

SACS Environmental Study Center

Bridge Replacement

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An existing bridge located on the trail system in the Southwest Allen County Schools Environmental Study Center needs to be demolished and replaced due to its poor condition from aging and weathering, as shown in Figure 1. Currently, this bridge is utilized by the public, who use the trail system to walk their dogs, exercise, and explore nature, to name a few uses. Additionally, the students and teachers at Southwest Allen County Schools utilize this area for lessons. This bridge goes over an unnamed ditch that drains to the Graham-McCulloch Ditch. The Graham-McCulloch Ditch is regulated by the Allen County Surveyor and by the Indiana Department of Natural Resources.

The bridge must be raised above the flood line of the ditch. This will ensure the bridge is not affecting the flow of water through the ditch, as well as helping the lifespan of the structure and preventing the public from walking in water. The bridge must be widened to a minimum of 6 feet to allow maintenance vehicles to more easily access the trail system. Additionally, it is necessary for the bridge to have an increased load capacity to accommodate the increased load from the maintenance vehicles, as it is not currently designed for this load. Finally, the bridge must have proper foundations to properly support the structure, and the current soil conditions need to be addressed to prevent failure of the foundations and the bridge structure. Also, debris removal is highly recommended on up-down stream flow, which is causing erosion around the pipe outlet.

Adjacent to the bridge is a culvert that fails to support current runoff conditions and is starting to show signs of failure, causing flooding and erosion of the bank. Due to the erosion of the soil around the bridge and culvert, an erosion control measure is necessary to protect the bridge's foundation. River rock or field stone will have to be specified to adhere to standards from the Department of Natural Resources. Because of the pipe deterioration, it will be cost-effective to have both the pipe and bridge repaired at the same time if possible.

Southwest Allen County Schools does not have any regulations and/or standards that must be followed. However, if it is necessary to work in the waterway, the Indiana Department of Natural Resources will need to be involved in permitting. Potentially, it could be determined that the Army Corps of Engineers needs to be involved. Because of these reasons, the bridge will be designed to not need a pier in the waterway and any material selected to go in the waterway to protect the foundation will have to adhere to the requirements of the Department of Natural

Resources. For load considerations and safety factors, AASHTO LRFD will be utilized. The bridge will have ramps on each end to reduce the amount of earthwork needed to be done. Due to limited trail width and the somewhat remote location of the bridge, constructability and transportation of materials must be considered as a key factor when designing this project. The replacement bridge should be designed for durability to reduce future maintenance and extend service life.



Figure 1. A photo of the current bridge.