

8 March 2016

PDR 15510

Chief Executive Officer
Douglas Shire Council
PO Box 723
Mossman Qld 4873

Attention: Neil Beck

Dear Neil,

RE: Stages 4B and 4C of Ocean Breeze Estate adjacent to Cooya Beach Road Cooya Beach – Information request – OP 3546/2009

We acknowledge receipt of Council's information request, dated 22nd February 2016, relating to the operational works application for the above project. Following receipt of the RFI we had discussions with Council's reviewing consultants to clarify a number of the issues raised and determine exact requirements.

As a result of our review and the discussions with Council's consultants we respond to the RFI (using the same notation) as follows:

Roads:

Item 1: The condition relating to this work only required construction of the widening and made no reference to an asphalt overlay for the whole of the pavement where the widening occurs. We have provided new pavement in the widening and reconstructed section of Cooya Beach Road. These will be sealed with asphalt. We consider that this is the extent of work required as the road is existing and, we assume, was built to approved standards for residential use.

We can, at construction stage, confirm the depth and condition of the existing pavement and advise Council accordingly. This would appear to be the extent of the applicant's reasonable responsibility.

Stormwater Drainage:

Item 2: The approved master drainage plan actually shows the intended path of the underground drainage from this stage on drawing 1187 – STM03. This involves future underground pipes along Barrabal Drive which will discharge to the open drain through stages 5D and E. Our system is based on this path and is subject to final design when that stage is developed. From this it would appear that the master plan does not require updating.

Stormwater will be catered for by a combination of the pipes with the road providing the secondary drainage path. Some of these pipes may be designed to cater for flows greater than the ARI 5 year event. However, this cannot be determined until the design is commenced. We have provided for an easement between lots 184 and 185 which will be continued through future lots 198 and 199 to provide a corridor to Barrabal Drive. We have

also provided an easement at the rear of lots 184 to 187 to cater for and collect stormwater flows from those lots.

Item 3: The original master plan showed this catchment always discharging in a southerly direction to the existing drains and culverts at the Melaleuca Drive intersection. We carried out our own investigation of the area to determine what happens to runoff in the area. It appears as though, during the upgrading of Bonnie Doon Road, that some flows may have been altered.

Our inspection revealed that there was a small low point where we have placed pit A1, however, the current drains and mounds past this point allow stormwater to continue flowing to the south. We also ground proofed catchment A1 to determine its extent. We are confident that we are correct in this regard.

Whilst we have allowed for the Q5 flow to be taken through the subdivision by underground pipes (to eliminate local flooding in the existing drain) we have determined that the balance of the Q100 flow will discharge to the south. Council have indicated that they will not accept this diversion. We consider the flow is following its current path and that it would not be acceptable, based on engineering principles, to divert this flow into the subdivision and cause issues within the new allotments.

We attach a plan that shows levels at pit A1 and downstream of the area. This plan is discussed later in this response and it may be necessary to obtain additional survey information to prove up our observations and solution.

Item 4: The matter of the grades in Julaji Close was raised in our letter submitted with the OWA application in which we requested Council to accept the design. The main reason for adopting these grades was to match the existing constructed grade and to ensure that the cul-de-sac bowl was not too low. As advised we have checked that overland flows are contained in the road reserve and this is demonstrated on the attached plan. We trust, given the conditions, that Council will approve accept these grades.

Item 5: We made the assumption that the flows in the existing section of Julaji Close had been checked and approved during the previous OWA approval. Following your request we checked this and determined that the flow from catchment A2 exceeded QUDM flow widths. To correct this situation we have extended the underground system from pit A2 up to the boundary with the previous stage and installed another kerb inlet. Details of this change are contained in the attached amended engineering drawingC05. The provision of this additional kerb inlet will reduce the flow width to acceptable standards.

Item 6: Pipe gradients of 0.3% are not necessarily a factor of pipe velocity in a system that works under hydraulic grade. The pipe velocities in the three pipes at this grade for the design flow are in excess of scour velocity and we are satisfied in this regard. We checked flow velocities for the lower event as requested and prepared the following table to show the relative velocities for each event:

Event	Pipe	Flow l/s	Velocity m/s
Q1	A4 – A5	650	1.39
Q5	A4 – A5	1094	1.01
Q100	A4 – A5	1254	1.57
Q1	A5 – A6	840	1.45
Q5	A5 – A6	1313	1.20
Q100	A5 – A6	1488	1.58

Q1	A7 – A8	950	1.35
Q5	A7 – A8	1582	1.05
Q100	A7 – A8	1762	1.76

Item 7: The attached drawing indicates the proposed bund level of 6.635, the top of the pit at A1 is 6.65 and the overflow point downstream of the inlet to be 6.59. From these levels the bund will not be overtopped and the lots in question will not be flooded. This is on the basis of the details given in the response to item 3. Should Council not accept our calculations or indication of the flows then we will have to gather additional survey of the area to demonstrate this to Council.

Item 8: We point out that there are existing bunds and mounds at the rear of existing lots 86-92 and our observations are that overtopping will not occur. If structure A1 is completely blocked it is our contention that all stormwater will flow south in the manner we consider that it already does. If Council requires further evidence then additional survey may have to be gathered.

Item 9: The required long sections and table calculations for line A7-A11 showing the hydraulic grade levels for the ARI 100 year event are attached. The grade lines indicate that there are no issues.

Items 10 and 11: We considered that the best way to respond to the information required was to produce a plan from the hydraulic model showing the location and level of the flow path for the 100 year event with 100% blockage of pit A7. The attached plan demonstrates this result and shows (in Blue) the extent of the stormwater flow in Julaji Close and across Cooya Beach Road. As can be seen the water levels on Cooya Beach Road are well within the requirements of QUDM. It can also be noted that there is no intrusion into allotments in Julaji Close or Road 1. These results show that there is no risk to property or infrastructure under these conditions which is the purpose of the severe impact statement.

Item 12: The response to item 2 advises that there will be a drainage easement provided between lots 184/185 which will be extended in the future through lots 198/199. The future layout plan shown on the locality sketch is indicative of the proposed layout and is subject to change during the ongoing design process. This is why drainage easements have not been shown on future areas but will be provided as and where required. We again refer to the overall master drainage plans where drainage paths are shown.

Item 13: Details of proposed drainage paths are shown on the overall master drainage plan. At this stage it is not our intent to deviate significantly from the proposed route. Therefore when the area including lots 198/199 is designed an appropriate easement will be provided. The intent of our design is that underground stormwater capable of carrying the Q100 flow will be continued through to Barrabal Drive. The underground system will continue as previously described with the Barrabal Drive road reserve taking part of the overland flow in the Q100 event.

Item 14: This appears to be an additional requirement and not included in the DA conditions. We understand why Council has requested the conduits and we have shown a detail on the amended engineering plan C05 to overcome this potential problem. Council have suggested that they be placed either side of the affected allotments, however, you will note that on the plan we have a notation that they be placed as directed by the engineer. The reason for this is that if they are placed a set distance from the boundary they may clash with future infrastructure such as Ergon power plinths, Telstra pits or future driveways. Can we suggest

that these be included as a condition in the OWA and that they be located when the other infrastructure items are determined?

We trust that the provision of these responses, drawings and attachments answer your request for information to your satisfaction and enable you to finalise the assessment of the OWA.

Should Council wish to discuss any of the issues and responses please do not hesitate to contact the writer. We would also be pleased to attend any meetings if that will assist in finalising the OWA.

Yours faithfully
PDR Engineers

A handwritten signature in black ink, appearing to read 'Alan McPherson', with a long horizontal flourish extending to the right.

Alan McPherson
Senior Civil Engineer