

Technical Memo

WALLACEVILLE



Peer Review Report

Response to Council Peer Review of Stormwater Soakage System for Wallaceville Residential Development, by PDP

TO: Plan Change 40 Hearing Committee
FROM: Alan Blyde, Technical Director

HG PROJECT NO : 1850-135652-01
DATE: 1 July 2015

This technical memo has been prepared to provide the Hearing Committee with background information of ongoing discussions held with council in order to reach agreement on any points of concern raised either by submitters; or from the findings of a Peer Review report prepared by PDP for council; or through correspondence from Mr Steve Taylor on behalf of council's Development Engineers.

This response is only related to **Stormwater Management** for the Wallaceville Plan Change Area. A meeting was held with Mr Lachlan Wallach and Mr Jeff Haste on 24th June 2015 to discuss the findings of the PDP peer review report and to reach agreement on the areas of concern raised.

MATTER RAISED FROM PDP PEER REVIEW REPORT

The PDP review concludes that the use of infiltration and soakage systems at Wallaceville **is feasible**. Mr Lachlan Wallach and Mr Jeff Haste were in agreement with this conclusion.

Section 4.2 of the PDP report discusses suitability of the information provided. In short, PDP recommend further soakage testing be undertaken and this be carried out in a more consistent approach across the site and for longer testing periods. They also recommend soakage testing on Area B and in the existing soakage basins on site.

RESPONSE

We confirm – this testing will be undertaken, at Detailed Design phase in conjunction with actual design of the soakage systems. Lachlan/ Jeff are in agreement with this approach. My evidence will confirm our intentions to undertake the testing at detailed design stage.

MATTER RAISED FROM PDP PEER REVIEW REPORT

Section 4.2 also recommended further commentary on the range of groundwater levels likely to occur and further assessment of groundwater mounding likely to occur.

RESPONSE

We confirm these further analysis will be undertaken at detailed design phase. To date the assessments carried out by Engeo and the groundwater levels measured on site within the groundwater monitoring wells do confirm that disposal to soakage is viable and will not be adversely affected by rising groundwater levels, nor will groundwater levels be compromised or unduly affected by the sites discharge to soakage.

MATTER RAISED FROM PDP PEER REVIEW REPORT

Section 4.2.2 queries how the soakage pits on each individual site will be sized.

RESPONSE

We believe our SMP report may have been misread and therefore confirm the following. All soakage pits on individual sites will be sized to cater for discharge from that entire site (i.e. roofed area, paved area and grassed/ landscaped area) at the appropriate runoff coefficients. They will be sized for the 4% AEP storm event (1 in 25yr) as per council's standards for Primary stormwater flows. After discussion with Lachlan/ Jeff, we understand council do not want discharge from individual driveways connected to the soakage system within the public roadway, as recommended by PDP.

MATTER RAISED FROM PDP PEER REVIEW REPORT

Section 4.2.2 also calls for a revised C value for longer duration storms and also for revised soakage rates with further soakage testing.

RESPONSE

We confirm, this will be undertaken at detailed design phase. The changes to calculations, soakage rates and runoff coefficients will have minor effect on the soakage basin sizing to date, and we are certain that the calculations provided to date are suitable to confirm the feasibility of the concept to discharge to ground soakage and the appropriateness of the initial basin sizing.

MATTER RAISED FROM PDP PEER REVIEW REPORT

Section 4.3.1 disputes EnGeo's view that 5% of recharge to the unconfined aquifer will be from rainfall and the remainder from the Hutt River. The PDP report states "it is feasible that during a particularly wet period, groundwater levels could rise significantly." They recommend hydraulic testing and analytical mounding calculations be undertaken to verify that mounding will not impact the operation of the proposed soakage basin(s).

RESPONSE

We confirm this work will be undertaken at detailed design phase. Furthermore, at that point, a greater level of groundwater monitoring results will be available which will better confirm the influence of the Hutt River and site rainfall on groundwater levels and recharge at the site. At present we are confident that the soakage system proposed for the site is feasible.

MATTER RAISED FROM PDP PEER REVIEW REPORT

Section 4.3.1 suggests that concentrating flows to a few large basins could create greater risk of groundwater mounding. PDP recommend that discharge could be split to a larger number of basins.

RESPONSE

Firstly we confirm that if required, a larger number of basins can be used, and this detail would be decided upon once final development layouts are confirmed and more detailed soakage testing and groundwater analysis has occurred, at Detailed Design Phase. We also point out that it is important to note that the storage basins are for attenuating only the Secondary overland flowpaths. So all primary flows (for up to the 1 in 25yr storm event) are dispersed at source and over the entire site. For that reason we are satisfied that having only the 2 or 3 soakage basins currently discussed within our SMP is suitable at this point.

MATTER RAISED FROM PDP PEER REVIEW REPORT

Section 4.3.2 continues to call for testing to confirm the effects of groundwater mounding.

RESPONSE

We confirm this will occur at Detailed Design phase. The section also suggests that discharge from grassed swales into soakage pits will not fully remove bacterial contamination from dog wastes. Council's own soakage pit details within the Code of Practice do not call for anything different to what is proposed. On the Wallaceville site, the grassed swales as proposed provide additional treatment above council's current standards. Our response is that we do not believe bacterial waste from dog faeces is of significant concern to compromise groundwater quality, after passing through grassed swales, however, the recommended contaminant transport modelling will be undertaken at Detailed Design stage. If this identifies that bacterial contaminants from the site have the potential to discharge to groundwater and affect groundwater quality at neighbouring bores at an unsuitable level, then we are confident we can re-design the soakage pit configuration to provide additional suitable treatment for bacteria removal. This could be raingardens; or a greater level of planting within the swales; or reconfigured infiltration trenches; or sand filters; etc. There are numerous options, however we are confident that the current configuration is suitable.

MATTER RAISED FROM PDP PEER REVIEW REPORT

Section 4.4 notes that PDP have 3 points of concern towards the proposed Stormwater Management System. These being:

1. It is not clear whether the on-site systems are for roofwater or roofwater plus hardstand.
2. The design for the roadside swale and soakage system shows water discharging through a catchpit to a soakhole followed by discharge to an infiltration trench. It is unclear why this level of complexity is required.
3. The soakage basins appear to be open to underlying gravels.

RESPONSE

1. *We confirm that they are for the entire site at the appropriate runoff coefficient. I.e. they are for roofwater, hardstand and landscape areas on each site.*
2. *Having been involved with a number of these systems being implemented on other sites, I can confirm that the reason for the discharge from the soakage pit to the infiltration trench is to ensure that water actually gets to the infiltration trench, therefore discharging to ground over a much wider area, then just at the point of the soakpit. The infiltration trenches do not collect stormwater well enough, if just dependent on vertical seepage down through the swale drain as the grassed swale will have less permeable topsoil and grass. This is just not free draining enough to feed the infiltration trench.*
As to why there is a catchpit at the end of the swale, prior to discharge to the soakpit, this is council's standard, and provides final silt capture prior to discharge to ground. While we feel the current design is not overly complicated, and from our own experience having implemented these on other sites, is the best design, we confirm that these can be simplified to a design that is acceptable with council and PDP if required at detailed design stage.
3. *Correct – this is how soakage basins work, in order to achieve the best soakage capacity. Having discussed this with Lachlan/ Jeff, they are in agreement that achieving good soakage is of main concern. Council have set a requirement that ponding will not occur on the site for more than 48hrs after a storm event.*

PDP have a concern that contaminants from the basin will be more readily able to enter the groundwater system if the basin is open to underlying gravels. They refer to contaminants from birds/ ducks. We comment that we are not convinced that this contaminant source is significant. The soakage basins will be free draining and will generally sit dry thereby not being attractive to waterfowl. Also the soakage basins only cater for secondary flowpaths. They will not cater for the primary flows for up to the 1 in 25 yr storm event. Therefore the "first flush" carrying the most heavily laden contaminant load, will not discharge to these basins.

MATTER RAISED FROM PDP PEER REVIEW REPORT

Section 4.4.1 discusses that sizing on-site soakage areas for the 10% AEP event does not comply with council's requirements.

RESPONSE

We confirm that our SMP report has been mis-read and the intention is that these on-site soakage disposal areas will be sized for the 4%AEP event (1 in 25yr storm) as per council's standards.

MATTER RAISED FROM PDP PEER REVIEW REPORT

Section 4.4.2 discusses overland flowpaths and states that there is no discussion about overland flow from the site in the event of the failure of the soakage systems.

RESPONSE

We will add greater detail to the final SMP document at detailed design stage, and this issue is covered within my evidence. To summarise, our plans show where existing overland flowpaths travel (pre-development) and where the future overland flowpaths will travel (post development). It is clear that we do not propose to change the direction of the overland flowpaths as they leave the site. They will continue to go where they currently go. Our SMP confirms that we will attenuate all flows on-site for up to the 1% AEP event (1 in 100yr) so that overland flow discharging in a 1% AEP event is the same as currently occurs predevelopment. Following discussion with Lachlan/ Jeff we agreed to two matters. We will upsize the storage basin sizing so that it is based on the assumption that all other soakage systems on-site have failed (i.e. we will not deduct the 4% AEP event flows from the 1% AEP event flows in determining secondary overland flows). Furthermore we will address in our evidence some discussion around what occurs further downstream of the site in a large event.

We see no issues with completing a design for the stormwater system proposed in Section 4.4.4, at Detailed Design stage. However we also confirm that we are confident in the engineering suitability of the current design and have implemented these at numerous subdivision previously.

MATTER RAISED FROM PDP PEER REVIEW REPORT

Section 6.0 – PDP state they are unfamiliar with the use of open soakage basins and propose an alternative design incorporating infiltration trenches

RESPONSE

We believe PDP have missed the point, that the soakage basins are intended for secondary overland flow control only. We are therefore not concerned about bird related contaminants reaching the basin. Furthermore the basins are intended to remain dry and not be standing waterbodies attracting birdlife. They are for flood flow control.

To summarise my comments above, we generally see no significant areas of concern raised within PDP's report and following our meeting with council, we believe that Lachlan and Jeff are of the same opinion. We accept that there is more testing, calculations and analysis required for soakage capability and the effects of groundwater level to the soakage system and the effects of the system on groundwater quality at the site and downstream, which is appropriate to be provided at detailed design stage. This will include slug testing, mounding assessments and contaminant transport assessments. This information will be provided at Detailed Design stage.

Finally PDP's report confirms our own view that disposal of stormwater to soakage is feasible for the Wallaceville Development.

We have received correspondence from Mr Steve Taylor on behalf of the Development Engineering team at council on 30 June 2015 and 1 July 2015. Below I summarise the additional requirements raised by council and confirm our acceptance to adhere with these.

MATTERS RAISED BY COUNCIL

In an email received from Steve Taylor on Tuesday 30th of May the following additions to the stormwater principles were suggested:

- All secondary overland flow paths and flood storage areas shall be designed to accommodate the 1% AEP storm event and the design shall show how overland flowpaths will dissipate flow downstream.
- that the system demonstrate that the proposed soakage disposal is suitable through permeability tests, that it is a viable long term solution, that silt entry will be minimised
- that the design of the system identify any assumptions regarding the maximum area of impermeable surfaces, and whether it is appropriate to restrict the maximum percentage of such impermeable areas in future land use.
- that the proposed stormwater system shall not result in ponding of stormwater on the ground for more than 48 hours following a 1% AEP storm event, unless part of the stormwater treatment systems,

- that the design identify whether the adoption of a minimum freeboard for habitable buildings is necessary, and if so, the amount of such freeboard
- that secondary overflow paths are identified and protected
- that primary drainage conveyance systems which do not have secondary overland flowpaths shall be designed to accommodate the 1% AEP event
- that primary and secondary drainage conveyance systems shall be designed and constructed to ensure ease of maintenance.
- that the design and construction of soakage systems give due allowance to long-term pore clogging of the receiving environment, including the adoption of mechanisms to require owners to maintain soakpits if they do become blocked.

RESPONSE

I confirm that all of the information requested by Council above is typical for a development of this type and will be allowed for within our designs. We will include the above in a Section entitled Minimum Design Information Requirements, within the Stormwater Management Principles and this information will be required to be provided with any application for subdivision or development proposal on the site.

Prepared By



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