

# Heritage Hills Wetlands Project

Locke Girvan  
Dan Schilbe

## Abstract

The Heritage Hills Wetlands project was the first attempt by a Developer and Strathcona County to conserve a naturally occurring wetland in the process of developing a new urban subdivision within Sherwood Park, Alberta. The Heritage Hills Wetlands is part of a tributary of the Old Man Creek watershed that originates within Sherwood Park and flows east into Old man Creek before discharging into the North Saskatchewan River.

Qualico Developments Limited (Qualico) began planning the Heritage Hills Subdivision in 1990. The original plan included a proposal to bisect the naturally occurring wetlands with a road and modifying the existing wetlands for stormwater management requirements. Environmental concerns and public demand for the conservation of the natural landscape changed the course of development. In addition to its stormwater management function, other opportunities within the wetlands were recognized for passive recreation, wildlife viewing and appreciation, maintaining wildlife habitat, aesthetic quality, and interpretation that are otherwise not readily available to urban residents. The objective subsequently focused on maintaining the unique natural features and ecological function of the wetlands which would otherwise be lost through traditional development practices. In this regard the transportation network plans were changed with roads being diverted around the wetlands to avoid the fragmentation and loss of habitat posed by the road and to minimize their potential as a pollution source to the wetlands. The wetlands project was substantially completed in 2003 with immediate success.

## Detailed project description

Urban centres are recognized as having low species diversity due to the removal of the natural landscape elements that supports them in the course of development. The result is urban residents often are disconnected from nature by sheer virtue of the exclusion of natural areas and its wildlife inhabitants. Further, the loss of natural habitat often inhibits the urban resident's ability to observe the diversity and natural processes they support. The sight of a flock Canada geese (*Brantus canadensis*) settling onto the glass like surface of a waterbody, backlit by the setting sun, will most certainly induce a response by the human observer. Imagine the ability for people to personally view the spring arrival of brilliantly coloured Neotropical migrants, to hear the cacophony of song as courtship and nesting takes place, to experience seeing young wildlife grow and take their first fight in preparation for their first migration to a more favourable climate for the winter. Imagine the ability of people to watch the graceful Common tern (*Sterna hirundo*) as it dances on the breeze dipping suddenly to pluck a minnow or invertebrate from the water surface and compare it to the statue still Great-blue heron (*Ardea herodias*) as it waits patiently for its prey to come within reach of its spear like beak. The preservation of natural upland and wetland habitats provides these opportunities as well as the ability to observe seasonal influences

and the changes that occur to wetland and upland habitats within the natural environment throughout the year. Urban residents are empowered to become more familiar with nature and its cycles through daily observation and exposure, and may be enticed to learn more about them when the opportunity exists.

The Heritage Hills Subdivision Design in Sherwood Park, Alberta, was carried out in 1990-91 by Qualico. Through a series of public meetings and review by municipal staff concerns were raised with the proposal to construct a road through an existing natural wetland. In addition to the loss and fragmentation of habitat, the road was identified as a potential direct source of road born pollutants and silt to the watercourse. Subsequently Qualico investigated the feasibility of rerouting the traffic and preserving the natural wetlands as part of the storm water management system for the Heritage Hills Subdivision. The Heritage Hills Wetlands receives inflow from several smaller basins within Sherwood Park and is the last basin that water flows through before exiting the urban area. The water flows east under Highway 21 where it joins Old Man Creek 0.8 km downstream before discharging into the North Saskatchewan River approximately 12 km to the northwest of the wetlands. The lower reaches of Old Man Creek were identified as a Locally Significant Environmentally Sensitive Area (Infotech Services, 1989) and is associated with areas more recently identified as priority upland and wetland wildlife habitat (Bentz et al, 1997).

An environmental evaluation undertaken by Qualico, as part of this process, recommended the preservation of the Heritage Hills Wetlands. Strathcona County approved in principle an alternative proposal that would avoid crossing the wetland with the road following a presentation by Qualico to Strathcona County, Technical Advisory Committee on September 11, 1991. The Qualico proposal and subsequent Technical Advisory Committee and Administrative analysis concluded that the preservation of the wetlands was viable for stormwater management and that the internal subdivision road network could effectively avoid the wetlands.

This was a departure from the traditional practice in urban centres where wetland features are commonly filled in due to the engineering constraints to accommodate development including transportation networks and constructed storm water management facilities. Up to this point, no attempt had been made to incorporate a natural wetland into a subdivision plan. In addition little regard was given to other opportunities such as recreation, wildlife use, or other environmental factors. On August 31, 1993, Strathcona County Council approved an amendment to the Heritage Hills Area Structure Plan, which incorporated the wetlands preservation alternative in the subdivision design. The amendment eliminated the road that was originally designed to bisect the wetlands and other substantial disturbances to the natural basin and its inherent characteristics.

The objectives of this initiative became; to retain the natural character of the existing wetlands; conserve an environmental amenity; develop a interpretive program to educate the public on the natural form and function (e.g. water quality, wildlife habitat, importance to the hydrologic and nutrient cycles, etc.) and human values (e.g. wildlife appreciation, aesthetics, recreational opportunities, etc.) attached to wetland systems; and integrate them with the need for urban

transportation and the stormwater management function of the wetlands. This was achieved through innovative design elements and construction techniques focused on minimal impact to the sensitivity of the wetland ecosystem. The use of sediment controls during the subdivision construction minimizes silt discharge into the wetlands. The roads being constructed away from the wetlands, reduces the potential for salt and other water born pollutants directly entering the watercourse, and disturbances limited to protect the natural characteristics of the basin and riparian edge. Constructed sidewalks adjacent to roadways, pedestrian trails, and boardwalks control where pedestrian traffic occurs were designed and constructed with the objective of conserving other relatively undisturbed areas for wildlife while providing safe public access. Interpretive signage has been developed and will be installed along the trail network to provide the public with information on the wildlife that occurs there, how people can enjoy them at a distance, how wetlands function, and proper conduct in and around wetlands.

### **Tangible Environmental Benefits or Results**

Tangible environmental benefits can already be seen. The natural outflow of the Heritage Hills Wetlands was previously diverted with the construction of Highway 21. Discharge was diverted into the roadside ditch network which was not conducive for facilitating fish movement upstream into the Heritage Hills Wetlands. In 1999, the consultants retained by Qualico, identified in their submission to Department of Fisheries and Oceans that the proposed project was expected to result in an overall increase in available fish habitat. Subsequently and on the advice of their consultant, Qualico installed a fish ladder within the stormwater control structure as a proactive measure to improve conditions for fish movement in and out of the wetlands. In 2003, White suckers (*Catostomus commersoni*) were found in the wetland following a major rain event. This is the first time fish other than Brook stickleback (*Culaea inconstans*) have been recorded in the upper reaches of this watershed.

Grebes, ducks, Canada geese and numerous passerines have been observed nesting and raising their young in close proximity to people. American pelicans (*Pelecanus erythrorhynchos*), Double-crested cormorants (*Phalacrocorax auritus*), and Common loons (*Gavia immer*) are examples of birds that are occasional visitors to the wetlands. In total, approximately 30 upland flora and fauna species and 100 aquatic flora and fauna species have been observed in the wetland, however, a formal inventory of wildlife species has not been undertaken in the area.

The trail development within this relatively pristine environment has proven to be a popular destination for the public to participate in the passive recreational pursuits the wetlands offer. The success of the trail and wetland conservation has provided an impetus for the local community to become involved in public information sessions and wanting to become more involved in the stewardship of the natural resource. This gives an indication that urban residents appreciate the wetlands as an asset to their community and signifies an increase to their quality of life in an urban setting. Their interest in and use of the area provides an opportunity for urban

people to learn more about the natural environment and the function of wetlands through the interpretive signage program.

The preservation of the Heritage Hills Wetlands has presented some issues to Qualico. It required a higher level of land dedication to reroute the road and fully contain the wetland than is traditionally needed for a constructed stormwater management facility which represents a loss of developable area for residential lots. The cost of construction for the subdivision road network increased significantly as more road was required to go around the wetlands versus going directly through them however some costs were offset through the savings of not removing this natural feature and the need to stabilize the road bed to support the carriage way. The innovative design elements and construction techniques applied to minimize disturbance to the wetlands resulted in higher costs for the amenities such as fencing, boardwalks, and the outlet control structures provided by Qualico. Conversely some of these costs to the developer have been offset by the public demand and willingness to pay a higher price for lots bordering and in close proximity to the wetlands. This response indicates that the public perceives an added value to living close to a natural area when the opportunity exists.

### **Intangible Environmental Benefits or Results**

Stormwater management facilities in urban centres are generally recognized as receiving higher inputs of water born silt and pollutants from road runoff, inappropriate use of pesticides and fertilizers, accidental spills and other sources. A large body of evidence has emerged through recent research identifying transportation networks as a significant source of heavy metals and petroleum pollutants. While not proven at this time, by virtue of the road being constructed around the wetland versus through the wetland, the risk of water born silt and other road born pollutants directly entering the watercourse is expected to be substantially reduced. Runoff originating from the road is directed into the underground stormwater conveyance system where it daylight into silt settlement ponds prior to entering the water held within the Heritage Hills Wetlands. Thurston (1999) determined that sedimentation was the primary mechanism actively reducing water column concentrations of lead and petroleum hydrocarbons introduced to the wetland via stormwater runoff. The residual silt load is further expected to be reduced through the increased residency time of the water held within the wetlands and the increased ability for natural biotic processes to reduce the load of water born pollutants held in the water. This is an important consideration since the water flowing through this natural wetland system will be entering the greater Old Man Creek Watershed outside of the urban centre of Sherwood Park. Areas disturbed through the construction of a roadway through the wetlands were also recognized as being prone to erosion thus increasing the potential for direct input of silt into the watercourse through the presence of bare soil along the constructed road bed and other disturbed areas for an indeterminate period of time until a vegetated surface could be re-established following construction. The aquatic and riparian vegetation being left in an undisturbed condition within the wetland is expected to resist erosion during periods of high water flow. A water quality testing protocol will be established and implemented in the future in conjunction

with the overall implementation of the Strathcona County Best Management Practices for Stormwater Management Facilities presently being developed.

Heritage Hills Wetlands provides a future opportunity to link Sherwood Park with the surrounding rural area of Strathcona County via association with a common wetland feature, and the transportation and pedestrian networks. Since the Heritage Hills Wetlands are part of the greater Old Man Creek Watershed, retaining the natural wetland system within Heritage Hills provides a transition between the urban/rural environments. The Heritage Hills Wetlands and the trail network provides an opportunity to connect Sherwood Park with the rural area as it develops downstream of Heritage Hills in the future. Additional opportunities for protecting downstream reaches, connecting to a trail network, and expanding the interpretive signage program are anticipated in the future.

### **Demonstration of Effort and Commitment**

The initial vision for this oasis of nature within an urban area was the result of nearly 15 years of careful planning and collaboration between many dedicated interest groups. Through a series of public consultation sessions, municipal and developer meetings, and consultation with a series of regulatory authorities, a strong sense of team commitment led to the success of this highly acclaimed public amenity. Through an in-depth understanding of the dynamics between human intervention and nature, Heritage Hills Wetlands demonstrates a sustainable balance between human disturbance and ecological integrity through controlled use and mitigation. Ultimately, the long term success of this natural system is reliant upon a strong commitment from the general public to respect the allowable carrying capacity of a feature of this kind. Further, an on-going educational process through both public communication and an interpretive program will allow for a better understanding of exactly how individuals can assist in guaranteeing long-term success of Heritage Hills Wetland. Through numerous meetings, consultation and correspondence with local residents, Strathcona County and Qualico representatives have received an overwhelming response from the general public, who has embraced this wetland within their urban community.

Other residential developments within the greater Edmonton area have attempted to incorporate similar naturalized systems (naturalized, yet totally constructed as opposed to natural) into their communities. In most cases the long term success has yet to be demonstrated. Limited understanding of the dynamics of the natural processes involved and the minimum elements necessary to replicate the function of a natural wetland inhibits the ability to predict the outcome of a naturalized system. The Heritage Hills Wetland strategy involved an intense commitment by Strathcona County and Qualico to ensure all residents became aware of the importance of responsible use, as well as a careful consideration of the interface between private and public space.

## **Innovation “Going the Extra Mile”**

The objectives stated earlier were to retain the natural character of the existing wetlands; conserve an environmental amenity; develop an interpretive program to educate the public on the natural function (e.g. water quality, wildlife habitat, importance to the hydrologic and nutrient cycles, etc.); consider human values (e.g. wildlife appreciation, aesthetics, recreational opportunities, etc.) attached to wetland systems; and integrate them with the urban transportation network and stormwater management function of the wetlands. As stated previously, this was achieved through innovative design elements and construction techniques focused on minimal impact to the sensitivity of the wetland ecosystem. Poorly regulated construction practices are the first step toward declining stream health in urbanizing landscapes (Miltner et al 2004).

Incorporating passive recreational uses, while retaining this natural ecosystem in a long-term sustainable manner, became a significant challenge. This development is unique to Alberta, and this high level of innovation required the implementation of a variety of both new engineering details, as well as revisiting traditional design standards for Strathcona County. As earlier stated, a substantial effort was made to relocate the road outside of the wetlands and the proactive installation of a fish ladder within the stormwater control structure by the developer was a significant additional cost however it has already demonstrated that this expenditure improved conditions for fish movement in and out of the wetlands. A detailed analysis demonstrated the need for sediment controls to be used during the subdivision construction to minimize silt discharge into the wetlands. Similarly, erosion controls were employed in conjunction with the reclamation of those areas adjacent to the roads, trails and other landscape features that were disturbed during construction.

A detailed pedestrian circulation study which correlated passive recreational disturbance with ecological carrying capacity resulted in a pathway and view area circulation pattern which best demonstrated sustainable design. Implementation of the alternative transportation design strategy was intended to limit disturbance and protect the natural characteristics of the basin and riparian edge. The constructed pathways and boardwalks control where pedestrian traffic occurs leaving other areas relatively undisturbed for wildlife. Interpretive signage was seen as an integral part of the trail network to provide the public with information on the wetlands and wildlife they encounter during their time in this natural oasis.

## **Other Meritous Considerations**

Innovational projects such as Heritage Hills Wetlands require a high level of communication between many interest groups, including land owners, local residents, municipalities, developers and regulatory authorities. It further demands a great respect for the sensitivity of natural ecosystems retained within urban areas, and those laws and regulations associated with them. Although the actual construction of the wetland area spanned less than three years, this project

had evolved over nearly 15 years. Due to encounters with migratory birds, the fisheries component, and other significant natural features, the implementation team included not only planners, engineers and landscape architects, but also involved regulatory specialists, biologists and agrologists. Their guidance through the implementation phase led to a series of construction delays in consideration of the best interests of the natural environment. The significant monetary increase in construction became less of a concern when considering the long-term benefit of staging construction and protecting the interests of this pristine environmental feature.

## References

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