
TO: Bede Morrissey, Policy Planner, City Development

FROM: Bruce Saunders, Strategic Planning Engineer, 3 Waters
Jared Oliver, Engineering Services Team Leader, 3 Waters

DATE: 6th September 2022

SUBJECT: **VARIATION 2: 3 WATERS RESPONSE TO SUBMITTER EVIDENCE
PRESENTED IN THE HEARING ON GREENFIELD REZONING SITES**

INTRODUCTION:

1. We have reviewed submissions made in the hearing in relation to 3 waters matters.
2. We have considered questions and comments made by submitters and the Hearings Panel.
3. Please find below our response to questions and comments made during the Hearing.
4. The information below is presented in addition to the written response we made on 26th August 2022 to further submitter evidence.

High-level overview of 3W constraints – Dunedin-wide

5. When assessing greenfield sites and their potential inclusion in Variation 2, we have had to consider not only the impacts of each site alone but the impact of the site as it relates to additions to the cumulative impact of potential / plan enabled development existing in the 2GP. Dunedin's 3 Water infrastructure has several existing constraints, many of which will take significant time to resolve. Due to Dunedin's need to provide additional development capacity, cumulative impacts have been carefully considered against existing constraints to provide additional capacity while mitigating the risk of exacerbating the existing infrastructure constraints.
6. The following tables provide a high-level overview of some of the key existing 3 Waters constraints that have been considered against the cumulative impacts of potential, and plan enabled, development. Please note that this is not a complete list and is intended only to highlight the most constrained areas.

3 Waters	Comments
Potable Water Supply	Dunedin is well-served from raw water sources during normal demand but during dry hot summer periods when water demand peaks there are issues around the resilience of the water supply systems to meet capacity in certain areas of the city. These constraints are most prevalent in the following areas: • Mosgiel (see further information below) • West Harbour

	• Peninsula • Northern areas (Waitati, Warrington, Seacliff) While water restrictions are currently rare these are a policy tool that 3 Waters has come close to using on several occasions in recent years. Growth will further constrain the resilience of the water supply systems during dry hot summer periods and will increase the likelihood that water restrictions will need to be enforced, at least until upgrades can be carried out to resolve the capacity constraints. Dunedin's raw water supplies also suffer somewhat from a limited ability to get source water to all areas of the network, should a raw water source become unusable for a period. Planning work is currently in progress to identify future projects to address this. Work is also being undertaken to understand how raw water yields will change in future as climate change impacts increase. Future water supply planning will need to respond to the increased risks of drought, catchment fires and intense rainfall.
Wastewater	In dry weather Dunedin's wastewater networks and treatment plants are adequate to cope with demands. In significant wet weather, inflow and infiltration of stormwater and groundwater into the piped wastewater network overloads the capacity. This can result in wastewater overflows to Otago Harbour, the Dunedin coastline, local watercourses including Lindsay Creek and Kaikorai Valley and areas of South Dunedin. The high flows also wash out the treatment plant biological material (which is responsible for treating the wastewater) and can result in an inability to meet discharge consent requirements for several days or weeks. These constraints are most prevalent in the following areas: • the entire Kaikorai Valley wastewater catchment (Wakari to Burnside, including Brockville, Glenross and Bradford) • North East Valley/Opoho • Parts of Mosgiel (see further information below) Problems are also experienced in the West Harbour and Peninsula areas although further work is required to better understand these.
Stormwater	Dunedin's stormwater systems are complex, as much of Dunedin's drainage is provided by private piped and open watercourses which are privately owned. The capacity of the private and DCC stormwater drainage network is generally below the target service levels of modern drainage systems. Climate change is increasing the intensity of rainfall which further exacerbates this limited stormwater capacity. Development, where it increases impervious surfaces, has the potential to further exacerbate the limited capacity issue, if run-off from development is not effectively managed. The capacity limitations of the existing stormwater systems are most obvious in the following areas: • Mosgiel (see further information below) • South Dunedin The capacity of some of the stormwater systems is currently not well understood and further work is being done on this. As a result, in areas outside of the above, where development is proposed, consideration is given to potential downstream impacts and known flooding issues in the local area when determining the degree of stormwater management required for new development.

High-level overview of 3W constraints – Mosgiel

7. Impacts of cumulative growth in the Taieri and adding the rejected sites, broadly speaking are:

3 Waters	Comments
Potable Water Supply	Mosgiel water supply is currently constrained during dry hot summer periods, and this would be exacerbated by further development. Adding further rejected sites increases the likelihood and frequency of having to apply water restrictions during high water demand periods. Significant upstream network upgrades are required to resolve the existing water supply constraint and will be medium term timeframe to resolve.
Wastewater	Significant downstream upgrades are required as the network and treatment plants have issues in wet weather events. Adding further rejected sites increases the likelihood and frequency of having to discharge diluted, but largely untreated, wastewater into the Silverstream during wet weather events. Although this would be considered an emergency discharge, allowing further development while knowing it would increase the likelihood and frequency of having to discharge wastewater to the Silverstream may be considered as grounds for abatement notices or prosecution by the Otago Regional Council. The high flows can also wash out the treatment plant biological material (which is responsible for treating the wastewater) and can result in an inability to meet discharge consent requirements for several days or weeks. Medium to long term to resolve.
Stormwater	While the policies and rules in Variation 2 will ensure that peak flows are kept at pre-development levels and water quality concerns are addressed, there will be more stormwater volumes produced by surface run-off. Adding further rejected sites increases stormwater volumes. All of DCC's stormwater network in Mosgiel drains to the Otago Regional Council's (ORC) Lower Taieri Flood Protection Scheme (the Scheme). Stormwater volumes remain a concern for the ORC due to the potential for higher use of available storage volumes in the Scheme. ORC are currently undertaking a review of the performance of the Scheme. Significant works to update the Scheme have been planned in ORC's Long Term Plan 2021-31, and its Infrastructure Strategy from 2021-51. The detail of these works will be based on the outcome of this scheme review.

Funding for 3 Waters growth-related infrastructure

8. The Council 10-year plan outlines the services and activities the DCC aims to provide, how much projects are expected to cost and how they will be paid for. Over \$77 million of capital funding has been approved through the 10-year plan for new capital and renewals that support growth. The growth projects included in the plan provide for some of the projects needed to support the 2GP and Variation 2. Funding was not approved for all growth projects identified.
9. Any new areas rezoned through Variation 2 that have not been anticipated and considered through the strategic planning process, such as the previously rejected sites which are now being considered, would have to go through the strategic planning process to determine what projects are required. The projects and projected costs could then be submitted for approval as part of the 10-year plan process. If approved by the Council, the projects are included in the 10-year plan and the work can be programmed into that period. Projects are then also included in the Development Contributions Policy, to allow project costs to be recovered from developers.

The timeframe from identifying projects and having them approved through the 10-year plan and included in the Development Contributions Policy, can take several years.

10. The combination of existing underfunding of growth projects, and additional demand for infrastructure that would be created by any new rezonings (currently not anticipated) would place pressure on the approved funding and the timeframes to service both the new rezoned areas but also the existing rezoned areas through the 2GP and Variation 2, resulting in delays in infrastructure provision and demands for infrastructure sooner than may be planned through the strategic planning process.

Site-specific further comments

11. The tables below detail our site-specific further comments in response to questions and comments made during the Hearing.

RS204: 21, 43, 55, 65, 75, 79, and 111 Chain Hills Road – Rezoning from Rural Residential 1 to a mix of zones (GR1, LLR1) as shown on submitters structure plan

RS153: 77 and 121 Chain Hills Road and 100 Irwin Logan Drive, Mosgiel – Rezoning from Rural to a range of Residential and Rural Residential zones. Note – requested additional sites are included: 2-20 Jocelyn Way, 38 and 40-43 Irwin Logan Drive, and 25-27 Pinfold Place.

3 Waters	Comments
Potable Water Supply	In their evidence presented at the hearing, the submitter, presented evidence suggesting that the additional water demand from the Chain Hills (RS153) area of the site wouldn't have an additional effect on the water supply because this demand can be slowly fed over 24 hours. We disagree with the the comment that additional water demand from the Chain Hills (RS153) area of the site wouldn't have an additional effect on the water supply. As indicated in our evidence, the Mosgiel water supply is constrained during dry hot summer periods. These peak water demand periods can last for several days. During these times the total daily water demand in Mosgiel exceed the daily supply capacity of the system. This has the effect of draining the buffer storage held within the treated water reservoirs supplying Mosgiel. Put simply, reservoir levels drop each day as buffer storage is consumed, until the point at which total demand is less than supply and the system can refill the reservoirs. Adding further rejected sites to the development capacity beyond that already allowed through current zoning increases the likelihood and frequency of having to apply water restrictions during high water demand periods. Significant upstream network upgrades are required to resolve the existing water supply constraint and will be medium term timeframe to resolve.
Wastewater	No further comments following our written response to submitters evidence (26 th August 2022).
Stormwater	The Panel asked for comments from 3 Waters on whether the proposed stormwater management for RS204 / RS153 could resolve potential issues if the site were rezoned as proposed.

	Our previous evidence prior to this hearing indicates that provided the new stormwater management rules in Variation 2 are applied to the whole proposed area the site may be considered developable, however we have concerns over the affordability of the stormwater infrastructure and the risks to downstream areas if stormwater management is not properly implemented. On reviewing the written evidence from the submitter we have stated (in our memo dated 26th August 2022) that it is unclear whether the stormwater management proposed would meet the stormwater management policies and rules that are now operative through Variation 2 of the 2GP. The submitter evidence is also silent on our concerns regarding affordability. In our opinion the Quarry Creek / Owhiro Stream drainage system is complex. The ORC's Owhiro Stream Flood Hazard Study (2019) indicates that "future development in the area should be undertaken with careful consideration of local impacts on peak flow and runoff volume, and loss of storage capacity due to filling in of floodplain areas." We agree with this statement. It is currently unclear as to whether the potential stormwater issues created by rezoning the site could be resolved. Further investigation would be required. If the land were rezoned, applying a New Development Mapped Area (NDMA) to the site would ensure that unless the new stormwater management rules in Variation 2 are met, development could not proceed.
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RS14: Freeman Cl and Lambert St, Abbotsford – Rezoning from Rural to General Residential 1

12. In evidence presented at the hearing, we noted that the submitter, Mr Bowen, had marked on the plans displayed in the hearing the 1m depth waterline associated with the Mt Grand Raw Water Reservoir flood area. We would like the Panel to note that flood hazard from a dam break is a combination of water depth and water velocity. When the area of high flood hazard is considered, this increases the proportion of the site that is categorised by high flood hazard for a dam break of the Mt Grand Raw Water Reservoir.
13. We also noted that Mr Bowen has reviewed evidence provided in the Section 42a report regarding water storage and indicated during the hearing that providing additional storage at the same location as the existing treated water reservoir would be adequate. We would like the Panel to note that this reservoir is at an elevation of approximately 104m. This is fed from Southern Water Treatment Plant and can provide adequate water supply pressure to elevations of up to approximately 84m. Some parts of RS14 are at elevations of up to 100m and so couldn't be supplied without booster pumping and reservoir storage at a higher location than the existing reservoir.
14. In evidence presented at the hearing, we noted that the submitter, Ms Peters, while speaking for the whole of RS14 indicated that 3 Waters issues could be dealt with at the time of subdivision. We do not agree with this statement as our written evidence indicates a number of upgrades that would be required should the site be rezoned. The timing for some of the upgrades is medium to long term and would be likely to be different to the developers, if the site were to be rezoned.

GF14: 336 and 336A Portobello Road, The Cove – Rezoning from RR2 to T&S

3 Waters	Comments
Potable Water	The Panel asked during the Hearing, for Officers to confirm the legal status of the existing connections of the proposed site and neighbouring properties. These are defined as ‘extraordinary’ supplies in the DCC Water Bylaw 2011. These ‘extraordinary’ supplies are defined as properties where a connection has been installed or located outside water service boundaries, prior to 1 April 2011 that have subsequently been Approved by the Council. If the connections, as they exist currently, were proposed as new connections, 3 Waters would not support allowing some of the connections, primarily because we do not support multiple properties being fed from one connection. As indicated in our written response to further submitter evidence, should the land be rezoned, DCC would take the opportunity and the site owners proposal to correct the existing ‘extraordinary’ supplies. This would also reduce the number of connections on the water supply trunk main to Portobello, which is favourable from a 3 Waters perspective. The submitters evidence discussed 9 existing properties whose water connections could be made complaint as part of rezoning GF14. It is unclear from the evidence provided exactly which properties are being referred to be we believe there are the following: • 335 Portobello Road • 338 Portobello Road • 339 Portobello Road • 340 Portobello Road • 341 Portobello Road • 342 Portobello Road • 343 Portobello Road (3 lots total) There are also a further 10 properties that do have or may have extraordinary water supply connections that could potentially also be supplied with a complaint water supply if 336 were rezoned although further investigation would be required. Making existing extraordinary water supply connections complaint in this area would also address the concerns raised by some of the submitters who spoke at the hearing regarding existing water supply connections passing through the proposed site but not having easements.
Wastewater	We noted that in the evidence presented at the hearing one submitter indicated recent problems with the Challis Point wastewater pump station. We can confirm that during the heavy rainfall event on 13th-14th July there was a wastewater overflow from the pump station into Otago Harbour due to a significant amount of stormwater infiltration into the wastewater network.
Stormwater	We noted that the Panel asked for a response on the need for an NDMA for this site. As indicated in our written response to further submitter evidence, because we believe that the proposal for stormwater servicing is inadequate, it is our view that the NDMA should remain on this site if it is rezoned.

	We also noted that one submitter expressed concerns about the effects that stormwater discharge could have on the Otago Harbour in terms of water quality and sediment. We share these concerns and this is one of the main reasons that we believe an NDMA should remain on this site if it is rezoned.
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RS206, RS206a, RS77: Part 35 and 43 Watts Road, Part 109 North Road – Rezoning from Rural/Rural Residential 2 to General Residential 2/General Residential 1

3 Waters	Comments
Potable Water Supply	The Panel and one of the submitters asked for any further detail on the nature of the upstream potable water upgrades that are required for this area. Our hydraulic modelling work indicates that the trunk water main between North Road (at Glendining Ave) and the Maori Hill Treated water Reservoir (at Drivers Road/Balmacewan Road/Highgate intersection) is likely to require upgrading. This is approximately 2km of pipe of diameter greater than 250mm with a significant length of this through moderate to heavy traffic roads. The upgrades are required not just for this site but as a result of cumulative growth in the areas fed by this infrastructure. There is some capacity in the near term to accommodate growth demands until the significant upstream upgrades are completed.
Wastewater	The Panel asked for comments on the communal wastewater detention tank proposed. From the submitter's evidence this would serve the southern area of the site. The 14 lot area to the north would either discharge directly to the DCC sewer or be pumped into the wastewater detention tank. We have provided comments in our response to submitters written evidence regarding the wastewater management approach for the 14 lot area to the north. A wastewater detention tank, for the scale of the development proposed for the southern area of the site is the only approach that we would see as addressing our concerns regarding the lack of wet weather capacity in the wastewater network in North East Valley. This approach is proposed as two other 2GP appeal sites and three Variation 2 greenfields sites. However, such systems are more expensive to build and operate than gravity sewer networks so we only consider this as a solution if there is a strong need for this development when housing capacity for the area and wider city are considered. If the land is to be rezoned then a communal wastewater detention tank for the southern area of the site is the only way that the wastewater constraints can be managed. We still do not support rezoning of the site. The Panel asked for 3 Waters comments on whether, if the land was rezoned would a wastewater constraint mapped area (WCMA) apply. Or, for the area with a communal wastewater tank, would this mean a WCMA is unnecessary. There is an existing WCMA on the GR2 zoned area of the site. If the site were rezoned, the WCMA could be lifted from the area served by the communal wastewater detention tank. The WCMA should remain in place for all other areas of the site.
Stormwater	The Panel asked for comments on whether the proposed stormwater management for Areas C and E is okay (consisting of ponds on the quarry floor).

	The proposal would need to be looked at in more detail to understand whether the stormwater management would be adequate. If the ponds are below the level of Lindsay Creek then we would have concerns about their ability to drain and to function as stormwater detention areas. Provided the new stormwater management rules in Variation 2 are applied to the whole proposed area the site may be considered developable, however we have concerns over the affordability of the stormwater infrastructure.
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RS200: 489 East Taieri-Allanton Road – Rezoning from Rural to Township and Settlement/Large Lot Residential 1

15. The Panel asked whether any planning for growth in this area has been done. We can confirm that 3 Waters has done no planning for growth in Allanton, beyond the development capacity enabled through current zoning.

RS212 – 170 Riccarton Road West

3 Waters	Comments
Potable Water Supply	The Panel asked for 3 Waters comments on the ability to service the site for water supply. Our written response to further submitter evidence responds to this question.
Wastewater	The Panel asked for 3 Waters comments on the ability to service the site for wastewater. Our written response to further submitter evidence responds to this question. A comment was made during the Hearing that “bush road has a decent sized pipe”. We would like to provide a response to this comment as follows: • The wastewater pipe in Bush Road is relatively large pipe (750mm diameter). This directs flows down Carlyle Road to the Mosgiel Wastewater Treatment Plant (MWWTP). In Carlyle Road there are two wastewater pipes (750mm and 300mm diameter). A large 450mm diameter trunk main joins the 750mm at Tyne Street to get to MWWTP. • In dry weather, although there are no issues, the pipe capacity doesn’t meet current design standards in the section where the pipes converge at Tyne Street /Carlyle Road to MWWTP. • In wet weather the pipe in Carlyle Rd becomes surcharged upstream of Mallard Place. The Tyne Street main is surcharged upstream as far as Murray St. • So while the pipe in Bush Road is “a decent sized pipe” there are downstream capacity constraints in the wastewater network. • Also, in wet weather, flows into MWWTP exceed the flows that can be pumped to the Green Island WWTP. There is some capacity at MWWTP to store excess flows, but once this is exhausted, partially treated or untreated flows are discharged to the Silverstream.
Stormwater	The Panel asked for comment from officers on overland flows and stormwater capacity in this area. The site is in rural zoned land beyond the eastern boundary of the DCC stormwater network. As indicated in our written response to further

	evidence from submitters the nearby drainage infrastructure is an ORC Schedule Drain, M2, that run to the south and west of the property. DCC holds no capacity information on the drainage or overland flowpaths in this area and the question regarding stormwater capacity in the area is best answered by the Otago Regional Council. It should be noted that further upstream a large part of Mosgiel drains into the M2 Schedule Drain. There are some issues with flooding in at the interface between the DCC stormwater network and the M2 Schedule Drain. Our written response to further submitter evidence responds provides some additional comment. The submitter suggested that a Structure Plan could include a performance standard for stormwater. If the site were to be rezoned we recommend that the New Development Mapped Area (NDMA) overlay is used for this purpose instead. There are already stormwater policies and rules associated with NDMA's which set performance requirements for stormwater management.
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RS161 210 Signal Hill Rd Opoho – Rezoning from Rural to Large Lot Residential or Rural Residential

16. In their evidence presented at the hearing, we noted that the submitters outlined a change to their earlier proposal and a desire for the site to be divided into 3 sites. The submitter indicated that on this basis the site would suit LLR2 zoning and that the sites would self-service for waste supply, wastewater and stormwater.
17. As this would result in the sites not connecting to DCC services, we have no comments from a 3 Waters perspective.

RS170: Part 103, 105, 107 Hall Road, Sawyers Bay – Rezoning from Rural Residential 1 to some form of Residential zoning

18. Our self-servicing assessment indicates that self-servicing for wastewater within Township and Settlement zoning is not possible. The soil properties are such that a significant area is required for wastewater disposal and Township and Settlement zoning does not provide sufficient site size.
19. Self-servicing would be possible for large lot residential zoning. This includes self-servicing for both water supply and wastewater, however our assessment indicates that self-servicing for water supply is constrained. This means that there may be insufficient water supply at certain times of year (though this may be able to be resolved with more water storage, roof collection area or tanker top up). We would not support self-serving for wastewater only. This is because typically water demand is higher for properties serviced for water from town supply and this tends to overload the on-site wastewater disposal system.
20. Regarding Stormwater, there would be a requirement to carry out an attenuation assessment for 100year storm flows. The Natural gully / channel capacity is unknown. A Mistake in original memo.
21. In summary:

- 3 Waters do not support self-servicing for Township & Settlement zoning
- 3 Waters are open to the possibility of self-servicing with large lot residential zoning

RS176: 234/290 Malvern Street, Leith Valley – Rezoning from Rural Residential 2 to either Large Lot Residential (LLR1 or LLR2) or Rural Residential 1

22. In their evidence presented at the hearing, the submitters outlined their desire for the site to be divided into 3 sites (including existing dwelling on 1 site) with a structure plan to ensure protection of existing regenerated bush and restrict any further development. The submitters preference is for RR1 zoning, but in response to the planners concerns that such a zoning would not meet the objectives of Variation 2 for residential development for higher density of development, the submitter suggests large LLR2 sites with the structure plan restricting sites to 3.
23. As both LLR2 or RR1 zoning would result in the sites being self-serviced and not connecting to DCC services, we have no comments from a 3 Waters perspective.

RS160: 155 and 252 Scroggs Hill Road (in part) – Rezoning from RR1 to LLR1, LLR2 & Township and Settlement Zone

24. In their evidence presented at the hearing, the submitter focussed on GF01 and our understanding is that the submitter seeks Township & Settlement zoning for GF01. The submitter did not present evidence on RS160 but proposed that RS160 may have a Residential Transition Zone (RTZ) placed over it until transportation issues are resolved.
25. We have provided previous written evidence on 3 Waters infrastructure in relation to GF01, RS160 and RS220. Our comments below are in response to the submitters evidence presented in the hearing and proposing Township & Settlement zoning for GF01. Under Township & Settlement zoning there would be an expectation of 3 Waters servicing.

3 Waters	Issue Grade (minor/moderate/significant)	Comments
Overall	Significant issues (manageable)	Poor site from a 3 Waters servicing perspective. Water supply would require significant infrastructure to support part of the site and requires further investigation. For wastewater there are concerns regarding how much of the site could be serviced without pumping. Stormwater could be managed adequately with an NDMA overlay for stormwater management, although this may be expensive on a per lot basis. Overall development at Township & Settlement zoning is not currently supported from a 3 waters infrastructure perspective.
Potable Water Supply	Significant issues (manageable)	The site maximum elevation is approximately 98m. The site location is outside the area that is currently serviced by DCC. However, the Brighton Reservoir is adjacent to the

		site location at an elevation of approximately 86m. This is fed by Southern WTP, elevation approximately 114m. The existing infrastructure would be capable of servicing a portion of the proposed development at lower elevations. The topography of the site suggests that an additional reservoir may be required to service higher elevation areas of the site up to an approximate elevation of 84m. An additional reservoir and booster pumps would be required to service higher elevation areas of the site beyond 84m. Dunedin's water supply is fortunate in that many areas do not require pumping. 3 Waters prefers gravity to pumping where possible due to lower operating and maintenance costs and supporting DCC's Zero Carbon policy. I do not support servicing water supply for the development where additional storage or pumping. Some major upstream network upgrades would also be required in the future if the site was serviced. At this stage the proposal is not supported from a water supply perspective. Further investigation and assessment is required.
Wastewater	Significant issues (manageable)	There is existing infrastructure within Scroggs Hill Road. A significant 400m extension of the existing wastewater network would be required to service the site, however many areas of the site are at lower elevation to Scroggs Hill Road which passes through the site. For these areas, wastewater pumping may be required. 3 Waters prefers gravity to pumping where possible due to lower operating and maintenance costs and supporting DCC's Zero Carbon policy. While servicing by gravity would be possible for areas of the site with elevation similar to adjacent Scroggs Hill Road, I do not support servicing for wastewater for areas of the site that would require pumping. Significant downstream network upgrades would also be required if any wastewater servicing was required. At this stage the proposal is not supported from a wastewater servicing perspective without an understanding of the balance of gravity and pumped reticulation. Further investigation and assessment is required.
Stormwater	Significant issues (manageable)	The proposed development's stormwater runoff contributes to overland flow paths which flow down various valleys and gullies, eventually discharging over McIntosh Rd to the west and towards Hare Road to the east and finally into stream tributaries before heading out to sea. The capacity of the gullies and channels are unknown therefore an attenuation assessment is required for the 100 year storm flows. Due to the large site area, and the submitters requested zoning onsite attenuation would be required.

		The campground downstream has had previous flooding issues. Provided the stormwater management rules in Variation 2 are applied to the whole GF01 area using a New Development Mapped Area (NDMA) overlay the site may be considered developable, however I have concerns over the affordability of the stormwater infrastructure.
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