Waymark
Demolition ♦ Concrete ♦ Site Solutions

Temporary Site Fencing

Standards for use, set-up, modification, and removal

Objectives

1. Establish standards for site hazard assessment
2. Establish standards for site entrance/egress requirements
3. Ensure adequate protection for site workers, equipment, materials and general public
4. Establish standard practices for installation and bracing of site fencing
5. Establish site controls for safe installation, modification, and removal of fencing

Site Hazard Assessment

Potential hazards for site personnel and the general public will vary from site to site. A site hazard assessment must be prepared for each site to determining the fence composition, panel height, gates, and bracing required for that site.

All locations where construction activity or event activity will require a separation between the general public and the activities of the site must have a complete perimeter of site fencing in place at all times. The fencing requirement can be determined as a function of the hazards that the site represents including the following:

Low risk factors	**High risk factors**
Excavation < 1 meter deep	Excavation > 1 meter deep
Work ceiling < 4 meters	Work ceiling > 4 meters
Stationary equipment on site	Mobile equipment on site
Crane on site < 72 hours	Crane on site > 72 hours
Vehicle parking only	Vehicular traffic on site
Controlled site access	Uncontrolled site access
Flat, stable terrain	Uneven or unstable terrain
Light pedestrian perimeter traffic	Heavy pedestrian perimeter traffic

Fence composition: In cases where the boundary of the work site presents a high risk scenario due to high vehicular traffic, pedestrian traffic, or a sensitive environment of any kind (ie school, playground, daycare, hospital, etc.), the edge(s) of the work site that border the high risk environment must be composed of concrete jersey barrier bases with a minimum of 3' high fencing panels mounted on the top of the jersey barriers. Under normal circumstances the only gaps allowed in this edge will be for emergency pedestrian exit gates, however vehicular gates may also be allowed if the layout of the site will not accommodate vehicular access at any lower risk location. Any vehicular gate placed within a row of jersey barrier site protection must be attended by a flagger at all times that there is work activity taking place on site.

Fence Panel Height: The minimum height of the fence panels will be determined by the site hazard assessment as follows:

1. 3’ fence panels: may be used when the only site issue identified is pedestrian traffic patterns.

2. 6’ fence panels: must be used when the site hazard assessment identifies any risks to workers or the public beyond pedestrian traffic patterns.

3. 8 – 10’ panels: must be used when the site hazard assessment identifies either (a) 6 or more low risk factors; or (b) 3 or more high risk factors.

Fence panels in excess of 10’ in height will not be allowed as the stability of the fence can be compromised under adverse ground or weather conditions given the bracing options currently in use.

Pedestrian and Traffic Gates: Pedestrian gates must be present in all fence installations. Gates must be a minimum of 42” wide to ensure adequate bi-directional access, and cannot be more than 60” wide. Gates must be hinged and securely fastened to the adjacent fence panel on the hinge side. Some form of closure mechanism (chain, clasp, etc) must be present on the gate post opposite the hinge pole. Bracing for gate-adjacent panels is addressed in the section on bracing.

The number of gates required by any site will be a function of 3 factors; (a) maximum site occupancy, (b) perimeter fencing measurement of the site, and (c) risk factors present. The goal of this requirement is to ensure that anyone present on the fenced site will have reasonable access to a pedestrian exit in the event of an emergency. All gates installed are to be placed to maximize access by site occupants and minimize external risks when exiting the site.

First, the maximum occupancy of the site must be divided by the physical size of the site to determine the maximum occupational density. The number of pedestrian gates will be determined as follows:

Perimeter	Max Occupancy	Low Risk Factors	High Risk Factors	Ped Gates Req’d
< 75 m	Any	Any	None	1
< 75 m	Any	Any	Any	2
75 – 500 m	< 1 per 10 lm	Any	None	2
75 – 500 m	< 1 per 10 lm	Any	Any	3
75 – 500 m	> 1 per 10 lm	Any	None	3
75 – 500 m	> 1 per 10 lm	Any	Any	4
> 500 m	< 1 per 10 lm	Any	None	4
> 500 m	< 1 per 10 lm	Any	Any	6
> 500 m	> 1 per 10 lm	Any	None	6
> 500 m	> 1 per 10 lm	Any	Any	8

Traffic gates can be installed as required by site circumstances. Additional bracing may be required for large traffic gates which must be determined on a case by case basis. As a general rule, no site of any size should have more than two traffic gates at any time.

NOTE: All personnel, equipment, vehicles, etc. are to access the site using gate access ONLY. Temporary fence panels are NEVER to be disconnected for the movement of personnel or equipment – this is dangerous and is a ticketable offense. Should site conditions change over time such that a gate placement is no longer functional or optimal for site purposes, a certified fence installer must be called to relocate the gate and re-establish adequate bracing and security for both the former and the new gate locations.

Pedestrian Passage: For sites that identify pedestrian perimeter traffic as a risk, a safe pedestrian passageway must be provided. A safe pedestrian passageway provides protection from both side and overhead risks. The degree of pedestrian protection will depend on the work ceiling of the site (including any crane work).

1. For sites where the work ceiling does not exceed 4 meters, a low grade pedestrian passage will be required. This is typically fence panels with ¾" or thicker plywood or q-deck overhead cover. Minimum width of the passage is 42" and minimum internal clearance is 78".
2. For sites where the work ceiling exceeds 4 meters, a high grade pedestrian passage will be required. This is typically rated and inspected scaffolding.

Fence Stability: Temporary fence stability is a function of the stability of three points on the panel; the base, the top rail, and the connection to adjacent panels. In each case additional stability can be added as required by the fence installation and the risk assessment.

NOTE: The fencing installer must contact Alberta One Call prior to inserting any bracing stakes to determine if there are any possible underground hazards.

1. Bracing – Base: Each fence panel sits in or on a base which can be braced in a couple of ways depending on the surface under the base. In situations where the base is sitting on a finished surface of concrete or asphalt, the bracing to be applied will be a weight brace such as a sandbag or cinder block. When the base is installed on any type of natural surface (dirt, gravel, grass) the preferred method of bracing is to stake the base into the ground. Stakes must be a minimum of 18" in length and have an obstructed top section that cannot pull through the stake hole in the base.

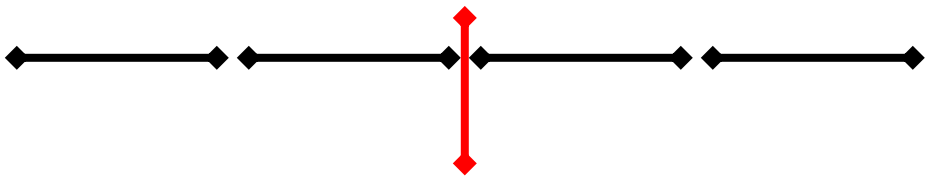
   Bases must be braced in all situations where lateral (wind, snow, signage, etc.) risks are present or where terrain risks exist. In either case, bracing must be placed on a minimum of 1 out of every 3 bases in the fence installation.

   For all bases that are adjacent to a gate installation, a weight brace, stake brace or top rail brace will be required.

2. Bracing – Top rail: The most vulnerable spot on any temporary fence installation is typically the top rail. Because of this, there are two forms of top rail bracing that can be employed – structural and attachment.

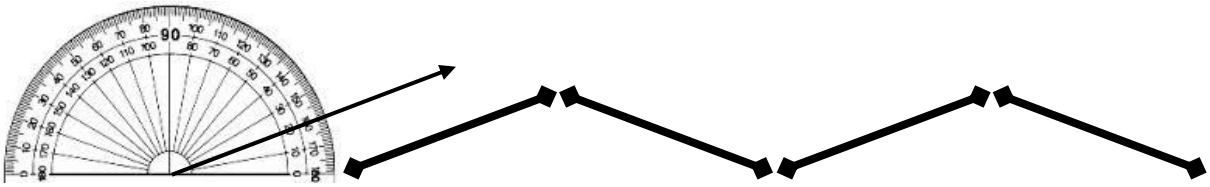
   Structural bracing is part of the design of the installation, and once again depends on the risks inherent in the site and installation. Factors such as wind loads, signage, uneven or loose terrain, mobile equipment on site, sensitive external environments, etc. all need to be considered when determining the structural bracing design. Options for this include installing cross bracing panels, installing a zig-zag pattern, or installing triangles.

   a. Cross bracing panels: This method of bracing involves the use of a base and top clip that are wide enough to accommodate an additional fence panel installed perpendicular to the perimeter fence panels. Depending on the conditions inside and outside of the site, the cross bracing panels are typically installed with approximately 25% of the panel on one side of the perimeter fence panels and 75% of the outside as shown below.



      Cross bracing can create a safety issue for pedestrian or equipment traffic on one or both sides of the perimeter fencing and is typically installed at every 4th or 5th panel connection depending on the severity of the site risks being addressed.

   b. Zig-zag panels: This method of bracing involves setting each panel in the perimeter installation at approximately 20 degree alternating angles to the centre line of the installation.



      This pattern provides for additional stability support for the fencing installation while avoiding the issues of having a cross installed panel protruding out from the perimeter installation. This approach would typically be used for low to moderate risk situations as it provides the lowest amount of top rail stability of the three options.

   c. Triangle panels: This method is similar to the cross bracing method, but provides greater stability due to its wider footprint on the perimeter line and the additional weight of the second panel. Two stabilizing panels are attached to one perimeter

panel a triangle as shown below. The depth of the triangle, and therefore the intrusion into either side of the perimeter line, is a function of the panel lengths used. For example, using 8' wide panels for all three sides will result in a greater intrusion than if 8' bracing panels are attached to a 12' perimeter panel.

Given the advantages of greater weight and less intrusion, the triangle bracing method is the preferred method for most high risk installations.

Attachment bracing can be added to any fencing installation at any time, and its use will generally be the result of (1) the inability to utilize structural bracing for some reason, (2) the inadequacy of structural bracing alone, or (3) changing conditions requiring additional bracing once the perimeter fence is already in place. The two most common forms of attachment bracing are bracing poles and tension ropes.

a. Bracing poles are solid poles that anchor into the ground and angle up towards the top rail where they attach using some form of clip. These are highly stable braces and can be placed almost anywhere there is top rail available, however their use is normally restricted to natural surfaces where the base of the pole can be set into the ground using a stake of some kind.

b. Tension ropes can also be used in a variety of situations since they also attach to the top rail of the perimeter fence almost anywhere. The other end of the tension rope is then anchored to some stable object – a tree, light post, ground stake, etc. and tightened to ensure adequate tension is placed between the fence panel and the anchor point.

3. Connectors: There are two main types of panel connectors that are generally used for two different types of fencing installations.
    a. Bolted clips attach adjacent perimeter panels by clipping the parallel side posts of the two panels together. These clips are the preferred method of connecting panels as they are the most stable and most difficult to remove if someone is trying to gain access to the site. Bolted clips must always be installed with the bolt head to the outside of the fence line and the nut on the inside, and should be installed between 18" and 24" from the top rail of the fence panels. Bolted clips are generally used unless either cross bracing needs to be installed, or if the nature of the site is such that there will be regular and necessary reconfigurations of the fencing system.

    b. The other type of panel connection is the top clip. This is a U shaped metal clip that sits in the top of the end post for the two adjacent panels. Top clips are necessary when cross bracing is to be installed and can be used when the fencing setup is only

temporary for some reason. Although these clips are easier to install, they also provide little security or stability for a temporary fence installation. Top clips should only be used when bolted clips are not an option for some reason.

Site Controls: The installation, modification, and removal of temporary fencing panels often requires the transportation of panels and accessories (bases, clips, bracing, etc.) across work sites and through public areas. This is particularly true for event site fencing at locations such as parks and plazas. Modifying an existing fence installation can present not only physical risks to anyone working or walking in the area of the work taking place, but potentially security risks as the site is temporarily unprotected while the modifications are taking place.

Site controls and risk mitigation measures must be in place during any temporary fencing scope of work. This is to be done through the following steps.

1. Site survey and hazard assessment: the first step in any fencing scope of work is to prepare a work site hazard assessment and to survey the site for any issues that may interfere with the transport of fence materials from the delivery truck/drop location to the work site. Physical site hazards must be noted and accommodated, while pedestrian or worker hazards must be managed.

2. Movement of fence panels and accessories must follow the most direct route from drop location to work area possible, subject to physical hazards that must be allowed for. Movement of fence panels must follow contractor's safe job procedures for handling of panels.

3. If light pedestrian, worker, or vehicular/equipment traffic has been identified near the work area, the work area must be clearly identified and controlled by (1) the presence of a flagger; or (2) high visibility cones set out to mark the perimeter of the work area.

4. If heavy traffic of any kind has been identified near the work area, a flagger must be present to control the work area at all times.

5. Once the installation is complete, the fence installer and the prime contractor (or authorized representative) on site must perform a "walk around" of the entire fencing perimeter to ensure all necessary components are in place. Both the contractor's site supervisor and the client must sign off that the fence has been erected correctly.