

PART 4 - RECOVERY

4.1 Welfare

- 4.1.1 The Department of Community Services will provide for the long-term welfare of people who have been evacuated.

4.2 Recovery Coordination

- 4.2.1 The Rockdale SES Local Controller will ensure that planning for long-term recovery operations begins at the earliest opportunity. This is to be done by briefing the chairman of the Rockdale City Council Local Emergency Management Committee on the details of the flooding and assisting in the establishment of a Recovery Coordinating Committee.
- 4.2.2 The Recovery Coordinating Committee is to prepare an outline plan for recovery operations and be prepared to recommend how such operations would best be controlled and coordinated.

4.3 Arrangements for Debriefs / After Action Reviews

- 4.3.1 As soon as possible after flooding has abated, the Rockdale SES Local Controller will advise participating organisations of details of response operation after action review arrangements.
- 4.3.2 The Rockdale SES Local Controller will ensure that adequate arrangements are in place to record details of the after action review and each item requiring further action is delegated to an organisation or individual to implement.
- 4.3.3 Follow-up to ensure the satisfactory completion of these actions will be undertaken by the Rockdale City Council Local Emergency Management Committee.

ANNEX A - THE FLOOD THREAT

Summary

1. The Rockdale LGA comprises 5 main catchment areas. The Cooks River catchment (approximately 100 km²); the Wolli Creek catchment (22 km²); the Bardwell Creek catchment (6 km²) which is the major tributary of Wolli Creek. The Bonnie Doon Channel catchment (1sq km) which forms a link between Wolli Creek & the Cooks River at Arncliffe and the Eve Street/Cahill Park catchment (0.8 km²) between the Bonnie Doon channel catchment and the Muddy Creek catchment.
2. The Wolli Creek, Bardwell Creek, Bonnie Doon Channel & Eve Street/Cahill Park catchments have been sub-divided into 15 'Floodplain Management Areas' so that the flood problem could be considered in the context of small localised areas created by floods in the area.
3. A total of 120 buildings would be flooded above floor level in a 1% flood event.

Landforms and River Systems

4. **Cooks River** drains a catchment of approximately 100 km² in the southern suburbs of Sydney, the river rises in the vicinity of Potts Hill, and empties into Botany Bay, just south of Sydney airport. The catchment has been heavily developed and the river channel highly modified, virtually the entire length of the river is lined and the channel has been straightened and realigned in a number of places.¹ This is a highly urbanised catchment with a history of intensive land-use, dominated by residential development and industrial areas concentrated in Botany, along Alexandra Canal within Tempe.²
5. **Wolli Creek** catchment is 20.4 km² and is a major tributary of the Cooks River in the southern suburbs of Sydney. For much of its length, the creek forms the boundary between Rockdale and Canterbury City Councils. Because of the local topography, almost all flood liable development lies on the south bank of the creek in the Rockdale City Council area.³ Upstream of Bexley Road, the channel is a concrete lined stormwater canal, after which it opens into a natural drainage channel. Primarily residential, with small light industrial parcels located along the southern and lower reaches of Wolli Creek.

Flooding within this catchment area results from intense rainfall over a period of 1 – 3 hours across the catchment. Runoff is concentrates in the creek system, which eventually overtops its banks and spreads across the floodplain. Flooding is generally of a short duration (2-4 hrs). Water level in Cooks River and Botany Bay affected flood level in the lower parts of Eve Street/Cahill

¹ Cooks River Floodplain Management Study, August 1994

² Rockdale City Council Website (www.rockdale.nsw.gov.au) April 2008

³ Wolli Creek Floodplain Management Study, March 1998

Park catchment, the Bonnie Doon Channel (downstream of the sewer) and to the footbridge at Turella on Wolli Creek.

6. **Bardwell Creek** is the principle tributary of Wolli Creek, which it joins 2.5km upstream the Cooks River junction. The floodplain of Bardwell Creek is within the Rockdale & Hurstville Council areas. Has a small sub-catchment of around 6.4km² dominated by residential development and a significant area of open space including the Bardwell Valley Parklands and two golf courses. The upper reaches of this tributary are in the Hurstville CBD.
7. **Muddy Creek** catchment drains the suburbs of Carlton, Kogarah, Rockdale, Banksia, Brighton-Le-Sands and Kyeemagh and parts of Hurstville. It is a tributary of the Cooks River.⁴ Consists of a brick and concrete lined channel owned by Sydney Water and has a sub-catchment of 5.7km² which is mainly residential, with small pockets of commercial area, a few parks and a several market gardens.
8. **Upper Muddy Creek** Catchment is predominantly medium density urban residential. Sydney Technical College & Carlton Public School, Bardwell Park, Percival Reserve, Tindale Reserve and the commercial developments along Carlton Parade, Queen Victoria Street & Durham Street are also in this area.
9. **Spring Street Canal** has a small catchment of 2.7km² which features the Spring Creek Wetland. All water enters the wetland via two culverts that feed directly into the Spring Street drain. Spring Street Canal is a concrete channel which drains the suburbs of Banksia and Rockdale and flows into Muddy Creek. This sub-catchment area is mainly residential with park areas and a large Chinese market garden which borders the drain.
10. **Eve Street** catchment is a tiny sub-catchment of 0.4km² comprising the Kogarah Golf Course, Barton Park plus the Marsh and Eve Streets Wetlands. Also bisected by the M5 East motorway and includes areas of residential development.
11. **Bonnie Doon Channel** catchment (1.0km²) comprises the land between Wolli Creek and the Cooks River at Arncliffe. The western bank of the Cooks River at Arncliffe is within Rockdale City Council area and the eastern bank with the Marrickville Council area. It comprises some light industrial/commercial areas in Arncliffe, as well as Arncliffe Park and a few residential properties.
12. **Scarborough Ponds** parts of this catchment to the north of Ramsgate Rd, can overflow into the Sans Souci Drains catchment. Overflows can occur at Tonbridge Street near the Ramsgate RSL and also between Margate and Macdonald streets. It discharges directly into Botany Bay via concrete culverts below ground level adjacent to Florence Street.

This sub-catchment is 4km² and drains parts of Kogarah. Its southern end forms a tidal creek and is dominated by Scarborough Park which occupies a

⁴ Upper Muddy Creek Pipe Drainage Analysis Stage 1, December 1999

long central section of the Rockdale Wetlands Corridor.

The park consists of a series of linked ponds flanked by grassed parks, many of which are dedicated to sports playing fields. Two small pockets of industrial/commercial areas are located along West Botany Street & Phillips Road/Production Avenue. There is also a commercial strip along Rocky Point Road.

This catchment also contains low to medium density residential areas.

13. **Sans Souci Drains Catchment (Drains 1, 2 & 3)⁵**

The critical duration of this catchment is estimated to be less than 2 hours

Waradiel Creek (formerly Sans Souci Drain 1⁶) catchment area is about 0.6 km². There are a number of structures along the drainage line with the outlet to Botany Bay at Dolls Point restricted by culverts at Russell Avenue and the George's River Sailing Club. There are a number of spots near the main drainage line where storm runoff could pond and a number of structures along the same line which cause flow restrictions.

There is considerably developed residential areas adjoining this drain on both sides. It is estimated that 1050 properties will experience inundation in a 1% flood. This area also comprises the Ramsgate Road shopping centre and Peter Depena reserve makes up a significant amount of its open space. This catchment is relatively flat.

Bado-berong Creek (formerly Sans Souci Drain 2⁷) catchment area is approximately 1.3km² at the southern end of the Rockdale Wetlands Corridor; the drainage line is generally a well defined unlined earth channel with a reasonably straight alignment through vacant RTA land southwards to Botany Bay. There are pedestrian bridges and road culverts located along the channel section.

Most of the land within the 1% level of this drain is undeveloped or has been restricted to open space or recreation facilities ie playing fields and is dominated by areas of parkland/open space, low-medium density residential properties and a section of commercial premises along Rocky Point Road.

It drains through Stan Moses Reserve and Scott Park Wetland into the Georges River at Riverside Drive.

Goomun Creek (formerly Sans Souci Drain 3⁸) has a 1.1km² subcatchment which drains the suburb of Sans Souci. It is dominated by medium-high density residential areas and passes under Rocky Point Road.

⁵ Sans Souci Drainage Catchments Floodplain Risk Management Plan, February 2005

⁶ Rockdale City Council Website (www.rockdale.nsw.gov.au) April 2008

⁷ Rockdale City Council Website (www.rockdale.nsw.gov.au) April 2008

⁸ Rockdale City Council Website (www.rockdale.nsw.gov.au) April 2008

The drain outlet is a long culvert extending under Rocky Point Road near the swimming pool. The area around Meriel Street is a trapped low point which is drained by this culvert. A cross-connection between this drain and drain #2 was constructed by Council at Bonanza Pde following the 1975 flood.

A significant area of land beside this drain is unused, having been previously set aside for other purposes. This creek discharges into Kogarah Bay in the Municipality of Kogarah.

14. **Botany Bay Foreshore (Lady Robinsons Beach)** is the stretch of beach between the mouth of the Cooks River and the mouth of Georges River on the western shore of Botany Bay.

Storage Dams

15. There are no storage dams within the Rockdale Local Government Area.

Weather Systems and Flooding

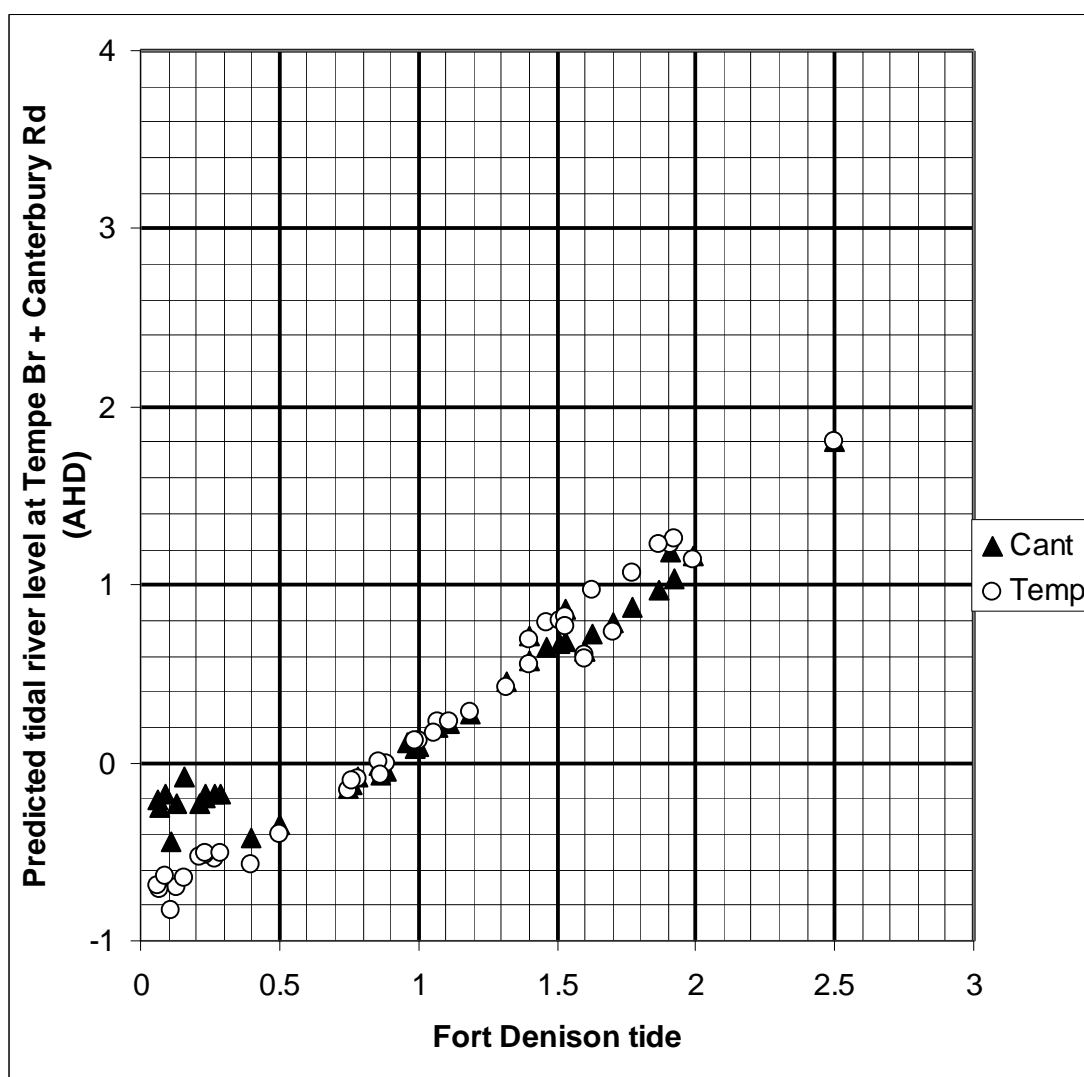
16. Most flooding on the Cooks River results from east coast low pressure systems located off the Sydney coast. If such systems are stationary or slow-moving heavy rain for several hours can occur and produce flooding which is worsened if there are strong south-easterly winds and storm surge effects. The worst situation would occur if peak flows in the river coincided with unusually high tides and storm surge conditions.
17. Flooding as a result of rainfall alone usually occurs quite quickly after the rain has fallen. Critical storm duration's to produce high flows between Brighton Ave at the Tempe Railway Bridge (on the boundary of the Rockdale and Botany council areas) can be as low as 2 to 6 hours, and rates of rise on the river are high. Likewise floods on the Cooks River and its tributaries fall quickly unless they are held up by high spring tides.
18. Rainfall totals of more than 200mm in 48 hours have been recorded at several locations within the Cooks River catchment area, and there have been instances of much more intensive falls over periods of 1-6 hours. Extreme rainfall of over 300mm in an hour and over 600mm in 4 hours is possible but such intensities would be very rare.

Characteristics of Flooding

19. The majority of floods within the Rockdale City Council area come from flash flooding along the Cooks River and its tributaries, Wolli Creek, Bardwell Creek, Muddy Creek and the Scarborough Ponds.
20. Low lying areas away from the river and its tributaries can also experience flooding during and after heavy rains, which are sometimes associated with slow moving, severe thunderstorms. Such storms usually occur during summer months. They are of short duration and the flooding occurs soon after the heavy rain which causes it. No part of the council area can be considered free from short-term localised shallow flooding from thunderstorm rains which

cause drains to overflow, minor creeks to burst their banks briefly and ponding to occur. Such flooding can occur even when there is no flooding from the Cooks River or from its tributaries within the council area.

21. Flooding in the lower reaches of Cooks River can occur as a result of high water levels in Botany Bay, heavy rainfall, or a combination of the two. The dominant influence below the Princes Highway is the level in Botany Bay where water levels are as follows (data provided by BoM)⁹:



Circles are Tempe Bridge points, and triangles are Canterbury Road points
 Lag between Fort Denison and Cooks River is always less than 30 minutes,
 and can be considered simultaneous
 The highest points plotted are those considered to be the 1% tidal points
 The difference between Fort and the Cooks stations is roughly 0.8 metres

⁹ Cooks River Flood Forecasting Directive, Bureau of Meteorology

Flood History

22. The highest tide level recorded on Botany Bay was 1.45 metres AHD at Kurnell in 1974. This is thought to be of the order of a 1% AEP storm event. With a south-easterly wind producing a wind stress effect of 0.2-0.3 metres at the mouth of the Cooks River, a level of 1.7 metres AHD would occur there. This could produce over-bank flows on both sides of the river within the Rockdale City Council area. Even as a result of very high tide levels alone, over-bank flow can cause flooding, and the parklands along the lower river flood regularly, even on a spring tide with no rain.
23. Recent floods on the Cooks River have included those of 1946, February 1956, March 1958, November 1961, June 1964 and March 1983. Some flooding also occurred in 1975, 1978, 1986 and 1995. The 1961 flood was the highest since 1946, but the 1889 flood was higher than both of these. The highest recorded floods in Wolli Creek occurred in 1946, 1975 and 1978. There is little record of flooding on Muddy Creek and in the Scarborough Ponds.
24. The table below shows the heights reached at selected gauges on the Cooks River in two recorded floods and the heights expected to be reached in design floods of specified frequency.

Peak Flood Heights (in metres) in Historical and Design Floods

Gauge Location	Nov 1961¹⁰	Mar 1963	5% AEP	2% AEP	1% AEP	Extreme
Brighton Ave (Croydon Park)	3.39	2.38	3.37	3.72	4.00	7.47
Canterbury Rd (Canterbury)	2.54-3.0	2.13-2.46	3.17	3.50	3.76	7.22
Wardell Rd (Dulwich Hill)	2.64-2.92	NA	2.81	3.11	3.34	6.59
Illawarra Rd (Undercliffe)	2.41	1.63-1.92	2.55	2.85	3.07	6.33
Unwins Bridge (Tempe)	2.63	1.38	2.15	2.43	2.64	6.01

25. The 'extreme flood' would be very rare indeed: the values given are estimates for the worst flood possible on the Cooks River. Such a flood might be expected to occur only once every 10,000-1,000,000 years.
26. It will be noted that the flood of November 1961 approximated the 5% AEP flood at the Brighton Ave, Wardell Ave and Illawarra Rd gauges, all of which are upstream of the Rockdale City Council area. It was close to the 1% AEP flood further downstream at Unwins Bridge, however, presumably because of an unusually high level of Botany Bay or because of strong inflows from the lower tributaries (Wolli Creek and/or Muddy Creek) which would have had no impact on the gauges further upstream. The March 1983 flood reached much lower levels than did the 1961 flood and probably approximated the 10-30% AEP event. That is, a flood reaching the heights of the 1983 flood can be expected, on average, every 3-10 years. In this event there was little overbank flooding and therefore only limited property inundation beyond the riverside parks.

¹⁰ Cooks River Floodplain Management Study, Aug 1994

27. The 1% AEP flood would be expected to reach about 0.4 metres higher than the 5% AEP flood at the Unwins Bridge gauge and flood waters would penetrate further away from the river. In the 'extreme flood', the river level at Unwins Bridge would be about 3.4 metres higher than in the 1% AEP and 1961 events.
28. Obviously the extreme flood would spread much further and inundate much larger areas (and to a greater depth). Substantial parts of Arncliffe and Kyeemagh would be flooded, along with land on both sides of the Alexandra Canal including parts of Kingsford Smith Airport.
29. Flooding much more severe than has been seen by present residents of the Rockdale City Council area is inevitable, but such flooding occurs only very infrequently.

Flood Mitigation Systems

30. There are two small levees in the LGA:
 - a. At Hillcrest Ave, a levee provides protection up to a 20% AEP flood level. Once the levee is overtopped, evacuation from the lowest lying house is difficult. In a 1% AEP flood event, 3 houses would be flooded above floor level (one property would be inundated by 3.9m). Since construction the creek level has not exceeded the height of the levee but floodwaters have been reported behind the bank.¹¹
 - b. A concrete levee (approx 1m) is on the northern side of the Muddy Creek storm water canal. It is referred to as 'The Strand Levee' and protects properties that back directly onto the Muddy Creek Storm Canal from Princes Highway to Hayburn Avenue and The Strand, Rockdale, in floods up to a 100yr event with minimal freeboard.

Extreme Flooding

31. In an 'extreme flood', areas quite distant from the identified watercourses of the council area and not normally considered to be flood prone could experience inundation. Areas close to the watercourses would experience deep inundation in such floods. Arncliffe and Kyeemagh could be severely affected, along with Kingsford Smith Airport, by flooding from the Cooks River. Parts of Bexley, Rockdale and Brighton-le-Sands would be inundated from Muddy Creek in an extreme flood, and parts of Kogarah, Monterey and Ramsgate would be flooded in such an event on the Scarborough Ponds.
32. Considerable numbers of residential and some commercial properties would experience over-floor flooding in such floods.

¹¹ Wolli Ck, Bardwell Ck, Bonnie Doon Channel and Eve St/ Cahill Park Catchments Floodplain Management Plan, March 1998.

ANNEX B - EFFECTS OF FLOODING ON THE COMMUNITY

Community Profile

Census Description ¹²	Rockdale LGA
Total Persons	92126
Total Dwellings	32873
Total persons aged 65 years and over	14405
Total persons aged below 15 years	16003
Total persons with a need for assistance (profound / severe disability)	4310
Total persons of indigenous origin	453
Total persons using Internet	19715
Single parent families	3632
Persons living alone	8515
Total persons who do not speak English well	6630
Total persons who lived at a different address 5 years ago	29677
Households without vehicles	5084
Total persons residing in caravans, cabins or houseboats	93
Mean household size	3

General

1. Most floods on the Cooks River, Wolli Creek, Bardwell Creek and Muddy Creek within the Rockdale City Council area and on the Scarborough Ponds inundate only small areas of parkland and recreational land adjacent to these watercourses. They also produce nuisance flooding on roads. Only the larger floods on these streams have direct impacts on residential and commercial land, but in genuinely severe events a large number of properties could experience over-floor inundation within the Rockdale City Council area. The areas likely to be most seriously affected in terms of private property

¹² 2006 Census. Australia Bureau of Statistics

inundation are those situated on low-lying land adjacent to Wolli, Bardwell & Muddy Creeks, plus the Sans Souci Catchments.

2. Localised flash flooding independent of flooding on these streams can also inundate properties. Since the 1970s there have been several cases of property damage being caused by surface flooding and stormwater runoff entering premises. Sans Souci has been especially badly affected, with 23 buildings sustaining ground-floor damage in a rain event in about 1980 and 17 in an event in April 1998. Small numbers of properties in Carlton, Bexley, Banksia, Rockdale and Arncliffe have been similarly affected. Such impacts can be expected at some locations within the council area in most years, with runoff between yards also doing damage to outdoor fixtures and fences.

Specific Risk Areas

Cooks River (Kyeemagh, Arncliffe, Turrella, Undercliffe)

3. Flooding in the lower reaches of the Cooks River can occur as a result of rainfall or high water levels in Botany Bay. This area is predominantly park land and reserves with very little urban development in the flood zone.
4. The urban developments in this area, particularly Kyeemagh & Undercliffe are flash flood zones with easy access to high ground.

Wolli Creek (Turella, Bardwell Park, Earlwood, Kingsgrove, North Bexley)

5. Upstream of Bexley Road is a medium hazard flood storage area. 1 house (10 Nairn Street) is inundated by 0.2m in a 1% event. There is easy access to high ground.
6. Harthill – Law Avenue: this area is classified as Low Hazard Flood Storage with easy access to high ground. The only property in this area which may be affected is the Earlwood/Bardwell Park RSL Club where the loading dock would be submerged in a 1% (the building's floor level is above a 1%).
7. Henderson Street: A High Hazard Floodway/Flood storage area. This area has fifteen commercial or industrial buildings in it of which ten are inundated above floor level in a 1% flood. Access to high ground is difficult due to the depth and velocity of flow as well as the distance to be covered.
8. Wolli Creek (suburb) between East Hills & Illawarra Railway Lines: this area consists of a mixture of residential properties (Goddard & Walker Streets) and commercial/light industrial (Lusty & Bonar Streets). 21 buildings would be inundated in a 1% AEP event. This area is currently undergoing substantial redevelopment and most of the industrial buildings at the eastern end are being converted to high density residential building with habitable floor levels set at 0.5m above the 1 in 200 yr flood and each with their own flood plan. Council is proposing additional drainage works in the Lusty and Bonar Streets area to reduce the continuing risk in this area.

Bardwell Creek (Turella, Bardwell Park, Earlwood, Kingsgrove, North Bexley)

9. Upstream of Stoney Creek Road. Bardwell Creek divides into two branches at Bexley Golf Course; inundation from the Croydon Road (northern) branch is fully contained within the golf course. On the Bridge Street (southern) branch, flooding can affect residential properties adjoining the concrete lined, open channel. These properties are in a Medium Hazard Floodway/Flood Storage area.

In a 1% flood one building (Unwin Street) will be flooded by 0.1m and ALL road crossings will be flooded.

10. Stoney Creek Road to Preddys Road. In this area the concrete lined channel passes within 10m of residential buildings with very little overbank flooding. The area is classified as Low Hazard Floodway. No habitable floors although some garages are affected in a 1% event and there is easy access to high ground.
11. Canonbury Grove. Five residential lots adjoin the concrete lined channel approximately 300m downstream of Preddys Road. The area is classified as Low Hazard Flood Storage. No above floor inundation occurs in a 1% event, but inundation and minor damage to yards has occurred in the past. There is easy access to high ground. A number of houses experience yard inundation in a 20% AEP event but no building inundation.
12. Veron Road. This area includes approximately 10 residential properties in Veron Road joining Bardwell Creek and is classified as Low Hazard Floodway. No habitable floors are flooded in the 1% event as the houses are located on high ground although the basement and garage area of one property is affected in a 1% event. Back yards are regularly flooded resulting in damage to yards and fences and there is easy access to high ground.
13. Hillcrest Avenue. The two lowest properties on each side of Hillcrest Avenue are located in a High Hazard Floodway/Flood Storage Area. A levee provided protection up to the 20% flood level. Once this levee is overtopped, evacuation from the last house in the street is difficult as it is particularly low-lying.

In a 1% event, 3 houses are flooded above floor level. No. 20 will be inundated by up to 3.9m.

14. Pile Street to Wolli Creek Confluence. From Pile Street to Wilsons Road the creek is confined to a heavily vegetated channel. Bardwell Road has been overtopped several times by floodwaters and has risen to near the boundary of 25 The Glen Road.

Three buildings, 25 The Glen Road (2 residential units) and 69 & 71 Hannam Street are inundated above floor level in a 1% flood. The area is classified as a Medium Hazard Floodway and evacuation to high ground is easy.

Muddy Creek (Kyeemagh, Banksia, Rockdale, Kogarah)

15. Harrow Road and the Hegarty Street Underpass have been classified as high hazard areas due to the depth and velocity of flood waters; Cadia Street and the land upstream of Connemarra Street and the left bank of Muddy Creek downstream of the Princes Highway also pose a major hazard to life due to the depth and velocity of flood waters. Much of the flood problem in these areas is due to deficiencies in the local drainage systems.
16. Other streets which have been classified as high hazard are Prospect Street, Union Street & Ferry Street. Guinea Street & Bestic Street have been classified as medium hazard; while Bay Street has a low hazard classification.¹³
17. The following table shows the number of properties affected in this catchment during a 1% flood¹⁴.

Area	Total No. Properties	No. with Over-Floor Flooding
D/S Bestic Street	10	0
Bestic St – Bay St	103	5
Bay St – Princes Hwy	73	31
Princes Hwy – Railway	4	1
Frys Reserve & Cadia St	9	7
Warialda St – Victoria Way	16	3
Victoria Way – Union St	20	3
Union St – Tindale Res.	26	7
Seaforth Park	23	0
TOTAL	284	57

¹³ Spring Street Drain, Muddy Creek & Scarborough Ponds Floodplain Risk Management Study 2000

¹⁴ Spring Street Drain, Muddy Creek & Scarborough Ponds Floodplain Risk Management Study 2000

Scarborough Ponds (Rockdale, Kogarah, Monterey, Ramsgate, Sans Souci)

18. For this area, the 20% AEP flood is contained generally within existing parkland. The 10% and higher flood levels are estimated to spread out over a much wider area, including residential property. Even in these large floods, depths in the residential areas will be very shallow (generally less than 0.3m) with negligible velocity.¹⁵
19. Most of the flooding in this catchment is shallow and confined to the yards of buildings. The rise of floodwaters in this area would be slow as it depends on the ponding of floodwaters. The critical duration of this catchment is estimated to be 36 hours.
20. Barton Street has a high pedestrian & vehicle hazard classification while President Avenue has a medium classification and Ramsgate Road has a low hazard classification.¹⁶
21. The following table shows the number of properties affected in this catchment during a 1% flood¹⁷

Area	Total No. Properties	No. with Over-Floor Flooding
Bay St – President Ave	19	5
President Ave – Barton St	122	3
Barton St – Florence St	146	9
TOTAL	287	17

San Souci Drainage (Ramsgate, Sans Souci, Dolls Point, Sandringham)¹⁸

22. The West Botany Street industrial area may have access routes cut or blocked by traffic during flooding. 17 properties would be inundated above floor level in a 1% event.
23. Along the Sans Souci Drains floods greater than the 10% AEP will affect residential properties but depths will be shallow (0.3m or less) with low flow velocity.
24. Approximately 180 properties in the Sans Souci Drainage Catchment #1 (Waradiel Creek) are affected by flooding due to high ocean levels. It is estimated that 60 properties adjoining the drain (including home units) have

¹⁵ Spring Street Drain, Muddy Creek & Scarborough Ponds Floodplain Risk Management Study 2000

¹⁶ Spring Street Drain, Muddy Creek & Scarborough Ponds Floodplain Risk Management Study 2000

¹⁷ Spring Street Drain, Muddy Creek & Scarborough Ponds Floodplain Risk Management Study 2000

¹⁸ Sans Souci Drainage Catchment Floodplain Risk Management Study 2005

surface flooding during a 50% AEP event, this number increases to 1050 in a 1% AEP event.

Bonnie Doon

25. Princes Highway/Illawarra Line to the Sewer Carrier. This area is occupied by commercial and light industrial developments. The Bonnie Doon drainage channel runs from the sewer carrier near Allen Street to the Princes Highway.

There are 16 buildings inundated above floor level in a 1% event and ponding in roadways, especially at the intersection of Guess Avenue and Arncliffe Street has occurred several times. The area is classified as Medium Hazard Flood Storage with easy access to high ground in most parts of the catchment.

This area is currently undergoing substantial redevelopment and most of the industrial buildings are being converted to commercial and high density residential buildings with habitable floor levels set at 0.5m above the 1 in 200 yr flood level and each with their own flood plan.

26. Upstream of the Sewer Carrier. The upper part of this catchment is occupied by residential properties and the lower part by commercial and light industrial development. 26 buildings are inundated above floor level in a 1% event but there is easy access to high ground for all properties.

Spring Street

27. Much of the flood problem in this catchment is due to deficiencies in local drainage systems. This area is proposed to undergo substantial redevelopment in the near future and most of the industrial buildings from Bonar Street to Martin Avenue will be converted to high density residential buildings with habitable floor levels set at 0.5m above the 1 in 100yr flood level and each with their own flood plan.

28. In this area Lynwen Crescent and West Botany Street have high flood hazard classifications while Short Street has a low hazard classification. The following table shows the number of properties affected in this catchment during a 1% flood ¹⁹

Area	Total No. Properties	No. with Over-Floor Flooding
Muddy Creek – West Botany St	0	0
W. Botany St – Short St	93	9
Bestic St East of Railway	30	0
Short St – Banksia Subway	9	0
Subway – Gardiner Ave	36	4
Oswin Lane – Railway St	65	0
TOTAL	233	13

Eve Street/Cahill Park

29. Gertrude Street/Levey Street/Innesdale Road. This area contains a mixture of residential and commercial buildings. Flooding is caused by either local runoff or from the Cooks River overtopping (20%). In a 1% event 36 buildings would be inundated above floor level. The area is classified as Medium Hazard Flood Storage with moderate access to high ground. Ponding in Gertrude Street & Innesdale Road occurs if there is a high Cooks River level at the same time as heavy rainfall in the catchment.
30. Valda Avenue. This area covers four (4) properties located at the eastern end of Valda Avenue. Local runoff has resulting in minor traffic disruption and inconvenience but has not caused significant flood damages. The area is inundated from the Cooks River in a 1% flood but no buildings are covered above floor level. The area is classified as Low Hazard Flood Storage with easy access to high ground.
31. The following table indicates the streets and properties that are likely to be affected in a 1% AEP flood on the watercourses specified.

¹⁹ Spring Street Drain, Muddy Creek & Scarborough Ponds Floodplain Risk Management Study 2000

Area	Street Affected	Properties inundated in a 1%AEP ²⁰
Wolli Creek	Upstream of Bexley Rd	2
	Henderson Street	10
North Arncliffe	Between East Hills & Illawarra Railway lines	21
Bonnie Doon Catchment	Princess Hwy / Illawarra Line to the Sewer Carrier	16
	Upstream of the Sewer Carrier	28
Eve Street / Cahill Park	Gertrude St./Levey St / Innesdale Rd	36
Bardwell Creek	Upstream of Stoney Creek Rd	1
	Hillcrest Ave	3
	Pile St to Wolli Creek Confluence	3
<i>Arncliffe – Wolli creek area</i>		<i>120</i>
Scarborough Ponds	Bay Street to President Ave	19
	President Ave to Barton Street	122
	Barton Street to Florence Street`	146
<i>Scarborough Ponds</i>		<i>287</i>
Spring Street Basin	West Botany Street to Short Street	93
	Bestic Street branch East of railway	30
	Subway St to Gaidiner Ave	36
	Oswine to Railway Street	65
<i>Spring Street Basin</i>		<i>233</i>
Lower Muddy Creek	downstream of Bestic Street	10
	Bestic Street to Bay Street	103
	Bay Street to Princes Highway	73
Upper Muddy Creek	Princes Highway to the railway line	4
	Frys Res to Cadia Street	9
	Warialda St to Victoria Way	16
	Victoria Way to Union Street	20
	Union Street to Tindale Reserve	26
	Seaforth Park branch	23
<i>Muddy Creek</i>		<i>284</i>
Waradiel Creek	87-89 Park Road	2
“	Alice Street	4
“	Gannon Avenue	4
Bado-berong Creek	36 Sanoni Avenue	1
“	29 Dickin Avenue	1
“	19-21 Primrose Av	2
“	7-9 Waldron Street	2
Goomun Creek	640 Rocky Point Road	2

²⁰ Spring Street Drain, Muddy Creek and Scarborough Ponds Floodplain Management Study – Jan 2000.

“	660 Rocky Point Road	2
		149
Total	Properties	1073
Total	Persons	2300

32. The market gardens in Bestic St are located adjacent to Muddy Creek and are within the 1% AEP flood extent. Flood water would likely enter the area from Bestic St, rather than overtopping of the raised Muddy Creek bank.
33. Campsites are located within the Sheralee Caravan Park, Rockdale. Refer to Annex G. Caravans are parked nearly up to the edge of the Muddy Creek stormwater channel and there is a high potential for property damage and hazard to life if residents are not evacuated speedily.
34. Sites for Campervans are located within The Grand Pines Cravan Park, Sans Souci. Refer to Annex G.

Road Closures

35. The table below indicates the roads and streets which are susceptible to flooding and which could be closed for short periods because of flood waters.

Road / Street	Suburb	UBD Reference	Remarks
Bexley Road / stormwater canal to Wolli Creek	North Bexley	273 / Q8	
Subway Street	Banksia	274 / K11	at the Railway Underpass
Barton Street	Monterey	294 / L8	Duck crossing between Scarborough Ponds
Spring Street	Banksia	274 /M-N 11	Between Princess Hwy & West Botany Street
Bestic Street	Rockdale	274 / P14	Adjacent to Soccer Stadium entrance
Lynwen Crescent	Banksia	274 / N 11-12	Storm drain overflow
Warialda Street	Kogarah	294 / K1	Adjacent to the storm water canal
The Strand	Rockdale	294 / K 1	Next to the storm water canal
Agonis Close	Banksia	274 / M 12	Next to the storm water canal
Intersection of Gertrude & Levey Sts	Arncliffe		
West Botany Street			At Spring Street intersection.
Ada Street			At crossing of Wolli Creek
Unwin Street			“” “”
Bridge Street			“” “”
Oliver Street, Coveney Street & Preddys Road			Cut in PMF

Effects on Utilities and Infrastructure

36. **Railway Lines:** The East Hills Line & to a lesser extent the Illawarra Line will be affected by flooding in a 1% AEP event or higher. The first overtopping would occur between Turrella Station and the sewer carrier near the intersection of Stotts Avenue and Slade Road on the East Hills Line. In a PMF there is likely to be major damage to the East Hills Line and possible Illawarra Line near the Cooks River crossing. The East Hills Line is also cut just east of Kingsgrove Station due to overland flows in floods less than the 1% AEP.
37. **Sewerage:** Pumping stations are by necessity sited at low spots and can be affected by flooding. Main areas of concern are in Wolli Creek, Bonnie Doon Channel and at Gertrude St/Levey Street & Innesdale Road.
38. **Roads & Footbridges:** Henderson Road Footbridge is overtopped in floods exceeding the 1% AEP and has been swept off it's foundations in past floods. Princes Highway – both approaches to the Tempe Road Bridge are cut south of Brodie Spark Drive in floods less than the 1% AEP. The ridge approaches and part of the bridge are overtopped during PMF events.

ANNEX C - GAUGES MONITORED BY THE ROCKDALE SES LOCAL HEADQUARTERS

Station	AWRC No	Type	Stream	Flood Classification			Reading Arrangements
				Min	Mod	Maj	
Tempe (Unwins) Bridge UBD 275 A4	10370	Tidal	Cooks River				*
Henderson Rd UBD 274 J5	213212	Stream	Wolli Creek				+
Bexley Rd North			Wolli Creek				RTA monitor & alert

Notes:

1. The Bureau of Meteorology provides flood warnings for the gauges marked with an asterisk (*).
2. SES Local Flood Advices are provided for the gauges marked with a single cross (†).
3. The SES holds a Flood Intelligence Card for the gauges marked with a double cross (‡).

ANNEX D - DISSEMINATION OF SES FLOOD BULLETINS

The Sydney Southern SES Region Headquarters distributes SES Flood Bulletins and other flood related information a number of regional and national media outlets through the Media Net online distribution lists.

Television Stations:

Station	
ABN Channel 2	ATN Channel 7
Channel 10 NSW	SBS TV
TCN Channel 9	Sky News Australia
NHK Sydney (Japan Broadcasting Corporation)	

Commercial Radio Stations:

Station			
2CH	2 Day FM	2GB	2SM
2UE	702 ABC Sydney	96.1 The Edge FM	Mix 106.5 FM
Nova 96.9 FM	Radio National	SBS Radio Sydney	Triple J (National)
Triple M Sydney	WS FM 101.7	Vega 95.3 FM	

Newspapers and other Print Media:

Name	Location
Australian Financial Review	The Australian
Daily Telegraph	News Limited
Sun Herald	Sunday Telegraph
Sydney Morning Herald	

Other Agencies:

All other agencies listed under this plan and the St George Local DisPlan will be sent flood bulletins

Community Radio Stations:

Station	Intended Audience
2MBS	Classical & jazz station Sydney
2RPH	Radio Reading Service for the Print Handicapped
C91.3 FM	Macarthur First Radio
Koori Radio – Sydney	Indigenous Sydneysiders
Skid Row 88.9 FM	Reaching Leichardt, Marrickville and City of Sydney
2CCR FM	Cumberland Community Radio
2NBC	Christian Channel reaching Canterbury, Rockdale, Marrickville, Kogarah, Hurstville.
2SSR	Sutherland Shire Radio
FM 99.3	Sydney's North Shore
Radio 2 Moro	Sydney Arabic Radio
The Voice of Islam	Islamic Radio based at Lakemba
2CR	China Radio Network
2RDJ	Reaching the inner west – Ashfield, Strathfield, Burwood, Canada Bay
89.7 East Side Radio	Reaching the eastern suburbs – Botany, Waverley, Woollahra, Randwick, City of Sydney
Hawkesbury Radio	Hawkesbury Region
Radio B FM	Bankstown City Radio
WOW FM	Penrith Valley
2SER FM	Sydney Educational Radio – based at North Ryde & UTS Sydney
2MCR FM	Macarthur Community Radio
2RRR	Ryde Regional Radio
FM 103.2	Sydney's Contemporary Christian Radio Channel
Ninefourone	Illawarra Christian Radio
SWR FM	Reaches Blacktown, Holroyd and Fairfield
2ME	Sydney Arabic Radio
FBI Radio	Reaches across the Sydney Basin from Katoomba to Gosford to Wollongong

ANNEX E - TEMPLATE WARNING MESSAGE FOR ROCKDALE LGA

Warning for []

Date/Time of Issue: []

Authorised By: []

The Bureau of Meteorology has advised that heavy rain has fallen in the catchment upstream of Tempe. Flash flooding of the area is imminent as well as flooding of local roads and causeways along the Cooks and Wooli Creeks.

It is recommended that you prepare to shelter in the highest place indoors within the next [] hours.

To prepare for this you should:

- *Residents and businesses along streams and creeks should take immediate precautions to protect life and property.
- *Raise belongings by placing them on tables, beds and benches. Put electrical items on top. Some items may be able to be placed in ceilings.
- *Gather medicines, personal and financial documents and mementos together to take with you.
- *Listen to radio station ABC 702 for further information and to confirm this warning
- *Never drive, walk or ride through floodwater - this is the main cause of death during floods as water may be deeper or faster flowing and may contain hidden snags or debris.
- *Keep a vigilant watch on the situation, stay tuned to local radio or TV, alert your neighbours (particularly the elderly), check pets and reconsider travel plans.
- *Follow the advice of emergency services.
- *If flood waters rise around your car, get out and move to higher ground.**

If evacuation is necessary:

- Turn off the electricity, gas and water.
- Take three days' supply of clothes with you.
- If you have a car, drive to the evacuation centre at [] (*specify route*).
- If you don't have a car, buses will operate on normal routes. Special transport can also be provided on request if necessary, telephone [].
- So that you can be accounted for, it is important that you register at the evacuation centre.
- After registering, you may go to the house of a friend or relative. Alternatively, accommodation will be arranged for you.
- The Police will provide security for your property while you are away.

ANNEX F - EVACUATION ARRANGEMENTS FOR THE ROCKDALE CITY COUNCIL AREA

Background

1. The responsibility for issuing any general evacuation order during flooding rests with the Rockdale SES Local Controller who exercises his/her authority in accordance with Section 22(1) of The State Emergency Service Act 1989 (as amended). However, the decision to evacuate will usually be made after consultation with the Local Emergency Operations Controller and the Sydney Southern SES Region Controller.
2. As far as possible, evacuation will NOT be carried out in the Rockdale area due to it being largely a flash flood area. Residents will be advised to shelter in place however arrangements are in place should evacuations be required.
3. Some people will make their own decision to evacuate earlier and move to alternative accommodation using their own transport. These evacuees will be advised, via the media, to inform the Police or SES of their evacuation and their temporary address.

Arrangements

4. **Control.** During floods evacuations will be controlled by the NSW SES. Small-scale evacuations will be controlled by the Rockdale SES Local Controller. Should the evacuations operations escalate beyond the capabilities of local resources control may be handed over to the Sydney Southern SES Region Controller.
5. **Conduct.** Evacuations will be controlled by the SES and conducted in four phases:
 - a. Phase 1 - Warning.
 - b. Phase 2 – Withdrawal.
 - c. Phase 3 – Shelter.
 - d. Phase 4 – Return.

Phase 1 – Decision to Evacuate

6. The decision to evacuate. The responsibility for issuing any general evacuation order during flooding rests with the Rockdale SES Local Controller who exercises his/her authority in accordance with Section 22(1) of The State Emergency Service Act 1989. However, the decision to evacuate will usually be made after consultation with the Local Emergency Operations Controller and the Sydney Southern SES Region Controller.

7. **Evacuation triggers.** The Rockdale LGA is primarily affected by flash flooding resulting from heavy rainfall in the creek catchments. The strategy for this area is to shelter in place. Evacuation triggers will depend on critical levels above which access roads begin to inundate. Active reconnaissance in the area and consultation with BoM will be required to determine if evacuations are necessary.
8. Self-motivated evacuation. Some people will make their own decision to evacuate earlier and move to alternative accommodation using their own transport. These evacuees will be advised, via the media, to inform the Police or SES of their evacuation and their temporary address.

Phase 2 – Warning

9. **Evacuation warnings.** On the receipt of BoM warnings predicting possible flash flooding; the Rockdale SES Local Controller will consult as necessary to determine the level of the threat and the need to consider evacuations. As soon as possible after the decision to evacuate is made, the Rockdale SES Local Controller will issue evacuation warnings to the ‘at risk’ residents, indicating what people should do before evacuating and when actually doing so.
10. **Content of Evacuation Warnings.** A template guide to the content of evacuation warning messages is at Annex E. These are disseminated via:
 - The radio and TV stations listed in Annex D.
 - Door-knocks by emergency service personnel.
 - Public address systems from emergency service vehicles.
 - Telephone.
 - Two-way radio.
 - SES Flood Bulletins.

Phase 3 – Withdrawal

11. **Introduction.** Withdrawal involves the actual removal of the community/individuals from dangerous or potentially dangerous areas to safer areas.
12. **Movement.** Evacuees are to be encouraged to move using their own transport where possible. The Rockdale SES Local Controller will arrange transport for those people without their own vehicles.
13. **Phasing.** Generally, special needs groups will need to be evacuated first. In particular Henderson Street Turrella since its access road inundates at an early stage and there is a risk of power failure to critical systems. Once these groups have been organised, evacuation should proceed with the highest threat (ie lowest lying) areas being evacuated first.
14. **Evacuation routes.** If required, evacuations will proceed using the most appropriate route to the evacuation centre(s) in use (as indicated by active reconnaissance in the area). Note the low points described in Annex B.
15. **Large-scale evacuations.** Where large scale evacuations are needed, a multi-agency response will be required, controlled by the Rockdale SES Local Controller and coordinated by the LEOCON.
16. **Special Needs Groups.** Note the special needs groups and specific risk areas listed in Annex B.
17. **Animals.** Assistance animals (guide dogs, hearing assistance animals, etc) will remain in the care of their owners throughout the evacuation. This includes transport and access into evacuation centres etc. Due to safety restrictions, it may not be possible to allow companion animals to accompany their owners when being transported via aircraft or flood rescue boats. Department of Primary Industries will make separate arrangements for the evacuation and care of companion animals.
18. **Doorknocking.** Field teams conducting doorknocks will record and report back the following information back to the Operations Centre:
 - Addresses and locations of houses doorknocked and/or evacuated.
 - The number of occupants.
 - Details of support required (such as transport, medical evacuation, assistance to secure house and/or property and raise or move belongings).
 - Details of residents who refuse to comply with the evacuation order.

19. **Refusal to evacuate.** Field teams should not waste time dealing with people who are reluctant or refuse to comply with any evacuation order. These cases should be referred to the Local Emergency Management Operations Controller who will arrange for Police to ensure their evacuation.
20. **Security.** The NSW Police Force will provide security for evacuated areas.
21. **Transport and storage.** Transport and storage of furniture from flood threatened properties will be arranged as time and resources permit.

Phase 4 – Shelter

22. **Evacuation centres.** The usual purpose of evacuation centres is to meet the immediate needs of victims, not to provide them with accommodation. Evacuees will be advised to go to or be taken to the nearest accessible evacuation centre, which may initially be established at the direction of the Rockdale SES Local Controller but managed as soon as possible by the Department of Community Services. Any or all of the following sites may be used as evacuation centres:

Facility/Centre	Location	Comments
St George's Leagues Club	124 Princes Highway Kogarah	Full large club facilities
Rockdale RSL	45 Bay Street Rockdale	Small club facilities – function room to fit 80 with full dining available.
Mercure Hotel Sydney Airport	20 Levey Street Wolli Creek	Full hotel facilities – conference facilities available to fit up to 400 with catering
Arncliffe RSL	71A Wollongong Road Arncliffe	Small club facilities
Bexley RSL	24 Stoney Creek Road Bexley	Small club facilities

23. **Action on arrival.** On arrival, evacuees will be:
 - a. registered;
 - b. medically checked, if necessary; and
 - c. provided with their immediate welfare needs.
24. **Registration.** The NSW Police Force will ensure that all evacuees are registered on arrival at the designated evacuation centres.
25. **Animal shelter compounds.** Animal shelter compounds will be set up for the domestic pets and companion animals of evacuees. These facilities will be operated by Department of Primary Industries. Alternatively the St George Animal Shelter (77 Edward St, Carlton) may be used..

Phase 5 – Return

26. Once it is considered safe to do so, the Rockdale SES Local Controller will authorise the return of evacuees to their normal or alternative place of residence. This decision will be made in consultation with appropriate officers in regard to matters such as the electrical safety of buildings.
27. The return will be controlled by the Rockdale SES Local Controller and may be conducted, at his/her request, by DoCS.

ANNEX G - ARRANGEMENTS FOR THE EVACUATION OF CARAVAN PARKS AND THE RELOCATION OF CARAVANS

General

1. The following caravan parks are flood liable:

Name	Address	Evac Trigger	Total Van Sites	Number Permanent Vans	Number Casual Vans	Number Tent Sites
Sheralee Caravan Park	88 Bryant Street Rockdale	2.15m tide	120	80	20	20
Grand Pines Caravan Park	289 The Grand Parade Sans Souci		68	68	0	0

Advising Procedures

2. Caravan Park proprietors will be encouraged to ensure that the owners and occupiers of caravans are:
- a. Made aware that the caravan park is flood liable by:
 - Handing a printed notice to occupiers taking up residence. The notice will indicate that the caravan park is liable to flooding and outline the evacuation and van relocation arrangements as detailed in this Annex.
 - Displaying this notice prominently in each van.
 - b. Made aware that if they are expecting to be absent from their vans for extended periods, they must:
 - Provide the manager with a key; in a sealed envelope; to the van.
 - Provide a contact address and telephone number.
 - Inform the manager if a vehicle will be required to relocate the van during flood time.

- Leave any mobile van in a condition allowing it to be towed in an emergency (ie: tyres inflated, jacks wound up, personal effects secured and annexes and lines for water, sewer, electricity and gas readily detachable).
- c. Informed when a flood is rising. At this time, occupiers will be advised to:
- Ensure that they have spare batteries for their radios.
 - Listen to a local radio station for updated flood information.
 - Prepare for evacuation and van relocation.
3. The Rockdale SES Local Controller will ensure that the managers of caravan parks are advised of flood warnings and the details of any evacuation order.

Evacuation of Occupants and Relocation of Vans

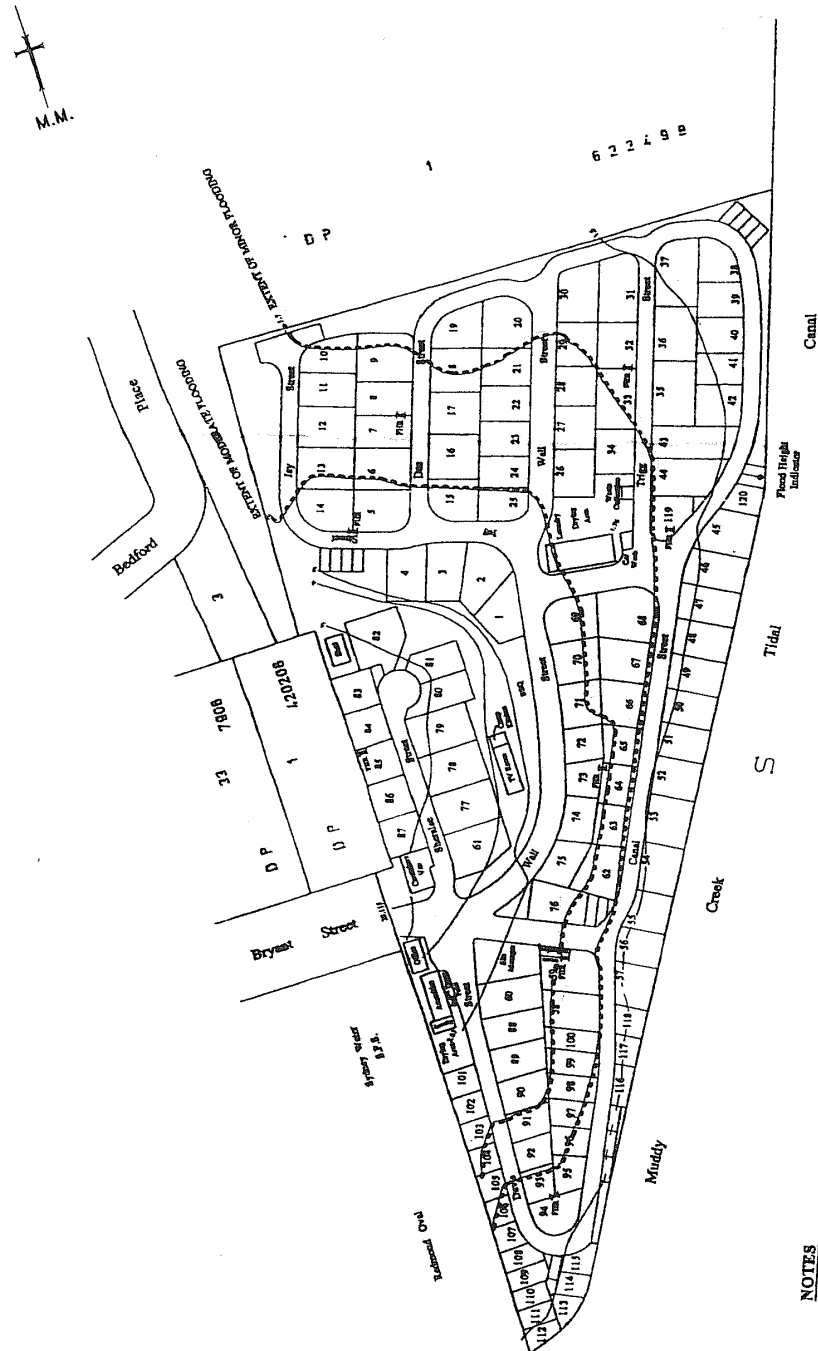
4. Caravan park proprietors will be encouraged to install flood depth indicators and road alignment markers within their caravan parks.
5. When an evacuation order is given:
- a. Occupiers of non-movable vans should:
- Secure their vans by tying them down to prevent flotation.
 - Isolate power to their vans.
 - Collect personal papers, medicines, a change of clothing, toiletries and bedclothes.
 - Lift the other contents of their vans as high as possible within the van.
 - Move to a designated evacuation centre if they have their own transport, or move to the caravan office to await transport.
- b. Where possible, vans that can be moved will be relocated by their owners. Park managers will arrange for the relocation of mobile vans whose owners do not have a vehicle. Council and SES personnel will assist if required and may be able to provide additional vehicles. Vans are to be moved to the following locations:
- Rocky Point Road, Ramsgate (via Ramsgate Road) for the Grand Pines Caravan Park
 - Bryant Street Rockdale for the Sheralee Caravan Park

6. Caravan park managers will:
 - a. Ensure that their caravan park is capable of being evacuated.
 - b. Advise the Rockdale SES Local Controller of:
 - The number of people requiring transport.
 - Details of any medical evacuations required.
 - Whether additional assistance is required to effect the evacuation.
 - c. Check that no people remain in non-removable vans that are likely to be inundated.
 - d. Inform the Rockdale SES Local Controller when the evacuation of the caravan park has been completed.
 - e. Provide the Rockdale SES Local Controller with a register of people that have been evacuated.

Return of Occupants and Vans

7. The Rockdale SES Local Controller, using council resources as necessary, will advise when it is safe for the caravan parks to be re-occupied.
8. Vans will be towed back to the caravan park(s) by van owners or by vehicles and drivers arranged by the park managers. Again, Council and SES personnel will assist if available.

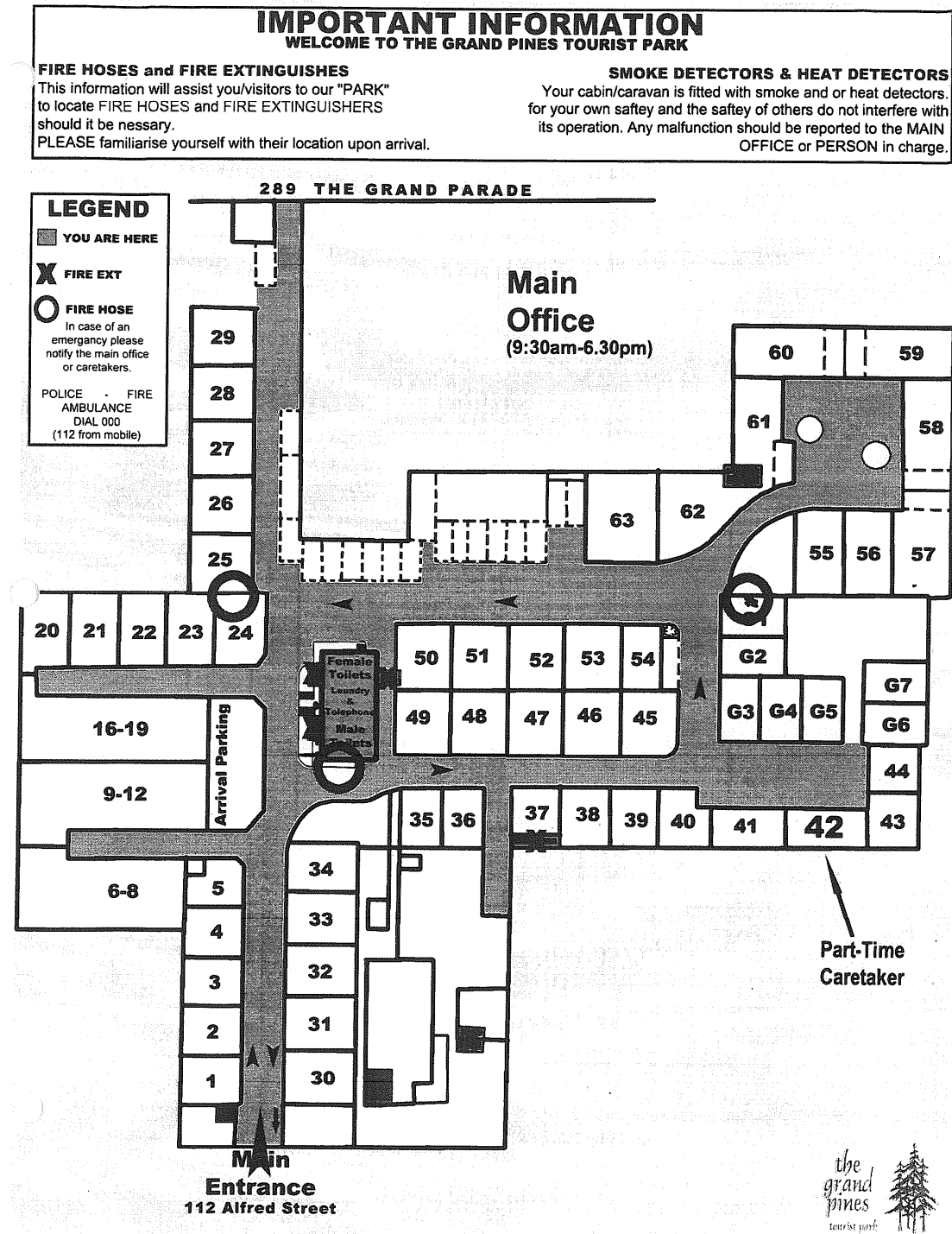
Site Map – Sheralee Caravan Park



NOTES

1. Water inundation in the Park may occur above a 1.56 tide level in periods of heavy rain.
2. Above this tide level, minor flooding will occur if rainfall is between 25mm and 58mm per hour.
3. Above this tide level, moderate flooding will occur if rainfall is between 58mm and 82mm per hour.
4. Flood risk is reduced from moderate to minor and minor to nil when rainfall stops within the hour.

Site Map – The Grand Pines



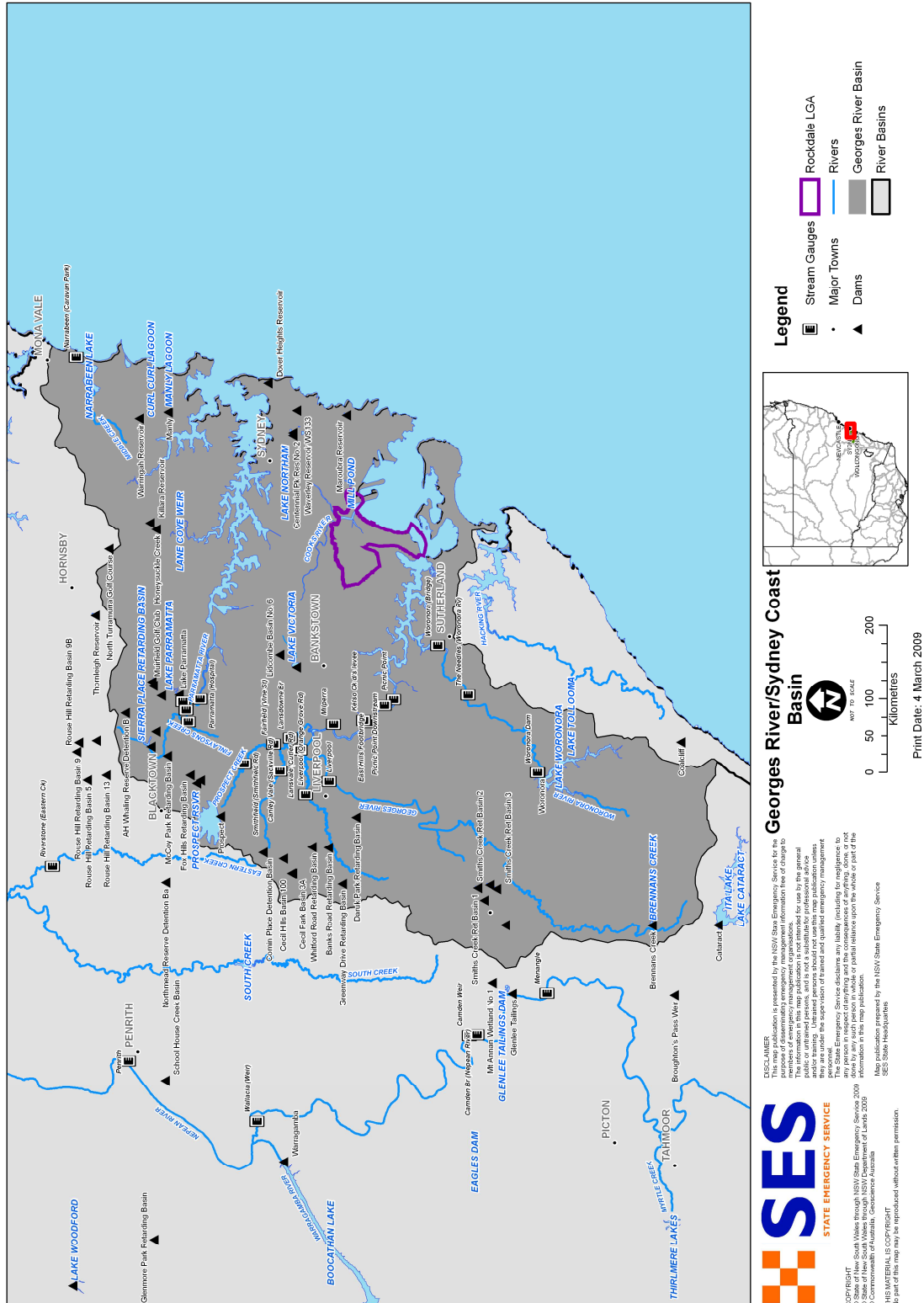
ANNEX H - BEXLEY ROAD/WOLLI CREEK FLOOD DETECTION SYSTEM

The RTA field resource or Police in consultation with Traffic Management Centre (TMC) manage access to Bexley Road. When the water level reaches 2.75m, Bexley Road at M5 East, Kingsgrove Avenue and Slade St/Shaw Road is closed at the discretion of the TMC Chief Traffic Operations Controller (CTOC) and Police. TMC coordinates the response and provides status reports to the public via the Incident Reporting Internet Service (IRIS) and the radio broadcast network.

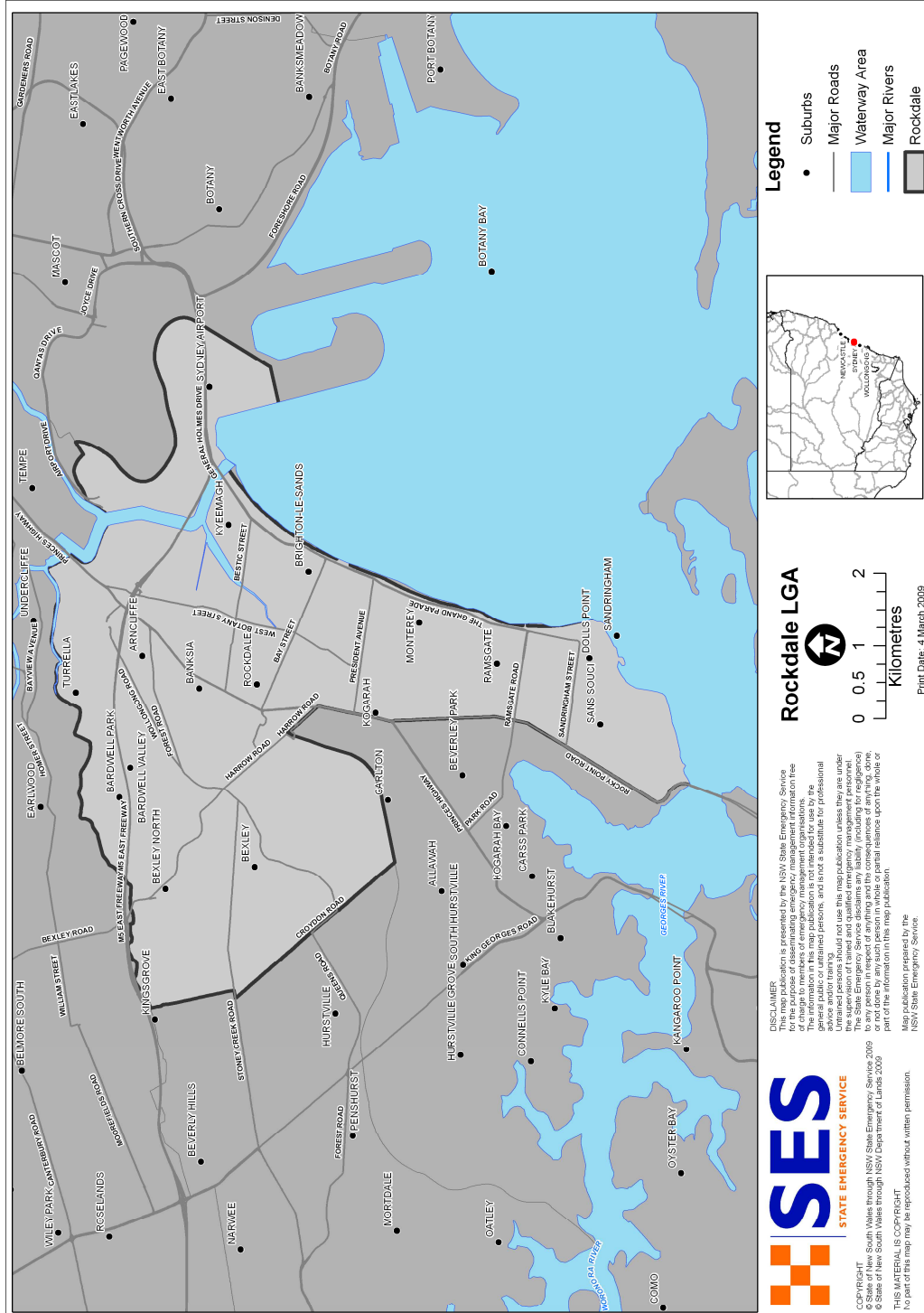
TRIGGER	Action By Transport Operations Room (TOR)
<p>(MHL) automated flood detection system sens first alarm message via SMS, email or fax at:</p> <p>- Low Water Rising alert (water level exceeds 1.0m)</p>	<ul style="list-style-type: none"> • Use CCTV to visually monitor conditions. Note: FLOOD LEVEL MARK preset show up to approx 1.6m on the scale. • RTA Field resources or Police inspect for flooding. • Check MHL on-line flood report.
<p>- Final High Water Rising alarm (water level exceeds 2.75m)</p>	<ul style="list-style-type: none"> • Use CCTV to visually monitor conditions. Note: once the top of the fence is breached, this is approximately equal to 2.75m • 'Road Closure' Variable Message Signs (VMS) and Sydney Coordinated Adaptive Traffic System are implemented automatically closing Bexley Road at M5 East, Kingsgrove Ave and Slade St/Shaw Rd. • A RED signal is displayed to traffic wanting to cross the Wolli Creek Bridge. • Local SCATS controller activates two flashing static signs ("WATER OVER ROAD") on Bexley Rd.. • Continue to monitor MHL on-line
<p>- High Water Falling alarm (below 1.5m)</p>	<ul style="list-style-type: none"> • Reopening is at the discretion of the

	<p>RTA CTOC and Police.</p> <ul style="list-style-type: none"> • 'Road Closure' VMS plan and the SCATS plan will be removed. • If localised congestion present then the 'Traffic Delays' VMS will be implemented. • Update traffic information on IRIS to public.
- Low Water Falling alarm (below 0.5m)	<ul style="list-style-type: none"> • Response is effectively complete.

MAP 1 - GEORGES RIVER/SYDNEY COAST BASIN



MAP 2 - ROCKDALE COUNCIL AREA



MAP 3 - ROCKDALE SECTORS

