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**EFFECT OF ROOTZONE CONSTRUCTION  
ON SOIL PHYSICAL PROPERTIES AND  
PLAYING QUALITY OF GOLF GREENS  
UNDER NEW ZEALAND CONDITIONS**

**A thesis presented in partial fulfilment of the requirements  
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in Plant Science at Massey University  
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## ABSTRACT

A field experiment was designed to examine the effect of five different rootzone constructions (partially amended sand, silt soil, pure sand, fully amended sand and partially amended plus zeolite sand) and aeration methods (untreated control, HydroJect, Verti-drain and scarifying) on soil physical properties, root development and playing quality of golf greens. The five rootzone constructions were randomly arranged in three blocks. A split plot design was superimposed on the rootzone constructions using different aeration methods. Aeration treatments were carried out in the spring and autumn of 1998. Measurements of bulk density, total porosity, volumetric moisture content, air-filled porosity, infiltration rate, oxygen diffusion rate, saturated hydraulic conductivity, root mass, organic matter content, surface hardness and green speed were made to monitor differences between treatments.

This study found there was no benefit of fully amended sand rootzone compared with partially amended sand rootzones (either plus or without zeolite). Although root development was greater in the pure sand rootzone, this occurred predominantly in the top 50 mm. Excessive accumulation near the surface of the profile can have detrimental impacts on turf growth. Rootzone construction had an important effect on surface hardness, i.e. pure sand rootzone produced the hardest surface, silt soil rootzone the softest and amended sand rootzones intermediate hardness. Rootzone construction had no effect on green speed in this study.

Aeration treatment had no effect on any of the soil, plant or playing quality parameters measured in this study. This suggests either aeration treatments were very short lived or that long term effects of aeration treatments were not yet apparent.

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