



Seeking Inspiration

► THE STRATEGY BEHIND THE DEVELOPMENT OF BAYPORT IN MINNESOTA, USA, HAS BECOME AN INTERNATIONALLY ACCLAIMED DESIGN FOR SUSTAINABLE LIVING, WITH MUCH THOUGHT GIVEN TO PROTECTION AND CONSERVATION OF NATURAL HABITATS AND THE INCLUSION OF A GROUNDBREAKING STORMWATER SYSTEM. HERE, JACK BROUGHTON REPORTS FOR SUSTAIN' ON HOW ECOLOGICAL SCIENCE HAS BEEN THE "INSPIRATION" BEHIND THIS INTRIGUING MINNESOTA DEVELOPMENT

Conservation development in the US is growing in popularity among communities which seek to achieve sustainability goals, maintain their rural character, or protect local and regional ecological health and water quality. Bayport, Minnesota, proved to be one such community in 2001, when land developer Homer H Tompkins III presented a concept masterplan with over 1,000 homes that would have nearly doubled the size of this quaint river town near Minneapolis/St Paul.

After two attempts to submit conventional designs, Tompkins' firm, Contractor Property Developers Company (CPDC), gave Bayport opinion leaders a chance to express their views. Tompkins loaded them onto a bus for a day-long tour of local developments and listened carefully to their desires.

A NATIONAL MODEL

"It became apparent that council members felt comfortable with nature sites and open space. Normal subdivision developments and high-density developments were a turn-off, but we struck a chord with open space and their desire to preserve as much of the site as possible," Tompkins says.

Following this revelation, Tompkins enlisted the aid of an internationally recognised ecologist, Steven I Apfelbaum, who saw the project as an opportunity to create a sustainable development that would serve as a national model for conservation planning and design. Apfelbaum and a team of ecologists, planners and engineers from his Wisconsin firm, Applied Ecological Services (AES), were told to view the 245 acres of farm land as a blank slate.

Today, its ecologically focused design has

become **Inspiration – a Natural Neighbourhood**, with 70 per cent open space restored to native ecological communities and wildlife habitats. The human environment includes two miles of walking trails, only 253 single-family homesites and one three-story senior complex with 73 condominiums under one roof.

Prior to designing homesites and roads, AES conducted an extensive natural-resource inventory of the site and surrounding lands, and studied the scientific data and history of ecological resources in the area. Sustainability and the ecological health of the land were of primary importance; priorities of the built environment were then dovetailed with those of long-term sustainability.

Upon an underpinning of ecological science, AES drafted an Ecological Restoration and Management Program for 140 acres of nature preserve and 30

acres of active village greens, all integrated with an alternative stormwater-management plan. The Stormwater Treatment Train™ designed by AES hydrologist, Dr Doug Eppich, will protect Bayport's crown jewel, the St Croix River, a federally-designated wild and scenic river (see sidebar right).

PROTECTION AND CONSERVATION

Grading, home construction and restoration of the natural areas commenced in 2005 and already, in a very short time, Inspiration has become a nationally acclaimed design for sustainable living.

The non-profit Minnesota Land Trust holds the conservation easement on the open lands at Inspiration. The conservation easement guarantees that the restored natural areas will be protected in perpetuity, and that it will follow the recommendations of AES' 90-page land-management programme. Long-term land management to achieve ecological goals is guaranteed by homeowner association bylaws, which provide for annual funding from Inspiration residents.

Over the next five years, CPDC will invest nearly \$2M in the restoration and management of eight distinct native-plant communities, ranging from wetlands to prairie, oak savanna and woodlands. These plant communities will provide wildlife habitat for hundreds of species of local and migratory birds, mammals, amphibians, reptiles and beneficial insects, and will help reconnect the web of life with the adjacent St Croix Bluffs Scientific and Natural Area (SNA). The St Croix Bluffs SNA is a high-quality, regionally significant eco-habitat owned and managed by the Minnesota Department of Natural Resources.

In addition, the land-management plan calls for protection of two Native American burial grounds identified by archaeologists on the eastern half of property. These areas will be left undisturbed and protected by a natural buffer more than 100ft wide that will be restored to native tallgrass prairie. This eastern portion of the parcel also serves as

an important habitat and travel corridor for declining populations of native grassland birds, according to AES senior ecologist Dr Kim Chapman. It was Chapman who advocated for a redesign of an early plan that had included a cul-de-sac in the south-eastern quarter of the property.

By removing the cul-de-sac, and nearly \$4M-worth of homesites overlooking the river, rare grassland birds would have free access to a large expanse of uninterrupted prairie habitat they need to sustain breeding populations, Dr Chapman contended. Upon hearing the value of the avian corridor, Tompkins agreed and erased the cul-de-sac from the plan.

SUSTAINABLE HOME CONSTRUCTION

The housing element of Inspiration also follows the principles of sustainability that have directed the land planning. The neighbourhood as a whole has been accepted by the US Environmental Protection Agency as an Energy Star Partner, and every home will be Energy Star certified. Energy-efficient heating, air-tightness designs and techniques, insulating windows and doors, energy- and water-saving appliances and other "green building" strategies are either required or encouraged to reach the highest-possible levels of sustainable home construction and maintenance.

Homesite landscaping with native plants is encouraged, including stormwater infiltration "rain gardens" to capture and soak up runoff, reducing runoff volumes and improving water quality in local water resources.

In time, CPDC intends to establish a relationship with an area CSA (Community Supported Agriculture) farmer, to provide organically grown local produce to residents.

"We're really trying to push the envelope to create a neighbourhood that truly meets sustainability objectives," Tompkins says. "This has been one of our most exciting land projects ever, and it is opening doors to even bigger and better conservation development projects on the horizon." □



STORMWATER TREATMENT TRAIN PROTECTS WATER QUALITY

An essential element of the ecological design of Inspiration is the Stormwater Treatment Train™ (STT) that uses a network of stormwater swales to direct runoff from yards, rooftops and driveways into and through the prairies and wetlands.

This alternative stormwater system reduces the volume of runoff due to infiltration in the native-plant communities, and it cleanses the runoff that does occur in order to improve water quality both on-site and in downstream water resources. In fact, the stormwater system has actually reduced the volume of runoff and improved water quality from pre-development conditions, despite an increase in impervious surface due to the development.

Stormwater quality and runoff volume is important because the property is perched on the upper terrace of the St Croix River floodplain. If runoff were piped downstream in a conventional system of curbs, gutters and storm sewers, it would flow directly to the river – a federally designated Wild and Scenic River. With it would flow lawn-fertiliser chemicals, herbicides, pesticides, sediment, oils, grease and heavy metals from automobile combustion and operation.

The Stormwater Treatment Train manages rainwater close to where it falls, and directs it through surface swales into a series of 15 interconnected wetland biofilters and rain garden detention areas. This allows stormwater to soak into the ground most effectively (in the prairies), it helps remove chemicals biologically (in the wetlands), and it traps sediments and particulates (in both prairies and wetlands), thus reducing pollution that could otherwise reach the river.

The treatment-train process meets regulatory standards for volume control, just like conventional storm sewer and NURP (National Urban Runoff Program) detention pond systems. Hydrologic models are run to ensure runoff volumes and storage capacities are within the maximums allowable for various storm events.

But rather than concentrating primarily on runoff volumes and flow rates, the STT adds significant water-quality benefits that are important to the water resources and community goals in the St Croix River valley. Using the functionality of prairies and wetlands, Inspiration's stormwater system emulates the historic hydrologic conditions of pre-settlement natural landscapes.

Through infiltration, evaporation and evapotranspiration, and through the design of dispersed microdepressional storage, rather than concentrated storage, the Inspiration stormwater system offers multiple benefits to protect local and regional water resources. In Minnesota, the "Land of 10,000 Lakes", Inspiration serves as the development model to help achieve national goals for "swimmable, fishable" waters.