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# Evaluating urban resilience to hydrologic change by modeling future impervious cover change due to infill development

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**Abstract:** This research investigates the impacts of infill development (or "redevelopment") on stormwater runoff quantity for stormwater management strategies of the City of Denver, Colorado. As a rapidly developing city, Denver is facing increasing population and redevelopment in the form of infill (where under-utilized parcels are redeveloped into high-residential land uses). The impact of the observed population growth is increased domestic water demand leading to a "supply-demand gap" - a large portion of which can be creatively mitigated through stormwater capture and management. Infill development increases stormwater runoff by introducing more impervious surface. The goal of this research is to analyze the technical feasibility of using the additional stormwater produced from redevelopment in Denver as a novel solution to enhance urban resilience and relieve pressure on future water supply needs. Currently, future predictions of parcel-scale impervious cover change in a calibrated Storm Water Management Model (SWMM) have been used to determine the quantity of runoff at the outlet of a small, dense neighborhood which enters a local golf course. Results include quantifying the runoff produced from a range of 24-hr design storms. Modeling results have informed the design of a Best Management Practice treatment train of bioretention ponds that will treat runoff to a level suitable for irrigation on the golf course. Replacing the potable water currently used for watering the golf course with stormwater can potentially reduce potable water demand by as much as 250 acre-feet per year – enough for about 20,000 Denver residents – from Denver's anticipated increased water supply needs.

***Keywords**:* urban; modeling; infill; redevelopment