

For a vintage golf course

MODERN DRAINAGE

10 fairway



The Problem



The existing system which was primarily intended for surface drainage does not drain away water quickly enough, and in some cases not at all.

Effects of Inadequate Drainage



Prolonged standing water allows our heavy soils to become saturated.

Effects of standing water and Saturated Soils

- Loss of “Cart Days”
- Wet and Soft Playing
- Maintenance delays
- Pump and Squeegee
- Summer Scald
- Winter Kill
- Prolific Poa
- Irrigation inefficiency
- Disease pressure
- Higher costs!



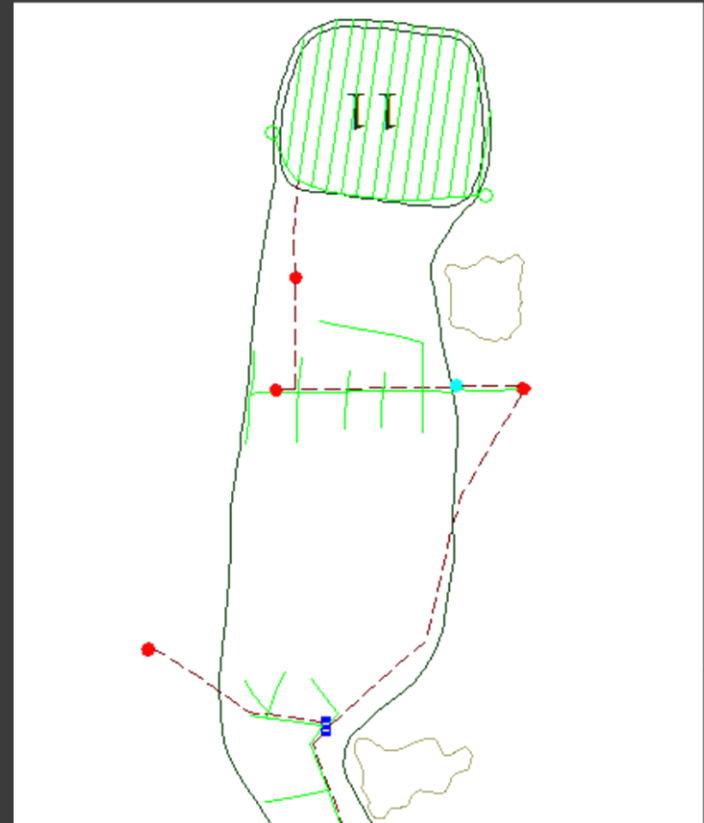
Our Solution

- ◎ Get a Master Plan
- ◎ Turf Drainage Company of America
Marrero, LA
- ◎ (Not Turf-Drain Inc.)
 - Dennis Hurley, President
 - Since 1983 they have worked with over 300 courses. Many in the top 100
 - History of success.

Area Specific Master Plan



#11 With No Drainage
Get the pumps out



#11 As Built

Basic principals

- ① Collection of Surface water
- ② Collection of Seepage Water
- ③ Transportation



Collecting Surface Water

- ⦿ The most efficient and least expensive
- ⦿ An adequate open inlet where water collects or streams
- ⦿ Catch it before it saturates the soil.
- ⦿ Take advantage of concentrated flows



Collecting Surface Water



**Perma Basin™ With
removable screen**



**Channel Drain for
concentrated flow**

Collecting Seepage Water

- ◎ Seepage water sources

- Lack of velocity
- Lateral movement from underground source
 - High water table
- Permeable soil covering a less permeable soil
 - Sand Top-dressed Areas



Collecting Seepage Water



- ⦿ No Pea Gravel
 - Very few native soils will bridge properly against gravel
- ⦿ This will result in fine particles infiltrating the gravel
- ⦿ Sand Backfill and use of geotextiles

Collecting Seepage Water

- ⦿ Proper depth and Spacing
 - The lower the permeability of the soil the deeper the sand column must be to create the hydraulic head necessary to release the water
- ⦿ 2' minimum and as deep as 6'
- ⦿ Run lateral lines perpendicular to flow



Collecting Seepage Water



Turf Drain™ collects water from the sand column more effectively than slotted pipe.



Sand that perks 40in/hour provides high permeability area

Collecting Seepage Water



Geo Textile and sand surround the Perma Basin™



This allows seepage water to flow directly into the basin

Transportation

- ◎ Solid smooth wall pipe
- ◎ Adequate diameter to handle the projected flow
- ◎ At a grade to provide self cleaning velocity of 3ft^3 per second
 - 1% for 4" smooth wall

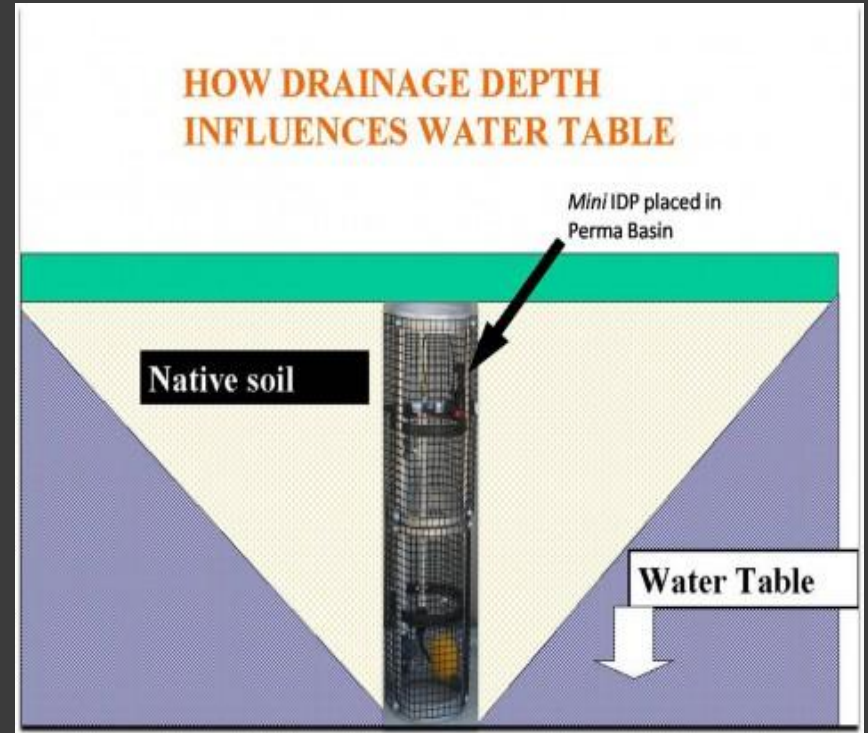
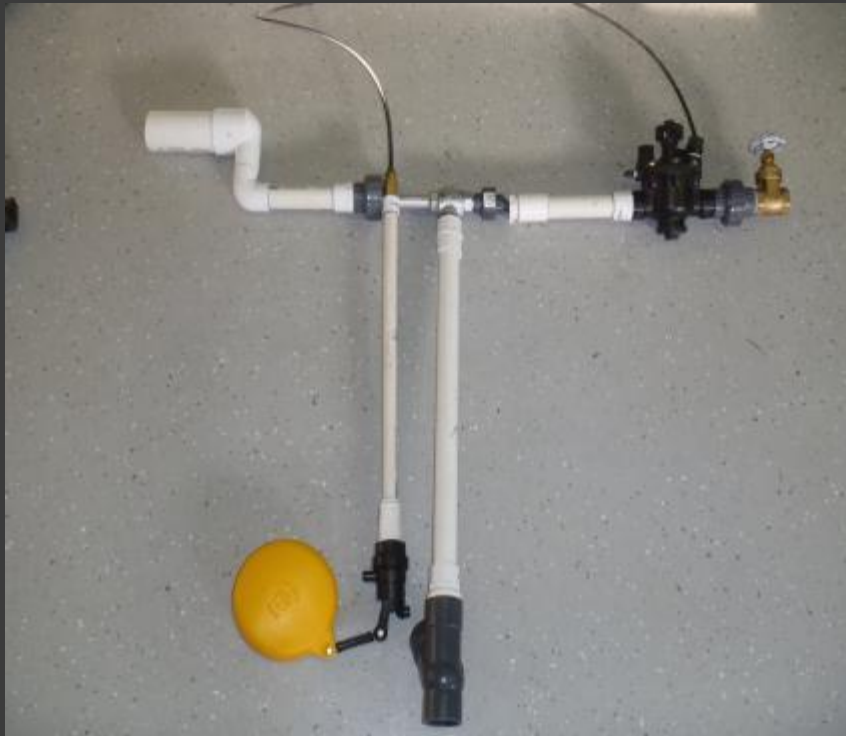


Transportation



- ⦿ Proper Relief
 - Must be an open outlet
 - Must be protected
 - Should not “daylight” onto another part of the course
- ⦿ If adequate relief cannot be achieved a pumping system must be employed

Transportation



The Mini IDP™

Franklin Hills Country Club

Phase One Installation

Laying out the system



Cutting the sod



Ready for Trenching



Trenching



The tarp system to haul away spoils



Excavate basin locations



Installation Turf Drains™



Connect Turf Drain to Basin



Fill with sand



Compact Sand



6" of Root Zone Mix



Roll Back the sod



Finished Area



Phase One Stats

- Work Began September 27th
- Completed the work on 6 holes
- 19,420 ft. of Turf Drain installed
- 8,136 ft. of 4" ADS N-12 installed
- 8 IDP' s
- 79 Basins
- 9 Channel Drains
- Used 1300 Tons of Sand
- Used 400 Tons of root zone mix
- Total Cost \$350,790

Do

- ⦿ Build a system that is a combination of surface and seepage collection
- ⦿ Run Lateral line perpendicular to flow
- ⦿ Have the end of the system open and free flowing
- ⦿ Backfill with sand not gravel
- ⦿ Make sure the reliefs are always protected
- ⦿ Plan when it's wet install when it's dry

Don't

- Try to collect seepage water with surface basins
- Collect surface water with seepage drainage unless there are no other options
- Use gravel sumps
- Allow water in a pipe to dump onto another part of the course

Misconceptions

- ⦿ Aerification will solve drainage problems
- ⦿ Soil is only wet at the top, so a deep trench is not needed
- ⦿ Low permeability soils cannot be drained
- ⦿ Geotextiles clog up

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