Community outreach for surface water management

Community engagement – a case study from Portland, Oregon, USA by David Schofield, Hydro Consultancy

There are a growing number of exemplary sustainable drainage (SuDS) case studies in the USA, with many of them driven by the need to satisfy the environmental demands of the well-established and Federal implemented Clean Water Act (CWA) 1972. Typically underpinning these SuDS successes are outstanding examples of community engagement, or "outreach" as the term is widely referred to in the USA. Arguably, there are no better American SuDS case studies than Portland, Oregon, where the widespread implementation of sustainable drainage components has been robustly underpinned by an unrelenting and successful programme of community outreach. Before examining their outreach strategy, it is worthwhile first reviewing the context for the Portland case study.

Background and drivers

The City of Portland is located in northern Oregon, and abuts the Washington state border. This geographic location means Portland's urban surface water runoff will drain into two significant American rivers. To the north of Portland is the mighty Columbia River, including the confluence with the Willamette River (Figure 1) and the Columbia Slough waterway. The Willamette itself originates nearly 190 miles south in the mountains around Eugene and Springfield, before meandering downstream through Oregon and finally downtown Portland towards its convergence with the Columbia and a journey towards the western USA seaboard Pacific Ocean. The Willamette is ranked in the top 20 American rivers in terms of volume and is estimated to contribute 12 to 15 per cent of the total flow to the Columbia River. The Willamette forms the primary navigational channel for Portland's harbour and riverside industrial areas, but is also extremely important for local amenity and biodiversity.

The Willamette River has a long and chequered past with regards to pollution, dating back as early as the late 1800s. As urbanisation gained pace, contaminated runoff, spills from combined sewer overflows (CSOs), and domestic and industrial waste from a prosperous Portland gradually took its toll on the Willamette effectively turning the city reach into an open sewer by the 1920s. Despite frequent negative publicity regarding the poor condition of the river, it was not until a 1966 television documentary (*Pollution in Paradise*) and vociferous criticism of the situation by the then Governor Tom McCall (the Waterfront Park was later named after him) that the serious attempts at a clean-up began as state tourism began to be affected. Even so, state financed studies in the 1990s continued to confirm a wide variety of unwanted pollutants in the river bed, including heavy metals and polychlorinated biphenyls (PCBs).

River pollution was greatly exacerbated by decades of numerous CSO spills (Portland has large catchment areas of combined sewerage), which annually contributed to the estimated 100 days and 10 billion gallons of combined sewer discharge into the Portland waterways, adding unwanted bacteria such as Escherichia coli (E coli) to the rivers. Portland's response was the 20 year *Big Pipe* project, which was completed at a $1.4bn cost by the self-imposed deadline of 1 December 2011 (and was largely funded by a five-fold increase in domestic sewage bills) a success widely reported in the Oregon press. The project was the most ambitious and expensive public works project undertaken by the City and resulted in three substantial storage tunnels: Columbia Slough (2000), West Willamette (2006) and East Willamette (2011). The original target of reducing untreated sewage spills into the Willamette was achieved and CSO spill frequencies are now one in three years in summer conditions – people now swim in the Willamette once more.

Figure 1 *Amenity and biodiversity, the Willamette River in Portland, Oregon (courtesy DS[7]Photography)*

The role of community outreach, or engagement

However, there is another crucial reason why the ambitious and impressive clean-up targets were achieved. The City of Portland's *Green Streets* (Portland Bureau of Environmental Services, 2007) project led by innovative landscape architect Tom Liptan and his highly motivated game-changing team at the Bureau of Environmental Services. Green Streets ran alongside and was integral to Big Pipe, but was wholly reliant on public acceptance and participation for its success. Without Green Streets, those three storage tunnels would have been constructed substantially larger (out turn cost as well as diameter) than they are today. And this is where the exemplary outreach programme underpinned the Green Streets Policy, with the following stated goal:

> *"City of Portland will promote and incorporate the use of green streets facilities in public and private development."*

Without any doubt, the majority of Portland citizens both understand and support the drive to improve the local biodiversity and environment. So how did they do that? SuDS components used on the Green Streets include rain gardens, roadside swales, surface water street planters in various guises, green roofs and a downspout disconnection programme second to none.

Operating as a surface water management train they are all aesthetically incorporated into the urban landscape and it's difficult to argue against the value of such water sensitive urban design (WSUD). In terms of SuDS performance they control surface water runoff quantity using attenuation, infiltration and evapotranspiration. In terms of improving runoff quality it is bioremediation and natural filtration at work.

Figure 2 *The disconnection numbers that matter from the City of Portland (courtesy DS[7]Photograph)*

Deliver of a retrofit programme

The numbers and statistics for the Green Streets are very impressive, with over 1000 SuDS implementation locations managing 37 hectares of contributing area across Portland. On the Tabor to the River project alone there are over 500 facilities constructed along with 3500 street trees planted (Figure 2). The extraordinary facts and figures continue with the Downspout Disconnection Programme that ran between 1995 and 2011 (although disconnection continues), with over 56 000 downspouts now disconnected from the combined sewer network and this included over 26 000 residential homes partly or completely disconnected (see Figures 3 and 4). So how did the City of Portland achieve such success with their Green Streets SuDS implementation?

Incentivisation has played an important part of the success of that there is no doubt. $53 per downspout disconnected will obviously induce many and prevent "pushback". The Clean River Rewards provides a discount programme so that property owners could qualify for as much as 100 per cent on their stormwater charges. But there's far more to the Portland success story than just incentivisation.

Two years before the disconnection programme started, the City of Portland Bureau of Environmental Services began their highly visible outreach programme to empower the public, which included clean rivers education programmes in schools. During the disconnection programme period, up to 10 staff members were formally involved in the Green Streets outreach, which required sufficient funding to be available and ring-fenced. There was a plethora of concise, clear and coherent public outreach collateral made widely available for the disconnection programme, including a how to disconnect a downspout pamphlet, accompanied by an explanatory

pamphlet (working for clean rivers) and a downspout disconnection brochure. Other brochures in this domestic outreach series include rain gardens, soakage trenches and rain barrels.

Figure 3 *Disconnection in the USA (courtesy DS7Photography)*

Figure 4 *A disconnection planter serving a commercial property (note outreach plaque on the wall) (courtesy DS7 Photography)*

The role of incentives

Successful outreach would sometimes involve declining disconnection requests, with the public communication and collateral very clear about what would and would not be acceptable for an approved (and reimbursed $53) disconnected downspout. This is why the City of Portland Bureau of Environmental Services, which describes itself as being risk averse, only received 27 risk claims on over 56 000 disconnections, with the majority of those claims due to wet basements. Also it was a factor as to why there was so little pushback from the public to the overall Green Streets initiative, despite the rise in their respective sewage charges.

Another highly successful incentivised outreach initiative is *Treebate* (Portland Bureau of Environmental Services, 2011), where a Portland resident purchases a tree for planting in a residential yard within the guidelines of the programme. A Treebate submission form is available until 1 May 2012 and once the planted tree is validated, a range of credit on the water/sewer utility bill is available up to $50 for larger trees. There is no doubt that trees provide multiple benefits to the environment in general. Interestingly, from a SuDS viewpoint the Treebate sizing guidance is based on a tree's average surface water interception capability, which is a surface water management technique well studied and the benefits understood by the Green Streets team.

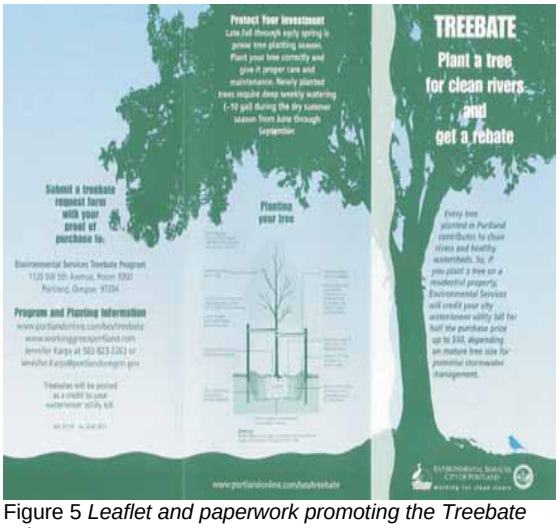

Figure 5 *Leaflet and paperwork promoting the Treebate scheme*

As the implementation of the various SuDS structures became commonplace across Portland, so the diversity and availability of outreach collateral increased. Perhaps the most inventive and seemingly ambitious example of the outreach is the *Stormwater cycling tour* (Portland Bureau of Environmental Services, 2011). This guide (Figure 6) details a 21-stop cycling tour around Portland's city centre that visits an array of SuDS implementation sites, with explanations of how the techniques work that empower the public in a cost-effective and multiple beneficial way, ie by encouraging outreach collateral for the public (citizens and visitors) to embark on city centre cycling tour to visit SuDS locations. And with notable subtlety, the tour ends back at the Willamette River waterfront and encourages people to stop and read the interpretive signs along the river bank, which highlight the importance of good river health. This initiative also supports the aim to promote good health through exercise for the citizens of Portland. There is also a similar themed walking tour around nearby Portland State University.

Figure 6 *Stormwater cycling tour guide*

The misuse of road gullies (or storm drains in America) is a widespread problem in both the USA and UK that contributes considerably to watercourse pollution due to prohibited dumping of harmful liquids and pollutants. As in many other American cities, Portland tackles this problem head-on and it is commonplace to see visible reminders of the implications of the dumping on or around each inlet. One method is to stencil the message in paint, which works adequately until the paint fades and the message is lost. Portland counters this by also using a more visible technique by securing vibrantly coloured coaster sized plastic disks onto the kerbing proclaiming the straight talking messages: "dump no waste, Willamette River watershed" or "only rain down the storm drain" (Figure 7).

Figure 7 *Community outreach is everywhere in Portland(courtesy DS7 Photography)*

Such sustained and effective outreach has resulted in greater payback than originally intended, with many Portland citizens and residents seemingly willing to get actively involved with Green Streets. This community involvement was a surprise benefit of the first Green Street project at NE Siskiyou Street and it has evolved into something more formal on projects such as Tabor to the River (Portland Bureau of Environmental Services, 2012b) as more and more community members asked how they could get involved (Figure 8). The answer from Environmental Services is the Green Street Steward programme for anyone who lives, works or runs a business in Portland. The powerful and credible message is that the City takes care of its Green Streets while protecting the rivers and welcomes community help from designated Green Street Stewards, who provide assistance with simple activities such as picking up litter and debris, removing leaves, occasional weeding and watering.


Figure 8 *Every revolution needs a leader, the pioneering Portlander, Tom Liptan photographed in 2011 where it all started with Siskiyou Street's 2003 stormwater planters (note the visible signboards) (courtesy DS7 Photography)*

Possibly the most ingenious and yet straightforward piece of outreach collateral has its origins in Portland's first Green Street project from 2003, which has been used in presentations around the World. The project is NE Siskiyou Street (between NE 35th Pl. and NE 36th Ave.) that encompassed proactive outreach from the start.

Figure 9 *A definitive Portland Green street planter, with informative signboard (courtesy DS7 Photography)*

The City of Portland Bureau of Environmental Services identified the residential area around NE Siskiyou Street as the perfect place to construct and adopt the first kerb extended and multiple benefit surface water planters (Figure 9). A mini competition in the neighbourhood confirmed NE Siskiyou Street as the chosen site, but it was stated that after the planters were completed, if the local

residents decided that they were not pleased with the end result, they would have been removed. However, the opposite occurred: not only were the residents of NE Siskiyou Street delighted with the traffic calming and fully functional SuDS components, but they also provided occasional light maintenance and tended to the plants. And the visible signboards that still adorn the two street planters, proudly empowers anyone with the inclination to stop and read, precisely what the structures achieve in terms of surface water management.

Figure 10 *The simple but ingenious Green Street planter rollout (courtesy Paul Cone, Bureau of Transportation, City of Portland)*

And the ingenious outreach concept as a result of the street planters? Full sized tarpaulin printed "roll-outs" that can easily be transported to a potential Portland Green Street, for the local residents to evaluate first-hand how the final SuDS structures might look (Figure 10). This brilliantly simple but effective example of outreach collateral typifies the exceptional Portland SuDS case study, and there are exceptionally valuable outreach lessons to be learned from them for UK application.

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CIRIA Guidance

CIRIA's guidance on ***Retrofitting to manage surface water*** (CIRIA, C713) provides advice on approaches to retrofit existing areas to manage local flood risk, diffuse pollution and provide green infrastructure improving local amenity and quality of life. The guidance features Portland's work as a technical case study on the engineering and urban design achievements. CIRIA is also working on a project to develop guidance on *Communicating local flood risk management* (CIRIA, RP975), which will capture good practice like this coming out from stormwater management champions in Portland.

References

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Useful websites

Engineering Nature's Way: www.engineeringnaturesway.co.uk/category/blog/

Willamette River: http://en.wikipedia.org/wiki/Willamette_River