Floods in the Marrickville Region

ANYA HAYWOOD

SGP STEP 5

MR. FEDELE

CONTENTS

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INTRODUCTION

Topic:

This SGP investigates upon the nature and impacts that flooding has on the Marrickville region and what council strategies have been implemented to prevent flood risk. Areas of Marrickville have experienced frequent flash flooding events for over a decade and still, through numerous council attempts to combat the issue, remains a place affected by flooding.

Location:

Marrickville is a suburb within the Inner-West of Sydney located in close proximity to the Cooks River.

*Map provided by **Whereis**'s website*

*Picture of the Cooks River in the Marrickville region provided by **Cooks River Alliance** website*

Scope:

The scope of the findings of this SGP are focused on the area of Marrickville and the Cooks River. One case study strays to nearby Strathfield, focusing upon the Coxs Creek. Eight residents completed a survey, all living in the town house complex

adjacent to the Cooks River. Ken Haywood aided this report with an interview complementary with flood photos.

AIMS AND HYPOTHESES:

Below are the aims and initial hypotheses for this topic, expressed in step one and two of the project.

Inquiry 1	Hypothesis
Discuss the nature of flood risks in the Marrickville Region	A flood is when water overflows land that is usually dry. The type of flooding in Marrickville region is flash flooding, which occurs when there is a very sudden and heavy rainfall. Marrickville is located in the Inner West of Sydney. The 39-43 Riverside Crescent townhouse complex is right next to the Cooks River. The nature of the flood risks in the Marrickville region are caused by pour stormwater drainage and high tides due to climate change.
Inquiry 2	Hypothesis
Analysis the social, economic and environmental impacts caused by the floods	The floods cause a loss of cars and a higher insurance premium (economic), they disturb the equilibrium of the habitat of the Dibble Avenue waterhole (environmental), allows the community to get involved with the council (social).

Inquiry 3	Hypothesis
Investigate what strategies have been implemented to minimise flood risk	The Inner West Council has implemented better stormwater drainage to combat the storms and high tides that cause intense floods.

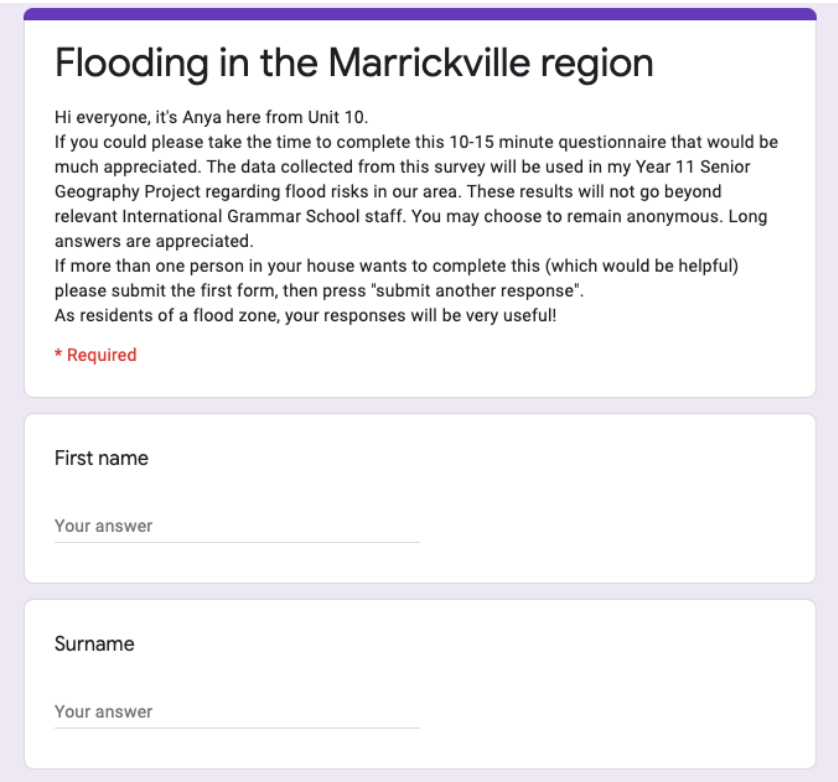
METHODOLOGY:

Both primary and secondary research was undertaken in this SGP to present a comprehensive response to the inquiry questions.

Primary research:

All methods of primary research used in this SPG:

Residential survey – A survey answered by neighbours in the townhouse complex adjacent from the Cooks River. In total, eight responses were collated to represent graphed data and responses to all inquiries. This primary data presented a unique community response to the topic.



Flooding in the Marrickville region

Hi everyone, it's Anya here from Unit 10.
If you could please take the time to complete this 10-15 minute questionnaire that would be much appreciated. The data collected from this survey will be used in my Year 11 Senior Geography Project regarding flood risks in our area. These results will not go beyond relevant International Grammar School staff. You may choose to remain anonymous. Long answers are appreciated.
If more than one person in your house wants to complete this (which would be helpful) please submit the first form, then press "submit another response".
As residents of a flood zone, your responses will be very useful!

* Required

First name

Your answer

Surname

Your answer

Introduction to survey sent to local residents

Interview – An interview with Ken Haywood - an active correspondent between residents and the local council regarding flood risks in the Marrickville area, was conducted to provide a community insight into council responses. Accessed through

this interview was an email between Ken and Ryan Hawken, an urban water engineer from the Marrickville council. Attached to this email was also a case study from 2000.

From: Ryan Hawken <ryan.hawken@marrickville.nsw.gov.au>
Date: Wed, 12 Feb 2014 01:39:50 +0000
To: Ken Haywood <ken@clikcreative.com.au>
Subject: RE: Flooding at Riverside Crescent (MERIT 986368)

Hi Ken

Thanks for the call earlier this week regarding flooding near the intersection of Riverside Crescent and Dibble Avenue and particularly the impact of this flooding on the carpark at 39-43 Riverside Crescent. As mentioned on the phone I have been on holidays and have only now received your letter from November last year. I apologise for not getting back to you sooner.

As a bit of background to the current situation, at the time of approval of the development, a decision was made by Council's Development & Environmental Services Committee to protect habitable floors consistent with the NSW Flood Plain Development Manual and to allow parking at existing ground levels only slightly above the road surface. I believe this was intended to reduce the bulk of the building.

An extract from the beginning of the email exchange between Ken Haywood and Ryan Hawken

Photos – The photos used in this SGP relate to each inquiry, evaluating the nature of floods, their impacts, and the council's drainage and catchment. The photos represent a timeline of floods and a visual aid to case studies and other data. All photographs courtesy of Ken Haywood.

Secondary research:

All methods of secondary research used in this SPG:

Flood case studies/reports – Flood studies prepared by the council showcase detailed data that can be used to evaluate this SGP's three inquiries:

1. The Riverside Crescent Catchment study, July 2000 (RCCS2000)

2.Cooks River and Coxs Creek Flood Study, October 2010 (CRCCFS2010)

3.Marrickville Valley Floodplain Risk Management Study, September 2017 (MVFRMS2017)

These case studies present secondary data vital to the evaluation of council strategies to reduce flood risk and the nature of floods. This includes the summation of the cost of drainage implements, the economic expenses floods have on the local community, the events leading to flood intensity and hydraulic and hydrologic modelling.

Media articles regarding floods in the Marrickville region – Media articles can supply an opinionated response to floods, a summary of flood events, statistics and an unbiased negative view on council initiatives. The two primary media articles studied through this SGP are

1. *Home collapse and residents evacuated after a month's worth of rain lashes Sydney in an hour (2017)*

This flood event recognises the danger of intense storms in the local area, and their extreme effect they can have on life. This relates to inquiry two as it explores economic, social and environmental impacts from flooding.

2. *Higher density in flood zone? Here's a way to do it and reduce the risks* (2017)

This article proposes ways to limit flooding within the local area and across Sydney. The main solution it addresses is the 'Green Grid', which involves creating spaces

that link hydrologic and ecological systems together to boost the capacity to deal with severe impacts.

FINDINGS

Inquiry 1: Discuss the nature of floods in the Marrickville region

Research undertaken throughout this SGP highlights that the nature of floods in the Marrickville region are greatly dependant on storm events, high tides, climate change and inadequate street drainage.

Intense storms and high tides produce the most destructive floods in Marrickville. Street drainage cannot handle intense rainfall and flood water, causing the street to flood and the catchment to fail. It was also found in the RCCS2000 report that:

'flood heights might be increased by wind and wave action, and by waves created by vehicles driving through ponded stormwater'.

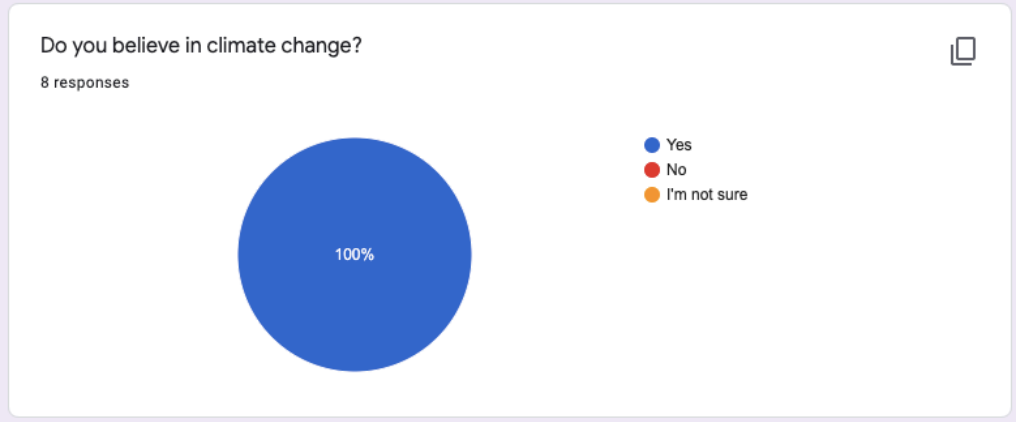
This report also suggests that:

'the main cause of flooding here is low level relative to the river, with the gutter level at the low point being only 1.04m'.

This concludes that the manmade structures and drainage are at a relative level to the river, contributing to more destructive flood events.

It was evident through the primary research method of photographs, that most economic loss was endured during intense rainfall and a king tide. In Photograph 1, 8 cars were written off in these conditions.

The survey showed that unanimously, respondents claimed they believed in climate change and suggested that it increases flood risks through more frequent and intense storm events as well as a rise in sea levels.



It has been proven through the CRCCFS2010 that ocean level rises can cause as much as a **0.91 metre** increase in floods, and a peak rainfall and storm volume as much as **30%**. These rates have most definitely increased since the RCCS2000 report, highlighting that climate change is a main cause for flood intensity within the Marrickville region. An increase in rainfall can cause more frequent and destructive storm events, such as the landslide in Marrickville in 2017. Residents of the apartment building were forced to evacuate as the structure was under threat of collapsing. As Sydney was drenched with 35mm of rain in just one hour, the SES responded to 126 calls for help, 5100 properties were without power, light rail lines were suspended and flights were delayed.

In the interview with Ken Haywood, Ken introduced an email between himself and Ryan Hawken, an urban water engineer for the Marrickville council. In this email, Hawken provides a conclusive statement that: ‘the RCCS2000 report found that overland flooding - caused by local runoff from the Riverside and Dibble Ave catchment, reached approximately 0.6m above the road level for a 2-year storm’. This showcases again that high tides and storm events occurring concurrently, contribute most to the intensity of flooding in the Marrickville region.

Inquiry 2: Analysis the social, economic and environmental impacts caused by the floods

This complex inquiry investigates the long-term effects of flooding on the local community. It was found through both primary and secondary research that these effects had negative impacts on social, economic and environmental factors. The MVFRMS2017 includes a multi-criteria assessment of options:

Economic:

- benefit cost ratio
- implementation complexity
- staging of works

Social:

- reduction of risk to life
- emergency access
- social disruption
- community and stakeholder support

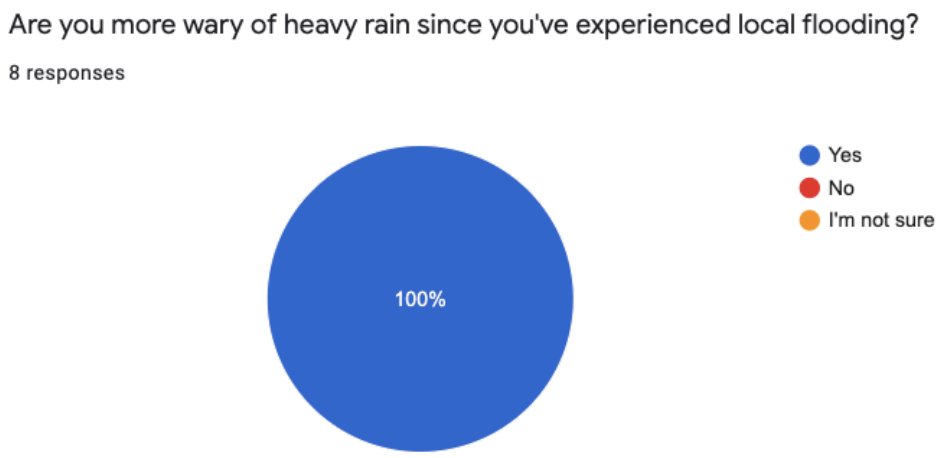
Environmental:

- Heritage conservation areas and heritage items
- Recreation and flora/fauna impacts including street trees
- Acid sulfate soils and contaminated land
- Visual impact

This clearly outlines the impacts flood risk has on each factor.

The residential survey concluded that all respondents are now warier of rain since experiencing local flooding. This shows a social and psychological aspect to flood

risk that is often overlooked. This wariness can cause high levels of stress and anxiety to an individual.



Flooding can cause loss of life and possible water-borne diseases. Although these impacts are not present in the Marrickville region, they are values that can degrade social value in other flood zones.

The activism to push for flood risk prevention can often bring the community together and create a closer relationship with the local council – whether this be positive or negative.

Floods can also cause social disturbances in commute and electricity as shown in Article 1 and Article 3. In article 3, intense rain and flooding in February of 2020 caused over 100,000 homes to endure loss of power as well as numerous public transport modes were forced to be shut down for safety reasons.

Flooding can cause financial loss for a community through the damage or complete loss of cars or property. The residential survey determined that 50% of residents claim they have lost property to local flooding, with the highest financial loss summating at $100,000. Residents in a flood zone have insurance to cover the cost of lost cars or property, but this is still a massive amount of money being lost. Floods leave mud and dirt where they travel which needs to be cleaned. Cleaning the

carpark or road in front of the 39-43 Riverside Crescent property becomes expensive as floods are frequent.

MVFRMS2017 included an evaluation of economic damages from flooding, stating:

"The average annual damages for the Marrickville Valley floodplain under existing conditions is $21,264,981".

This is an enormous amount of money to be lost on a preventable cause.

2Year ARI					
Residential	4384	119	0.12	0.46	$18,750,270.81
Commercial	279	13	0.14	0.99	$546,749.48
Industrial	986	61	0.13	0.8	$1,927,913.03
Public	121	5	0.08	0.09	$242,854.73
Total	**5770**	**198**			**$21,467,788.05**

This table locates the sum of economic loss for residential, commercial, industrial and public areas during a 2year ARI[1]. The largest financial loss is endured in the residential category, followed by industrial areas. It is arguable that if proper drainage systems and catchments were implemented, this great amount of loss could be avoided.

A number of survey respondents believe the floods bring contaminated water into the environment making it unsafe for local flora and fauna, claiming the effects of flooding can cause soil erosion and trees to become uprooted. Floods can also cause short-term loss of habits for local animals and disrupt the equilibrium of the surrounding environment.

Article 2 addresses flood risks through the solution of Green Grid. This involves creating spaces that link hydrologic and ecological systems together to boost the

[1] The Average Reoccurrence Interval (ARI) is "the likelihood of occurrence, expressed in terms of the long-term average number of years, between flood events as large as or larger than the design flood event". – *Flood Victoria.* Floods with a discharge as large or larger than a two-year ARI flood will occur on average once every 2 years.

capacity to deal with severe impacts. This would create a positive impact on the environment while simultaneously aiding in flood risk prevention.

Inquiry 3: Investigate what strategies have been used to minimise the risk

Case studies from step four highlight the strategies used by the local council to reduce flood risk and their respective effectiveness. These reports show that the Marrickville council has a thorough understanding of the nature of floods and the manmade issues increasing flood risk.

100% of survey responders claim they know of council strategies enforced to prevent flood risks. This shows that communities impacted by floods can often be highly involved with their local council, providing observations on their own experiences with flooding and perhaps pushing the council to be more active in reducing flood risks.

It was unanimous that better drainage was the main strategy implemented to reduce flood risks by the Marrickville Council, as the drains would be able to keep up with the excessive flow of water. 50% of residents said they were satisfied with the council's approach to flood issues, while 25% were much less content.

It is clear from the RCCS2000 report that the drainage systems on Riverside Crescent were inadequate.

> *"Riverside Crescent is inundated two or three times a year, partially due to inadequate local drainage"*

This report also detailed using the Dibble Pond to model as a detention basin[2]. It found that 'ponding[3] occurs at Riverside Crescent in all storms, although this is caused by the tailwater level of 0.1m as well as local catchment flows'.

[2] An excavated area installed on or adjacent to a body of water that temporarily stores stormwater runoff. It reduces 'the peak rate of runoff to a stream or storm sewer' and helps minimise local flood risks.

[3] Ponding is a type of flooding that occurs on relatively flat areas from rain downfall alone.

The council uses hydraulic and hydrologic modelling to access the effectiveness of local drainage against a variation of flood intensities.

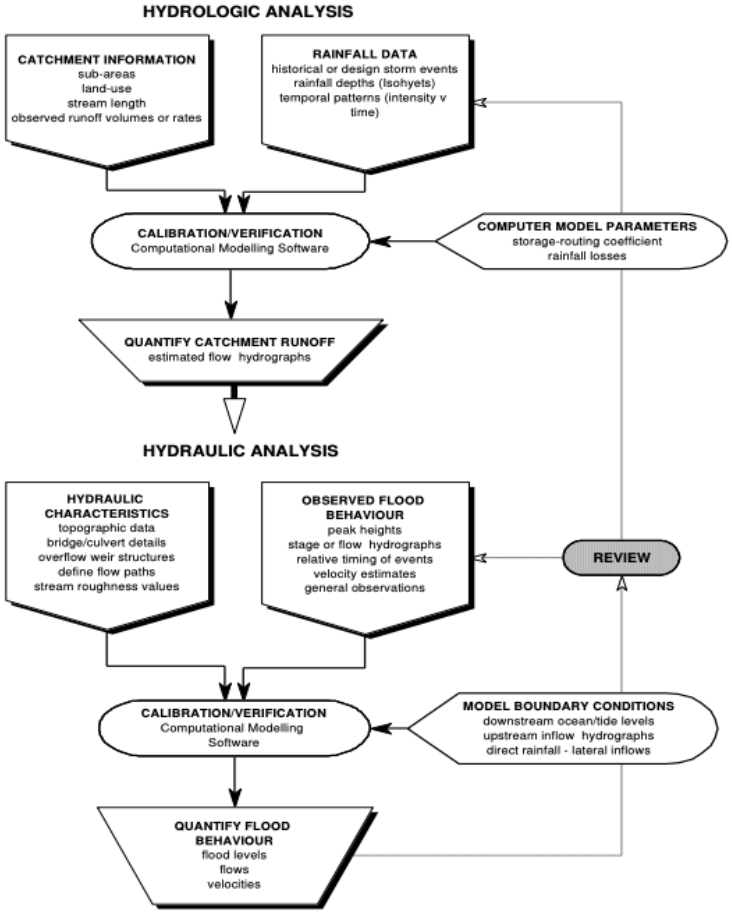


Diagram of the flood study process from the CCFS2010 report

The hydrologic model, DRAINS, can ‘simulate the full storm hydrograph’ and ‘the flow behaviour of a catchment and pipe system’. The following table comparing the peak flows with previous studies shows that the DRAINS model reduces the damaging flows of floods in the local region.

Table 9: Comparison of Peak Flows with Previous Studies

Location	ARI (y)	Source	Reference Flow (m^3/s)	DRAINS Flow (m^3/s)	Percentage Difference
11 Cameron Street (total)	20	Reference 11	1.8	1.8	0%
11 Cameron Street (total)	100	Reference 11	2.3	2.1	-9%
p10228 (overland)	100	Reference 4	15.9	13.1	-18%
p10228 (pipe)	100	Reference 4	3.4	2.8	-18%
p10520 (overland)	100	Reference 4	27.8	24.6	-12%
p10520 (pipe)	100	Reference 4	11.1	4.7	-58%
p9168 (overland)	20	Reference 3	8.8	12.0	36%
p9168 (overland)	100	Reference 3	11.3	15.7	39%
p9168 (pipe)	20	Reference 3	2.8	2.0	-29%
p9168 (pipe)	100	Reference 3	2.7	2.1	-22%
p9196 (overland)	20	Reference 3	8.5	12.8	51%
p9196 (overland)	100	Reference 3	10.8	17.2	59%
p9196 (pipe)	20	Reference 3	4.3	2.8	-35%
p9196 (pipe)	100	Reference 3	4.5	2.8	-38%
Central Drain (total)	20	Reference 7	18.0	13.5	-25%
Central Drain (total)	100	Reference 7	23.0	17.7	-23%
DELEC Drain (total)	20	Reference 7	14.0	13.5	-4%
DELEC Drain (total)	100	Reference 7	19.0	17.7	-7%

The email from Ryan Hawken showcased the Council's understanding of flood risks and their respective causes. It seems the two main issues are a) the carpark at the Riverside Crescent townhouse complex slops down, allowing water to flow easily into it, and b) the inadequate pipeline running beneath residency combined with the local catchment positioned on Riverside Crescent creating a water surcharge. The Council has proposed processes to reduce flood risk, but all require intense planning and a realistic wait-time.

There has been an initiative to fixing flood concerns for over ten years, with the first documented exchange between residents and council in 2013. At that time, the process to reduce overland flooding would involve duplicating the existing outlet pipeline to the Cooks River:

"The only feasible means to reduce overland flooding would be to duplicate the existing outlet pipeline to the Cooks River. This would cost in the order of $400,000 and may provide protection for between a 2 year and a 5 year storm depending on

the water level in the Cooks River. The magnitude of these works is beyond Councils annual maintenance budget."

- *Ryan Hawken Email*

The realistic time for these procedures to progress would be 5+ years, as these are slow processes that require long term planning.

The campaign for more effective drainage at Riverside Crescent continued with no action until 2018. The change came as funds were made available to the cause. This was the year a recess drainage area was added to the bottom of Riverside Crescent, helping to combat flood water contaminated with diluted sewage and other pollutants. It is yet to be confirmed whether this strategy is effective as it only works with heavy rainfall and therefore cannot be assessed with floods caused by tides.

This accentuated process has shown that the Marrickville Council has been successful in implementing a possible solution to flood risks, but has taken an immense amount of time to do so.

CONCLUSION

Inquiry 1:

Hypothesis: *A flood is when water overflows land that is usually dry. The type of flooding in Marrickville region is flash flooding, which occurs when there is a very sudden and heavy rainfall. Marrickville is located the Inner West of Sydney. The 39-43 Riverside Crescent townhouse complex is right next to the Cooks River. The nature of the flood risks in the Marrickville region are caused by pour stormwater drainage and high tides due to climate change.*

The first inquiry of this report explores the nature of floods and which factors effect flood intensities. It was confirmed through secondary and primary research that the Marrickville region is subject to flash flooding and exposed to flood risks caused by inadequate drainage and climate change.

Research accumulated through case studies also showcased that if the footpath outside the 39-43 Riverside Crescent townhouse complex was raised, a large amount of flood risk could be prevented. It is stated in the RCCS2000 that:

'the main cause of flooding here is the low level relative to the river, with gutter level at the low point being only 1.04m'.

Climate change has also been proven to be a leading cause of flooding. Ocean levels have risen to 0.91m effectively creating higher and more damaging tides. As well as this, there has been a 30% increase in rainfall, leading to more frequent and destructive storm events (as seen in Article 1 and Article 3).

The inquiry 1 hypothesis has been proven true due to primary and secondary research in Step 4.

Inquiry 2:

Hypothesis: *The floods cause a loss of cars and a higher insurance premium (economic), they disturb the equilibrium of the habitat of the Dibble Avenue waterhole (environmental), allows the community to get involved with the council (social).*

The hypothesis for inquiry two was quite vague and excluded many other economic, social and environmental impacts revealed through research conducted in Step 4. Flooding can cause a massive loss of cars, amounting to a significant final loss as well. Another aspect discovered through research was the amount of money need to clean roads and carparks after floods have left a contaminated mud trail. This costs on average $900 to clean every time - $700 covered by insurance.

The equilibrium of the Dibble Avenue waterhole and surrounding greenspaces are subject to the degrading values that come with floods such as sewage contamination, uprooted trees and unsanitary water. This aspect also links back to economic impact by the recreation of flora and fauna including street trees. Although environmental impacts are not visually obvious, the long-term effects of flooding on the environment are substantial.

Socially, it has been proven that public concerns over flood risks have led to the community getting further involved with their local council. Ultimately, it was this continual involvement that initiated change. The flooding has also caused local flood zone residents to become more wary of the rain, as evaluated through the residential survey.

Inquiry 3:

Hypothesis: *The Inner West Council has implemented better stormwater drainage to combat the storms and high tides that cause intense floods.*

An array of primary and secondary research gathered in Step 4 validates this hypothesis. In 2018, a drainage area was added to combat the intensities of storms and high tides, but it had its limitations. This strategy is only effective in a 2 – 5 year ARI, meaning it is not beneficial to any flood intensity higher than a 5year flood. This is still a council initiative that causes less frequent flood risk and aids in flood risk prevention.

The case studies in Step 4 also show a council understanding of flood natures and flood risks. The MVFRMS2017 report showcased floodplain management options categorised by existing flood risk, future flood risk and residual flood risk. This allows the council to detail the evolution of local risks and how to best prevent them. Hydraulic and hydrologic modelling highlights an initiative taken by the Council to further model flood movement, and thus create an effective solution.

EVAULATION

This Senior Geography Project's goal was to explore the natures of floods, their impacts on economic, social and environmental values, and to investigate local council strategies to combat flood risk. The collection of data through the methodology of surveys, interviews, photographs, case studies and articles has provided evidence to support the inquiries.

To improve this study, further primary research in accordance with surveys and interviews would help to provide additional data. A larger sample space would have given more substantial results for the residential survey and a wider range of long-answer responses. Interviews with more residents involved with the council could contribute to a greater social understanding of community initiative. Limitations on these fronts were a minor obstacle in the process of this report, but possibly with more exposure to information, the inquiries could have had more in-depths responses.

Flood studies prove to be the most beneficial point of research as they presented detailed data that was reflective to all inquiries. Perhaps one or two more case studies could have been evaluated to better the understanding of flood risk and provide a wider timeline for results, but the three case studies from 2000, 2010 and 2017 create a coherent enough outline to satisfy the needs of this report.

During all processes of this report, ethical considerations were taken into account and practiced. The residential survey was made voluntary and the option to stay anonymous was given to provide an option of privacy. While conducting the interview with Ken Haywood, consultation protocols were practiced by showing respect and acknowledging Ken's opinions. A disclaimer was made apparent to everyone

involved in primary research that their responses would not go beyond International Grammar School Staff.

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Appendix

Appendix A:

Residential Survey:

Flooding in the Marrickville region

Hi everyone, it's Anya here from Unit 10.
If you could please take the time to complete this 10-15 minute questionnaire that would be much appreciated. The data collected from this survey will be used in my Year 11 Senior Geography Project regarding flood risks in our area. These results will not go beyond relevant International Grammar School staff. You may choose to remain anonymous. Long answers are appreciated.
If more than one person in your house wants to complete this (which would be helpful) please submit the first form, then press "submit another response".
As residents of a flood zone, your responses will be very useful!

* Required

First name

Your answer

Surname

Your answer

What is your gender? *

- Female
- Male
- Other
- Prefer not to say

What is your age? *

- 0-15
- 15-25
- 25-35
- 35-55
- 55-65
- 65-75
- 75+

How long have you lived here? *

- 1-5 years
- 5-10 years
- 10+ years

How many floods have you experienced during this time? *

- 1
- 2
- 3
- 4
- 5
- 5+

What factors do you think contribute to the causes of flooding? *

Your answer

Do you believe in climate change? *

- ◯ Yes
- ◯ No
- ◯ I'm not sure
- ◯ Other: _____

If you answered yes to the above question, do you think climate change increases flood risks? Why or why not?

Your answer

Have you ever lost property to local flooding? *

- ◯ Yes
- ◯ No

If you answered yes to the question above, approximately how much financial loss have you endured?

Your answer

How much do you think the community is affected by the floods *

	1	2	3	4	5	
Not at all	◯	◯	◯	◯	◯	A lot

Are you more wary of heavy rain since you've experienced local flooding? *

- ◯ Yes
- ◯ No
- ◯ I'm not sure
- ◯ Other: _____

What kind of affect do you think the floods have on the environment? *

Your answer

Are you aware of any actions or strategies that have been proposed by the local council to lower flood risks? *

- Yes
- No

If you answered yes to the above question, what are they?

Your answer

How satisfied are you with the council's approach to the flooding problem? *

	1	2	3	4	5	
Not satisfied at all, they haven't done anything	○	○	○	○	○	Very satisfied, they have done a lot

Any other comments?

Your answer

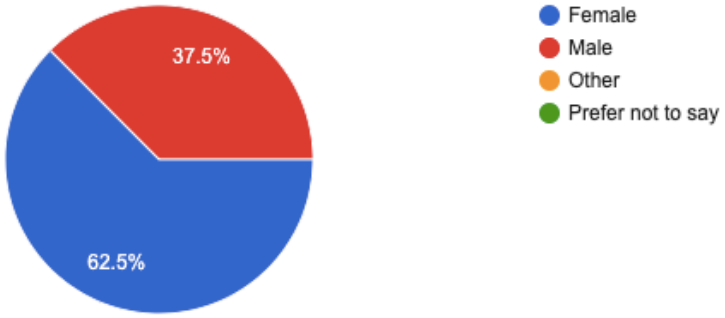
Submit

Page 1 of 1

Survey Results:

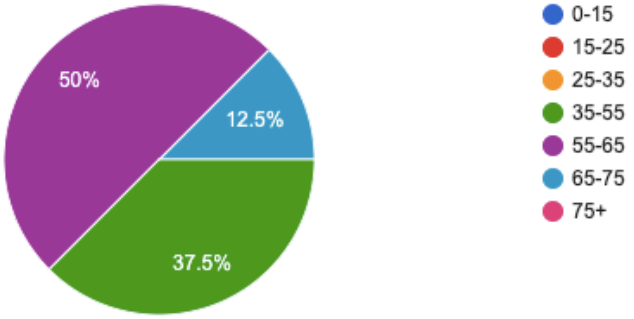
What is your gender?

8 responses



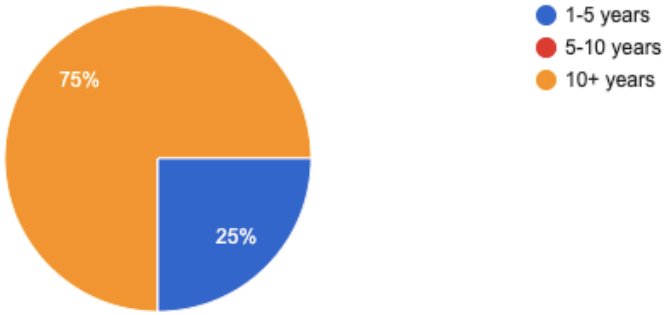
What is your age?

8 responses



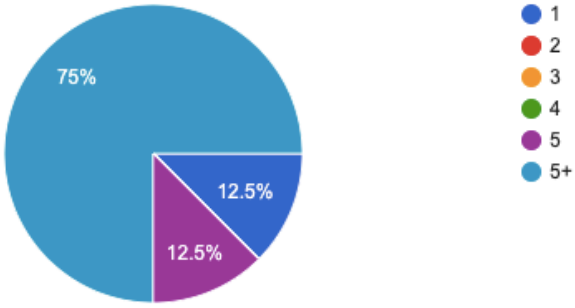
How long have you lived here?

8 responses



How many floods have you experienced during this time?

8 responses



What factors do you think contribute to the causes of flooding?

8 responses

Drainage, high tides, increased extreme weather

Storm intensity, tidal levels, topographic location (low points)

Sudden rain, high tide on Cooks River, increased hard surfaces in our valley, more severe weather events.

Inadequate storm water system uphill from Riverside Crescent. Poor design of road level in relation to tide heights and lack of flood mitigation channels to handle flood waters when river breaks it banks.

Poor street drainage of rain water, overdevelopment which reduced the are of land which would absorb rain water, and heavy rains combined with high tides causing the river to burst its banks.

Inadequate drainage

Poor placement of housing with In sufficient drainage infrastructure to handle the low lying water collection from other catchments.

Storm run off, tidal river in lowest point in the valley

Do you believe in climate change?

8 responses

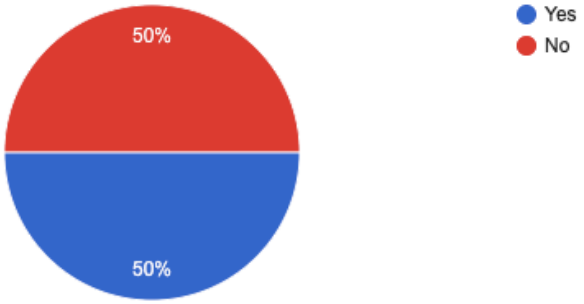
If you answered yes to the above question, do you think climate change increases flood risks? Why or why not?

8 responses

- Yes due to sea levels rising and increased extreme weather
- Increases storm intensity and frequency
- Yes. More extreme weather events.
- Yes. Increased high tides, and increased storm activity.
- Yes, as lately we have been experiencing much stronger storms and heavy downpours which I believe area result of climate imbalance.
- More disruptic weather patterns
- Yes - Climate change effects are wide reaching and would effect areas all the way up the water way
- Yes. More extreme weather events plus sea level rise

Have you ever lost property to local flooding?

8 responses



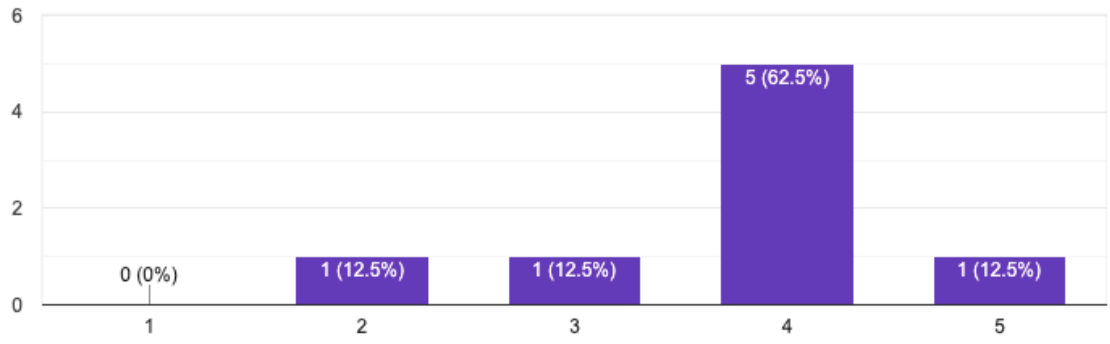
If you answered yes to the question above, approximately how much financial loss have you endured?

4 responses

- About 10,000
- 6,000
- 100k
- $17,000, covered by insurance

How much do you think the community is affected by the floods

8 responses



Are you more wary of heavy rain since you've experienced local flooding?

8 responses

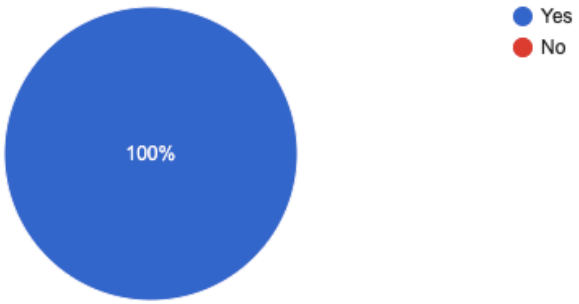
What kind of affect do you think the floods have on the environment?

8 responses

- Flora and forna drowned so trees are uprooted
- Soil erosion, damage or displacement of habitat
- Floods can damage parts of the built environment, including roads, building, as well as objects. Floods would've been a natural part of the environment before white settlement.
- Erosion.
- Not sure
- Little on the natural environment
- Negligible in our little area. In the wider community there would be loss of trees and infrastructure etc
- Local flooding brings contaminated run off water and litter into local waterways

Are you aware of any actions or strategies that have been proposed by the local council to lower flood risks?

8 responses



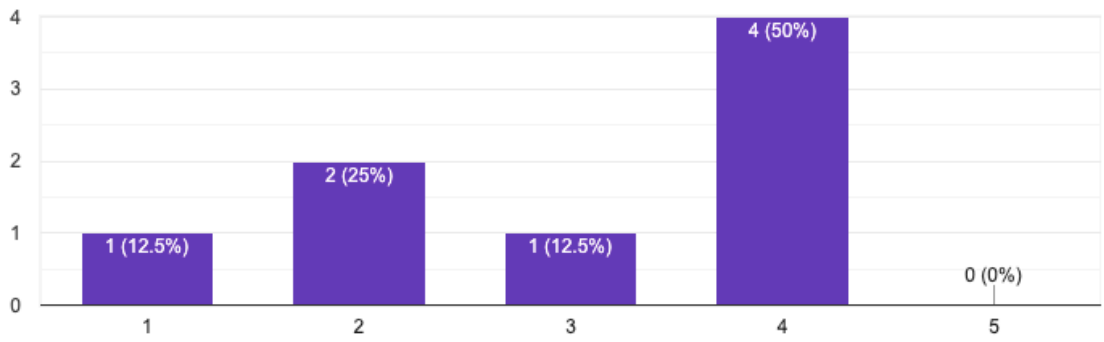
If you answered yes to the above question, what are they?

8 responses

- Drainage pipes by the golf course
- Stormwater drainage upgrades
- Construction of a swale drain at the bottom of Riverside Crescent.
- Increased capacity of drainage from road to river.
- Improved drainage for rain water and a valve system preventing street overflow form the river. However, heavy downpour combined with high tide will still result in heavy flooding.
- Better drainage
- New drains put in place - that didn't work
- Improved storm water management, including re engineered drains

How satisfied are you with the council's approach to the flooding problem?

8 responses



Interview: Ken Haywood

How long have you lived in this townhouse complex and how long have been involved with the council over flooding concerns?

Ken has lived here for approximately 20 years and has been involved with the council over flood concerns for 10 years. The first recorded contact he had with the local council over this topic was in November 2013. Ken expressed concerns from local residents regarding the frequency and the intensity of local floods. Ryan Hawken, an urban water engineer from Marrickville Council, wrote back explaining flood patterns, council flood studies, cost of fixing flood problems and more. This response was sent in February 2014, 4 months after the initial email was sent addressing concerns. This email showcased the Council's understanding of the flood risks and the causes of such. It seems the main two issues are a) the carpark at the Riverside Crescent townhouse complex slops down, allowing water to flow easily into it, b) the inadequate pipeline running beneath residency combined with the local catchment positioned on Riverside Crescent creating a water surcharge. The Council has processes and solutions to reduce flood risks, but all require intense planning and a realistic wait-time.

When did Council implement these strategies?

According to Ken, the Council only implemented strategies to reduce flood risks in 2018, five years after the initial request, as funds were finally made available to improve the drainage systems to reduce flood risks.

In 2018, a recess drainage area with a wet area in front filled with reeds was implemented. The reeds were meant to combat flood water contaminated with diluted sewage and other pollutants.

Did these strategies work?

Ken said that, “we are currently waiting for a big enough flood to test the new drainage.” At the beginning of this year, Marrickville dealt with intense floods caused by king tides. The new drainage system only works with heavy rainfall and therefore cannot be assessed with floods caused by tides.

Are you satisfied overall with the Council’s approach?

Ken says he is glad the Marrickville Council have finally applied something to combat the intensity of floods, although it has taken a considerable amount of time. He says he’s not sure yet if the drainage is an effective solution, but that time will tell.

Ryan Hawken Email:

From: Ryan Hawken <ryan.hawken@marrickville.nsw.gov.au>
Date: Wed, 12 Feb 2014 01:39:50 +0000
To: Ken Haywood <ken@clikcreative.com.au>
Subject: RE: Flooding at Riverside Crescent (MERIT 986368)

Hi Ken

Thanks for the call earlier this week regarding flooding near the intersection of Riverside Crescent and Dibble Avenue and particularly the impact of this flooding on the carpark at 39-43 Riverside Crescent. As mentioned on the phone I have been on holidays and have only now received your letter from November last year. I apologise for not getting back to you sooner.

As a bit of background to the current situation, at the time of approval of the development, a decision was made by Council’s Development & Environmental Services Committee to protect habitable floors consistent with the NSW Flood Plain Development Manual and to allow parking at existing ground levels only slightly above the road surface. I believe this was intended to reduce the bulk of the building.

A floodstudy of the Riverside Crescent subcatchment was subsequently completed in 2000. This floodstudy found that overland flooding (i.e. flooding caused by local runoff from the Riverside and Dibble Ave catchment) reached approximately 0.6m above the road level for a 2 year storm (i.e. a storm event that happens on average every two years). The maximum flood depth is limited to around 0.8m above road level, as additional overland flows escape across the golfcourse to the Cooks River. For your reference, the recent events of 8 March 2012 and 15 November 2013 were approximately 2 year overland flow storm events.

I have undertaken preliminary hydraulic analysis of the local catchment to better understand the nature of the problem. Essentially water flows to this trapped low point both overland and through the piped system running under 39-43 Riverside Crescent. At this point the ground flattens out and the existing pipe system does not have capacity to convey the flows to the River. This results in surcharges from the pipe system and overland flows being trapped behind the higher ground of the golfcourse. In a 1 year storm (i.e. a storm event that happens on average once per year) around 300L/s surcharges from the piped system and combines with around 400L/s flows from along Riverside Crescent, mainly from towards Wardell Road. Based on this preliminary hydraulic analysis, it's possible the low point near the intersection of Dibble Ave and Riverside Crescent would flood a few times a year from overland flows. This confirms what you had mentioned regarding being flooded numerous times in recent times.

Unfortunately there is no easy solution which would ameliorate flooding at this location. As mentioned above, in overland flow events the outlet from this location is constrained by the outlet pipe size, and is exacerbated by the water level in the

River. The only feasible means to reduce overland flooding at this location would be to duplicate the existing outlet pipeline to the Cooks River. This would cost in the order of $400,000 and may provide protection for between a 2 year and 5 year storm depending on the water level in the Cooks River.

The magnitude of these works is beyond Councils annual maintenance budget. The proposed works will therefore be listed on Council's Future Drainage Capital Works Program with other priority drainage projects. Works from this list are undertaken on a priority basis and subject to funding allocations. As this location is currently not on the future capital works program I am unable to commit to a date as to when these works will be completed. Based on this, realistically I cannot foresee construction of these major works being undertaken within the next 5 years.

I should note that the other aspect to consider, which I haven't discussed above, is Cooks River flood events (i.e. when the cooks River breaks its banks and flows over the golf course into Riverside Crescent). In the worst case 100 year storm, flood depths could reach up to 2.3m above the road level. The Cooks River Floodplain Risk Management Study and Plan considers this and provides recommendations that Council will be looking into such as the construction of a levee and rezoning, however these are slow processes and will require long term planning.

Unfortunately there are no immediate solutions and we appreciate the information you have provided. If you would like to raise this issue with your local Councillor to request additional funding allocations for stormwater infrastructure the contact details are available on Council's website.

To provide flood protection in the medium term, I would suggest that the executive committee consider a passive flood protection system at the driveway entrance. These systems can provide flood protection for flood depths up to 3m. In your case a 1m high passive flood barrier tied into the existing retaining wall at the carpark entrance could provide protection against all overland flood events and most Cooks River flood events. One distributor of this type of system in Australia is Ausfloodbarriers who I believe have done a few installations in the Sydney area. There are other companies who could provide similar products. Consideration of such a system is of course a matter for the executive committee.

If you would like to discuss the above, or have any further queries, please don't hesitate to contact me directly.

Regards

Ryan Hawken
Urban Water Engineer, Design & Investigation | Marrickville Council
Phone 02 9335 2222 Direct 02 9335 2246 Fax 02 9335 2029
PO Box 14, Petersham, NSW 2049

Photographs:

Photograph 1:

Photograph 2:

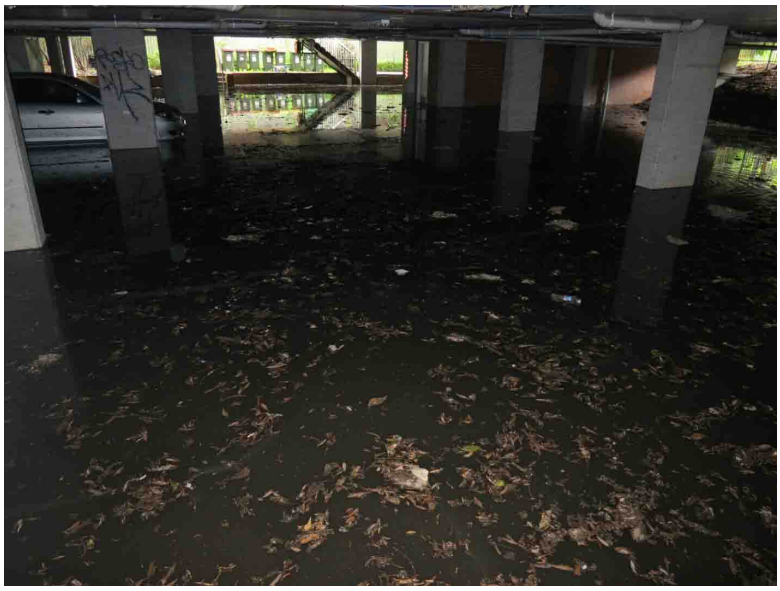
Photograph 3:

Photograph 4:

Photograph 5:

Photograph 6:

Photograph 7:



Photograph 8:

Photograph 9:

Photograph 10:

Photograph 11:

Photograph 12:

Appendix B:

2000 case study:

CRCCFS010 Case Study:

Strathfield Council. (2010, October). Cooks River & Coxs Creek Flood Study. Retrieved on 4th May, from: https://www.strathfield.nsw.gov.au/assets/Development/CooksRiverCoxsCreek-FloodStudyOct.2010.pdf

MVFRMS2017 Case Study:

Inner West Council. (2017, September). Final Floodplain Risk Management Plan. Retrieved on the on 5th of May from: file:///Users/anyahaywood/Downloads/Marrickville%20Valley%20Floodplain%20Risk%20Management%20Plan%20(2).pdf

Article 1:

Tolj, B. (2017, February). Marrickville building with 100 people inside on the brink of collapse. Retrieved on 30th April from: https://www.dailymail.co.uk/news/article-4198368/Building-100-people-brink-collapse-Marrickville.html

Article 2:

Roggema, R. (2017, November). Higher density in a flood zone? Here's a way to do it and reduce the risks. Retrieved 20th May, from: https://theconversation.com/higher-density-in-a-flood-zone-heres-a-way-to-do-it-and-reduce-the-risks-86608

Article 3:

Zhou, N (2020). Thousands of Sydney home still without power after heavy rain – as it happened. Retrieved from: https://www.theguardian.com/australia-news/live/2020/feb/10/nsw-queensland-floods-weather-rain-sydney-traffic-commuters

WRITTEN BY ANYA HAYWOOD