

Flooding Investigations and Options for Sarah Avenue, Whitianga

TO	Thames-Coromandel District Council
FROM	Bruce Hinson - Infrastructure Group Manager
DATE	8 October 2014
SUBJECT	Flooding Investigations and Options for Sarah Avenue, Whitianga

1 Purpose of Report

The purpose of this report is to seek Council approval to resolve ongoing flooding matters relating to Sarah Avenue, Whitianga.

2 Background

Since January 2011, the Cyclone Wilma event, Council staff have been investigating the flooding issues in and around Sarah Ave, Whitianga. These investigations have involved land surveys, public consultation, hydrological modelling and much deliberation over various designs and solutions. The results of which have been presented to the, then Service Delivery Committee and now, the Infrastructure Committee a number of times as various requests and queries have presented themselves.

Initially staff had proposed a solution to either restore the Level of Service or construct a structure in the berm to ensure a level of protection between 5%-2% Annual Exceedance Probability (AEP) storm events. The Committee also requested that staff investigate a similar solution running down the road centre, hence the three options proposed.

These proposals were presented to the Infrastructure Committee, who then requested staff to investigate whether other stormwater problems of a similar magnitude exist in Whitianga. This was assessed and presented to the Infrastructure Committee who then requested the report be presented to the Mercury Bay Community Board for feedback. A further paper back to the Infrastructure Committee, presented their comments.

To recap; in moderate rain Sarah Ave experiences frequent ponding across the road which can be a nuisance. However, during severe storm events, some dwellings are at risk of inundation. This is due to the fact that the current stormwater infrastructure, which is the original infrastructure, was designed to cater mainly for the road network. Currently, most of the roof run-off and hardstand areas in the vicinity are directed to the road. This overloads the system and flooding occurs.

Since January 2011 until July 2014, some 3½ years now, TCDC has investigated various options to provide the area with a cost effective solution, however, the solutions vary in cost from \$450,000 to \$750,000.

The Infrastructure Committee on 29 July 2014 considered this report and recommended:

Resolved

That the Infrastructure Committee:

- 1. Receives the report.*
- 2. Approves the option of a boarded open trench in the berm to be publically*

consulted as part of the 2015-2025 Long Term Plan with provisional construction identified for the 2015/2016 financial year.

Moved/Seconded By: Wells /Fox

3 Issue

The stormwater infrastructure within Sarah Avenue is the original that was installed with the subdivision some 30-35 years ago. As it stands today it is undersized and inadequate.

Due to the dense housing, many of whom dispose their roof water directly to the curb, and the amount of hardstand area in the Laura Place catchment, stormwater run-off is high and has an immediate effect on the road and catch-pits, which were originally only designed to take the run-off generated by the road, hence the seemingly inadequate infrastructure.

On-site soakage is relatively poor due to the clay/swampy content of the underlying soils, compounded by the fact that the groundwater table is close to the surface; Sarah Avenue is only about 2m above sea-level. However, during large intense storms soakage becomes irrelevant, the water tops gutters at a far greater rate than can soak away and becomes surface flow contributing to flooding.

4 Discussion

From the last presentation to the Infrastructure Committee, a new resolution was issued to "ask staff to revisit the options and solutions for this project".

Due to the low lying nature of this area, a simple and cheap stormwater solution is difficult to design. When the high tide is in there is only about 0.5m between it and the lowest point in Sarah Avenue, which is some 240m away from the edge of the estuary. This creates a very shallow gradient to work with.

Over the course of investigating the problem, Council has engaged Chartered Professional Engineers, specialising in hydrological modelling and the design of stormwater systems, to assist in analysing the situation and proposing solutions. The investigations include hydrological modelling, land surveying, public consultation, various designs and their associated costs.

Staff have visited and re-visited the options and solutions. There is no low cost or simple solution to remedy the Sarah Avenue flooding problem. Remedial works do need to be done to prevent further flooding of existing finished floor levels. The following is a list of potential options with comments upon their suitability:

Stormwater system options	Appropriate	Notes
In-ground soakage	No	<ul style="list-style-type: none"> This area of Whitianga will have high groundwater tables, is low lying, and will have low permeability subsoils.
Individual house systems	No	<ul style="list-style-type: none"> Ineffective unless designed for large events. Controversial with rate payers.
In the public reticulation	No	<ul style="list-style-type: none"> Insufficient area for the volumes required. Expensive.
Whitianga Area School	Yes	<ul style="list-style-type: none"> Detention of the Area School sub-catchment stormwater could reduce the contributing catchment for Sarah Ave. Relatively low cost. No houses affected.
Through Properties	No	<ul style="list-style-type: none"> Controversial with complications over easements and compensation.
Down the road corridor by lowering the road, or by using a boarded open trench in the berm	Maybe	<ul style="list-style-type: none"> An initial long section based upon the Lidar survey data suggests that the Council road would need to be dropped at least 400mm assuming an appropriate level of acceptable ponding level could be agreed, or by at least 700mm with no ponding along Sarah Avenue. A boarded open drain (as seen in other areas of Whitianga) flowing to a box culvert, would depend upon a feasibility study of available room and existing services.
Property acquisition	No	<ul style="list-style-type: none"> Cost prohibitive - Council would need to buy at least 8-10 properties.
Raising house Finished Floor Levels	No	<ul style="list-style-type: none"> Cost prohibitive - most of the existing dwellings affected by flooding have concrete floors.
Protecting individual houses by bunding and / or pumps	No	<ul style="list-style-type: none"> Individual bunds/pumps for houses would be an ineffective solution given the extent of the ponding. Also this solution is reliant on numerous pumps which could fail, and/or the use of bunds which could be altered.
Minor upgrade works to the existing stormwater system: including improving the inlets and repairing defects	No	<ul style="list-style-type: none"> These works should be done but will not resolve the Sarah Avenue flooding problems.
Upgrade the primary system capacity to a 5 year standard and allow some temporary ponding of secondary (10-50 year events) below the existing FFLs	Yes	<ul style="list-style-type: none"> If the primary system had capacity for a 5 year event and had higher capacity (secondary) inlets then any temporarily ponded water would leave the ponding area faster. Careful consideration would be required for a) the maximum allowable ponding level, and b) the efficiency of the whole system to maintain flow (i.e. free from blockage) during secondary level events.
Pumping	Maybe	<ul style="list-style-type: none"> Stormwater pumping to cater for the full secondary flow would be cost prohibitive. Pumping excess flows to maintain a maximum acceptable ponding level could work provided an approved outlet location such as the Area School grounds or the estuary is found.

There is an acknowledgement that the stormwater infrastructure in the area of Sarah Ave needs upgrading. The works require considerable expenditure and the correct processes must be followed.

After assessing all the data and options, staff recommends the option of using a boarded open trench in the berm, as in Mercury Street. This and other options have been presented to the Infrastructure Committee previously.

The table below summarises the options, their costs and expected protection (as at January 2013):

Option	Cost	Protection
Engineering design and admin*	\$75,000	
Restore the Level of Service	\$450,000 - \$500,000	20% AEP
Open timber drain system Road centre	\$650,000 - \$750,000	> 2% AEP
Open timber drain system Berm	\$550,000 - \$650,000	> 2% AEP

* Engineering design (approx. \$75,000) is required for each option.

While some value engineering works can be considered and cost estimates refined further, the magnitude of the expenditure required will be similar to that shown above.

A further resolution was to "ask staff to revisit the interim measures for residents and inform them of these."

There is a standing strategy that the Water Services Field Representative - Mercury Bay has in place for this particular property (25 Sarah Ave) and local area - this is well communicated with Mr Rodd Ganley, the owner. Previously efforts were made using sandbags. While Veolia have a supply of these for 25 Sarah Avenue, they are likely to be fairly ineffective in a large weather event.

The strategy is:

- For each and every storm event the Water Services Field Representative - Mercury Bay calls Mr Ganley.
- Mr Ganley knows well the situations which will cause local flooding and the Field Representative relies to some degree on his feedback of concern.
- Mr Ganley has direct contact with the Field Representative if there is potential for surface flooding
- Sandbags are available to assist with avoidance of flooding
- If need be, the Field Representative will instruct Veolia to organise overland pumping from the last manhole in Sarah Avenue to the estuary some 45m. There would need to be some level of traffic control.

5 Suggested Resolution(s)

That the Thames-Coromandel District Council:

1. Receives the report.
2. Approves the option of a boarded open trench in the berm to be publically consulted as part of the 2015-2025 Long Term Plan with provisional construction identified for the 2015/2016 financial year.