

## Project Overview:

The goal of this project was to minimize flood risk and cost to the residents of Manchester, Iowa. Updated FEMA flood maps show that low-cost residential areas in Manchester are now at elevated flood risk relative to previous assessments. Our design addresses flooding along the two tributaries, shown below in red, using a wide variety of best practices, which are indicated on the map. Each element of the design is intended to achieve one or more of the following goals: reduce flood peaks, improve water quality, slow the concentration of flood waters, and eliminate choke points along the waterways. By implementing these designs, we create sustainable solutions and reduce flood impacts in Manchester.

## Native Vegetation & Stream Maintenance:

Reintroducing native vegetation along Tributary A will benefit the stream's water quality by natural nutrient removal processes. It will also increase channel roughness and curve number, slowing the concentration of flood waters and increasing infiltration.

## Green Roof:

The roof of West Delaware High School has a large continuous surface area, which produces large amounts of direct storm runoff. Provided the existing structure is adequate to house this design, a green roof would promote rainfall infiltration and reduce runoff.

## Channel Daylighting:

Stretches of Tributary A are buried underground in the residential area between E Howard St. and E Main St. These conduits bottleneck flows, backing up flood waters during storm events. Daylighting the channel will eliminate flow restrictions through the existing culvert system and lower the local flood risk.

## Detention Basins:

Three locations were selected for detention basins based on land availability and critical areas of flooding. Detention basins provide storage for large storm inflows, decreasing flood peaks downstream by releasing more uniform flows. We envision the basins to double as recreational areas for the community during dry weather.

## Constructed Wetlands:

Constructed wetlands will extend from an ongoing wetland restoration project on the eastern edge of Manchester. The wetlands improve water quality and delay flood water concentration. Additionally, they provide a habitat for native species and natural beauty to the area.

## Bioswales:

Bioswales for this project were selected to be placed along Main Street and in one location in Joseph J. Baum Memorial Park. Bioswales help slow the concentration of flood waters and increase water quality by removing sediment and contaminants.

Bioswales would bring vibrance to a prominent part of town, increase flood resiliency, and provide native vegetation and habitat for pollinators.

## References

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