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Title of the work: Alternatives for a sustainable management of stormwater in megacities of emerging countries

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Currently Santiago de Chile lacks efficient stormwater-management systems, except for the inner city combined stormwater-sewer system. Even precipitation events of lesser intensity convert streets into little streams that accumulate and flood the lower areas of the city. After years of relative inactivity the recent stormwater-masterplan (MOPTT 2003) considers conventional end-of-pipe systems that channel stormwater quickly and efficiently away from development along the main avenues to receiving bodies of water, involving an estimated investment cost of around one billion euros only for the primary sewers.

It is known, that unintended consequences of these conventional drainage systems include increased frequency and magnitude of flooding events of natural waterways downstream (Helmreich 2004). Additionally in developing and emerging countries increased non-point source pollution must be expected due to waste accumulation in water ways or public spaces, insufficient street cleaning, building materials (zinc roofs) and wastewater infiltration. On the other hand, conventional end-of-pipe systems do not contribute to the groundwater recharge, meanwhile the groundwater table in Santiago descended some 20 to 30 m within the last three decades.

Low-Impact Development (LID) on the other hand emphasizes stormwater-management methods which imitate drainage and flow patterns that existed prior to urban development. In general, LID retains more stormwater where it falls, which promotes increased filtration and groundwater recharge. While international discussion prompts towards an increased tendency of artificial infiltration (UNESCO 2005, Fox 2007), local Chilean efforts are less advanced (Brown 2003).

The range of ecosystem and social benefits generated by LID are wide, but identifying and measuring the full range of benefits and costs of LID and conventional systems are challenging, especially in emerging countries where economic concerns often outweigh other aspects. Maybe for the same reason, specific sustainability criteria and indicators are little developed. Gantner (2002) for example proposes a total of 13 sustainability indicators that focus primarily on environmental aspects. On the other hand,

This investigation aims to identify those LID stormwater-management methods that are recommendable and worthwhile to implement in developing and emerging countries. Environmental, social and economic dimensions shall be described and quantified within Helmholtz-Society's integrated sustainability concept and the sustainability indicators that are actually developed within the "Risk-Habitat-Megacity" initiative.

Finally, a decision guideline will be developed and applied to a case study in Santiago de Chile. Nevertheless, the benefit-cost analysis of proposed solutions should prescind from specific local conditions in order to guarantee transferability to stormwater management problems in other countries.