

Quality above depends on quality below

BY MARLIN BREEMS

Out of sight, out of mind! Sub-surface drainage is seldom seen and seldom thought about. Items such as turf, fertilizer, bleachers, P.A. systems, scoreboards, irrigation, and field markings are more visible and get more attention. However, when a downpour 2 hours before an event turns your field into a mud bowl, the issue of drainage comes to mind. The quality of the field above depends greatly upon the quality of the drainage system below.

Whether designing a drainage system for a new field or for an existing field, certain principles must be considered. The first thing to consider is the system's total capacity. In other words, "How quickly do you want your field to return to a playable condition?" If your field is already saturated with water, and you receive a 3-in. rainfall, then 84,150 gal. of water need to be removed. The field's owner needs to decide about what a reasonable drainage time would be. Is the field located in Florida or Arizona? Is it for amateur or professional use? What kind of flexibility will there be for rescheduling? If the park and recreation department regularly hosts soccer tournaments for out-of-town teams then the designers may wish to drain that field in an hour, not days. A 12-in. smooth wall pipe could accomplish that, assuming of course that the lagoon, stream, or storm sewer is able to accept that speed. It is more likely that 4 6-in. smooth-walled pipes do the job. A 6-in. rain would double the requirements.

This all assumes, of course, that the field is equipped with a system that is able to collect the water and send it on its way expeditiously. It also assumes that the water is able to readily get into the collection system. A herringbone pattern is typically used when the field has a crown in the center running the length of the field. The herringbone allows water running from the higher elevation to cross over a drainage line rather than running parallel to the drainage lines toward the edge of the field. If the field is flat, or has less than a .005 gradient (.5 percent slope) from the center, then a parallel or grid drainage pattern may be appropriate. This drainage pattern should be extended 15 ft. beyond the sidelines to include the area where players and coaches stand.

The drainage lines should be located between 10 and 20 ft. apart depending on how quickly you wish to see your field recover (see Fig. 1). These relatively close spacings are needed for different reasons on different fields. Fields with healthy, porous soil will drain quickly, filling the collection system. If the collectors are spaced too far apart they will be called upon to carry excessive amounts of water and backup will result. Fields with dense, clay-like soil will not drain nearly so quickly. Water will tend to pool on the surface and seep into the collection system on the collection lines. This will be most feasible if sand backfill from around the pipe extends up to near the surface.

Collection systems located near the surface respond more quickly than those deeply buried do. Attention should be paid to burying the system to a depth that will avoid soil aeration techniques. The system that is submerged 6 in. with sand located above and around the collectors is fast and efficient. Products with a tall but enclosed core such as the Multi-Flow Drainage System provide a substantial surface area with which to intercept and collect the water and flow rates that get rid of it efficiently.

A multi-layered filter system (Fig. 2) protects the collectors from failure due to blinding and guarantees a long life. A fabric filter prevents the core from filling with fine sand and silt. A 3.5-4-oz. needle punched geo-synthetic fabric will do the best job. An inch or two of very coarse sand surrounding a fabric will prevent the fabric from blocking. As the water passes through the sand particles of clay and silt are arrested before they reach the fabric filter.

This is much more critical in some soils than in others but it is always an effective insurance against a blinding. In some circles filter wrapped drainage medium has received some bad press. For example the USGA discourages its use. However filter wrapped drainage medium encased in sand is a safe investment. Tom Biddart, a turf-

grass management technology instructor at Fairview College, teaches that encasement in course sand is the only way to satisfactorily protect a geotextile filter and thereby protect the drainage system.

Sports turf drainage is a science in need of far more attention than it gets. A well-designed sub-surface drainage system will yield rewarding dividends in attractive, hardy, healthy, and cost-effective turf. **ST**

Marlin Breems is director of marketing for Varicore Technologies. He can be reached at 800-978-8007.



Figure 1



Figure 2