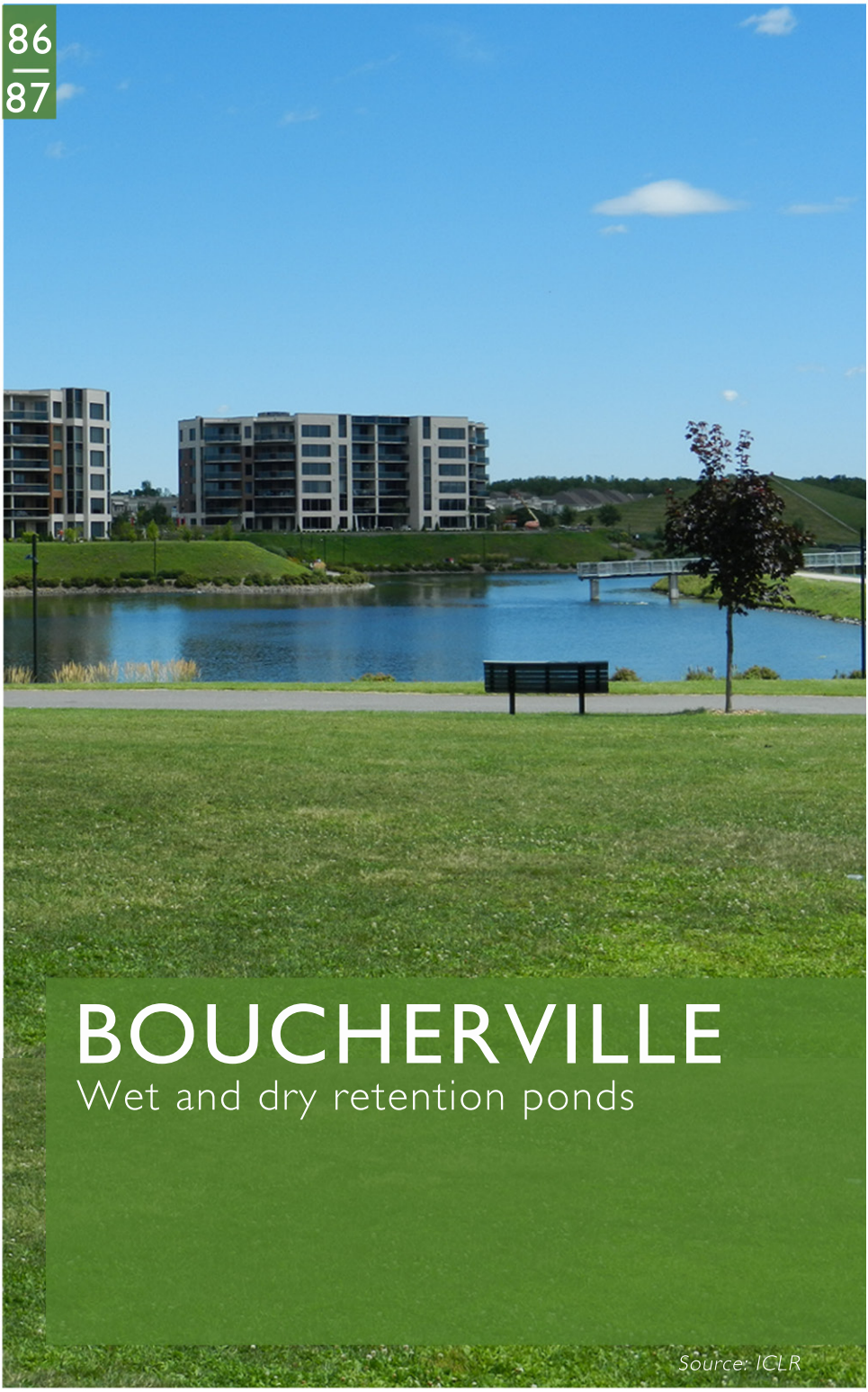

BOUCHERVILLE

Wet and dry retention ponds

Source: ICLR

THE SCIENCE

Greenfield developments sometimes transform farmland, forests and pastureland into modern, high-density housing. Land that previously had considerable capacity to absorb and slow rainfall flows may become covered with roads, buildings, shopping malls and other impermeable surfaces with little capacity to absorb rainfall. There can be a considerable change in the flow of stormwater in the area that is developed and to adjacent regions. Changes in stormwater flows both negatively affect the environment and increase flood risk. Also, established, downstream homes some distance away may begin to experience an increased risk of basement flooding and water damage as rainfall during extreme events quickly flows out of impermeable, developed lands into established neighbourhoods overwhelming the capacity of existing stormwater management systems.

THE TRIGGER

The City of Boucherville wanted to grow and welcome new development. When the City decided to develop the Harmonie neighbourhood, they faced a stormwater management problem. The Sabrevois River located nearby could only safely cope with a limited amount of stormwater runoff before encountering the risk of environmental problems. Also, the cost of installing new high-capacity sewer systems and rainwater collectors would be expensive - a cost that the City did not want to impose on developers and new residents.

Boucherville chose to orient the development of this neighbourhood in a way that would reduce the expected peak flow of stormwater from the new neighbourhood into the river during extreme rainfall events, and to ensure that waters that eventually flow into the river were naturally filtered to absorb pollutants from rooftops and paved surfaces. Boucherville also identified the potential of the new development to provide recreation features for residents, including attractive natural paths for walking, jogging and cycling.

THE APPROACH

Consulting engineers conducted preliminary studies that included hydrologic simulations to help determine the best stormwater management practices for the new Harmonie neighbourhood. The research identified an approach using double drainage principles. There would be wet and dry detention ponds in the neighbourhood. Two ponds or small urban lakes would have permanent water retention (wet detention ponds), and two ponds would be dry most of the time but would have capacity to temporarily hold water in the eventuality of heavy rainfall events (dry detention ponds). Drainage pathways were created to connect the dry ponds to wet ponds.

The four ponds protect the quality of urban water runoff from roads, parking lots, residential neighbourhoods and other impervious areas. The ponds also help to reduce peak stormwater runoff rates by providing temporary storage

Figure 26 & 27 : *Drainage pathways were created along the multifunctional corridors to connect the dry ponds to the wet ponds.*
(Source: ICLR)

during heavy rainfall events. The wet detention ponds have plants that provide a natural filter for storm water. Dry detention ponds are designed to drain within 24 hours after a storm. The four ponds provide a capacity to retain extreme rainfall water volumes similar to that present before the development, minimizing the risk of increase stormwater flowing into established neighbourhoods and resulting in flood risk reduction.

THE OUTCOME

The small urban lakes created in Boucherville were used as the starting point of the neighbourhood's development. After their construction, they were connected to municipal parks by multifunctional corridors for cyclists and pedestrians. These corridors surrounded by drainage ditches were used for draining purposes, but also to connect the new parts of the neighbourhood with the rest of the city. Through this land use planning, the city created 'blue' and 'green' networks that increased the popularity of the area.

One of the urban lakes created in the project was also conceived as a mitigation measure to control erosion on the Sabrevois River by procuring better waterflow control. This same lake also allowed best stormwater management practices because of its high retention capacity that helps prevent flooding in the event of a one in 50 year extreme rainfall, compared to the one in 10 year capacity of traditional systems in the City.

The Harmonie project received Quebec's Consulting Engineering Award for its stormwater management system. The project has been popular with the citizens of Boucherville and demonstrates sustainable approaches to new development, where actions to support growth can be consistent with environmental protection.

A WORD FROM BOUCHERVILLE

When asked for his thoughts on the project, Claude Poirier, Engineer for the City of Boucherville responded that "the project has been successful and extremely well received by the population because the City was not afraid to be visionary. Many stakeholders were involved and decided to join their efforts and worked together in the same direction. There was a vision for that neighborhood. Instead of just digging big holes in the ground, we were able to create an attraction that became highly popular in the neighbourhood," says Mr. Poirier.

The project achieved a number of recreational and environmental objectives beyond minimizing the impact of the new development on the stormwater management capacity in existing neighbourhoods.