INTRODUCTION

Southwest Missouri is known for its extreme range in weather that can cause flash flooding in a moment's notice. This flooding can unfortunately lead to extreme damage and serious injury, or even loss of life. The combination of Monett's average annual rainfall of over 44 inches and the area's topography, which funnels the storm water runoff directly through the downtown, has created a serious flooding problem for the community and hampers the economic development of the city center.

The topography around the City of Monett is primarily level pasture land. Within the city limits the topography drops roughly 100 feet to its lowest point in the downtown area at Clear Creek and Kelly Creek.

The 2002 FEMA study of the rainfall and storm drainage of the area stated that during a 100-year flood event there would be approximately 18,000 cubic feet of water flowing through the main channel on the west side of town. This translates to over 133,200 gallons of water per second. The current strategy of channelizing this storm water increases the velocity and force of the water and the risk to public safety.

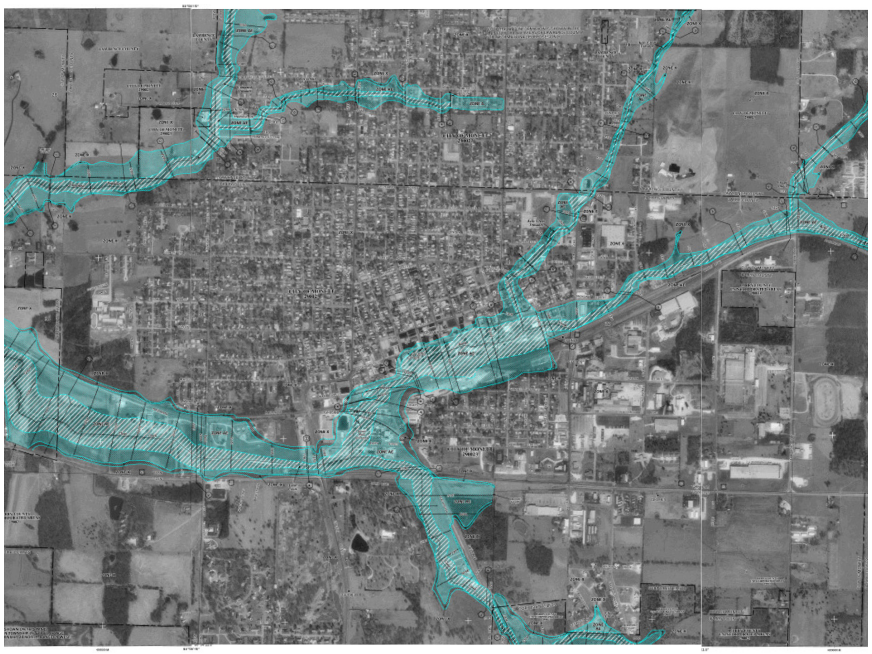

Figure 4.1.1 2008 FEMA flood map

FLOODING PHASING

We recommend that the city and county develop a multi-year phased flood mitigation plan.

- The first phase should include the development of water retention ponds in South Park and a new park northeast of downtown along the Kelly Creek drainage system to slow the speed of water and to decrease the volume of water flowing through the downtown.

  Also as a part of phase one, the city should acquire the land between Highway 37 and Kyler Street from the channelized storm drainage system to the railroad property and create a City Center Park. Within this area, the flood prone buildings and the channelized storm drainage system should be removed and the land contoured to create a tiered storm water retention area. This would allow the storm waters to flow across a larger controlled space and, thus, slow the speed of the water, reduce the safety hazard and help recharge the aquifer.

- The second phase should be the systematic purchase and land-banking of property in the watershed to the east and south of the community. This watershed conservation land should remain undeveloped or be developed using low-impact best practices to allow storm water to infiltrate into the ground, recharge the aquifer and reduce the amount of water passing through the channelized system.

- The third phase should be the review, strengthening and establishment of city and county zoning laws and regulations pertaining to storm water management best practices.

- The final phase should be the creation of a regional water conservation program that instructs and encourages all citizens to use low-impact best practices to reduce their property's storm water run-off.

Figure 4.2.1 Low-impact storm water design

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NORTH PARK

Kelly Creek Watershed

The Kelly Creek watershed east of Monett covers an area of approximately 5.2 square miles of surrounding pastureland. Kelly Creek flows into the downtown area from the east where it merges with Clear Creek; at flood stage, the Kelly Creek drainage system contributes approximately 144,000 gallons per second to the flood waters in the city center.

We recommend the development of a series of retention basins on Kelly Creek east of the city limits and downtown to control the volume of flood waters and release it into the Kelly Creek and Clear Creek drainage system in a more controlled manner. We recommend the construction of a series of weirs on Kelly Creek that will pond the water at specified depths. Excess water will be discharge over the spillways from one retention pond to the next. Such a series of retention ponds along the Kelly Creek drainage system would be a positive aesthetic feature and important flood control component.

Figure 4.3.1 Aerial view of existing site in north

Figure 4.3.2 Proposed rentention ponds

NORTH PARK

Figure 4.3.3 existing retention pond with greenway

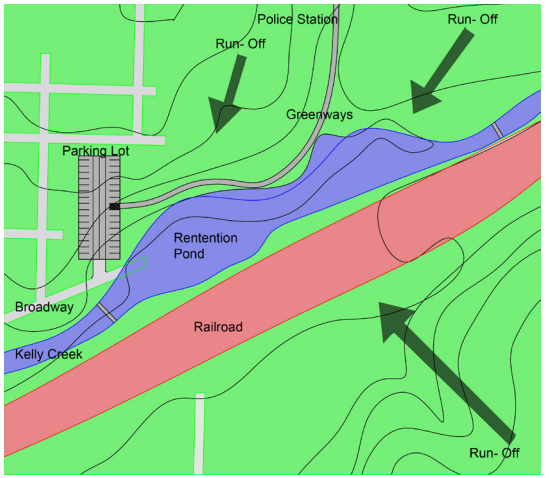

Figure 4.3.4 detailed of rentention ponds

Figure 4.3.5 spillway at existing retention pond

Figure 4.3.6 example of concrete weirs

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SOUTH PARK

Clear Creek Watershed

The Clear Creek watershed south of Monett covers an area of approximately 7.3 square miles. Clear Creek flows east of South Park and under Highway 60 into the downtown area where it merges with Kelly Creek; at flood stage, the Clear Creek drainage system contributes approximately 41,500 gallons per second to the flood waters in the city center.

We recommend the development of a series of retention basins on Clear Creek at the South Park location to slow the flood waters and release it into the Kelly Creek system in a more controlled manner. At the South Park location we recommend the construction of a series of weirs on Clear Creek that will pond the water at specified depths. Excess water will be discharge over the spillways from one retention pond to the next. Such a series of retention ponds in South Park would be a positive aesthetic feature and important flood control component.

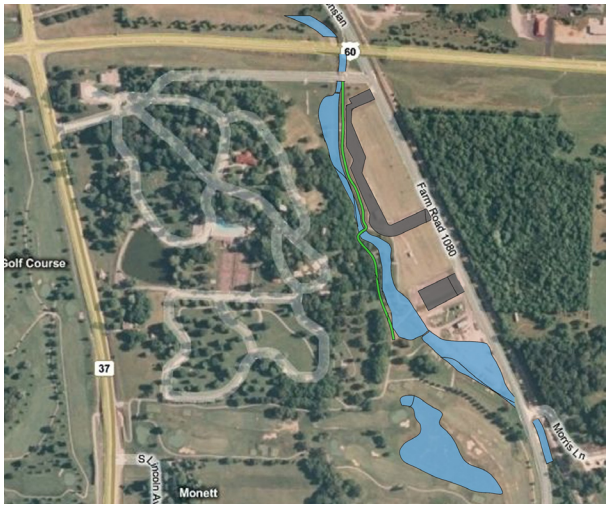

Figure 4.4.1 Proposed rentention ponds

Figure 4.4.2 Aerial view of existing South Park

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Figure 4.4.3 Rentention pond in Ozark, Missouri

Figure 4.4.4 Spillway in rentention pond

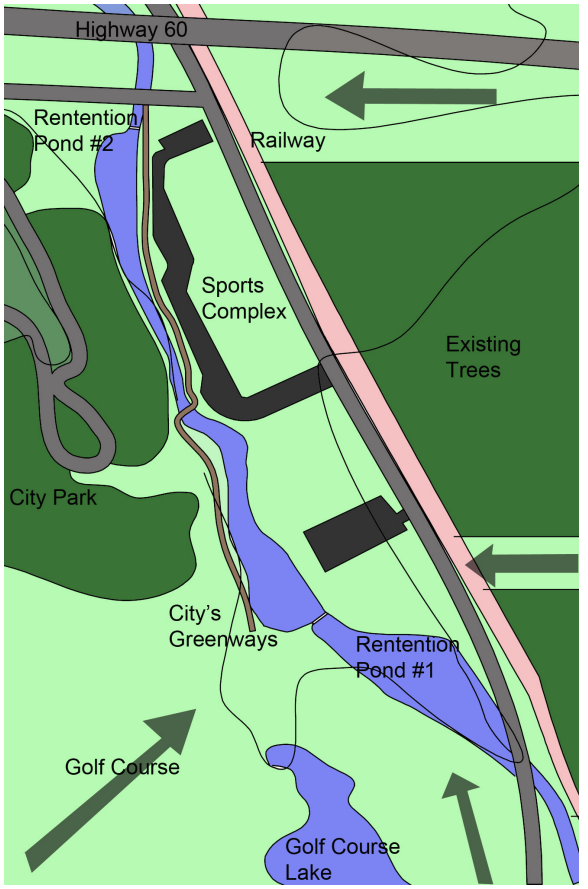

Figure 4.4.5 Detail of retnetion ponds

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Watershed in Center City Park

- **City Center – Combined Clear Creek and Kelly Creek Watersheds:**

  The flooding problem in the city center is exacerbated by the combination of the:

  - Excessive water runoff flowing through the area from both the Clear Creek and Kelly Creek watersheds
  - Channelized storm water drainage system
  - Lack of permeable surfaces

  This has contributed to the:

  - Flooding along Broadway and Front Street
  - Significant economic cost due to damage and disruption
  - Impediment to the renewal of Monett's city center

  We recommend the development of a central park–City Center Park–to be located within the floodplain between Highway 37 and Kyler Street and the channelized storm drainage system and railroad property. This property should be acquired by the city and the channelized drainage system, flood prone buildings and obstructions removed and the land converted to a park and terraced water retention area.

- **The Creation of the City Center Park**

A. Would allow for the removal of the channelized storm water drainage system in the downtown area which restricts the flow of the storm water. This restriction speeds up the water flow and increases the safety hazard. When the capacity of the channel is exceeded the water flows out of the channel and into the downtown area. By removing the channel and allowing the storm water to flow through a larger controlled retention area, the speed of the water is reduced and the safety hazard is lessened.

Additionally, all streets, parking lots, buildings and obstructions in the Central Park area should be removed to expose the ground and allow the water to percolate into the soil. By allowing the water to soak into the ground as it passes through the Central Park area it will help recharge the aquifer, reduced the flooding in the downtown and decrease the volume of discharge water leaving the city center.

The city center retention area should be constructed as a series of wide, vegetated terraced that allow the storm water to spread out as it flows through Central Park. Each tier of the terrace would be designed to accommodate increasingly larger volumes of storm water in a planned and control manner. The soil that is removed during the construction of the tiered terraces should be used to construct a physical, visual and sound buffer along the length of the railroad line adjacent to the park.

As Kelly Creek passes through Central Park it would follow the alignment of the lowest tier of the terraced system. The alignment of the creek should create a natural, meandering feature that

CITY CENTER PARK

helps to define the various activity zones within the park. Small water features can be created throughout the park by placing weirs across the creek. These water features will reinforce the natural setting of the park and add visual points of interest.

The soil that is removed during the construction of the tiered terraces should be used to construct a physical, visual and sound buffer along the length of the railroad line adjacent to the park.

As Kelly Creek passes through Central Park it would follow the alignment of the lowest tier of the terraced system. The alignment of the creek should create a natural, meandering feature that helps to define thevarious activity zones within the park. Small water features can be created throughout the park by placing weirs across the creek. These water features will reinforce the natural setting of the park and add visual points of interest.

B. Would provide a new social and recreation destination in the city center. The Central Park should be developed as an integrated natural setting that flows along and links to the Broadway Street corridor. As the character of the Broadway Street corridor changes, so should the adjacent Central Park space:

a. More passive recreational activities shouldbe located adjacent to the gateway east section

b. More formal civic and group activity spaces should be located adjacent to the city center section

c. More active recreation and mixed-use community facilities should be located adjacent to the gateway west section

C. Would help to interconnect the community through a park and greenway system running from South Park to Central Park to North Park. This park and water control network would become the backbone of the community. The park system would be accessible to the community through a series of interconnected roads, sidewalks and bicycle paths that converge at the heart of downtown in Central Park.

D. Would convert an economic deficit into a community asset by:

a. Improving the city's storm water control system and lessening the flood potential in the city center.

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b. Beautifying and improving the image of the city center.

c. Creating a new civic, social and recreational destination in the city center that would attract local and regional community members to downtown Monett.

d. Stimulating economic investment and physical renewal in the city center.

e. Reinvigorate and redefine the life of downtown Monett and make it a special destination for shopping, entertainment, recreation and living that cannot be replicated by the big box retailers, strip malls and suburbia.

E. Would strengthen the community's "Pride and Progress" image by becoming a national model for community Smart Growth principles and practices.

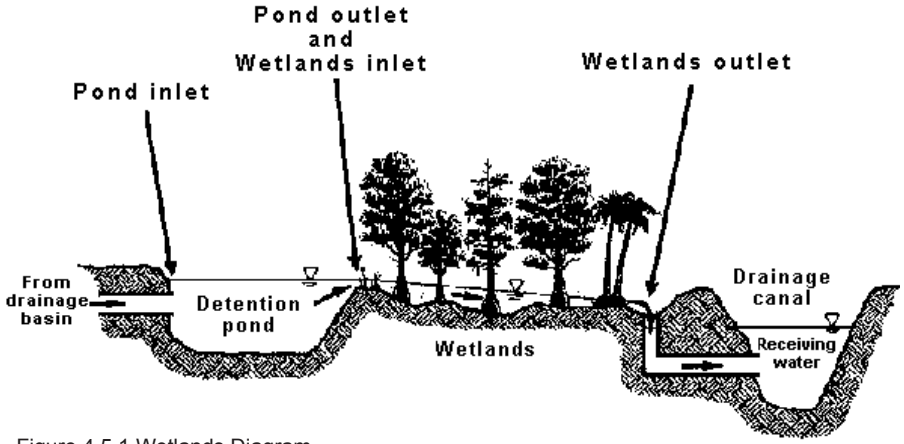

Figure 4.5.1 Wetlands Diagram

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Figure 4.5.2 Porous Pavement

Figure 4.5.3 Stamped Porous Pavement

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Additional Flooding Solutions

Landbanking

Future plans must be addressed now in order to correct the flooding in downtown Monett. One of the long term plans must be to control future development on the outer edges of the city. One way that this is done is referred to as landbanking.

The purpose of landbanking is to control development in those area by requiring low impact building to reduce the amount of run-off. This will require the city to purchase this land in the future but this will have a direct effect of the resolving flooding in the downtown area. In addition to the low impact building this land would allow for additional saturation into the ground, which over time would recharge the water table.

The water table in southwest Missouri has, over the past 50 years, begun to reach dangerously low levels due to the increase in population and the rate of construction in southwest Missouri.

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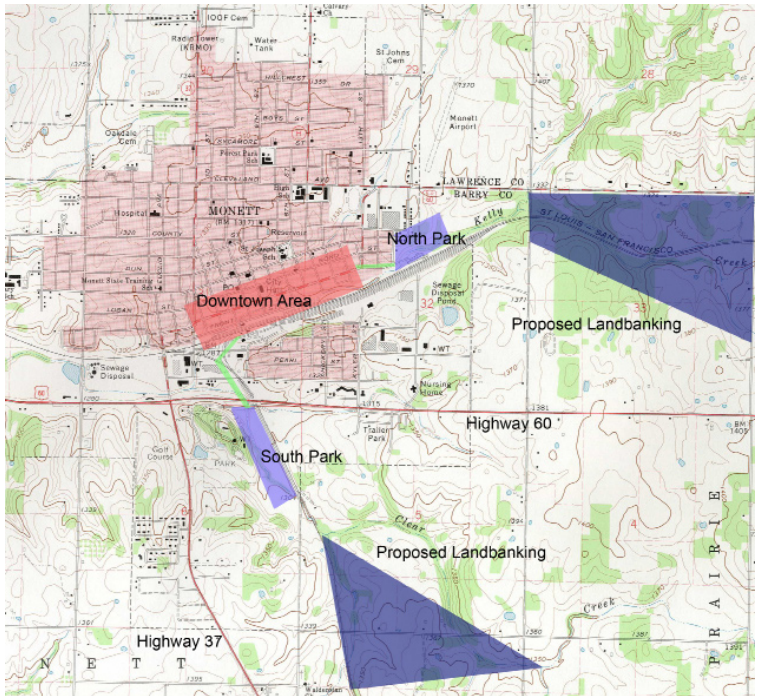

Figure 4.5.4 Proposed Landbanking

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Figure 4.5.5 Storm Rentention pond in developemnt

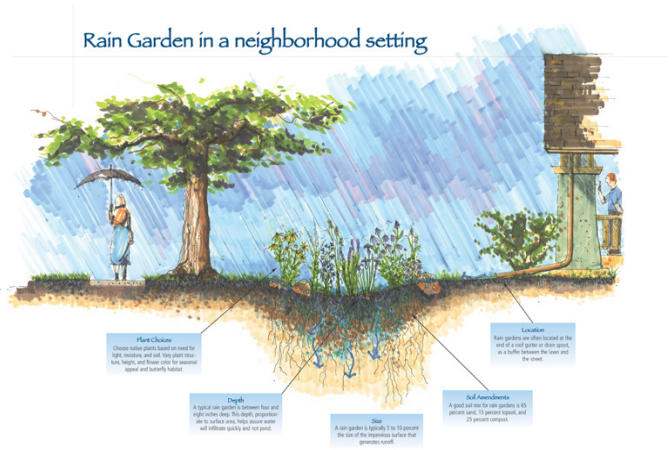

Figure 4.5.6 Diagram of Rain Garden

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