ERTEC Environmental Systems

Protecting Global Lands and Waterways™

Case Study
E-Fence™
Wildlife Exclusion Fence

Application: **Wildlife Exclusion from Construction Areas**

Product: **ERTEC E-Fence 48" (1.22 m), black installed with 8" climber barrier lip**

Project: **Highway 401 McDougall Drain Bridge Rehabilitation, Widening and Installation of Concrete Median Barrier**

Owner: **Ontario Ministry of Transportation**

Species at Risk: Eastern fox*snake* (*Pantherophis gloydi*), Common snapping turtle (*Chelydra serpentine),* Painted turtle *(Chrysemyspicta),* Eastern milk snake *(Lampropeltis riangulum)*

- **> Lower Project Costs**
- **> Better Performance**
- **> ZERO Waste**
  - **✓Reusable**
  - **✓Recyclable**

E-Fence HDPE Polymer Matrix

E-Fence shown connecting to and sealing against bridge abutments

ERTEC E-Fence is a highly reliable and low cost species exclusion and control barrier designed for projects in habitat where threatened small vertebrates are present. The fence is designed to exclude small vertebrate species from active construction areas, control movement within fragmented habitat and for survey perimeter control. E-Fence has the capability to serve more than one function in the same trench (fence-line): 1) Wildlife exclusion, 2) Hi-Viz construction safety and 3) Sediment control using ERTEC's revolutionary sediment control systems

Benefits of Use: Typically cuts first project costs significantly, if reused on subsequent projects, the savings are dramatic, highly configurable for different species and habitat, and allows wind and water flow-through and significantly reduces knock-downs, and washouts. Link to Brochure

Project Background: This Project includes the rehabilitation and widening of a bridge along Highway 401 in the Municipality of Chatham-Kent. Protecting wildlife and their habitat is a key part of conserving biodiversity in the area. To protect against adverse effects to the Eastern foxsnake, ERTEC E-Fence exclusion fencing was installed to prevent access to the construction zone.

E-Fence Anti-Climb Features: In live tests at Scales Nature Park in Ontario, Canada, Eastern foxsnakes (Pg) were not able to climb over E-Fence with a climber barrier. Three aspects enhance the safety factor of E-Fence versus the current standard practice of 2-meter high geotextile fence for the protection of Pg: 1) Pg individuals were not even able to reach the climber barrier. 2) The surface of E-Fence has a very low friction coefficient by design. The snakes were not able to establish suitable contact with the fence in order to climb. They were observed to rise to a certain point but then collapse to the right or to the left. The E-Fence polymer matrix strand angle contributes to the difficulty in climbing. Additionally, unlike mesh fences (such as metal mesh or geotextile mesh) on which the snakes could apply their scutes to the ladder structure, E-Fence Rigid Polymer Matrix presents itself at sharp strand angles which tend to drive climbers to the right or to the left and then down. The snakes could not find leverage to climb. 3) The very high reliability (high functional longevity) of E-Fence (almost no stormwater washouts, or wind knock-downs) as compared to traditional systems leaves significantly less opportunity for a Pg to find a gap in the perimeter barrier and migrate onto a construction site.

E-Fence installed along the highway right-of-way where it passes through habitat of species at risk

Technical Support Distributor for Projects in this Region

ADVANCED BUILDING MATERIALS INC SINCE 1984

Several U.S. and Int'l patents apply

ERTEC Environmental Systems
1150 Ballena Blvd. Suite 250, Alameda, CA 94501
phone: 510-521-0724, fax: 510-521-3972
sales@ertecsystems.com, www.ertecsystems.com

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E-Fence installed along the highway right-of-way to keep species at risk out of the construction zone

Configuration: E-Fence Black, 48" (1.23 m) width, trenched 6" (15 cm) with over-hanging climber barrier top lip 8" (20 cm) as shown in Diagram 1.

The Challenge: The traditional Best Management Practice recommends a very expensive two-meter-high fence which is lumber-framed, lumber-braced, and geo-textile-covered. Geotextile fences are fraught with very high total project costs and ongoing maintenance difficulty. Geotextiles tend to fail from or during wind and rain events or from longer-term (6 months) UV exposure. It is common to find these geotextile fences either riddled with holes or with locations along the base where it has been undermined by stormwater flows (see photos in side column). Geotextile/ Lumber fences are known to be highly unreliable due to their very high coefficient of drag. E-Fence has a very low drag profile and does not suffer these same issues. There are also traffic concerns with placing a two-meter-high fence in the clear zone.

High Wind and Storm Water Flows: The coefficient of drag (Cd) was evaluated for both E-Fence (which is at least 50% open area) and solid type exclusion fences (such as geotextile or solid plastic types). Link to wind study. A very large difference in Cd was evident. Drag forces on E-Fence are dramatically reduced (less than 10% of that found with solid fences). For this reason, we see that solid fences must withstand much greater wind-driven forces and pressure. The greater pressure and forces on solid fences dramatically reduce their reliability leading to premature failure.

E-Fence allows high wind and concentrated stormwater flow-through

Stormwater runoff will cause geotextile or solid type exclusion barriers to fail in two modes: 1) if installed along contours, head-pressure from ponding against the barrier can penetrate weak points along the trench. Storm water flows will then concentrate and flow underneath causing unwanted and sometimes severe land erosion. Ponding upstream of the fence occurs because the barrier's Percentage Open Area (POA) is very low, causing it to block flow quickly, 2) if solid barriers are installed up and down contours (which is routinely required), runoff will collect and concentrate along the barrier as it flows downhill. Runoff will scour out the base of the barrier, creating loss of integrity. Weep holes drilled or formed into solid barriers will not allow enough water to flow through (POA is often less than 1%). Weep holes will plug and block flow very quickly in stormwater events. To control damage, E-Fence is designed with 50% POA, and with a flow rate greater than 600 gallons/ft2/min. E-Fence Rigid Polymer Matrix™ allows stormwater to flow through. It provides very high reliability because there is almost no storm-water washouts nor wind knock-downs. This significantly reduces maintenance and monitoring costs and increases animal safety. Link to Key Design Factors for Wildlife Exclusion Fence.

Summary: "Excluding wildlife from construction sites can be challenging, particularly for Eastern foxsnake. E-Fence offers an effective and efficient solution to multi-species projects that have varied exclusionary requirements. This product is durable and adaptable to site conditions which allow for customized field-fit solutions." - Martine Esraelian, Terrestrial Biologist, Parsons Inc.

"The Ontario Ministry of Transportation selected the E-Fence Rigid Polymer Matrix product to provide an effective measure for reptile exclusion from the construction work zone while ensuring no hazards to vehicles within the highway right of way and minimal maintenance required for the exclusion fence." Heather Mitchell - Senior Environmental Planner - Ontario Ministry of Transportation - West

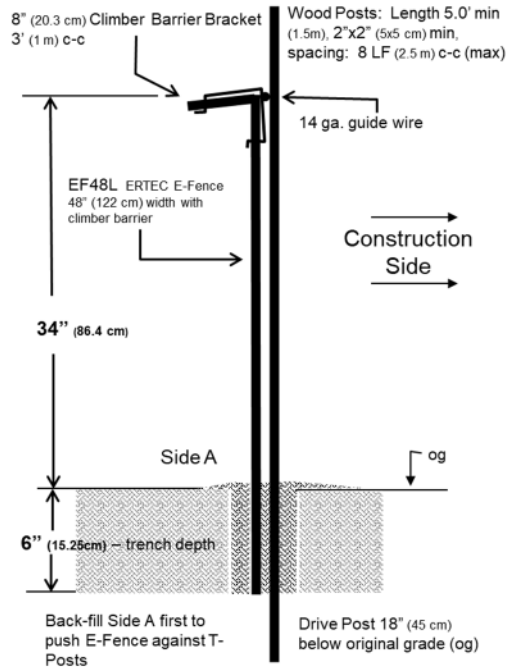

Diagram 1

E-Fence installed with an 8" climber barrier. The Eastern foxsnake is an excellent climber. It has been demonstrated that this species cannot climb E-Fence.

E-Fence installed along the highway right-of-way to keep species at risk out of the construction zone