



2/2/07

Alex York
HOK Sport Architecture
P.O. Box 5290
Brisbane
QLND 4001
Australia

Dear Alex

New Carisbrook Stadium, Dunedin

We have studied the information supplied in your e-mail (22/1/07) as well as the additional light study information supplied in your e-mail dated 25/1/07 and provide comments below.

Light levels

The sun path studies show that the stadium roof and in particular the wall design mean that the pitch will not be subject to the same amount of shading as most enclosed stadiums. For example, at 12.00 noon on June 15th, with the exception of some small areas, the entire pitch will be receiving direct sunlight. In most enclosed stadiums, on the shortest day of the year, large areas of the pitch will receive no direct sunlight at any stage of the day.

The information supplied by Vector Foiltec concerning the EFTE material states that with the two layer system, 64 to 84% of the light in the photosynthetic wavelength range is transmitted. Clearly it would be preferable that all of the available photosynthetic wavelength light reached the pitch during the winter months when total light levels are low. However, that fact that all of the pitch will receive significant amounts of direct light during the winter months will offset the moderate shade effect of the EFTE material to a significant effect.

On the basis of the information available, we consider that it will be feasible to establish and maintain a temperate grass sward of suitable standard within the stadium. However, it is probable that light levels will be sub-optimal for growth at times during the winter – temperature will also be a factor here. Correct turf grass selection will be essential – species other than the traditional rye grass are likely to be better suited to the environment. Other turf management techniques such as turf re-placement or light supplementation may also be required. Determination of the exact requirement for and cost of such techniques is beyond the scope of this initial feasibility study and will need to be determined through further more detailed study in the next phase of the project.

Auckland Office:

126 Market Road
PO Box 26-714
Epsom

Auckland 1344
New Zealand

Ph: +64 9 529 5064

Fx: +64 9 529 5046

✉: alexg@nzsti.org.nz

Head Office:

163 Old West Road
PO Box 347

Palmerston North 4440
New Zealand

Ph: +64 6 356 8090

Fx: +64 6 354 0081

✉: turf@nzsti.org.nz

www.nzsti.org.nz

Ventilation

The information concerning the ventilation of the stadium does not at this stage include details of the year round environmental conditions that will occur in the stadium.

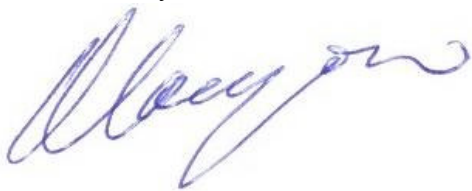
Temperature will be a key environmental factor. We anticipate that the winter temperatures within the stadium will be elevated above the outside air temperature and this will be beneficial to plant growth.

The optimal (air) temperature range for the growth of temperate grasses is 16-24 degrees C. Growth rates start to drop off either side of this optimum range. As temperatures fall below 16 degrees, growth will decline with no significant growth in temperate grasses occurring below about 10 degrees.

Hence, we anticipate that the minimum temperatures that occur in the stadium will not cause any significant turf management problems. Rather it is high temperatures that are of the greatest concern. Temperatures that are consistently above 30 degrees C will make management of a temperate grass sward very challenging. Hence ideally, the maximum temperature in the stadium should only rarely reach 30 degrees. Ideally, the "normal" maximum temperature in the stadium in the summer will be no more than 26 to 27 degrees C.

We anticipate that the air movement created by the proposed ventilation will be sufficient to allow a temperate grass sward to be maintained in the stadium provided that exceeding the maximum temperatures mentioned above can be avoided. We assume that including vents at the upper levels of the stadium would assist greatly with that. More precise analysis of the implications for turf growth in the stadium will be able to be provided following further study in the next phase of the project as more information concerning the environmental conditions that will occur, becomes available.

Yours sincerely



Alex Glasgow
General Manager – Agronomy

Auckland Office:
126 Market Road
PO Box 26-714
Epsom
Auckland 1344
New Zealand
Ph: +64 9 529 5064
Fx: +64 9 529 5046
✉: alexg@nzsti.org.nz

Head Office:
163 Old West Road
PO Box 347
Palmerston North 4440
New Zealand
Ph: +64 6 356 8090
Fx: +64 6 354 0081
✉: turf@nzsti.org.nz
www.nzsti.org.nz