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Test study of the optimal design for hydraulic performance and treatment performance of free water surface flow constructed wetland

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1 **Test study of the optimal design for hydraulic performance and treatment**

2 **performance of free water surface flow constructed wetland**

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8 **Abstract:** Orthogonal tests with mixed levels of design parameters of a free water
9 surface flow constructed wetland were performed to assess their effect on hydraulic and
10 treatment performance, and discover the relationship between the design parameters and
11 the two performances. The results showed that water depth, plant spacing, and layout of
12 in- and outlet mainly affected the two performances. Under 40 cm depth, central pass of
13 in- and outlet, 1.8m³/h flow rate, 20 cm plant spacing, 2:1 aspect ratio, and *Scripus*
14 *tabernaemontani* as the plant species, treatment performance of 5.3% TN, 6.1% TP and
15 15.6% TSS removal efficiencies and a high hydraulic performance of 0.854 *e*, 0.602 MI
16 were achieved. There was no significant correlation between the design parameters and
17 the two performances. The relationship among various hydraulic indicators and that
18 among the purification indicators displayed extremely significant correlation. However,

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