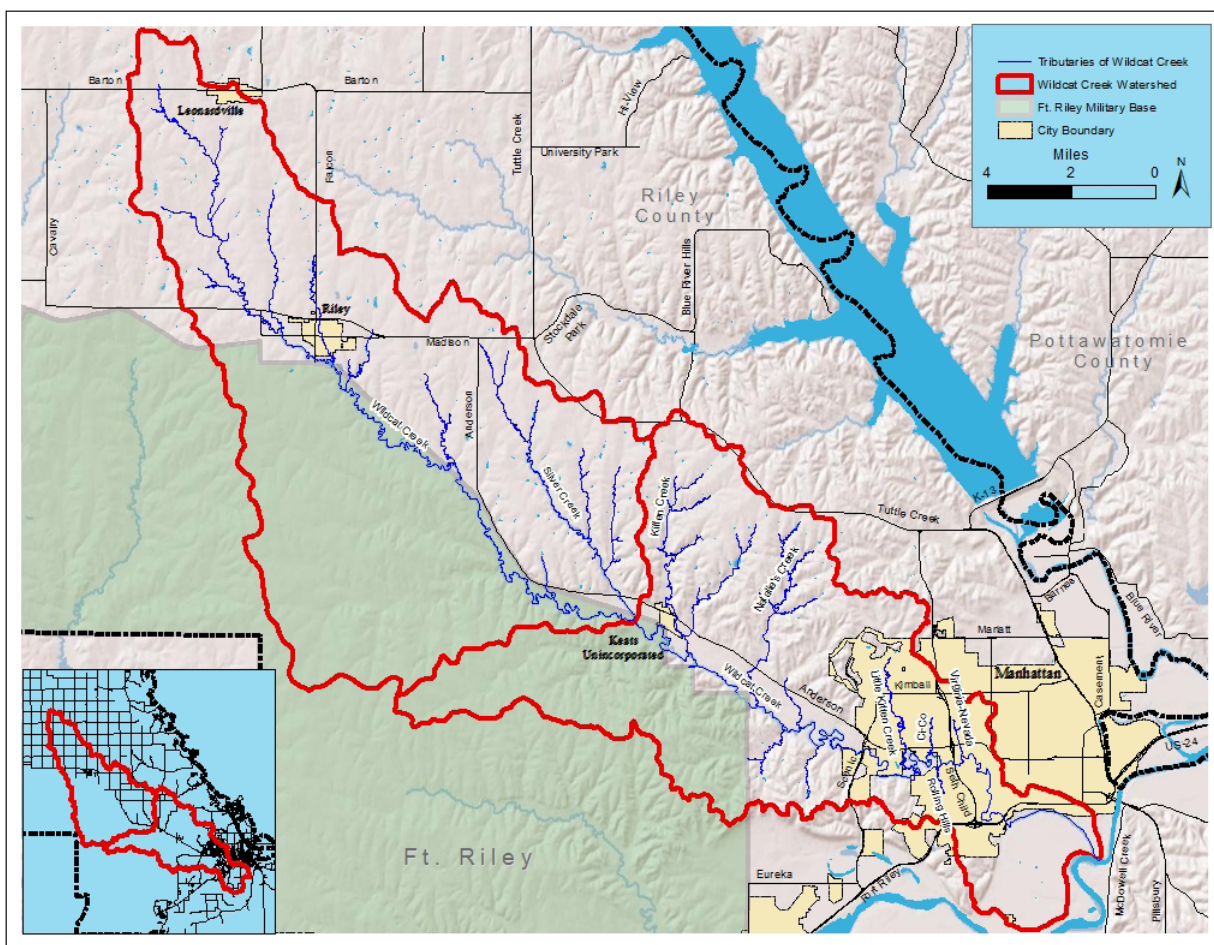


FIGURE 4. INDEX MAP SHOWING THE VARIOUS TRIBUTARIES OR SUB-WATERSHEDS OF WILDCAT CREEK NEAR THE WEST SIDE OF THE CITY OF MANHATTAN.

TABLE 1. FLOOD HISTORY.

Month	Year	Name of Water Body	Estimated Probability of Occurance in Each Year (limited by uncertainty in period of record, also uncertainty values depending on year)
June	1903	Kansas River & Big Blue River	Not Available
September	1914	Wildcat Creek	Not Available
May	1915	Wildcat Creek	Not Available
June	1935	Kansas River & Big Blue River	Not Available
October	1941	Wildcat Creek	Not Available
July	1951	Wildcat Creek	Not Available
July	1951	Kansas River & Big Blue River	0.2% (500-yr return frequency)
June	1954	Wildcat Creek	Not Available
September	1970	Wildcat Creek	Not Available
June	1977	Wildcat Creek	4% (25-yr return frequency)
(Summer)	1993	Wildcat Creek Kansas River & Big Blue River	Not Available
May	2007	Wildcat Creek	Not Available
June	2010	Wildcat Creek	Not Available

The following sections have been organized to provide a sub-watershed perspective, focusing on reaches of the creek between distinguishing man-made features (such as Seth Child Bridge) or tributaries leading to Wildcat Creek. The location of tributaries and other features along Wildcat Creek are described as being on the left or right bank of the stream. To orient oneself, this can be envisioned as if you are traveling upstream on Wildcat Creek from its confluence with the Kansas River, with features being located to the left or right of your boat on the waterway.

Hydrological information has been gathered from the effective Flood Insurance Study (FIS) and Flood Insurance Rate Maps (FIRMs) (FEMA, 2010) and preliminary hydrological information from a preliminary FIS and DFIRMs produced by AMEC Environment & Infrastructure (AMEC, 2012). The AMEC preliminary information also included a study of flooding along Wildcat Creek, with the watershed built out based on the Manhattan Urban Area Comprehensive Plan's Future Land Use Map.

The following sections display maps of the results of the study, including the index map. Aerial maps with flood hazards are presented in the subsections below for each sub-watershed of Wildcat Creek. Separate maps present the effective 1% Annual Chance Floodplain or the preliminary 1% Annual Chance Floodplain and the Future 1% Annual Chance Floodplain calculated by AMEC Environment & Infrastructure (see map title and legends for specific map differences). Flood hazards related to future conditions on Fort Riley land are not shown.

2.1.1 Flood Hazards: Wildcat Creek from Kansas River to Seth Child Road. (K-113).

This is the lower reach of Wildcat Creek, including the confluence with the Kansas River. Just downstream of Seth Child Road (Highway K-113) on the right bank lies the confluence with the urbanized sub-watershed, the Virginia-Nevada tributary. Major roads in this reach are Manhattan Avenue and Fort Riley Boulevard (Highway K-18).

The following facts should be noted in this reach:

1. *Source of the Problem.* The source of flooding problems in this reach of Wildcat Creek is floodwater from the upper reaches of the watershed passing through this area. There is evidence that existing bridges at Fort Riley Boulevard (Highway K-18) restrict the flow of floodwaters passing through this area. Flooding is also impacted by the water levels of the Kansas River to the southeast. Localized flooding can also occur throughout this reach of the watershed.
2. *Flood Data.* The current Flood Insurance Study, dated July 6, 2010, shows that the peak discharge of the 1% Annual Chance Flood is 18,100 cubic feet per second (cfs) at the confluence with the Kansas River. The preliminary Flood Insurance Study for Riley County shows that existing peak discharge of the 1% Annual Chance Flood is 16,496 cfs at the confluence. In addition, the preliminary flood study calculated what future flood events would be, based on the complete build out of the Wildcat Creek watershed, based on the Manhattan Urban Area Comprehensive Plan's Future Land Use maps. The peak discharge for the 1% Annual Chance Flood would be 22,444 cfs at the confluence.

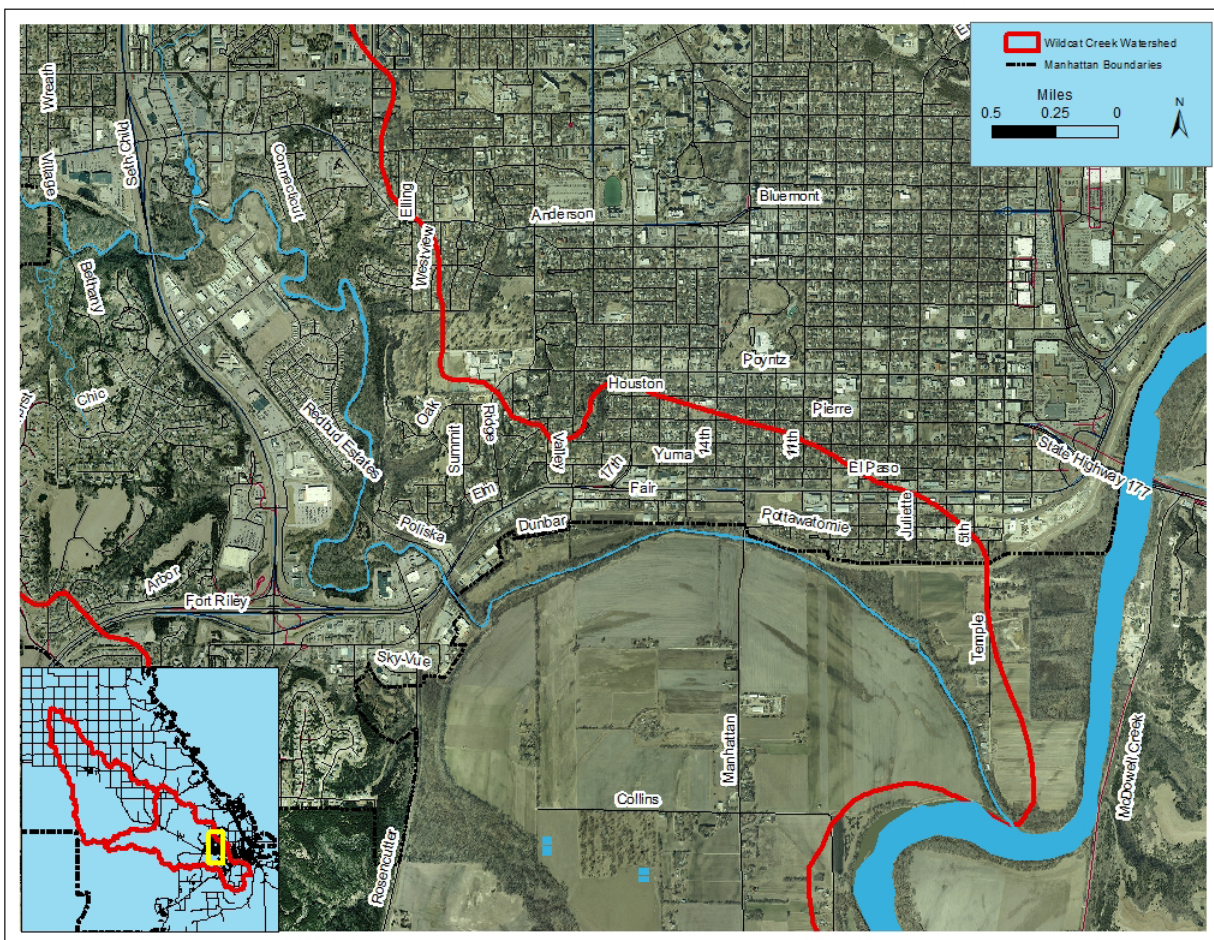


FIGURE 5. LOCATION OF THE LOWER REACH OF WILDCAT CREEK.

The maps in this section show the Floodway and 1% Annual Chance Flood boundaries of the current flood model, as well as the Floodway, 1% Annual Chance Flood and Future Conditions 1% Annual Chance Flood boundaries. Please note the title of each map for details.

3. **Land Use & Building Data.** A variety of land uses are present in this reach of Wildcat Creek. In the southern part of this reach, known as Hunter's Island, there is open space, agricultural and rural residential uses. Some of the open space and agricultural land was acquired with Federal Hazard Mitigation Grant Program funds and local matching funds following the 1993 flood. The existing homes were generally built in a wide time frame, ranging from the early 1920s to the 1990s.

Adjacent to Fort Riley Boulevard (Highway K-18) are industrial uses comprised of contractor businesses and self-storage units. A 197-room, full-service hotel is located along Wildcat Creek in this area. The industrial uses were built from the 1950s to the 1970s. The hotel was built in 1981. The Riley County Law Enforcement Center is also located in this area to the west of the hotel at the intersection of Fort Riley Boulevard (Highway K-18) and Seth Child Road (Highway K-113).

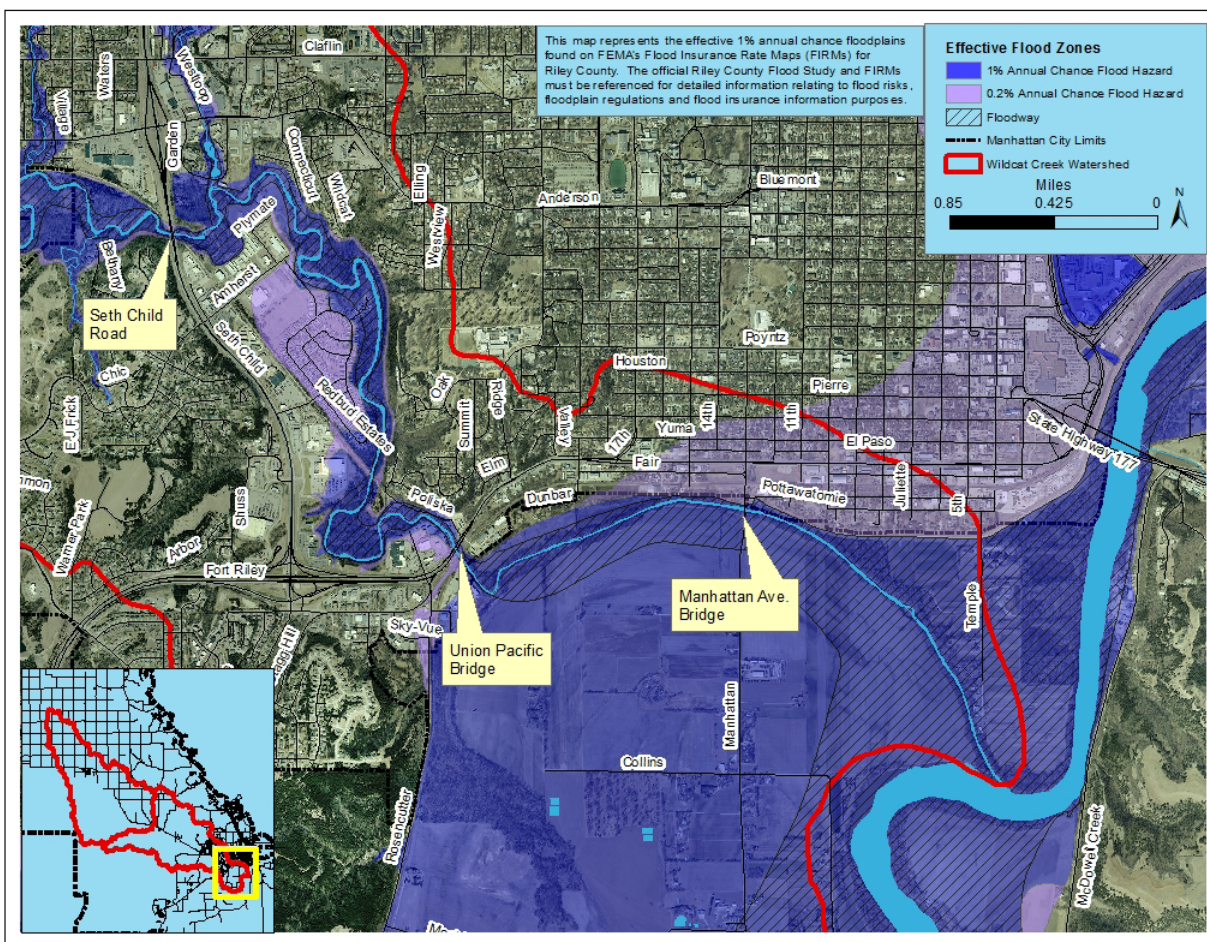


FIGURE 6. EFFECTIVE FLOODPLAIN OF THE LOWER REACH OF WILDCAT CREEK.

Newer commercial developments, including large box retailers, and industrial uses that are similar to that along Ft. Riley Boulevard (Highway K-18) are located between Wildcat Creek and Seth Child Road (Highway K-113). Residential uses are also present in this area.

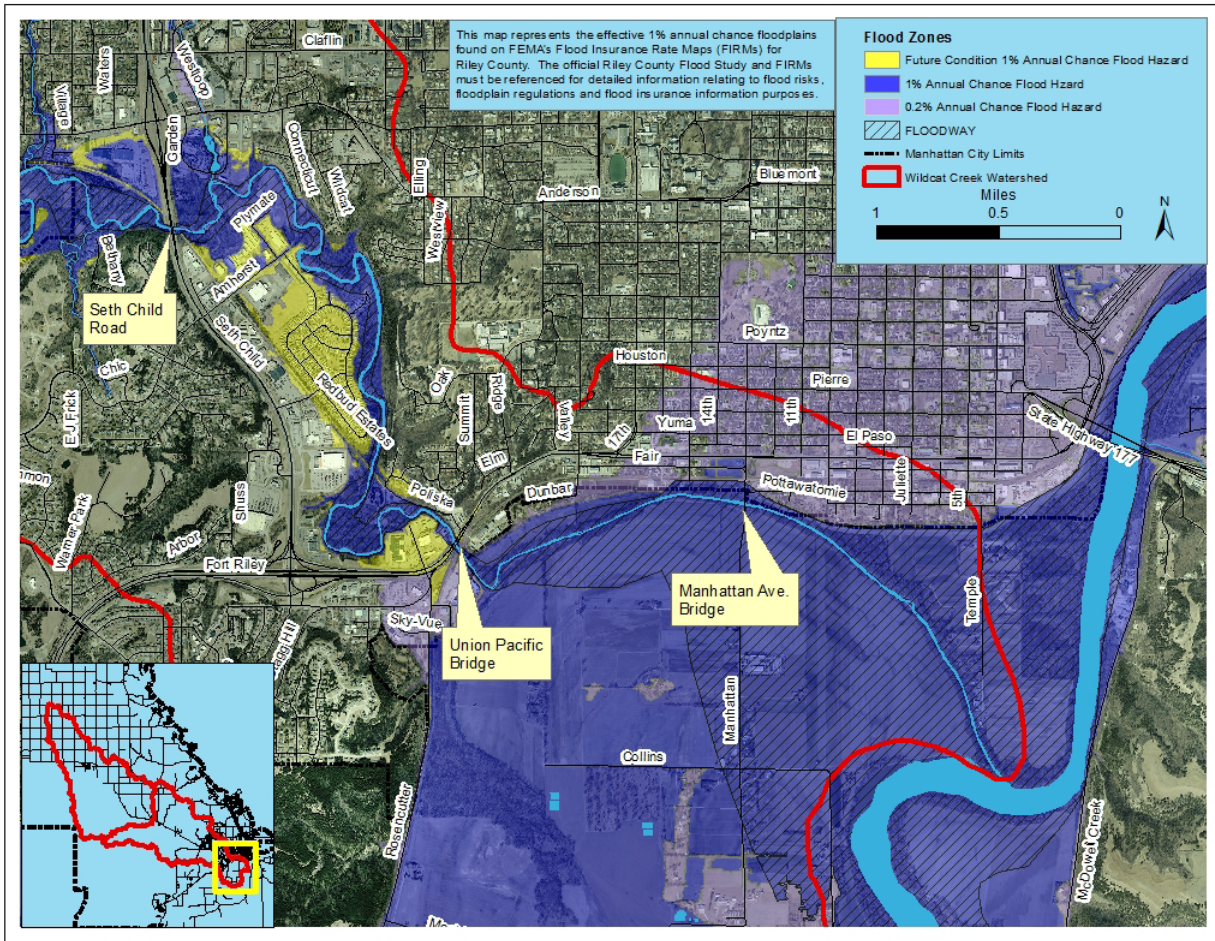


FIGURE 7. PRELIMINARY FLOODPLAIN OF THE LOWER REACH OF WILDCAT CREEK.

The Redbud Estates manufactured home community is located on the left bank of the creek. Single-family and two-family homes are along the right bank of the creek. The right bank residences are typically elevated above the floodplain due to the terrain of the right bank. There are multiple-family homes located at the confluence of the Virginia-Nevada Tributary with Wildcat Creek. The Optimist Ballpark is also located near the confluence of this tributary on the left bank of the creek. The residential uses are generally around 40 years old. The industrial uses in the area were originally established in the 1980s, but most of them were damaged by a tornado in 2008 and have since been rebuilt. The commercial retail properties were built from the early 1980s to the present. Red Bud Estates was established in 1970. The multiple-family developments were constructed in the 1960s and 2000s. The Optimist Ballpark was improved in 2008 to include three (3) new ball fields. Significant fill was brought into the floodplain on this property to develop the new ball fields.

4. **Development Trends.** The majority of this reach of Wildcat Creek is already built out. There are a few vacant parcels of land that are developable along Seth Child Road (Highway K-113). Long term, the industrial uses between Seth Child Road (Highway K-113) and Wildcat Creek may someday be re-developed to similar commercial uses found in other locations along the major arterial.
5. **Development Constraints.** The largest development constraint to new or future redevelopment of this area is the floodway of Wildcat Creek and the steep terrain along the right bank of the creek. Because federal dollars were used to acquire flood prone residential properties in Hunter's Island, those parcels of land must remain as vacant open space and cannot be redeveloped.

6. **Critical Facilities.** A Riley County Rural Fire Station is located in the vicinity of Hunter's Island (reference Executive Order 11988). A business that stores hazardous materials above the Tier II threshold is located in this reach. A public utility infrastructure element that is considered critical to the operation of the system is also located in this area of Wildcat Creek. Because of the need to keep these critical facilities confidential, the exact location has not been provided; however, officials of Riley County, the City of Manhattan and the State of Kansas have the location and information regarding the facilities.

2.1.2 Flood Hazards: Wildcat Creek from Seth Child Road to Scenic Drive.

This is the second reach on Wildcat Creek upstream of the Kansas River floodplain. Two notable right bank tributaries in this reach are CiCo Tributary and Little Kitten Creek, which are both well developed. The Rolling Hills Tributary is a left bank tributary between the CiCo Tributary and Little Kitten Tributary. An unnamed tributary also enters this reach of Wildcat Creek on the left bank to the west of Wildcat Creek. This unnamed tributary is not specifically listed in current FEMA flood insurance studies because the amount of developed land is less than one square mile. Because of this, FEMA, the City of Manhattan and Riley County have not conducted a detailed study of this tributary as of yet.

TABLE 2. FLOOD DATA, WILDCAT CREEK FROM KANSAS RIVER TO SETH CHILD RD.

Elevation Location	Current 1% Annual Chance Flood	Preliminary 1% Annual Chance Flood	Future Conditions 1% Annual Chance Flood
Manhattan Avenue Bridge	1019.1'	1019.5'	N/A
UP Bridge	1021.0'	1021.0'	1023.3'
Seth Child Road	1039.3'	1041.7'	1045.0'

Limited information regarding this tributary is provided below. No roads cross Wildcat Creek in this area. The majority of floodplain along this reach is open space attributed to Frank Anneberg Park and the Wildcat Creek Golf Course.

1. **Source of the Problem.** The source of the flooding problems in this reach of Wildcat Creek is floodwaters from the upper reaches of the watershed passing through this area and by the confluence with the four (4) tributaries in this reach. Localized flooding can also occur throughout this reach of the watershed.

A small watershed basin, commonly referred to as Barton Lake, exists on the unnamed tributary that was mentioned above. This basin was established in the 1930s and had been dry for many years, acting as a large detention basin for the tributary watershed and Wildcat Creek watershed as a whole. The current property owner has recently spent considerable resources to seal Barton Lake, which has changed the dynamics of the basin. As previously mentioned, this tributary has not had a detailed study because the area is largely vacant rangeland. When this area begins to develop, the City of Manhattan and/or Riley County will need to analyze the drainage impacts from the new developments.

2. **Flood Data.** The current Flood Insurance Study, dated July 6, 2010, shows that the peak discharge of the 1% Annual Chance Flood is 17,600 cfs at the Highway K-113/Seth Child Road Bridge. A Flood Insurance Study is in preliminary form for the Riley County flood re-study. This study shows that peak discharge of the 1% Annual Chance Flood is 16,496 cfs just upstream of K-113/Seth Child Road Bridge. In addition, the peak discharge for the Future Conditions 1% Annual Chance Flood storm would be 22,444 cfs at this point.

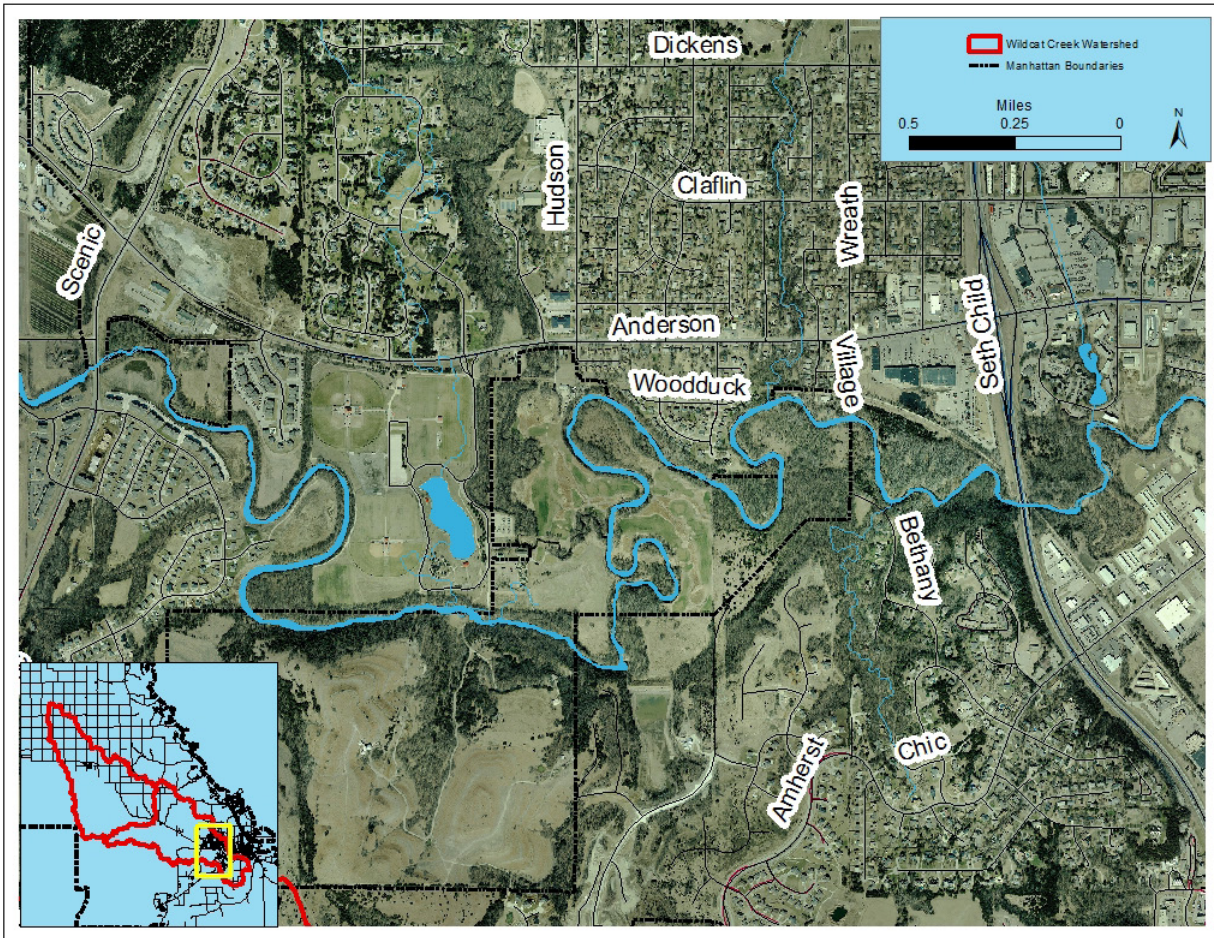


FIGURE 8. LOCATION OF THE MIDDLE REACH OF WILDCAT CREEK.

The preliminary flood study shows the peak discharge southeast of Anneberg Park as 16,680 cfs for the existing 1% Annual Chance Flood and 22,660 cfs for the Future Conditions 1% Annual Chance Flood.

The current flood model shows the flood elevation of the 1% Annual Chance Flood elevation at the confluence of Rolling Hills Tributary at 1046.5 feet, 1044.77 at the CiCo Tributary confluence, 1050.8 feet at the confluence of Little Kitten Tributary, and 1063.2 feet at Scenic Drive. The maps in this section show the Floodway and 1% Annual Chance Flood boundaries of the current flood model, as well as the Floodway, 1% Annual Chance Flood and Future Conditions 1% Annual Chance Flood boundaries. Please note the title of each map for details.

3. **Land Use & Building Data.** The majority of development in this reach of Wildcat Creek consists of single-family homes. The Plaza West/Village Plaza Shopping Center is located adjacent to Seth Child Road (State Highway K-113). Two-family and multiple-family dwellings are also present on the west side of this reach near Scenic Drive. In addition to these land uses, there is open space attributed to Frank Anneberg Park and the Wildcat Creek Golf Course. Other open space is present in privately held land that has not been developed. The residential uses east of Anneberg Park are generally twenty to thirty years old, with homes closer to the Plaza West/Village Plaza as old as eighty years. Homes and apartment buildings west of Anneberg Park were built in the late 1990s and mid-2000s. The Plaza West/Village Plaza Shopping Center was first developed in the 1960s.

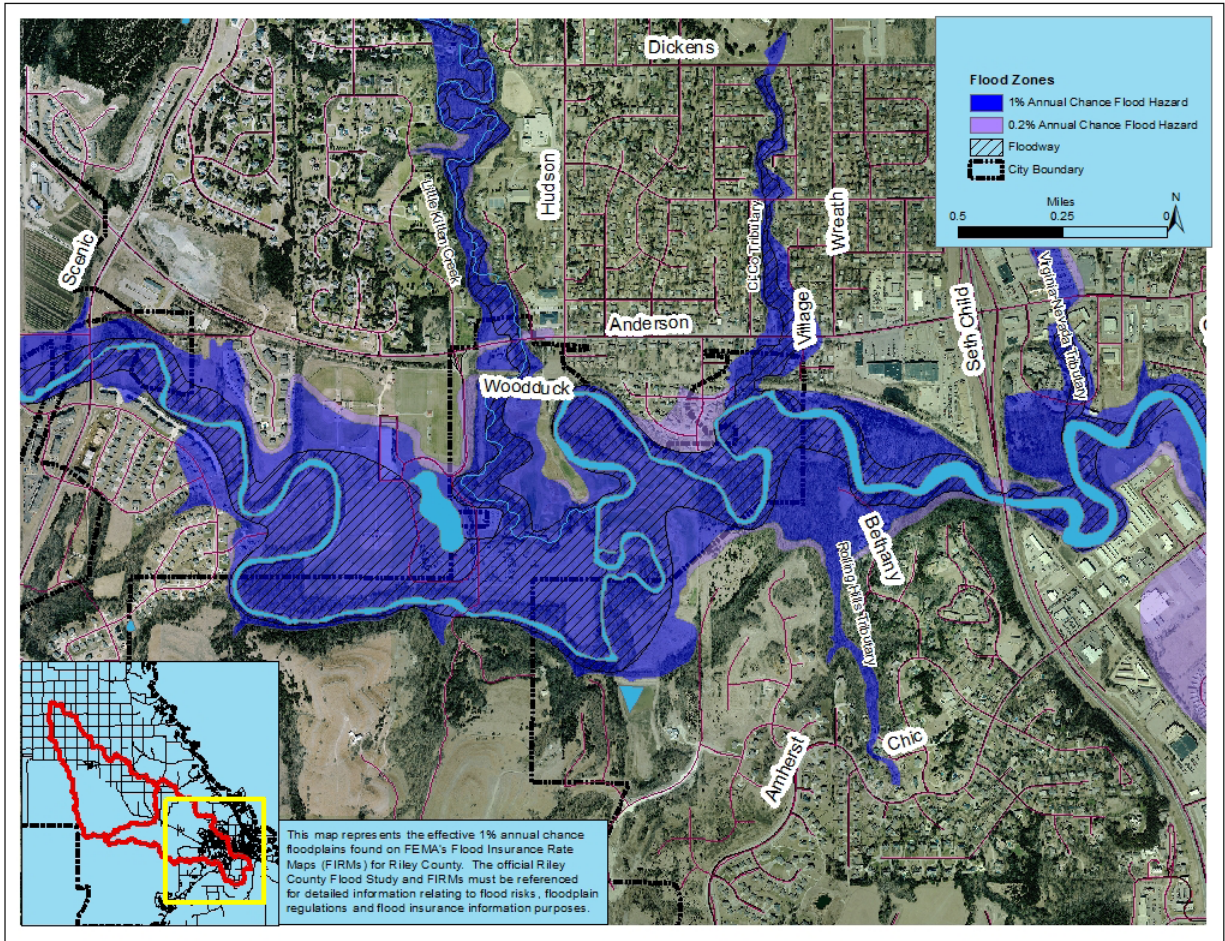


FIGURE 9. EFFECTIVE FLOODPLAIN OF THE MIDDLE REACH OF WILDCAT CREEK.

4. *Development Trends.* The eastern part of this reach is completely built out. Because of the terrain in this area, there are large lot developments and/or common areas for trails and drainage capacity. The middle portion of this reach is largely open space created by the park and golf course and undeveloped land on the left bank. Because of the existing terrain, which is similar to that to the east, a comparable residential pattern of large lots, with common areas and/or large yards can be anticipated.

TABLE 3. FLOOD DATA, WILDCAT CREEK FROM SETH CHILD RD. TO SCENIC DR.

Elevation Location	Current 1% Annual Chance Flood	Preliminary 1% Annual Chance Flood	Future Conditions 1% Annual Chance Flood
Rolling Hills Trib.	1046.5'	1045.6'	1050.2'
Ci-Co Trib.	1044.7'	1045.9'	1050.5'
Little Kitten Trib.	1050.8'	1050.6'	1052.6'
Scenic Drive	1063.2	1061.2'	1066.0'

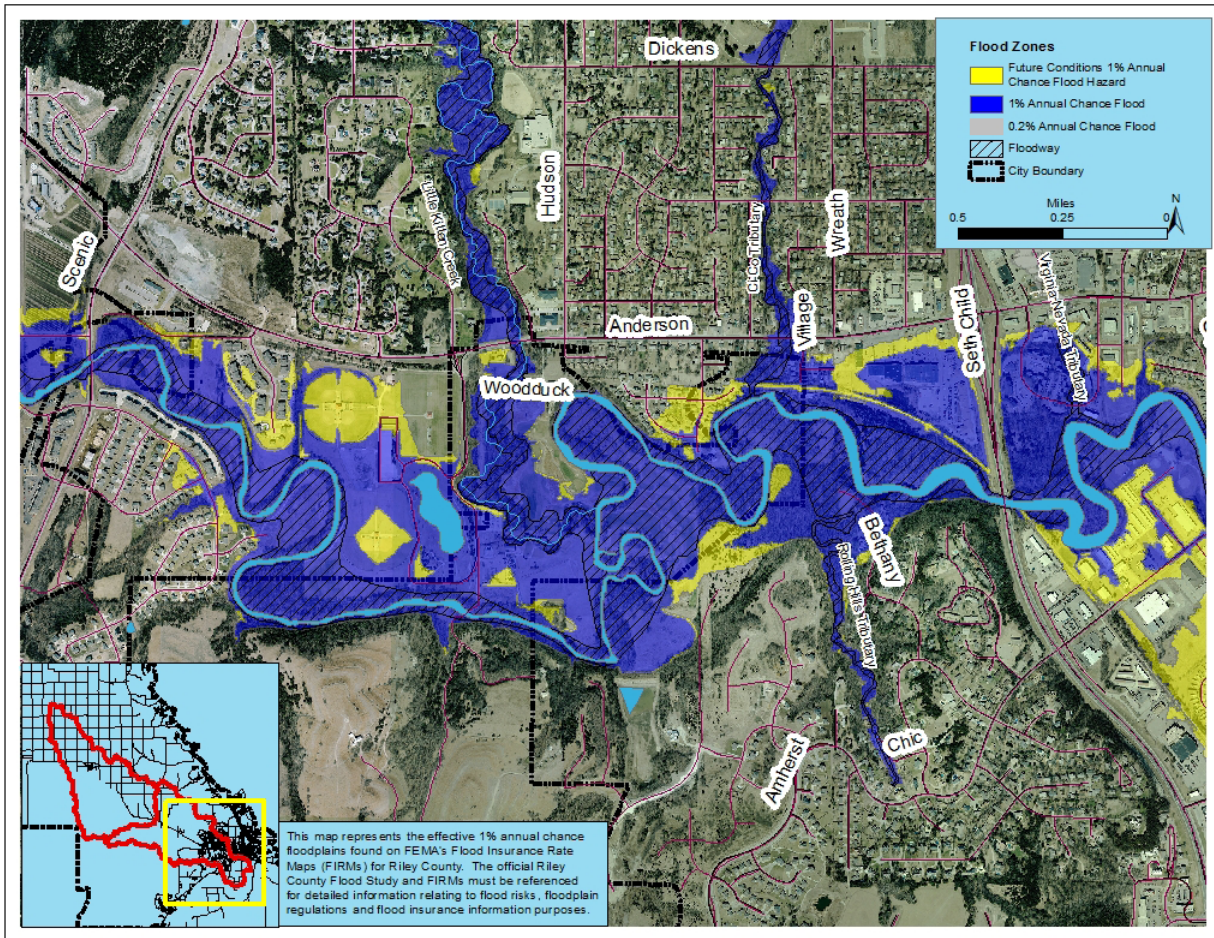


FIGURE 10. PRELIMINARY FLOODPLAIN OF THE MIDDLE REACH OF WILDCAT CREEK.

The western edge of this reach is mostly built out with single-family, two-family and multiple-family dwellings. Several multiple-family dwelling complexes in various stages of development are located in the upper extent of this reach of the watershed. On the left bank of the creek are a few commercial office developments along Anderson Avenue that are present.

5. *Development Constraints.* The largest development constraints to new or future redevelopment of this area are the floodway of Wildcat Creek and the steep terrain along the left bank of the creek.
6. *Critical Facilities.* A number of critical facilities are located in this reach of Wildcat Creek, including businesses storing hazardous materials above the Tier II threshold and critical public infrastructure elements. Due to the nature of these critical facilities and the need to keep the information confidential, the exact location has not been provided. However, officials of Riley County, the City of Manhattan and the State of Kansas have the location and information regarding the facilities.

2.1.3 Flood Hazards: Virginia-Nevada Tributary.

The Virginia-Nevada Tributary is the first major tributary that drains into Wildcat Creek. The tributary is on the right bank near Seth Child Road. Below is a map of this reach.

1. *Source of the Problem.* The source of flooding problems is primarily found in the lower parts of the tributary caused by water from Wildcat Creek leaving its banks and flooding the multiple-family dwellings and businesses on Garden Way.

Large stormwater detention basins have been constructed in recent years that have significantly reduced the flood impacts from new and existing developments in the upper reaches of this tributary. The overall impact can be seen when comparing the flood data found in the next section from the current flood model data (studied prior to the construction of these basins) and the preliminary flood model data in the upper reaches of the tributary watershed.

The tributary is channelized via a large underground culvert in the West Loop Shopping Center. The culvert collects the stormwater near the intersection of Beechwood Terrace and Claflin Road and directs it towards an existing wet basin in the middle of the Garden Way development. Localized flooding can occur in other areas of the tributary.

2. **Flood Data.** The current Flood Insurance Study, dated July 6, 2010, shows that the peak discharge of the 1% Annual Chance Flood is 1,590 cubic feet per second (cfs) at the mouth of the tributary. The peak discharge at Beechwood Terrace is 1,260 cfs. The preliminary Flood Insurance Study shows that peak discharge of the 1% Annual Chance Flood is 1,288 cfs near the mouth of the tributary and 534 cfs at Beechwood Terrace. The peak discharge for the Future 1% Annual Chance Flood storm is calculated to be 1,442 cfs near the tributary mouth and 726 cfs at Beechwood Terrace. The maps in this section show the Floodway and 1% Annual Chance Flood boundaries of the current flood model, as well as the Floodway, 1% Annual Chance Flood and Future Conditions 1% Annual Chance Flood boundaries. Please note the title of each map for details.

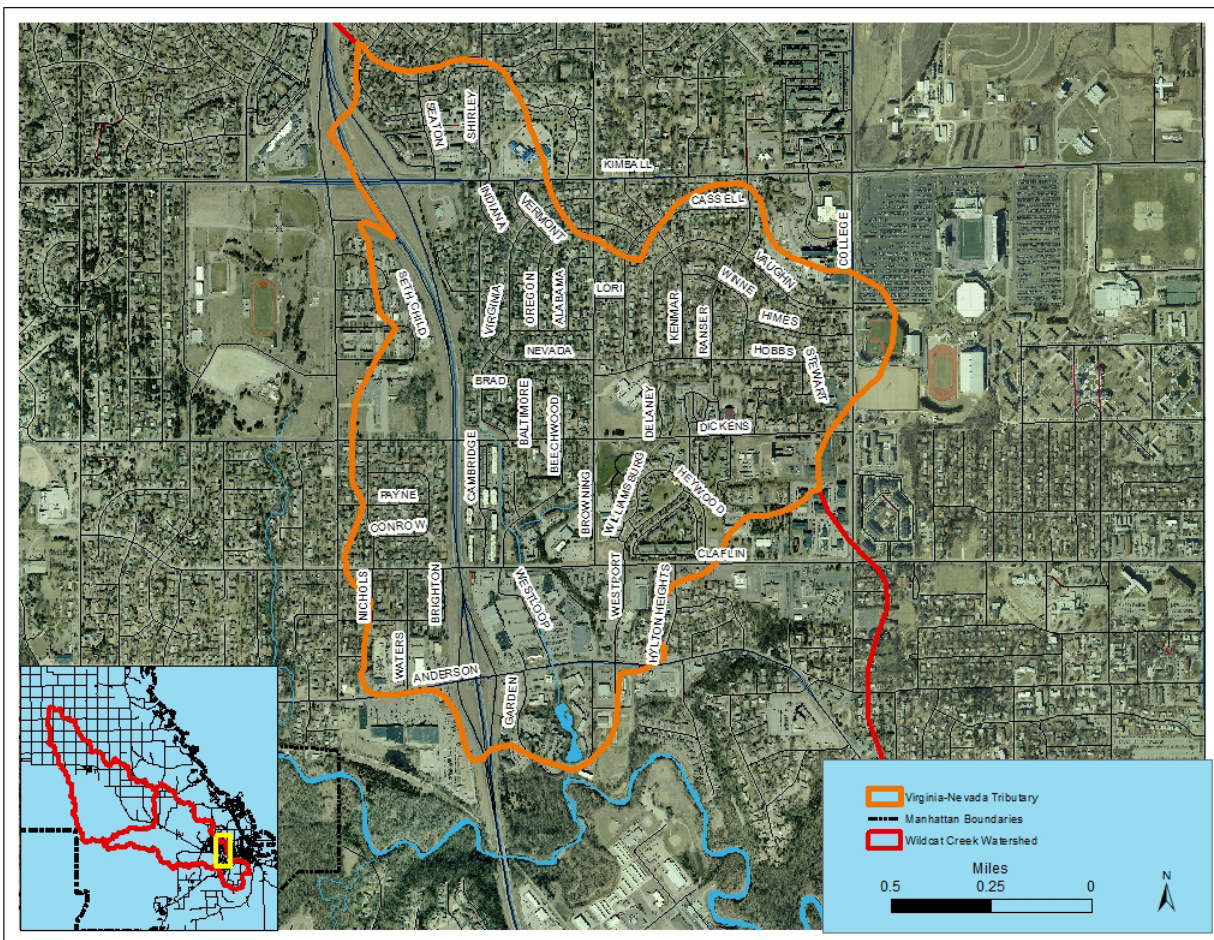


FIGURE 11. LOCATION OF THE VIRGINIA-NEVADA REACH.

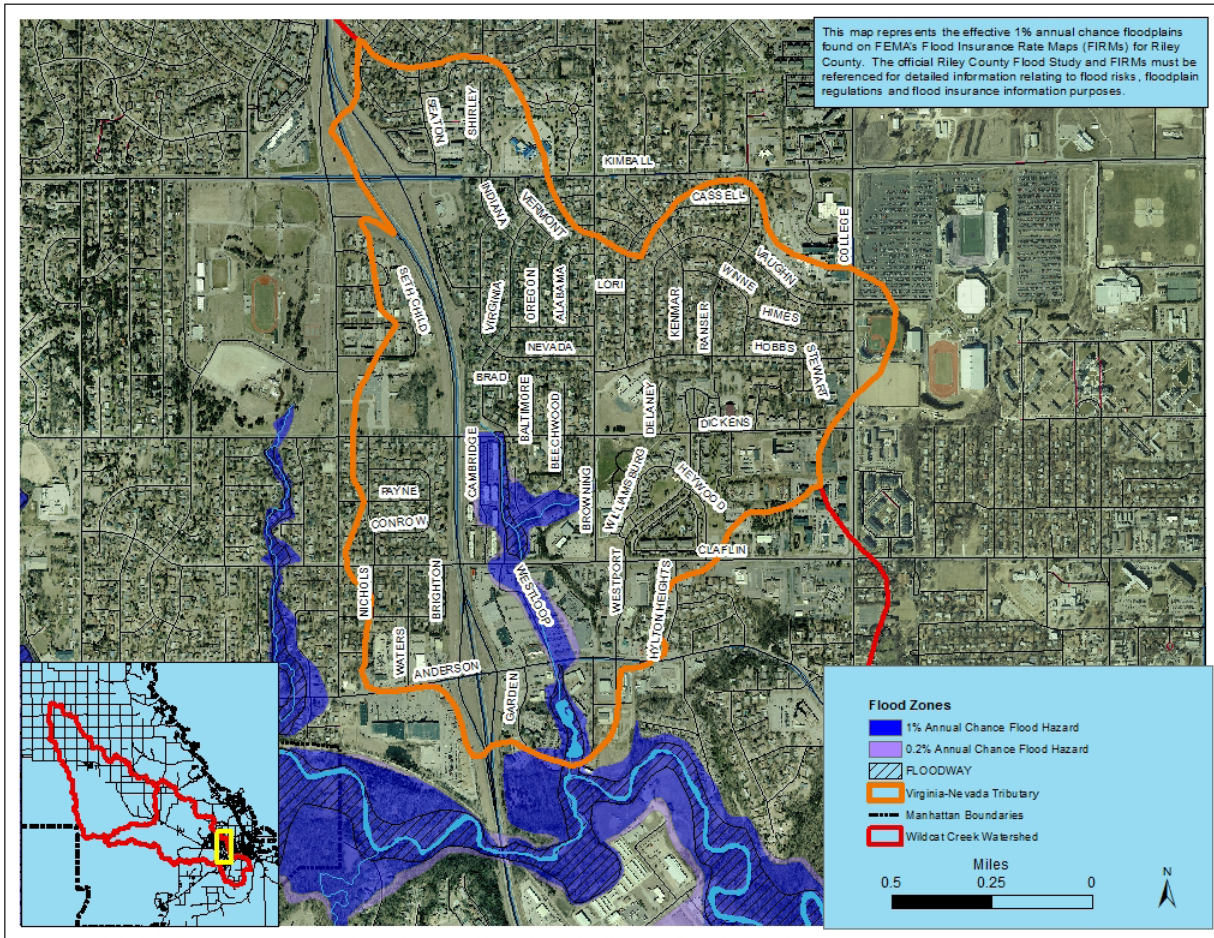


FIGURE 12. EFFECTIVE FLOODPLAIN OF THE VIRGINIA-NEVADA REACH.

3. **Land Use & Building Data.** A variety of land uses are present in this tributary. Upper reaches of the tributary are largely single-family residential developments, with a few multiple-family apartment complexes. In the middle and lower portions of the watershed are mostly large apartment complexes and commercial developments. The single-family homes were built in the 1970s. The apartment complexes were built in the early 1960s. The commercial developments were also constructed in the 1970s. The West Loop Shopping Center has seen major redevelopment in 2011-2012, with the construction of a new grocery store.
4. **Development Trends.** Anderson Avenue and Seth Child Road is a commercial node, with several retail and service commercial businesses. Multiple-family residential buildings are located to the south of Anderson Avenue. Between Claflin Road and Dickens Avenue are several apartment complexes, a large religious center and some single-family homes. To the north of Dickens Avenue are mostly single-family homes. There are a few multiple-family apartment complexes along Kimball Avenue in the upper portions of the tributary.
5. **Development Constraints.** The tributary watershed is completely built out. No vacant land is available to develop upon. Some areas of the watershed have experienced redevelopment, such as the West Loop Shopping Center and areas along Claflin Road.
6. **Critical Facilities.** A number of facilities that house children (schools, preschools, etc.) or elderly citizens (nursing homes or assisted living facilities) are located in the Virginia-Nevada Tributary.

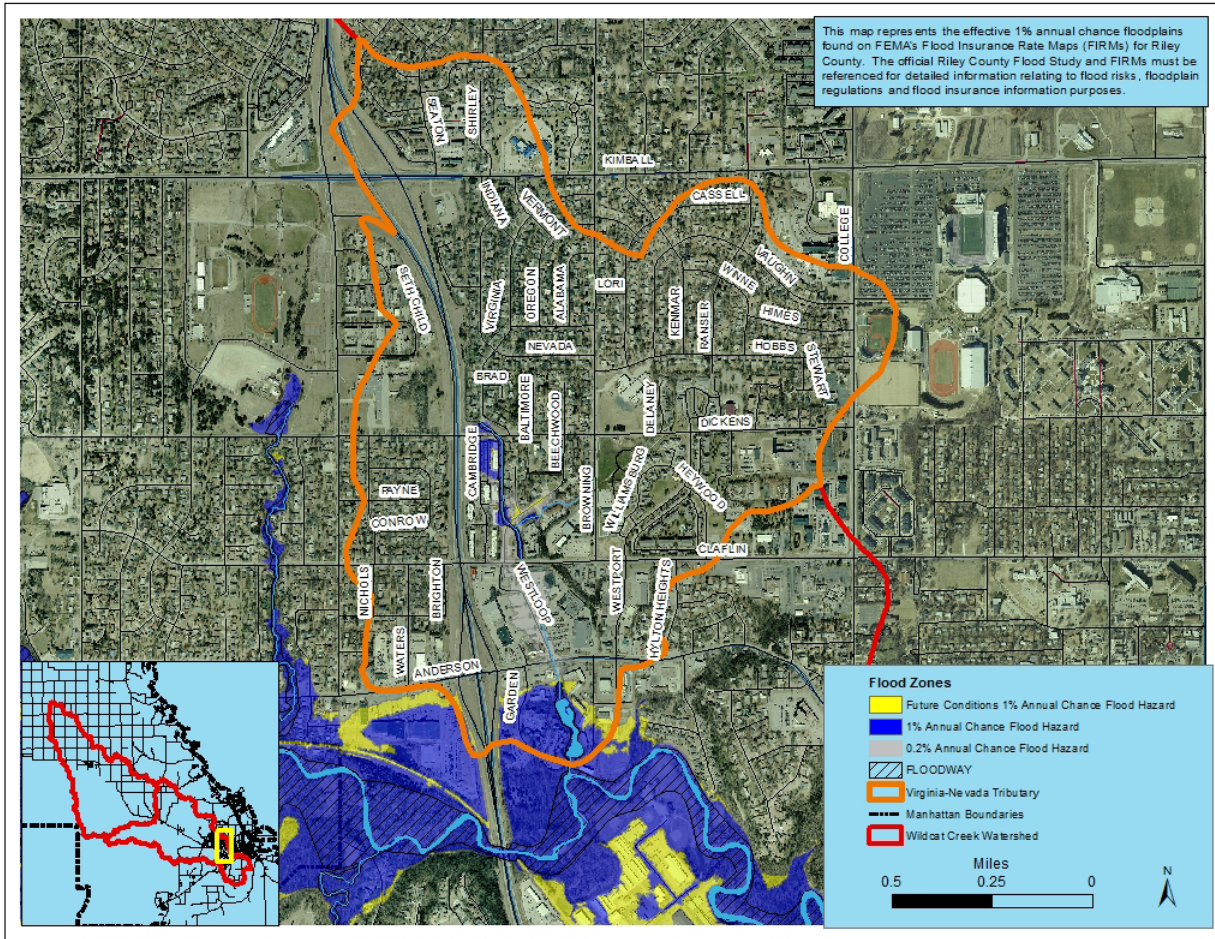


FIGURE 13. PRELIMINARY FLOODPLAIN OF THE VIRGINIA-NEVADA REACH.

These are critical facilities due to the significant amount of resources necessary to evacuate these facilities in flood events. No other major critical facilities or infrastructure is located in this tributary. Due to the nature of these critical facilities and the need to keep the information confidential, the exact location has not been provided. However, officials of Riley County, the City of Manhattan and the State of Kansas have the location and information regarding the facilities.

TABLE 4. FLOOD DATA, VIRGINIA-NEVADA TRIBUTARY.

Elevation Location	Current 1% Annual Chance Flood	Preliminary 1% Annual Chance Flood	Future Conditions 1% Annual Chance Flood
Mouth	1036.3'	1040.6'	1044.1'
Beechwood Terrace	1066.3'	1061.8'	1062.2'

2.1.4 Flood Hazards: CiCo Tributary.

CiCo Tributary is the next right bank tributary along Wildcat Creek in the limits of Manhattan. The tributary extends from Wildcat Creek, just south of Anderson Avenue to the north to Churchill Street.

1. **Source of the Problem.** The lower reaches of the tributary, south of Anderson Avenue are impacted by backwater effects from high water conditions on Wildcat Creek. To the area south of CiCo Park, the main concern is severe erosion along the channel and its impact on homes adjacent to the channel. The City of Manhattan has undertaken a detailed study of this tributary. A professional consultant, Olsson Associates, completed the study and has recommended a number of mitigation measures, including detention basins in CiCo Park to reduce the rate of stormwater runoff and improvements to the stream channel downstream of Dickens Road to mitigate erosion problems (Olsson Associates, 2012). Localized flooding can occur in other areas of the tributary.
2. **Flood Data.** The drainage area studied by the current Flood Insurance Study, dated July 6, 2010, is 0.86 square miles. The current study shows that the peak discharge of the 1% Annual Chance Flood is 1,680 cfs at the mouth of the tributary. The drainage area of the CiCo Tributary associated with the preliminary flood study is shown as 0.83 square miles. The peak discharge of the 1% Annual Chance Flood calculated by the preliminary study is 1,588 cfs at the same location. The peak discharge for the Future Conditions 1% Annual Chance Flood storm would be 1,880 cfs at this location. The maps in this section show the flood boundary for the current flood model of the 1% Annual Chance Flood for the preliminary flood model and the flood inundation depths for the Future Conditions 1% Annual Chance Flood.
3. **Land Use & Building Data.** Most all of the tributary watershed is developed with single-family residential uses.

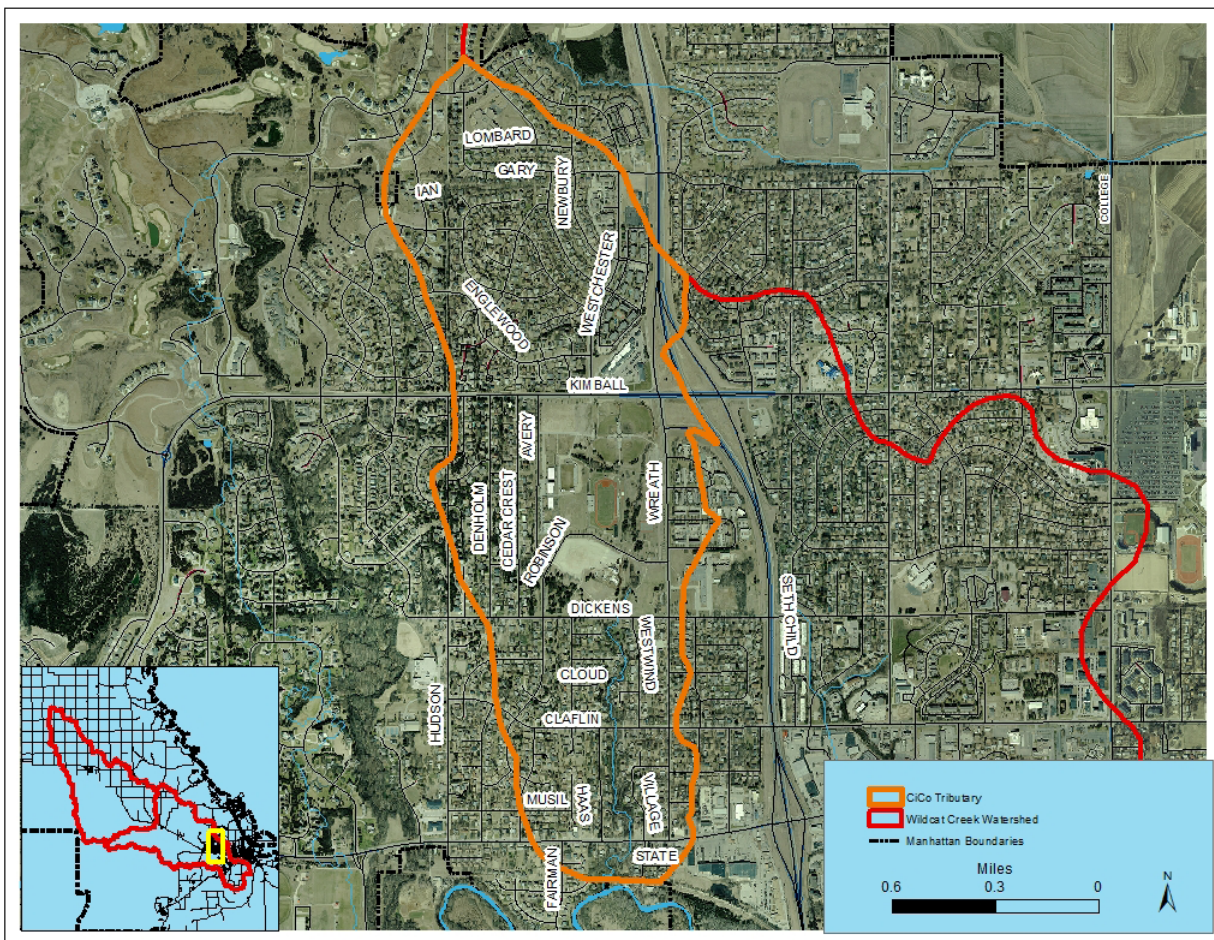


FIGURE 14. LOCATION OF THE CICO REACH.

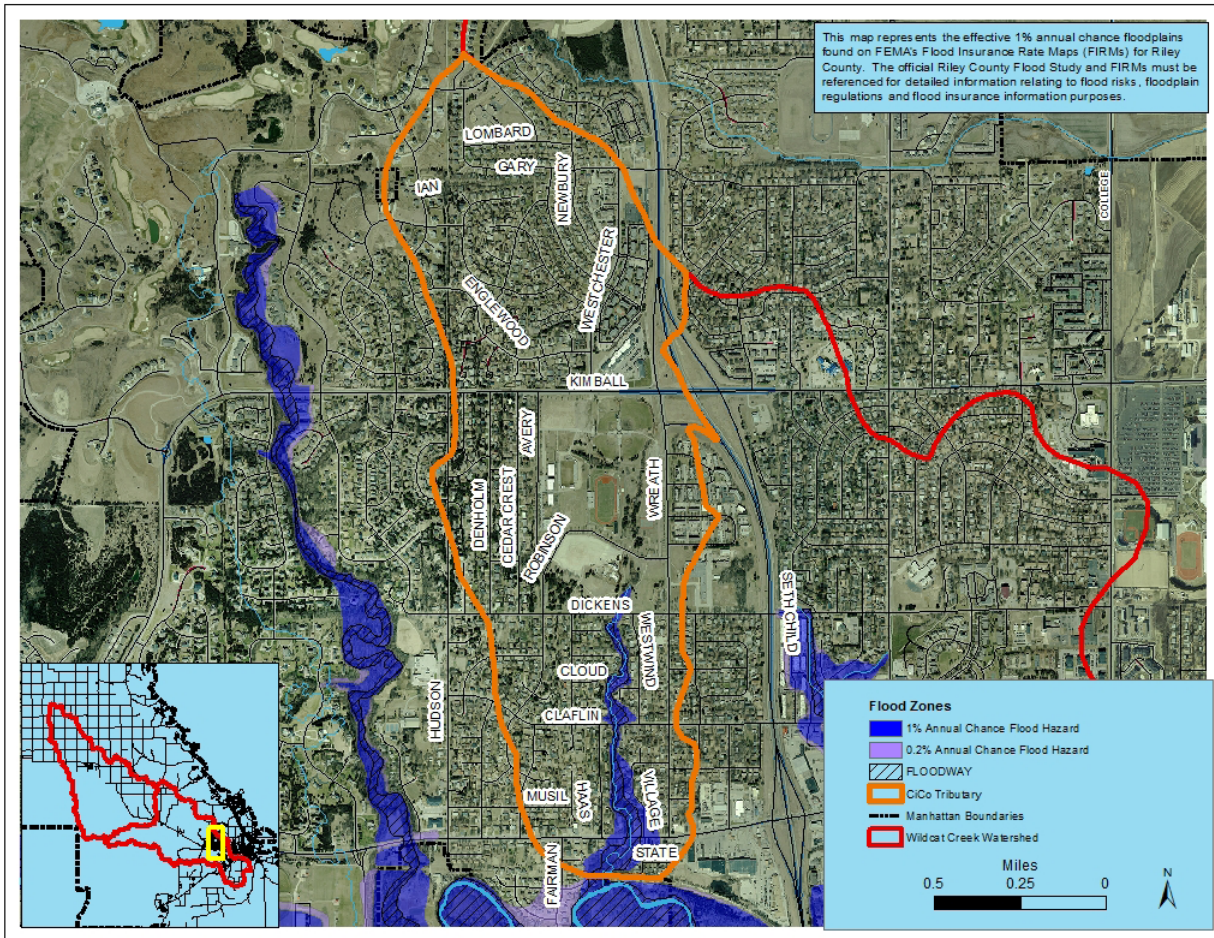


FIGURE 15. EFFECTIVE FLOODPLAIN OF THE CICO REACH.

In the middle of the watershed is CiCo Park, which consists of large open spaces, a swimming pool, the Riley County Fair Grounds and the Manhattan High School football and track stadium. To the north of Kimball Avenue, just west of Seth Child, are the Candlewood Shopping Center and multiple-family apartment complexes. The residential uses are generally forty years old. There are newer residential developments in the upper reaches of the tributary watershed built in the 1990s. The commercial retail properties were built in the mid-1980s.

4. *Development Trends.* The tributary is completely built out. Single-family homes are built on moderately sized lots (10,000 to 15,000 square feet in area). The layout of the existing development is dependent on the terrain, which dictates the use of linear or curvilinear streets and cul-de-sacs and associated lot layouts. Areas of CiCo Park may be re-purposed or redeveloped depending on the City, County and School District's needs.
5. *Development Constraints.* The tributary watershed is completely built out. No vacant land is available to develop.
6. *Critical Facilities.* Two facilities that house children (schools, preschools, etc.) or elderly citizens (nursing homes or assisted living facilities) of Manhattan are located in the CiCo Tributary. These are critical facilities due to the significant resources necessary to evacuate these facilities in a flood event. No other major critical facilities or infrastructure is located in this tributary. Due to the nature of these critical facilities and the need to keep the information confidential, the exact location has not been provided. However, officials of Riley County, the City of Manhattan and the State of Kansas have the location and information regarding the facilities.

TABLE 5. FLOOD DATA, CICO TRIBUTARY.

Elevation Location	Current 1% Annual Chance Flood	Preliminary 1% Annual Chance Flood	Future Conditions 1% Annual Chance Flood
Dickens Avenue	1076.1'	1073.7'	1074.7'
Claflin Road	1061.7'	1061.8'	1062.3'
Anderson Avenue	1050.9'	1049.5'	1050.4'

2.1.5 Flood Hazards: Little Kitten Creek.

Little Kitten Creek is the next right bank creek that flows into Wildcat Creek. It is a large tributary that extends from Wildcat Creek to the flint hills north of Kimball Avenue.

1. *Source of the Problem.* Flooding along the confluence of Little Kitten Creek and Wildcat Creek has occurred when Wildcat Creek has been in its flood stages. In other areas of the creek, localized flooding can occur. The impacts of stormwater runoff through the creek have been improved with the development of Colbert Hills Golf Course and the Grand Mere Development in the upper reaches of the tributary.

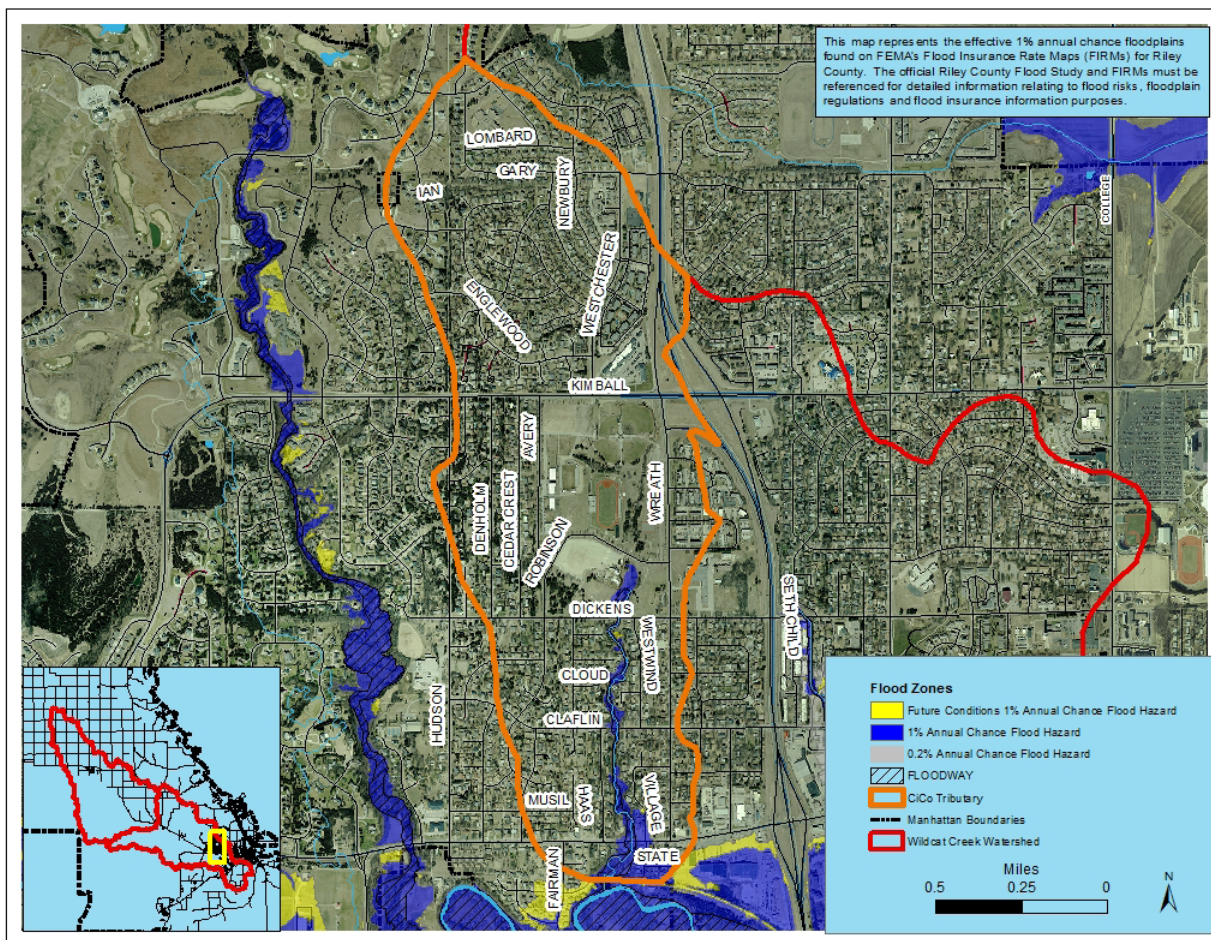


FIGURE 16. PRELIMINARY FLOODPLAIN OF THE CICO REACH.

Several large detention basins have been constructed, which have improved the rate of runoff in the area. This is reflected when comparing the flood data and reviewing the flood information maps provided in this section.

2. **Flood Data.** The current FIS shows the drainage area to be 2.85 square miles. This study lists the peak discharge of the 1% Annual Chance Flood as 3,160 cfs at the mouth of Little Kitten Creek. The preliminary FIS expanded the drainage area and study boundary for this tributary further to the north than previously studied. The new drainage area of the preliminary flood model is 3.05 square miles. This study shows that peak discharge of the 1% Annual Chance Flood is 3,331 cfs near the confluence with Wildcat Creek. In addition, the peak discharge for the Future Conditions 1% Annual Chance of Flood storm would be 3,097 cfs at this point. The Base Flood Elevations are impacted by overflow waters of Wildcat Creek and also backwater effects by the creek during flood stages. The maps in this section show the flood boundary for the current flood model of the 1% Annual Chance Flood for the preliminary flood model and the flood inundation depths for the Future Conditions 1% Annual Chance Flood.
3. **Land Use & Building Data.** The tributary watershed is primarily single-family residential homes built on moderate sized to estate sized lots (8,000 square feet to 1.0+ acres). The area to the south of Kimball is completely built out. The area to the north of Kimball Avenue is in various stages of development. The new development is primarily situated in the Grand Mere Development, a master planned golf course community. Some commercial uses, multiple-family residential uses and retirement communities exist along Kimball Avenue in the northern reaches.

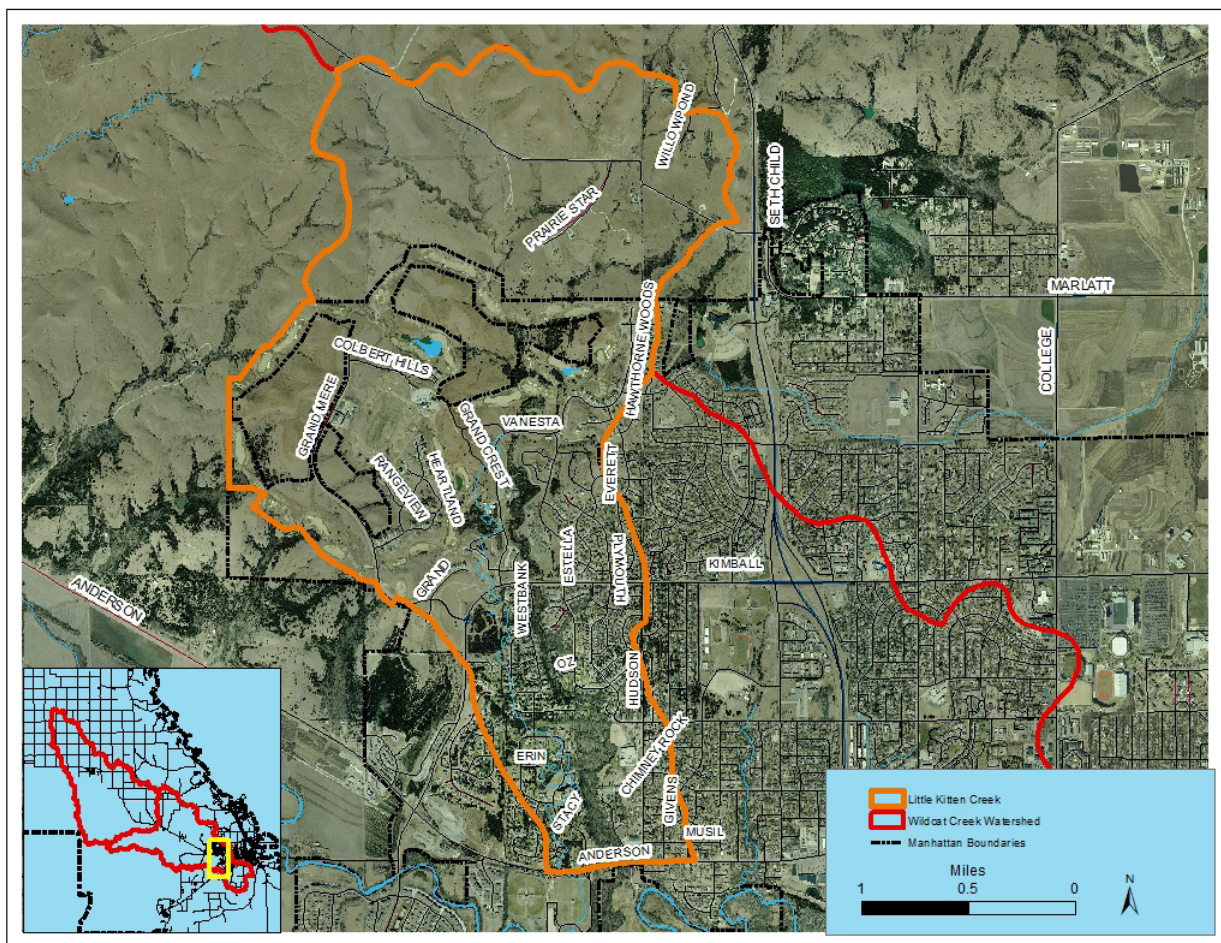


FIGURE 17. LOCATION OF THE LITTLE KITTEN REACH.

The other prominent land use in the Little Kitten Creek Tributary is the Colbert Hills Golf Course, which Grand Mere is situated in and around. Finally, there is open flint hills range land, mostly associated with Kansas State University.

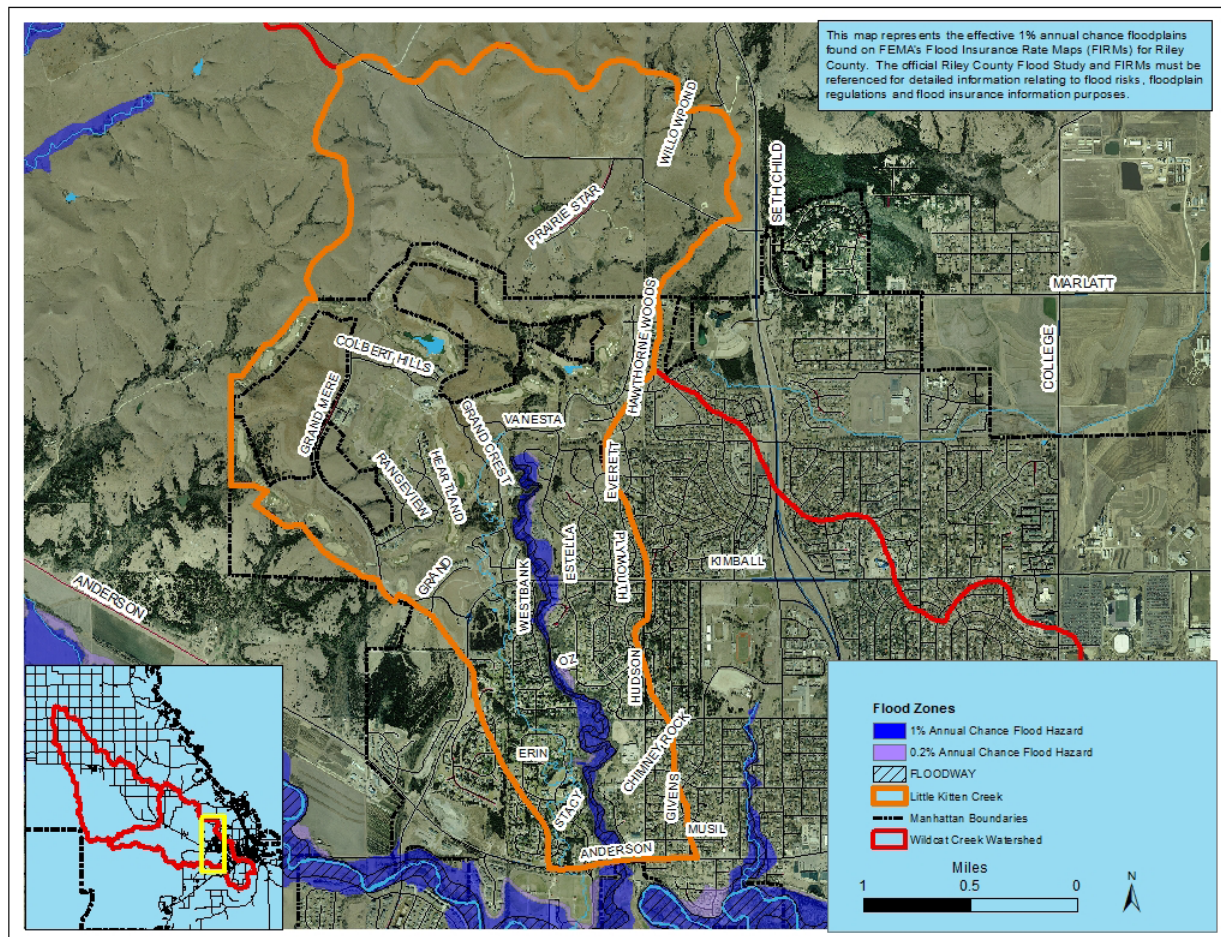


FIGURE 18. EFFECTIVE FLOODPLAIN OF THE LITTLE KITTEN REACH.

4. **Development Trends.** As previously mentioned, the lower reaches of the tributary are primarily built out. The upper reaches are under development in Grand Mere. The extreme upper reach of the tributary is not anticipated to be developed because the land is under control by Kansas State University for their various research and educational uses.
5. **Development Constraints.** The Flint Hills terrain is the primary constraint to development in the tributary. Large tracts of land in the extreme upper reaches of the tributary, owned by Kansas State University, are valued in their current state for research and educational purposes. The primary area under development is in Grand Mere. This development is a master planned community that has planned for a mix of generally low density residential uses and a small commercial center. Grand Mere has also developed a master drainage plan consisting of open space, and detention and retention basins to control the amount and rate of runoff from the development.
6. **Critical Facilities.** There are a number of critical facilities in the Little Kitten Creek watershed. The list includes a school, nursing homes and assisted living facilities, preschools, a Manhattan Fire Station, and public infrastructure elements.

Due to the nature of these critical facilities and the need to keep the information confidential, the exact location has not been provided. However, officials of Riley County, the City of Manhattan and the State of Kansas have the location and information regarding the facilities.

TABLE 6. FLOOD DATA, LITTLE KITTEN CREEK.

Elevation Location	Current 1% Annual Chance Flood	Preliminary 1% Annual Chance Flood	Future Conditions 1% Annual Chance Flood
Kimball Avenue	1120.1'	1121.9'	1122.8'
Anderson Avenue	1065.0'	1066.0'	1068.0'
Confluence w/ Wildcat Creek	1051.0'	1053.0'	1054.1'

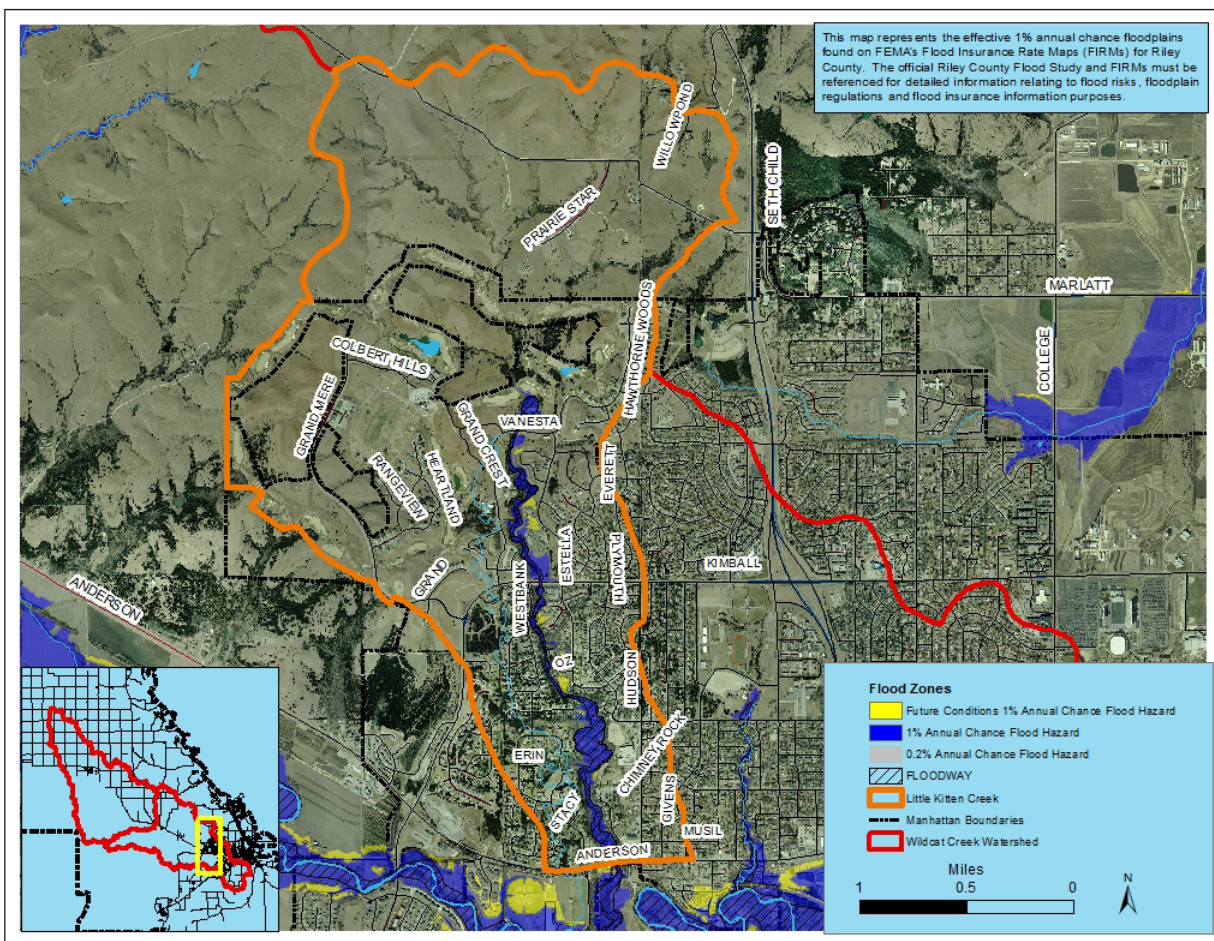


FIGURE 19. PRELIMINARY FLOODPLAIN OF THE LITTLE KITTEN REACH.

2.1.6 Flood Hazards: Rolling Hills Tributary.

Rolling Hills Tributary is a small left bank tributary of Wildcat Creek extending south from Anderson Avenue.

1. *Source of the Problem.* Flooding along the confluence of the Rolling Hills Tributary and Wildcat Creek when Wildcat Creek is in its flood stages is the primary flood hazard. However, in other areas of the tributary, localized flooding can occur.
2. *Flood Data.* The current FIS shows the drainage area to be 0.35 square miles. This study shows that the peak discharge of the 1% Annual Chance Flood as 1,050 cfs at the mouth of the tributary. The preliminary FIS expanded the drainage area slightly, with the preliminary flood model having 0.42 square miles of study area. This study shows that peak discharge of the 1% Annual Chance Flood is reduced compared to current FIS with 780 cfs near the confluence with Wildcat Creek. In addition, the peak discharge for the Future Conditions 1% Annual Chance Flood storm would be 1,053 cfs at this point. The reduction of the peak flow is primarily due to new detention basins being constructed in the tributary watershed since this area was last modeled in 2003. The Base Flood Elevations are impacted by backwater effects when Wildcat Creek is in flood stage. The maps in this section show the flood boundary for the current flood model of the 1% Annual Chance Flood for the preliminary flood model and the flood inundation depths for the Future Conditions 1% Annual Chance Flood.
3. *Land Use & Building Data.* The small tributary watershed is composed completely of single-family residential homes built on large lots (25,000 to 50,000 + square feet). These homes were built from the 1970s through the 2000s.

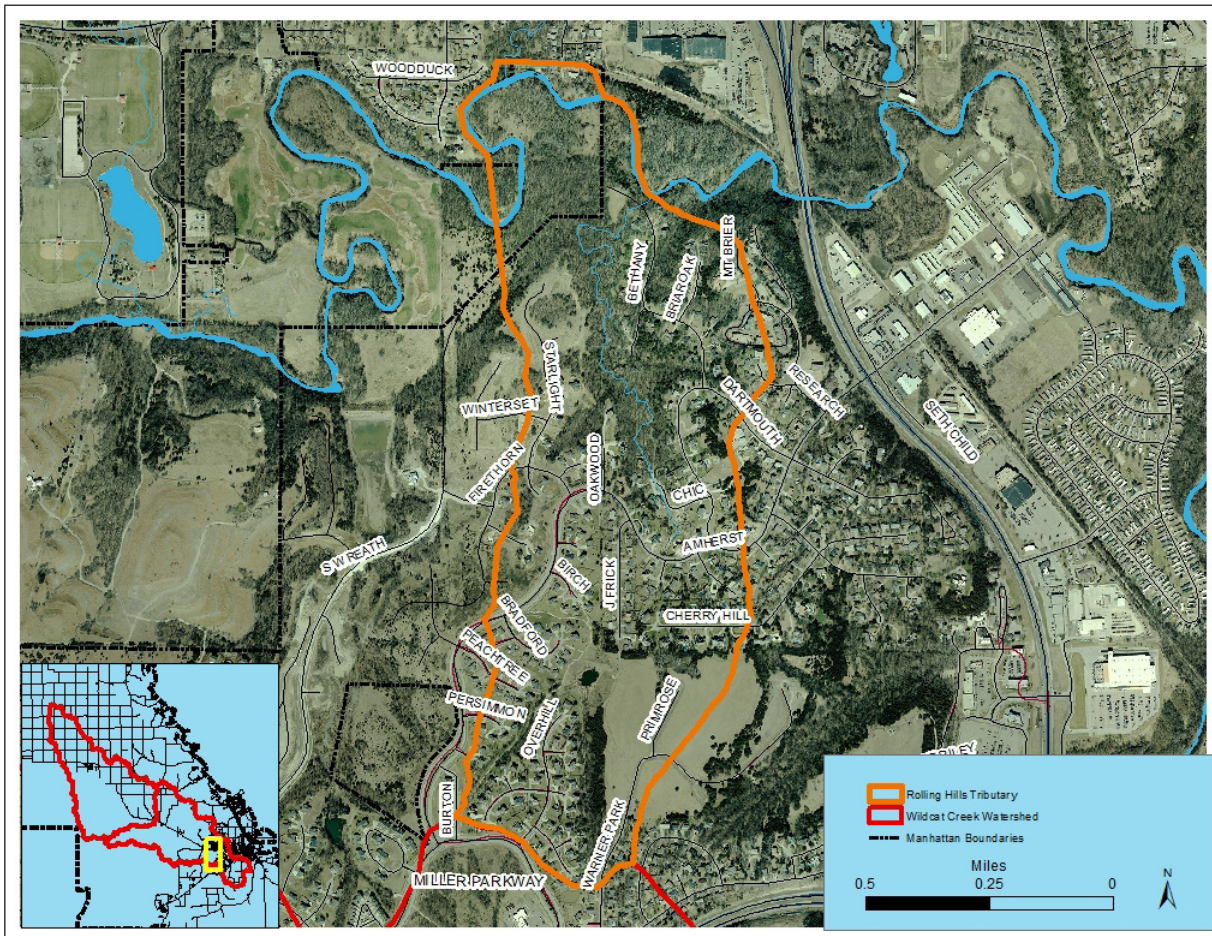


FIGURE 20. LOCATION OF THE ROLLING HILLS REACH.

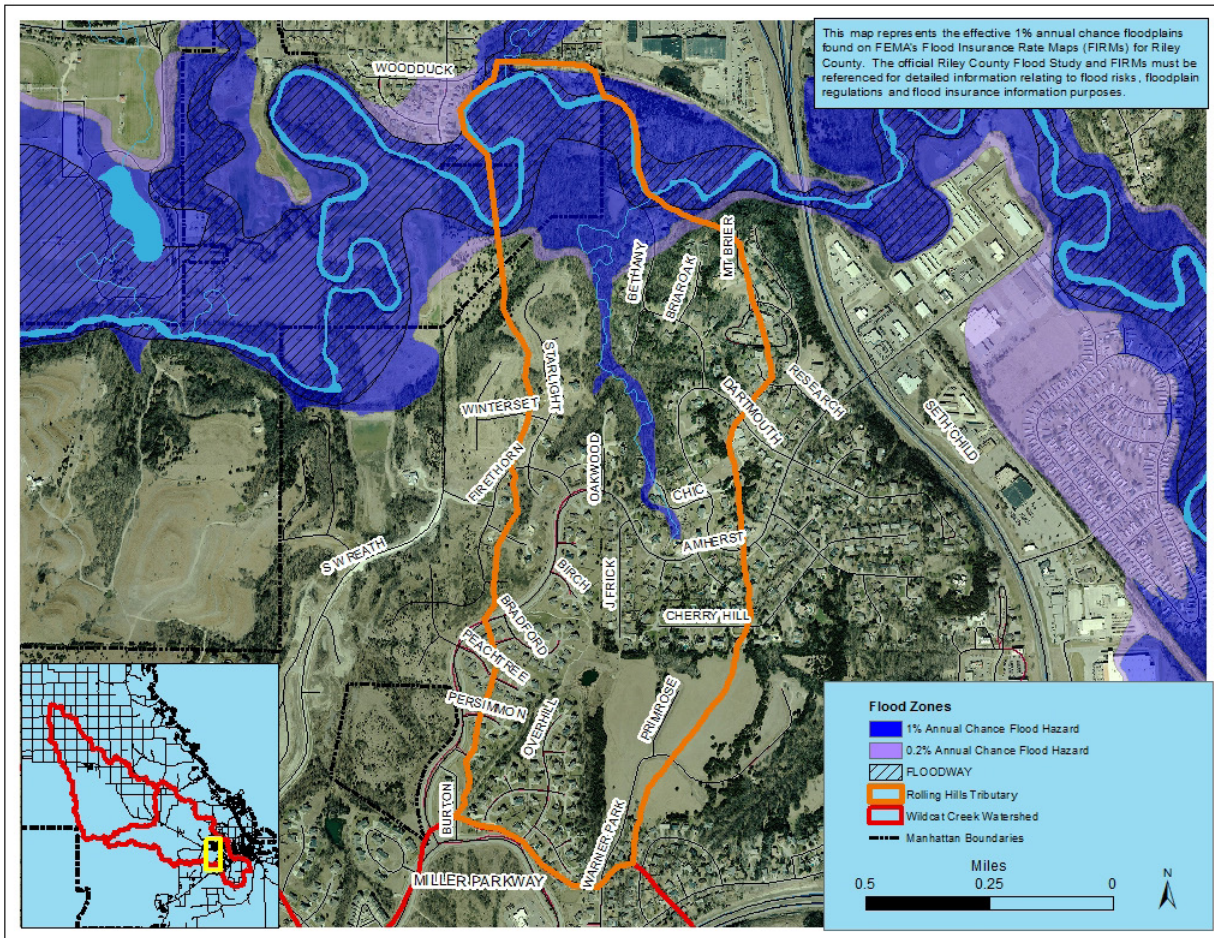


FIGURE 21. EFFECTIVE FLOODPLAIN OF THE ROLLING HILLS REACH.

4. *Development Trends.* As mentioned, the tributary is completely built out with single-family homes. Because of the terrain of the flint hills, these residential lots are located on curvilinear streets and cul-de-sacs and have large rear yards that primarily follow the tributary channel and other ravines in the minor watershed.
5. *Development Constraints.* The flint hills terrain is the primary constraint to development in the tributary. The backwater effects from Wildcat Creek near the confluence with the Rolling Hills Tributary generally prohibits development due to mapped floodways.
6. *Critical Facilities.* Because of the small size of the Rolling Hills Tributary, there are no critical facilities.

TABLE 7. FLOOD DATA, ROLLING HILLS TRIBUTARY.

Elevation Location	Current 1% Annual Chance Flood	Preliminary 1% Annual Chance Flood	Future Conditions 1% Annual Chance Flood
Confluence with Wildcat Creek	1042.2' (backwater effect)	1045.3' (backwater effect)	1050.2'

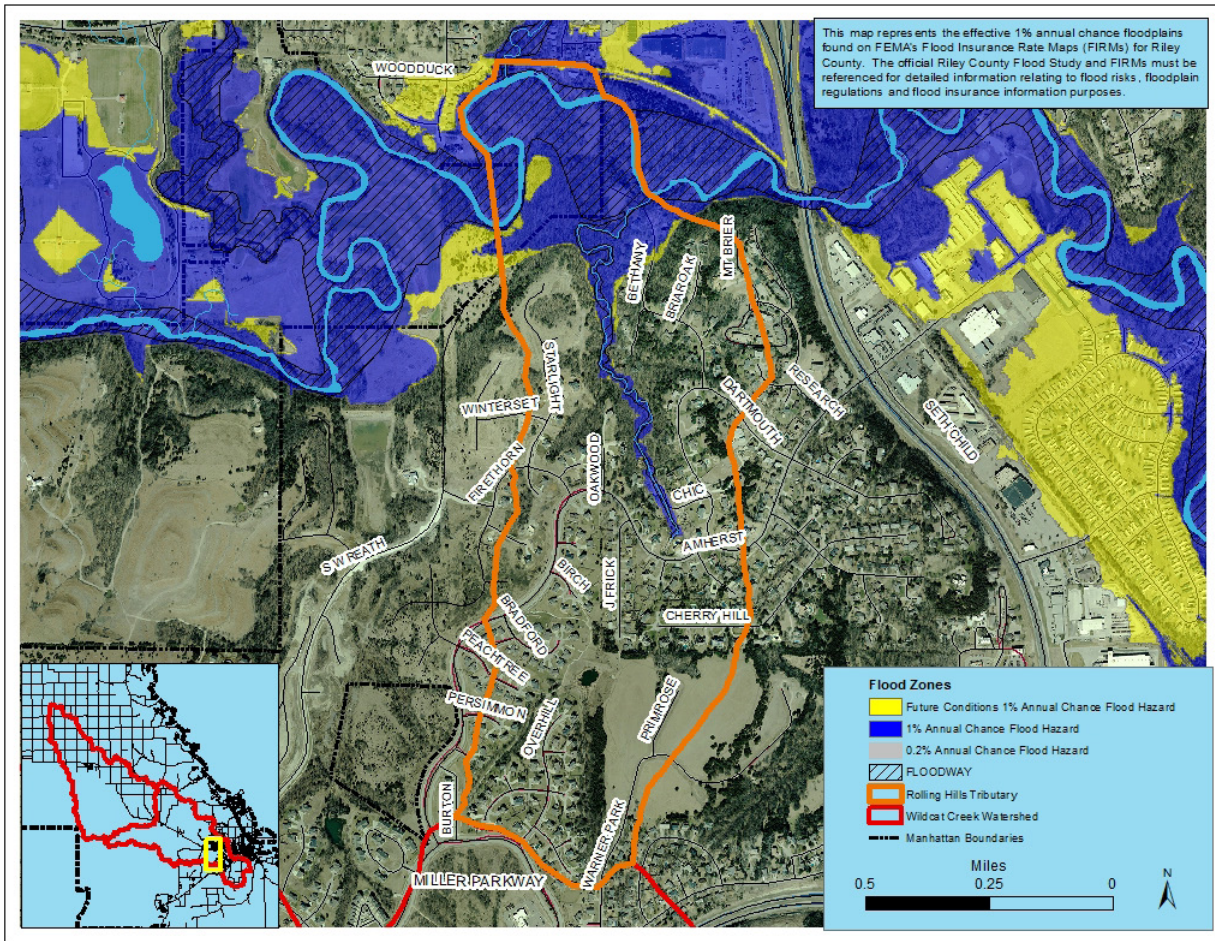


FIGURE 22. PRELIMINARY FLOODPLAIN OF THE ROLLING HILLS REACH.

2.1.7 Flood Hazards: Manhattan to Keats.

This reach encompasses Wildcat Creek upstream from the Manhattan city limits to the western edge of Keats and includes the left bank tributaries of Kitten Creek, two unnamed tributaries and three small right bank tributaries including one on Fort Riley. The Fort Riley tributary is not discussed in this section.

1. *Source of the Problem.* Flooding along the confluence of the Kitten Creek Tributary and Wildcat Creek when Wildcat Creek is in its flood stages is the primary flood hazard. However, in other areas of the tributary, localized flooding can occur.
2. *Flood Data.* The current FIS does not contain information regarding the drainage area or the peak discharge of this reach or any of its tributaries.
3. *Land Use & Building Data.* The majority of this area is in agricultural use, with associated residences and outbuildings. However, there is a concentration of single family residential homes within the unincorporated town site of Keats. There are also single family residential homes scattered throughout the reach. Blueville Nursery, a commercial garden store and landscaping operation, is located at the downstream end of the reach.
4. *Development Trends.* There have been some single-family residences constructed in scattered locations.

However, Riley County discourages a large number of non-agricultural residences from locating in highly productive agricultural areas. Blueville Nursery has added several structures in recent years. The area near the intersection of Anderson Avenue and Scenic Drive/Kimball Avenue may be developed with commercial and/or residential uses in the future.

5. *Development Constraints.* In addition to the flint hills terrain, the primary development constraint in this area is the Riley County Vision 2025 Comprehensive Plan and implemented Zoning and Subdivision Regulations, which discourage the widespread placement of non-agricultural residences in productive agricultural areas. The boundaries of Fort Riley to the south restrict development in that direction.

6. *Critical Facilities.* The Keats fire station is the only critical facility in this reach.

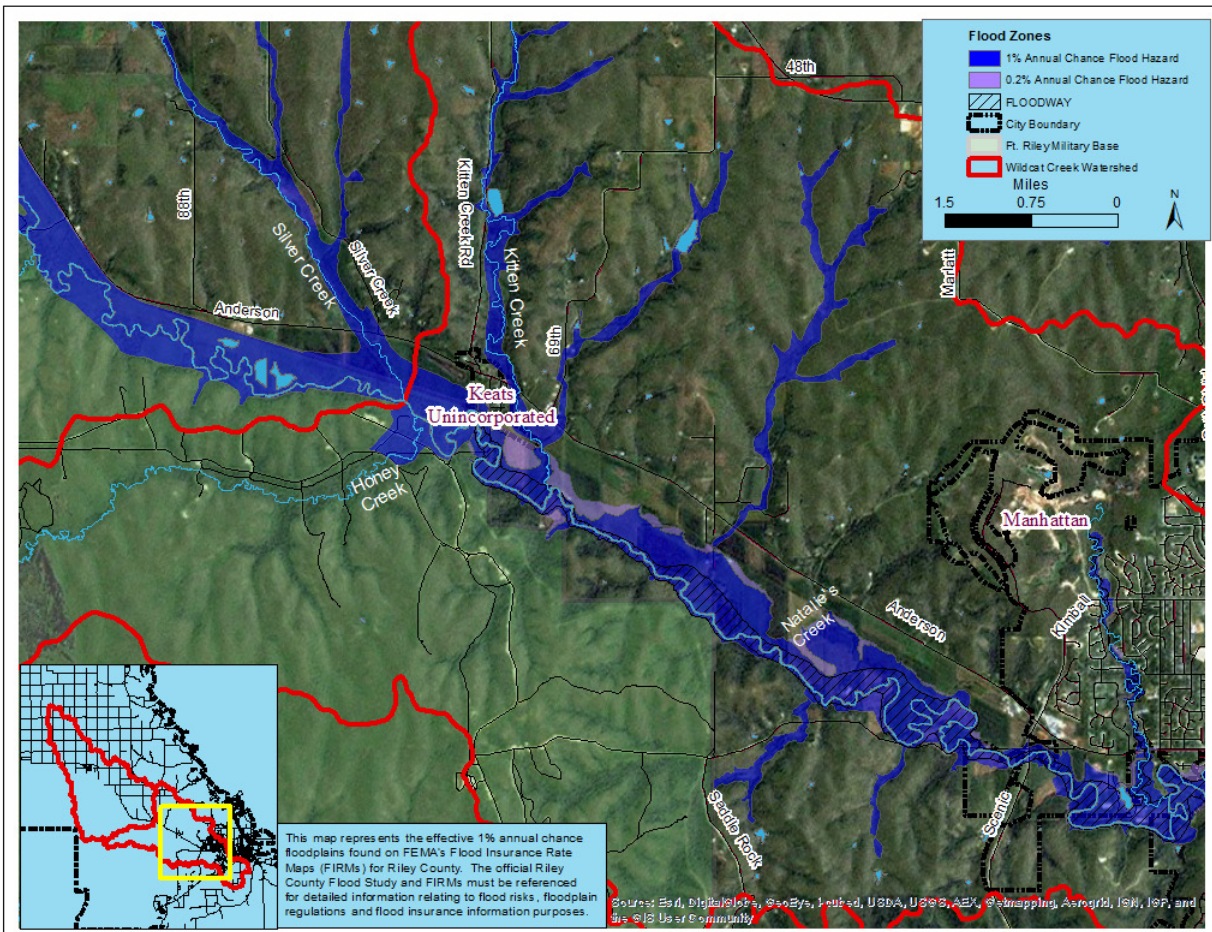


FIGURE 23. EFFECTIVE FLOODPLAIN OF WILDCAT CREEK: MANHATTAN TO KEATS.

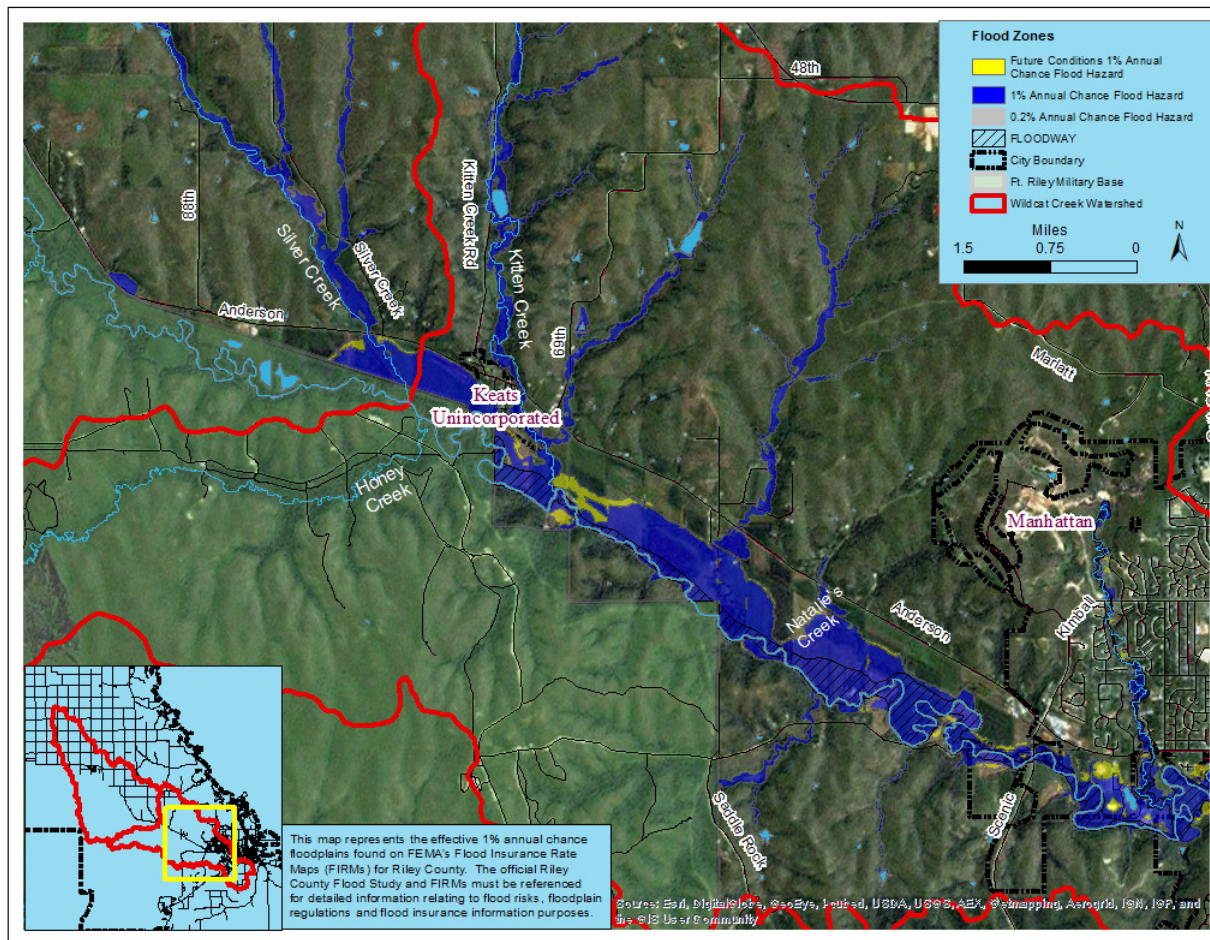


FIGURE 24. PRELIMINARY FLOODPLAIN OF WILDCAT CREEK: MANHATTAN TO KEATS.

2.1.8 Flood Hazards: Keats to Riley.

This reach extends from the western boundary of the unincorporated town site of Keats to the eastern boundary of the incorporated City of Riley and includes the right bank tributary of Silver Creek and a smaller unnamed tributary.

The reach also includes the left bank tributaries of Honey Creek, Wind Creek and the Little Arkansas Creek, all of which are on the Fort Riley military reservation, which are not discussed in this section.

1. *Source of the Problem.* The primary concern in this reach is flash flooding in localized areas.
2. *Flood Data.* The current FIS does not include information regarding the drainage area, however, the study does show the peak discharge of the 1% Annual Chance Flood as 14,100 cfs at Keats. The preliminary FIS is not available for this reach.
3. *Land Use & Building Data.* The majority of this area is in agricultural use, with associated residences and outbuildings. This area also includes some scattered residential home sites and residential subdivisions surrounded by rolling hills and farm land/pastures. The boundary of the Fort Riley military reservation to the south restricts development in that direction. During the Wildcat Creek Watershed Working Group meetings, much discussion centered on whether or not military use of the land was adversely affecting the land's ability to absorb water. Compaction of the soil under heavy military equipment was at the center of the discussion.

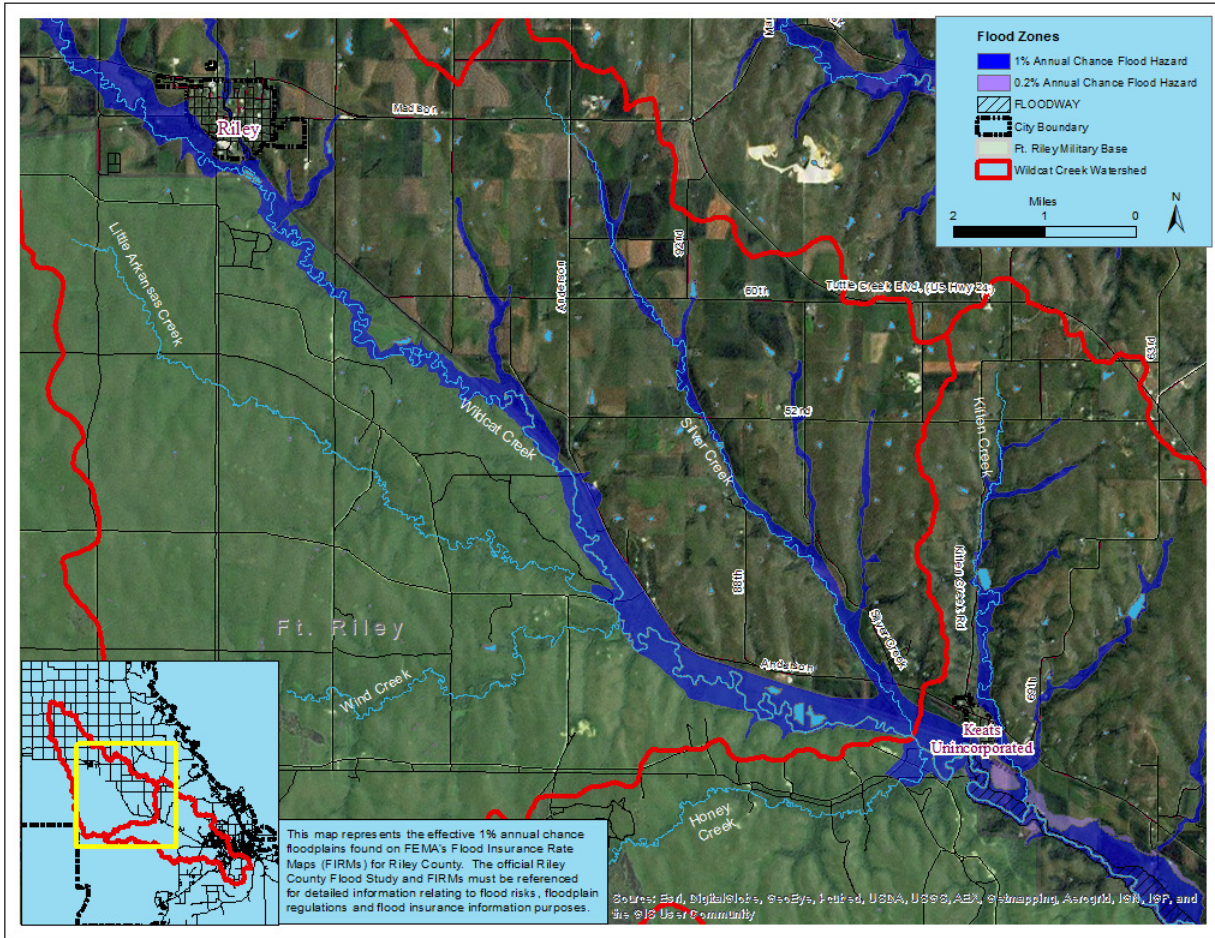


FIGURE 25. PRELIMINARY FLOODPLAIN OF WILDCAT CREEK: KEATS TO RILEY.

Fort Riley has contributed funding to implement a gauge at Keats, which allows enhanced forecasting for stakeholders that may use the new flood inundation maps of the Wildcat Creek at Scenic Drive National Weather Service forecast point and stream gauge. A scientific comparison of the nature of flows passing to the gauges at Keats, Scenic Drive and Seth Child Road, can help determine sources of flooding as more rain events occur. Land use is an important consideration to flooding and is part of determining rainfall runoff through hydrological modeling equations. Therefore, the Garrison Command submitted a letter explaining the development patterns on the Army base in the Wildcat Creek watershed (see appendix 2.1.8). Generally, the land at Fort Riley is well maintained. Progressive Low Impact Development techniques are part of all designs. Part of the land management includes the naturally occurring native species of plants which, because of their deep roots, encourage more infiltration into the soil than agricultural crops.

4. *Development Trends.* There have been some single-family residences constructed in scattered locations, however Riley County discourages a large number of non-agricultural residences from locating in highly productive agricultural areas.
5. *Development Constraints.* In addition to the flint hills terrain, the primary development constraint in this area is the Riley County Vision 2025 Comprehensive Plan and implemented Zoning and Subdivision Regulations, which discourage widespread placement of non-agricultural residences in productive agricultural areas. The boundary of Fort Riley to the south restricts development in that direction.
6. *Critical Facilities.* There are no critical facilities in this reach of the watershed.

2.1.9 Flood Hazards: Wildcat Creek Headwaters.

This reach encompasses an area from the eastern boundary of the City of Riley to the headwaters of Wildcat Creek. The headwaters extend from the north and northwest of Riley to an area just south and west of Leonardville. An unnamed left bank tributary extends north through the center of Riley, with several additional right and left bank tributaries extending north to the headwaters.

1. *Source of the Problem.* The primary concern in this reach is flash flooding in localized areas, especially in the City of Riley where the northern tributary joins the main stem of Wildcat Creek.
2. *Flood Data.* The current FIS does not include any information regarding this drainage area. The preliminary FIS is not available for this reach.
3. *Land Use & Building Data.* The majority of this area is in agricultural use, with associated residences and outbuildings and some non-agricultural residences in scattered locations. However, the area also includes numerous single-family residences and businesses in the cities of Riley and Leonardville.
4. *Development Trends.* The City of Riley has experienced the addition of a number of single-family residences in several subdivisions.

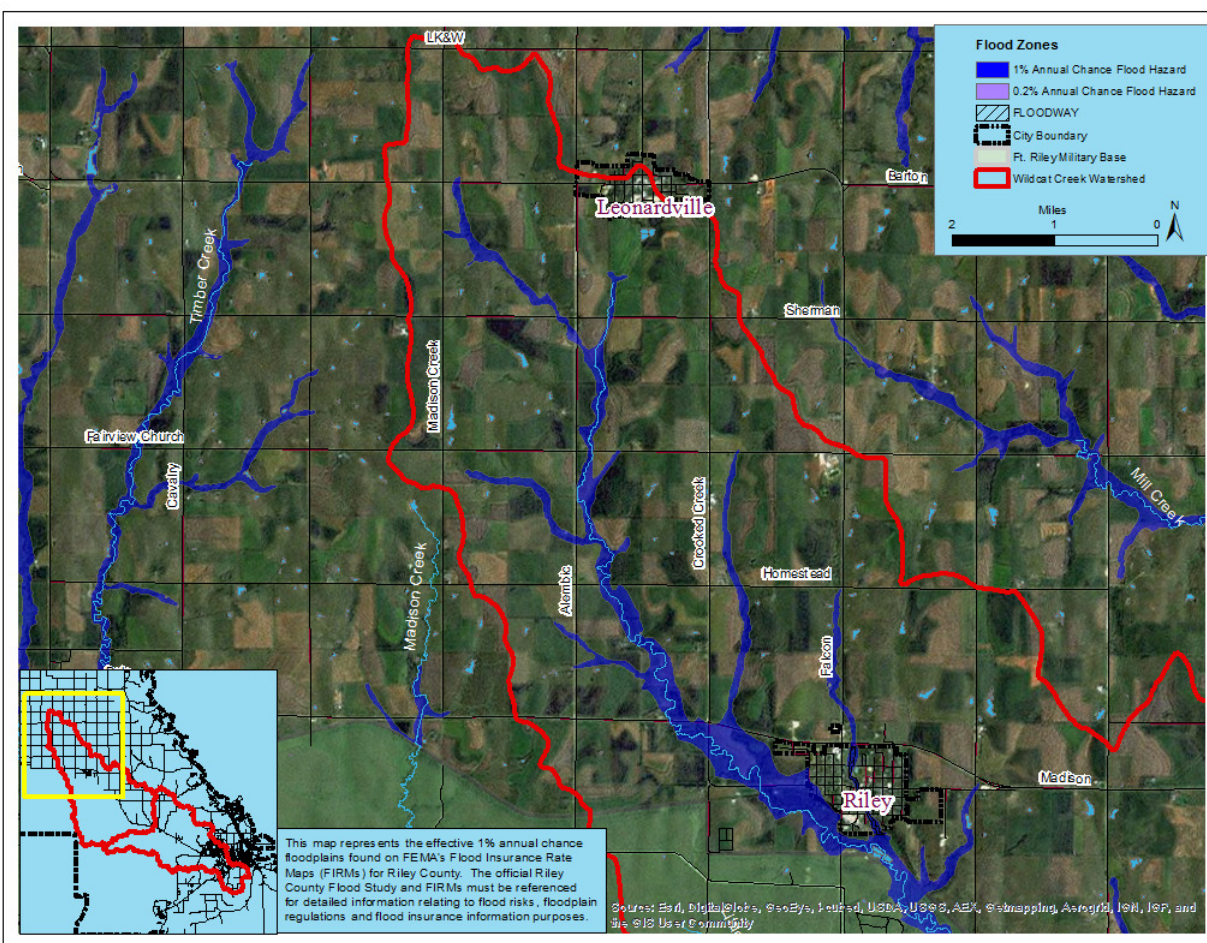


FIGURE 26. PRELIMINARY FLOODPLAIN OF WILDCAT CREEK: RILEY TO WILDCAT CREEK HEADWATERS.

Riley County discourages a large number of non-agricultural residences from locating in highly productive agricultural areas.

5. *Development Constraints.* The City of Riley is somewhat constrained by the limits of their municipal utility systems and the noise zones surrounding the Fort Riley military reservation. The primary development constraint in the outlying areas is the Riley County Vision 2025 Comprehensive Plan and implemented Zoning and Subdivision Regulations, which discourage the widespread placement of non-agricultural residences in productive agricultural areas. The boundary of the Fort Riley military reservation to the south restricts development in that direction.
6. *Critical Facilities.* The critical facilities in this area include public utilities, fire stations and government offices in the cities of Leonardville and Riley, the Riley County High School and schools in the City of Riley.

2.2 Public Involvement Process

This section briefly outlines the committee that created the Wildcat Creek Floodplain Management Plan and the public informational process in the plans formal adoption.

2.2.1 Wildcat Creek Watershed Working Group.

On July 16, 2011, following the June 6, 2011 flood event, the Manhattan City Commissioners and Riley County Board of County Commissioners established an ad-hoc committee, the Wildcat Creek Watershed Working Group (WCWWG), to research and provide recommended solutions for flooding along Wildcat Creek to the governing bodies.

At the June 21, 2011 City Commission meeting, the City Commission formally appointed Commissioner Richard Jankovich to co-chair the working group. On June 23, 2011, the Board of County Commissioners appointed Alvan Johnson to Co-Chair the working group. Following the Riley County Board of County Commissioner elections in November, 2012, Ron Wells took over as the County Co-Chair following an appointment on January 24, 2013.

The WCWWG first met on July 28, 2011 to establish the group's framework and to begin researching the flooding issues and determine mitigation measures to reduce the flood risks along the creek. Community members of the working group included:

Richard Jankovich, City Commission – Co-Chair	Mike Hill, Manhattan Urban Area Planning Board
Alvan Johnson, Riley County Commission – Co-Chair	Pat Keating
Mike Johnson, City of Leonardville	Mel Nudson
Tim Sharp, City of Riley	Charly Pottorff
Alan Hynek, Fort Riley	Kelly Briggs
Tom Taul, Riley County Planning Board	Tim Trubey
Mark Scott, Riley County Farm Bureau Association	Nyle Larson
Tim DeNoble, Kansas State University	Keith Westervelt
	Rod Harms

The working group was divided into six (6) sub-committees to further research various topics. The sub-committees were:

- Grants and Funding Sources
- Detention and Watershed
- Development and Freeboard
- Research & Data Collection
- Debris Mitigation and Enforcement
- Training and Education

To support and provide professional direction to the working group, a number of City, County, State and Federal staff members were involved. These staff members include:

Karen Davis, AICP, Community Development Director – City of Manhattan

Monty Wedel, AICP, Planning and Development Director – Riley County

Eric Cattell, AICP, Assistant Community Development Director – City of Manhattan

Steve Higgins, CFM, Zoning Enforcement Officer – Riley County

Chad Bunker, AICP, CFM, Planner II – City of Manhattan

Rich Vargo, County Clerk – Riley County

Rob Ott, P.E., City Engineer – City of Manhattan

Pat Collins, Emergency Management Director, – Riley County

Shane Swope, P.E., Stormwater Engineer – City of Manhattan

Tom Morrey, CFM, State NFIP Coordinator – State of Kansas

Jerry Snyder, Director of Fire Services – City of Manhattan

Brian Rast PE, CFM, PMP, Silver Jackets Coordinator for Kansas and Missouri – U.S. Army Corps of Engineers Kansas City District

Ryan Almes, Deputy Fire Chief – City of Manhattan

Since the creation of the ad-hoc committee, the group has discussed a number of issues, including:

1. Causes and extent of flooding.
2. What is being done about flooding.
3. What to do during a flood.
4. How people can protect their homes.
5. Flood insurance.
6. Taking care of drainage ways.
7. Updates on City and County projects .

During the initial stages of the Working Group meetings, the Kansas State Hazard Mitigation Team proposed a USACE Silver Jacket Pilot Project to implement some of the work that the WCWWG had discussed. Among other planning and research tools, the Silver Jacket Pilot Project proposed the creation of a Floodplain Management Plan. The WCWWG, along with supporting professional staff from the City, County, State and Federal levels, has been the de facto committee to draft the Wildcat Creek Floodplain Management Plan.

2.2.2 Other Public Involvement.

The general public was invited to attend the Wildcat Creek Watershed Working Group meetings and regularly participated throughout the process. Consistently property owners who were directly impacted by the flooding on Wildcat Creek attended meetings and provided valuable input and feedback. The document creation process and the final draft version of the Floodplain Management Plan were displayed on the City of Manhattan website and the Riley County website for public review and comment. Both the Manhattan Urban Area Planning Board and Riley County Planning Board have reviewed the document.

TABLE 8. RECORD OF PUBLIC MEETINGS.

Meeting Name	Location	Date
City Commission Meeting	City Hall	June 7, 2011
Wildcat Creek Public Meeting	City Hall	July 28, 2011
Wildcat Creek Watershed Working Group (WCWWG)	City Hall	August 11, 2011
WCWWG	City Hall	September 22, 2011
WCWWG	City Hall	October 27, 2011
WCWWG	City Hall	November 17, 2011
WCWWG	City Hall	January 12, 2012
WCWWG	City Hall	April 5, 2012
WCWWG	City Hall	June 28, 2012
WCWWG	City Hall	July 26, 2012
WCWWG	City Hall	October 18, 2012
WCWWG	City Hall	January 13, 2013

The Manhattan City Commission and Riley County Board of County Commissioners have formally adopted the plan as a policy document; likewise, the Manhattan Urban Area Comprehensive Plan and the Riley County Multi-Jurisdictional Hazard Mitigation Plan have been amended to recognize and reference this document.

Several flood related projects are underway in the City of Manhattan, including:

- The FEMA NFIP flood insurance rate maps will be updated on a county-wide basis, and will be presented to the public beginning in 2013.
- The Manhattan levee protects a significant portion of the southeastern part of the City from flooding on both the Big Blue and Kansas Rivers. The levee will go through a certification process for the NFIP involving a minor levee raise.
- In addition, the levee's reliability is being addressed with a USACE feasibility study.
- Also, the USACE will release a Levee Safety Action Classification for the levee in 2013.
- Finally, FEMA is conducting RISK MAP in the Lower Big Blue River and Upper Kansas River watersheds, where final discovery has been completed for both of these watersheds.

All of these activities may either directly or indirectly impact those interested in flood risk management along Wildcat Creek. The activities will also likely have public meetings, which will pose opportunities to present the Wildcat Creek Floodplain Management Plan for public review, comments and informational purposes.

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3.0 Goals and Objectives Shared by the Communities

The Wildcat Creek Watershed Working Group conducted a number of work sessions to develop the goals and objectives on how to manage the shared flood risks along Wildcat Creek and its tributaries. A consensus was found through several group meetings and feedback with City and County staff.

3.1 Goal: Develop a collaborative multi-jurisdictional approach towards floodplain management to address the flooding concerns and impacts in the Wildcat Creek watershed.

3.1.1 Objective: Establish an organizational framework to facilitate ongoing collaboration, coordination and discussion of floodplain management issues and activities. Establish a funding mechanism, like the Watershed District to provide necessary resources.

3.1.1 Objective: Adopt and implement a Wildcat Creek Floodplain Management Plan by Riley County and the City of Manhattan.

3.2 Goal: Proactively manage and reduce flood risk along Wildcat Creek and its tributaries to protect life and property.

3.2.1 Objective: Reduce risk to life, property and the economy to acceptable levels identified by the community.

3.2.2 Objective: Identify and mitigate repetitive loss areas.

3.2.3 Objective: Develop a Storm Water Capital Improvements Program (CIP) for the Wildcat Creek watershed.

3.2.4 Objective: Revise floodplain and subdivision policies and regulations.

3.2.5 Objective: Identify and understand the causes and impacts of the events that have occurred within the watershed over the past seven years, as well as changes in development.

3.3 Goal: Protect and preserve the natural riparian corridor environment to enhance habitat connectivity, water quality, erosion and sediment management, bank and channel stabilization, and provide compatible recreational opportunities.

3.3.1 Objective: Implement appropriate Best Management Practices to stabilize channel and stream banks, protect wildlife and habitat, conserve open space, and reestablish riparian corridors.

3.3.2 Objective: Implement restoration and storage capacity of existing floodplain.

3.3.3 Objective: Develop a Joint City – County Recreation Plan for the Wildcat Creek watershed.

3.4 Goal: Obtain a balance between development needs and the proper functions of the floodplain within the Wildcat Creek watershed.

3.4.1 Objective: Implement appropriate Best Management Practices (BMPs) for public and private development projects. Encourage green infrastructure through incentives and development standards for redevelopment areas and with new development.

3.4.2 Objective: Encourage BMPs for agriculture and range land through appropriate incentives.

3.4.3 Objective: Continue to assess the performance of the Wildcat Creek watershed as a complete system.

3.4.4 Objective: Implement appropriate policies and regulations that incorporate the Future Build Out Model and address needs of existing properties.

3.5 Goal: Improve public understanding of the flood risks within the Wildcat Creek watershed.

3.5.1 Objective: Develop a range of educational tools to inform the general public, elected officials and interested parties (i.e. Realtors, property owners, tenants and developers) of the flood risks, promote floodplain stewardship, connect citizens to the riparian environment, encourage appropriate recreational activities, and develop a sense of watershed ownership along Wildcat Creek.

3.5.2 Objective: Implement an Early Warning System that incorporates multiple media tools that are tied to the National Weather Service Wildcat Creek Prediction Model, which could include sirens, road sign warning, Immediate Response Information System (IRIS) and internet-based systems.

3.5.3 Objective: Establish an emergency preparedness and evacuation plan for residents and property owners within the floodplain. Implement voice warning capabilities.

4.0 Strategies and Tools

The City and County professional staff considered a long list of strategies and tools and used the following reasons for inclusion or rejection of those strategies and tools. This section explains the decision process and background regarding how these strategies and tools were selected.

4.1 Strategy: Modifying Human Susceptibility to Flood Hazards

Flooding impacts may be reduced through information, development policies, regulations, and flood protection measures on individual properties.

4.1.1 Tool: Land Use Policies and Regulations.

Advisable

A wide range of potential land use policies and regulations are available to be adopted that will lessen the likelihood that new or redeveloped buildings would be flooded. The term “higher standard regulations” is used to denote regulations that are more restrictive than the minimum FEMA floodplain regulations requirements.

Some potential higher standard regulations include:

- Prohibit development in the 1% Annual Chance Floodplain.
- Prohibit fill within the 1% Annual Chance Floodplain.
- Increase the required “freeboard” above the current minimum standard of one (1) foot above the base flood elevation.
- Regulate development within the floodplain to the width and depth of the mapped 0.2% Annual Chance Floodplain (commonly referred to as the 500-year floodplain) rather than the FEMA standard of 1% Annual Chance Floodplain.
- Regulate to a community based floodplain model, such as the AMEC Future Conditions 1% Annual Chance Floodplain.
- Require compensatory storage in the floodplain when fill is brought into the floodplain beyond a designated threshold.
- Require new development after a designated date to comply with higher floodplain standards to protect existing developments in the watershed.
- Require development outside and upstream of the urbanized areas to comply with higher floodplain standards to protect existing developments in the urbanized areas of the watershed.
- A host of complementary policies and regulations to some of the ones stated above which are designed to further protect lives and properties during a flood event.

The Land Use Policy & Regulation strategy is readily acceptable to proceed forward within the action plan of the FMP, as it can be an effective measure to protect new developments, additions or redevelopments from flooding by changing current development practices.

4.1.2 Tool: Development Policies - Moratorium.

Not Advisable

Early in the WCWWG discussions, it was proposed to place a moratorium on development in the floodplain of Wildcat Creek until research and ultimate solutions could be created to reduce the flooding impacts from the Creek. In researching the moratorium, it was determined that such a measure would only impact a very small number of vacant properties in the City and might be considered a “taking” if implemented. It was advised by the City of Manhattan Legal Department to not implement such a measure because of these factors.

4.1.3 Tool: Flood Warning Systems.

Advisable

The effects of flooding on lives and personal property can be reduced if enough advanced warning can be given. Advanced warning can empower people who live or work in the floodplain to move themselves and valuable personal property out of harms way. Ideally, early warning systems should be paired with an emergency evacuation plan that has been disseminated throughout the community and in the information and education process.

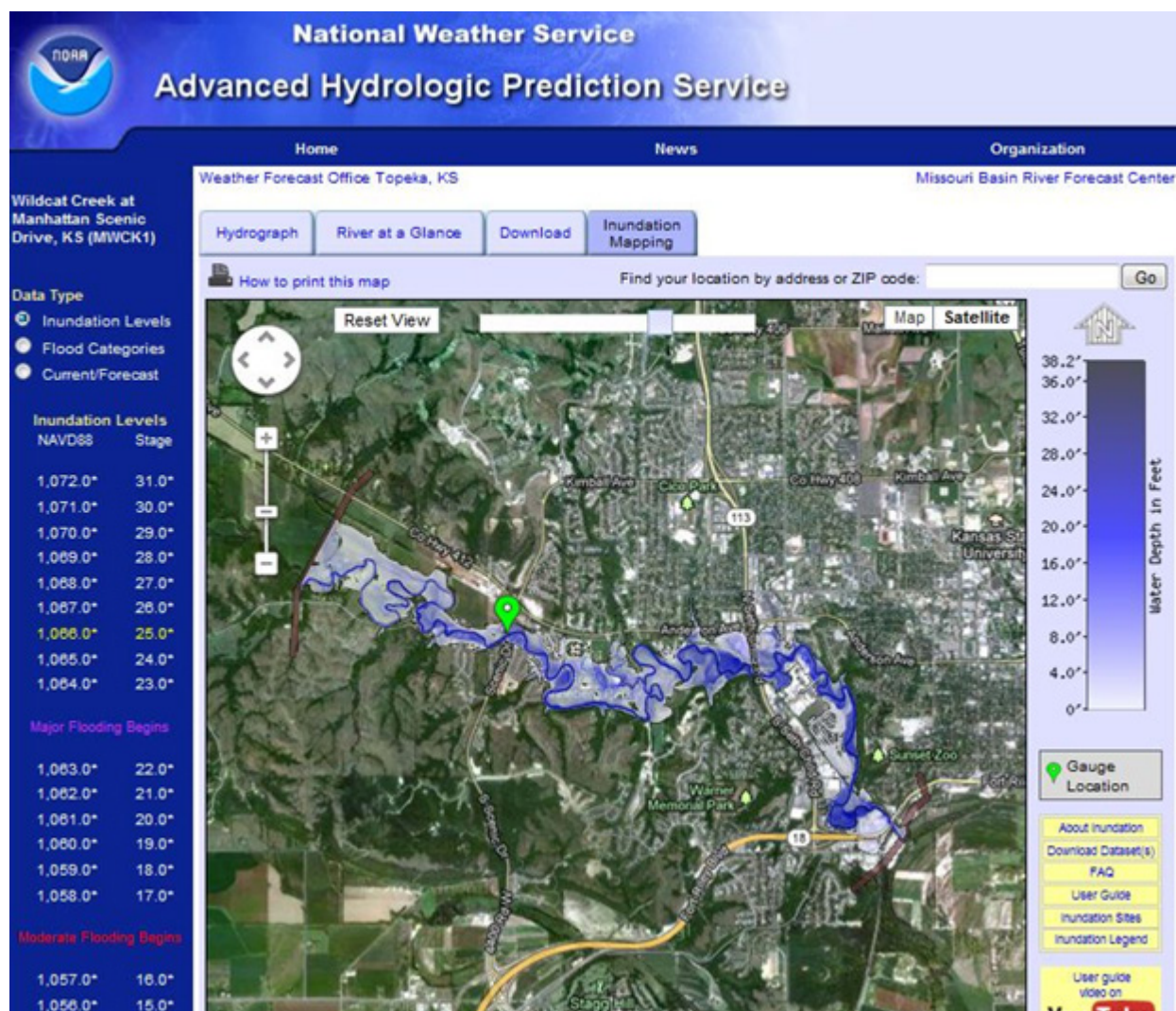


FIGURE 27. THE WILDCAT CREEK IN THE NWS ADVANCED HYDROLOGIC PREDICTION SERVICE.

Riley County and the City of Manhattan have a number of advanced warning measures currently in place. Other measures can be created or expanded upon to induce a more positive effect:

- **IRIS Warning System** – The Immediate Response Information System (IRIS) is a subscription-based warning system that is free to Riley County residents. The IRIS Warning System is linked to the National Weather Service notifications and will alert subscribers to a wide variety of weather watches and warnings via a number of media types, including phone calls to a land or cellular phone, text messaging or email.
- **Bridge Warning Lights** – Through the Silver Jacket Pilot Project, warning signs and lights were purchased and installed at the Scenic Drive bridge over Wildcat Creek on the west side of Manhattan. During a flood event, the warning lights are activated on the signs to alert motorists of the flood threat. The warning lights can also provide warning of the flood event to residents living nearby as they travel to or from their homes.
- **Gauges & Website** – The USACE Silver Jacket Pilot Project, the City of Manhattan, Riley County and the Garrison Command of Fort Riley helped purchase and place three (3) stream gauges along Wildcat Creek (see Figure 29 for location of gauges). These digital stream gauges are linked to the U.S. Geological Survey and National Weather Service websites (see reference section for website address) and provide a real time account of the depth of Wildcat Creek.

These gauges aid in the prediction of flooding on Wildcat Creek based on rainfall data and the rise of Wildcat Creek. In addition, these maps are clearly organized in a foot-by-foot mapping library that is available on the NWS Advanced Hydrological Prediction Service (AHPS) web-page and is coupled with the NWS weather forecasting. These two (2) tools enable residents and emergency responders the ability to keep a watchful eye on potential flooding on Wildcat Creek and the areas predicted to be impacted by flooding.



FIGURE 28. EXAMPLE STEPS FOR REDUCING FLOOD RISK TO ACCEPTABLE LEVELS.

- **Voice Modulated Warning Sirens** – The U.S. Army Corps of Engineers established a voice modulated warning siren system in Manhattan, Riley County and Pottawatomie County as part of a Tuttle Creek Reservoir Dam failure warning system for the Blue River. The City of Manhattan Fire Department would like to replicate that system in the Wildcat Creek watershed within the City limits to provide sound and voice flood warnings and instructions to residents that are outdoors. This system can be tied to the National Weather Service weather notifications system and alert people that are outdoors of a flood and give them instructions on how to evacuate the area. A secondary benefit to the system is that many people will be able to hear the warnings and instructions within their homes and businesses, although most outdoor siren and voice systems are not designed for such a use.

The City of Manhattan and Riley County should continue efforts to increase the number of warning systems to accommodate flood warnings and also look for new and innovative ways to warn those in harms way of a flood or other natural disaster and how to evacuate an effected area.

4.1.4 Tool: Flood Protection of Structures in the Floodplain.

Advisable

There is a wide range of flood protection measures that home and business owners can implement to reduce or eliminate the risk of future flooding. The entire range of flood protection measures should be reviewed and evaluated for properties at risk of flooding.

Non-residential structures, such as businesses or detached garages, can be constructed in a manner to prevent flooding of the interior. In addition to the building materials, special doors and windows and operation procedures are required to seal the building from rising flood waters. City of Manhattan and Riley County regulations currently require that non-residential structures located in designated floodplains that are to be flood-proofed, do so to a minimum of one (1) foot above the base flood elevation (BFE). Residential structures are not permitted to use flood-proofing measures to meet the current floodplain regulations.

Residential structures prone to flooding can use a variety of measures to reduce or eliminate the possibility of flooding. A residential structure can be elevated in place so that it is higher than a certain level of flooding. This will provide a higher level of protection. City of Manhattan and Riley County floodplain regulations require a residential structure to have its lowest enclosed floor a minimum of one (1) foot above the BFE. Home owners with properties prone to flooding may consider raising the home higher than the minimum requirement; however when elevating a home in place, special consideration should be given to how access to the home is provided during a flood event. At least one (1) way of dry access should be provided to a home in case an emergency arises during a flood. One of the most costly impacts from flooding is its effect on a home's electrical, heating and air conditioning systems (HVAC). Having these systems flooded can cost thousands of dollars to clean, repair or replace. A good preventative measure is to relocate these systems above the expected elevation of flood waters. By moving these systems out of a basement and raising the exterior unit of a HVAC system above the expected flood elevation, a home owner can prevent expensive repairs and lessen the impacts from a flood. Flood walls can protect basement window wells or stairs from shallow flooding by preventing waters from entering these openings. Special attention should be given to the design and construction of flood walls to ensure they function properly and don't exacerbate flooding.

Home owners can take other measures to prevent or reduce flood water inundation through back-flow preventers on floor drains, sewer hook-ups and/or foundation drains. These measures can protect against minor or localized flooding and prevent costly cleanups from sanitary sewers backing up during high water in the system, or in cases when the sanitary system fails for other reasons. Home and business owners are encouraged to check with local building code officials and floodplain managers in their jurisdictions before undertaking such flood protection measures as there will most likely be building code and floodplain regulation requirements and permits.

The City of Manhattan and Riley County should be, at a minimum, a repository for information on these types of flood protection options for home and business owners. Local construction contractors should be encouraged to become experts in this topic.

4.1.5 Tool: Process for Relocation or Removal of Structures.

Advisable

One of the most preventative measures to protect a home or business is to relocate it to an area more protected from flooding, such as a high area on the property or to a new piece of land entirely. By moving the structure outside of an area prone to flooding, it can effectively eliminate the impacts of flooding. This measure can be done voluntarily by a property owner or with assistance from local, state and federal governments.

Following a federal flood disaster declaration, mitigation dollars are typically available for mitigation projects, such as purchasing flood prone properties. These federal and state mitigation programs are completely voluntary on the part of the property owner; a local entity **CANNOT** use eminent domain to acquire a property through this project. These mitigation funds are managed by the Kansas State Hazard Mitigation Office and have to meet certain standards, including an acceptable benefit to cost ratio. These programs also require a certain match of local dollars or in-kind contributions. Once a property is purchased through these programs, the local entity must ensure the property is retained by that entity and is maintained as open space in perpetuity.

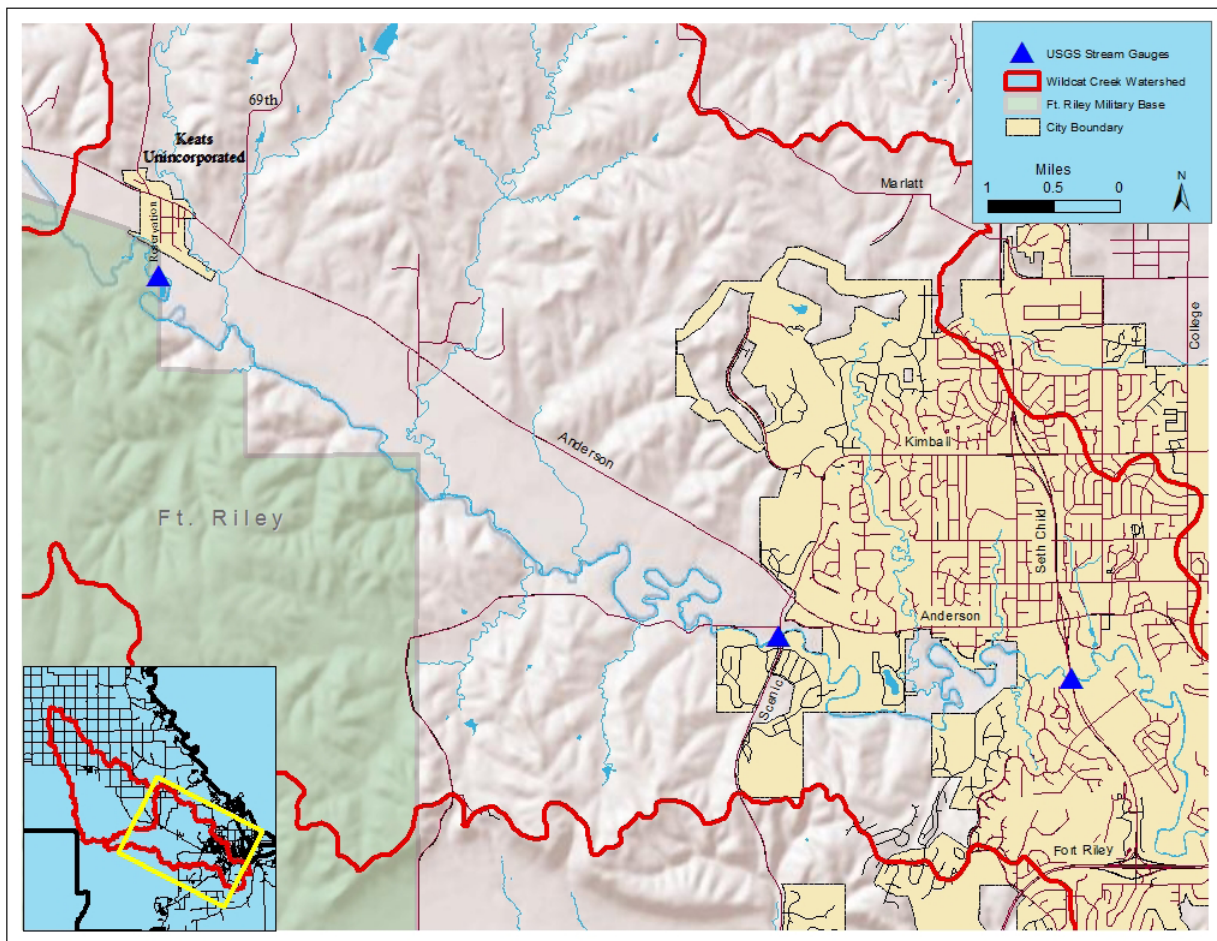


FIGURE 29. LOCATION OF WILDCAT CREEK STREAM GAUGES.

Riley County and the City of Manhattan should evaluate areas of the community where these programs may be worthwhile to move residents and their property out of harms way and develop a comprehensive plan identifying homes and businesses which should be purchased and relocated or removed. These entities should develop comprehensive plans to return the purchased lots back to a natural state or other uses complementary to the floodplain, such as open playing fields (i.e. soccer fields), trails or nature education centers.

4.2 Strategy: Modifying the Impact of Flooding

Local community officials can do a variety of things to modify the impacts flooding has on residents. Education and information on how to avoid floods, the importance of flood insurance and how to recover after a flood event are all elements of this strategy that can help residents of Riley County and the City of Manhattan.

4.2.1 Tool: Information and Education.

Advisable

City and County officials should, through a variety of methods and media, inform the general public and residents within the floodplain of specific flood hazards, how to prevent and/or prepare for a flood event and what to do after a flood event.

Both the City of Manhattan and Riley County maintain current and historic flood insurance studies and Flood Insurance Rate Maps (FIRMs) and applicable local floodplain regulations. The most current FIRMs are available in digital form through geographical information systems (GIS) software. Floodplain development documents are also on file at the public offices. Other data has been and can be further collected by City and County officials, such as localized flooding issues that are not shown on the FIRMs. This list of information topics of the flood risks for specific areas can be relayed to residents. In addition, general flood hazard information should be provided to residents. Public officials should continue to inform residents, real estate agents, lending institutions and developers that such information is available.

A number of local, state and federal agencies, such as the Kansas Division of Water Resources, American Red Cross and FEMA, have prepared detailed pamphlets, books and other informational pieces on how to prevent and prepare for a flood event. Similar information about how to recover from a flood event has been created by these agencies and others. City and County officials should continue to collect, review and maintain a sufficient library of information to assist residents with these topics. In addition to notifying the public about this resource library, the information should be cataloged at public libraries in Riley County.

Information on other topics related to flooding, such as water quality and water conservation, should be collected and made public in similar fashion as the flood hazard and prevention information. This information can be provided at City and County offices and/or the public libraries. A variety of media types can be used to inform residents and other interested parties about these flood related topics. Both Riley County and the City of Manhattan maintain informative websites where this information can be displayed. Newsletters, newspaper advertisements, press releases, notices on utility bills, other government notices, social media and direct mailings should also be used. Both entities should be creative as to how these messages are relayed to the public both broadly and specifically in an effort to have a well informed community on the hazards of flooding in the area.

The City of Manhattan recently applied for and has been accepted to the Community Rating System (CRS), a national program that evaluates a community's floodplain management efforts and rewards those efforts with reductions on National Flood Insurance premiums based on the community's floodplain management performance. A component of the CRS program is public outreach.



FIGURE 30. BRIDGE WARNING LIGHTS ON WILDCAT CREEK.

Credit points can be earned for a comprehensive approach to informing the general public and residents living and working in the floodplain of the potential hazards of flooding in the community. The City of Manhattan should set a goal to create a comprehensive public outreach and educational plan that targets a variety of topics and groups of residents to inform as many people as possible and potentially earn greater reductions in flood insurance premiums through the CRS program.

SPECIAL NOTE: A floodplain management plan (FMP) is the very essence of the Information and Education tool. A primary purpose of the FMP is communicating flood risks, helping to establish public

understanding of those flood hazards, and documenting for the community the decision processes used in developing plans, policies and regulations.

4.2.2 Tool: Future Conditions Flood Model.

Advisable

As part of the upcoming Riley County Flood Insurance Study and FIRMs update, the City of Manhattan contracted with AMEC Environment & Infrastructure to develop a flood model based on the Wildcat Creek watershed and Marlatt Ditch watershed being completely built out using the Manhattan Urban Area Comprehensive Plan's Future Land Use Map. This model was completed in the summer of 2012 and is planned to be shown on the FIRMs for reference and potentially for regulatory purposes. The model predicts what the width and depth of flood waters will be for a 1% Annual Chance Flood (commonly referred to as a 100-Year Flood) if currently vacant lands are developed as proposed on the Future Land Use Map. This information is valuable to residents, lenders, developers and public officials by representing what flooding could be in the future (10 – 15 years from now) and how new development and redeveloped areas should be designed to protect against flooding.

4.2.3 Tool: Flood Insurance.

Advisable

Both the City of Manhattan and Riley County are active participants in the National Flood Insurance Program (NFIP) by the Federal Emergency Management Agency (FEMA). Flood insurance is available to all property owners and tenants in participating communities, and in some cases is required for a federally-backed loan to be made. Both entities should continue their participation in the program as it provides the only affordable means of flood insurance for property owners and tenants that are in a mapped floodplain, as well as for those that are not in a mapped floodplain, but want the added protection.

4.2.3.a Tool: Community Rating System.

Advisable

The City of Manhattan has recently been accepted into the Community Rating System (CRS), a national program that evaluates a community's floodplain management efforts and rewards those efforts with reductions on National Flood Insurance premiums based on the community's floodplain management performance. There are four (4) floodplain management categories with nineteen (19) total activities where CRS communities can earn credit points towards flood insurance premium reductions. The Wildcat Creek Floodplain Management Plan, if formally adopted, can earn credits in CRS.

Other credits include higher standard floodplain regulations, public outreach, and floodplain document libraries. Several manuals on this are listed in the References section of this FMP, including the manual, Example Plans and Coordinator's Manual (FEMA).

4.2.4 Tool: Tax Adjustments.

Dependent on Location and Situation

One strategy to promote and provide open space along streams and within floodplains is to provide tax incentives to property owners who provide this dedicated open space. The purpose of open space is to provide an area along a stream that is free and clear of man-made obstructions so that flood waters can flow unobstructed as nature intended in these areas. A tax incentive program could provide a reduction of the property tax in exchange for the dedicated open area through conservation and drainage easements.

The majority of land along Wildcat Creek is privately owned, so this strategy tool may be effective. More research on this tool needs to be done to determine if there would be a substantial benefit to both the property owner and the community and what mechanisms need to be put into place to make an open space tax incentive program successful.

4.2.5 Tool: Emergency Relief.

Advisable

Following the latest flood events along Wildcat Creek and the wealth of research and information collected by the City, County, Kansas State University, State, and Federal agencies and community groups, emergency responders have been able to devise specific response and evacuation plans for flood events on Wildcat Creek. The United States Geological Survey (USGS) stream gauges and National Weather Service flood models should be invaluable in the event of a flood by providing advance warning that will allow emergency responders to act in a more timely and decisive fashion. As part of a Presidential Disaster Declaration, emergency relief funds and hazard mitigation grants are typically available to address property owner's needs after an event and to reduce or remove the impacts of hazards, such as purchasing property through FEMA's property acquisition hazard mitigation assistance program.

To participate in these Federal grant programs, the County's Multi-jurisdictional Hazard Mitigation Plan must be up to date and formally adopted. Riley County's Emergency Management Department is the entity in charge of the plan, with help from the City of Manhattan Fire Service, Riley County Emergency Medical Services, Riley County Police Department and other local and state agencies. This plan should be, at a minimum, updated as required to ensure these grants are available.

4.2.6 Tool: Post-Flood Recovery Processes.

Advisable

Unfortunately, the City of Manhattan and Riley County have been well versed in their roles and requirements in post-flood events along Wildcat Creek in recent years. Both the Manhattan building codes and the Manhattan and Riley County Floodplain Regulations require that homes and businesses impacted by flood waters be inspected to ensure they are habitable and meet all regulations and standards.

The City of Manhattan and Riley County will continue to inspect damaged homes after future flood events to ensure they comply with all regulations. In addition, both entities should, at a minimum, become a repository of post-flood disaster information on flood safety, clean up and mitigation options for home and business owners and encourage local businesses to become experts in these topics.

4.3 Strategy: Preserving and Restoring Floodplains' Environmental Quality

Generally Advisable

Floodways and floodplains function best when they are left in their natural state to move storm water out of an area, reduce erosion, and control sedimentation and water quality. Typical development patterns in the City, County, and across the country have been to manipulate floodplains to accommodate development. Where physically and financially possible, options should be reviewed to preserve natural floodplains and restore disturbed floodplain to its natural state.

4.3.1 Tool: Wetlands Protection and Restoration.

Dependent on Location

Wetlands play an important role in reducing sediment and other pollutants from entering a stream channel and can reduce flood waters in low intensity storms. The City and County have a number of known and mapped wetlands within the City limits and there are several within the Wildcat Creek watershed. Federal and State regulations dictate the protection, restoration and creation of wetlands. The continued protection of established wetlands in the City and Riley County is a priority of both entities.

Where feasible, the restoration of wetlands should be considered in mitigation measures along Wildcat Creek and its tributaries.

4.3.2 Tool: Erosion and Sediment Control.

Advisable

Sediment Control: The City of Manhattan and Riley County are required to follow the Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES), Phase II program to prevent polluted storm water runoff from entering U.S. water bodies. As part of NPDES, Phase II, the City and County require Notice of Intent Permits for construction projects that will disturb an acre or more of ground. The City also has adopted best management practices (BMPs) for construction projects to prevent sedimentation from construction sites from reaching the stormwater system and staffs a full-time employee to enforce the BMP construction requirements (City of Manhattan, 2012).

Riley County has recently adopted riparian buffer regulations that require specific buffer zones based on the order ranking of the stream (Riley County, 2011). Other agencies, such as the Riley County Conservation District, provide educational and technical support and possible funding sources to preserve natural resources in Riley County. The City has also adopted policies and procedures for post-construction BMPs, which through structural and non-structural measures, are intended to provide for long-term water quality improvement for individual lots and/or entire subdivisions (City of Manhattan, 2012).

Erosion Control: Erosion control is an ongoing problem on Wildcat Creek and its tributaries. The majority of the issues are on private property, where the City and County have limited abilities to assist with the correction of severe erosion. In instances where the City and County can participate to prevent or repair eroded stream banks, assistance should be given. This assistance can be in the form of sponsoring state and federal grants and projects. For instance, following the recent flooding events on Wildcat Creek, significant erosion of the stream bank has occurred near Garden Way. This erosion has threatened some apartment buildings in the area. With the assistance of property owners and the Natural Resources Conservation Service, a project was proposed to properly restore and stabilize the bank and protect the existing buildings. Unfortunately, this project was never implemented due to a variety of reasons.

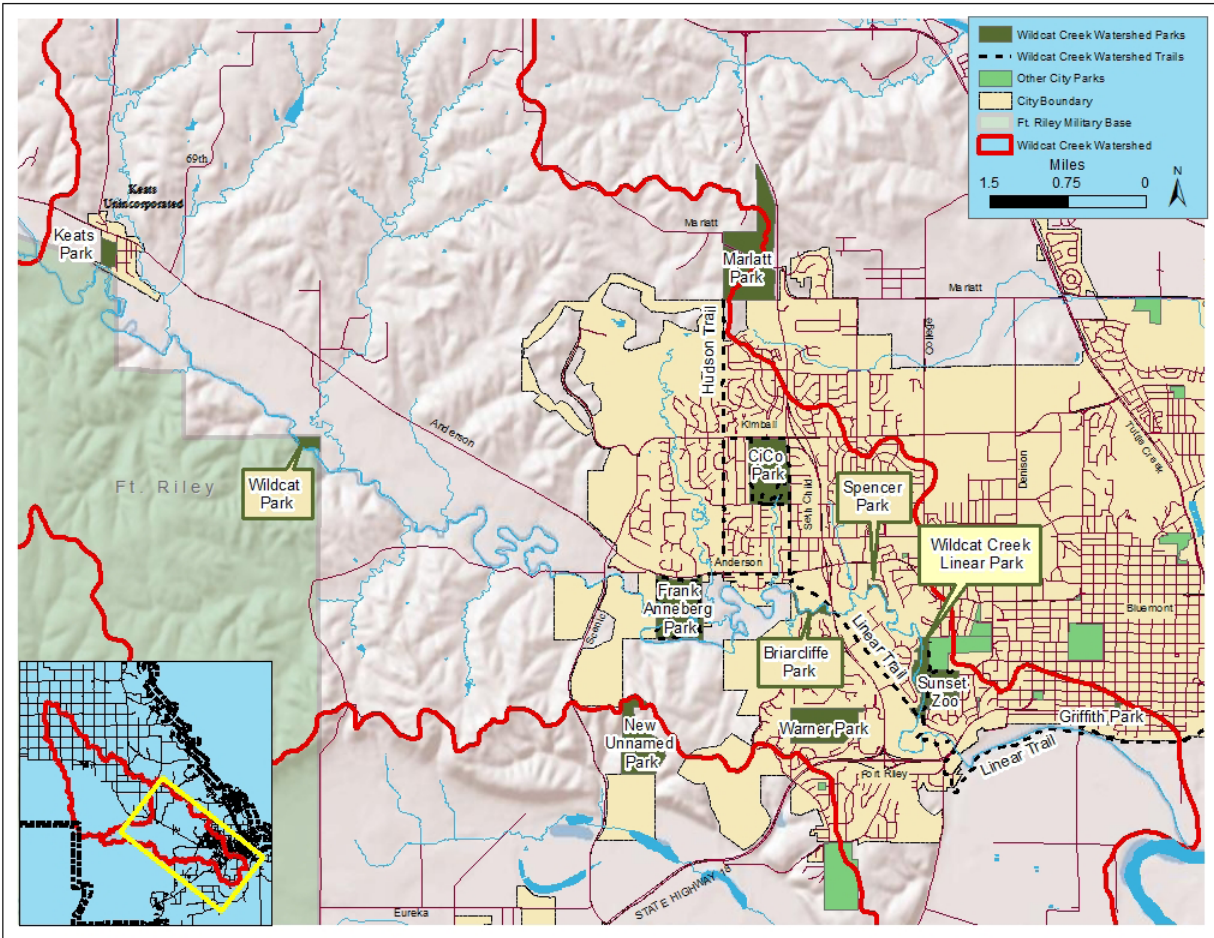


FIGURE 31. COMMUNITY PARK LOCATIONS.

For several reasons, significant erosion has also occurred along the CiCo Tributary. The City contracted with Olsson Associates to study the issues and develop solutions to stabilize the stream bank and to a lesser extent control flooding along the tributary. The study has been completed and a proposal has been designed over two phases to meet the objectives of the City and the property owners in the area. The final proposal includes stream stabilization projects along the stream south of Dickens Avenue and upstream detention basins in CiCo Park. The project is currently awaiting a funding source (Olsson Associates, 2012). The City and County should continue to participate in these types of programs and projects to protect existing homes and businesses. Riley County's riparian buffer regulations and the City's post-construction BMPs will also assist in preventing or slowing erosion problems.

4.3.3 Tool: Water Quality Enhancement.

Advisable

As described above in 4.3.2 Erosion and Sediment Control, the City, County and other agencies have plans, policies and regulations in place to begin addressing water quality issues. These items include pre- and post-construction BMPs and riparian buffer regulations. However, more can and should be done where feasible. A variety of local groups and organizations can be partnered with, to address both water quality issues and other environmental concerns along Wildcat Creek and in other parts of the City and County. These groups include classes and organizations at Kansas State University and the Wildcat Creek Watershed Council.

Collaboration projects, such as rain barrel giveaways and sales, which were recently done at Sunset Zoo, City Park Pavilion, Kansas State University Earth Day, 4-H Discovery Days at Kansas State University, and the Riley County Garden Show, can be accomplished. Professors and students at Kansas State University can assist government entities in developing educational programs and assist private property owners with technical assistance to address water quality concerns. More collaboration and cooperative endeavors should be explored to tackle these needs.

4.3.4 Tool: Enhancement of Recreation and Educational Opportunities.

Advisable

A variety of recreation amenities exist along Wildcat Creek, including the Linear Trail and Frank Anneberg Park within the City, and Keats Park in the County (see Figure 35). Currently, there is no direct connection via a recreation trail between these amenities. To date, no specific master plan has been created to study and expand on this concept, however an opportunity exists.

In the mid-1970's creek bottom land that is south of present day Washington Square, was dedicated to the City to extend a Wildcat Linear Trail. A portion of Wildcat Linear Trail exists west of Sunset Zoo - this appears to be the start of a concept to connect these recreation amenities together by extending and expanding the Linear Trail. This concept could be extended beyond the City limits to include Wildcat Park and Keats Park in Riley County, making this a regional park and trail network along Wildcat Creek.

The Manhattan Urban Area Comprehensive Plan, which was jointly developed and adopted by the City and Riley County in 2003, includes applicable policies in Chapter 5 – Natural Resources and Environment that promote the creation of trails and connected open space areas along riparian stream corridors including Wildcat Creek.

In addition to the expansion of recreation in the watershed, a regional trail and park network, if done correctly, could also be used to preserve more open space in the floodplains, which will assist in alleviating flooding downstream and improve erosion and water quality. This concept could also include an educational component to describe a variety of functions and topics related to natural and cultural resources found in the Wildcat Creek watershed. Much of the land along the creek is privately owned. A joint venture between the City and County will most likely be needed to study the preferred route, purchase easements and property. A funding source will need to be established to make this trail network a reality.

4.3.5 Tool: Preservation of Cultural Resources.

Advisable

The Wildcat Creek watershed holds a plethora of cultural resources. Artifacts from prehistoric nomadic tribes, American Indian tribes, the establishment of Fort Riley Military Reservation, and early settlers can be found in the watershed. The watershed also contains an excellent example of today's agrarian lifestyle characteristic of the Flint Hills. The City of Manhattan and Manhattan Historic Resources Board, in conjunction with the State Historic Preservation Office, Riley County Historical Society and the History Department at Kansas State University have done both a Phase I and Phase II archaeological resource study for the area within the boundaries of the Manhattan Urban Area Comprehensive Plan, including much of the Wildcat Creek watershed.



FIGURE 32. WILDCAT CREEK FLOOD STRUCTURE.



FIGURE 33. PHOTO OF SILT FENCE.

Advisable

On March 1, 2009, an update to the City of Manhattan's Design and Construction Standard Specifications and Policies was adopted that made changes to the Stormwater Detention Requirements. The updated requirements are summarized as follows:

The stormwater detention requirement has changed for the post development condition on new subdivisions and infill projects that are 0.5 acres or larger. Previously the Stormwater Management Master Plan (SWMMP) established maximum allowable release rates on page 19 for the 2 year, 10 year and 100 year storm events on a per acreage basis. The new criteria for both new subdivisions and infill developments shall provide stormwater detention on site and the post-development condition shall have stormwater release rates equal to or less than the pre-developed condition. Developers should continue to have licensed professional engineers prepare drainage studies on all new developments and infill projects to determine the impact and mitigating methods to keep post developed conditions for the 2 year, 10 year, and 100 year storm equal to or less than the pre-developed condition.

This requirement has been implemented in new developments and redevelopment areas where it is appropriate, such as the upper reaches of a watershed.

Because of pressure from urban growth, a large portion of the Wildcat Creek watershed was the focus of pedestrian surveys during the phase II project, which meant that, when available, researchers systematically walked and surveyed targeted areas in the watershed for potential archaeological artifacts and sites to be identified for future studies. As structural projects are proposed that are related to this Floodplain Management Plan, these cultural resources must be considered and protected when discovered.

4.4 Strategy: Modifying Floodwaters

Where appropriate, storm waters may be modified to mitigate impact on private and public property. This can be in the form of man-made structures to slow runoff, and block or redirect flood waters. These strategies tend to be more costly, when compared to other strategies, due to the cost of land acquisition, design and construction of the facilities and on-going maintenance. Likewise, these strategies can never ensure that the risk of flooding is eliminated. Dams, levees and detention basins can be designed improperly and fail, have a finite lifespan and, due to an intense storm event in the "wrong" location in the watershed may be ineffective in preventing flooding. Careful consideration must be made regarding the feasibility, value, maintenance costs and reliability of each of these strategies.

4.4.1 Tool: Stormwater Detention and Retention Basins.



National Flood Insurance Program
**Nothing Could
 Dampen the Joy of
 Home Ownership . . .**



FEMA

FIGURE 34. FEMA FLOOD INSURANCE BROCHURE.

A detention structure would typically be inappropriate near a stream and/or in the floodplain. Examples of recent detention basins are those found in the Grand Mere Development in the Little Kitten Creek watershed and the Westport Commons development at the intersection of Claflin Road and Browning Avenue in the Virginia-Nevada Tributary. These new basins have significantly reduced the rate of runoff from these developments and the surrounding areas to the point that they have lessened the base flood elevation and shrunk the mapped floodplain boundaries below these basins when comparing the preliminary flood study to the current flood study for Riley County. In addition to requiring detention basins where they are appropriate, the City of Manhattan has also implemented the practice of requiring restrictive covenants on the property to identify who will own and maintain the basins and what measures will be taken by the City in the event that a detention basin is not maintained. These measures can include the City doing the required maintenance of the detention basin and assessing the property for the cost of the work. This policy should be continued within the City. A similar policy is encouraged to be adopted in rural Riley County to reduce the rate of runoff from new developments that could flow into Wildcat Creek and affect properties downstream, including the urban areas of Manhattan.

4.4.1.a Tool: Additional Stormwater Policies

An additional or supplemental policy could be to require fee-in-lieu payments, or off-site improvements for new developments or redevelopment areas that are not appropriate for on site detention. Detention basins are best used in the middle to upper reaches of a watershed where they can slow the rate of runoff from an area before it reaches a stream.

If designed properly, these basins should lessen the impacts of a flood by reducing the amount of peak flows in a flood. A detention basin located in a floodplain or close to the receiving body in the watershed is typically not appropriate because it can hold back flood waters and release the water at a time when flood waters from upstream reach the area. This can worsen a flood event by "stacking" the water released from a detention basin onto the peak flood waters, making the flood event deeper, longer lasting and more significant.

By requiring a fee-in-lieu payment for development in areas not appropriate for stormwater detention or retention basins, the developer would pay the City and/or County the equivalent of what it would cost to construct the basin. The funds generated in this manner could then be used to construct new basins and other stormwater improvements within the community or a specific watershed or improve existing stormwater infrastructure.

4.4.2 Tool: Levees, Floodwalls, and Landforms.

Dependent on Location

A levee, floodwall or other landforms could be constructed along Wildcat Creek to protect private property from flood waters. A few of these structures exist on Wildcat Creek at the Deer Run Addition, Pebblebrook Apartment Complex, and the Stone Pointe Apartments. The majority of property along Wildcat Creek is privately owned, so the public sector currently does not have the ability to construct a major levee system in this area. In addition to this restriction, constructing these kinds of structures takes a considerable amount of funding, engineering, land and construction expertise to ensure that a failure of this kind of protective structure would not occur during a flood event. These requirements may make the improvements cost prohibitive. If private property owners would like to undertake such a structure to mitigate flood waters along Wildcat Creek, all local, state and federal regulations and permit requirements must be followed. The structure should be designed appropriately and constructed accurately to prevent damage to adjacent and downstream property owners and failure during a flood event. It should be noted that structural solutions are not always the best tool to address reduction of flood risk and there can be unforeseen and unintended consequences that cost more in the long run.

4.4.3 Tool: Channel Alterations, Diversions, and Bypasses.

Not Advisable

Ideally, floodplains should be maintained without any channel alterations to mitigate the effects of flood waters. Only in extreme cases are channel alterations or diversions used to protect a community. This type of mitigation measure is extremely costly, a massive public undertaking and only done in circumstances where the surrounding terrain would make this a possibility. **Altering the channel of Wildcat Creek is not advisable.** In limited situations, improvements or alterations to the channel may be appropriate when associated with stream bank stabilizations and restorations, such as the work that has been done along the creek in Washington Square, near Pecan Circle and the proposed restoration project near Garden Way.

4.4.4 Tool: Pump Stations.

Not Advisable

Pump stations are stormwater sewer system improvements that are generally found on the land side of a levee or floodwall that are used to pump ponding stormwater up and over the flood protective structure during flood stage events, when storm water would not be otherwise released into the stream. **Pump stations are not an adequate improvement to the stormwater sewer system to mitigate flooding on Wildcat Creek** for the following reasons:

1. There are no levees along Wildcat Creek. The old Rock Island Rail Road track bed, now the Linear Trail, functions as a levee, but was not designed as such and does not meet current preventative standards. A few walls that act as floodwalls have been constructed on private property along the creek, but it is indeterminable if they were designed to function as such.
2. The flood characteristics are extremely “flashy”, with flood waters recently rising and receding within 8 hours. Pump stations are ideally used when flood waters are present for several days or weeks on a levee or floodwall and other means of draining stormwater on the land side of the protective structure cannot occur.

5.0 Action Plan

This is the very heart of the floodplain management plan (FMP). The action plan is a blueprint for implementation of the FMP. This action plan is based on the recommendations developed throughout the FMP process, as presented in the earlier sections of this FMP. Possible strategies and tools of the action plan were evaluated for their relationship to the FMP's goals and objectives (Section 3.0) and their feasibility to be completed.

Riley County and City of Manhattan professional staff developed the following detailed action plan for the implementation of the community's selected measures, and their schedule for implementation. Of great importance is establishing a funding source that will allow the community to pay for the level of effort necessary to administer this floodplain management plan. Following the development of the Action Plan, discussion of how to fund these items through existing utility funds or through the capital improvement program must be done. Without a sustainable and dedicated funding source, the FMP will fail to achieve the identified goals and reduction of flood risk within the Wildcat Creek watershed will be less likely.

5.1 Action Items

An overview of FMP action items for the City and County are presented in this section. Detailed descriptions of the Action Items are found in Section 5.2.

Table 3, below, is a summary of the Action Items for the first two years.

5.2 Description of Action Items

This section provides detailed explanation of the FMP action items.

5.2.1 Adoption of the Wildcat Creek Floodplain Management Plan.

The Wildcat Creek Floodplain Management Plan is the culmination of over a year of participation and work by the Wildcat Creek Watershed Working Group, concerned citizens, City and County staff members and Federal and State partners. The FMP documents these efforts and creates an action plan to implement strategies and tools to promote mitigation of flooding along Wildcat Creek. To strengthen the resolve of this plan, a public approval process was conducted. The public participation process should ultimately conclude with both governing bodies amending the Manhattan Urban Area Comprehensive Plan and the Riley County Vision 2025 Comprehensive Plan to reference the document. The Floodplain Management Plan may also serve as the key guidance document for a watershed authority, as necessary per Kansas statutes. This would facilitate communication between the City, County, and the watershed authority, if pursued under a separate action item. This process should begin immediately and is anticipated to be completed within three (3) months.

5.2.2 Establish a City and County Development Coordination Process.

The Wildcat Creek watershed covers over 99 square miles of Riley County. Development within the watershed can affect both City and rural County residents and business owners alike. Professional staff members from both entities, and possibly Fort Riley Military Base, when applicable, should form an informal technical working group to discuss development plans occurring within the watershed and how the development may impact the dynamics of the floodplain. This group is informal in nature and is in no way intended to replace the work of the respective Planning Boards or Governing Bodies, but rather have planning and engineering employees who can comment on issues and work in a coordinated effort to address them. Staff members who would be included in these informal discussions would be planners, floodplain managers, city and county engineers and stormwater engineers. The process to create the coordination of reviewing development within the watershed should begin immediately and is anticipated to be completed within three (3) months; however once created, it should be a permanent avenue promoting communication and coordination.

TABLE 9. ACTION ITEMS, GOALS, AND RECOMMENDATIONS.

Action Item	Goal: Collaborative Approach	Goal: Manage & Reduce Flood Risks	Goal: Protect & Preserve Riparian Corridor	Goal: Balance Development Needs & Floodplain Function	Goal: Improve Public Understanding of Flood Risks	City	County	Timeline
Adopt the Wildcat Creek Floodplain Management Plan (FMP)	X					X	X	3 months
Create a City/County Development Coordination Process	X	X	X	X		X	X	3 months
Amend the Mult-Jurisdictional Hazard Mitigation Plan to include the FMP	X	X		X			X	6 - 12 months
Research and, if acceptable, form a Wildcat Creek Watershed District	X	X	X	X			X	2+ years
Develop a comprehensive flood hazard mitigation plan	X	X	X	X		X	X	2+ years
Adopt Future Conditions model and Flood Insurance Rate Maps		X	X	X		X	X	1 year
Research and adopt higher standard floodplain regulations		X	X	X		X	X	1 year
Develop a Wildcat Creek recreation plan	X	X	X		X	X	X	12 - 18 months
Develop a comprehensive public outreach plan	X	X			X	X	X	12 months
Research and update, where needed development policies and regulations		X	X	X		X	X	12 months
Adopt stormwater detention/retention policies							X	12 - 18 months
Join the Community Rating System		X	X	X	X	X	X	12 - 18 months
Maintain and expand the existing flood warning systems		X			X	X	X	On-going

5.2.3 Amend the Riley County Multi-Jurisdictional Hazard Mitigation Plan to include the Wildcat Creek Floodplain Management Plan.

The Board of County Commissioners may incorporate amendments to the Riley County Multi-Jurisdictional Hazard Mitigation Plan during the yearly plan review. Section 5.0 of that plan, which covers the mitigation strategies, should be updated to reference the Wildcat Creek Floodplain Management Plan.

Also, the Riley County Multi-Jurisdictional Hazard Mitigation Plan, Section 4.4.2, provides Jurisdiction Profiles for the community. The flood hazard profiles developed by AMEC in 2012 should be added to enhance the understanding of flood risks. These types of updates will be creditable actions in the FEMA Community Rating System and/or contribute to eligibility for FEMA's Hazard Mitigation Grant Program funding. Because of the timing of the annual review, which is typically the ideal time to amend the plan, this action item is anticipated to be completed in six (6) to twelve (12) months.

5.2.4 Research and, if Acceptable to a Majority of the Residents Within the Proposed District's Boundaries, Form a Wildcat Creek Drainage District or Watershed District.

A sub-committee of the Wildcat Creek Working Group was the Detention and Watershed Committee. This committee focused their efforts on the practicalities of creating a watershed district or drainage district for the Wildcat Creek watershed to help address the current and future flooding issues. Both district types offer extensive powers to manage flooding and water quality issues that are overseen by an elected Board of Directors. These powers include the ability to levy property taxes, issue bonds, condemn land for purposes of the district and construct infrastructure to prevent and mitigate flood damages on properties within the district, and sue and be sued for damages.

One distinction between a drainage district and watershed district is the set boundaries of the two. A drainage district is a defined boundary that is described by the petition filed with the Board of County Commissioners during its creation. A watershed district's boundary is defined as "all of the area within the state draining towards a selected point on any watercourse, stream, lake or depression." (Holeman, 11-17-11). Additional general information regarding drainage districts and watershed districts can be found in a document presented to the Riley County Board of County Commissioners and the Wildcat Creek Watershed Working Group by Clancy Holeman, Riley County Counselor (see Appendix 5.1).

The mechanism for creation of a drainage district generally involves action by the Board of County Commissioners, following a petition to the Board of County Commissioners by residents within the proposed district or, exclusively for a watershed district, creation by the Chief Engineer of the State of Kansas following a petition from residents within the watershed desiring the watershed district. Although the final decision to form a drainage district lies with the Board of County Commissioners, either type of district's actions will likely affect all residents within the Wildcat Creek watershed. If a majority of the residents within the boundaries of any proposed drainage or watershed district are unwilling to tax themselves, through their elected board of directors, that district will be unable to fund major projects.

Because of this, the topic needs to be well-researched and discussed with a majority of the residents of any proposed district. Although Riley County may lawfully create a watershed district by resolution, without a petition from proposed district residents, county staff has recommended to the WCWWG that no such district be created without first obtaining consensus from a majority of the residents within such proposed district. This action item may take longer than two (2) years.

5.2.5 Develop a Comprehensive Flood Hazard Mitigation Plan.

A wide variety of structural solutions are available to Riley County and the City of Manhattan to reduce the risk of flooding along Wildcat Creek. The range of structural solutions includes:

- Detention basins located in the upper reaches of tributaries to Wildcat Creek to the west of the City.
- Added or enlarged stormwater infrastructure, such as stormwater sewers, culverts and swales to divert stormwater runoff.

- Flood-proofing of existing structures to reduce damages from flooding.
- Purchasing and removing structures that are at high risk of repetitive flooding to create additional open space that should improve the stream's functionality.
- Stream bank improvements to minimize or prevent significant erosion.
- Stream channel restoration to improve river functions.

To adequately address the flooding problems of Wildcat Creek through structural improvements, a joint, comprehensive approach with the City and County should be made. The plan would be determined on a watershed and sub-watershed basis to develop a mitigation plan through structural improvements with priorities and identify funding sources. By evaluating and implementing improvements to the stormwater sewer system in urban and rural areas, reduction of flood risks may be realized.

There are recent examples of cooperation between the two entities to address flooding in Wildcat Creek and in other watersheds around the City. These include maintenance and improvements to existing ditches along Scenic Drive leading to Wildcat Creek, improvements to the stormwater sewer system in the Tecumseh/Quivera Tributary and improvements to the Eureka Valley Tributary associated with the Kansas Department of Transportation project along K-18.

Because of the complexity, this action item could take two (2) or more years to complete.

5.2.6 Adopt the Wildcat Creek Future Conditions Flood Model and Flood Insurance Rate Maps.

As explained in Section 4.2.2, the City of Manhattan contracted with AMEC Environment & Infrastructure to develop a flood model based on the Wildcat Creek watershed being completely built out based on the Manhattan Urban Area Comprehensive Plan's Future Land Use Map. This information will be valuable to residents, developers, lenders and public officials by more accurately depicting what flooding could be in the future (10 – 15 years from now) and how new development and redeveloped areas should be designed to protect against flood dangers and to reduce future risks.

The AMEC floodplain model will also be valuable in developing regulations based on the future 1% annual chance flood. Regulating new and redeveloped properties with the future conditions floodplain and base flood elevations will decrease the level of risk of flooding that the property owners will face. The description of adopting higher standard floodplain regulations is further discussed in 5.2.7.

It is anticipated that adoption of the future conditions flood model and FIRMs will be done sometime in 2014 in conjunction with the adoption of the updated FEMA mapping products created by the Kansas Division of Water Resources and AMEC.

5.2.7 Research and Adopt Higher Standard Floodplain Regulations.

Section 4.1.1 lists a number of broad higher standard floodplain regulation concepts that can be considered and adopted that would allow development within floodplains under certain conditions, while providing for lower risk of flooding and reduce or eliminate the impacts on adjacent properties up or downstream of the development.

The City of Manhattan and Riley County should consider creating and adopting these regulations jointly to establish a uniform development pattern with seamless regulations in the floodplains. This will reduce confusion for property owners and developers and would avoid nonconforming issues for any structures on property being annexed into the City of Manhattan. Ideally, these regulations would be adopted with the new Riley County Flood Insurance Study, Flood Insurance Rate Maps and the AMEC Future Conditions study, which is anticipated to occur in 2014.

5.2.8 Develop a Wildcat Creek Recreation Plan.

As described in Section 4.3.4., by expanding upon existing facilities, opportunities are available to develop a recreation corridor along Wildcat Creek that could protect the riparian corridor, help maintain the floodway and floodplain as open space, improve quality of life in Riley County and possibly create educational programs and products.

The City of Manhattan and Riley County should jointly develop a recreation plan to create such a corridor. Because of the complexity of such a master plan, the anticipated time line is at least two (2) or more years.

5.2.9 Develop a Comprehensive Public Outreach Plan.

There is an extensive amount of information that property owners and tenants in or near a floodplain should know before, during and after a flood event. The City and County can be a valuable clearing house for this information. Through traditional public information channels and newer channels, such as social media and mobile applications, the following information should be disseminated:

- National Flood Insurance Program (NFIP) information and requirements.
- Local Floodplain Regulations.
- Information and guidelines for developing in the floodplain.
- General flood risks for the community.
- Specific flood risks for areas of the City.
- Emergency preparedness information.
- Emergency evacuation information.
- Post-flood disaster recovery information.

Through a comprehensive public outreach plan, these topics can be better disseminated to the public. A comprehensive public outreach plan can also earn Community Rating System credits, which may decrease NFIP premiums. The action item should be created within twelve (12) months, then continually maintained, reviewed and refined to provide residents and property owners with information about flood risks.

5.2.10 Research and Update, Where Needed, Development Policies and Regulations.

The City of Manhattan and Riley County have a number of stormwater policies in place to reduce the risk of flooding. These policies should continually be reviewed and researched to ensure that the policies are meeting the community's objectives to reduce flood risks and manage stormwater.

One such rule that may benefit both the City and County is to create a fee-in-lieu payment policy for developments in the floodplain that would otherwise require stormwater detention. Strategy 4.4.1.a explains the logic behind not requiring detention facilities in areas in or in proximity to the floodplain and the benefits of a fee-in-lieu policy.

Other policies worth reviewing and researching are stormwater runoff prevention, sediment and erosion control, water quality, wetland protection and green infrastructure (open space requirements), and stormwater harvesting. Both entities should review and research existing and new policies. Because of the breadth of this topic, this action item may take up to two (2) years to complete.

5.2.11 Adopt Stormwater Detention/Retention Policies.

Strategy 4.4.1 details the current City of Manhattan stormwater detention policy. In summary, for new and redevelopment projects over 0.5 acres in area, stormwater detention facilities are required to be installed to reduce the rate of runoff that is equal to or less than before the development project. Although the amount of stormwater generally increases with the addition of new buildings and other impervious surfaces, it is released slowly over time, reducing the peak flow of stormwater runoff.

Since a majority of the Wildcat Creek watershed is in rural Riley County and is upstream of the major urban center of Manhattan, County officials should consider a similar policy and requirements for residential, commercial and industrial developments in this area.

5.2.12 Join the Community Rating System.

The Community Rating System (CRS) is outlined in Strategy 4.2.3.a. The City of Manhattan has been accepted into CRS. Formal acceptance into the program was in May, 2013. The City has initially reached a Class 8, which equates to a 10% reduction in flood insurance premiums for property owners in the floodplain. The City should continue its participation in the program and work to earn more activity credits through higher regulatory standards, more public outreach and expanding the flood warning system.

Riley County is also actively pursuing an application for participation in the CRS program. If accepted, Riley County could earn enough credit points to enter the program and provide a 5% reduction in flood insurance premiums. The typical application process takes twelve to eighteen (12 - 18) months.

5.2.13 Maintain and Expand the Existing Flood Warning Systems.

Riley County and Manhattan have put into place a number of flood warning systems to alert residents of impending flooding, both for Wildcat Creek and the community at large, such as IRIS and existing flood warning signs. Strategy 4.1.2 outlines a number of current systems in place to alert residents of flood warnings and other natural disaster warnings.

New and innovative ways to inform and alert residents of flooding and other emergencies should be considered. The use of media that are different than the traditional sirens and warning lights, such as social media outlets and mobile applications should be researched and considered, particularly given the high percentage of young, transient residents in the area associated with Fort Riley and Kansas State University.

Both entities should continue their support for established emergency warning systems and look for ways to expand the system to alert as many residents as possible to flooding and other emergencies. This action item should be ongoing.

5.3 Monitor, Evaluation and Changes to the Floodplain Management Plan.

The City of Manhattan Community Development Department, in partnership with the Riley County Planning and Development Department will initiate an annual review of the Wildcat Creek Floodplain Management Plan with technical staff members who will monitor and evaluate activities related to the master plan's action plan.

The annual review will discuss effectiveness of the following items and provide any recommendations or changes:

- Adopted policies and regulations.
- Public outreach projects conducted and what products were produced.
- Infrastructure improvements completed.

An annual report, outlining discussion and identifying issues by technical staff members, will be made to the respective Planning Boards and, if necessary, to the governing bodies.

Substantial changes to the action plan or other parts of the Floodplain Management Plan will be made through a formal public hearing process, similar to amending the Comprehensive Plan for the City or County.

Every five (5) years following the initial adoption of the Wildcat Creek Floodplain Management Plan, a formal review and update will be conducted to include changes in the watershed, risk assessment and needed updates to the strategies, tools and action plan.

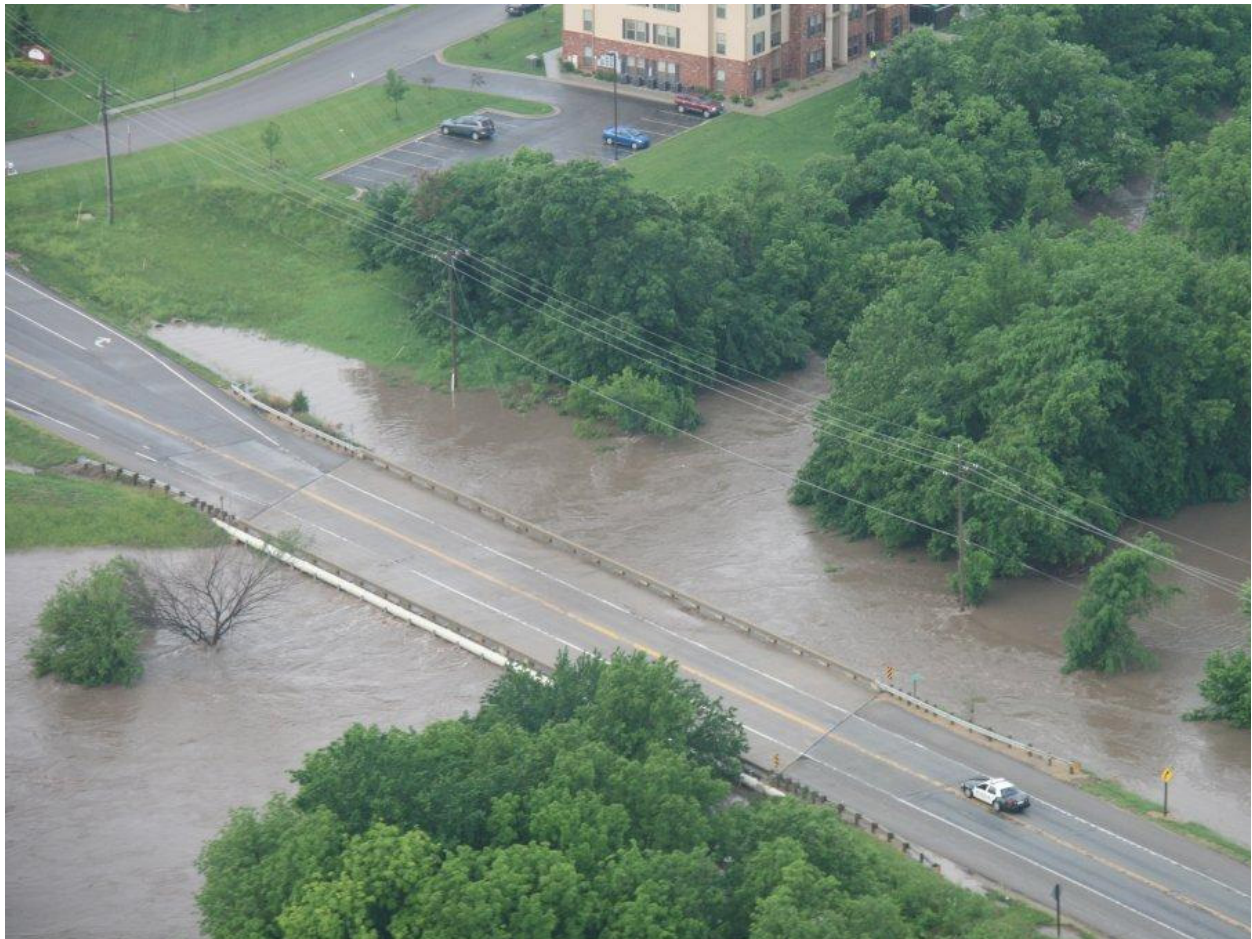


FIGURE 35. JUNE 16, 2010 FLOOD AT SCENIC DRIVE BRIDGE.

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Many thanks to those that have contributed, in the sources shown below, to the communities' shared mission of managing Wildcat Creek's flood risks.

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7.0 Definitions

The following words help to unify the communities and provide consistency in conducting the work associated with this living document.

Alternative - a collection of measures that are associated by project site to address a mission; synonymous with plan.

Best Management Practices (BMPs) - measures intended to provide an on-the-ground, practical solution to diffuse pollution problems from all sources and sectors. They are technology and education based requirements in federal stormwater regulations that call for the implementation of controls to reduce the discharge of pollutants to the maximum extent practicable in municipal stormwater systems.

Comprehensive Plan - A planning document to determine a community's goals and aspirations of how future development will occur. The comprehensive plan dictates public policy for housing, land use, recreation, transportation, and utilities. The United States Army Corps of Engineers defines a comprehensive plan as a plan including recommendations for new and operating projects, primarily for USACE implementation, but in coordination with other agency efforts, and focusing on one or more USACE mission areas in Civil Works.

Dynamic Modeling - a framework, consisting of a language and a set of key concepts. These are embedded in a process for representing, understanding, explaining, and improving, specifically how dynamic systems are put together and how they perform over time.

Geographic Information Systems (GIS) - a database of points, lines, shapes, and a set of attributes that are geospatially referenced and enable quality communication of the interrelationships of the data via visual aids, such as maps.

Ecosystem Restoration - the practice of restoring degraded significant ecosystem structure function and dynamic processes to a less degraded more natural condition; to improve or re-establish structural components and functions of natural areas; to mimic as closely as possible conditions which would occur in the area in the absence of human changes to landscape and hydrology.

Feasibility Study - for the Corps of Engineers, this is a study lasting less than three years, when adequately funded, and uses specific six step planning process to form projects composed of alternatives that are acceptable to the locals and the federal government to solve a problem. Also synonymous with Feasibility Planning Study.

Flood Risk Management - the shared practice among local communities, state and federal agencies of flood damage reduction that includes and extends beyond structural measures to include the proper management of all parts of watersheds to address flooding, to address opportunities for wider, shared, programmatic approaches and multi-purpose flood damage reduction projects, and to better clarify the level of risk associated with flood damage reduction measures.

Low-Impact Development (LID) - a site design strategy with the goal of maintaining or replicating or minimizing the change in the pre-development stormwater runoff conditions to create a functionally equivalent hydrological landscape.

Measures - features (structural measures) or activities (non-structural measures) that can be implemented at a specific site to address one or more objective or goal;

Model - a method, often including a set of computer program code, which allows the user to simulate a system.

Multipurpose - the ability to use several purposes to strengthen benefits that are used to justify a project; taking advantage of opportunities to include several functions as part of the goal of one project and improve efficiency in spending construction funds and meeting goals of a systems approach; the combination two or more of the following: flood risk management, ecosystem restoration, and recreation mission areas.

Non-Structural Measures - measures that do not include physical or constructed components but rely sole on policies, maintenance practices, or management activities.

Risk Communication - integrating effective communication of risk and reliability concepts, alternatives levels of risk, and the associated consequences to the public and other stakeholders.

Shared Vision Planning - a process that incorporates collaboration among stakeholders, sound technical analysis, and planning principles into a practical forum in which resource management decisions are made. Integrates a planning process, public participation, and a technical systems model.

Sponsor - an entity that participates in funding a project.

Stakeholders - those that have a stake in the outcome of a project; those that can provide vital input on issues that affect data, and possible alternatives.

Structural Measures - measures that include physical alterations or constructed components as part of an alternative or plan.

System - a whole compounded of several parts, where an understanding of the complexities of the entirety presents benefits to those that are part of the system.

Systems Approach - a method for framing a problem considering space, time, and function.

Systems Problems - problems with the characteristics of being dynamic, changing over time; including multiple players and/or diverse interests; having interdependencies across borders and/or disciplines; and being difficult to communicate.

Water Quality - a measure of the suitability of water for specific uses based on chemical, biological and physical characteristics. These characteristics are compared to standards and guidelines to determine if the water meets designated uses. Water quality is affected by both natural process as well as human activities, and a healthy environment supports a diverse community of organisms and protects public health.

Watershed - the area that drains rainfall to a common point along a stream or river. Synonymous with basin.

Watershed Management Plan - a document that presents a watershed's vision and goals, beyond the focus of quantity of stormwater to both quantity and quality; also presenting the actions and policies, and the order or timing for the actions that result from a watershed planning effort. The plan details who will do what over a definite or indefinite time frame.

Watershed Master Plan - a document that presents to a community the results of study that may or may not have truly included the entire watershed. The document typically includes a list of prioritized projects, where prioritization and project formulation often did not include a systems approach or a watershed approach and is usually limited to the confines a political boundary.

Watershed Study - a study to plan a better way to manage water resources in a watershed and includes a comprehensive watershed assessment, which has a significant amount of data; data often used in a management process developed in a watershed management plan.

8.0 Appendices

The following appendices accompany the **Wildcat Creek Floodplain Management Plan**.

Appendix 1: Maps

Appendix 2: Fort Riley Memo

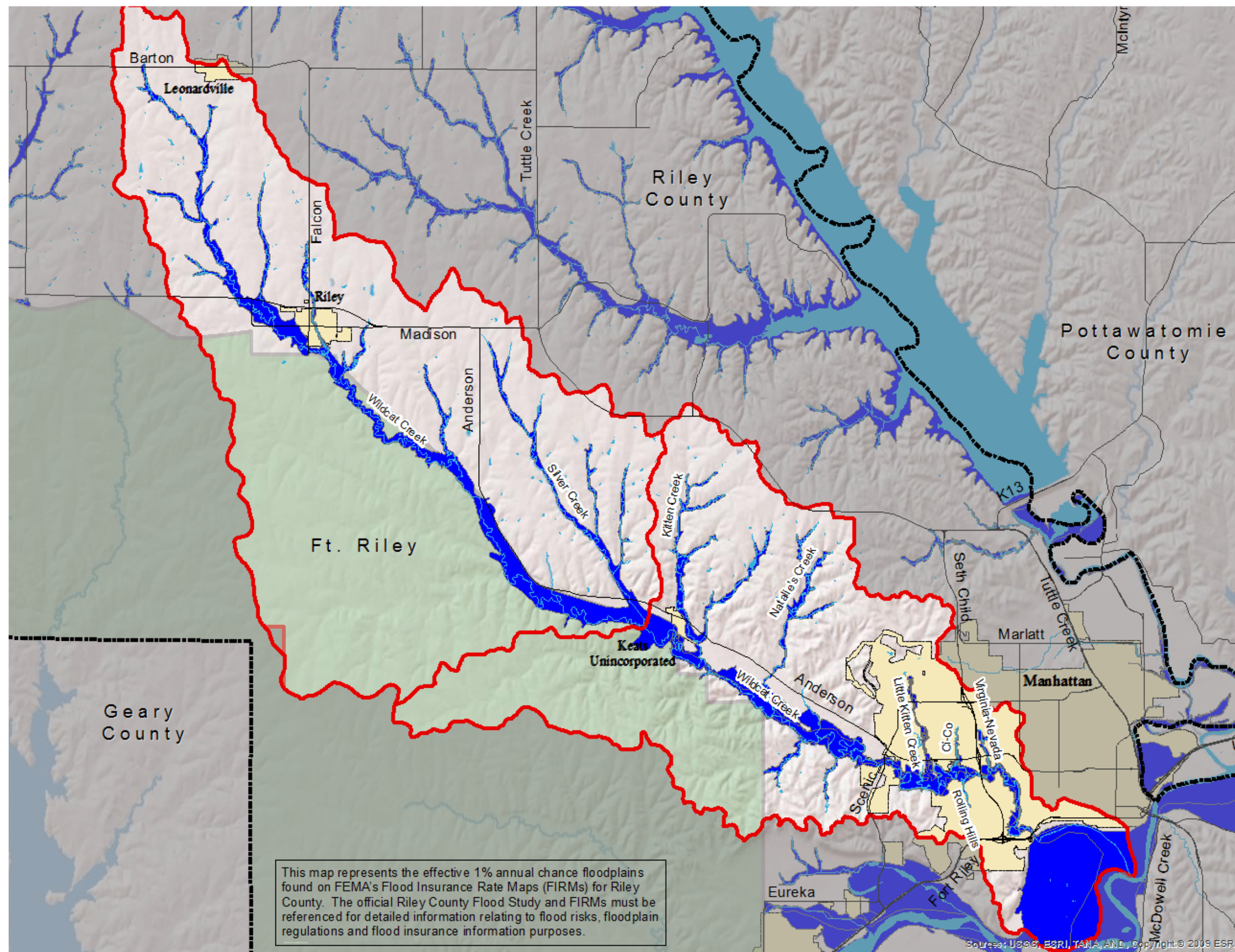
Appendix 3: Holeman Memo

Appendix 4: City Ordinance

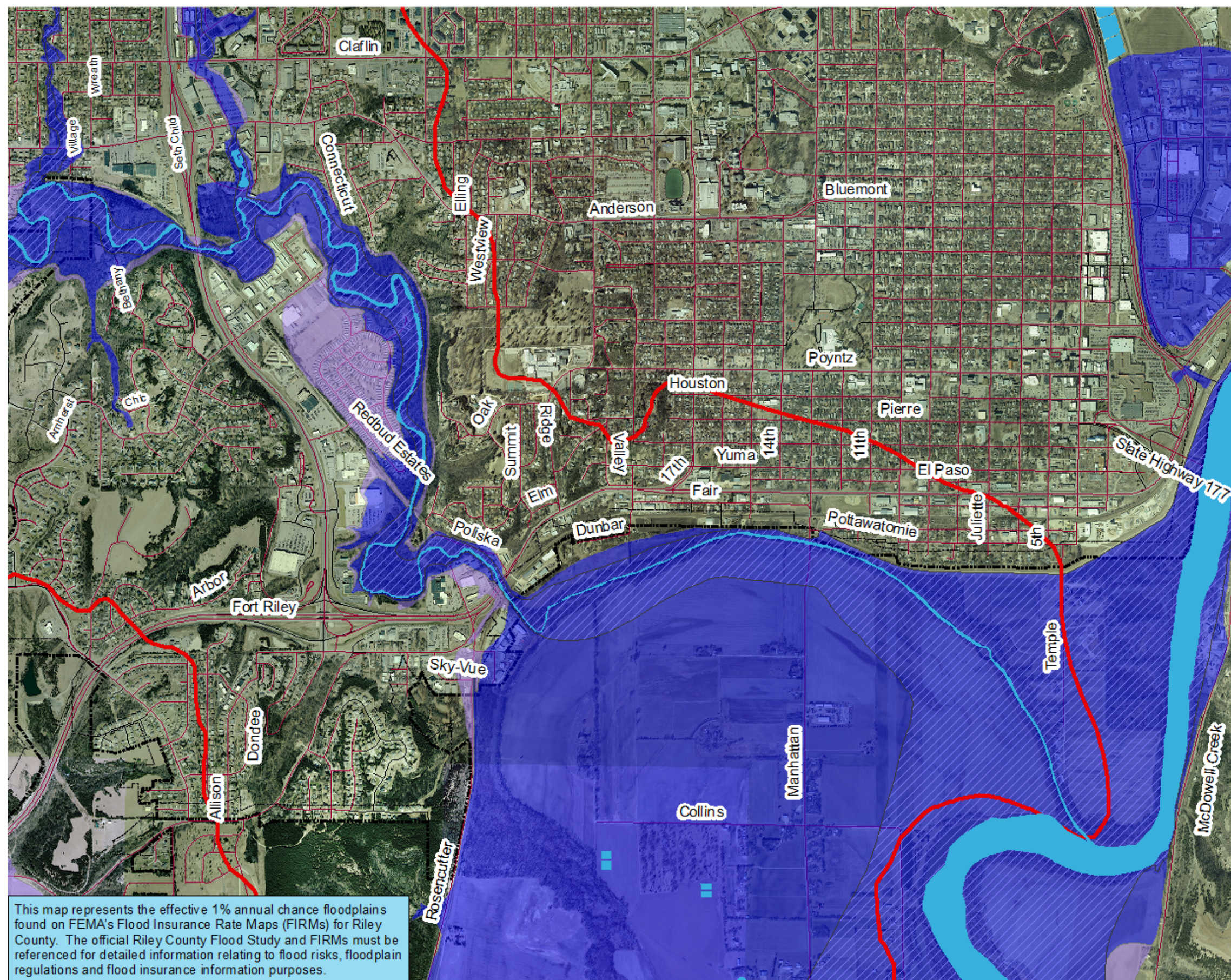
Appendix 5: County Resolution

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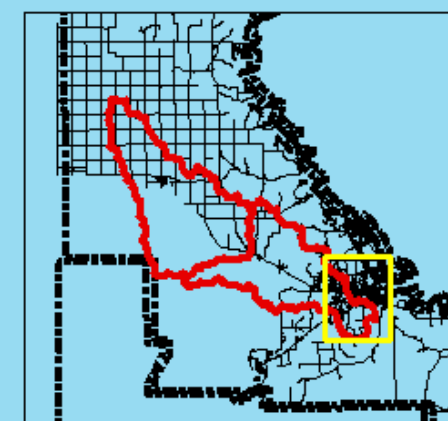
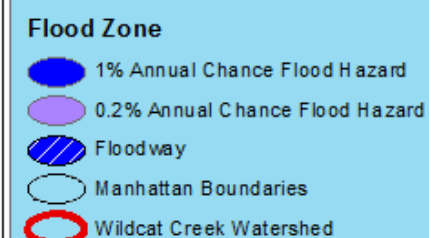
Wildcat Creek Watershed Mapped Flood Risks Appendix 2.1

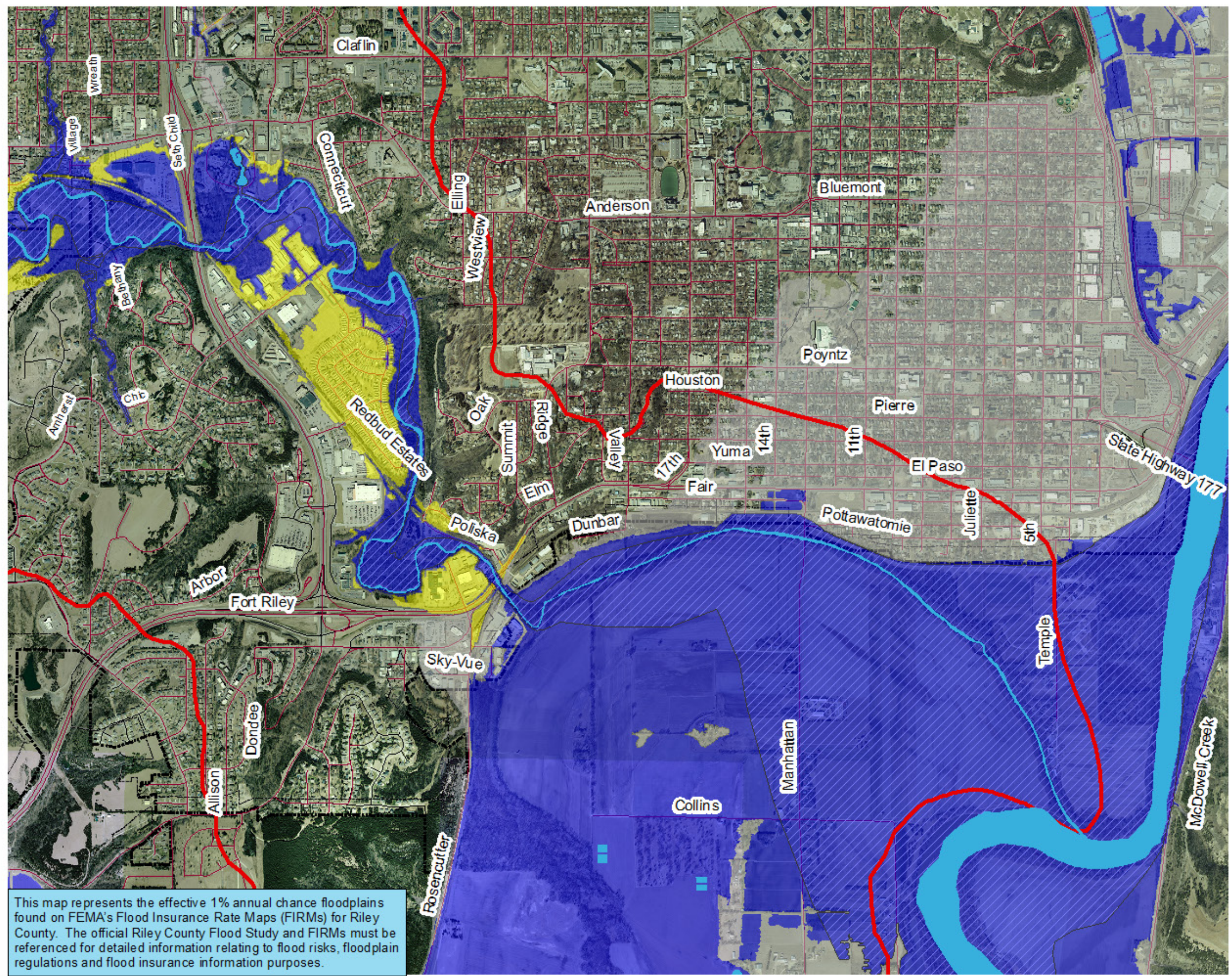


Sources: USGS, ESRI, TANA, AND, Copyright © 2009 ESRI



Wildcat Creek Effective Floodplains Kansas River to Seth Child Road Appendix 2.1.1.a

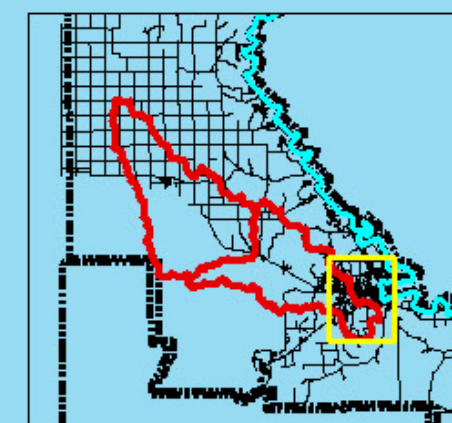
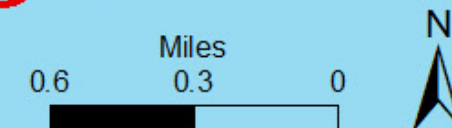


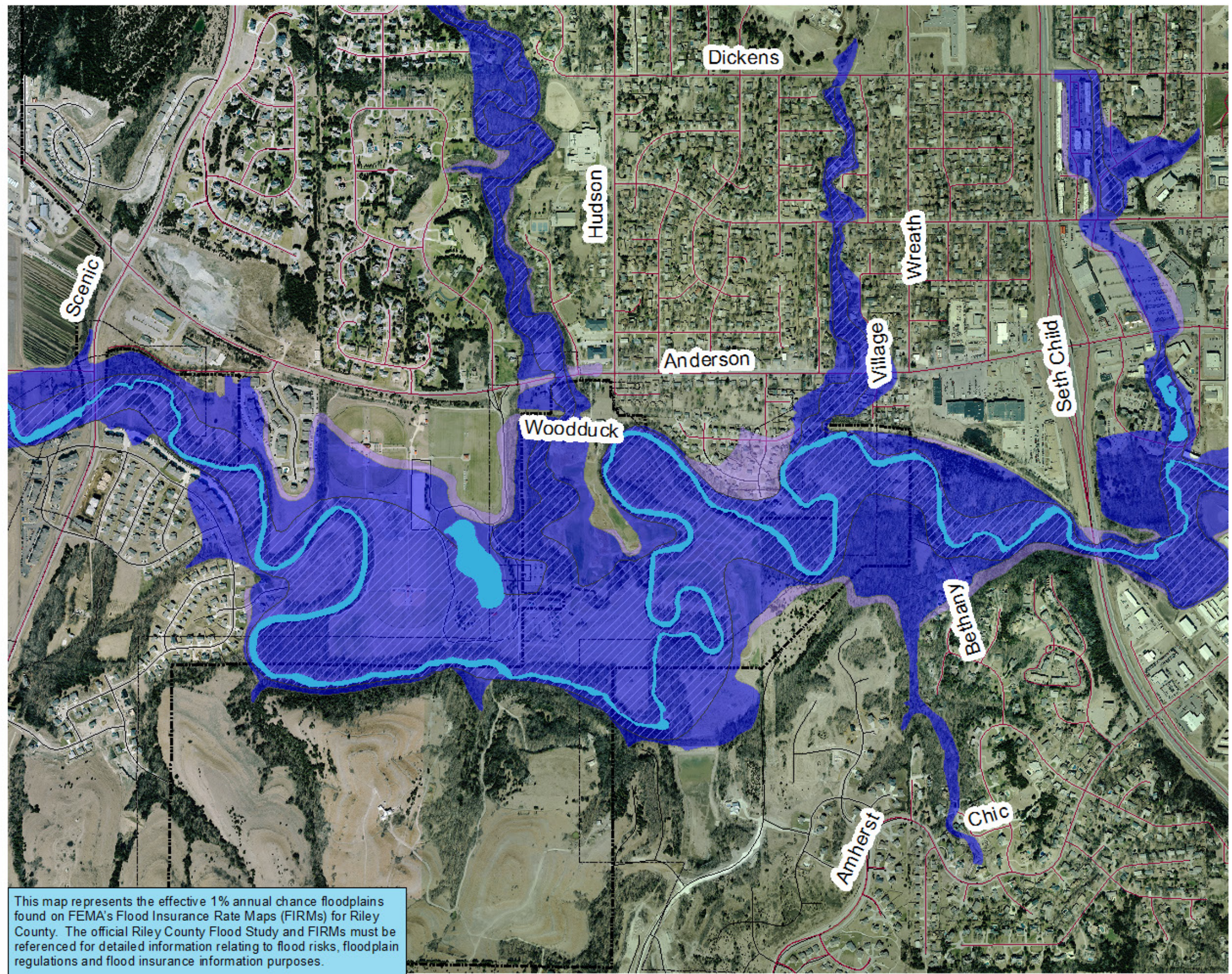


This map represents the effective 1% annual chance floodplains found on FEMA's Flood Insurance Rate Maps (FIRMs) for Riley County. The official Riley County Flood Study and FIRMs must be referenced for detailed information relating to flood risks, floodplain regulations and flood insurance information purposes.

Wildcat Creek Preliminary Floodplains Kansas River to Seth Child Road Appendix 2.1.1.b

- Flood Zones**
- Future Conditions 1% Annual Chance Flood Hazard
 - 1% Annual Chance Flood Hazard
 - 0.2% Annual Chance Flood Hazard
 - Flood way
 - Manhattan Boundaries
 - Wildcat Creek Watershed

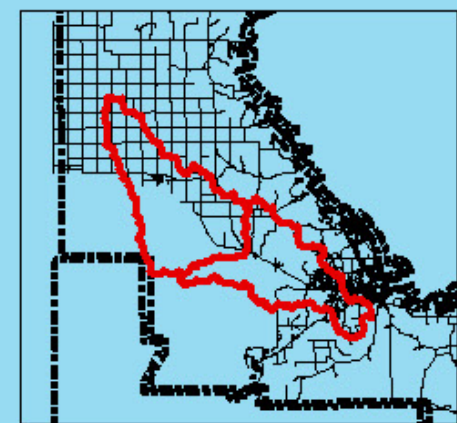
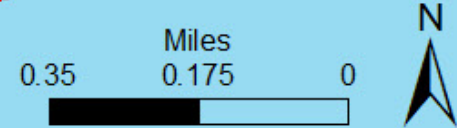


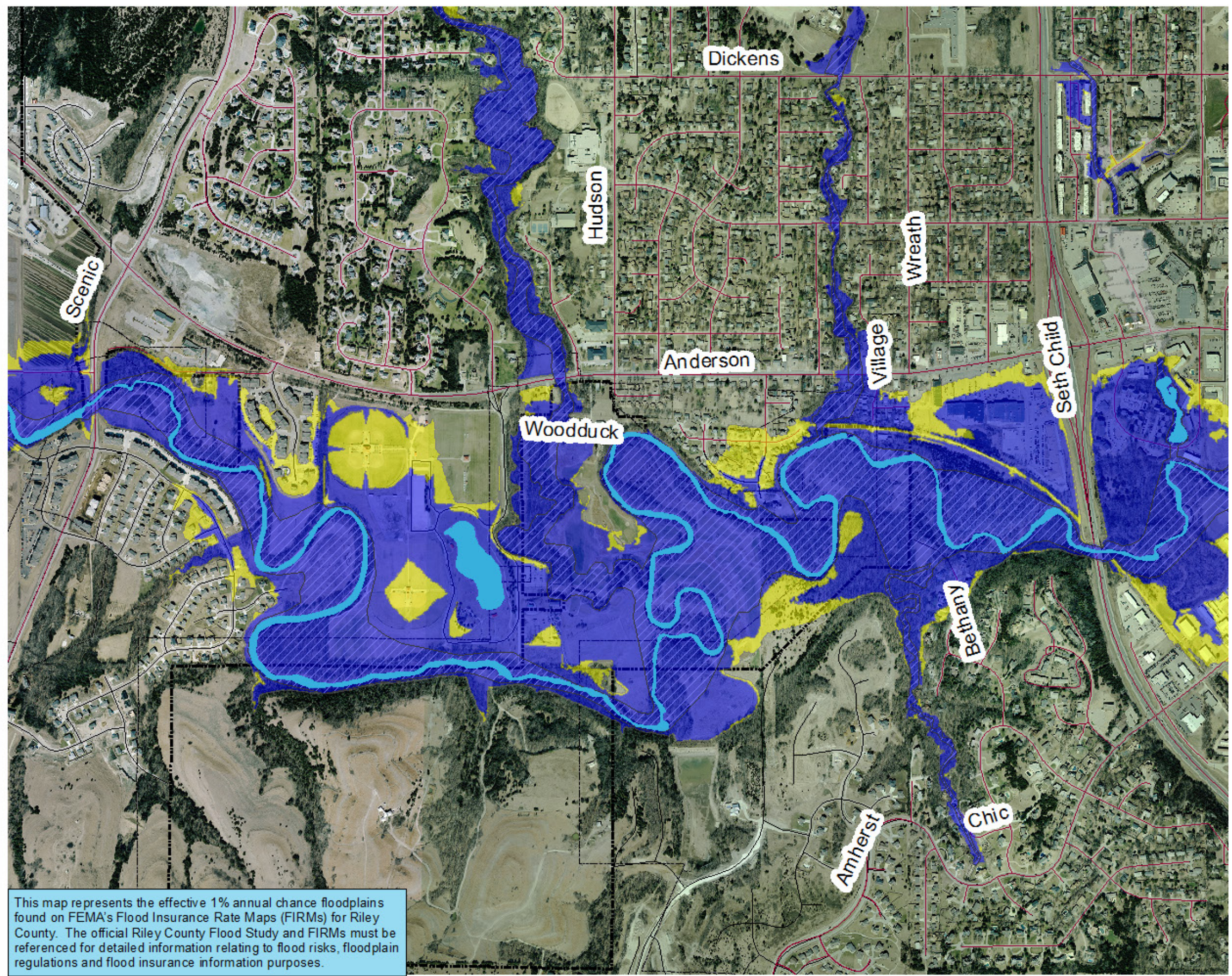


This map represents the effective 1% annual chance floodplains found on FEMA's Flood Insurance Rate Maps (FIRMs) for Riley County. The official Riley County Flood Study and FIRMs must be referenced for detailed information relating to flood risks, floodplain regulations and flood insurance information purposes.

Wildcat Creek Effective Floodplains Seth Child Road to Scenic Drive Appendix 2.1.2.a

- Flood Zones**
- 1% Annual Chance Flood Hazard
 - 0.2% Annual Chance Flood Hazard
 - Floodway
 - Manhattan Boundaries
 - Wildcat Creek Watershed



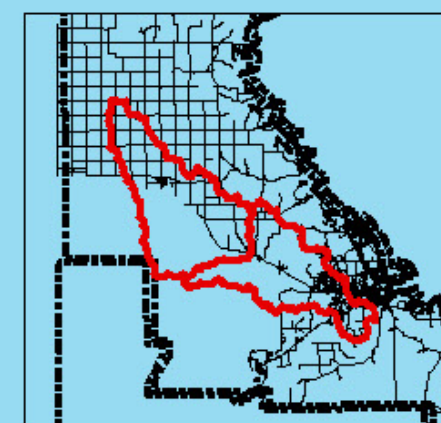


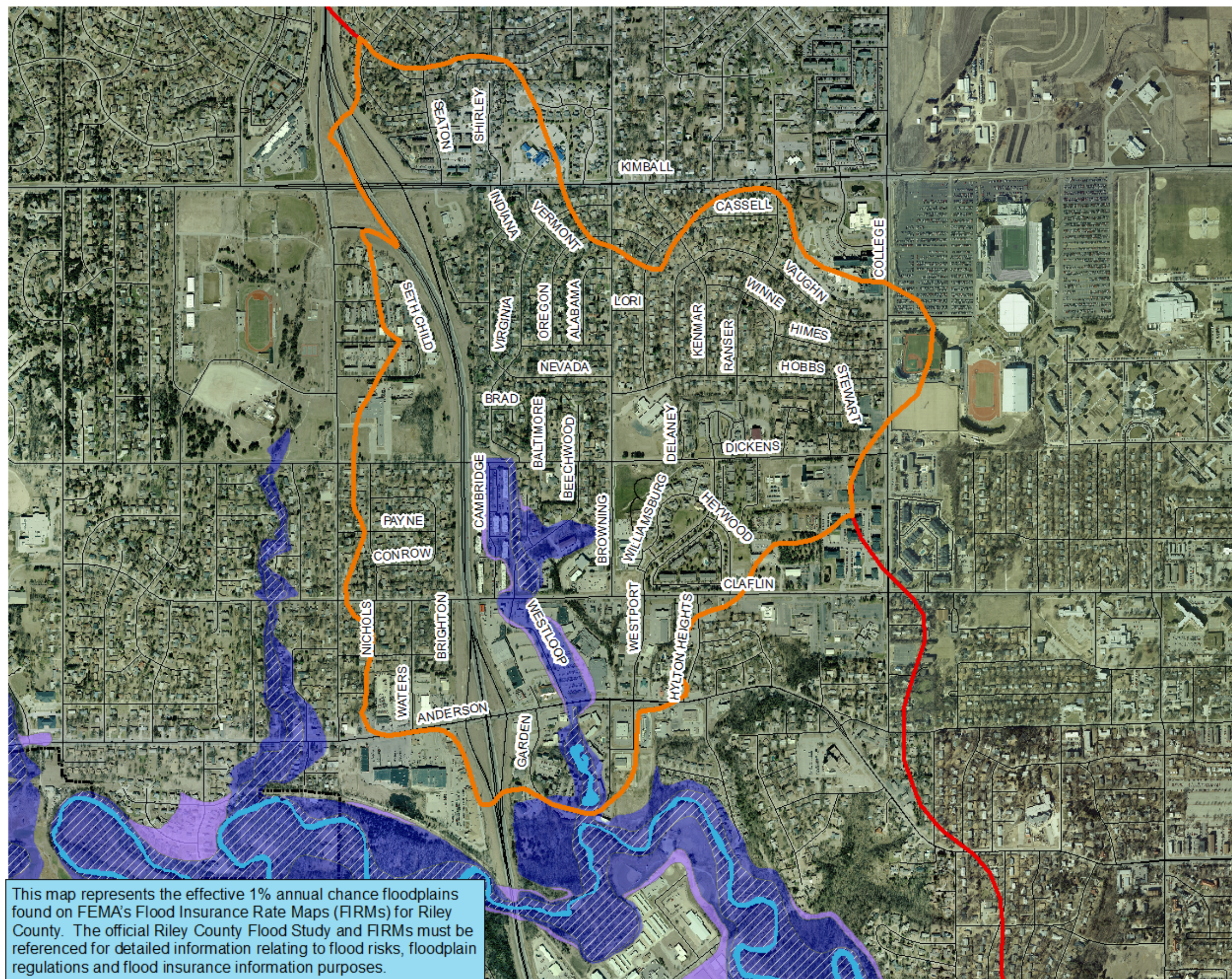
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Wildcat Creek Preliminary Floodplains Seth Child Road to Scenic Drive Appendix 2.1.2.b

Flood Zones

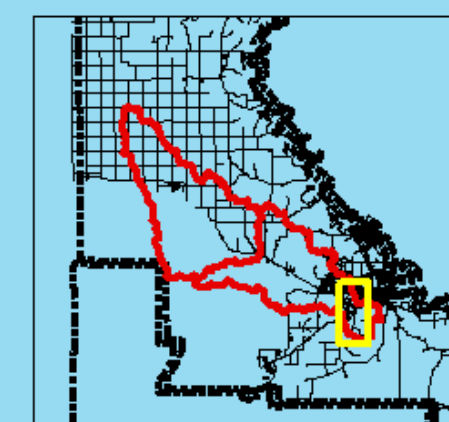
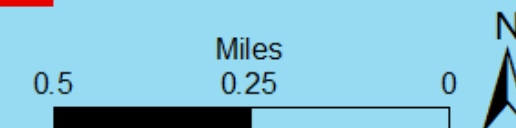
- Future Conditions 1% Annual Chance Flood Hazard
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Flood way
- City Boundary
- Wildcat Creek Watershed

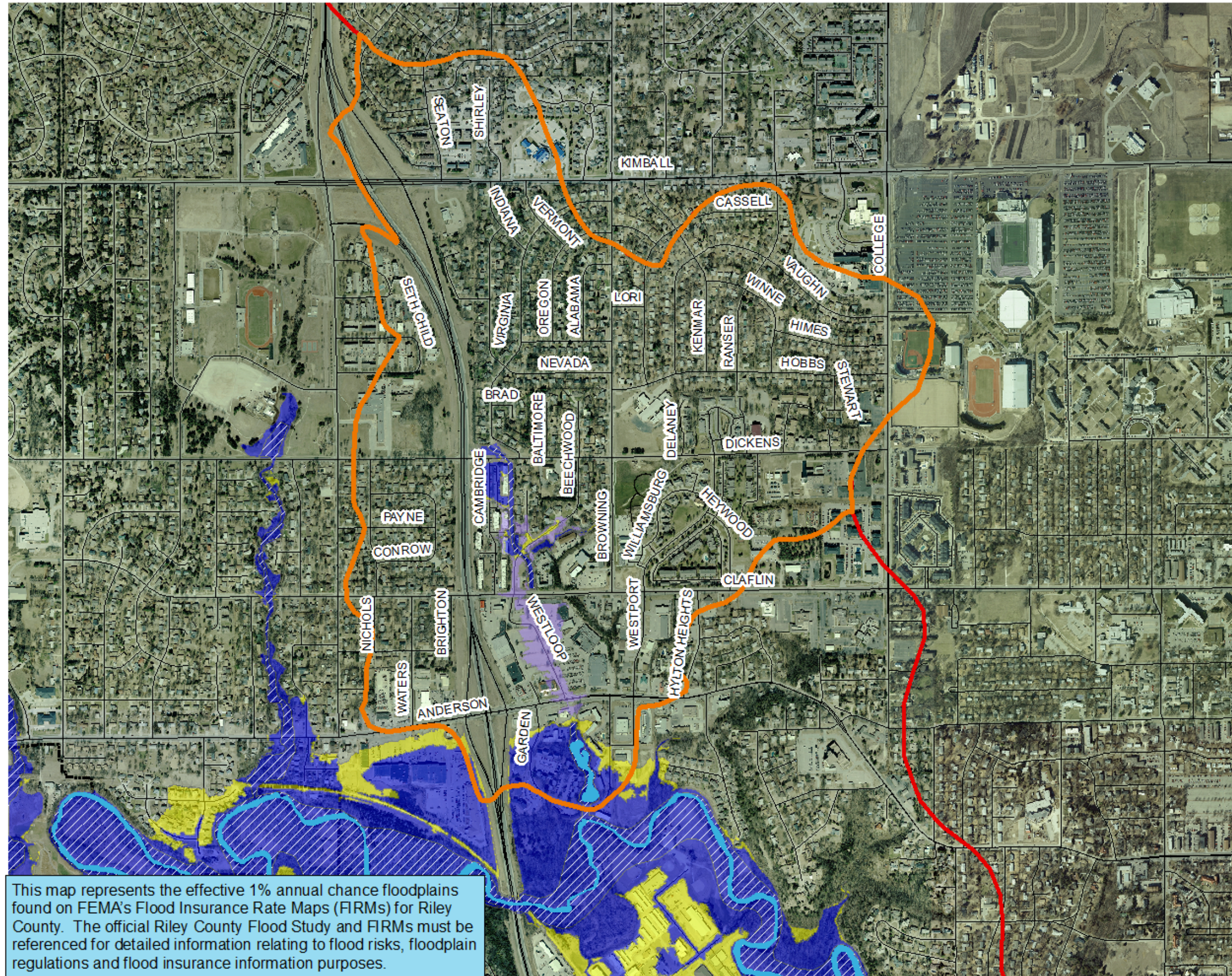




Wildcat Creek Effective Floodplains Virginia-Nevada Tributary Appendix 2.1.3.a

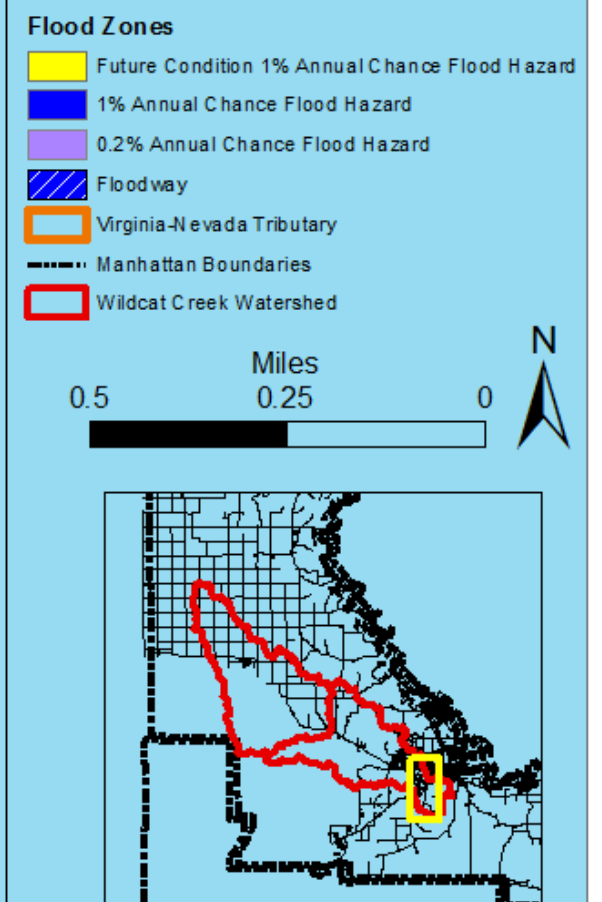
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 - 0.2% Annual Chance Flood Hazard
 - Floodway
 - Virginia-Nevada Tributary
 - Manhattan Boundaries
 - Wildcat Creek Watershed

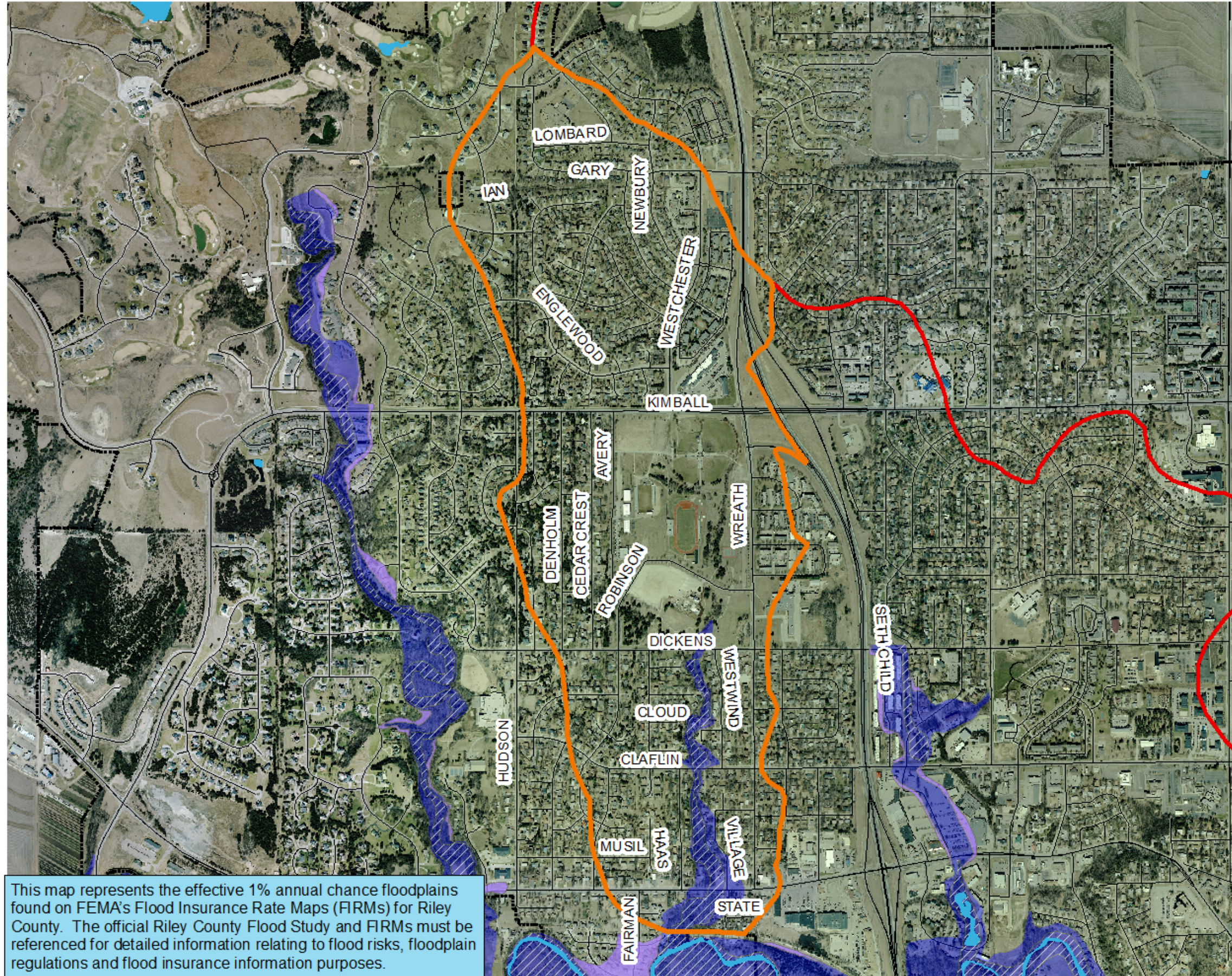




This map represents the effective 1% annual chance floodplains found on FEMA's Flood Insurance Rate Maps (FIRMs) for Riley County. The official Riley County Flood Study and FIRMs must be referenced for detailed information relating to flood risks, floodplain regulations and flood insurance information purposes.

Wildcat Creek Preliminary Floodplains Virginia-Nevada Tributary Appendix 2.1.3.b

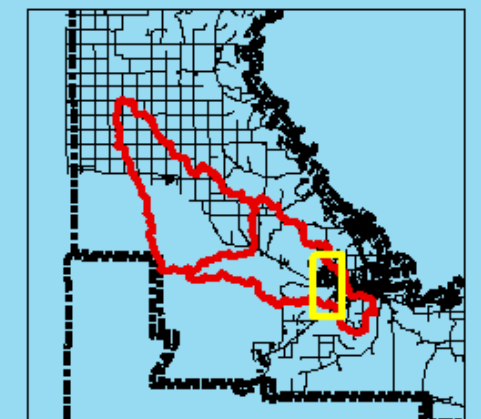
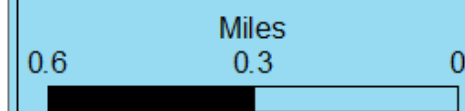


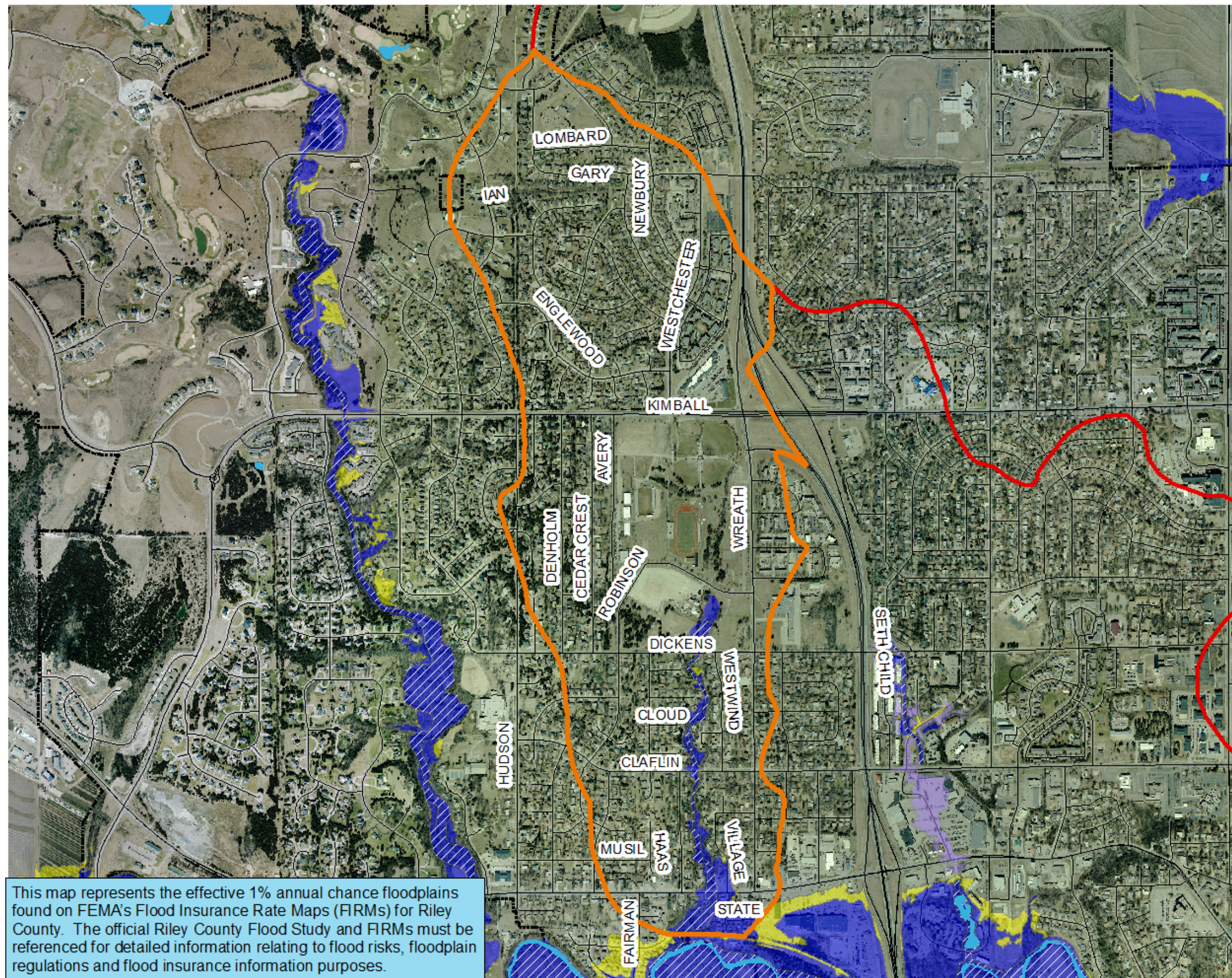


Wildcat Creek Effective Floodplains CiCo Tributary Appendix 2.1.4.a

Flood Zone

- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Floodway
- Cico Tributary
- Manhattan Boundaries
- Wildcat Creek Watershed

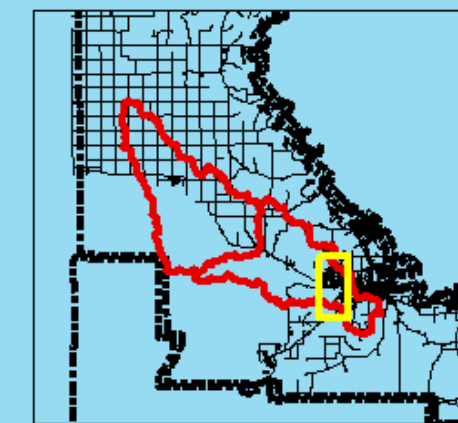
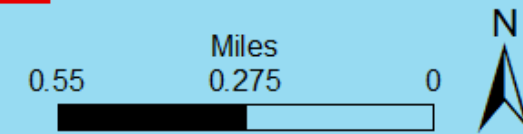


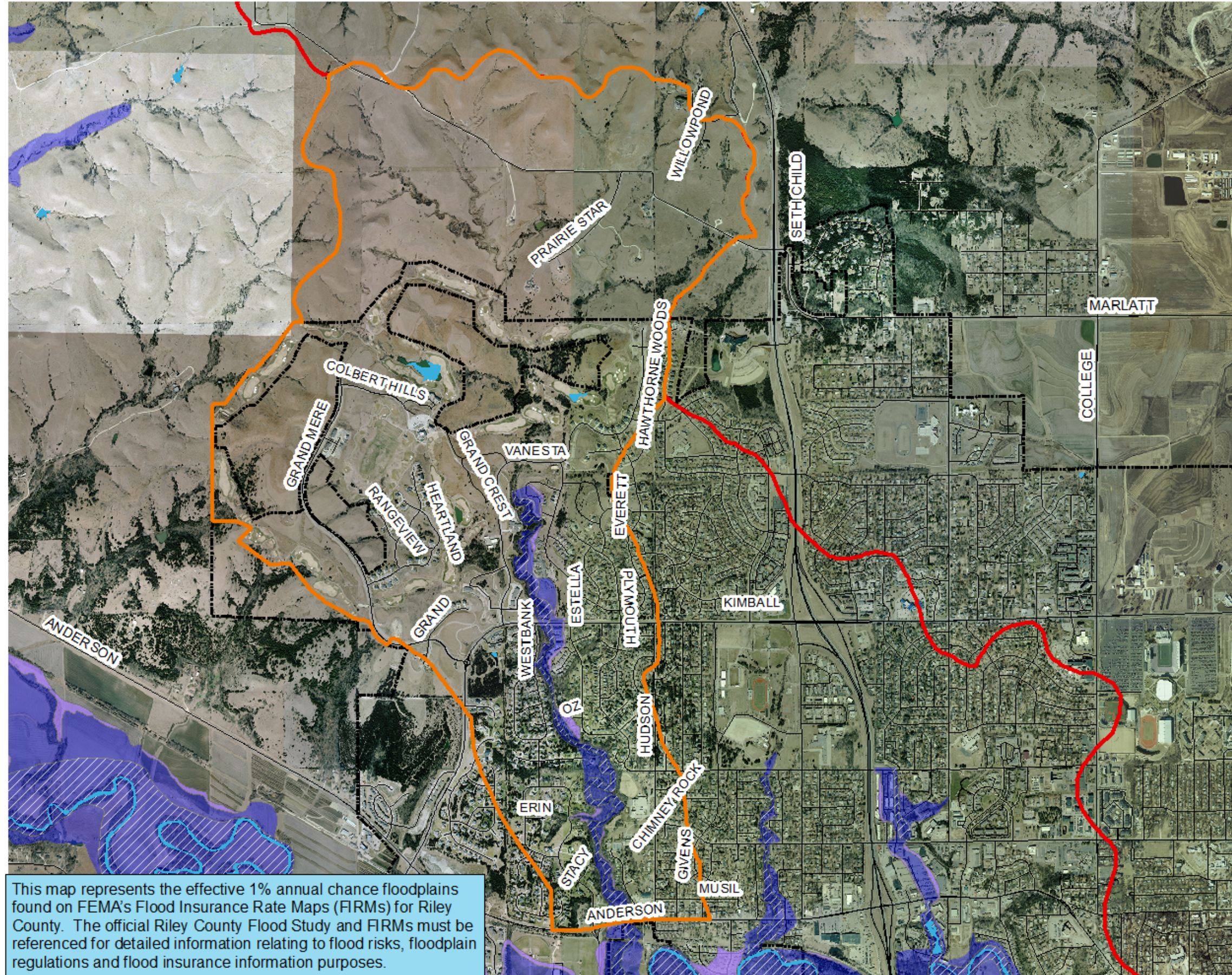


This map represents the effective 1% annual chance floodplains found on FEMA's Flood Insurance Rate Maps (FIRMs) for Riley County. The official Riley County Flood Study and FIRMs must be referenced for detailed information relating to flood risks, floodplain regulations and flood insurance information purposes.

Wildcat Creek Preliminary Floodplains CiCo Tributary Appendix 2.1.4.b

- Flood Zones**
- Future Condition 1% Annual Chance Flood Hazard
 - 1% Annual Chance Flood Hazard
 - 0.2% Annual Chance Flood Hazard
 - Floodway
 - Cico Tributary
 - Manhattan Boundaries
 - Wildcat Creek Watershed

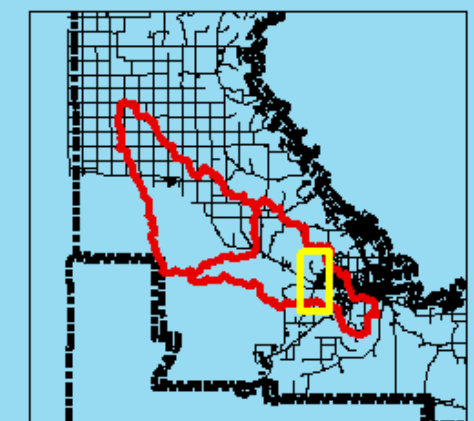
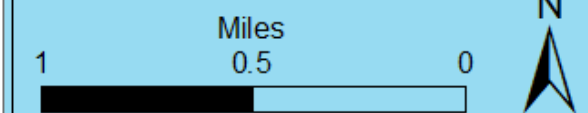


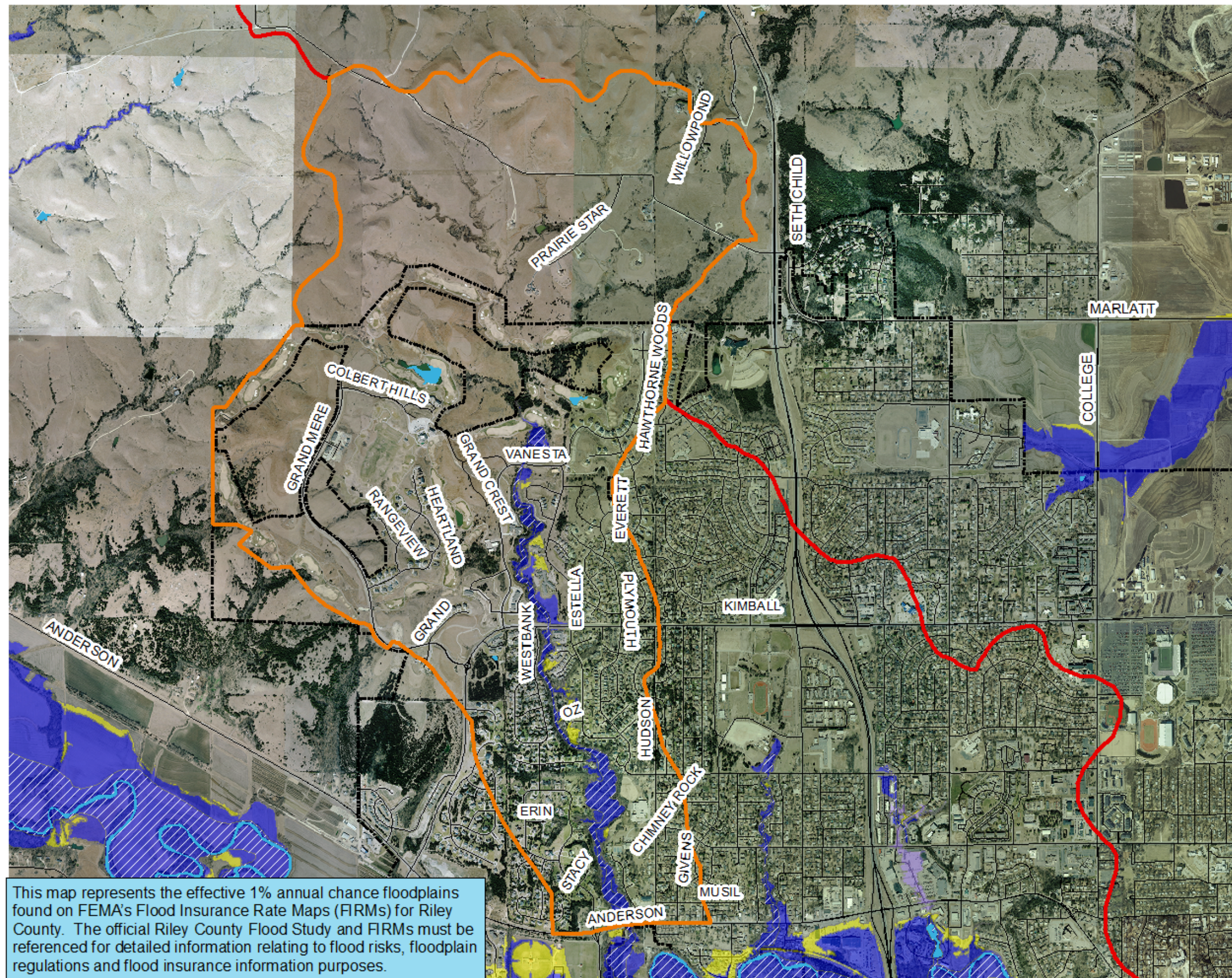


Wildcat Creek Effective Floodplains Little Kitten Creek Appendix 2.1.5.a

Flood Zone

- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Floodway
- Little Kitten Tributary
- Manhattan Boundaries
- Wildcat Creek Watershed





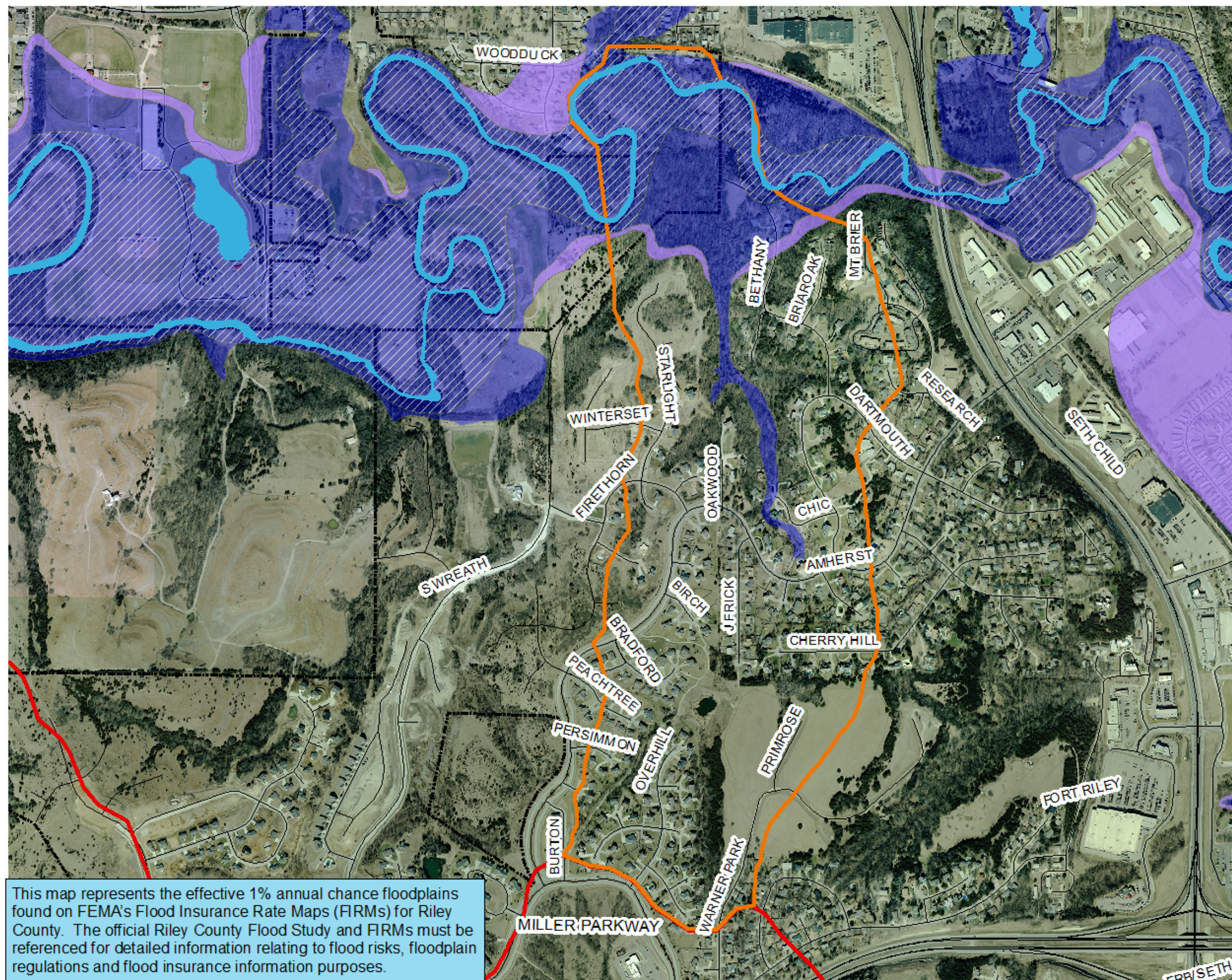
Wildcat Creek Preliminary Floodplains Little Kitten Creek Appendix 2.1.5.b

Flood Zones

- Future Condition 1% Annual Chance Flood Hazard
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Floodway
- Little Kitten Tributary
- Manhattan Boundaries
- Wildcat Creek Watershed

Miles
1 0.5 0

N



This map represents the effective 1% annual chance floodplains found on FEMA's Flood Insurance Rate Maps (FIRMs) for Riley County. The official Riley County Flood Study and FIRMs must be referenced for detailed information relating to flood risks, floodplain regulations and flood insurance information purposes.

Wildcat Creek Effective Floodplains Rolling Hills Tributary Appendix 2.1.6.a

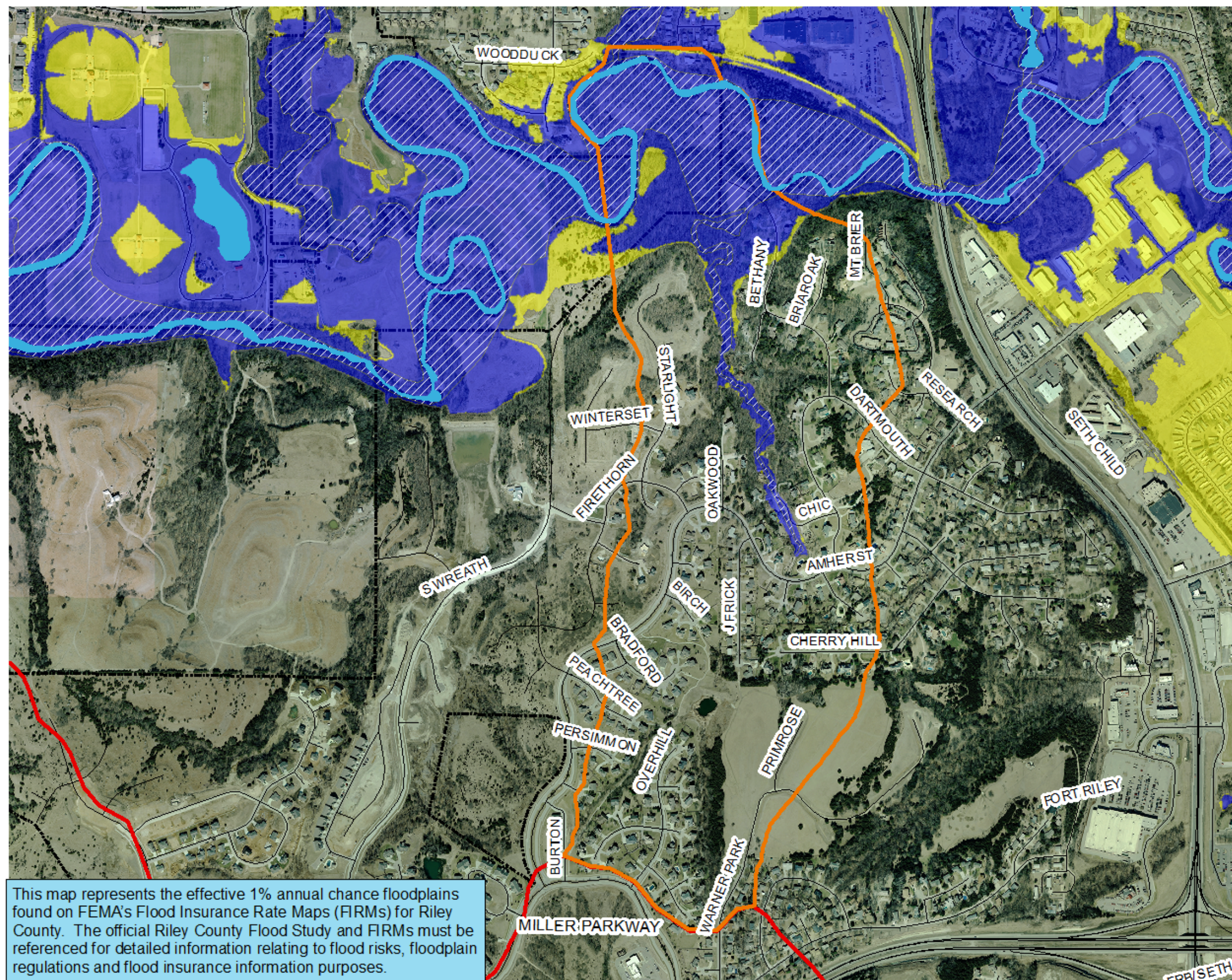
Flood Zone

- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Floodway
- Rolling Hills Tributary
- Manhattan Boundaries
- Wildcat Creek Watershed

Miles

0.45 0.225 0

N



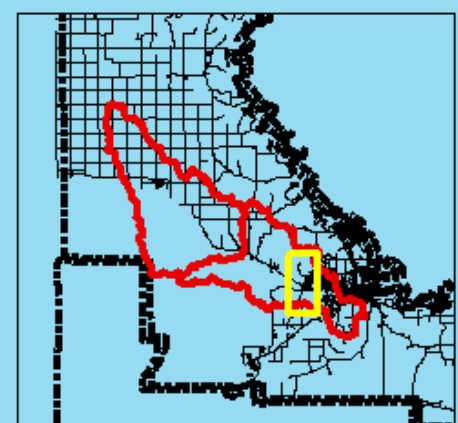
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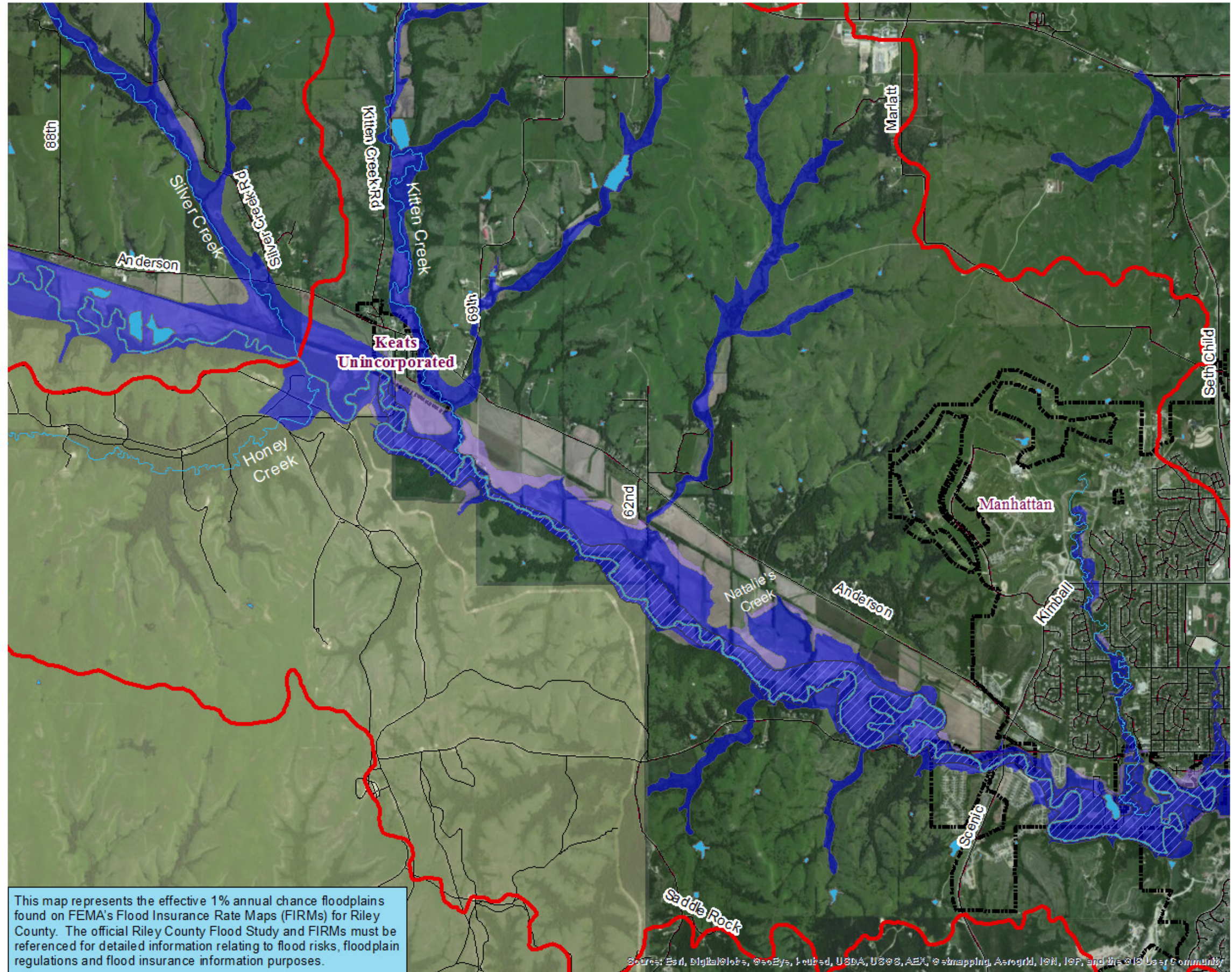
Wildcat Creek Preliminary Floodplains Rolling Hills Tributary Appendix 2.1.6.b

Flood Zones

- Future Condition 1% Annual Chance Flood Hazard
- 1% Annual Chance Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Floodway
- Rolling Hills Tributary
- Manhattan Boundaries
- Wildcat Creek Watershed

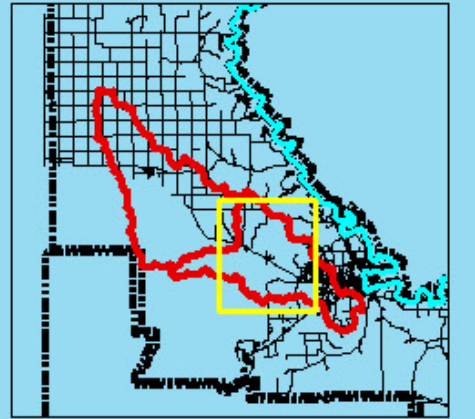
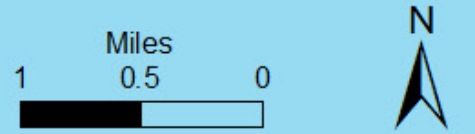
Miles
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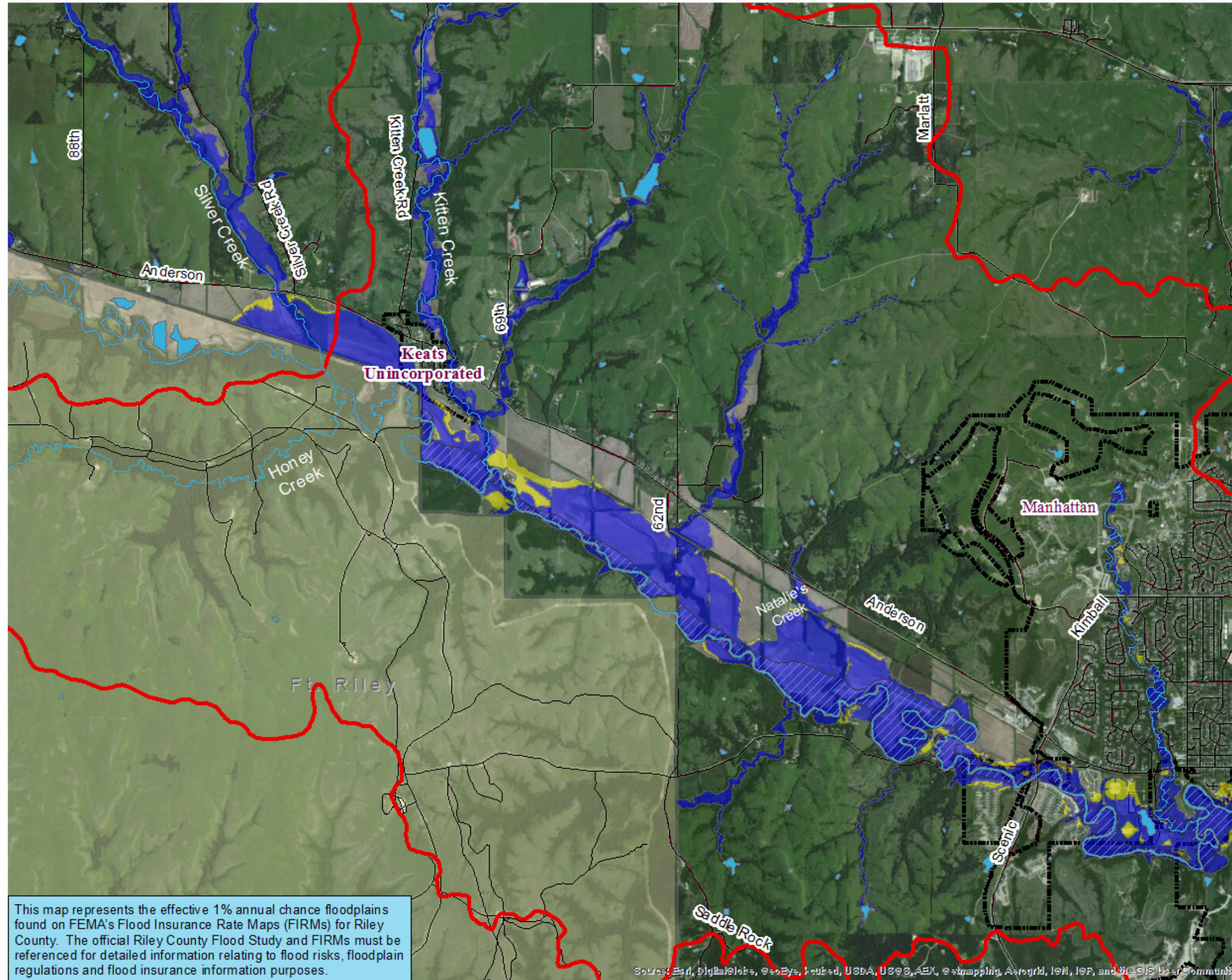


Wildcat Creek Effective Floodplains Keats to Manhattan Appendix 2.1.7.a

- Flood Zone**
- 1% Annual Chance Flood Hazard
 - 0.2% Annual Chance Flood Hazard
 - Floodway
 - Community Boundary
 - Ft. Riley Military Base
 - Wildcat Creek Watershed



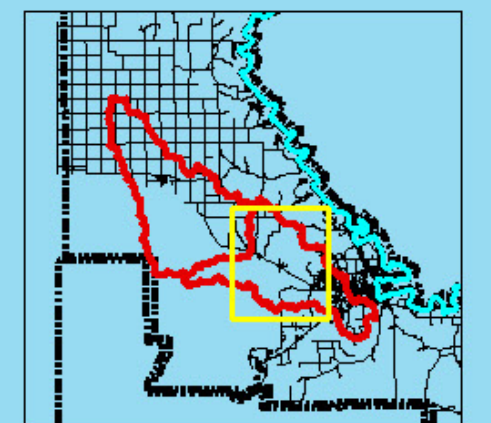
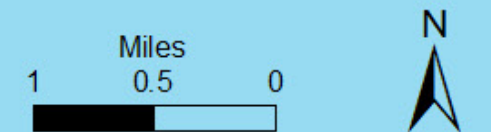
Wildcat Creek Preliminary Floodplains Keats to Manhattan Appendix 2.1.7.b

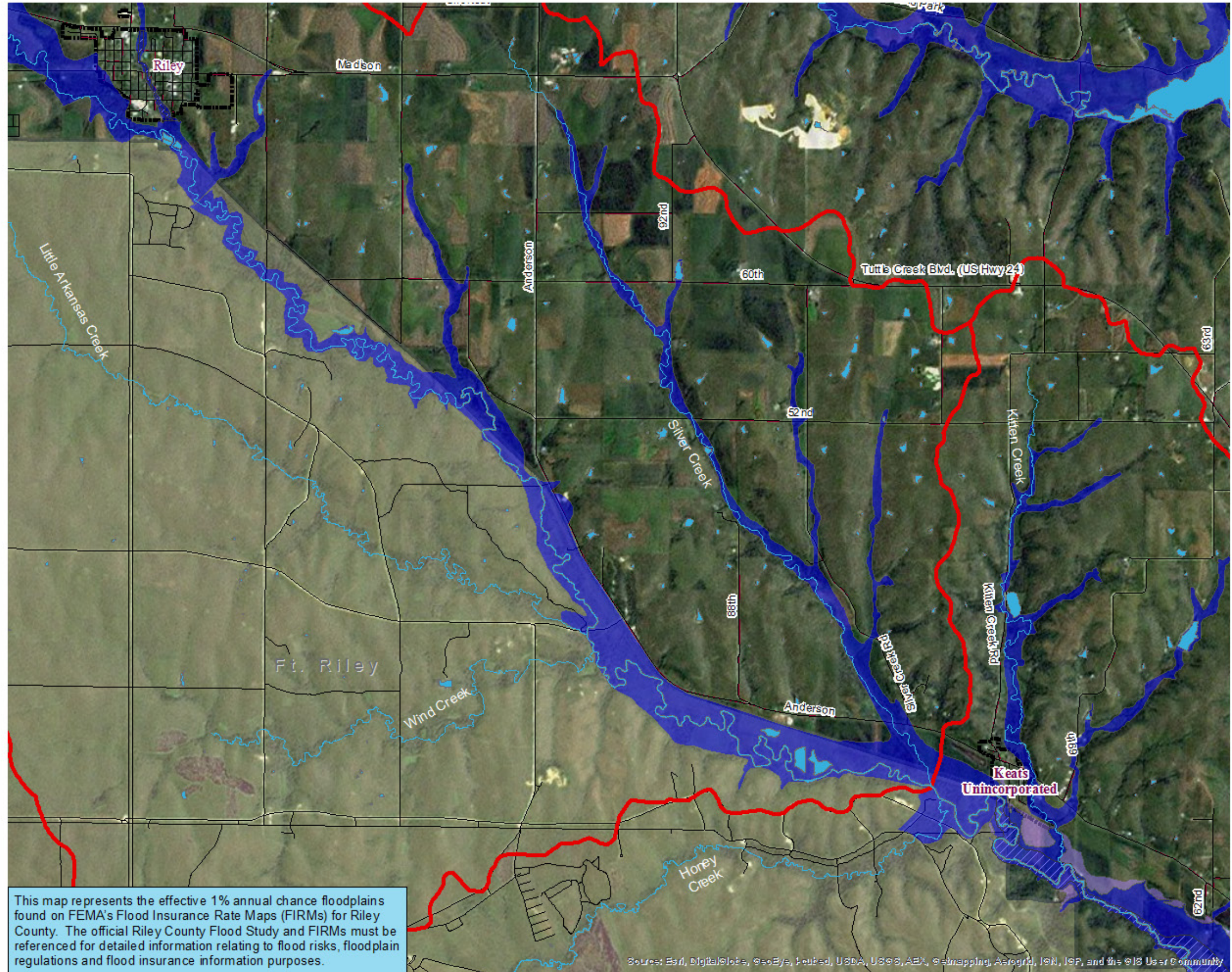


This map represents the effective 1% annual chance floodplains found on FEMA's Flood Insurance Rate Maps (FIRMs) for Riley County. The official Riley County Flood Study and FIRMs must be referenced for detailed information relating to flood risks, floodplain regulations and flood insurance information purposes.

Sources: Esri, DigitalGlobe, GeoEye, Earthstar, USDA, USGS, AEX, GeoMapping, AeroGrid, IGN, IGP, and the GIS User Community

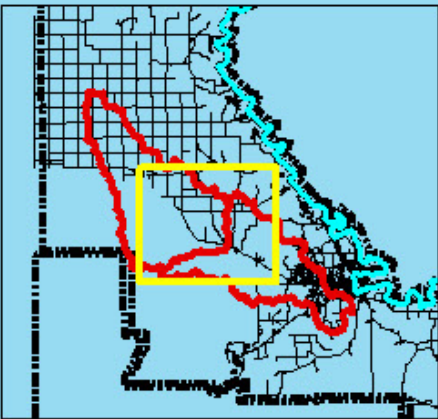
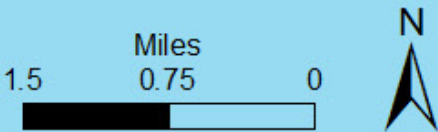
- Flood Zones**
- Future Conditions 1% Annual Chance Flood Hazard
 - 1% Annual Chance Flood Hazard
 - 0.2% Annual Chance Flood Hazard
 - Floodway
 - Community Boundary
 - Ft. Riley Military Base
 - Wildcat Creek Watershed

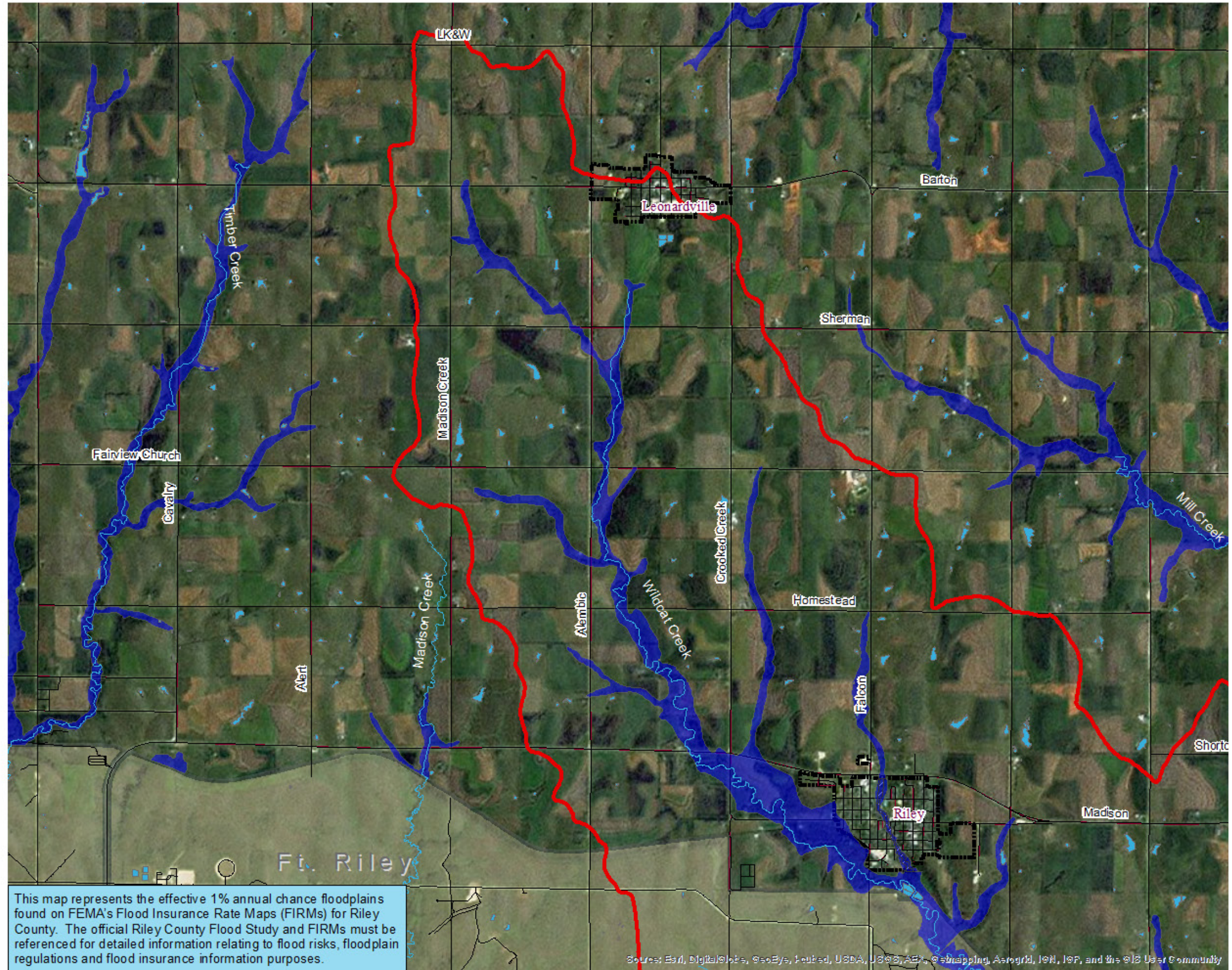




Wildcat Creek Effective Floodplains Riley to Keats Appendix 2.1.8.

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 - 0.2% Annual Chance Flood
 - Floodway
 - Community Boundary
 - Ft. Riley Military Base
 - Wildcat Creek Watershed



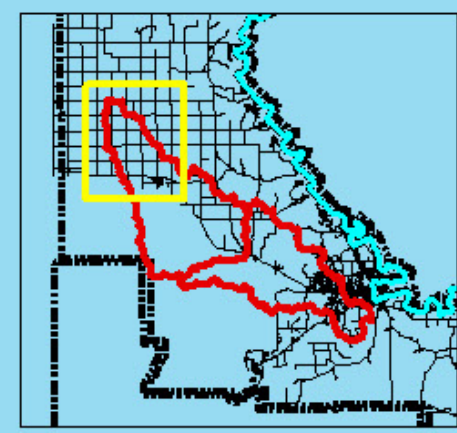
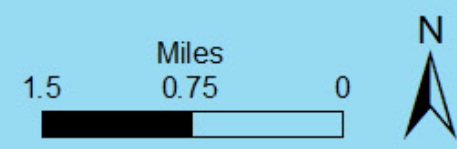


This map represents the effective 1% annual chance floodplains found on FEMA's Flood Insurance Rate Maps (FIRMs) for Riley County. The official Riley County Flood Study and FIRMs must be referenced for detailed information relating to flood risks, floodplain regulations and flood insurance information purposes.

Sources: Esri, DigitalGlobe, GeoEye, Earthstar, USDA, USGS, AeroGRID, IGN, IGP, and the GIS User Community

Wildcat Creek Effective Floodplains Headwaters to Riley Appendix 2.1.9

- Flood Zone**
- 1% Annual Chance Flood
 - 0.2% Annual Chance Flood
 - Floodway
 - Community Boundary
 - Ft. Riley Military Base
 - Wildcat Creek Watershed



Appendix 2: Fort Riley Memo

Letter from the Garrison Command at Fort Riley regarding development plans on post and its impact on flooding on Wildcat Creek

The watershed of Wildcat Creek on Fort Riley encompasses approximately 21,800 acres, and is composed of high upland prairies, alluvial bottomland flood plains, and broken and hilly transition zones. Grasslands comprise over 80% of the watershed on Fort Riley, and consist of two basic types; native prairie and “go-back” areas with the go-back grasslands being areas that were formerly cultivated for crop production and were subsequently allowed to return to grassland. Past land use activities and ongoing military training have produced grasslands that exhibit a less than pristine species composition, and that have been invaded by woody species. Shrubs are located along in the grasslands along the edges of woodlands, in isolated patches along intermittent drainages and ravines, and scattered throughout grassland fields. Scattered individual trees and patches of trees have become established throughout the grassland fields. The alluvial bottomlands and transition zones contain leased crop fields (520 acres) that provide firebreak protection and bur oak woodlands (approximately 2,500 acres).

The overall habitat management strategy within the Wildcat Creek watershed on Fort Riley is to protect, propagate, and conserve the native tallgrass prairie where it occurs, and the fauna species associated with it, and to reverse woody plants’ encroachment into the grasslands that has occurred. Most trees and substantial quantities of shrubs within grassland fields will be eliminated. It is anticipated that the overall spatial extent of wooded areas in these fields will be reduced by 15%, with almost the entire decrease being due to reduction of spatial extent of the invasive shrubs.

Native prairie evolved under the influences of fire and grazing, and these or similar disturbances are required to maintain the grasslands. Fort Riley integrates habitat management actions, including prescribed burning, hayfield cutting, mechanical tree and brush control, herbicide application and land rehabilitation to sustain the training mission, enhance Soldier safety, maintain, enhance or reclaim native prairie, control undesirable invasive plants, and provide suitable habitat for the native fauna typically associated with tallgrass prairie. Fire is especially effective in retarding the spread of woody vegetation into the prairie. Prescribed burns are conducted from approximately September 1 through April 30 annually, with the objective that every grassland area will burn at least 2 out of every 5 years. Management actions focus on juxtaposition of varying time since the vegetation’s last disturbance treatment to create more heterogeneous habitat conditions within the grasslands.

Generally, in grasslands with a minor shrubby component, prescribed burning is the only management tool used. In grasslands with a moderate shrubby component, prescribed burning, rotary mowing and chemical treatment are used. In grasslands with an extensive shrubby component, scattered trees or both, prescribed burning, various mechanical controls, and chemical control are used to combat woody encroachment. Approximately 6,900 grassland acres within the watershed on Fort Riley are leased for hay harvest. Hay-cutting is timed to reduce detrimental effects on breeding birds, provide adequate forage quality, provide adequate re-growth, and interrupt the development of viable noxious weed seed.

Large, warm-season grasslands are mowed on a rotational system with some subunits left idle in each year rather than annually cut for hay. Warm season grasses may be cut during the period of July 15 to August 15 each year.

The management objective in the watershed’s woodlands is to develop, maintain, and enhance open oak woodland and create a ground cover with forbs, grasses, and oak sprouts. The prairie and woodland ecotone is maintained through the use of periodic prescribed fire, encouraging oak and other shade intolerant species. Prescribed burning, timber stand improvement and commercial harvest actions are integrated to sustain the training mission, promote Soldier safety, provide improved forest stand health, and achieve the desired end-state forest conditions.

The firebreak crop fields are grown and harvested by contracted producers (lessees). These crops are managed in a manner that provides for year-round fire protection, does not unduly expose the leasehold to erosion or infestation with noxious weeds, provides wintertime food for wildlife, provides reasonable opportunity for profit by lessees, and increases the biodiversity of the installation. Under normal circumstances, alfalfa or cereal grain is planted in no more than one-half of the width of the firebreak.

The remaining firebreak is planted to row crops such as grain sorghum, corn, soybeans, or sunflowers and is not left fallow. No-till farming is generally not considered an acceptable practice for firebreak fields and is allowed only on a case by case basis. In areas where the soil is not arable because of severe slopes or rocky conditions, a crawler tractor-pulled plow accomplishes the tillage. The firebreak varies in width from approximately 150 feet to more than 300 feet.

Topeka shiners have been found on Fort Riley in Wildcat Creek and its tributaries Silver, Honey, Wind and Little Arkansas creeks. The Topeka shiner typically occurs in streams with high water quality. Streams containing Topeka shiners are relatively undisturbed, with minimal streambed disturbances. The streams have not been impounded or channelized and usually do not drain areas subject to high silt loads in water runoff. Mainstem reservoir developments and tributary impoundments have adversely impacted the species. Topeka shiner populations have been eliminated from streams both above and below dams following the construction of stream impoundments. Impoundments have several negative impacts. The dams eliminate the scouring floods that create pool habitat downstream and maintain a rocky, silt-free substrate. Upstream habitat may be converted to deep, open water habitat behind the dam. Predatory fish move upstream and downstream from the impoundment where they pose a predatory threat to Topeka shiners that did not naturally exist.

To manage Topeka shiners, Fort Riley controls construction of water impounding structures within the Wildcat Creek watershed, and consults with the U.S. Fish & Wildlife Service regarding any planned action that would affect Wildcat Creek or its tributaries. Fort Riley also prevents degradation of streams within the watershed. All streams are protected from adverse impacts. Adverse impacts include activities that result in channel destruction or alteration, increase water turbidity or eutrophication, or destroy vegetation filter strips. Specifically, the following activities are controlled within 50 feet on either side of the streams: construction, operations and maintenance activities, demolition, operation of vehicles, timber harvest, detonation of explosives, and certain recreational pursuits. Little development has occurred within the watershed on Fort Riley. There are 25.3 miles of asphalt/paved roads, and 36.6 miles of gravel roads. Three rock quarry sites totaling 50 acres are also present. Developed, shallow-water wetlands occupy 25 acres.

Currently, one facility is under construction in the watershed – an Infantry Squad Battle Course having an estimated construction completion date of August 2012. The Kansas City District Corps of Engineers (KCD) is supervising and administering a contract to construct the Course, which includes approximately 3,700 gross square feet of various support structures (classroom, covered mess area, latrine, bleacher enclosure, ammo breakdown, and control tower), impervious pavement sidewalks and aggregate paved parking areas and vehicle lanes. The KCD's design of the project incorporates Low Impact Development techniques (e.g. aggregate paving, open channels, low water crossings, etc) and located improvements away from existing creeks and tributaries so that it will not increase the amount of storm water runoff generated from the site. Storm water is being strictly controlled during construction in accordance with a KDHE-approved Storm Water Pollution Prevention Plan that includes minimal disturbance of the site to ensure the natural hydrology and water quality features that currently exist on site can remain in place and fully functional during and after construction.

Any future construction having a footprint exceeding 5,000 square feet in the watershed on Fort Riley will meet the requirements of Section 438, Storm Water Runoff Requirements for Federal Development Projects, of the 2007 Energy and Independence Security Act (EISA).

Section 438 requires the sponsor of any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet to use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of storm water flow.

Additionally, the Office of the Assistant Secretary of the Army, Installations and Environment, requires the installation to incorporate Low Impact Development (LID) criteria as a means to manage storm water on all projects. It further states, the LID features must be designed in accordance with EPA 841-B-09-001, Technical Guidance on Implementing Storm water Runoff Requirements for Federal Projects Under Section 438 of the EISA, and all master planning, project development and project site planning will maximize the use of the existing topography including slope, hydrology, flora and soils, and minimize site clearing and soil grubbing activities to the greatest extent possible.

Tony Cady, Program Manager-Forward, U.S. Army Corps of Engineers, Kansas City District
Alan Hynek, Conservation Branch Chief, Fort Riley, DPW, Environmental Division

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Appendix 3: Holeman Memo

NOTICE: WHAT FOLLOWS IS A GENERAL SURVEY ONLY OF MANY (BUT NOT ALL) OF THE STATUTES CONCERNED WITH FORMATION AND OPERATION OF KANSAS DRAINAGE DISTRICTS AND WATERSHED DISTRICTS. IT IS NOT INTENDED TO BE LEGAL ADVICE, BUT REPRESENTS MATERIAL FOR GENERAL INFORMATIONAL PURPOSES ONLY. Clancy Holeman, Riley County Counselor, 11-17-11

I. Drainage Districts—Formation.

A. Ordinarily, formed by petition to BOCC. (K.S.A. 24-401)

1. Signed by either owners of 51% of the land or by 2/5 of the landowner's resident within the proposed district. (K.S.A. 24-404)
2. Petition must describe boundaries of the proposed district "and state that the lands and property therein embraced are subject to injury and damage from the overflow of some natural watercourse...that the improvement of the channel of such watercourse, the construction and maintenance of levees, drains or other works, including detention dams and reservoirs, are necessary to prevent such overflow; and that such improvement or works will be conducive to the public health, convenience, or welfare." (K.S.A. 24-403)

B. When presented with petition BOCC must take following actions:

1. Set a public hearing after one published notice. (K.S.A. 24-404)
2. At that public hearing, if you find notice of the hearing complied with the statutory requirements and the petition meets the statutory requirements "and that the allegations thereof are true," you create the drainage district according to the boundaries set out in the petition. (K.S.A. 24-405)
3. If you have formed such a drainage district under K.S.A. 24-404 et seq., your next statutory obligation will be to "fix the time and place of holding the first election to choose such officers of such drainage district...and designate five taxpayers residing within said district, three to act as judges and two to act as clerks of such election..." (K.S.A. 24-406)
4. By five days following creation of the district, the Riley County Clerk must deliver a "certified list of the qualified electors to one of the appointed judges. (K.S.A. 24-411) Such "qualified electors" are defined within that same statute. (Voters in that election must be both taxpayers and residents of the proposed district, and the cost of the election is paid from the general fund of the district.) (K.S.A. 2010 Supp. 24-414)
5. The district board must meet at least annually and must adopt and publish a resolution setting out the location and time of all its regular meetings. (K.S.A. 24-416) The chair or member of the district board may call meetings, and all such meetings are open to the public. **The district board has no authority to hold executive sessions.**

II. Drainage Districts—Powers.

- A. All district powers are exercised by its 3-member elected board of directors. (K.S.A. 2010 Supp. 24-409) Each director must be an owner of land located within the district boundaries and a resident of Riley County. (K.S.A. 2010 Supp. 24-409 contains exceptions to these director and land ownership requirements which do not appear relevant here.)

- B. **There is no statutory provision allowing dissolution of a drainage district. Once created, a drainage district is a legal entity which will exist permanently.** A drainage district has “perpetual succession” and is a “public corporation.” (K.S.A. 24-405)
- C. The powers of a drainage district are extensive, to put it mildly. Such district has authority to: sue and be sued; **“exercise exclusive control of all natural watercourses within the district”**; “widen, deepen, establish, regulate and maintain the channels” of those watercourses; build levees, detention dams and reservoirs on the banks of those watercourses and in areas adjacent to them, if “necessary to prevent or restrain overflow or lessen the volume” of such overflow; purchase and operate pumps; “alter, change or abandon the channel or any part of the channel of any natural watercourse and relocate or excavate and establish a new channel for such watercourse or any part thereof located within the district;” **exercise eminent domain**; remove “obstructions” from such watercourses; **regulate the height, length and location of piers for all bridges** over such watercourses; construct levees across the rights-of-way of railroads; **“regulate and change the grade of all public highways...where any levee may cross or intersect”** such highways; **sue for injunctive relief** to enforce the “reasonable orders” of board of directors, including prohibiting placement of unauthorized bridges or other structures which are an obstruction in the channel of watercourses, and to have them removed as public nuisances; **“To annually levy a tax not exceeding five mills on the assessed value of all tangible taxable property within the district to create a general fund.”** (K.S.A. 2010 Supp. 24-407) Further, the district board may also: levy special assessments to pay for construction and maintenance of levees and other improvements “to prevent the overflow of natural watercourses, or provide drainage of overflowed lands” in the district, or such improvements “that may be conducive to the public health, convenience or welfare”; **issue bonds** to pay the cost of “widening, deepening and otherwise improving the channels and constructing embankments, drains, levees and other works along the banks of natural watercourses, to pay the cost of constructing detention dams and reservoirs in areas adjacent to all such watercourse, **to pay for the purchase or condemnation of land necessary therefore** or to prevent overflow and protect the property located within the district from damage and injury thereby...; **“contract and cooperate with private corporations and individuals owning lands located outside of the district...which are subject to injury by overflow in common with lands located within the district;”** **“contract for and receive aid and contributions from the United States,** and from all public corporations the property within which will be benefited and with all private corporations and individuals whose property will be benefited by the improvement, whether the property is located within the district or within some other district or state;” “do all other acts necessary to carry out and execute the general powers granted under the provisions of K.S.A. 24-401 et seq., and amendments thereto, although not specially enumerated.” (No drainage district may alter or construct any dam without first “filing an application with the division of water resources of the Kansas department of agriculture...”) (K.S.A. 2010 Supp. 24-409; emphasis added)
- D. Once elected, the district’s board of directors are authorized to make a wide variety of drainage improvements: from widening or deepening the channel of “all natural watercourses within the district” to constructing “walls, embankments and levees to be constructed along the banks,” to making “such other improvements, including detention dams and reservoirs in areas adjacent to such watercourses...as may be deemed necessary to prevent the overflow of such watercourses or protect property from damage thereby,” to the “removal of obstructions from the channel.” (K.S.A. 2010 Sup. 24-418)
1. The district must not begin any such work without plans and specifications, along with a written cost estimate from an engineer appointed by the district. Those plans and estimate must be filed with the district’s secretary. **The cost of such projects is to be supplied by a general tax** on all taxable district property, and bonds in an amount up to 20% of the taxable property of the district may be issued. **But no such improvements can be made until first authorized in a vote of the district’s taxpayers at a special election.** (This same statute limits the ability of a drainage district to “remove, lower or injure” any existing dam build by any city for the purpose of storing

water for city residents. Neither can the district lawfully construct a ditch around or alongside such a dam, without filing an application with the division of water resources.)

2. Subject to the foregoing limitations of K.S.A. 2010 Supp. 24-418, the district board has **additional authority** to construct drainage improvements within its boundaries and to pay for those improvements by: issuing bonds paid by general taxes; or by levying special taxes or assessments. (K.S.A. 24-419)
 - a) The board has that additional authority if it determines it is necessary to “alter, change or relocate the channel or any part of the channel of any natural watercourse within the district.” (K.S.A. 24-421)
 - b) Before the district board can begin such construction or incur “liability of any kind,” it must have on file with its secretary a written cost estimate and description of the work planned, from a “competent engineer.” (K.S.A. 24-420)
 - 1) If the district board intends to issue bonds for the work, it must call a special election and obtain approval from the district members in advance of any such bond issuance.
 - 2) If, instead of bond issuance, the district board prefers to levy special assessments, it must appoint 3 residents of the district to inspect all land within the district which will be benefited by the proposed improvement. (K.S.A. 24-422)
 - a) Those residents must provide the district board with a report setting out for each property both its actual value and proposed special assessment.
 - b) If the proposed assessment of any tract exceeds 10% of its actual value, the district board must call a meeting of all taxpayers subject to the proposed assessment (K.S.A. 24-423)
 - c) A vote must be taken at that meeting as to whether the proposed assessments should be made. A majority vote of those voting at the meeting determines whether the special assessments can be made.

III. Drainage Districts—Enlargement.

A. District may petition for enlargement of its boundaries. (K.S.A. 24-463)

1. Subject to K.S.A. 19-270, which requires BOCC hold a hearing and take testimony from any city, township, county or regional planning commission with jurisdiction over the affected area.
2. BOCC obligated to “investigate such petition and ascertain whether it is in conformity with the provisions of ... act.” (K.S.A. 24-463)
 - a) Petition must describe area proposed to be annexed and that area proposed to be added is “subject to injury and damage from the overflow of some natural watercourse...that the improvement of the channel of such watercourse, the construction and maintenance of levees, drains, ditches, dikes, jetties, riprap or other works are necessary to prevent such overflow;; and that such improvement or works will be conducive to the public health, convenience or welfare....” (K.S.A. 24-464)
 - b) Must be signed by not less than 2/5 total taxpayers within both the original district and the proposed additional area, **or by all directors of the original district.** (K.S.A. 24-465)

- 1) BOCC must set public hearing on the petition and publish notice
- 2) If petition signed by number in excess of 2/5 of total number taxpayers residing in proposed area of extension, no petition from taxpayers residing in original district is necessary.
- 3) During hearing BOCC hears testimony and determines if signers qualified—shall approve petition if those formalities are met and “it is found...that the allegations thereof are true.” (K.S.A. 24-466)
- 4) “No territory within any incorporated city located in a county having an assessed tangible valuation of more than \$150,000,000 shall be included...unless the consent of the governing body of such city...shall first be obtained.” (K.S.A. 24-466)

B. Drainage district may exercise its power of eminent domain outside district boundaries.
(K.S.A. 2010 Supp. 24-467)

1. If directors deem necessary to “construct any ditch, levee, dike, jetty, riprap or other protective structure across or upon the land of any individual or corporation whether within or outside the territorial limits of the drainage district...” they may do so, as provided immediately below.
2. “Whenever it shall be deemed necessary to appropriate any private property for use by the district in widening, deepening or otherwise improving any natural watercourse to prevent the overflow thereof or for the construction of any ditch, dike, levee, jetty, riprap, canal, drain or other work, the board of directors ‘shall obtain a survey and description and survey of the required land from a licensed land surveyor or professional engineer.’”

IV. Watershed Districts—Petition to Secretary of State.

A. Ordinarily, formed by petition filed with secretary of state (K.S.A. 24-1203)

1. Signed by at least 20% of landowners and representing 25% of acreage within proposed district
2. “Watershed” defined as “all of the area within the state draining toward a selected point on any watercourse, stream, lake or depression.” (K.S.A. 2010 Supp. 24-1202(g))
3. Contents of petition. (K.S.A. 2010 Supp. 24-1204)
 - a) Description of lands to be included.
 - b) Statement of purposes.
 - c) Statement of number of persons on board of directors—uneven number not less than three and not more than 15—designated in petition as original steering committee.
 - d) Map showing lands to be included and any sub watersheds therein, **prepared in consultation with the chief engineer of the division of water resources of the Kansas department of agriculture.**
 - e) **If any part of an incorporated city is included within proposed boundaries of district, there must be election called by city of those qualified voters in area proposed to be included.** (K.S.A. 24-1205)
 - 1) If disapproved by voters, city land is excluded from district.

- 2) If approved by voters, city land is included within district.
4. Counterpart of petition must be circulated within proposed boundaries of district. (K.S.A. 24-1205)
 - a) Counterpart petition and signature sheets are forwarded to county clerk and secretary of state.
 - b) Secretary of state determines sufficiency and qualifications of signers.
5. If secretary of state finds petition sufficient, forwards to chief engineer (K.S.A. 24-1206)
 - a) Chief engineer "shall institute an investigation of...proposed district, its territory and purposes and, within 90 days after receipt...shall transmit a written report of the chief engineer's findings on the petition....with the chief engineer's written approval or disapproval of the petition to the secretary of state and the acting chairperson of the steering committee named in the petition...."
 - b) Chief engineer must approve petition if finds and discloses in engineer's report all of the following (K.S.A. 24-1206):
 - 1) Lands in proposed district represent a watershed;
 - 2) Proposed district do not include land in existing watershed;
 - 3) Statement of purposes in petition conforms to act;
 - 4) Lands in proposed district are "subject to erosion, floodwater or sediment damage or would be benefited by the construction of works for the conservation, development, utilization or disposal of water;
 - 5) Boundary of district is defined, "as far as practicable, so as to include all quarter-quarter sections of which more than ½ of each is within the watershed;
 - 6) "Downstream limit of ...district is established with due regard to the location of highways and railroads and the location and character of existing works of improvement, the boundaries of any organized levee, drainage, irrigation and watershed districts, and the physical characteristics of and the probable relative effect of the operation of the proposed district upon any flood plane area common to both the stream or watercourse and any other stream or watercourse; and
 - 7) Map attached to petition conforms to the map "previously prepared in consultation with the chief engineer.
- B. Within 10 days of receipt of chief engineer's report approving petition, chair of steering committee calls meeting of committee. (K.S.A. 24-1207)
 1. Steering committee elects board of directors consistent with number in petition.
 2. Board of directors selects from their number a president, vice-president, secretary and treasurer.
 3. Board of directors must, by resolution, call for election of the qualified voters of the district to submit question of whether district should be organized as set out in petition (as amended or revised by the chief engineer).

4. Board of directors must designate voting locations within district, and appoint three judges and two clerks for each voting place.
 5. Election returns are provided to the board of directors, who must canvass the votes.
 6. Election results are certified to the secretary of state.
 7. If majority of those voting approve, secretary of state shall issue to board of directors a certificate of incorporation for the district.
 8. No legal action may be filed challenging incorporation of district after 90 days from the issuance of secretary of state's incorporation.
- C. If voters in district disapprove organization of the district, or if chief engineer refuses to approve petition, board or directors or steering committee named in petition continues to function for following purposes (K.S.A. 24-1208):
1. Board or steering committee must determine amount necessary to pay all costs and expense incurred in the preparation and filing of petition and in conducting the election and certify statement of those costs to Riley County Clerk.
 2. County clerk must ascertain total assessed value of all taxable tangible property within district and certify that value to the county clerk of the county in which acting chair of the board of steering committee of the proposed district resides.
 3. County clerk must determine levy necessary to be spread against taxable tangible property in entire proposed district to raise funds sufficient to pay amount in certified statement.
 4. Clerk shall cause such levy to be extended against such taxable tangible property within boundaries of proposed district.
 5. Riley County Treasurer shall remit funds raised by such levy to county in which acting chair person of the board of steering committee resides.
 6. County treasurer shall hold such funds and honor warrants drawn upon them by acting chair of the board or steering committee and countersigned by acting secretary of the board of steering committee in payment of the costs and expenses incurred in the proposed organization of the district, as reflected in the certified statement.

V. Watershed Districts—Resolution by BOCC—an Alternative Formation Procedure.

- A. Watershed District may be formed by passage of a resolution by BOCC. (K.S.A. 24-1203a)
1. BOCC resolution has effect of “proposing the establishment of” a watershed district;
 2. BOCC resolution appoints a steering committee;
 3. BOCC resolution **must include at least same information required in an “ordinary” petition** as described above, at paragraph I.A.2., above, **but also the following requirements exist:**
 - a) Lands within the proposed district “comprise substantially a watershed...as determined by the chief engineer;”
 - b) In preceding 5 years, governor has issued a proclamation declaring state of disaster emergency in Riley County, due to flooding;

c) Cost of all projects of district must be paid by a general levy on all taxable property within district.

B. Language of this alternative formation procedure (K.S.A. 24-1203a) states it is “**In lieu of the procedures provided by K.S.A. 24-1203, 24-1204 and 24-1205.**” (emphasis added)

1. A key portion of K.S.A. 24-1205, as described above at paragraph IV.A.3.e, is that portion requiring “city” resident voter approval if the boundaries of a proposed district include any portion of an incorporated city.
2. **The plain language of K.S.A. 24-1203a suggests the BOCC has authority, when forming a watershed district by resolution, to include land within the city limits of Manhattan without the requirement of obtaining approval from those city residents within the proposed district.**
3. Another key distinction in the formation process under this “alternative” method is that there is no required circulation of a petition among the residents of the proposed district, since K.S.A. 24-1205 is inapplicable to watershed districts proposed directly by the BOCC.
4. K.S.A. 24-1203a’s language making this “alternative” formation procedure “in lieu of” 3 listed statutory provisions is far less important regarding K.S.A. 24-1203 and K.S.A. 24-1204.

a) K.S.A. 24-1203 concerns only signature requirements on a petition (a document the BOCC is not presented with in this “alternative procedure”)

b) K.S.A. 24-1204 concerns only additional formal requirements of such a petition.

C. If the BOCC passes a resolution proposing organization of a watershed district the remaining formation steps are almost identical to that begun by petition:

1. Since verification of “petition” signatures is unnecessary, upon passage of the resolution, it is transmitted directly to the chief engineer. (K.S.A. 24-1203a)
2. Chief engineer has the same duties and authorities when reviewing the resolution, as that engineer has when reviewing a petition (K.S.A. 24-1206; see IV.A.5.a), b), above).
3. Chair of steering committee has same duties and authorities upon receipt of the resolution approved (or as amended) from the chief engineer (K.S.A. 24-1207; see IV.B.1-8, above)
4. If voters in the proposed district disapprove organization of the district, or if chief engineer refuses to approve resolution, board of directors or steering committee named in the resolution continues to function for the purposes of assessing residents of the proposed district for the costs incurred (K.S.A. 24-1208; see IV.C.1-6, above).

VI. Watershed Districts—Powers.

A. Like drainage districts, watershed districts have extensive powers, probably best viewed in the language of the statute itself, K.S.A. 24-1209: Each watershed district incorporated under the provisions of this act shall be a body politic and corporate and shall have the power:

First. To adopt a seal.

Second. To sue and be sued by its corporate name.

Third. To purchase, hold, sell and convey land and personal property and to execute such contracts as may, by its board of directors, be deemed necessary or convenient to enable it to properly carry out the purpose for which organized.

Fourth. To construct, improve, maintain and operate works of improvement including such facilities and appurtenances as necessary for the conservation of soil, prevention of floods, disposal of water and the conservation, development and utilization of water for domestic, municipal, agricultural, industrial, recreational purposes and such other uses as may be authorized by the provisions of K.S.A. 82a-701 to 82a-725, inclusive, and any amendments thereto; and in any case where the construction, improvement or operation of such works causes the substantial displacement of a wildlife habitat and when required by the soil conservation service of the United States department of agriculture as a condition precedent to the release of federal funds for such works, to acquire land for the purpose of restoring such wildlife habitat. The power of eminent domain shall not be used for any such acquisition.

Fifth. To operate or lease any and all district properties and facilities associated with the use of water and to collect reasonable fees, rentals, tolls, and charges for the use of such facilities, said revenue to be placed in the maintenance fund of the district. Where the property is leased the lessee or anyone authorized to collect such fees, rentals, tolls and charges shall conform to a schedule approved by the board of directors of the district.

Sixth. To employ such professional services and other assistance as is, by its board of directors, deemed essential. Soil conservation engineering services may be used whenever available.

Seventh. To acquire personal property by gift or purchase.

Eighth. To acquire land and interests in land by gift, purchase, exchange or eminent domain; such power of eminent domain to be exercised within or without the boundaries of the district in like manner as provided by K.S.A. 26-501 to 26-516, inclusive, or any amendments thereto.

Ninth. To levy taxes and assessments, issue bonds and incur indebtedness within the limitations prescribed by this act.

Tenth. To cooperate and contract with persons, firms, associations, partnerships and private corporations, and with other watershed districts, drainage districts, and cities of all classes of this state, and with drainage districts, watershed districts, or other public corporations organized for similar purposes in any adjoining state and with other local, state and federal governmental agencies and to enter into co-operative contracts and agreements with any such districts, corporations or agencies.

Eleventh. (a) To take appropriate actions to extend and transfer the territory of the district, receive territory transferred from other districts, and dissolve all or a portion of the district as provided for in this act; (b) to merge with adjoining watershed districts, subject to approval of a majority of the qualified voters voting on the proposition in each of the districts proposing to merge.

Twelfth. To select a residence or home office for the watershed district, which shall be at a place in a county in which the watershed district or any part thereof is located and may be either within or without the watershed district as may be designated by the board of directors. The board shall thereupon designate the county in which said residence or home office is located as the official county for the filing of all official acts and levies. After an official county has been so designated, said county designation shall not be changed even though the residence or home office of said watershed district may be changed at a later date.

B. All watershed district powers are exercised by its board of directors (K.S. A. 24-1210). Each member

serves term of 3 years. They “shall serve without compensation, but shall be allowed actual and necessary expenses incurred in the performance of their duties.”

1. Not less than 12 nor more than 13 months from the date of recording of the certificate of incorporation, must hold its first of **at least annual** meetings—purpose of such meetings being to elect board members whose terms are ending and to “render a report on the financial condition and activities of the district, including the estimated construction date of all proposed projects to be initiated within the next five years and the boards’ determination as to whether each of these projects is still cost effective and in the current public interest.” (K.S.A. 24-1211)
2. Board must also meet at least quarterly. (K.S.A. 24-1212) Majority of directors shall qualify as a quorum, “and in the absence of any of the duly elected officers of the district a quorum at any meeting may select a director to act as such officer pro tem.” All meetings of the board shall be open to the public. Copies of minutes shall be provided to the state conservation commission.

C. Initial Expenses of the Watershed District. (K.S.A. 24-1219)

1. Board of directors may issue “no-fund warrants to pay for initial organizational, engineering, legal and administrative expenses of the district,” provided amount issued “shall not exceed the product of two mills times the assessed valuation of the taxable tangible property within the district.” Board must levy “at the first tax levying period, after such warrants are issued, sufficient to pay such warrants and interest.”
2. Following its incorporation, board may levy tax of not more than two mills to “create a general fund for the payment of engineering, legal, clerical, land and interests in land, installation maintenance, operation and other administrative expenses and such tax may be against all of the taxable, tangible property of the district.”
3. Board may increase that levy by resolution up to a total of four mills. That resolution for an increased levy must be published and is subject to protest petition.
4. Board may establish a “structure maintenance fund.” “The fund shall consist of moneys deposited therein from funds received according to provisions of the watershed district law. Money in that fund may be used for “engineering, reconstruction and other required maintenance and other expenses relating to the maintenance of a structure.”
5. If improvement bonds are issued, board has authority to levy tax “sufficient to pay such bonds and interest.”

D. Projects of Watershed Districts.

1. General Plan. (K.S.A. 24-1213)

- a) Upon incorporation, board must begin preparing a “general plan of the district.”
- b) Must also prepare an estimate of cost for installation, maintenance and operation of the proposed projects “and information as to the location and extent of areas that would be benefited by the proposed” projects.
- c) Once general plan and estimates of costs completed, board must examine and, if board approves of them, transmit “a complete copy...to the chief engineer.”
- d) Chief engineer shall examine plans as to:

- 1) "Feasibility."
 - 2) "Co-ordination of the plan with any general plan for the watershed of which the district might be a part."
 - 3) "The safety of the works and improvements proposed."
 - 4) "Conformity with the "intents and purposes of this act." (K.S.A. 24-1213)
- e) Chief engineer must provide board written report with any changes or modifications and such report must either approve or disapprove of the general plan. (K.S.A. 24-1213)
2. Financing of projects in the general plan. Once the general plan is approved by the chief engineer, board shall pass a resolution that proposed cost to district of all projects identified be paid by either general levy against all taxable property in the district; by special assessment against lands within district specially benefited; or that both a general levy and special assessment be used. (K.S.A. 24-1214)
- a) Board must set a time and place for public hearing on the general plan and resolution proposing method of financing projects. Following such hearing, board must pass resolution adopt as "official" or reject the general plan and method of financing, or determine one or both should be modified.
 - b) Any modified general plan must be provided to the chief engineer for "further consideration." After review, chief engineer shall submit to board a "supplemental" report of the engineer's review of the modified general plan. If such modified plan is approved by chief engineer, board shall pass a resolution adopting it as the "official general plan of the district."
 - c) If board cannot carry out a general plan because a bond issue fails before the electors, or because insufficient funds are generated by a bond issue, the board may reconsider the general plan, the method of financing, or both items.
 - d) If resolution of financing authorizes issuance of improvement bonds payable by either the entire district or by properties specially benefitted, an election within the district must be called by the board. (K.S.A. 24-1215)
 - e) If resolution of financing proposes to pay all costs through a general levy, with no bond issuance, board must publish resolution. It will become effective in 30 days unless petitions are signed by landowners of the district in excess of 20% of the landowners. If sufficient petitions are filed, an election must be held.
 - f) If resolution of financing proposes special assessments be used on lands "especially benefited," the board must appoint 3 appraisers who shall provide a recommendation of apportionment of the special assessment to the lands benefited. (K.S.A. 24-1217)
3. Sequence of projects in the general plan. (K.S.A. 24-1216) After adoption of the general plan and method of financing, board may determine order of projects. Detailed construction plans and cost estimates from an engineer may be considered. If board approves those plans and estimates, **they shall provide a copy of those documents to the chief engineer.** Chief engineer shall review and provide written report to the board with any changes or modifications engineer believes are necessary.

- a) 10 years after adoption of the general plan and “every five years thereafter” board shall review it and decide if projects in original plan “are still feasible and in the public interest.”
- b) Report of the board’s review shall be given at a public meeting “called for that purpose.”
- c) If all projects in general plan are complete, no such review is required.
- d) If the board makes “revisions or amendments” to the general plan as a result of this review, they shall be provided to the chief engineer for review.

VII. Watershed Districts—Enlargement (or transfer of territory).

A. Chief engineer has authority to transfer territory from a watershed district “to any other adjacent watershed district...” (K.S.A. 24-1222).

- 1. Petition must be submitted to chief engineer showing both watershed districts agree with the transfer and it will “result in more efficient operation of both districts...” (K.S.A. 1223)
- 2. A hearing on the petition is held before the chief engineer. (K.S.A. 24-1224)
- 3. If chief engineer finds statements in petition are true, engineer shall declare detachment of territory from one district and its addition to the other district. (K.S.A. 24-1225) Chief engineer may also reject the petition.
- 4. Balance of any bonded indebtedness, including temporary notes unpaid remains “a charge upon the territory transferred.” The transferred territory does not assume any portion of such outstanding debt existing within the district to which it is attached. (K.S.A. 24-1226)

B. **Extension of Boundary of District.** Upon presentation of a petition, the secretary of state, if approved by the chief engineer, may extend territory of watershed district. (K.S.A. 24-1227)

- 1. Petition must describe area to be annexed;
- 2. Identify watershed district the petitioners wish to join;
- 3. Attach a map showing area to be annexed;
- 4. Show the proposed extension has been “recommended by the watershed district concerned by resolution duly adopted by its board.”

VIII. Watershed Districts—Complete or Partial Dissolution.

A. Complete Dissolution of Watershed District. (K.S.A. 24-1228)

- 1. Once incorporated, if district has “**for more than eight years**...not adopted a general plan of work and projects to be undertaken by the district, constructed or contracted to construct any works of improvement or incurred any continuing obligations for maintenance of any works of improvement, or when such a district has been organized an incorporated under such provisions **for more than four years** and has not made substantial progress toward a general plan of work and projects to be undertaken by the district,” it is subject to dissolution.
 - a) If resolution is adopted by 2/3 vote of all district board members present and voting, “but in no event less than a majority of all members of such board at a special meeting of such board called for that purpose” may call for election on question of dissolving district;
- or**

- b) If written petitions signed by 20% of landowners are submitted, calling for such an election, board must call election.
- c) If a majority of those voting favor dissolution, board “shall immediately certify the results of such election to the secretary of state... .” The secretary shall provide the secretary of the board with a certificate of dissolution.

B. Partial Dissolution of Watershed District. (K.S.A. 24-1229)

1. Chief engineer may dissolve only a portion of a watershed district, upon receipt of an appropriate petition.
 - a) Petition must describe portion of district to be dissolved;
 - b) Petition must show dissolution requested by majority of board “or majority of the landowners in the territory to be dissolved.”
2. Chief engineer must hold a hearing.
 - a) Duty of petitioners to “show satisfactory evidence in support of the requested dissolution.”
 - b) If chief engineer finds dissolution “will not substantially impair the effectiveness of a general plan of the district which has been approved by the chief engineer, he shall transmit a written report of his findings ...together with his written approval or disapproval of the petition, to the secretary of state and the secretary of the board.”
 - c) Secretary of state shall issue a certificate of dissolution regarding that portion of the land identified in the petition.
3. Directors are notified of partial or complete dissolution of watershed district
 - a) When secretary of board receives certificate of complete or partial dissolution from the secretary of state, secretary must notify directors.
 - b) Directors must “immediately pay all obligations of said district or portion thereof, including all costs incurred by the district, the chief engineer and secretary of state in regard to the dissolution proceedings, and the treasurer shall thereupon distribute all moneys in his hands belonging to the district or portion thereof in the manner prescribed by this act, and immediately after making such distribution, the treasurer shall notify the secretary of such distribution.”
4. Funds of Partially or Completely Dissolved District. (K.S.A. 24-1231)
 - a) All funds of completely dissolved district must be divided among the townships or cities within the district “in the proportion which the assessed valuation of property in said watershed district located within the township or city bears to the total assessed valuation of the watershed district, based on equalized assessed valuations for the preceding year.”
 - b) Any funds of watershed district “which is partially disorganized and dissolved by the provisions of this act shall be apportioned and paid to the township or cities located within or partly within the dissolved portion of said watershed district and retained by the remaining portion of said watershed district in the proportions which the assessed valuation of property in the dissolved portion of said watershed district located within the township or city and the assessed value of property in the undissolved portion of said watershed district bear to the total assessed valuation of the watershed district based on equalized assessed valuations for the preceding year.

Appendix 4: City & County Adoption Documents

ORDINANCE NO. 7047

AN ORDINANCE AMENDING THE MANHATTAN URBAN AREA COMPREHENSIVE PLAN.

WHEREAS, the Manhattan Urban Area Comprehensive Plan, was adopted by the Manhattan Urban Area Planning Board by the adoption of the publication known as the “Manhattan Urban Area Comprehensive Plan, dated April 2003” (the “MUACP”) on April 21, 2003; and

WHEREAS, the Governing Body of the City of Manhattan, Kansas, pursuant to K.S.A. 12-747, adopted and approved the MUACP, by adoption of Ordinance No. 6350, dated June 17, 2003; and

WHEREAS, the MUACP currently consists of the base document, which is actually entitled the Manhattan Urban Area Comprehensive Plan, dated April 2003, and nine other separately bound documents, which are incorporated into the base document, and which are entitled: a) the Poyntz Avenue Corridor District Plan; b) the Grand Mere Community Master Plan; c) Downtown Tomorrow, A Redevelopment Plan For Downtown Manhattan, Kansas; d) the Manhattan Area Transportation Strategy: Connecting To 2020; e) Housing Manhattan: Planning For the Future; f) the Aggieville-Campus Edge District Plan, dated August 2005; g) the US 24 Corridor Management Plan, dated September 2009; h) the Gateway to Manhattan, dated April 2011; and i) the Eureka Valley – Highway K-18 Corridor Plan, dated April 2013.

WHEREAS, the Manhattan Urban Area Planning Board and the Governing Body of the City of Manhattan, Kansas, desire to amend the Manhattan Urban Area Comprehensive Plan, in order to guide the development or redevelopment of the Manhattan Urban Area and the City of Manhattan, Kansas, by incorporating into the MUACP that certain document known as the Wildcat Creek Floodplain Management Plan, dated November, 2013; and

WHEREAS, the Wildcat Creek Floodplain Management Plan, dated November 2013, provides guidance for managing and reducing flood hazards along Wildcat Creek, and for maintaining and enhancing natural floodplain assets and related land resources within the floodplain. Managing and reducing flood risk is a shared responsibility of local communities, the county, state, and federal agencies. The Plan inventories flood hazards along various reaches of Wildcat Creek and its tributaries and provides a description of the public engagement process, goals and objectives, strategies and tools, and the Action Plan for achieving the goals. The Wildcat Creek Floodplain Management Plan is a sub-part of the Riley County Multi-Jurisdiction Hazard Mitigation Plan, which is the local comprehensive emergency response and mitigation plan; and,

WHEREAS, the City of Manhattan and Riley County, Kansas have worked together to develop the Wildcat Creek Floodplain Management Plan, dated November, 2013; and,

WHEREAS, pursuant to provisions of K.S.A. 12-747, the Manhattan Urban Area Planning Board gave proper notice in the official City newspaper and held a public hearing on

Monday, September 16, 2013, at which time due consideration was given to all comments and remarks relating to this amendment; and

WHEREAS, following said public hearing a majority of the Manhattan Urban Area Planning Board members approved Resolution No. 091613 amending the Manhattan Urban Area Comprehensive Plan by incorporating into the MUACP that certain document known as the Wildcat Creek Floodplain Management Plan, dated November, 2013; and,

WHEREAS, the Governing Body of the City of Manhattan, Kansas, has considered this Ordinance at two meetings;

NOW, THEREFORE, BE IT ORDAINED BY THE GOVERNING BODY OF THE CITY OF MANHATTAN, KANSAS:

SECTION 1. The Comprehensive Plan for the development or redevelopment of the Manhattan Urban Area and the City of Manhattan, Kansas, is hereby reestablished by amendment of the MUACP, as set forth hereinafter.

SECTION 2. The Manhattan Urban Area Comprehensive Plan is hereby amended by incorporating that certain document known as the Wildcat Creek Floodplain Management Plan, dated November, 2013, into the MUACP.

SECTION 3. The necessary cross-references to the Wildcat Creek Floodplain Management Plan, dated November, 2013, are added to Chapter 5 of the base document.

SECTION 4. The publication known as the “Manhattan Urban Area Comprehensive Plan, dated April 2003,” (the “MUACP”) is hereby readopted and incorporated by reference. Following this amendment, the MUACP consists of the base document, which is actually entitled the Manhattan Urban Area Comprehensive Plan, dated April 2003, and ten other separately bound documents, which are incorporated into the base document, and which are entitled: a) the Poyntz Avenue Corridor District Plan; b) the Grand Mere Community Master Plan; c) Downtown Tomorrow, A Redevelopment Plan For Downtown Manhattan, Kansas; d) the Manhattan Area Transportation Strategy: Connecting To 2020; e) Housing Manhattan: Planning For the Future; f) the Aggieville-Campus Edge District Plan, dated August 2005; g) the US 24 Corridor Management Plan, dated September 2009; h) the Gateway to Manhattan, dated April 2011; i) the Eureka Valley – Highway K-18 Corridor Plan, dated April 2013; and, j) the Wildcat Creek Floodplain Management Plan, dated November, 2013. One copy of such publication shall be marked or stamped “Official Copy as Adopted and Incorporated by Ordinance No. 7047”, and shall be attached to a copy of this ordinance and filed with the City Clerk and open for inspection and available to the public at all reasonable hours. All administrative departments of the City charged with enforcement of the Land Use Element shall be supplied, at the cost of the City, such number of official copies, similarly marked, as may be deemed expedient.

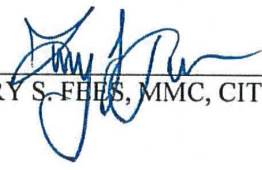
SECTION 5. All prior Ordinances in conflict herewith are hereby repealed.

SECTION 6. This Ordinance shall take effect and be in force from and after its passage and publication in The Manhattan Mercury.

PASSED AND ADOPTED THIS 5TH DAY OF NOVEMBER, 2013, BY THE GOVERNING BODY OF THE CITY OF MANHATTAN, KANSAS.



ATTEST:


GARY S. FEES, MMC, CITY CLERK


JOHN E. MATTA, MAYOR

RESOLUTION NO. 112513-73

A RESOLUTION AMENDING THE MANHATTAN URBAN AREA COMPREHENSIVE PLAN AND VISION 2025 – A COMPREHENSIVE PLAN FOR RILEY COUNTY, KANSAS

WHEREAS, the Manhattan Urban Area Comprehensive Plan, was adopted by the Manhattan Urban Area Planning Board by the adoption of the publication known as the “Manhattan Urban Area Comprehensive Plan, dated April 2003” (the “MUACP”) on April 21, 2003; and

WHEREAS, the Manhattan Urban Area Comprehensive Plan, was adopted by the Riley County Planning Board by the adoption of the publication known as the “Manhattan Urban Area Comprehensive Plan, dated April 2003” (the “MUACP”) on April 21, 2003; and

WHEREAS, the Board of Commissioners of Riley County, Kansas, pursuant to K.S.A. 12-747, adopted and approved the MUACP, by adoption of Resolution No. 060303-56, dated June 3, 2003; and

WHEREAS, Vision 2025 – A Comprehensive Plan for Riley County, Kansas, was adopted by the Riley County Planning Board by the adoption of the publication known as “Vision 2025 – A Comprehensive Plan for Riley County, Kansas 2009” (“Vision 2025”) on October 7, 2009; and

WHEREAS, the Governing Body of Riley County, Kansas, pursuant to K.S.A. 12-747, adopted and approved Vision 2025, by adoption of Resolution No. 102209-31, dated October 22, 2009; and

WHEREAS, the MUACP currently consists of the base document, which is actually entitled the Manhattan Urban Area Comprehensive Plan, dated April 2003, and nine other separately bound documents, which are incorporated into the base document, and which are entitled: a) the Poyntz Avenue Corridor District Plan; b) the Grand Mere Community Master Plan; c) Downtown Tomorrow, A Redevelopment Plan For Downtown Manhattan, Kansas; d) the Manhattan Area Transportation Strategy: Connecting To 2020; e) Housing Manhattan: Planning For the Future; f) the Aggieville-Campus Edge District Plan, dated August 2005; g) the US 24 Corridor Management Plan, dated September 2009; h) the Gateway to Manhattan, dated April 2011; and i) the Eureka Valley – Highway K-18 Corridor Plan, dated April 2013; and

WHEREAS, the Riley County Planning Board and the Board of Commissioners of Riley County, Kansas desire to amend the Manhattan Urban Area Comprehensive Plan, in order to guide the development or redevelopment of the Manhattan Urban Area and the City of Manhattan, Kansas, by incorporating into the MUACP that certain document known as the Wildcat Creek Floodplain Management Plan, dated November 2013; and

WHEREAS, the Riley County Planning Board and the Board of Commissioners of Riley County, Kansas desire to amend Vision 2025 – A Comprehensive Plan for Riley County, Kansas, in order to guide the development of unincorporated areas of Riley County, by

incorporating into Vision 2025 that certain document known as the Wildcat Creek Floodplain Management Plan, dated November 2013; and

WHEREAS, the Wildcat Creek Floodplain Management Plan, dated November 2013, provides guidance for managing and reducing flood hazards along Wildcat Creek, and for maintaining and enhancing natural floodplain assets and related land resources within the floodplain. Managing and reducing flood risk is a shared responsibility of local communities, the county, state, and federal agencies. The Plan inventories flood hazards along various reaches of Wildcat Creek and its tributaries and provides a description of the public engagement process, goals and objectives, strategies and tools, and the Action Plan for achieving the goals. The Wildcat Creek Floodplain Management Plan is a sub-part of the Riley County Multi-Jurisdiction Hazard Mitigation Plan, which is the local comprehensive emergency response and mitigation plan; and

WHEREAS, the City of Manhattan and Riley County, Kansas have worked together to develop the Wildcat Creek Floodplain Management Plan, dated November, 2013; and

WHEREAS, pursuant to provisions of K.S.A. 12-747, the Manhattan Urban Area Planning Board gave proper notice in the official City newspaper and held a public hearing on Monday, September 16, 2013, at which time due consideration was given to all comments and remarks relating to this amendment; and

WHEREAS, following said public hearing a majority of the Manhattan Urban Area Planning Board members approved Resolution No. 091613 amending the Manhattan Urban Area Comprehensive Plan by incorporating into the MUACP that certain document known as the Wildcat Creek Floodplain Management Plan, dated November, 2013; and

WHEREAS, pursuant to provisions of K.S.A. 12-747, the Riley County Planning Board gave proper notice in the official County newspaper and held a public hearing on Monday, November 18, 2013, at which time, due consideration was given to all comments and remarks relating to these amendments; and

WHEREAS, following said public hearing a majority of the Riley County Planning Board members approved Resolution No. 111813 amending the Manhattan Urban Area Comprehensive Plan and Vision 2025 – A Comprehensive Plan for Riley County, Kansas by incorporating into the MUACP and Vision 2025 that certain document known as the Wildcat Creek Floodplain Management Plan, dated November, 2013.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COMMISSIONERS OF RILEY COUNTY, KANSAS:

SECTION 1. The Manhattan Urban Area Comprehensive Plan is hereby amended by incorporating that certain document known as the Wildcat Creek Floodplain Management Plan, dated November 2013, into the MUACP.

SECTION 2. The necessary cross-reference to the Wildcat Creek Floodplain Management Plan, dated November 2013, is hereby added to Chapter 5 of the base document.

SECTION 3. Following this amendment, the MUACP shall consist of the base document, which is actually entitled the Manhattan Urban Area Comprehensive Plan, dated April 2003, and ten other separately bound documents, which are incorporated into the base document, and which are entitled: a) the Poyntz Avenue Corridor District Plan; b) the Grand Mere Community Master Plan; c) Downtown Tomorrow, A Redevelopment Plan For Downtown Manhattan, Kansas; d) the Manhattan Area Transportation Strategy: Connecting To 2020; e) Housing Manhattan: Planning For the Future; f) the Aggieville-Campus Edge District Plan, dated August 2005; g) the US 24 Corridor Management Plan, dated September 2009; h) the Gateway to Manhattan, dated April 2011; i) the Eureka Valley – Highway K-18 Corridor Plan, dated April 2013; and, j) Wildcat Creek Floodplain Management Plan, dated November 2013.

SECTION 4. Vision 2025 – A Comprehensive Plan for Riley County, Kansas is hereby amended by incorporating that certain document known as the Wildcat Creek Floodplain Management Plan, dated November 2013, into Vision 2025.

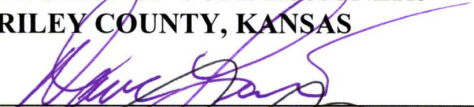
SECTION 5. The necessary cross-reference to the Wildcat Creek Floodplain Management Plan, dated November 2013, is hereby added to Chapter 6 of the Vision 2025 document.

SECTION 6. All prior Resolutions in conflict herewith are hereby repealed.

SECTION 7. This Resolution shall take effect and be in force from and after its passage and publication in The Manhattan Mercury.

ADOPTED THIS 25th DAY OF NOVEMBER, 2013.

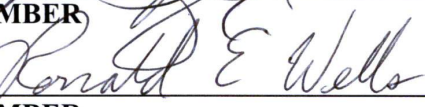
**THE BOARD OF COMMISSIONERS
OF RILEY COUNTY, KANSAS**



CHAIRMAN



MEMBER



MEMBER

ATTEST:



RICH VARGO
Riley County Clerk



