The regulatory framework for urban stormwater flood management in England and Wales: Challenges for the implementation of sustainable drainage systems

Le cadre réglementaire de la gestion des eaux pluviales urbaines en Angleterre et au Pays de Galles : défis pour la mise en œuvre des techniques alternatives de drainage

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RÉSUMÉ

Des inondations majeures, dont le montant total des dommages a été estimé à 4 milliards de Livres Sterling, ont frappé le Royaume-Uni en 2007. Le ruissellement pluvial a été identifié comme principale cause des inondations urbaines. Durant les neuf dernières années, en réponse à ces évènements, une étude gouvernementale pour l'évaluation de la gestion des eaux de ruissellement a été conduite. En réponse à ces conclusions, une nouvelle loi (Flood and Water Management Act - FWMA) a été promulguée en 2010, encourageant entre autres l'utilisation de techniques alternatives de drainage. Cette communication analyse l'émergence de nouvelles structures de gouvernance faisant suite à ces nouvelles demandes législatives et comment ces techniques alternatives s'accordent avec les récents changements dans le système de planification urbaine. Ce papier illustre les implications de tels changements au travers de cas concrets, et plus particulièrement par la mise en place de revêtements poreux.

ABSTRACT

In 2007 the UK was hit by a major flooding event. With estimated damage costs in the region of £4 billion reported, pluvial flooding was identified as a major source of flood waters within residential, commercial and industrial settings. Over the intervening 9 years, the responses to these events have included a major governmental review of surface water management and, to address its findings, the introduction into UK legislation in 2010 of the Flood and Water Management Act (FWMA). This paper reviews the emerging governance structures developing to implement the requirements of this new Act which include encouraging more sustainable forms of drainage, and how these measures align with recent changes in the national planning system. The implications of the changes in practice and how these new forms of governance address previously identified challenges associated with increasing SuDS uptake is presented through a focus on the use of permeable paving.

KEYWORDS

Flood risk management, Permeable paving, Planning, SuDS, Surface water regulation

1 INTRODUCTION

The severity of the UK 2007 floods, which inundated 55,000 properties and has been estimated to cause over £4.0 billion of damage, triggered a national review of strategic flood risk management (Pitt, 2008) which led to the introduction in 2010 of a new legislative Flood and Water Management Act (FWMA) (Defra, 2010). The Pitt review estimated that up to two-thirds of these properties were flooded as a direct result of impermeable surface water (stormwater) overloading the sewer system. Major recommendations of the Pitt review which were incorporated into the FWMA included the lead role of local authorities (LAs) in the management of local flood risk including responsibilities for local surface water (pluvial) flooding and coordination of flood risk planning. In addition to this lower tier (i.e. borough and district councils) arrangement, upper tier authorities (county councils and other unitary authorities such as metropolitan areas e.g. London, Birmingham etc.) were charged with establishing Lead Local Flood Authorities (LLFAs) to prepare local flood risk management (LFRM) strategies and to review approval of mitigation works for reducing flood risks. LLFAs were given responsibility for flood defence consents and enforcement powers in implementing LFRM strategies. The FWMA further gave LLFAs and highway authorities a duty to contribute towards the achievement of sustainable development when planning flood mitigation works. In association with these activities, many LLFAs and LAs have also produced sustainable drainage (SuDS) policy statements which include an interpretation of how drainage schemes are expected to demonstrate compliance with national standards but expressed in terms of the local development site context.

The environmental regulator, Environment Agency (EA) retained the national responsibility for formulation of strategic overview of and policies for flood risk (including risk assessment procedures) as well as full responsibility for surface water quality. As part of this strategic responsibility the EA has produced surface water flood maps to help the identification of susceptible flood zones within urban areas to support LLFA and LA local flood risk management planning. A reformed national planning policy framework (NPPF) has also been put in place with the intention of recognising the importance of avoiding development in flood prone areas and as a basis to help reduce the causes and impacts of future pluvial flood exceedance events. The NPPF gives priority to the use of SuDS in new major developments and the related 2015 Town & Country Planning Order (TCPO) expects that SuDS should be installed unless demonstrated to be inappropriate in terms of site circumstances or cost. At the same time, the NPPF and TCPO indicate that planning applications should ensure any SuDS installed within a development should meet minimum standards of operation and have clear arrangements for lifetime ongoing maintenance, but that these should remain “economically proportionate”. Thus the NPPF and TCPO only carry a presumption in favour of sustainable development and SuDS controls rather than any mandatory obligation. Under the new governance structures for flood risk management, the LLFA requires that all major developments should have a surface water management plan (SWMP) which may be incorporated into the wider LFRM strategy (BSI, 2013). However in terms of determining whether SuDS are actually included within development plans, the strength of a LA/LLFA SuDS policy statement is much less significant than the role of an active motivated “champion” or the presence and implementation of innovative, integrated sustainability principles (White and Alarcon, 2009).

Generic national non-statutory technical guidance for SuDS has been published by Defra (2015) which covers (peak/volume) flow controls and brief considerations for design and maintenance. Consideration of water quality, which was briefly included in an earlier draft version of the technical guidance, was omitted from the final publication. A collaborative LA working group has produced a companion guidance manual to the technical standards to help clarify and interpret the proposed standards in respect of national sustainable drainage policy and in terms of drainage design (LASOO, 2015). Separate to but complementing these activities, the Construction Industry Research and Information Association (CIRIA, 2015) has just published its updated comprehensive SuDS manual covering the planning, design, construction, operation and maintenance of a range of SuDS. Schedule 3 of the FWMA created powers to require the inclusion of SuDS in new major developments, giving authority to LAs to establish SuDS approval bodies (SABs) whose role would be the approval of proposed SuDS designs and their subsequent adoption and maintenance. In preparation for full implementation of the FWMA (2010), several LAs established SABs e.g. Cambridge, Kent and Greenwich. However, following a government Defra-led consultation over the summer of 2014, where LAs and housebuilders raised concerns over the requirement to in effect receive two sets of permission before new development works could commence, the SABs approach was set aside with the government considering a more effective SuDS delivery mechanism would be delivered through an amended local planning policy arrangement. The large majority of UK LAs have now produced

formal advice and guidance for developers on SuDS implementation within their local administrative areas and which is readily accessible through their websites and planning portals (e.g. Cambridge City Council, 2015), with water companies also producing planning guides that outline their positon on adopting SuDS (e.g. Yorkshire Water, undated).

There is therefore a new regulatory framework emerging for urban drainage in England and Wales in respect of new developments with several organisations carrying potentially overlapping duties and responsibilities. At the same time, there is a growing awareness of the need for cross-organisational and cross-sectoral partnerships and associated consultee arrangements in the planning process which also have particular significance for future SuDS implementation (DCLG, 2015). For example, inclusion of a wider consideration of the benefits and costs of reducing stormwater flows in combined sewers through enhanced uptake of SuDS on sewer network performance, energy footprints and property developers as at both a local and national scale. This paper examines some of the challenges to the use of SuDS posed by the new regulatory framework and organisational arrangements. Will the new regulatory and organisational framework, procedures and processes be likely to make any substantial difference to SuDS implementation and introduce an increased awareness at the lower tier Local Authority level of responsibilities for and operational knowledge of SuDS?

2 THE REGULATORY FRAMEWORK

2.1 Organisational Structures

Figure 1 shows the new regulatory framework and organisational arrangements for local urban flood risk management and SuDS design, installation and maintenance following the introduction of the FWMA. The solid circles indicate the organisations which have statutory consultee status within the new regulatory framework in respect of major development proposals, the dashed circles indicate examples of discretionary consultees with overlaps indicating common membership.

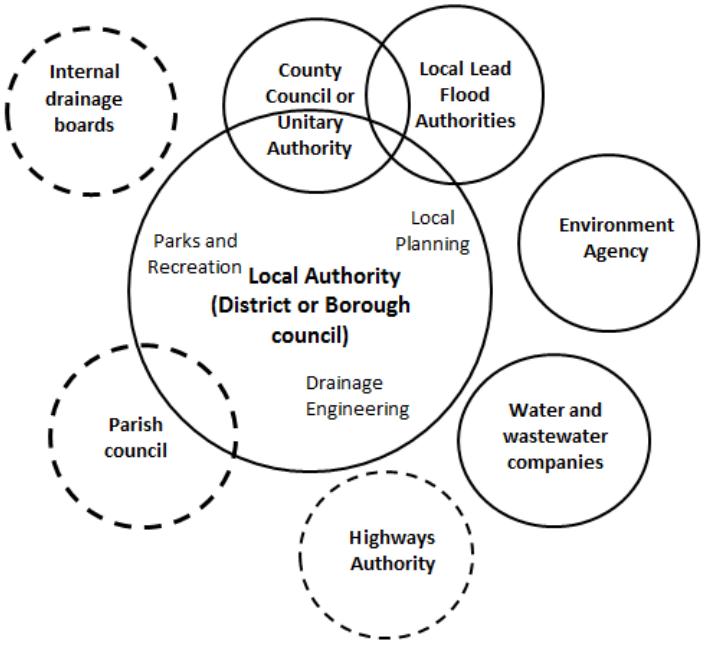

Figure 1. Regulatory framework and organisational arrangements for urban flood risk management and SuDS design in England and Wales.

Although the work remit and responsibilities of the LLFAs have been set out in detail (Local Government Association, 2012), there have been no formal suggestions for their composition apart from statements which stress the need for partnership arrangements between the statutory consultee stakeholder organisations shown in Figure 1. Other additional stakeholder groups (shown by dashed circles in Figure 1; e.g. Highways Authority, Internal Drainage Boards (IDBs), Non-Governmental

Organisations (NGOs), British Waterways, Network Rail etc.) are to be encouraged to “buy-in” to the partnership arrangements as necessary. Reference in the Defra (2012) LLFA guidance document to the 2011 Localism Act suggests that this latter legislation may offer a source of bespoke local funding to support the work remit of the LLFA. This same Defra (2012) document however, acknowledges the difficulties which will be faced by the LLFAs to secure sufficient funding sources and to achieve effective partnership arrangements and this financial “burden” remains to be satisfactorily resolved.

Some LLFAs have established a hierarchy of separate governance groups to deal with collaborative partnership and operational delivery of their LFRM strategy with cross-membership between the groups. In the case of Cumbria County Council in Northern England for example, the operational LLFA Working Group is supported by further district groupings which provide input on localised “hotspot” flooding. In addition, to these formal governance structures, some LLFAs have made collaborative arrangements with various local flood and community action groups, many of which were initiated by the EA as communication forums prior to 2010, and which primarily focus on local fluvial overbank flood issues. Other LLFAs have set up local flood resilience forums, risk management technical groups etc., within their formal governance structures to provide more focussed local knowledge, communications and awareness-raising to address specific needs identified locally. The relationships between the local planning system, water resource and flood risk management and wider catchment management strategies are fully detailed in Bide and Cranston (2014).

A layering of the various governance structures seems to be emerging in the organisational framework with a lower level of partnership structures focussing on local issues and communication linkages with local community action and interest groups, typically operating in relation to immediate to short-term timelines. These local level partnerships support the development and implementation of district-based SWMPs and associated drainage controls. The core of the upper governance level comprises the statutory consultee cross-organisational partnerships in which the strategic (and therefore presumably longer term) overview and lead responsibility for flood risk management and drainage infrastructure approval is vested. However, the statutory consultation and approval in the application process is subject to a 21 day time-limited period.

There still remains within the organisational framework a separate autonomy between LAs highways authorities and water companies in respect of SuDS drainage for housing developments, public highways and land drainage. For example, highway authorities can refuse to accept surface water drainage from housing developments but highway authorities (through development of a reciprocal agreement under Section 115 of the Water Industry Act 1991) and property developers (under the FWMA, 2010) have the right to connect their infrastructure to water company owned combined and surface water drainage systems, and this remains contentious.

2.2 The Planning Application Process

Figure 2 outlines the planning application process now in place under the regulatory and legislative framework for new major development proposals and associated SuDS drainage. Pre-application discussions between the local planning authority (LPA) and the developer are intended to identify early design and adoption issues and to encourage consultation with the formal statutory consultees shown in Figure 1. It has been alleged that this process could extend the application and approval time frame for development as well as potentially engendering too close a relationship between the developer and LPA. The NPPF legislation framework also limits consultation to major development only and excludes developments less than 0.5 hectares (<10 properties). However, such smaller developments, particularly infill development within metropolitan areas, can comprise a significant cumulative flood risk. Housebuilders and LPAs are generally not “geared-up” for small development sites with drainage designs frequently being dealt with by reference to “conditions” rather than under the full consent planning procedure. On such small sites, the developer is reluctant to “make space for water”. It is left to the LA to reference any advice that might be given by the LLFA on what might constitute such potential development impacts.

As indicated from Figure 2, it is possible for Section 106 agreements (a mechanism to make a development acceptable when it would not otherwise be i.e. a planning obligation which must be legally complied with) to be tied to an outline application which may not carry any housing layout or SuDS design. Such matters then become “reserved” and subject to “conditions” which could result in inadequate SuDS solutions and requirements. In addition, without a detailed layout and drainage design, the LA may find it difficult to quantify a reasonable commuted sum for SuDS adoption and maintenance. The legislation is currently constructed to leave the developer and not the LPA to

demonstrate how SuDS components will be maintained.

Producing a detailed SuDS design however, requires a knowledge of the housing layout and if this is held over as a "reserved" matter, then SuDS cannot be considered in the outline application and early consultation stage. Such considerations also apply to staged development proposals on large sites where the full proposed drainage system needs to be discussed and agreed at an early stage and not left for piecemeal agreement at each later stage. Such discrete accumulative drainage design is unlikely to meet a holistic surface water management strategy or sustainability criteria. Developers would also prefer to learn what commuted sums in respect of future operation and maintenance (O&M) might be required at the early pre-application stage so that they can be taken into account in land pricing negotiations or house sales, rather than being left as "reserved" matters at a much later stage. SuDS commuted sums also carry uncertainties associated with unexpected lifetime maintenance costs, life expectancy, interest rates and inflation levels which can inhibit future large scale development, although experience in agreeing commuted sums for such purposes is accruing (e.g. see guidance developed by Rhondda Cynon Taf, 2014

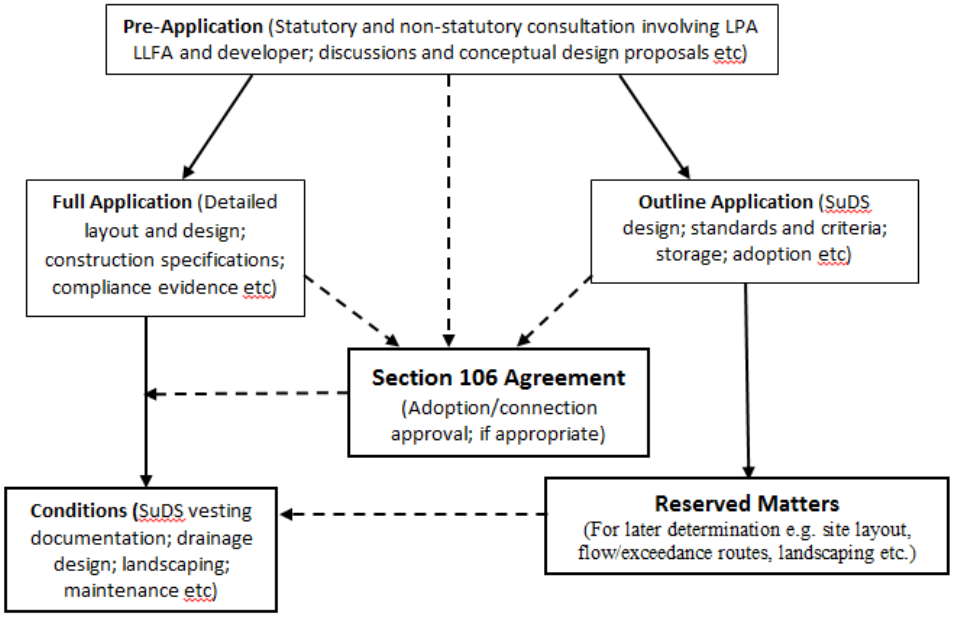

Figure 2. Planning application process for development including SuDS (solid lines indicate required steps; broken lines indicate possible steps)

There is little consideration in the regulatory framework of the relative roles of the LPA,LLFA, LA or water companies etc in the assumption of responsibility for adoption and maintenance. This could lead to overlap of remits and organisational misunderstandings. In addition, other issues such as the future designation of SuDS under possible protected species status might well conflict with earlier agreed maintenance requirements. All these uncertainties do not give confidence that consistent, high quality procedures and practice will widely emerge to stimulate future SuDS uptake.

3 PLANNING, DEVELOPMENT AND PERMEABLE PAVING: A CASE STUDY

The term SuDS applies to a diversity of drainage systems which can be grouped into four broad categories: storage systems (e.g. retention an detention ponds), infiltration systems (infiltration basins and soakaways), conveyance systems (e.g. swales and filter strips) and permeable surfaces with storage (e.g. porous paving). These categories are not always discrete, with SuDs in each category facilitating the occurrence of a range of water quantity and quality mitigation mechanisms, from settlement and infiltration to volatilisation and microbial degradation. In terms of water quantity management, infiltration is prioritised in national working manuals (e.g. Anglian Water Services Ltd., 2011; BSI, 2013; CIRIA, 2015) as the preferred first source disposal option for surface water runoff following any considerations for rainwater harvesting. Despite this stated preference and the existence of successful demonstration sites (Forterra, 2015; Interpave, 2015) (*www.forterra.co.uk/formpave*; *www.paving.org.uk*), concern amongst LAs about the sustainability of infiltration systems and

especially permeable paving continues to persist. As such SuDS controls are not generally on public open space, their operation and maintenance is very much down to local residents and/or private management companies. Under the FWMA, LLFAs can designate features of the drainage system which may cause adverse receiving water impacts and thus can exert a veto power in assessing what is adoptable. However the designation process needs to be undertaken long before individual property sales and discussed during the pre-application stage in order to be fair to both developer and resident.

Local planning authorities (LPAs) have been receiving increasing applications for permeable paving (as well as attenuation tanks) as proposed SuDS source controls, with some developers requesting direct discharge of roof waters to porous paving storage volumes (as opposed to managing directly received volumes of rainfall only). However, many LAs have become somewhat cautious and risk-averse about approving permeable paving as a viable sustainable drainage option. There are many reasons that are given for this reticence:

- limited in-house technical knowledge to properly evaluate the design efficiency, construction and performance
- limited time and finance to independently outsource, check and discuss the drainage design and ensure it accords with national technical criteria
- no independent site supervision to ensure that actual in-ground construction is in full accordance with the approved drainage design and performance specifications
- no independent check on post-installation compliance, operation and maintenance

This uncertainty leaves LAs with a perceived residual risk of performance deterioration and uncertain financial liabilities over the medium to long term. Some LAs consider that the introduction of formally licensed paving contractors to undertake initial installation and re-instatement if disturbed at a later date, would provide an arrangement to help alleviate their concerns. The uncertainty also means that some LAs resort to Section 38 legislation on adoption and right to connect to existing drainage systems as a deterrent tool to try to persuade developers to seek an alternative drainage option rather than as a positive tool for adoption.

Increases in impermeable cover of between 10% - 24% have been recorded for front garden conversion to car park hardstanding in many UK urban areas (Warhurst *et al*, 2014) with more than 60% estimates for parts of the metropolitan London area (Smith, 2010). Planning permission is not required for new or replacement driveways (of any size) using permeable (or porous) surfacing, planning permission is required for the use of impermeable materials on surface areas >5m^2 (Planning Portal, 2015). However this requirement rarely appears to be enforced and the conversion of front gardens to impermeable surfaces continues apace. There is hence an increasing diversion of roof drainage to permeable surfacing with many such arrangements having an overflow to roadside (highway) gutter and drains. Many initial designs will have been based on calculated areal infiltration rates rather than any additional point-loading inflow rates and volumes expected from the drain pipe. Planning consent needs to limit such rooftop discharge rates to no more than 5 l/s in order to avoid overloading and overflows to the adjacent highway surface. Although there is official guidance on such front garden conversion (DCLG, 2008), formal applications often incorporate a “geotextile-wrapped” diffuser pipe to the basal sub-layer. Issues arise here from potential dangers of long term blockage and through-passage of surface-derived pollutants. Exceedance of the localised sub-surface storage capacity could also lead to wash-out of the finer particulate leading to void spaces and an early collapse of the surface pavers. Softening and collapse of the basal layers, experience of poor installation, flood exceedance onto adjacent highways collectively make LAs cautious of approving such designs for permeable paving.

Subject to Section 106 of the Water Industry Act (1996) owners / occupiers of any premises have the right to discharge foul water and surface water from those premises to the public sewer. Generally, LAs do not permit “private” connections such as rooftop discharges to highway drainage systems but some LAs such as Peterborough City Council in the East of England and Swansea in S Wales, have permitted such roof discharges via sub-base connection of a permeable driveway or car park to a porous highway surface or to a SuDS control such as a roadside swale or infiltration trench. The issue of liability should the highway drainage fail as a result of such surface water connections has been raised, particularly in respect of against whom any enforcement could be taken. If residents do not maintain the permeable paving drainage properly or are deemed by the highway authority to contribute to surface water flooding as a result of the design, redress can be sought under Section 106 planning obligations (Howe and White, 2011). Section 163 of the 1980 Highways Act also enables

LAs to require householders to prevent such surface water discharges to the highway. However, there is a need to ensure that the LPA consults with their drainage engineers and the LLFA on such "connections" rather than assume that the drainage proposal is acceptable simply because it constitutes an LA asset.

CONCLUSIONS

It is evident from the multitude of organisational and legislative acronyms associated with SuDS for future urban development that there is a complexity of structures, processes and procedures. Given the lack of clarity regarding organisational arrangements and legislative structures, SuDS design and approval agreements should be predicated such that higher maintenance components be located on controllable land and ensuring that SuDS always complements rather than interferes with the wider practical use of public open space. Many of the administrative functions and responsibilities of the stakeholder organisations have potentially overlapping work remits. The emerging regulatory regime might result in SuDS design and standards become only "material considerations" within the planning approval process and lacking clear enforcement procedures. Given the differing objectives, constraints and resources of the various stakeholder organisations, it is not at all certain that the goal of wider SuDS implementation or integrated urban drainage can be readily achieved. Opportunities for cross-sectoral benefits to be realised – such as that accrued by reducing stormwater flows within combined sewer systems for water companies, property developers and environmental protection - may also be lost. Irrespective of this, it is certainly the case that objectives can and should be aligned as best as possible with common visions established from shared and supportive collaborative relationships. This however, requires commitment at all organisational levels rather than just being treated as a technical and/or administrative issue to be dealt with at the negotiating level between the LPA/LLFA and the developer; this will not secure trust or consistency of practice. There is evidence that LAs and LLFAs are developing good working linkages with statutory consultees and are becoming more professionally and technically knowledgeable about SuDS. However, clarity of objectives, standards and practice as well as certainty regarding funding and related adoption issues need to be worked out if SuDS implementation is to become the "norm" for urban drainage.

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