

Green Infrastructure: Achieve More With Less

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Local governments in British Columbia are faced with this financial challenge: the initial capital cost of infrastructure is about 20 per cent of the lifecycle cost; the other 80 per cent largely represents a future unfunded liability. Each year, the funding shortfall grows. As infrastructure ages and fails, local governments cannot keep up with renewal and/or replacement. Fiscal constraints provide a powerful impetus for doing business differently. Green infrastructure is part of a holistic approach to 'achieve more with less'.

While developers may pay the initial capital cost of municipal infrastructure, local government must assume responsibility for the lifecycle cost associated with operation, maintenance and replacement of infrastructure assets. Often this is not adequately funded through property taxation and utility charges, as various political priorities compete for limited tax dollars. In addition, local governments bear the entire financial burden to stabilize and restore watercourses impacted by increased rainwater runoff volume after land is developed.

Unfortunately, asset management is sometimes only considered after infrastructure is built. The challenge is to think about what asset management entails BEFORE the asset is built. Mitigate future financial burdens! This paradigm shift starts with land use planning. Connecting the dots between watershed health and infrastructure type is emerging as an important piece in 'sustainable drainage infrastructure', both fiscally and ecologically.

The financial burden and environmental impacts associated with 'pipe-and-convey' drainage infrastructure contrast with the benefits of 'green' infrastructure at a watershed scale: natural landscape based assets reduce runoff volumes, have lower lifecycle costs, decrease stresses applied to creeks, and enhance urban liveability.

Local governments
can protect
watershed health
by means of a
'design with nature'
approach.

Level-of-Service Approach

'Level-of-Service' is the integrator for everything that local governments do. For drainage infrastructure, it refers to the expected level of performance of municipal systems in providing flood protection. What level of service does a community wish to provide, and what level can it afford?

There are tradeoffs between drainage of land, flood protection, ecological integrity AND cost. Everyone will have to make level-of-service choices. Thus, a guiding principle for a watershed-based plan could be framed this way: Establish the level-of-service that is fiscally sustainable AND protects watershed health.

Appropriate and effective green infrastructure is a way to increase the level-of-service — for example, permeable landscapes that restore the rainfall absorption capacity of the watershed will reduce runoff. This has tangible value because it protects aquatic habitat and hence stream health. This will increase the level of ecological protection. Less runoff will also improve the level of drainage protection during wet weather.

To understand the link, think in terms of the 'Level-of-Service' an urban tree canopy provides for rainfall interception. As trees grow, the interception capability increases. There is less runoff, less wear-and-tear on creeks, and less need for creek stabilization.

Doing Business Differently

The province's Living Water Smart and Green Communities initiatives are a catalyst for doing business differently: start with effective green infrastructure and restore environmental values within the urban fabric over time. Actions and targets in Living Water Smart encourage 'green choices' that foster a holistic approach to infrastructure asset management. Two complementary strategies can green a community and its infrastructure: preserve and protect natural green infrastructure; and implement designs that soften the footprint of development.

An absorbent topsoil layer has emerged as a fundamental building block to achieve a lighter 'water footprint'. As a green infrastructure practice, topsoil is the interface between rainwater management and drought management. Soil depth creates a sponge which can limit runoff during wet-weather periods; and reduce water need during dry-weather periods. If we can show how to get the topsoil part right, then other parts of the water sustainability equation are more likely to follow.

In collaboration with three municipalities, the Green Infrastructure Partnership has developed two primers: one deals with law and policy; the other is technical in nature. Released in February 2010, the Topsoil Law and Policy and Technical Primer Set synthesizes the pioneering experiences of the City of Courtenay, City of Surrey and District of North Vancouver. This is a critically important first step in developing a suite of practical green tools for use by municipal staff and designers.

Currently, the Okanagan Basin Water Board and Green Infrastructure Partnership are collaborating to expand the two primers into a Topsoil bylaws primer. This will provide a more comprehensive and accessible resource for local governments. It will support rainwater management, water conservation, and aquifer recharge. The Topsoil bylaws primer will be available at the end of 2011.



Soil depth after land is developed for urban uses will have a bearing on...

- How water is conserved
→ sustainability of supply
- How water runs off the land
→ sustainability of aquatic habitat

Conclusion

Local governments can protect watershed health by means of a 'design with nature' approach. This uses more natural features and functions, rather than hard manmade systems, to green infrastructure practices. Through a watershed-based plan, local governments can strategically connect the dots between land use planning, development, watershed health AND asset management. And by 'designing with nature', local governments could make a very strong case for a 'sustainable drainage system', at a lower life-cycle cost. **CB**

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