SportSurf Seminar
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Design Issues for Synthetic Turf Surfaces

Mike Abbott April 2008

The introduction of the FIFA Quality concept for 3G artificial grass, or ‘football turf’ as FIFA call it, has meant the introduction of lifetime testing on surfaces. In order to retain the FIFA Two Star badge, a pitch must meet the performance criteria set down by FIFA on a ‘year-on-year’ basis

The FA have now followed this lead and have embarked on a policy of testing surfaces at installation then after 1, 3 and 6 years.

Recent testing by the FA has raised some issues concerning the ability of surfacing systems, base designs and maintenance regimes to sustain this level of performance

A basic requirement of Football Foundation in grant aiding a pitch installation has been an availability of 85 hours per week. It now has become apparent that 3G pitches will not sustain such intensity of use without major deterioration in performance criteria. This requirement is now being examined and is likely to be revised.

Design Issues

- Base design
- Drainage design
- System design & quality assurance
- Maintenance requirements
- Environmental aspects.

Base Design

Base Design

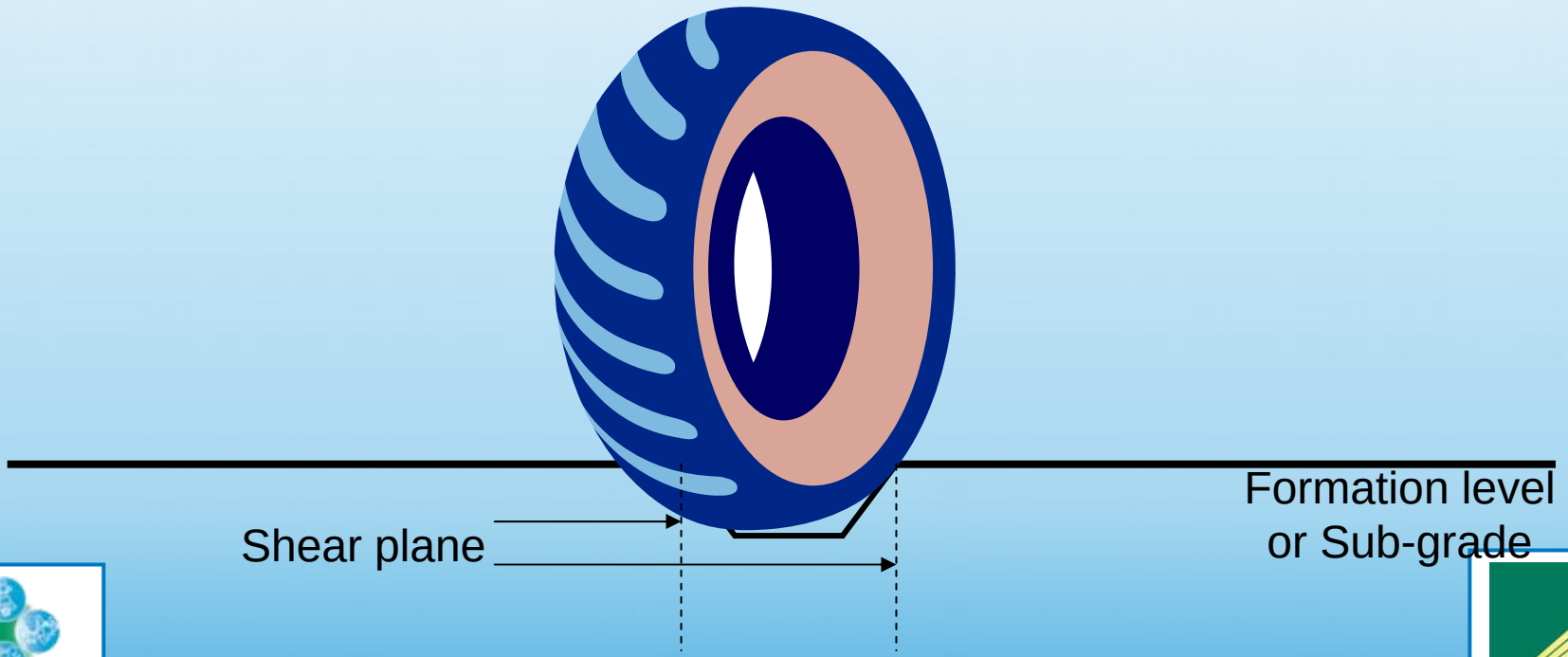
- Structural design & capacity
- Drainage properties
- Attenuation properties
- Frost susceptibility
- Contribution to performance characteristics.

Structural Design - Loading

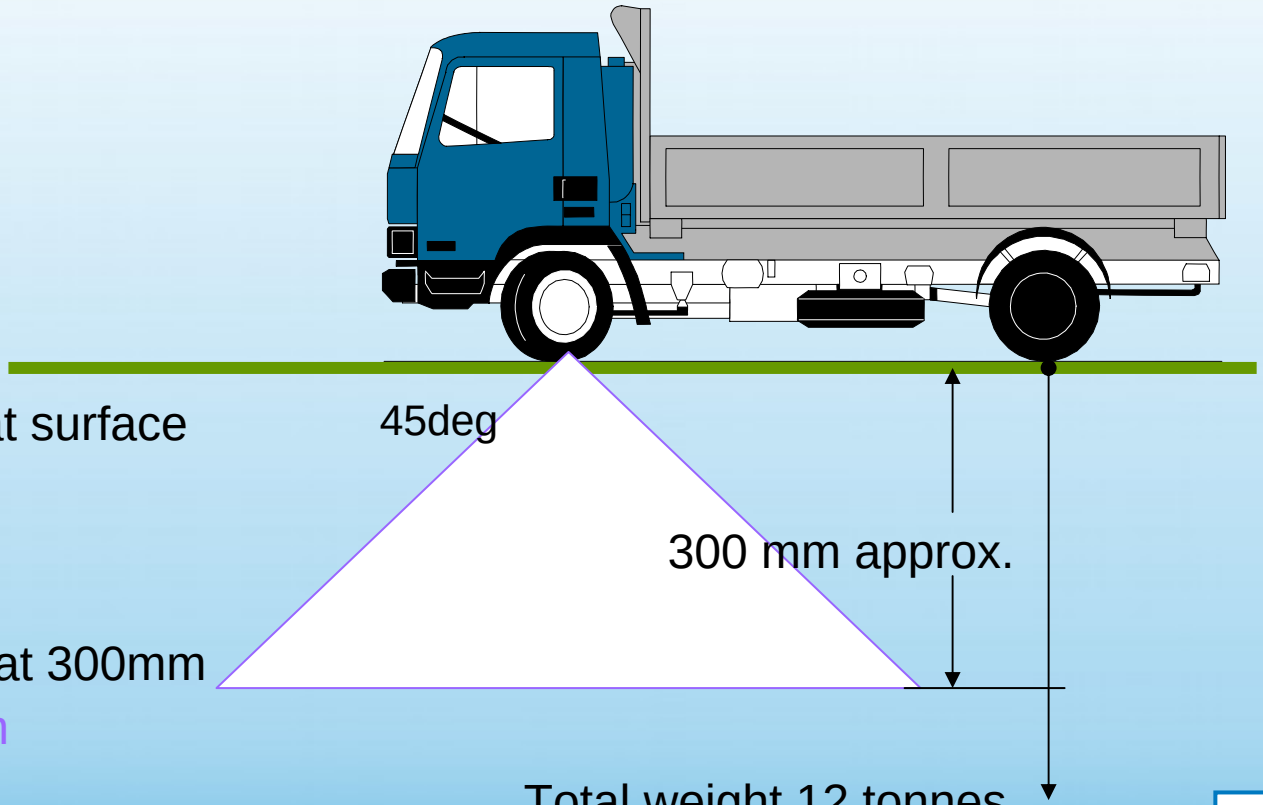
Invariably the maximum load applied to a sports surface is the wheel loading from vehicles during construction.

Load transfer to formation

With no base construction



Structural Design of Pavements



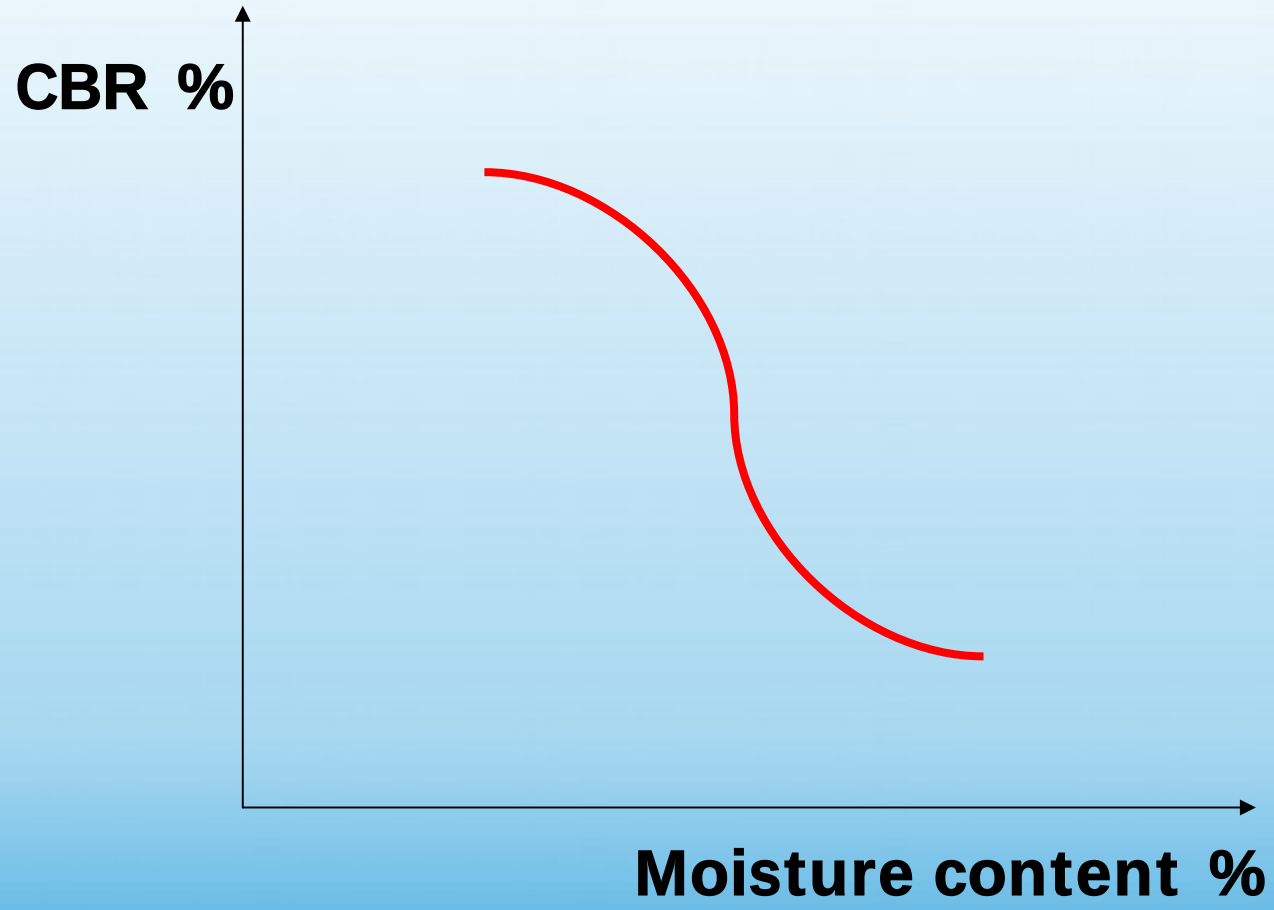
Structural Design of Pavements

Essential requirements pre-construction phase:

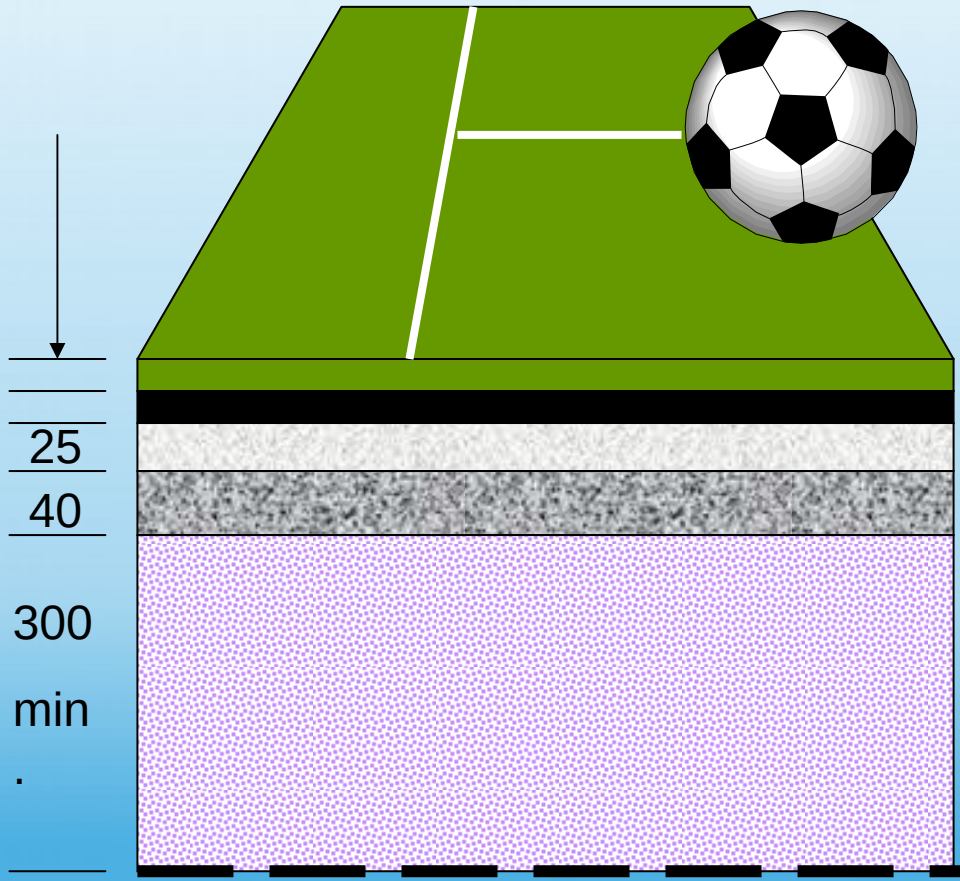
- Comprehensive Site Investigation
- Topographical survey
- Surface water outfall

California Bearing Ratio

Moisture content and CBR



Typical Pitch Construction (Engineered)



Carpet

Shockpad or geotextile

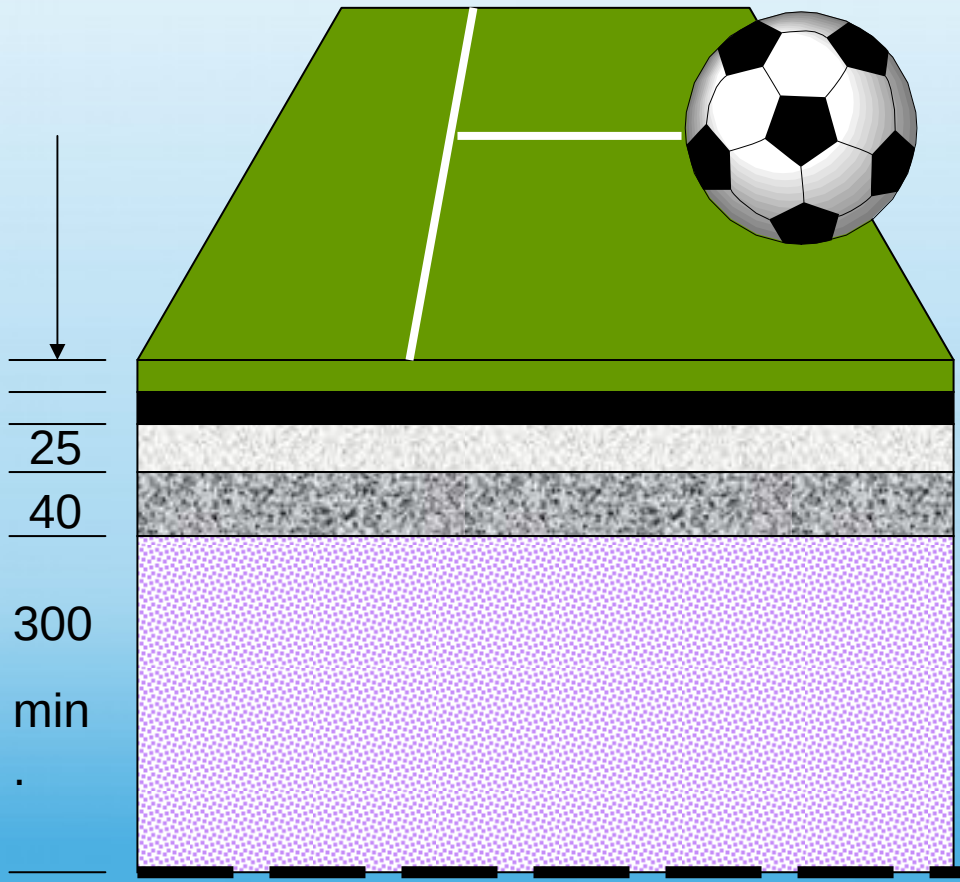
Bitmac binder course

Bitmac base course
(To BS 594987)

Dry stone base

Geotex. at formation

Typical Pitch Construction (Dynamic)



Carpet

Shockpad or geotextile

Unbound regulating layer

Graded stone layer

Dry stone base

Geotex. at formation

What are the long term loading intentions?

Drainage Design

Intensity of rainfall

Capacity of outfalls

- Attenuation of base system
- SUDS

Football or water polo?

Pitch Drainage

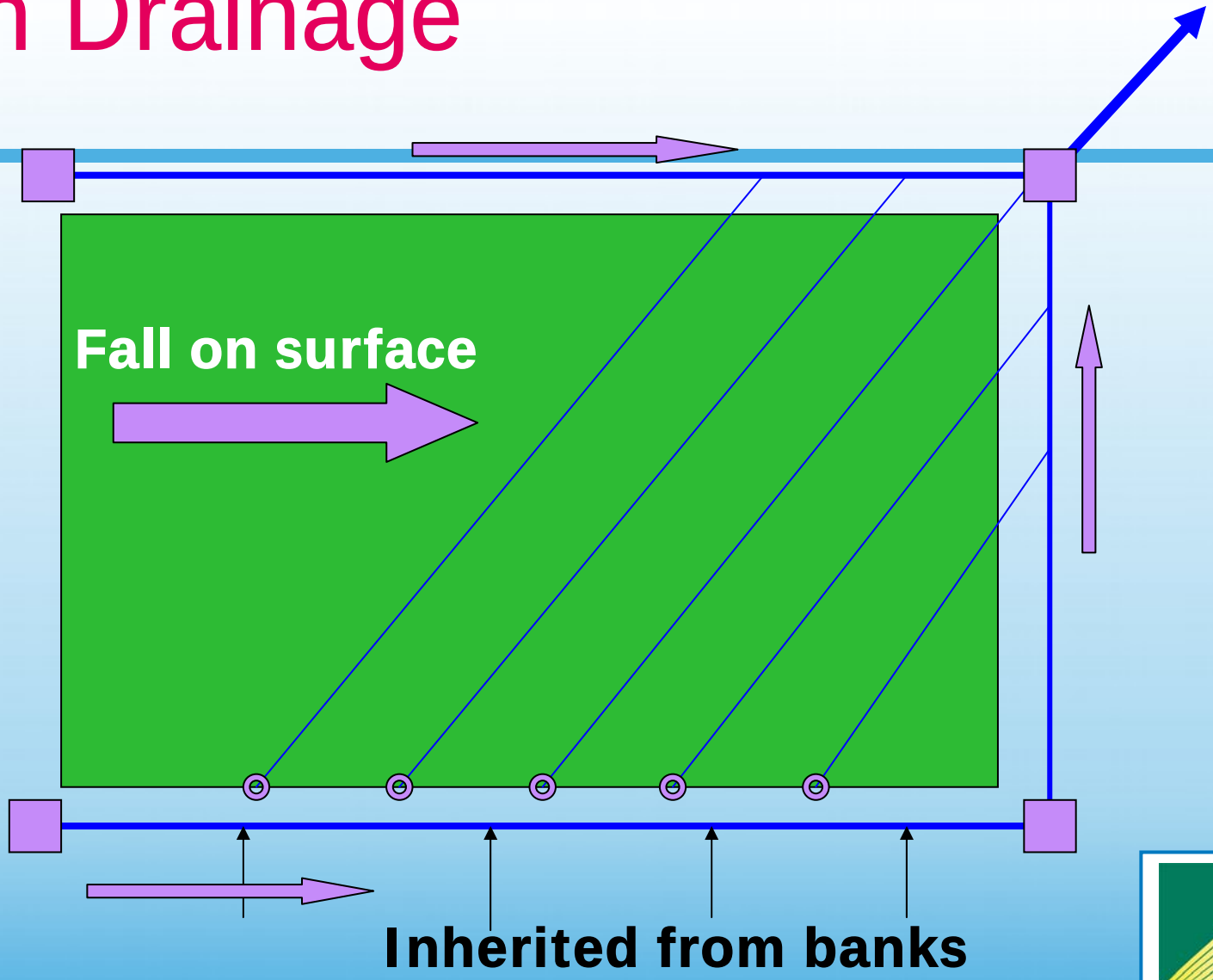
DRAIN DIAMS

100mm sub-soil

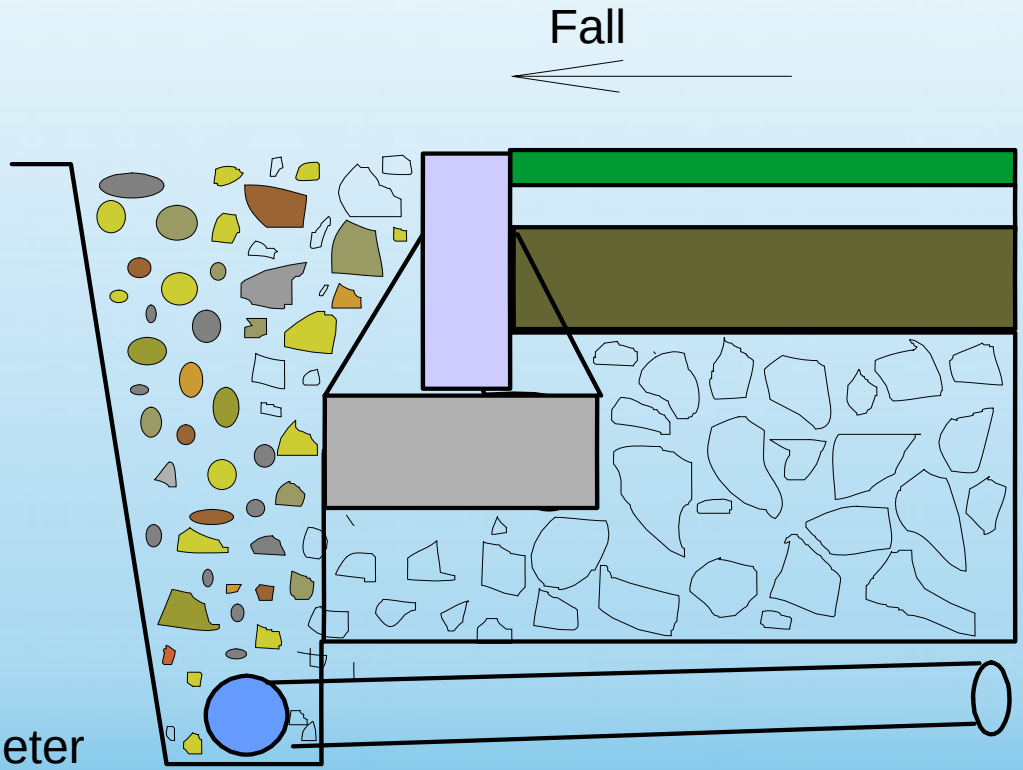
150 – 200mm peripheral

225mm outfall

(solid)



Drainage detail on Pitch



SUDS Sustainable Drainage Systems

Benefits

- Attempts to mimic the natural drainage from a site before development
- Controls surface water run-off reducing peak flows
- Controls the quality of surface water run-off
- Reduces the volume of surface water flowing directly into water courses or sewers
- Improving the environment, wildlife habitat, etc.
- Replicating natural drainage patterns and sustaining existing groundwater.

SUDS Sustainable Drainage Systems

Techniques

- Attenuation in drainage blankets or large volume attenuation tanks
- Filters for fuel etc., settlement chambers, catch pits, etc.
- Open balancing ponds, natural environments
- Porous paving using open textured surfaces, pervious blocks, etc
- Avoidance of sewer connections, especially in combined systems.

Pitch System Design

- Total system design to cover:-
  - Porosity - attenuation
  - Tolerances
  - Durability
  - Player - surface properties
  - Ball - surface properties
  - Sustainability

Maintenance of Performance Requirements

- Surface regularity
- Porosity
- Ball roll
- Force reduction
- Durability

Maintenance requirements

- Type of carpet
- Manufacturer/installer requirements
- Performance requirements
- Costs v depreciation

Brushing

Brushing

Environmental issues

- Recycled materials in base
- Recycling of infill materials
- Recycling carpets
- SUDS

Future

- Cost efficient SUDS – attenuation
- Non irrigated pitches
- Sustainability – recycling
- Predictable lifetime performance
- Bespoke maintenance methods to suit carpet systems

Any Questions?