

HOW ARE COUNCILS MANAGING THEIR OVERLAND FLOW RISKS?

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ABSTRACT

Managing overland flowpaths is a major headache for local government. This is particularly the case where council areas are largely developed and there are pressures for infill development or redevelopment.

The January 2001 *Floodplain Management Manual* places increased responsibilities on local government to manage their overland flow risks in accordance with the NSW Government Flood Policy. In managing these risks, councils' legal indemnity under Section 733 of the Local Government Act relies substantially on councils acting in accordance with the 2001 *Manual*. This is proving difficult however for many councils.

At the instigation of Bankstown City Council, Bewsher Consulting has recently carried out a survey of local government practice in relation to the management of overland flow risks. This paper presents the results of the survey and describes the various approaches (or absence of approaches) being used to manage overland flowpaths. The principal problems faced by local government are identified and discussed.

The survey identified that of the councils with potentially significant overland flow problems in the Wollongong–Sydney–Newcastle area, just less than half (45%) have identified the majority of their overland flow risks. Of the remaining 55% of councils, three quarters were proposing to identify the risks in the near future. The principal means of identifying these risks was through a combination of computer based simulation models, anecdotal information and the long-term experience of senior council officers.

More than half of all councils have not prepared floodplain risk management studies for any of their overland flow problem areas, although about half of these intend to do so in the near future.

A strategy for the management of overland flow risks is also discussed in the paper. This includes a recommendation to prepare development control plans (DCPs) for areas subject to overland flow, and an approach that can be followed when computer-based overland flow information is not available for the whole LGA.

1. WHY THE RECENT INTEREST IN OVERLAND FLOW RISKS?

For many years now the emphasis on managing flood risks has concentrated on “main stream” flooding. This is where floodwater breaks the banks of the waterway and inundates the floodplain, often flooding low-lying buildings.

But significant flooding can also occur from overland flow, especially if little thought is given to how this is to be managed. Overland flow is local runoff that is en-route to the trunk drainage system, creek or river. It can represent runoff from a catchment area less than a hectare to a catchment area that could be as large as several square kilometres.

Local runoff is typically managed using the minor/major drainage approach outlined in *Australian Rainfall and Runoff*. *Minor drainage* is often provided using gutters along roads, street drainage and other piped systems. It usually only caters for small, frequent storm events. Larger flows are carried along *major drainage* paths on the surface. These comprise the many planned and unplanned drainage routes that convey runoff from major storms to the trunk drains, creeks or rivers. This usually includes flowpaths along roadways, drainage easements and natural depressions. In a properly planned scheme, overland flow may cause flooding of open space areas and inundation of the grounds of buildings, but should restrict flooding above floor level to all but minor buildings.

So why all the sudden interest in overland flow problems?

Recent floods experienced throughout NSW, particularly the 1998 Wollongong floods, have highlighted the damage that can result from overland flow. In particular, these floods have demonstrated the potential for culvert and pipe systems to become substantially blocked by debris, putting added strain on the available overland flow paths.

This problem is also exacerbated in developed catchments, where councils face increasing pressure to approve development, or intensification of development, within the few remaining undeveloped areas (which were often avoided in the past due to inundation problems).

The 2001 *Floodplain Management Manual* has also recognised the potential problems of overland flow and have incorporated provisions within the *Manual* specifically related to overland flooding. This places added responsibility on councils to properly manage their overland flow risks and gives councils greater opportunities for government funding to reduce the impact of overland flow.

2. WHAT THE FLOODPLAIN MANAGEMENT MANUAL SAYS

Little mention was made on overland flow problems in the former (1986) NSW Government’s *Floodplain Development Manual*. Whilst it did not specifically exclude overland flooding, financial assistance through the State and Commonwealth Government was rarely made available for either investigations or measures to alleviate this form of flooding. This is not to say that overland flooding could be ignored. Rather that the NSW Government had given it a lower priority than mainstream flooding, and it remained solely the responsibility of local government to address.

With the release of the 2001 *Floodplain Management Manual*, greater recognition has been provided for overland flow problems. Certain recommendations for the management of this risk have also been provided.

The Policy statement, which appears as Appendix A of the *Manual*, has been expanded to incorporate overland flooding. The revised policy reads “*both mainstream and overland flooding shall be addressed, using the merit approach, in preparation and implementation by Councils of floodplain risk management plans*”.

The *Manual* recognises the potential cost to the community that is caused by all forms of flooding, including urban overland flooding. It also notes that the distinction between mainstream and overland flooding can be somewhat arbitrary, often difficult to distinguish, and of little consequence to residents who may be flooded.

The *Manual* categorises overland flow problems into either local drainage or major drainage (and not to be confused with the “major/minor” approach outlined in *Australian Rainfall and Runoff*). Local drainage problems invariably involve shallow depths (less than 0.3m) with generally little danger to personal safety. Whilst the *Manual* does not specifically deal with local drainage, it notes that these problems can generally be minimised by the adoption of general urban building controls, such as requiring a minimum difference between finished floor and finished ground levels to cope with shallow water depths.

Major drainage, which now lies within the scope of the *Manual*, has been defined to typically include:

- < the floodplains of original watercourses (which may now be piped, channelled or diverted), or sloping areas where overland flows develop along alternative paths once system capacity is exceeded; and/or
- < water depths generally in excess of 0.3m; and/or
- < major overland flow paths through developed areas outside of defined drainage reserves; and/or
- < where there is potential to affect a number of buildings along the major flow path.

The *Manual* provides certain recommendations concerning the management of major drainage. These include:

- < good subdivision design practice in new development, which considers the potential for overflows and blockage, and determines how to pass these flows through the subdivision via drainage reserves and public pathways rather than having them enter private property and buildings.
- < strategies to address existing problems, which in many cases will be similar to solutions normally considered for mainstream flooding;
- < considering the impacts of upstream urbanisation on downstream flooding and to any developments that block flow paths; and
- < providing notifications on Section 149 Certificates concerning overland flooding.

Most importantly, the *Manual* emphasises the need to develop a strategic management approach to dealing with land potentially affected by flooding, which now applies to both mainstream flooding and overland flooding (where this is classified as major drainage). This strategic approach relies on following the floodplain management process outlined in the *Manual*. This process starts with the establishment of a floodplain risk management committee and culminates with the adoption of a floodplain risk management plan.

3. WHAT ARE SOME OF THE PROBLEMS THAT COUNCILS FACE?

There are a number of problems and questions that many councils have found themselves faced with. These include:

- < How do we identify all our overland flow risks?
- < Where do we start? We have so many problem areas and no resources available!
- < Do we need to form a floodplain risk management committee to consider these problems?
- < Do we need to develop a floodplain risk management study and plan for our problem areas?
- < Should we try and “map” our potential overland flow problem areas and what if we miss some?
- < Should we make public our map of overland flooding ‘black-spots’?
- < Do we need to consider flood evacuation and access issues?
- < Do we need to consider the PMF?
- < Do we attempt to redress past development problems when redevelopment is proposed?
- < How do we incorporate blockage into the picture? Especially if no overland flow path is available through a developed area?
- < What do we do with fences that obstruct overland flow?
- < Should we include notification of overland flow problems on Section 149 Certificates?
- < Should we develop a special policy for overland flooding?

Bankstown Council recently sought advice from the authors to some of the above questions. They also questioned how other councils were managing their overland flow problems. Subsequently, a number of councils were surveyed to determine just how councils were managing their overland flow risks. The results, which are listed below, were anything but consistent.

4. SURVEY OF COUNCIL POLICIES

From the authors’ experience in working with over twenty councils in the greater Sydney area, there are still several councils that have no formal policy relating to overland flow risks. The majority of councils have brief, performance-based policy documents or codes that address the issue. Some others have very detailed prescriptive-based development control policies relating to overland flooding issues. There is a wide variability in approach.

Some 28 major councils in the Sydney–Wollongong–Newcastle area were selected to form part of a survey, based on known or anticipated flood problems, and where overland flooding issues were likely to be relevant. The response was very good, with 22 questionnaires completed and returned (a response rate of 79%). Thank you to those who responded.

The survey asked questions which were divided into three basic themes. These involved:

- < what mapping or identification of overland flow risks has been undertaken, or is proposed to be undertaken;
- < what flood risk management studies and plans have been undertaken, or proposed to be undertaken, to define overland flow problems and solutions; and

< how are the public notified of overland flow risks.

Results from the survey are represented in Figures 1 to 3. As some councils preferred their response to be kept confidential, results are quoted in terms of a percentage response to each of the questions, rather than identifying the response from various councils.

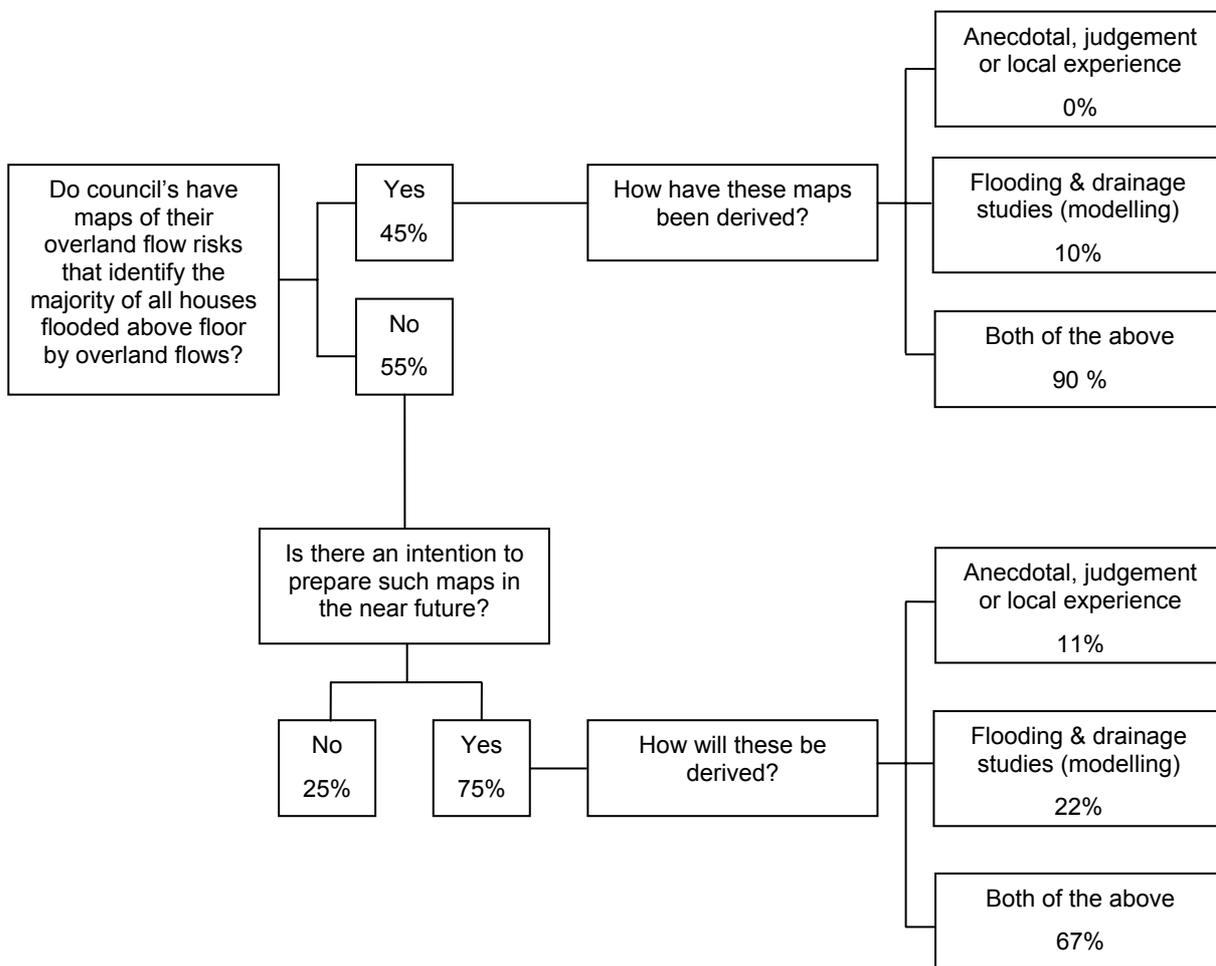


Figure 1: Identification of Overland Flow Risk Areas

A relatively high number of councils (45%) indicated that they have already identified, or substantially identified, property at risk from overland flow. Mapping of this flood risk appears to be largely property-based (ie if the building on the property is potentially flood affected), rather than attempting to map the extent of potential flooding. In a few cases, it was reported that this identification had been incorporated in the council GIS computer system. The identification was largely based (90%) on both anecdotal/local experience, and from more formal studies involving computer modelling.

Of the councils that had not yet identified property at risk from overland flow (55%), the majority of these (75%) suggested that there was an intention to prepare maps identifying property at risk from overland flooding. The majority intended to use a mix of anecdotal/local experience and more formal studies.

Some of the councils (25%) that had not already identified property at risk from overland flooding had no intention to do so.

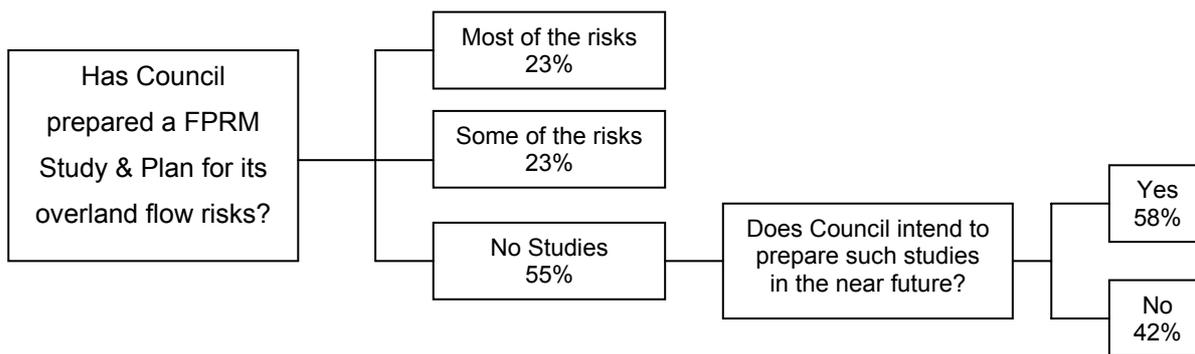
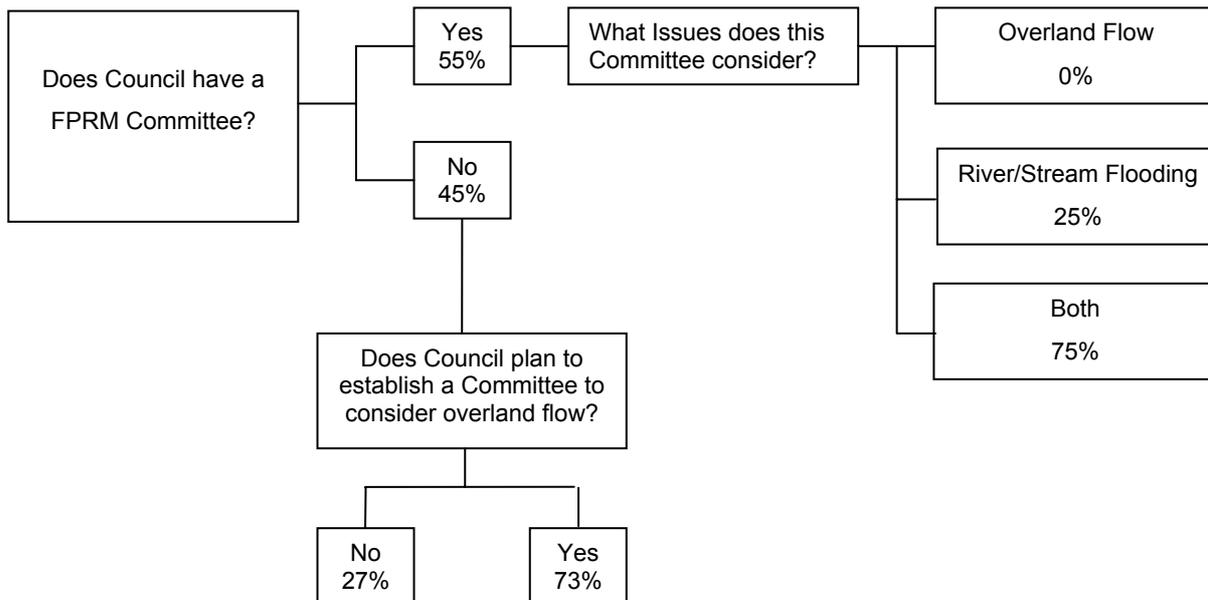


Figure 2: Role of the FRM Committee, and Studies undertaken

Some 55% of the councils surveyed already have a floodplain risk management committee. None of these committees exclusively considers overland flooding, 25% exclusively considers mainstream flooding, and 75% were reported to consider both mainstream flooding and overland flow problems. Of the remaining councils with no committee (45%), 73% intended to establish a committee over the next couple of years.

A few councils (23%) reported that studies and plans had already been developed for most of their overland flow risk areas. A similar number reported that studies and plans had been undertaken for some of these areas only. The majority (55%) had undertaken no formal studies of their overland flow risk areas. Of these, more than half (58%) intended to do so in the near future.

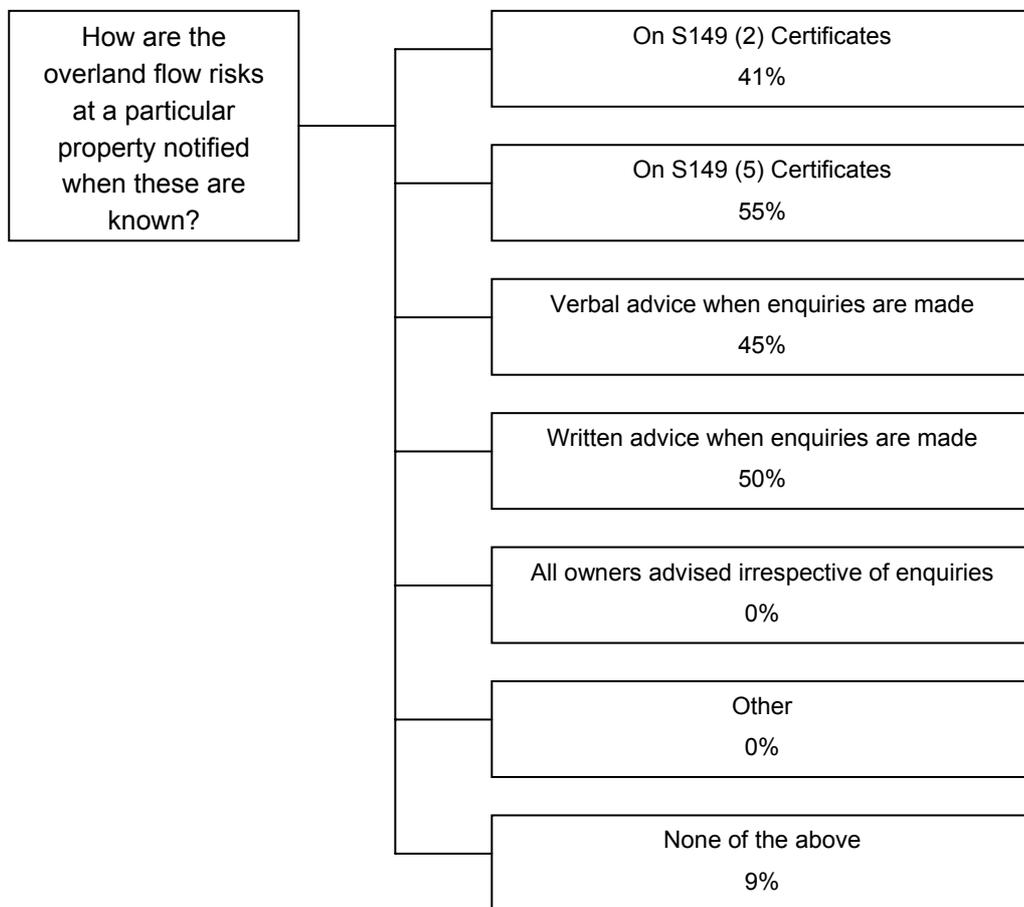
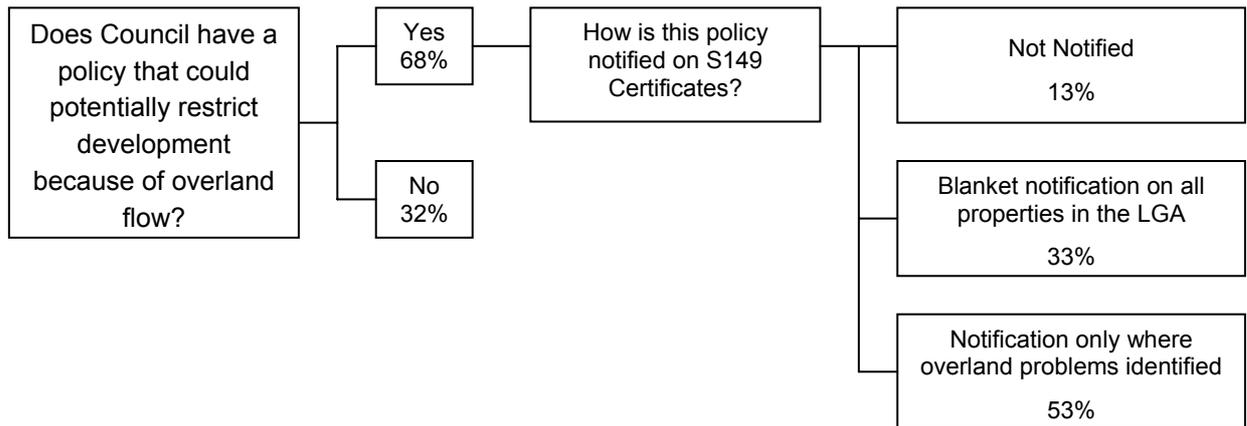


Figure 3 Notification of Overland Flood Risks and Policies

The majority of surveyed councils (68%) had a policy that could potentially restrict development due to overland flow. Of these councils, 13% provided no notation to this effect on their Section 149(2) certificates. “Blanket” notification on all properties within the LGA was provided by 33% of the councils, whilst 53% provided notifications for specific properties where overland flow problems were known. Less than half (41%) provided notifications on Section 149(2) certificates, whilst just over half (55%) said they would provide notifications on Section 149(5) certificates. Less than half (45%) would provide

verbal advice to people making enquiries, whilst half (50%) would provide written advice using flood certificates or other means, when enquiries were made. Most of those respondents favouring written advice also indicated that verbal advice would not be given. Only a few councils (9%) said that no notification of flood risks would be provided, where these are known.

5. PROVIDING COUNCIL WITH INDEMNITY

The Local Government Act provides indemnity in regard to 'flooding'. With the introduction of the 2001 *Floodplain Management Manual*, it is understood that this indemnity now extends to also includes 'overland flow' associated with major drainage. The Act provides immunity from liability in respect of:

- < any advice furnished in good faith by the Council relating to the likelihood of any land being flooded or the nature or extent of any such flooding; or
- < anything done or omitted to be done in good faith by the Council in so far as it relates to the likelihood of land being flooded or the nature or extent of any such flooding.

Section 733(4) of the Act clearly spells out that a council is considered to have acted in good faith (and therefore have indemnity) if it has acted substantially in accordance with the principles contained in the "relevant manual", being the 2001 *Floodplain Management Manual*.

Most importantly, it has been the authors' experience that legally such provisions are interpreted to mean that the process spelled out in the *Manual* must be followed to provide the most substantial basis for a defence. This process is clearly explained in Chapter 2 of the *Manual* and involves the formation of a Floodplain Risk Management Committee and the preparation of various studies and other activities leading to the preparation and implementation of a Floodplain Risk Management Plan.

In layman's terms, the best defence a council has is to have diligently prepared and implemented a Floodplain Risk Management Plan for overland flow, and be acting in accordance with it. Unfortunately very few councils have developed and implemented plans in accordance with the *Manual*, and often those which have Plans, have often only considered works and failed to assess flood planning levels, Section 149 certificates, flood awareness initiatives and wider floodplain planning issues.

Thus all councils without Plans, or who have overland flow policies not developed through 'the process' outlined in the *Manual*, would be well advised to take immediate action to follow 'the process', and move towards the preparation and implementation of a Floodplain Risk Management Plan for their overland flow risks.

6. DEVELOPING A DCP FOR OVERLAND FLOWS

6.1 Why Develop a DCP?

A fundamental principle of floodplain risk management is to assess development applications when dealing with the issue of overland flow, within a strategic framework. This strategic framework is provided by a floodplain risk management plan and applications should not be considered in isolation or individually (i.e. the 'ad-hoc' approach). For this to happen however, it is essential that relevant sections of the floodplain risk management plan are translated into development control plans (DCPs), local environmental plans (LEPs) and other flood related policies. In the authors' experience, the most effective way to do this is through the preparation of a DCP for all overland flow areas within the whole LGA.

Such a DCP could provide a number of advantages, including:

- < providing detailed controls for development of land affected by overland flow;
- < allowing the strategic planning outcomes of the floodplain risk management plan to be documented and to guide future development within overland flow areas;
- < providing guidance and greater certainty for developers as to what forms of development are appropriate within specific overland flow areas;
- < avoiding 'ad-hoc' development assessments based on local flood considerations and in the absence of a strategic assessment of the entire overland flow area;
- < codifying an approach to investigate suspected overland flooding concerns where mapping is non-existent;
- < providing a consistent approach over the whole LGA, comprising various catchments and possibly various floodplain risk management plans;
- < alerting the community to the overland flow risks;
- < providing a comprehensive basis to the issuing of Section 149(2) notifications; and
- < encouraging development and use of land which is compatible with the flood hazard.

6.2 Integration of the DCP with other Planning Instruments

While the DCP can provide the appropriate basis for incorporating the majority of development control recommendations that may be included in a Floodplain Risk Management Plan, there are matters which must be dealt with by an LEP (or in some cases a Regional Environmental Plan). Such matters include:

- < objectives which recognise the validity and importance of the issue of overland flow in the development assessment process;
- < clear definitions which are consistent with other documents such as the DCP and the Floodplain Risk Management Plan; and
- < prohibition of particular land uses in overland flow areas where the hazard is high or extreme. In these areas, there may be no potential to consider the hazard acceptable when assessed in balance with other planning criteria or possible ameliorative measures.

6.3 Further Background and Examples of DCPs

The authors have prepared numerous floodplain DCPs over the last decade. Many cover both flooding and overland flow. The DCPs range from those applicable to a single catchment (e.g. Eastern Creek floodplain at Blacktown), to those applicable to a whole LGA (e.g. Liverpool LGA) or even those which are applied to a number of adjacent LGAs (e.g. WESROC and UPRCT).

For further details of the philosophy behind the preparation of such DCPs and examples of DCPs already prepared, visit www.bewsher.com.au or contact the authors directly.

By writing the DCP in a generic format, it is possible to have the DCP applying to the whole LGA but still preserving differing outcomes within individual floodplains and overland flow areas. In this manner the "merits based" approach espoused in the *Floodplain Management Manual* is not compromised.

A key component of such DCPs is a planning matrix for each area. This matrix specifies the development controls which are to be tied to land use types within each floodplain or overland flow area (see paper entitled “*Changing Our View of Floodplain Planning*” at www.bewsher.com.au). In the case of the recent draft floodplain DCP developed for Wollongong City Council for example, which currently has four floodplain risk management studies under way and a number planned for the near future, separate planning matrices could be developed for each major floodplain whilst retaining consistent terminology and approach to floodplain management over the whole LGA.

It must also be recognised that the preparation of the matrices will occur at different times and some areas may have such minor flooding issues that a flood study may never be prepared. In this instance when a catchment specific matrix has not been prepared (or is waiting to be prepared) it is suggested that another matrix covering ‘all other areas within the LGA’ be prepared.

The format for DCPs will vary between councils and over time. Some councils have a preference for ‘stand alone’ DCPs in which case a Floodplain Risk Management DCP would take the form of a separate document. Some councils have a preference for a singular comprehensive DCP applying to all planning issues throughout the LGA. In this instance, floodplain risk management issues could form a discrete section in this document. The current trend in planning is to move to singular planning policy documents which incorporate both LEP and DCP type provisions, in which case floodplain risk management issues would need to be similarly incorporated. The format should not be a constraint to achieving the floodplain risk management objectives of the State Government policy and *Manual*, nor to a council satisfying its ‘good faith’ obligations to achieve indemnity from possible legal claims.

7. WHAT TO DO WHEN INFORMATION IS NOT AVAILABLE FOR THE WHOLE LGA?

A major issue with overland flow is that there is often a much poorer understanding of the extent of property affection than in the case of river flooding. It may also be impractical to develop computer models to map the full extent of potential local overland flooding across a whole LGA, particularly one which is substantially developed.

Because councils often do not have sufficient information and mapping regarding the extent of overland flow within their LGA, this is used as an excuse for not formulating a set of controls to manage such overland flow risks. When considering the purpose of planning controls and the common practice of councils, such an argument seems nonsensical.

Councils have a statutory responsibility to deal with development applications (DAs) and to take into consideration the issue of flooding and overland flow when doing so. Accordingly councils typically have a process of accepting DAs, identifying issues, referring them to various professionals in council for assessment of those issues and then making decisions regarding the acceptability of the proposal. The acceptability of the proposal should be based on a properly formulated Floodplain Risk Management Plan, but is often dealt with on an ad-hoc basis or crudely with reference to a floor level standard equal to the 100 year event, while the broader floodplain risk management issues remain unsatisfactorily resolved.

Where it is impractical to produce flood hazard mapping for an area, we see little reason why councils cannot codify the process they follow and provide greater certainty and consistency in the process. That is, councils can produce development controls to outline circumstances where further investigation of potential flood hazards may be warranted, the process to procure these investigations and the criteria for assessment of the DA once the information is available. Such a process is outlined in Figure 4. Alternatively, councils can prepare a map of lots potentially affected by overland flow based on the collective long-term

experience of senior council officers supplemented by a complaints register and other anecdotal and formal inundation reports.

One obvious criticism of such an approach is that it may incorrectly identify the potential for concern, leading to a political backlash or legal action against a council. The objective would be to ensure councils are conservative in requesting further information so that no potentially flood affected properties are missed even if some are found to be unaffected. This is unlikely to be different to the informal process followed by the majority of councils. The political consequences must also be weighed against professional responsibilities and the political and financial consequences of legal action brought by someone whose property, approved in the absence of appropriate formal controls, is flooded.

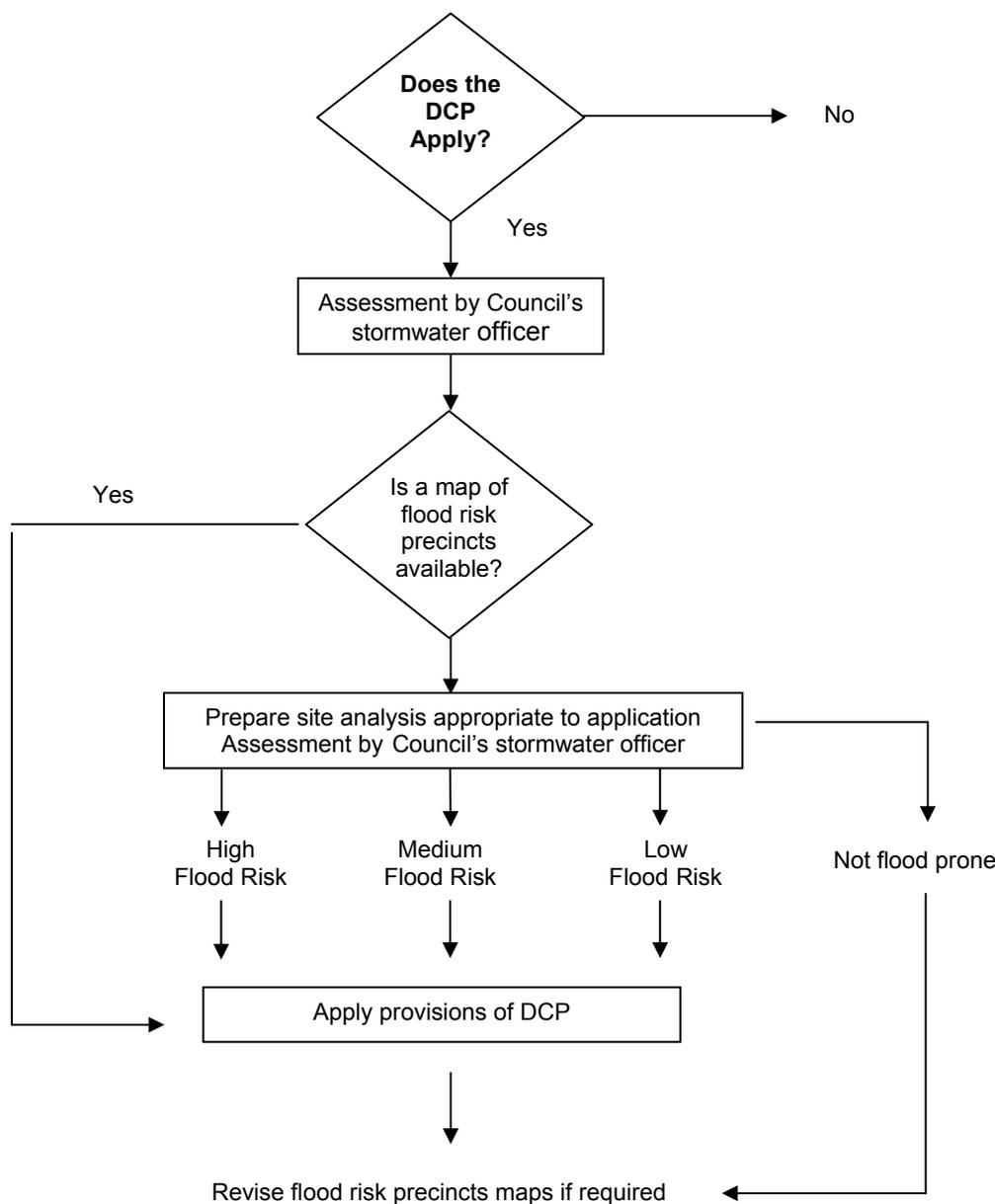


Figure 4: Process for Application of a DCP to Overland Flow Areas

8. NOTIFICATIONS ON S149 CERTIFICATES AND FLOOD AWARENESS ISSUES

The authors have previously written a number of papers relating to flood notations on Section 149 certificates and flood awareness initiatives. Time and space restricts a full discussion of these issues in this paper. Again readers are referred to www.bewsher.com.au for copies of a number of relevant papers.

As discussed above, the preparation of a comprehensive DCP for overland flow risks is by itself a flood awareness tool. Notification of the existence of the DCP would be required on Section 149(2) certificates. Where maps showing the application of the DCP have been prepared for the whole LGA, councils have the option of notifying all owners or only those affected by the mapping, on the Section 149 certificates. Given the political sensitivities of such notifications, the former alternative may be more acceptable to some councillors.

However, the authors believe a council should be proactive in disclosing known flood hazards to the community. Whilst there is clearly a moral obligation to do so, many council risk managers also confirm that councils have a duty of care to disclose all flood risk information to the public. This extends beyond a reactive role (i.e. only providing information when asked) to a proactive role. There are various methods available through which a council can proactively make flood information available to the community. The preparation and regular distribution of flood certificates (as described in the paper, “*Using Flood Certificates to Raise Flood Awareness*” — see www.bewsher.com.au) is one such means.

Readers should also be aware that the *Floodplain Management Manual* provides much clearer guidance on the use of flood notations on Section 149 certificates than the previous manual. These notations apply to river flooding and overland flow issues. Typical examples of notations on Section 149(2) and 149(5) certificates are provided in the new *Manual*.

Whilst Section 149 certificates have an important role under the Environmental Planning and Assessment Act and are required to be provided to all property purchasers, they are an ineffective community education tool in themselves. They can, however, form an important component of an overall program to raise the community’s awareness of overland flow risks.

Councils which rely solely on the Section 149 certificate to advise of known inundation risks, in the authors’ view, fall well short of their obligations.

9. ACKNOWLEDGEMENTS

The authors wish to thank Bankstown City Council for first asking the question, “How are other councils managing their overland flow risks?” The assistance and cooperation of each of the 22 councils that participated in this survey is also gratefully acknowledged.