J.M Brass
[redacted]

Dear Sir/Madam,

Floods cannot be prevented. The only way to avoid major damage and loss of life is to stop building on coastal sand dunes, areas under tidal influence, river channels, flood plains, drainage lines and on unstable substrates.

High intensity rainfall events are a feature of SEQ climate, causing frequent local 'flash' flooding which is difficult to predict and major flooding due to tropical lows. South east Queensland has large areas of low relief. Areas subject to tidal inundation have been built upon. Soil type and vegetation cover often affect the amount of damage that occurs. Anthropogenic changes to the catchment, stream channels and climate have increased flooding. However, I have no doubt that this will be another multimillion dollar, publicly funded whitewash. The review panel will be stacked with developers and others who stand to gain from rapidly increasing populations and increased urbanisation of flood plains and catchments which are already flood prone. The panel will congratulate themselves on a job well done, award themselves for excellence and recommend greater public funding to support more development.

The findings appear to have been preempted by approving a whole suburb suspended 4m above a flood plain. This has been rejected several times due to well founded fears about the stability of the structure.

Next time there is a similar rainfall event there will be many more homes on flood plains. Greater runoff from higher density developments will increase overland flows and flooding. More homes will be swept away, more infrastructure will be lost or damaged and more lives will be lost The social, economic and environmental cost will be higher.

Developers and builders who have made millions from developments on flood plains and the politicians and public servants who approved such developments should pay the cost, not the long suffering Australian taxpayer. Insurers of flood free properties and taxpayers must not be forced to subsidise 'cheap' industrial land, 'affordable' housing and lifestyles of prestige property owners.

Environmental impacts of floods

1. Erosion Channel erosion where stormwater flows have been concentrated, for example, along roadsides, is easy to see and quantify. Sheet erosion from diffuse overland flows is less visible and more difficult to measure. Both cause loss of soil, destabilisation of remaining vegetation and have the potential to damage built structures.
2. Sediments carried by run-off increases scouring of the landscape (erosion) and can smother aquatic vegetation such as sea grass beds in Moreton Bay. "Stormwater run-off to be one of the main causes of reduced water quality in our local waterways and Moreton bay", [1] 75% of sediments come from Bremer River, Lockyer Creek, Logan River and Albert River. [11]
3. Pollution and nutrient runoff causes algal blooms, oxygen depletion and deaths of aquatic life.

[redacted]

2011 Floods: lessons to learn

J.M.Brass January 2011

Introduction

High intensity rainfall and floods are a feature of the Australian climate. South east Queensland has large areas of low relief. Low lying areas and drainage lines are inundated regularly and other areas less frequently.

South east Queensland soils are often poorly structured and prone to erosion. Under natural vegetation soils have a high absorption capacity. Removal of vegetation reduces infiltration, hence increases runoff volume, erosion, siltation and flooding.

Anthropogenic changes to streams and catchments, often result in increased flooding and erosion, including land slides. Measures to reduce flooding in one area simply redirect floodwater to other areas.

Floods in South east Queensland are influenced by many factors and are almost impossible to predict months in advance. It is difficult to predict effects at the property level, even during the event, particularly against a background of accelerated development to accommodate the increasing population.

"One of the key principals of waterway management is that 'the first rule' of rehabilitation is to avoid the damage in the first place! It is easy, quick and cheap to damage natural streams and it is hard, slow and expensive to return them to their original state" (Rutherford et al, 1999)

No engineering solution will change these facts. No structure can withstand all potential flood forces.

Effects of urbanisation on stormwater flows

Urban areas have a much higher percentage of impermeable substrates and less vegetation than most natural environments. Reduced infiltration to ground water increases both the volume and rate of stormwater runoff. Higher peak flow volumes from urban areas lead to increased flooding, erosion, changes to stream beds, smothering of aquatic organisms with silt and increased transfer of pollutants to waterways.

Retrofits of existing urban areas may reduce flooding, improve water quality and reduce the negative impacts of urbanisation on the environment. The best design principals can only reduce the detrimental effects of new developments, not eliminate them.

Building and development

1. Don't build on flood plains They will flood.
2. Don't fill in creeks and gullies. Water will find its own path and cause destruction, either in the new development or elsewhere when a new channel is cut or runoff spreads out.
3. Assess the capacity of the catchment to accommodate increased run off before building more houses. Ensure that the absorption and discharge capacity of the catchment is not exceeded. Further development in flood prone catchments will increase runoff, erosion and flooding.
4. Determine the effect developments, including dams, individual buildings and new urban areas, will have on runoff pathways, peak storm water flows, stream flows and the water table. Do not approve developments and structures that will cause or increase flooding.

5. Provide adequate storm water drainage for roads and urban developments. Do not direct stormwater runoff where it will cause flooding. Don't build long straight roads down or through steep hillsides in areas where high intensity rainfalls can be expected. They turn into raging torrents during downpours.
6. Don't allow large numbers of people to build in areas that become island during floods. Publicise evacuation centers before houses are flooding. Do not wait until water is entering homes before warning people that they will flood. Ensure that flood victims can get to evacuation centres.

Vegetation

7. Removal of vegetation will increase runoff and erosion and raise the water table, hence reduce the capacity of the soil to store precipitation. Don't clear steep hillsides, erosion and landslides will result. Revegetate erosion prone areas, flood plains and steep hillsides to minimise erosion and prevent mass movement.

Dams

Dams cause major changes in the hydrology of the catchment, including overland flow paths, ground water recharge, water table depth and discharge volume of streams. Dams increase upstream flooding.

8. Dams will only decrease downstream flooding if they have sufficient capacity to store runoff from the catchment. Don't use dam flood buffers for water storage. Don't wait until flood rain is falling to release water from dams.
9. Dams will not decrease flooding caused by precipitation or runoff between the dam downstream of the dam or flooding caused by tidal influence
10. Don't increase dam wall heights without determining where the extra water will go. Don't build earth wall dams above high density developments. They collapse when overtopped.

Warnings

11. Due to the unpredictable nature of flooding, warning systems will never be perfect. Too little too late will place lives at risk. Frequent 'false alarms, will breed complacency and be criticised as an inconvenience.
12. Warnings may save lives and movable household contents but will not save buildings or reduce environmental impacts of building on flood plains.

13. **Insurance**

14. Where existing buildings are allowed to remain on flood plains, insurance premiums must be high enough to cover the full cost of reconstruction. For example; If flood frequency is determined to be once every 40 years (this corresponds to about the 1 in 100 flood line and the 1973 flood level) and the house would cost $200,000 to rebuild, then annual insurance premiums would be $5,000 more than premiums for homes unlikely to ever flood.

Climate change

Climate change is not something that needs to be planned for in the future. It is occurring now.

15. Sea levels are currently rising at a rate of 1cm per annum. This does not seem like much, but it is significant, when the low relief of the Australian continent is considered. In the last 20 years, large scale developments have been approved for coastal areas and river flats under tidal influence. Some of these areas are already flooding on the high tides.

16. As sea levels rise, water tables generally also rise, especially on highly permeable substrates such as sand. High saline water tables degrade building materials, destabilizing buildings.
17. Predictions for South east Queensland suggest that storms will be more severe, high intensity rainfall and flooding will be more frequent and drought will be more frequent and more severe. These factors need to be taken into consideration.

Ipswich

18.It is no surprise that Goodna was hardest hit by recent flooding. Large areas of development have occurred both on the flood plain and upstream along Sixmile and Woogaroo Creeks from Redbank Plains/Camira to greater Springfield. Karalee, Brassall and North Booval were also worse than 1974 due to developments on flood Plains and steep slopes. Urbanisation of rhe Ripley Valley will increase flooding along Bundamba and Warrill Creeks. These catchments are already highly flood prone.

Conclusions

There is a need to consider environmental and social impacts, both short term and long term at both the building and broadhectare level before approving developments. Replacement of vegetation with urban developments results in more severe storms downwind, increased runoff and increased downstream flooding, both by overland flows and rising stream levels. No amount of good design will prevent this flow on effect. Engineering solutions that decrease flooding in one area usually increase flooding elsewhere.
Flooding, erosion, salinity, hydrological changes, water and food shortages, rapid species decline, poverty and declining social cohesion clearly demonstrate that environmental impacts and human needs have not been considered when setting population targets and approving developments. Population projections need to be adjusted downward from the current population, to the level where human use of unsuitable environments such as flood plains is minimised. Reduction of population to sustainable levels, is necessary to solve many serious problems facing this nation and reduce impacts economy, human life and the environment.

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Facts to consider when setting population targets

J.M.Brass January 2011

1. **Water availability**: Australia is the driest continent; less water than the Thames River catchment. Industries use a disproportionate amount of the available water in Australia. Lack of water also limits agricultural production in dry years, even on the east coast where rainfall is highest.
2. **Arable land** hence capacity to supply food: 4th least amount of land per capita, only 3 small African countries have less. About 2% of Queensland. Less than 60m^2 per person in SEQ. Australia is an ancient land with infertile soils that would not be highly productive even if water was available.
3. **Forests** to supply building materials and a multitude of other services. Australia has one of the least amounts of forest. less than 6% actual forest. 19% includes all woody vegetation including sparse shrubs.
4. **Biota**: Due to its long isolation Australia has a unique assemblage of animals and plants. Most of species and ecosystems are declining rapidly due to clearing for urbanisation, agriculture and resource extraction.
5. **Extractive industries** to supply bulky building materials such as road base (basalt), sand and gravel South east Queensland only has 20% of these materials necessary for projected doubling of the population in 20 years. The remainder is too expensive to extract. Even if every grain of sand etc was used in construction there is only enough for 40 years.
6. **Mineral ores** Australia has a plentiful supply of iron ore and bauxite (aluminium) but this is being dug up and shipped out at such a rapid rate that the supply will be exhausted in 40 years.
7. **Transport** Australia lacks large inland waterways for efficient transport of bulky goods.
8. **Pollution** Australia is the sixth most polluted country. Topography, geology, climate, land management practices and industries all play a part in this.
9. **Finance** Australia has the second highest per capita personal debt level. Even high income earners are in debt. Australia's national debt is moderate when compared with GDP, but among the highest on a per capita basis. Small to medium businesses also carry a high debt burden.
10. **Fossil fuels** Australia has an adequate supply of coal and gas and some oil but these are also being exported at an unsustainable rate.
11. **Alternative energy** has limited capacity to reduce green house emissions due to the high payback time of solar and lack of suitable sites close to points of use for other possible sources.
12. **Real wealth** is measured in resources per capita. This makes Australia one of the poorest nations on earth, not one of the richest.

Australia has the sixth largest land area but little of it can can sustainably support medium to high population densities. Aridity, flooding and ancient soils are the major population limiters in most areas. Maintenance of our unique biota is also a major factor, particularly on the east coast. No amount of technological advances will increase the supply of essential resources such as water, fresh nourishing food and ecosystem services. Populations must be decreased to sustainable levels, not increased until all our flora and fauna is extinct, all the farm land is built upon the economy collapses and everyone starves.

Trees stabilise humidity by absorbing excess water in wet weather and adding moisture to the atmosphere by transpiration in dry weather.

(3) **Rain condensation**
South East Queensland does not have glaciers or monsoons to provide abundant supplies of water. An average of four rain depressions produce half our annual rainfall but these fail to produce any rain some years.
The rest of our rain results from moist coastal air masses condensing on vegetated mountains. When these mountains are denuded of tree cover, less condensation occurs and rainfall decreases.

(4) Wind speed reduction
In addition to the heat island effect discussed above, trees provide a mechanical barrier which reduces wind speed and the amount of dust which becomes airborne. Foliage filters the wind without causing turbulence that a solid structure such as a building of fence would cause.

(5) Erosion control
(a)The foliage of trees helps to break up large raindrops which reduces soil scouring.
(b)trees remain in active growth for longer than grasses in dry weather. Their roots help to bind soil which would otherwise be washed away.
(c)Leaf litter helps to protect the soil from loss of structure and erosive forces.
(d)Foliage also traps and filters out dust and some pollutants and protects buildings from flying debris in high winds.

(6) Greenhouse gas absorption, pollution and dust control
(a)Combustion of 1 kg of any organic matter, weather wood or fossil fuel, results in the production of about 3 kg of CO^2. 1 atom of carbon (molecular weight 12) from the organic matter combines with 2 atoms of oxygen (molecular weight 16) from the air to produce 1 molecule of CO^2.
Australians are the highest per capita produces of green house gases. Biomass burning accounts for about half of this. Most of the CO^2 is produced by burning off but wood heaters are a significant contributor.

(7)Water quality protection
(a)Trees reduce erosion and hence reduce the sediment load in streams
(b)Trees filter out nutrients from stormwater and help prevent algal blooms
(c)Trees shade streams and provide food and shelter for aquatic life
(d)Trees transpire water into the atmosphere and prevent the water table from rising and bringing salt to the surface