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**BULIMBA CREEK FLOOD STUDY
PRELIMINARY ASSESSMENT OF THE
FLOOD MITIGATION SCHEME**

February, 1992

1.0 GENERAL

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Wardens City Council required that a flood mitigation strategy be determined for Burnley Creek catchment. This strategy was to consist of both non-structural and structural flood mitigation measures.

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Non-structural measures include:

1.0 GENERAL (including reassignment of flood affected properties), and review of current flood monitoring network. 1

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Structural measures could include:

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- channel lining (concrete, gabions, earthwork),
- channel re-assignment and training (removal of meanders, overbank and bypass channels),
- retention banks,
- retardation basins,
- upgrade of structures (e.g. bridges, culverts etc.),
- rationalisation of floodplain structures,
- floodplain and channel maintenance,
- levee banks,
- flood proofing, and
- development of overflow channels.

It was not required to identify problem areas using hydraulic model results under the various design events. The causes of the flooding problem may or may not be obvious. One obvious cause could be a restrictive structure/embankment combination that would be easily identified by a large afflux. This would be improved by upgrading the structure, making it pass structures and therefore reducing the afflux. Where houses are directly threatened by flooding and no structural measures will reduce flood levels or property destruction then this be considered as a viable option.

2.0 Problem Areas

Hydraulic model results for floods up to 100 year flood were used to identify major flood affected areas within the catchment. These areas were then investigated in order to formulate mitigation options.

1.0 GENERAL

Brisbane City Council required that a flood mitigation strategy be determined for Bulimba Creek catchment. This strategy was to consist of both non-structural and if viable, structural flood mitigation measures.

Non structural measures include:

- floodplain management (including resumption of flood affected properties), and
- review of current flood monitoring network.

Structural measures could include:

- channel works (widening, dredging etc.),
- channel lining (concrete, gabions, earthen),
- channel re-alignment and training (removal of loops, overflow and bypass channels),
- retention basins,
- retardation basins,
- upgrade of structures (e.g. bridges, culverts etc.),
- removal/relocation of floodplain structures,
- floodplain and channel maintenance,
- levee banks,
- flood proofing, and
- development of overflow channels.

It was first required to identify problem areas using hydraulic model results under the various design events. The causes of the flooding problems may or may not be obvious. One obvious cause could be a restrictive structure/embankment combination that would be easily identified by a large afflux. This would be improved by upgrading the structure, making it less restrictive and therefore reducing the afflux. Where houses are directly threatened by flooding and no structural measure will reduce flood levels, flood levees or property resumption must then be considered as a viable option.

2.0 Problem Areas

Hydraulic model results for floods up to the 1 in 100 year flood were used to identify major flood affected areas within the catchment. These areas were then concentrated on when formulating mitigation options.

A summary of major flood affected areas is as follows:

Problem Area	Probable Cause/s
1. Properties in Hemmant along Hemmant and Tingalpa Road and Foley Road	Cleveland rail bridge and embankment are holding up flood waters. <u>Tributary off Bulimba Creek in this region poorly maintained and with restrictive structure at Young's Road crossing.</u> This part of the floodplain is very flat and generally poorly drained.
2. Kianawah Park, Tingalpa and some nearby properties in Boundary Street and Washington Avenue.	Area is flat and poorly drained.
3. Properties in Fursden Road, Wood Avenue and Grey Street, Carina	Houses are built on an area of floodplain that is flat and flood prone. Creek channel is sluggish in this area and overgrown.
4. Properties adjacent to Mimosa Creek from Mt Gravatt Park downstream to the confluence with Bulimba Creek	Houses built adjacent to the creek. Channel choked with weeds and growth.
5. Properties along Altandi and Creswell Streets, Sunnybank.	Houses are built on an area of floodplain that is low and floodprone.

In addition to these areas, several road crossings along the creek are worthy of note either because they are inundated during minor flooding or have large levels of afflux. Brandon Road, Runcorn is one example of a frequently inundated road, with very little rain required for its closure. The structures at the following crossings have affluxes that are considered excessive (i.e. greater than 200mm) under the 1 in 100 year floor:

Cleveland rail bridge

Wynnum Road bridge

Mt Gravatt-Capalaba Road bridge

- Padstow Road bridge
- Beenleigh rail bridge (east and west branches)
- Beenleigh Road bridge (west branch only)
- Logan Road bridge (east branch only)
- South-East freeway bridge (east branch and Mimosa Creek)

3.0 FORMULATION OF MITIGATION OPTIONS

Flood mitigation options were derived by considering the problem areas and their causes (outlined in Section 3.2) combined with input from the Environmental consultants. In general, all areas considered to have high conservation value were avoided when contemplating structural options.

This process lead to the following twenty-one options to be put forward for further consideration:

Option	Detail
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1 (a).	Re-establish the original mouth of Bulimba Creek, as a full depth excavation to bed of Aquarium Passage.
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1 (b).	Cut a floodway just above tidal influence in the original mouth site.
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2.	Upgrade the Cleveland rail bridge crossing with a larger opening.
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3.	Excavate and widen the main drain from Hemmant/Tingaipa to Bulimba Creek.
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4.	Construct a high level (just above tidal influence) floodway under the Cleveland rail line.
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5.	Construct an overflow channel (just above level of tidal influence), just downstream of the Gateway Arterial.
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6.	Upgrade Wynnum Road bridge with a larger opening.
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7.	Construct an excavated floodplain channel upstream of Wynnum Road, through a restrictive low ridge.
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8. Create a detention basin near Fursden Road on the main creek, by using bunding etc. to create a wetland reserve.
9. Construct an excavated by-pass floodway channel under the Gateway Arterial and Wynnum Road.
10. Upgrade Mt Gravatt/Capalaba Road bridge, with a larger opening.
11. Upgrade Padstow Road culvert.
12. Construct flood protection levees around flood affected houses near Altandi Street, Sunnybank Hills.
13. Upgrade of Beenleigh Road and rail bridges (west branch), with larger openings.
14. Upgrade South-East Freeway culverts.
15. Upgrade Logan Road culverts.
16. Construction of a detention basin in Toohy Forest Park for Mimosa Creek.
17. De-weeding of Mimosa Creek.
18. De-weeding of Bulimba Creek.
19. Protective bunding around the Fursden Road area, and associated drainage pumps.
20. Resume properties in Fursden Road, Wood Avenue, Grey Street, Billan Street and part of caravan park.
21. Construction of a detention basin in Mt Gravatt Park for Mimosa Creek.

For locations of the proposed options refer to Figure 1.

7.5 MAINTENANCE AND REHABILITATION OF WILDLIFE CORRIDORS

The value of Bulimba Creek as a wildlife corridor has been highlighted in Chapter 6.0. The two most important management considerations are:

- maintaining the existing corridor, and
- enhancing the corridor through rehabilitation and enhancement programmes.

In so far as maintenance is concerned, much of the existing corridor vegetation is or will be protected by virtue of Council ownership and the forthcoming Vegetation Protection Ordinance. It would seem essential that the Vegetation Protection Ordinance be applied over bushland which is located on privately owned lands along the creek corridor. Even though these lands are zoned as 'Open Space', bushland areas which form part of the corridor are not protected.

The requirement for sensitive development of Council-owned parklands should also be noted. While the high recreational value of the Bulimba Creek corridor has been noted in Chapter 6.0, it should be stressed that recreational developments should not be of a type, scale or distribution which would place at risk the corridor and other biological values of the Bulimba Creek system.

In so far as rehabilitation and enhancement are concerned, there are obviously many opportunities for these types of programmes along Bulimba Creek and its tributaries. As required in the study brief, this aspect will be addressed in more detail during Stage 3 of the investigations.

8.0 IMPLICATIONS FOR FLOOD MITIGATION WORKS

From the environmental overview of the Bulimba Creek catchment, it has been possible to derive a set of environmental 'rules' which should be followed as far as possible in the selection of any future flood mitigation proposals. These rules should be used:

- to help derive a short list of flood mitigation options for further consideration, and
- to help assess the environmental implications of short-listed options.

Rule 1: Maintain Energy Pathways from Source to Mouth

The justification for this rule is:

- there are well-defined energy leakages from creek headwaters to lower reaches,
- creek biota has adapted to these energy flows, and
- barriers to energy flows in one part of the creek system may have important downstream implications.

The implications for flood mitigation proposals are:

- there should be no barriers such as concrete channels which significantly modify downstream energy flows, and
- there should be no works which would significantly reduce upstream energy inputs.

Rule 2: There Should be No Net Loss of Wildlife Corridor Function

The justification for this rule is:

- linked networks of remnant urban bushland are essential to the survival of local populations of native fauna, and
- Bulimba Creek and its riparian zone are integral parts of one of the City's most important bushland networks.

The implications for flood mitigation proposals are:

- no new breaks in existing wildlife corridors, and
- restoration and rehabilitation of all structural flood mitigation works.

Rule 3: No Barriers to Fish Movement

The justification for this rule is:

- there are estuarine fish species present in Bulimba Creek which move upstream at different stages of their life cycle, and
- there may be detrimental effects on the reproductive cycles of some marine organisms.

The implications for flood mitigation proposals are:

- no structural works (eg concrete channels) which present a barrier to the upstream and downstream movement of fish and other species.

Rule 4: No Change to the Tidal Prism In the Bulimba Creek Estuary

The justification for this rule is:

- the Bulimba Creek estuary consists of a mosaic of saltwater, and freshwater wetlands,
- this wetlands mosaic is highly productive from a fisheries point of view,
- the freshwater wetland components are now a scarce resource in Brisbane, and
- any changes in tidal penetration would modify salinity gradients, ecological conditions and therefore the viability of existing wetland communities in the lower reaches of the creek.

The implications for flood mitigation proposals are:

- no dredging works which would substantially modify the existing tidal regime in the lower reaches of Bulimba Creek.

Rule 5: Maintain Areas Designated as Having High Conservation Value (see Map 9)

The justification for this rule is:

- the designated areas have special conservation value by virtue of their intactness, representativeness, scarcity, diversity, presence of rare/unusual species or outstanding visual amenity.

The implications for flood mitigation proposals are:

- no works in these areas unless there are no feasible alternatives, and
- provision of environmental offsets in other parts of the catchment to compensate for losses resulting from works in such areas.

Rule 6: Consideration of Archaeological Potential

The justification for this rule is:

- the Bulimba Creek corridor may have high archaeological potential, especially for the discovery of subsurface deposits, and
- little archaeological research has been undertaken in the area.

The implications for flood mitigation proposals are:

- a need to conduct archaeological surveys prior to and during flood mitigation works, and
- a need to assess and record any archaeological finds.

Rule 7: Maintenance of Recreation Opportunities

The justification for this rule is:

- the Bulimba Creek corridor will continue to grow in importance as a major recreation resource in Brisbane and surrounds, and
- there is likely to be increasing use of the lower reaches of the creek for canoe and boating activities.

The implications for flood mitigation proposals are:

- no barriers to movement in areas which have potential for canoe and boating activities, and
- no works or structures which would significantly decrease the visual or recreational amenity of the area.

Rule 8: Monitoring of Effects

The justification for this rule is:

- proper management of the effects of works requires a factual and reliable data base,
- some of the biological effects of flood mitigation works may not arise immediately, and
- monitoring can provide an early warning system to warn of impending changes before they become a problem.

The implications for flood mitigation proposals are:

- the need to design and implement an appropriate biological monitoring programme, and
- use of this information to take management actions if needed.

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