

## **NACCAI Stormwater Management Action Report to Mid Coast Council. Review 3. 8 Nov. 2022.**

A report by the Residents Association's Roads, Drainage and Signage Sub Committee on the status of progress in completing works identified in the BMT North Arm Cove Stormwater Management Strategy Report to Council (2017), following inspections by Seamus Devlin and Gary Sylvaney during October/November 2020. For a description of priority and work level required classifications, see table on last page. It is not intended to include works requests in this report that would be considered normal periodic maintenance by the local Council Depot, for example Table Drain clearing. This Report seeks to identify for Council works planning/budgeting Stormwater/Drainage issues in North Arm Cove that create damage to residential properties, council assets, topography and/or safety hazards.

### **Reference Numbers.**


Requested\_Works identified by a unique Reference Number in this report are deleted when completed at each 6 monthly review. Reviews are conducted for the following period in the last month of the current period. Their associated Reference Numbers are not reallocated to assist continuity of Site/Works identification, so if any new stormwater issues are identified in a period, they will be given a new sequential Reference Number.


### **Priority Allocation.**

Priorities for each period are allocated by NACCAI based on assessed Resident impact and Safety Risk factors. At each 6 monthly review, when works and priority allocation are agreed with MCC, these are planned for completion within the next period. For major works, these may be planned for a 12 month period and identified as such. Most of this report's issues have been active since at least 2014, therefore initially many will have an "A" priority.



<b>Ref. Number.</b>	<b>Requested Drainage Works for Current Period. (Dec. 2022 to May 2023)</b>	<b>Priority.</b>	<b>MCC Status.</b>
48 to 50.	91 Promontory Way and adjacent properties experience heavy Cross Road flooding	A+	Works Order issued by Council to have corrective work completed. It is anticipated with Christmas near, work will commence in the new year.
3, 4 & 89.	North end Eastslope Way Inadequate Pit and Culvert flow capacity for volumes delivered from surrounding catchment. Hazardous open drain on opposite corner footpath is a safety risk to pedestrians. Provide solution to temporary sandbags blocking pit opening.	A+	Council to investigate additional under road pipe to carry some flow south and enlarged pit and for Ref.89, enclose open drain to eliminate dangerous situation.
29 to 38 & 90.	104 and 106 Cove Blvd. Heavily affected by crossroad and upslope flooding.	A+	Council preparing plans for works to correct for property owners.
91a to 91g.	North end Merriwa Blvd. heavy cross road flooding occurs from the west side of the Blvd. due to absent Driveway Culvert Drains and inadequate Table Drains both sides.	A+	Council to correct, with consideration for effectiveness of recent Council rebuilding of Gloucester St. Table Drain on volume of stormwater flowing into Merriwa Blvd.


Ref. No.	BMT Map Site	Description.	Report from Observations.	Priority.	MCC Work	MCC Capital Funding & Period
3.	S1	<p>Reconstruct existing drainage pit corner Merriwa Blvd / Eastslope Way.</p> 	<p>Pit has not been upgraded to mesh type and fails child safety requirements.</p> <p>Higher volumes of water being directed to it than its design can cope with and sandbags further reducing volumes.</p> <p>Pit discharges to opposite corner via under road culvert. Hazardous situation with open drain. Refer Ref. No.</p>	A	2	

3 cont.			<p>South side Table Drain in Merriwa Blvd. west remains shallow. North side drain is now a good size.</p> <p>West side Table Drain Eastslope Way from this corner north is too shallow or absent.</p>	A		
4	S1	Construct new Debris Barriers for North side Table Drain Merriwa Blvd. to Eastslope Way.	<p>Temporary sandbags to reduce flow rate washed down drains to pit where they further reduce Pit flow.</p> <p>Permanent swales required.</p>	B	2	



5	S1	<p>Table Drain 51 to 57 Eastslope Way.</p> 	<p>Some driveway culvert improvements here. Problem is now related to table drain depth/size or absence. (Note No. 47 should read 45 in BMT Reports 2014/2017).</p> <p>If drains are rebuilt, Ref. 6 may not be required.</p> <p>Table Drains between No.51 and 57 are shallow and may not adequate for stormwater flow volumes. A Second enclosed drain however, runs below this Table Drain from property No. 51 to 61. Thence to Casuarina open outlet.</p> <p>Sustained high rainfall events have resulted in heavy cross road flooding in this area.</p>	A	1	
6	S1	<p>Construct kerb and gutter along eastern side of Eastslope Way.</p>	<p>NOT DONE. May not be required if the west side table drain is kept cleared/deepened from Merriwa Blvd. to Casuarina. Road side collection pits opposite Reserve would have sufficient capacity to handle more volume than is currently reaching them if improvements are made to these pits.</p>			
8	S1	<p>Construct level spreader at drainage outlet into Casuarina Park.</p>	<p>NOT DONE. If cross flows are corrected by deepening and maintenance of the west side table drains this should not be required.</p>			




<p>8 Cont.</p>	<p>S1</p>	<p>Construct pre-treatment swale/basin and biofiltration basin in Casuarina Park.</p>  	<p>NOT DONE. May not be required. North Arm Cove for historical reasons has precious little waterfront access land available for public recreation. We believe therefore any reduction in this small area is not a positive for residents. We would like to suggest an alternative.</p> <p>The drains feeding into the Casuarina Outlet (south perimeter) are more than adequate to pass any foreseeable volume of stormwater from the northern section of Eastslope Way with 2 x 760mm ID pipes as evidenced in the 2015 and 2020 storms. One west side drain centred on the park near 61 exits to the west top end of the park. It pours onto the park and Table Drain beside new sealed entry track.</p> <p>The second pit 35 metres south stays underground and empties on the east end of the park beside the Dinghy Ramp. If the first pit drain pipe was connected to the second under-ground within the park both could exit directly beside the Ramp.</p> <p>If similar swales were constructed here as were at the Water St outlet, current problems with stormwater impacting on the Ramp and therefore restrictions on its length could be resolved.</p>	<p>C</p>	<p>3</p>	
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<p>8 cont.</p>	<p>S1</p>		<p>Thus, two significant problems, uncontrolled erosion of the park and inability to lengthen the Ramp to a practical and useful length would be resolved. Most importantly, the current very unsafe construction of the Ramp end would be eliminated.</p> <p>All existing Concrete pits feeding to the two main pipes including adjacent to house Nos 57, 61 and 63 should be converted to mesh style to reduce the impact of debris build-up and subsequent flow restriction.</p> <p>Currently sandbagged which ultimately further reduces the pits effectiveness.</p> <p>Heavy cross road flow into Casuarina as a consequence.</p> <p>Sealing of the track to the Ramp recently by Council has reduced the erosion flow and provided safer access. It will be interesting to record flow when the next heavy sustained rain event occurs.</p>			
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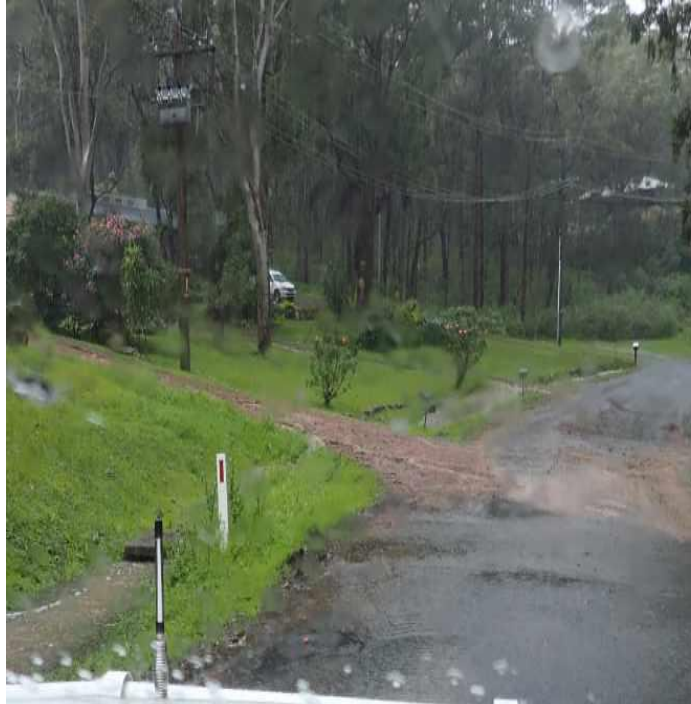
15	S2b	<p>Construct new debris barriers Water St.</p> 	<p>PARTLY COMPLETED north side only.</p> <p>South side of road inlet also requires debris barriers and child access protection.</p>	A		
19	S2b	<p>Revegetation of existing informal track between Eastslope Way and The Ridgeway.</p> 	<p>NOT DONE. This is the top end of Water St. If not closed off, suggest bitumen seal and construct drains on both sides with sediment and debris diversion / barriers.</p> <p>Currently Yallarwah Park and rear access tracks to Eastslope Way homes contribute to large catchment flowing to Eastslope Way and hence to Water St. and north end Cove Blvd.</p> <p>All sources of heavy sediment transfer so require a holistic review to determine an appropriate solution.</p>	B/C	2	

20	S2c	<p>Construct sub-soil drainage system. 43 - 49 Cove Blvd.</p> 	NOT DONE.	B/C	2	
21	S2c	<p>Construct concrete dish crossing. 43 - 49 Cove Blvd. Investigate use of Table Drain and Culvert crossings.</p>	NOT DONE.	B/C	2	



22	S2c	<p>Re-construct driveway crossings. 43 - 49 Cove Blvd.</p> 	<p>NOT DONE. Currently 49 has no culvert driveway pipe. Flows from driveway cross road.</p>	B/C	2	
23	S2c	<p>Construct new kerb and gutter between 36 - 54 Cove Blvd. (east side) and adjust driveway accesses.</p>	<p>NOT DONE. Cross flow due to west side drain maintenance and sediment /gravel wash from driveways. Water flow blocked at south end of 73 Driveway pipe. Drain should be deepened.</p> <p>Gravel from driveway 51 flowing to 64 - 68.</p> <p>Kerb and gutter could wait until effect of new drain is assessed.</p>			
24	S3a Fig.4-5	<p>79 Cove Blvd. – negotiate with owner on easement.</p>	<p>Partly completed. Child access protection required for new Pit.</p>	A		
29	S3c	<p>Formalise drainage easement through 104 Cove Blvd. (Empty block).</p>	<p>Floods heavily. Block recently sold.</p>	A		

30	S3c	Construct new drainage pit at natural low point opposite 104 Cove Blvd.	NOT DONE	A		
31	S3c	Construct new drainage line and culvert discharging into 104 Cove Blvd.	NOT DONE	A		
32	S3c	Construct level spreader at drainage outlet into 104 Cove Blvd.	NOT DONE	A		
33	S3c	Construct kerb and gutter in front of 104 Cove Blvd.	NOT DONE	A		
34	S3c	Construct new debris barriers.	NOT DONE	A		
38	S3c	Construct pre-treatment swale/basin and biofiltration basin in 104 Cove Blvd.	NOT DONE	A		
40	S4a	Construct new drainage line through 33 The Esplanade.	PARTLY COMPLETE. No protection against child access at either end of drain.	A		
42	S4A	Prepare flood management plan for 33 The Esplanade.	STATUS UNKNOWN.			
43	S4a	Formalise drainage easement through 33 The Esplanade and delineate the easement.	STATUS UNKNOWN.			
44	S4a	Register the flood prone nature of the site on the properties planning certificate.	STATUS UNKNOWN.			
45	S4a	Erect flood warning signs adjacent to the existing causeway.	NOT DONE. Due to new culvert and drain from 33 The Esplanade, Review Need			
47	S4b	Regrade the existing table drain on north side of The Esplanade.	COMPLETE to 41. No table drain between 41 to 35			

48	S5a Fig.4-8.	<p>Construct kerb and gutter in front of 91 Promontory Way and adjacent properties.</p> 	<p>NOT DONE. Resident and neighbours suffer heavy flooding both around and within their dwellings from properties up slope and north / south. Besides under sized Pits, a significant problem also comes from up slope properties with unsealed driveways. Sediment and top dressing erode and washes down, blocking Culvert pipes and Table Drains (a not uncommon problem) A permanent solution for high side of the road properties with unsealed driveways and their propensity to create costs for both Neighbours and Council, would be a Council requirement they be sealed in all locations for both new and existing developments. Two of four driveways remain unsealed in this location. Resident at 91 also needs Council assistance with utilisation of a pit.</p>	A+		
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48  
Cont.



Resident needs assistance re use of pit.





Result of flooding into garage.

49	S5a	Upgrade/modify drainage pits to increase capacity in line with receiving drainage line. No.34-38 Promontory Way.	NOT DONE. Existing pits are contributing to the severe cross road flooding down slope properties are suffering. They are inadequate in design and capacity.  Use of sandbags contributing to reduced flow volume to intended drains.	A		
50	S5a	Define overland flow path through 91 Promontory Way	NOT KNOWN if done but resident can show.	A		
51	S5b	Formalise drainage easement through 131 Promontory Way.	NOT KNOWN.			
52	S5b	Construct new pit and drainage line through 131 Promontory Way.	Open drain <b>COMPLETE</b> .  Pit NOT DONE and current is inadequate.  A dug drain is fed from a small pit opposite. The pit requires upgrading. 129 adjacent experiences flooding in sub floor area during heavy rain incidents requiring pumping out.  Table drains feeding existing pit too shallow.			
53	S5b	Construct kerb and gutter in front of 131 Promontory Way and adjacent properties.	NOT DONE.  Up graded pit and drains may negate need for this.			
54	V1	Community liaison and education.	NOT KNOWN			
55	V2	Reduce erosion of unsealed roads.	NOT KNOWN			
56	V3	Improved erosion and sediment control on construction sites.	NOT KNOWN			

57	V4	Drainage pipe inspections.	NOT KNOWN.			
58	V5	Drainage pit inlet inspections	Refer "Drainage Pit Survey North Arm Cove by NACCAI for MCC June/July 2021". Most pits require upgrading and some in urgent need of child protection guarding. Awaiting advice/response from MCC.			
59	V6	Improved maintenance of table drains.	VERY SIGNIFICANT IMPROVEMENT IN RECENT TIMES. Needs regular inspections. Also, resident education re impact of overgrown drains on across road neighbours is needed. Council can only perform scheduled maintenance.			
60	V7	Driveway crossing audit. (Culvert Pipe Diameters)	Refer "Culvert Pipe Size Survey for North Arm Cove" by NACCAI for MCC June 2021. Awaiting advice/response.			
61	V8	Update stormwater register.	NOT KNOWN			
62	LT1	Future Development Master Plan (Stormwater elements only).	NOT KNOWN			
63	LT2	Flood and Drainage Master Plan.	NOT KNOWN			
64	LT3	Stormwater Quality Master Plan.	NOT KNOWN			
65	LT4	Develop Water Management Guidelines.	NOT KNOWN			




67 New	Fig.4-4 Add	Two safety posts missing from south side table drain Water St.	<p>Replace white safety posts. Whilst essential for water flow in the absence of covered pipes, the depth of drains on both sides of road require clear warnings of the steep drop off from the road edge.</p> <p>Suggest a simple safety barrier of some description be erected between driveway crossings to reduce risk to pedestrians and vehicles.</p>			
68 New	Fig 4-5 Add	<p>Table Drain 99 - 107 Cove Blvd.</p> 	<p>Drain has eroded to edge of road bitumen.</p> <p>Requires realigning to the west to create a safe verge width.</p> <p>May require rock/boulder cutting.</p>			

69 News	Fig 4-4 Add	35 Cove Blvd. Undersize Driveway Pipe	Below ID of up slope pipes.			
70 New	Fig 4-5 Add	35 - 41 Cove Blvd. Inadequate Table Drains.	Deepening required.			
71 News	Fig 4-4 Add	41 - 51 Cove Blvd. No Table Drains	Evidence of heavy cross road flows to 52. Heavy erosion.			
72	Fig 4-4 Add	45 - 47 Cove Blvd. Table Drain too shallow.	Deepening required.	A/B	2	
73	Fig 4-5 Add	80 Cove Blvd. Severe cross road flooding into houses.  	Inadequate table drain and poorly constructed driveway opposite. 78 and 82 also affected. A causal driveway has been removed by unknow person. To be checked when heavy rain over a period occurs.			
74 New	Fig 4-6 Add	97 - 99 Cove Blvd. Pit 10 meters south has debris.	Cleaning required.	B	2	
75 New	Fig 4-6 Add	101 Cove Blvd. Driveway pipe south entry blocked.	May need drain realignment at entry.	B	2	
76 New	NA	103 Cove Blvd. Table Drain blocked.	Half filled with sediment.	A/B	2	



77 New	NA	107 - 111 Cove Blvd. Table Drains too shallow.	Rebuild.	A/B	2	
78 New	NA	121 - 135 Cove Blvd. Table Drains too shallow or absent.	Pit at 135 requires child protection guard and plants removed.	A	2	
79 New	NA	Point Circuit. (142 Cove Blvd. south side) No Table Drain.	House appears to be under construction.	B		
80 New	NA	49 - 53 Point Circuit. No Table Drain north side.	Erosion evident.	A	2	
81 New	NA	53 Point Circuit. Pit opposite needs upgrading to grated type.	To maximise stormwater collection to under road drain and easement.	A/B	2	
82 New	Fig 4-8 Add	20 - 26 Promontory Way. No table drain or driveway pipes.	Southern high end of large catchment area.	A	2	
83 New	Fig 4-8 Add	28 - 52 Promontory Way. Table Drains require deepening to varying amt.	Area generating heavy water volumes that flow both down road from north and south and cross road from 32 - 38 opposite.  Cross road flooding in this area is severe.	A/B	2	




84	Fig 4-8 Add	<p>32 - 34 Promontory Way.</p> 	<p>Pit at 34 requires upgrade to grate type to improve flow capacity and prevent child access.</p> <p>No 34. Driveway pipe totally blocked with driveway sediment.</p>	A/B	2	
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<p>85 New</p>	<p>Fig 4-8 Add</p>	<p>46 - 54 Promontory Way. No table drains or inadequate depth to handle flow volumes.</p> 	<p>Area of heavy cross road flooding. Construct table drains of consistent and adequate depth. Short drain between Nos.50 - 52 but pipe openings partly blocked. No.54 needs Council works to construct a deep drain to connect with the pit in No.52.</p> <p>Suggest problem in this area should be assessed by Engineer due to complex in flows including from Outlook Drive and flooding across road into Heros via access track and into No.101.</p>	<p>A/B</p>	<p>2</p>	
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86 New	Fig 4-8	Access track to Heros Bay badly eroded on south side.	PRIORITY. Could be hazardous to vehicles and pedestrians at lower end.			
87 News	Fig 4-8	58 - 68 Promontory Way. Table drains too shallow or non-existent.	Table drains require deepening and some driveway pipes are undersize.	A/B	3	
88 New	Fig 4-8	1 - block 29 The Esplanade. (Continuation from end of Promontory Way) No table drains.	Construct Table Drains.	A/B	2	
89	Fig 4-3	<p>38 Eastslope Way. Open drain too deep.</p> 	<p>Construct enclosed drain from under road outlet to driveway inlet. Currently hazardous.</p> 	A/B	2	

<p>90 New</p>	<p>Fig S3c</p>	<p>106 Cove Blvd. (Photo taken from 108).</p> 	<p>Result of Cross Road Flooding. from uphill/upslope into Nos.104 to 106.</p> <p>104 Cove Blvd. was identified for remedial works in the 2014 BMT Report. (Refer Ref. Nos. 29-38).</p> <p>Whilst some Pit and easement work was completed just south of this location, it did not improve the Cross Road Flooding for this property.</p> <p>As recommended an additional collection pit and easement should solve the problem. The upslope flooding into this area is too excessive for existing deep Table Drains and existing Pit to cope.</p>	<p>A</p>	<p>3</p>	
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<p>91a. New</p>	<p>No BMT Report for this North end of NAC.</p>	<p>5 Merriwa Blvd. View south.</p> 	<p>This area in the northern end of North Arm Cove was not reported as having flooding/drainage problems in the 2014 BMT Report.</p> <p>The NACCAI Stormwater and Drainage Sub Committee became aware when contacted by a resident after the draft report was placed on our web site for resident information and comment.</p> <p>Cross road flooding occurs mostly from Gloucester St. down and impacts as far as No.12.</p>			
<p>91b. Cont.</p>		<p>7 Merriwa Blvd. View north uphill.</p> 	<p>A Table Drain and Driveway pipe pass some stormwater effectively downhill from this point.</p> <p>The lack of drains and under driveway pipes uphill however also sends a parallel water flow down the road and then hence to downslope properties.</p>			

<p>91c. Cont.</p>		<p>5 Merriwa Blvd. View south downhill.</p> 	<p>Road surface repaired previously showing subsequent and continuing damage in two places from heavy Cross Road Flooding from two Dish Driveways.</p>			
<p>91d. Cont.</p>		<p>A). 4 Merriwa Blvd. View north</p> 	<p>A). East side of road showing edge erosion and shallow depth of drain These, with slope and lack of vegetation, creates increased flow velocity to properties adjacent and further downhill. Taken 65 metres. from Gloucester St. intersection.</p>			

<p>91e. Cont.</p>		<p>B). 8 Merriwa Blvd. View south.</p> 	<p>B). Driveway pipe undersize at 300mm with shallow drains feeding into and from.</p>			
<p>91f. Cont.</p>		<p>C). 8 Merriwa Blvd. View north.</p> 	<p>C). Shallow and poorly defined drain inadequate to control water volumes flowing from upslope and down-hill from Gloucester St.</p>			



<p>91g. Cont.</p>		<p>D).8 Merriwa Blvd .View south.</p> 	<p>D). Edge erosion from Cross Road Flooding.</p>			
<p>91h. Cont.</p>		<p>Corner Gloucester St. andMerriwa Blvd.. View South.</p> 	<p><b>Completed.</b></p> <p>Advice from long term residents is that the Surface flooding into Merriwa Blvd. is primarily coming from this area along Gloucester St. and land north and west of this intersection.</p> <p>Someone has recently driven the tyres of a heavy vehicle along the verge where a good size Table Drain should be. This slight indentation would have little impact on the directional control of surface flooding during heavy rains.</p>	<p>A</p>		



## **Priority and Degree of Work Required Classification**

### **Priority**

A – needed to prevent building/driveway flooding caused by drain overflow, or needed for child and /or general safety.

B - needed to prevent drains overflowing onto roads

C – needed to enable drains to flow properly, reduce likelihood of blockages

### **Degree of Work Required**

1 – clear drains/pits, remove debris

2 – widen/deepen/rebuild table drains, upgrade pipes

3 - new/upgraded drainage pipes (not under driveways), negotiate drainage easements, property acquisitions, seal roads