Alton Municipal (Wadlow) Golf Course Riparian Zone Restoration
Illinois EPA Illinois Green Infrastructure Grant (IGIG)

Final Report
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Summary
The Wadlow Golf Course Riparian Zone Restoration project was completed in the fall of 2012 and is a successful implementation of the project design and goals. What began as a municipal stormwater channel restoration in a local golf course molded into an integral component of a future development plan centered around Alton's new high-speed rail station. The changes to the property can be seen in figures 1 and 2 on page 4. While the timing of the land use change presented a few challenges to the design process for this project, it was in many ways the perfect opportunity to showcase the abilities and effectiveness of green infrastructure at even the most demanding and high-profile land use site.

The stream channel had become severely eroded, exposing utility lines through headcutting. It had also become severely ecologically degraded, choked with invasive and undesirable vegetation. In order to meet the demands of the mostly-impervious watershed's stormwater runoff, the channel needed to be widened and graded into a two-stage design. This design which will enable the 1,880 linear feet of restored channel to maximize its abilities to manage peak runoff flows and volumes, trap and filter sediment, infiltrate runoff into groundwater supplies, and filter excess nutrients.

The stream segment in this project drains to the West Fork of Wood River, which was/is listed Illinois EPA's 2010 Integrated Water Quality Report and Section 303(d) List for Total Suspended Solids. The restoration will prevent this watershed from contributing further to this impairment.

More of the stream channel (the segment directly north of the project area) needs to be restored as well, maximizing the benefits this corridor can provide to municipal stormwater management needs as well as regional water quality improvements.

Figure 1. Property Boundary Map showing project limits.

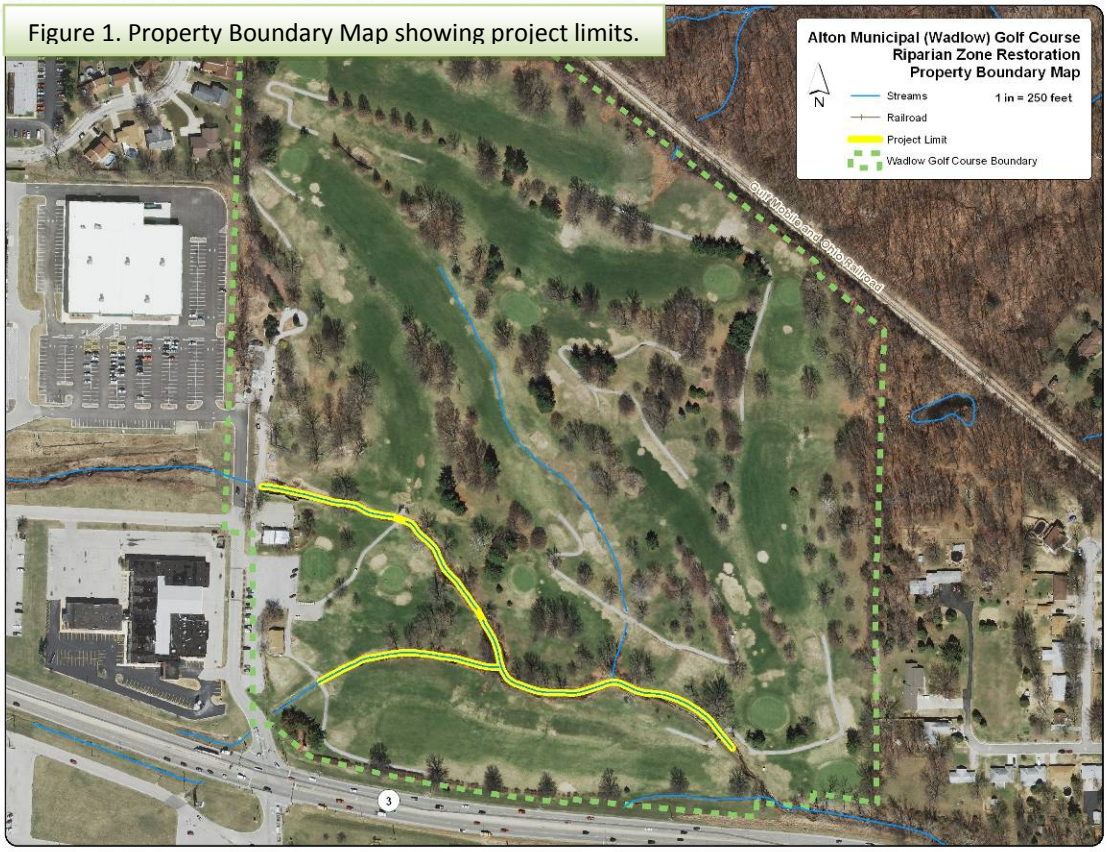
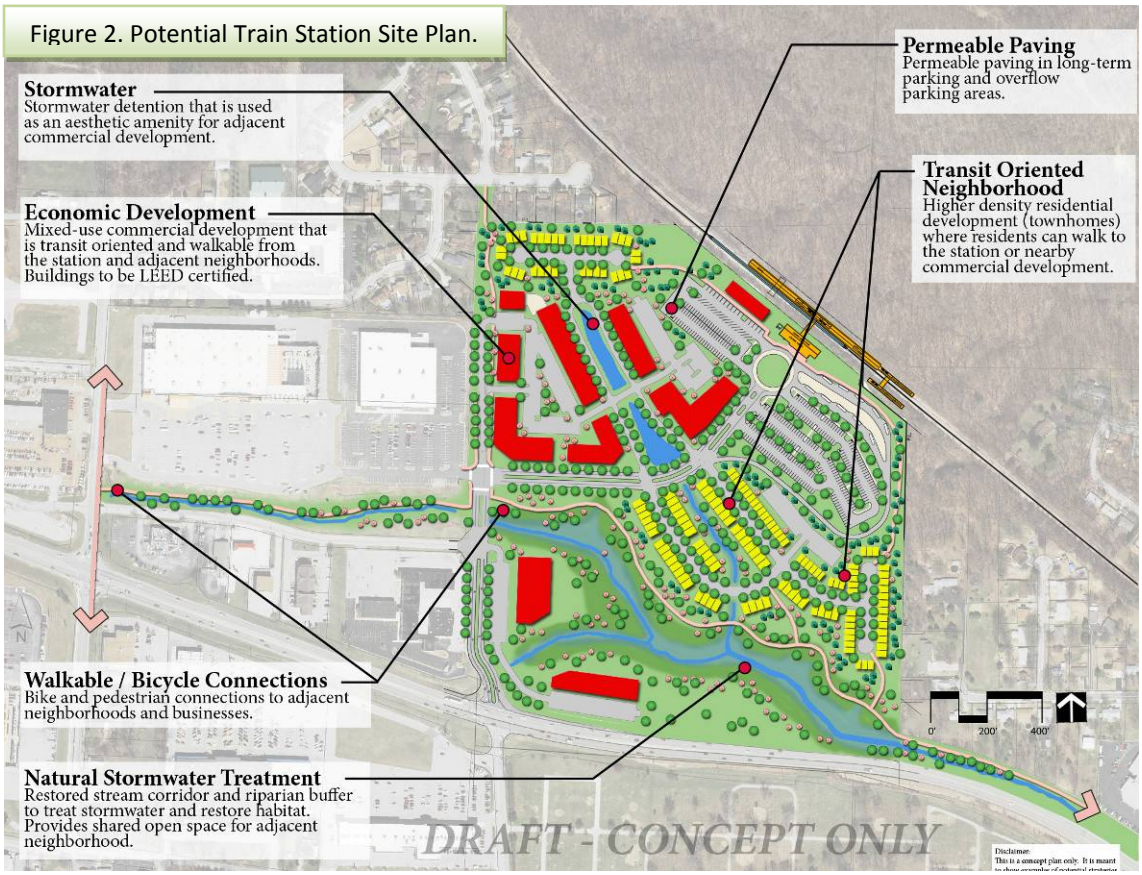


Figure 2. Potential Train Station Site Plan.



Introduction

HeartLands Conservancy partnered with the City of Alton to address the problem of stream erosion on one of the City's properties, the Wadlow Municipal Golf Course, located at Homer Adams Parkway and Golf Road. Approximately 1,880 linear feet of riparian corridor within the golf course property was severely eroded and experiencing headcutting (figure 3).

Figure 3: Wadlow stream headcutting (pre-construction)

Erosion and degradation was a result of the intense stormwater management demand on the stream from the largely impervious watershed. Major retail developments including large-scale parking lots drained their runoff into this stream channel. Utility pipes had become exposed and flash-flooding had been documented. Further downstream, the channel enters large culverts under two major roadways, plans were being made for expensive replacement of at least one culvert to a culvert with a larger diameter to accommodate the high volume storm flows.

This stream drains to the West Fork of Wood River, which was/is listed in the Illinois EPA's 2010 Integrated Water Quality Report and Section 303(d) List for Total Suspended Solids.

The project budget was $680,220, with 75% coming from the Illinois EPA and the 25% match contributed by the City.

The riparian zone restoration involved creating a two-stage ditch design where possible, which is designed to filter runoff so as to remove suspended sediment, heavy metals, oils and grease, excess nutrients, and other non-point source pollutants as well as reduce runoff volume and velocity while providing other beneficial hydrologic functions and wildlife habitat (figure 4). Williams Creek Consulting & Management was contracted to complete the engineering and construction work under this grant, which was complete in early October 2012.

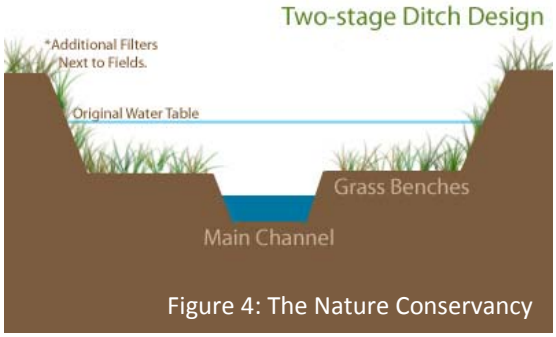


Figure 4: The Nature Conservancy

Prior to major design work for the project, the City received news that the golf course site would most likely be the location of a future high-speed rail station and new access

road to the station. The decision was made to design the riparian corridor restoration to accept and treat stormwater flow from a fully built-up site as opposed to the existing golf course land use. This enables the restoration to serve as an integral part and focal point of future development plans as well as relieving any potential need for additional construction/widening/restoration at a later date.

Discussion

At the writing of this report, the train station location and subsequent access road has not been finalized, although the golf course has been shuttered and the property removed from the City's park system. There is no danger to the riparian restoration if the site is never developed – the high levels of impervious surface in the watershed will keep runoff flow volumes at an adequate level for a healthy ecosystem and functioning corridor.

Once the design strategy was finalized in late 2011, final designs were drafted and submitted to all parties for review. Necessary permits were applied for and received. The change in land use caused one major structural change to the design, apart from the smaller changes made to accommodate more intense land use on the site. The original project application included moving one pedestrian (cart path) bridge and adding a second pedestrian bridge, at significant expense. With the golf course land use no longer a consideration, the bridge monies were reallocated to a limestone screening trail along the full length of the restored corridor. The trail would ideally have been paved with asphalt to accommodate the widest variety of users; however, the other budget demands restricted us to limestone (figure 5). However, this material can serve as a base for future paving of the trail, which has been strongly recommended to the City.

Figure 5: Final grading of trail turn-around at south end.

The additional budget demands came in the form of the check-dams. Once the site had been surveyed in detail, the elevation change from the northern project limit to the southern project limit was discovered to be more significant than previously estimated. In order to achieve the pre-determined design goals, additional check dams had to be included in the design, and some check dams had to be increased in size. The ponding and release pattern of water flow management they provide has proved to be invaluable to the success of the restored corridor.

In sections, the pre-construction site was heavily overgrown with undesirable woody shrubs, vines, including some invasive species. An initial tree inventory tagged those specimens that should stay and clearing began. This initial stage of construction caused a significant public reaction, as the site is clearly visible to drivers on Homer Adams Parkway – a major arterial in Alton. This provided us and the City with an opportunity to educate the public about invasive species and proper stream maintenance. Once people understood that the vegetation being removed was not healthy for the stream and would be replaced with the proper species at the end of the project, their support, and even excitement, for the project increased.

Figure 6: Sign at project site identifying the IGIG funding.

Once the excess vegetation was cleared out, tree removal began. Some trees were removed because they were an undesirable species. Some were diseased or dying. And some were removed because they were a structural impediment to the restoration design. As the stream corridor had been largely un-maintained, some trees had been allowed to grow in the main channel, making the necessary regrading for the two-stage design impossible. However, during the large tree-removal construction period, some specimens were determined to be too valuable to lose to the existing design plans. The design and construction plans were altered to accommodate these trees, enhancing the corridor's function and appearance. This effort was largely possible due to the sub-contractor being a design-build firm, which significantly eased the process of these changes.

Results

The project was successfully completed on time and within the allocated budget.

Now complete, this riparian corridor will aid the City in managing their stormwater runoff and create a green corridor for residents to enjoy (figure 6). A limestone screening trail along the corridor was constructed as part of this project to facilitate interaction

Figure 7: Completed restoration (fall 2012)

with the green infrastructure project. The trail is open to the public during normal City park hours.

The previously degraded stream channel has been widened and the stream bed returned to the proper height. The combination of these activities, plus the addition of native plants, trees and shrubs allow this 1,880-foot corridor to manage stormwater in the following ways:

1. Rainwater directed into this stream from large developments upstream is SLOWED, preventing severe erosion, sedimentation, and root instability in the larger older trees present on the site.
2. Rainwater is FILTERED. Water that does not infiltrate is filtered through the top layer(s) of soil and plant materials, removing sediment and excess nutrients that would otherwise contribute to impaired waterways downstream.
3. Runoff is allowed to INFILTRATE, recharging groundwater supplies and providing an adequate water table for trees and shrubs.

This project has the potential to reduce sediment in the watershed by an estimated 1,272 TONS per year.

Figure 8: Post-construction storm event.

Another result of the land use change for the site is the riparian restoration zone will be placed into a permanent conservation easement, extending the protection for this project past the 10 year operation and maintenance agreement HeartLands Conservancy holds with the City, per the requirements of this grant. This stipulation was negotiated with the City by the local chapter of the Sierra Club, which became involved when the site was proposed to be removed from the City's park acreage.

In 2012, the project was nominated for and received the Carl V. Anderson Conservation Project Award of Honor from the American Conservation Engineers (figure 9). The purpose of this design awards competition is to give recognition to those members and/or their agencies whose work, as judged by their peers and associates, best exhibits the goals and objectives of the Association of Conservation Engineers, which is to conserve and improve our natural heritage.

While all indications point to a successful restoration and flood management strategy, the watershed cannot rely on these 1,880 linear feet to accommodate all of the

stormwater runoff in the watershed. There is an additional 1,300 linear feet of degraded channel immediately north of the project area, in front of the Home Depot and Kohl's developments. Runoff that flows into and through this channel will continue to reach our project area at a high speed and volume, causing unnecessary demand on the northern portion of the restoration. This additional northern section should also be restored using the same design strategies as this project to create a more cohesive network of green infrastructure and water quality improvement practices.

Figure 9: ACE Award of Honor.