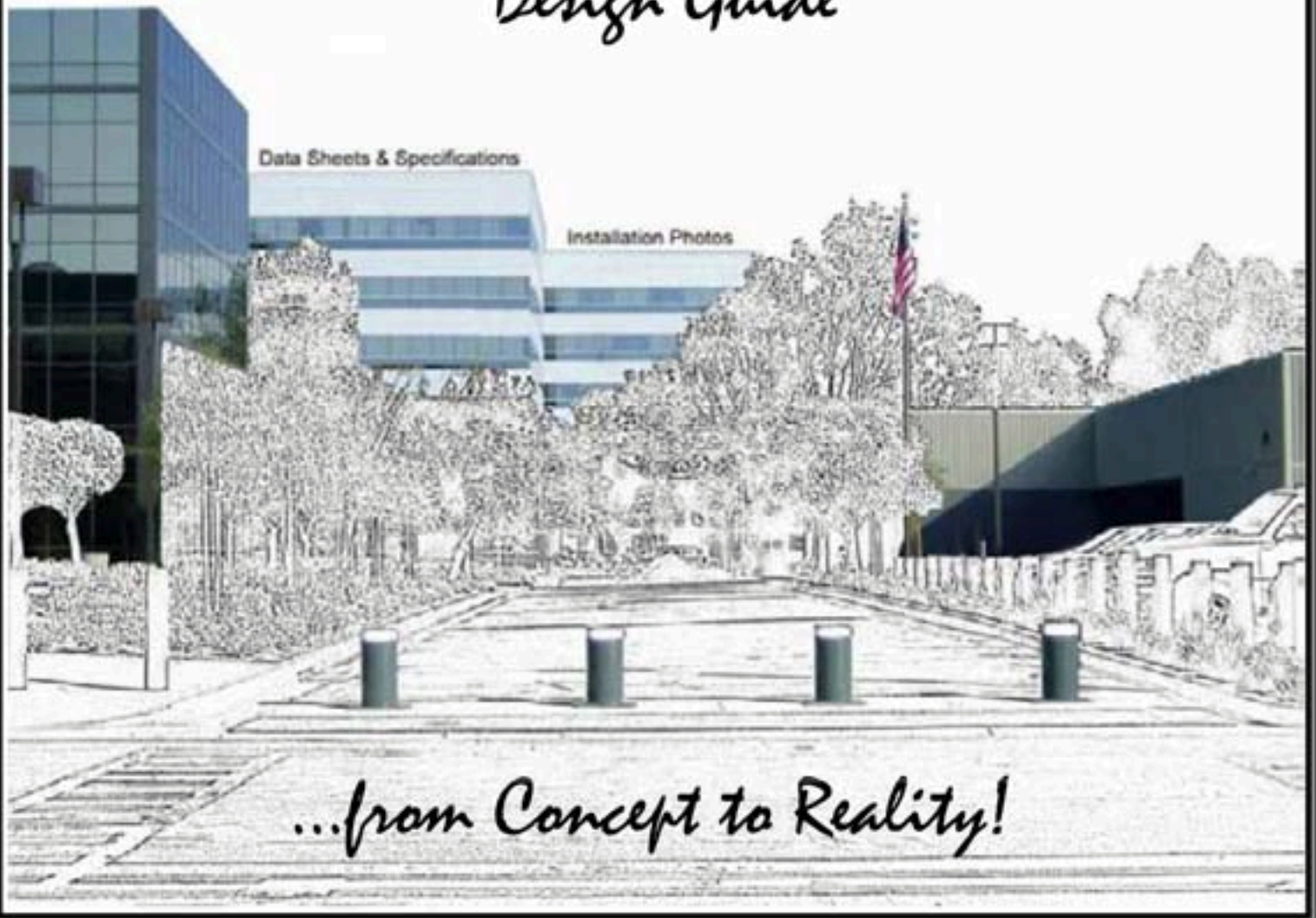




## Electric Bollards

# Architectural & Engineering Design Guide



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Data Sheet  
Equipment



Data Sheet  
Installation



CSI Format  
Specification



What You  
Need to Know



Project  
Portfolio

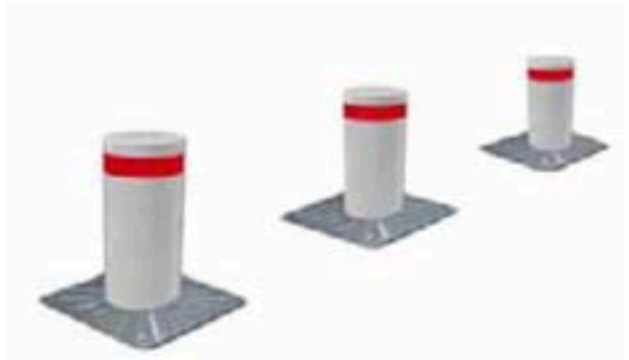
<b>Bollard Type:</b>	<b>Automatic • Retractable</b>
<b>Operation:</b>	Electric Motor Voltage: 208V, 1 ph w/ neutral, ground, 30A circuit Req'd (for up to 6 bollards) 120 V (optional) – 40A circuit
<b>Dimensions:</b>	Bollard – 11" dia. X 24" tall Casing – 18" x 18" x 42" Excavation Depth: 54" (allows for drain)
<b>Impact Resistance:</b>	Not Rated
<b>Operational Conditions:</b>	Fully waterproof – IP68 Rated Can operate submerged for up to 1 hr. Drainage required at 1 gallon/min. Operating Temperatures: -20°C to 90°C ( -4°F to 165°F)
<b>Actuation:</b>	Dry Contact input from external system: <ul style="list-style-type: none"> <li>• Card Reader System</li> <li>• Remote Transmitter</li> <li>• RFID</li> <li>• Guard Station Push Button</li> <li>• Knox Box – Emergency</li> <li>• Siren / Strobe Sensor</li> </ul>
<b>Operating Speed:</b>	3 seconds up
<b>Operational Frequency:</b>	120 operations per hour 1,500,000 MCBF
<b>Safety Features:</b>	Torque Monitor – monitors motor amps and retracts bollards when motor reaches pre-set resistance limit Vehicle Detectors with Memory 3M Reflective Stripes
<b>Materials:</b>	Bollards manufactured in one piece special alloy carbon steel 1/2" thick Bollard casing manufactured from special carbon steel 1/4" thick with reinforcing plates welded on 2" centers
<b>Finish Treatment:</b>	Bollards are available in painted finish RAL colors standard All equipment treated with anti corrosion treatment before painting.
<b>Fail-Safe Design:</b>	Bollards retract during power failure Optional UPS system keeps bollards up and locks engaged. Once lowered, bollards stay down until power restored
<b>Controls:</b>	30" x 36" x 10" interior or exterior panel to be located within 200 ft of bollards. One panel for up to 6 bollards



**eGuardian Series**  
**Model B-2A**  
**Automatic • Retractable**

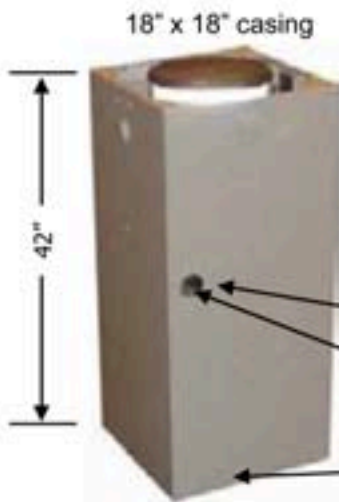
The eGuardian™ Model B-2A bollard is an automatic retractable bollard that operates using an electric motor. The standard operation starts from the up position. Upon receiving an input from an external access control system or button, the bollards lower into the down position (in the ground). After the vehicle has passed through, the bollards raise to the up position and lock.

The eGuardian™ Model B-2A bollard can be cycled constantly and requires no recovery time. Electric operation allows for built-in safety protection for authorized vehicles passing over the bollards.



**Safe, Reliable and Eco-Friendly**

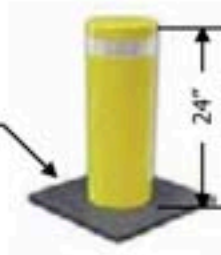




18" x 18" casing

42"

Casing cover is held in place by four (4) allen head screws. Access for servicing the bollard provided by removing this cover.



Bollard diameter: 11"  
 Painted Finish – color TBD  
 3M type Reflective Strip  
 Removable Cover  
 Bollard Casing Cover: 21"  
 Painted Finish – Gray

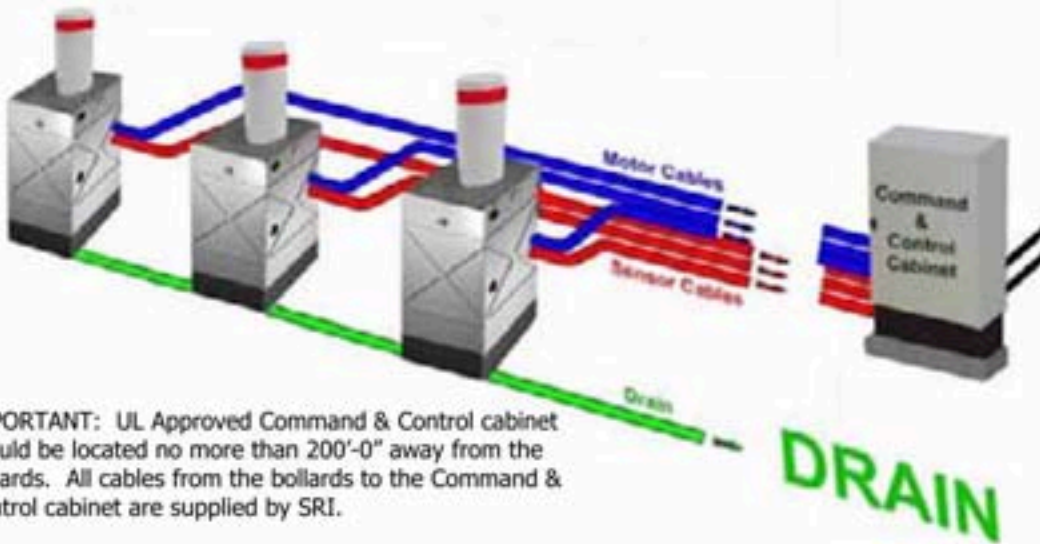
**Motor Cable Inlet** – attach a 1" PVC conduit

**Sensor Cable Inlet** – attach a 3/4" PVC conduit

**Drain Inlet** – attach a 3" drain line

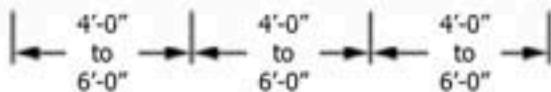
Bollard components are IP68 Rated and can operate submerged for up to an hour. It is necessary to provide drainage at a rate of one (1) gallon per hour.

**IMPORTANT:** Failure to meet specified drainage requirements will void warranty.



Note: Separate conduits must be run from each bollard to the Command & Control cabinet for high voltage Motor Cable and low voltage Sensor Cable.

**IMPORTANT:** UL Approved Command & Control cabinet should be located no more than 200'-0" away from the bollards. All cables from the bollards to the Command & Control cabinet are supplied by SRI.



Please refer to Installation Manual for specific rebar requirements.



## **eGuardian™ Series Model B-2A**

1.01

**SUMMARY**

- A. Section Includes: Furnish and install factory fabricated and tested electric bollards in accordance with plans and specifications.
- B. Related Work:
  - 1. Section 02221 – Excavation, Bedding, and Backfilling
  - 2. Section 02551 – Asphalt Concrete Paving
  - 3. Section 02721 – Storm Drainage
  - 4. Section 02820 – Fences and Gates
  - 5. Section 03050 – Basic Concrete Materials and Methods
  - 6. Section 13704 – Security Access Systems
  - 7. Section 13850 – Detection and Alarm
  - 8. Section 16120 – Electrical Supply and Termination
  - 9. Section 16520 – Exterior Luminaries

1.02

**REFERENCES**

- A. BOCA Evaluation Services, 4051 West Flossmoor Road, Country Club Hills, IL 60478, (708) 799-2305, Fax: (708)799-0310
- B. ICBO Evaluation Service, Inc., 5360 Workman Mill Road, Whittier, CA 90601-2998, (562) 699-0543, Fax: (562) 695-4694
- C. Southern Building Code Congress Int'l, Inc., 900 Montclair Rd, Birmingham, AL 35213 (205) 591-1853, Fax: (205) 591-0775

1.03

**SUBMITTALS**

- A. Product Data: Submit manufacturer's product data, standard details and installation instructions for all materials provided in this specification.
- B. Shop Drawings: Submit shop drawings that document: civil work required, product components, rebar details, adjacent construction materials, dimensions and necessary wiring and electrical requirements.
- C. Contract Closeout: Submit Manufacturer's Warranty and Owner's Manual.

1.04

**QUALITY ASSURANCE**

- A. Bollards shall be certified by the manufacturer to meet performance criteria according to the following test standards: [select, if applicable]:
  - 1. ICBO (UBC Standard 10-1)



## **eGuardian™ Series Model B-2A**

1.05

**PRODUCT HANDLING**

- A. All materials shall arrive in the manufacturer's crates.
- B. Store materials in a dry, protected, well ventilated area. Immediately report any damaged material to carrier that made the delivery and note such damage on the carrier's freight bill of lading.
- C. Precautions should be taken through the remainder of the construction process to ensure that the bollards will be without damage at the time of acceptance.

1.06

**SUBSTITUTIONS**

- A. Proposals for substitution products will be accepted from approved bidders only and must be submitted a minimum of ten (10) working days prior to the bid date. The proposed substitution shall meet the construction, safety and security performance standards of this specification.

1.07

**JOB CONDITIONS**

- A. Verify that other associated trades are complete with their required work before installing the bollards.
- B. Refer to the construction documents, shop drawings and manufacturer's installation instructions.
- C. Coordinate installation with adjacent barrier, concrete, security access controls and electrical work.
- D. Observe all appropriate OSHA safety guidelines for this work.

1.08

**WARRANTY**

- A. Manufacturer's Standard Warranty: Warranted materials shall be free of defects in material and workmanship for a period of one year from the date of delivery to the project location. Warranty is limited and is void if bollards are improperly installed, improperly drained or impacted by a vehicle.

## eGuardian™ Series Model B-2A

### 2.01

#### MANUFACTURER

- A. Shall be eGuardian™ Series, Model B-2HA (hardened) or Model B-2BA (break-away), Motorized Retractable Bollard.



- B. The system was designed to be used from the raised position and to interface with any access control system to require authorization to lower the bollards and allow access past the security barrier area. Without authorization, the bollards remain in the raised position preventing unauthorized vehicular access into secured areas.

### 2.02

#### CONSTRUCTION

- A. The eGuardian™ Model B-2HA and Model B-2BA bollard diameter is 11" and height is 24". The bollard system shall consist of retractable bollards riding on stainless steel guides, bollard casings, electromechanical assembly including AC motor, heavy-duty lifting straps and pulleys, special wiring with water-tight marine-type connections and control box. All components shall be factory assembled and tested.
- B. Bollard: Manufactured in one piece of carbon steel type E36, 3/8" thick, with rigidity reinforcements using 4" flat ties welded inside the bollard.
- C. Bollard Casing: A 18" x 18" x 42" housing manufactured of carbon steel type E24.2, 5/8" thick with a 2" nylon brush mounted on the casing with stainless steel screws that cannot be unscrewed in the raised position because of the internal hooks. Bollard casing is fully waterproof and is designed to operate temporarily submerged if necessary. Drainage must be provided and allow drainage at a rate of one (1) gallon per minute.
- D. Electromechanical System is fully water-resistant (I68 Rated) and includes:
1. 1/3 HP, heavy-duty, 208 VAC 1 phase instant-reversing motor, with life lubricated speed reduction gearbox, with worm screw type mechanism.
  2. Two heavy-duty lifting straps to raise the bollard.
  3. Safety torque limiter with adjustable friction disks. (HD Safety Clutch).
- System is capable of operating submerged for short periods of time but drainage must be provided and allow drainage at the rate of one (1) gallon per minute.

## eGuardian™ Series Model B-2A

### 2.03

#### CONTROL OPTIONS

- A. Command & Control cabinet is a 30" wide x 36" tall x 10" deep lockable metal cabinet that can be mounted in an interior or exterior location and which can control up to two (2) sets of three (3) bollards installed within 200 feet. The Command & Control cabinet is the location where the input line voltage must be terminated. Manufacturer supplied cables are then run from the Command & Control cabinet to each individual bollard. Any external connections from Access Control systems or other Control Options, including Emergency Access systems must be connected in this cabinet. Standard and optional features in the Command & Control cabinet shall include:
1. PLC with pre-set program for automatic operation
  2. Switch for manual operation
  3. Torque Monitor control
  4. Individual Breakers for each bollard
  5. Low voltage transformer
  6. Transaction counter
  7. Power failure indicator
  8. Modem for remote connection
  9. Vehicle detector mounting bases; (vehicle detectors optional)
  10. Controller for locking mechanism
  11. Lightning Protection/Surge Protection
  12. Clock and Timer (optional)
- B. Access Control System: eGuardian™ Model B-2A bollards are designed to integrate with external access control systems including, but not limited to the following:
1. Card Reader System
  2. RFID (radio frequency identification) System
  3. Biometric Authorization System
- A dry contact must be provided to the Command & Control cabinet from these external systems.
- C. Other Control Options: eGuardian™ Model B-2A bollards are designed to integrate with the following input options:
1. Push Button Station
  2. Vehicle Ground Loop Contact
  3. Vehicle Safety Beam
- D. Emergency Access Systems: eGuardian™ Model B-2A bollards are designed to integrate with local Emergency Access systems to allow local police / fire / ambulance access through the barrier. Upon receiving an input, the bollards will lower immediately and stay in the down position until reset. These systems include the following:
1. Knox Box key access
  2. Siren and Strobe Sensors (i.e.Tolmar)

## eGuardian™ Series Model B-2A

### 2.04

#### METAL TREATMENT AND FINISH

- A. Protected by yellow electro zinc dichromate thickness: 22 µm. Special research has been conducted on the anti-corrosion treatment to ensure resistance to the most severe environmental conditions. The entire course of treatment is as follows
1. Removal of grease from the metal parts,
  2. Rinsing in water to eliminate all alkaline residue,
  3. Zinc phosphatization: thickness 5 µm,
  4. Passivation, ensuring an increase in the corrosive resistance of the coat of phosphate obtained,
  5. Elimination of residual salts (ions), through rinsing with de-mineralized water
  6. Final treatment by cataphoresis, thickness: maximum of 22 µm. (Cathodic process).
  7. (1) coat of primer paint, (2) component epoxy micaceous iron ore, thickness: 40µm. Cabinet: (1) coat of (2) component polyurethane paint, thickness: 40 µm.
- B. Bollard Finish: Bollards are custom painted in a color to be selected. Please consult the RAL color system for available color options or consult the manufacturer. Standard color: Dark Gray (RAL 7034).

### 2.05

#### RELIABILITY

- A. Bollards are designed for reliable service in most applications and climates and provide a minimum of 1,500,000 MCBF (mean cycle before failure) rating.

### 2.06

#### CRASH RESISTANCE

- A. The eGuardian™ Bollard Model B-2A is designed and manufactured to withstand an exceptional amount of kinetic energy. Bollards have not been certified by the Department of State.

### 2.07

#### CONDITIONS

- A. Climatic Conditions: All electromechanical bollard system components shall operate between -20° C to +90° C (-4° F to +165° F). Systems are fully water-resistant – IP68 Rated – and capable of operating submerged for short periods of time. Drainage must be provided at the rate of one (1) gallon per minute.

### 2.08

#### RELATED WORK

- A. Electrical: Power supply to control box: 208V, 1 phase, with neutral and ground. (120 V optional).

## eGuardian™ Series Model B-2A

2.09

### SAFETY SYSTEM

- A. The eGuardian™ Model B-2A has safety features which prevent and/or minimize accidental injury to people. These features include the following components:
1. Bollards lower in case of power failure. An optional battery backup can keep the bollards locked in the up position. Once lowered, the bollards will remain down until power is restored.
  2. A band of 3M type reflective tape on the upper part of the bollard
  3. Torque Monitor: Rising bollard is limited to between 4,800N to 10,000N upwards force (approximately 500 lbs.). This is designed to minimize vehicular damage, bollard damage and injury that could occur if a bollard is raised by an external push-button while an authorized vehicle is passing through the security barrier zone.
- B. Proper design and use of the bollards is also a critical aspect of the bollard safety system. The following sequence of operation is recommended:
1. Sequence of Operation: Secured Entry Process  
Entry: Upon approaching the entrance; the bollards are in the up position.  
Entrance authorization: The bollards lower to the fully down position (5 seconds); the vehicle can now pass through the security barrier zone.  
Safety detection: After the vehicle clears the security barrier zone; the safety loop zone; the pedestrian sensor zone is clear; the bollards raise to the full up position (5 seconds).
  2. Sequence of Operation: Free Exiting Process  
Upon approaching the exit; the bollard is in the up position.  
Free Exit: Upon a signal from the bollards / exit loop, the bollards lower to the fully down position (5 seconds); the vehicle can now pass through the security barrier zone.  
Safety detection: After the vehicle clears the security barrier zone and the safety loop zone; the bollards raise to the full up position (5 seconds)
  3. Multiple Vehicle Exit Cueing:  
The continuous exiting of multiple vehicle is provided for under the following conditions:
    - a. The first vehicle is detected by the exiting safety loop
    - b. The second vehicle is detected by the free exit loop.
    - c. Under these conditions, the bollards remain down providing for the continuous exiting of vehicles.

## **eGuardian™ Series Model B-2A**

### 3.01

#### INSPECTION

- A. Check as-built conditions and verify the manufacturer's bollard details for accuracy. Report any detrimental conditions to the contractor that prevent the proper functioning of the bollards or controls. Installation shall proceed once any unsatisfactory conditions have been corrected and in accordance to the manufacturer's recommendations.

### 3.02

#### INSTALLATION

- A. Installation shall be by an installer approved and trained by the manufacturer in strict accordance with the manufacturer's instructions.
- B. Comply with the bollard manufacturer's written and verbal recommendations and/or installation manual and other installation documents when installing the bollards, rebar, conduits, drains, wires and control cabinets. Set all units level, secure and in the designated orientation to the roadway.
- C. Installer Adjustment and Cleaning: After repeated operation of the completed installation, inspect controls for optimum operating condition and safety. Clean all metal surfaces promptly after installation.

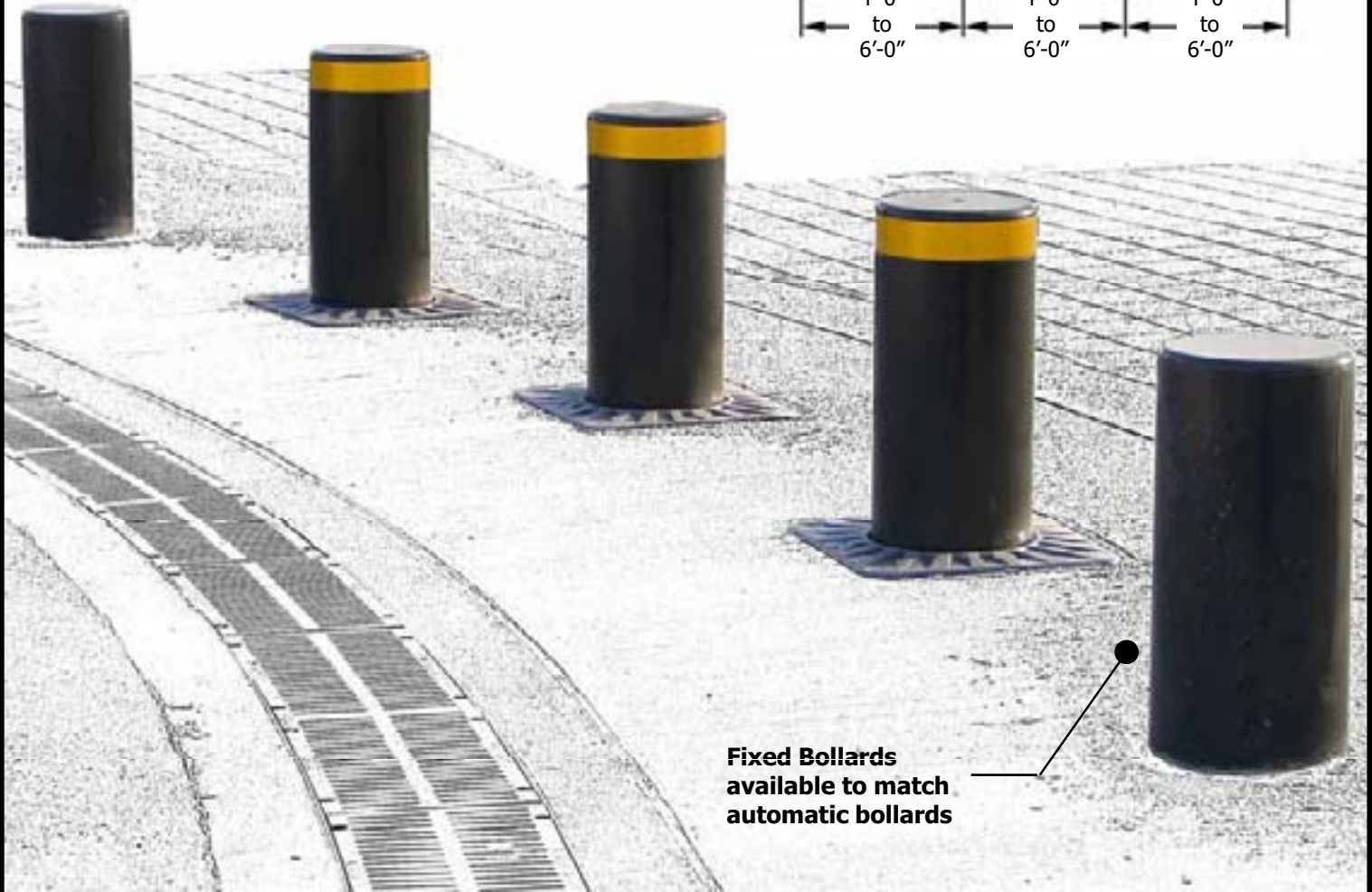
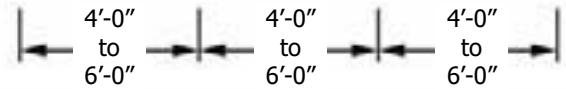
END OF SECTION

# What You Need to Know:

## General Layout

The eGuardian™ Series Model B-2A Bollards are designed to deter access to unauthorized vehicles. When used in groups, bollards should be installed at 4'-0" to 6'-0" apart (on centers). One lane of bollards can consist of between one and six bollards, depending upon the lane width.

- Each lane of bollards will operate together
- One lane of bollards = 1 to 6 bollards
- Custom controls available for larger groups
- A standard 12'-0" lane requires 2 bollards
- A single Command & Control cabinet operates:
  - Up to two lanes
  - Up to three bollards / lane



**Fixed Bollards  
available to match  
automatic bollards**



# What You Need to Know:

## Bollard Appearance

- Bollard finish options include:
  - Painted Finish - over 1000 RAL colors
  - Common Colors Include

Black RAL 9005	Grey RAL 7043	Silver RAL 7001	Brown RAL 8028	Yellow RAL 1023
----------------------	---------------------	-----------------------	----------------------	-----------------------

- Brushed Stainless Steel
- 2" Reflective Tape Strip Color Options include:
  - White, Red, Yellow



- Tubular Shape Only (for safety reasons)
- Ground Plate Finished Dark Grey
- Removal of Security Screws allows access



## What You Need to Know: Ground / Drain Preparation

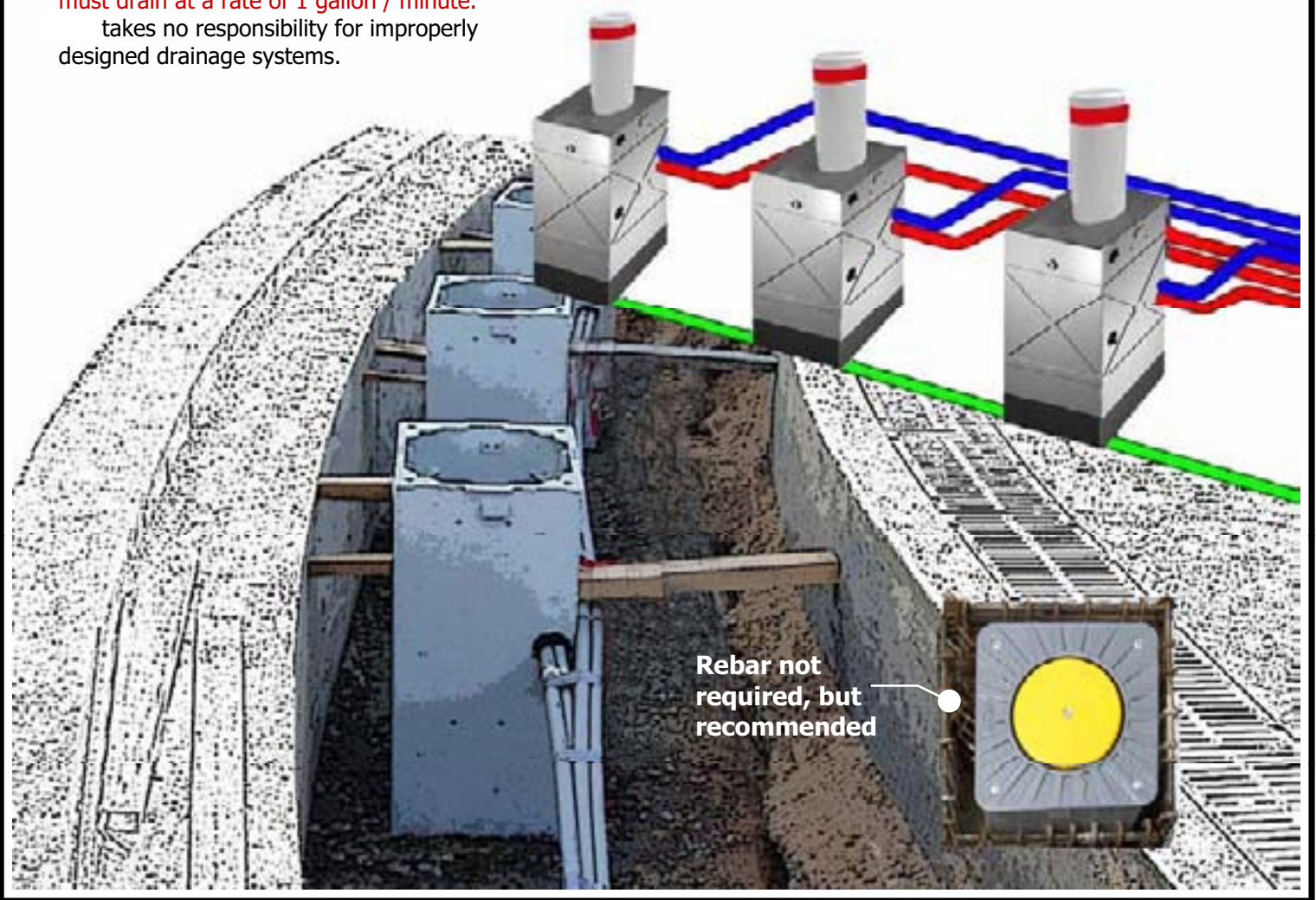
The eGuardian™ Series Model B-2A Bollards require a trench (for multiple bollards) to allow the 42" deep x 18" bollard casing, rebar cage and drain connection. All bollards should be connected to the same drain pipe and drained per the specifications of the architect or engineer. Rebar cages can either be pre-formed and dropped into the trench or formed on-site. Please refer to the Installation Manual when designing the rebar cages.

Although the bollards are IP68 Rated, the cases must drain at a rate of 1 gallon / minute.

takes no responsibility for improperly designed drainage systems.

- Trench Depth: 54" - 66"
- Trench Width: 48" - 60"
- Conduits enter casing on the right/left side
  - Ensure proper case orientation
- 3" Drain pipe connects to bottom of case
- Drain pipes can connect to:
  - Municipal Sewer System
  - Storm Drain
  - Daylight drain (if the slope allows)
  - Holding tank with sump pump
  - Gravel bed (CAUTION!)

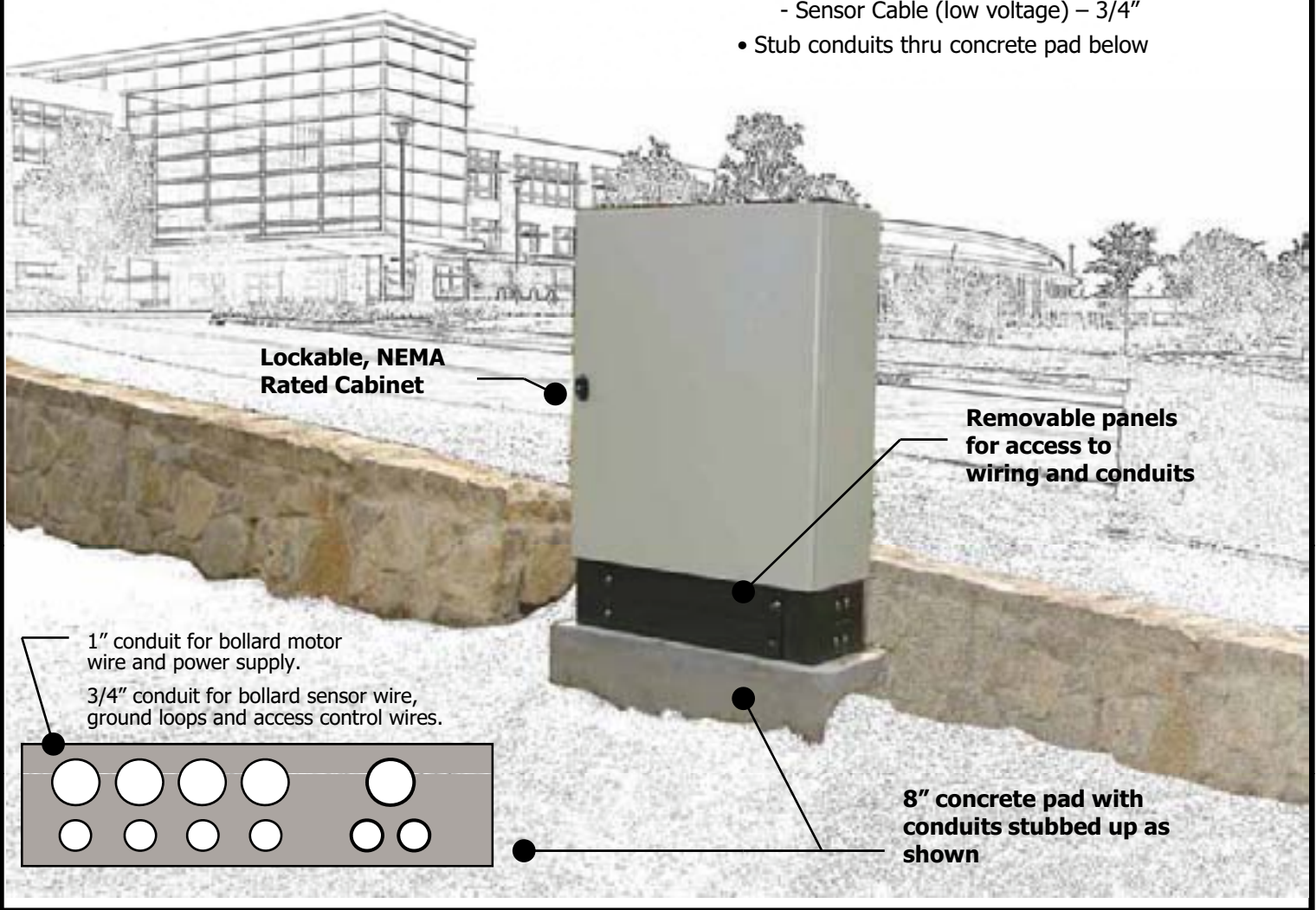
Note: There are no fluids associated with the bollards that drain out. Just rain / snow melt.



## What You Need to Know: Command & Control cabinet

The eGuardian™ Series Model B-2A Bollards are operated by instructions received from the Command & Control cabinet installed nearby. This cabinet can be mounted inside or outside and up to 200'-0" away from the bollards, provided that the signals received from recessed ground loops are adequate. This Command & Control cabinet is discussed in further detail in the Electrical Installation & Start-up Manual.

- Power Supply (208V, 1 ph with a neutral & ground)
- Access Control System terminates here
- Emergency Access System terminates here
- NEMA-rated, UL approved cabinet
- Contains all bollard controls including
  - PLC (1 per lane, 1 or 2 lanes max.)
  - Variable Frequency Drives
  - Diagnostic Codes
  - UPS (to keep raised bollards up)
- Typical cabinet size is 30" x 36" x 10"
- All cables to the bollards supplied by SRI
- Separate conduits required to each bollard for:
  - Motor Cable (high voltage) – 1"
  - Sensor Cable (low voltage) – 3/4"
- Stub conduits thru concrete pad below



## What You Need to Know:

### Emergency Access

The eGuardian™ Series Model B-2A Bollards are designed to remain in the upright position unless signaled to lower. Often, emergency services such as Police, Fire and Ambulance must be able to pass through the bollards quickly and can't wait for authorization.

Third party sensor systems and secured key systems can be integrated into the Command & Control cabinet to provide this emergency access.

- Available emergency access systems:
  - Knox Box (universal secured key)
  - Siren or "Yelp" Sensors
  - Strobe Sensors
  - Connection to Building Fire Alarm
- Lowered bollards remain down until reset
- An output can be provided to sound an alarm
- Optional Traffic Lights turn green

### Police • Fire • Ambulance

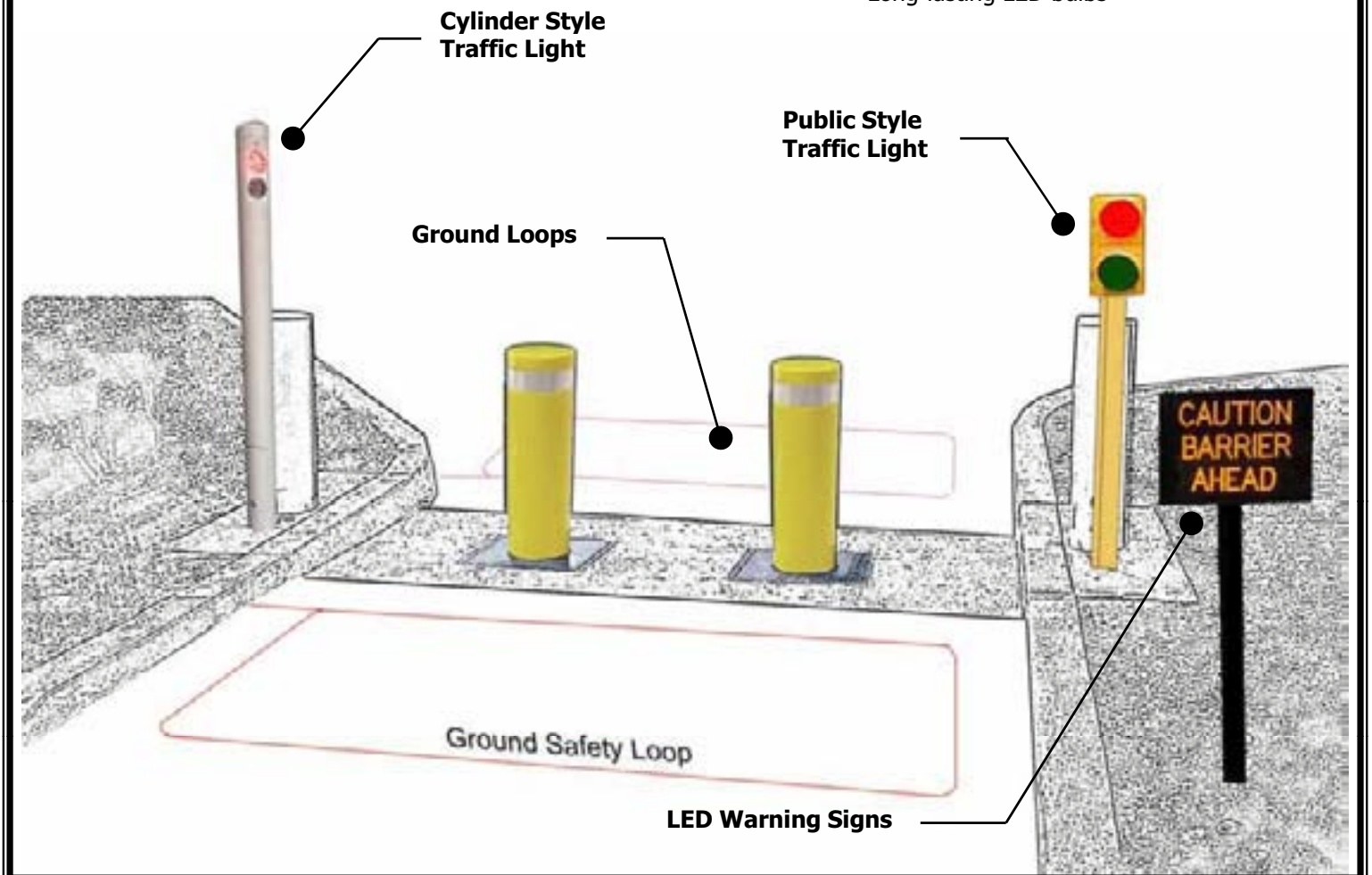


## What You Need to Know:

### Recommended Safety Options

The eGuardian™ Series Model B-2A Bollards are designed to restrict vehicle access and allow access to authorized vehicles only. To ensure that those authorized vehicles can safely pass over the bollards, we strongly recommend the use of external safety devices.

- Ground Loops
  - Will prevent bollards from raising
  - Can provide signal for free egress
  - Can provide signal for bollards to raise
- Traffic Lights
  - Architectural cylinder style
  - Public style (for city streets)
  - Long-lasting LED bulbs
- LED Warning Signs
  - Standard message
  - Customizable messages
  - Long-lasting LED bulbs



# What You Need to Know:

## Hardened or Break-Away?

The eGuardian™ Series bollard is available in two resistance options: Hardened (Model B-2HA) or Break-Away (Model B-2BA).

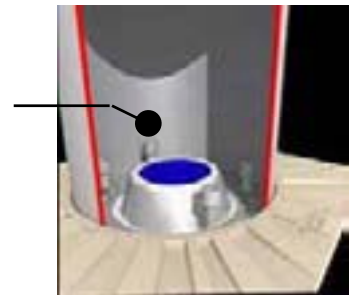
The Break-Away feature is ideal for applications that require the visual deterrence that a bollard provides but where it is more important to maintain safety for all vehicles.

Applications for Break-Away bollards:

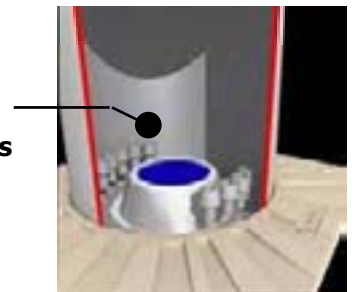
- Parking lots (bollard used in lieu of gate arm)
- Pedestrian Malls
- Bike Paths
- University Campuses



**Break-Away**  
Held with 2 or 4  
shredding bolts



**Hardened**  
Held with 10  
stainless steel bolts





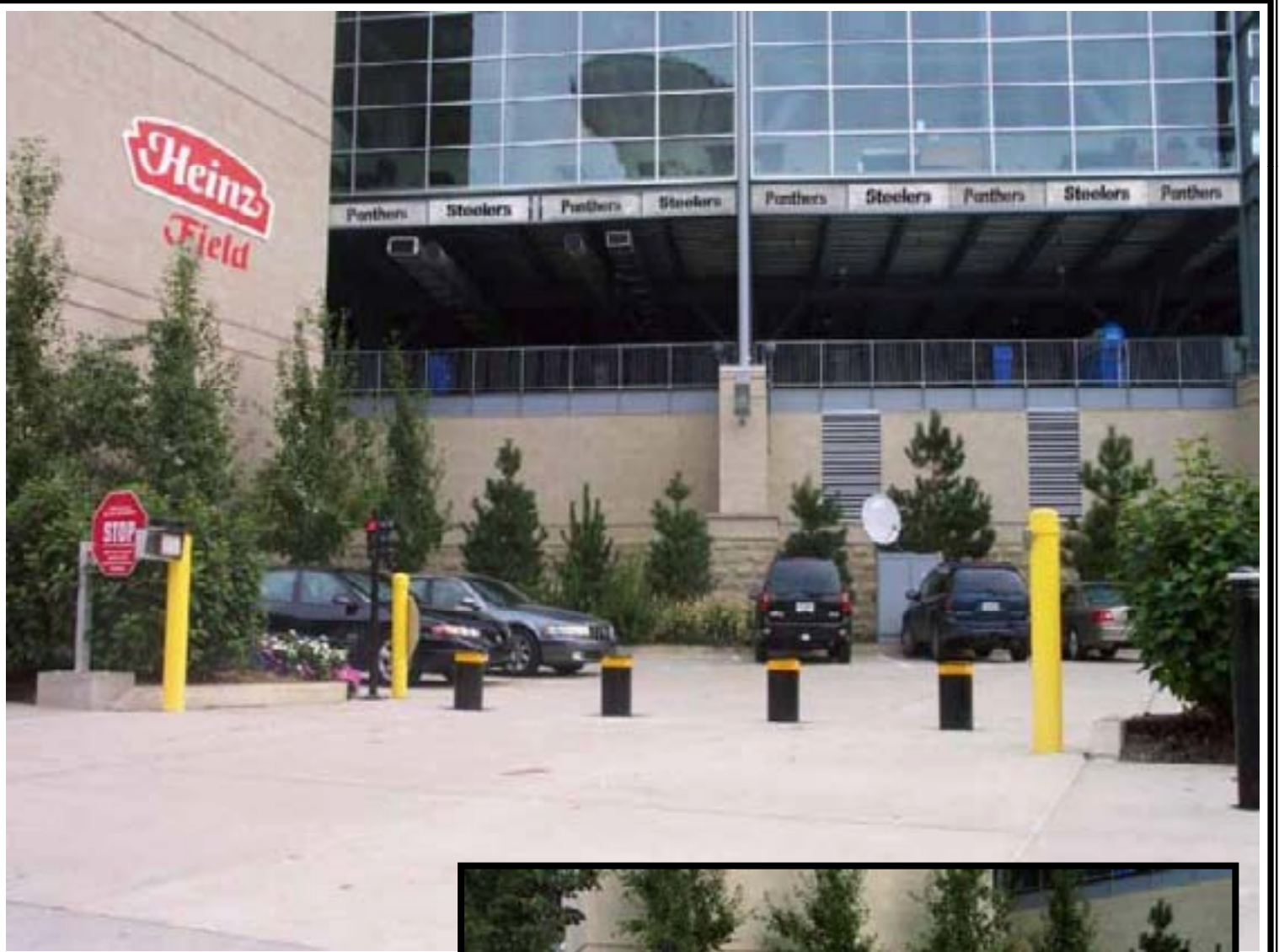
*Project Portfolio*





*Project Portfolio*





*Project Portfolio*





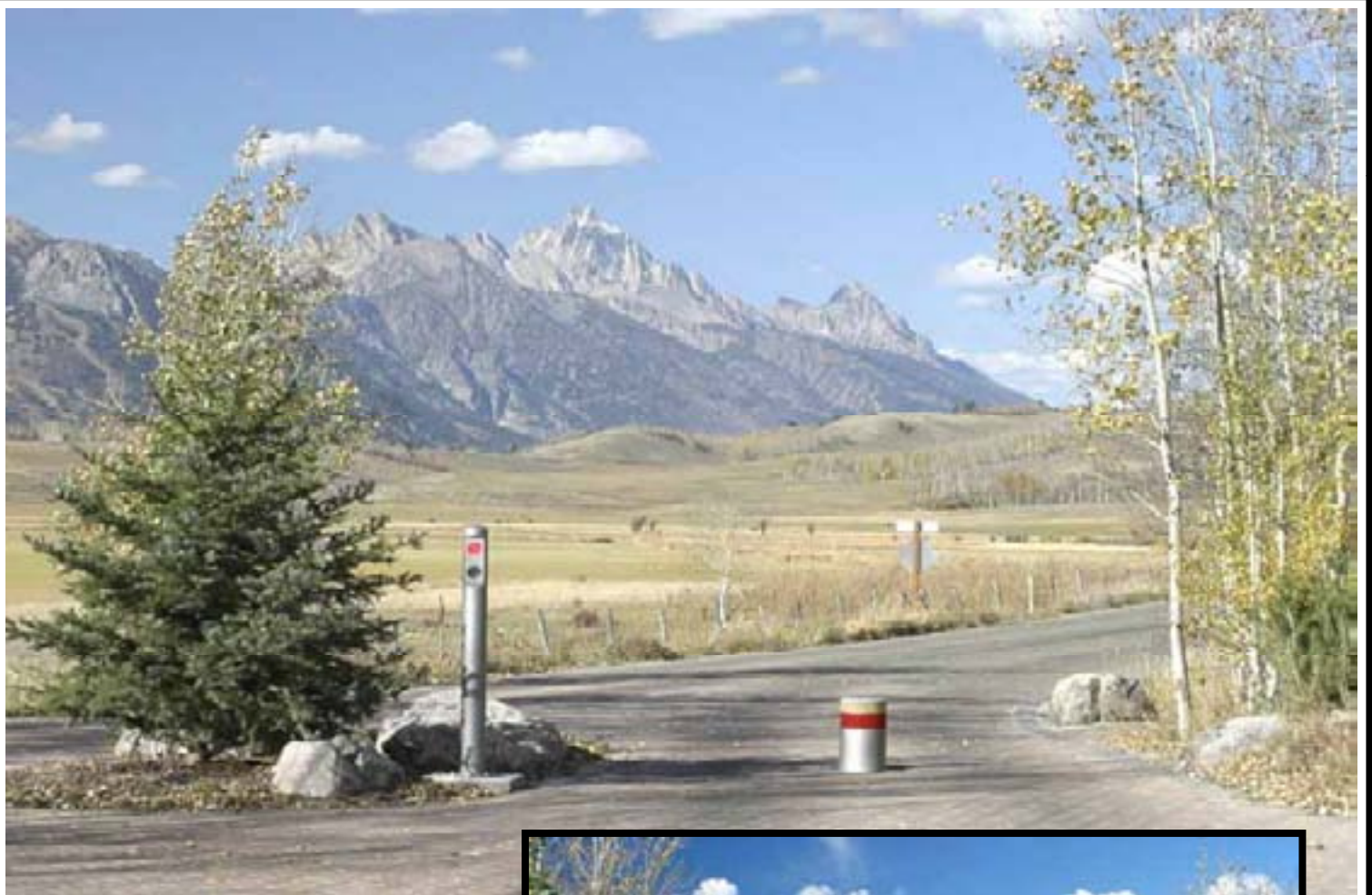
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