

## Rain Gardens as Artificial Recharge Measures in Hyderabad International Airport Watersheds, RR District, A.P.

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### ABSTRACT

Hyderabad International Airport at Shamshabad covers an area of about 5000 Acres. It is proposed to develop grass and green belt in 2000 acres, diverting all the obstructions, filling and leveling. Terminal Building 67500 sq. m to be developed initially during Phase IA. Initial Water requirement for the proposed airport would be approximately 450 m<sup>3</sup>/day. All 24 open wells could be located in the valley part of the watershed. The open wells have dimensions varying from 4 m × 5 m to 8 m × 8 m with depths ranging from 6 to 15 m. Some open wells had in well bores tapping the fractures. Two wells on western part of runway are high yielding (>300 m<sup>3</sup>). Absence of surface water tanks indicates possibility of good groundwater recharge with high infiltration rates in the watershed. Infiltration measurements confirmed this view with infiltration rates ranging from 2.5–4.5 cm/hr. Open wells have quickly responded to local rainfall showing immediate rise in groundwater level in the valley parts. However some localized areas like fuel farm and some other pockets exhibited low infiltration rates < 0.2 cm/hr.

The artificial recharge to ground water aims at augmentation of ground water reservoir by modifying the natural movement of surface water utilizing suitable Agri-engineering techniques. Artificial recharge techniques normally address the following issues:

- To enhance the sustainable yield in areas where over-development has depleted the aquifer.
- Conservation and storage of excess surface water for future requirements, since these requirements often change within a season or a period.

Stones also cover a large portion of red soils in the semi-arid tropics. Coarse fragments resting on the surface have the same effect as other mulching materials and protect the soil against the impact of rain drops and so prevent to some extent surface sealing and the detachment of soil particles. Rainfall intensities of 48.5 mm hour<sup>-1</sup> (I<sub>1</sub>), 89.2 mm hour<sup>-1</sup> (I<sub>2</sub>) and 136.8 mm hour<sup>-1</sup> (I<sub>3</sub>) have been selected with the knowledge that these would represent the range of natural rainfall intensity in the region with returns periods yearly, biannual and once in 20 years respectively. It was reported that greater the cover of stones, longer is the delay in generation of runoff.

Rain gardens capture runoff from impervious areas such as roofs and driveways and allow it to seep slowly into the ground. Capturing storm water during a storm and holding it on site to be used later for irrigation has many advantages. Enough storm-water can be captured to significantly reduce or eliminate the need for potable water use in landscapes in the HIAL watershed. Groundwater flow modeling studies indicated that the enhanced groundwater recharge would be about 30%.