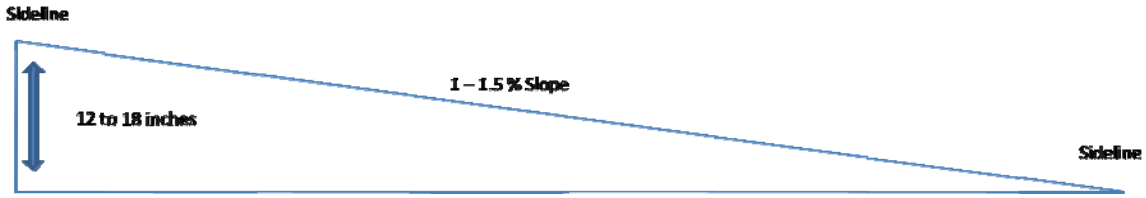
Field Crowns and Slopes

When designing a sports field, one of the most important aspects to keep in mind is drainage. The main purpose of drainage is to minimize the distance water must travel before it begins rapid removal from the surface. If a field does not drain well, the field will not play well. To help internal drainage, it is important not to overcompact the sub-base, subsoil, or topsoil during any process of construction. Scarifying throughout the process can eliminate layering and too much compaction.

One way to achieve good drainage is by building a correct and consistent grade. The sport being played on the field determines the type of crown and percent slope. The type of soil determines the height of the crown. In a sandy soil, the highest point on the field should be about 12 inches with a 1 to 1.5% slope. In a clay soil, the highest point on the field should be around 18 inches with a 1 to 1.5% slope.

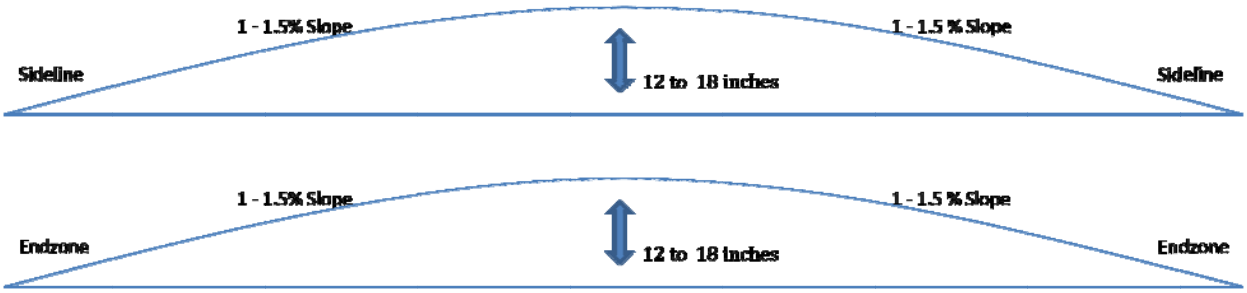
There are two types of crowns commonly used in football, rugby, soccer, field hockey and lacrosse. Some fields slope away from the center to drain toward the sidelines.

Some fields are flat and slope to one side so they only drain to that one side. Both of these field designs direct water away from the goal mouth area.

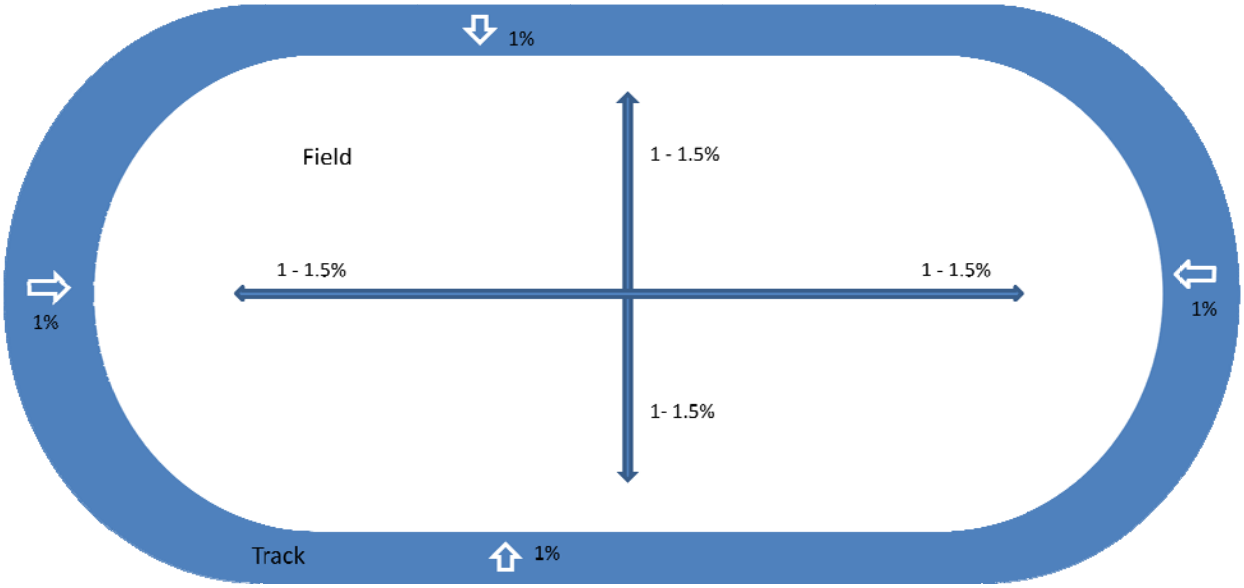


A tennis court can slope from side-to-side, end-to-end, or corner-to-corner. A tennis court should never be crowned in the middle. On a properly built grass surface, the slope can be as little as .25%. On a porous surface, the slope can be .25 - .4%, and .8 to 1% on a nonporous surface.

Another type of crown is called the turtle back. Be aware that a turtle back crown works only for football or rugby, because in addition to draining to both sidelines, the field also drains to both endzones. For a sport such as soccer, this type of crown would cause water to drain toward the goal mouths creating an unsatisfactory and unsafe playing surface.



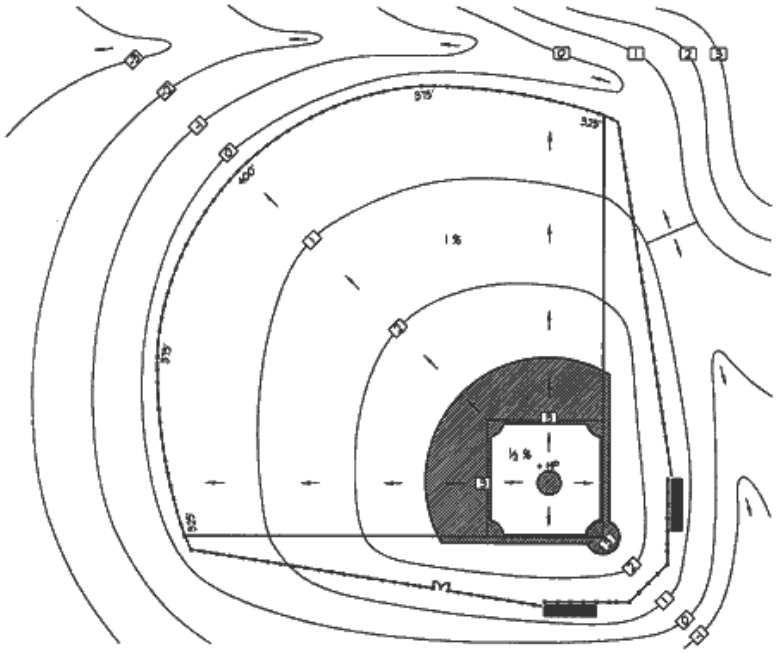
An effective design for a track and field facility is to slope the field surrounded by the track using the above specifications, then slope the track at 1% toward the infield. If this design is used, drainage must be installed around the inside of the track.



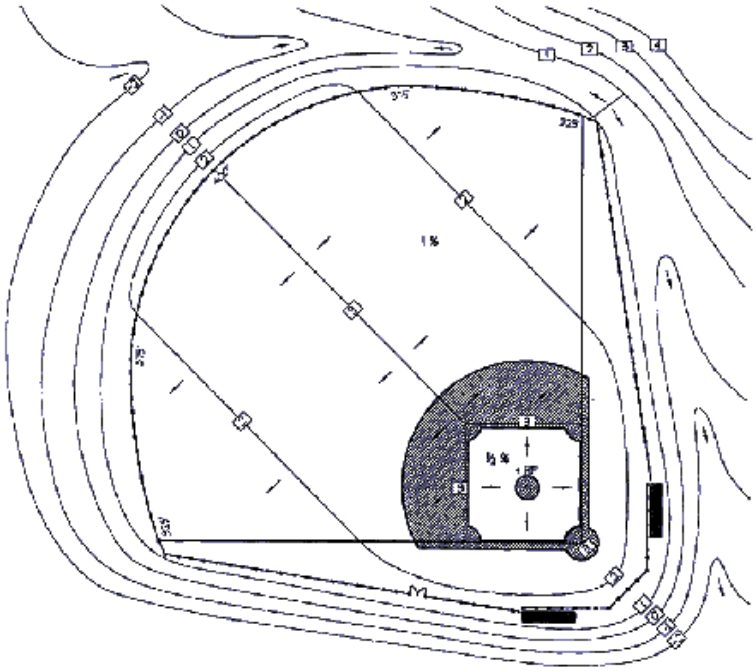
When designing a bocce court, there should not be a crown. Bocce courts need to be flat and level to provide a straight, true roll of the ball.

On baseball fields, the highest point is the pitcher's mound, which is 10 inches higher than home plate. The field slopes away from the mound in all directions. Apart from the pitcher's mound, the infield is higher than the rest of the field and has a .5% slope into the outfield. The outfield then slopes away at a 1 to 1.5% slope. Although softball fields do not have mounds, the infield is still the highest point and has a .5% slope into the outfield. Like a baseball field, the outfield slopes away at a 1 to 1.5% slope.

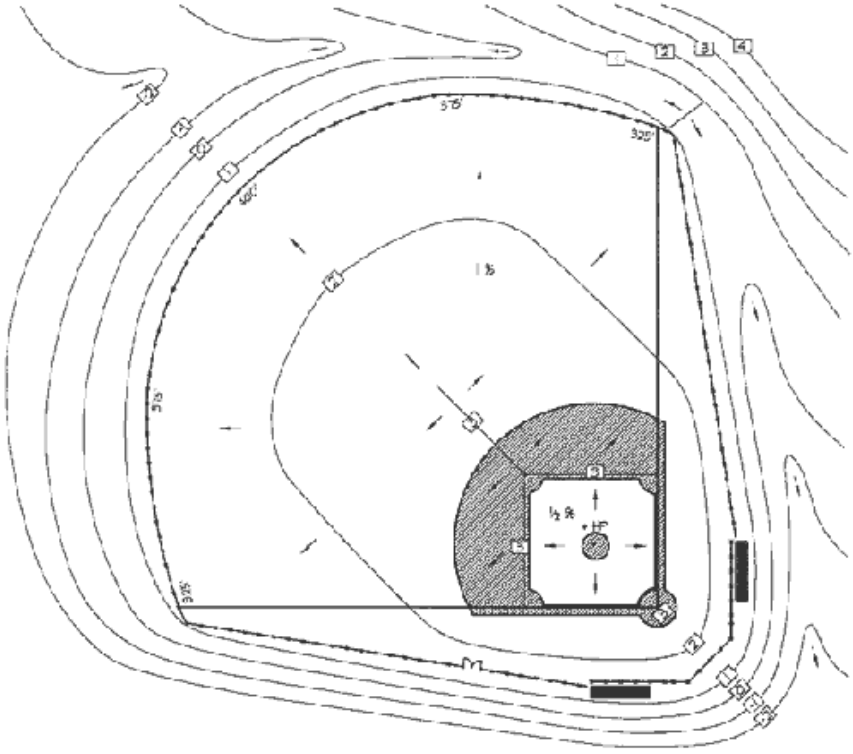
There are various ways to construct baseball and softball fields. The following depicts the simplest and most common field design with the infield sloping at .5% and the outfield consistently sloping 1 to 1.5% from the infield:



Another way to construct a baseball or softball field is to crown it from second base through the outfield. The infield would continue to slope at .5% from the pitcher's mound, but would then slope at 1-1.5% from side-to-side in the outfield. The following shows this design in more detail:



The best way to build a baseball or softball field is to maintain the .5% slope for the infield from the pitcher's mound and extend the crown to about one-third of the way to the outfield fence. The outfield still maintains the 1 to 1.5% slope, but water will drain in all directions from the center point of the field. The following shows this design in more detail:



For additional information on drainage systems, please visit the irrigation/drainage section of the educational resources.

References: The information for this section was taken from the book Sports Fields: A Manual for Design, Construction and Maintenance by Jim Pulhalla, Jeff Krans, and Mike Goatley.