

**BEFORE A HEARING PANEL
CONSTITUTED BY UPPER HUTT CITY
COUNCIL**

**PPC55
Gabites Block**

IN THE MATTER OF:

an application by **Maymorn Developments Ltd**
for a private change to the Upper Hutt District
Plan (Private Plan Change 55)

Brief of Evidence of: David Patrick Wilson

Acting on behalf of: Upper Hutt City Council

INTRODUCTION

Qualifications and experience

1. My full name is David Patrick Wilson.
2. I am a Natural Resources Engineer with over 25 years of experience in three waters infrastructure engineering. I am currently a Director at The Urban Engineers Ltd. I have a Bachelor of Natural Resources Engineering (Hons) from Canterbury University. I am a Chartered Professional Engineer in the practice areas of Civil and Environmental Engineering, a Chartered Member of Engineering New Zealand, and a Member of the New Zealand Water and Wastes Association.
3. I am a Principal Engineer and Director at The Urban Engineers Ltd and have held this role for the last five years. I have been providing technical assistance to Wellington Water's Land Development team for more than six years.
4. I have particular expertise in stormwater treatment, disposal and management, including undertaking Water Sensitive Design assessments on behalf of Greater Wellington Regional Council. I am an author and the technical reviewer of Wellington Water's *Water Sensitive Design for Stormwater: Treatment Device Design Guideline* and was a member of the Ministry of the Environment's Urban Water Working Group.

Involvement in proposed plan change

5. My current involvement in this proposed plan change 55 (PPC55) has been undertaking three waters infrastructure impact assessment of the plan change application on behalf of Wellington Water Limited for Upper Hutt City Council (the Council).

Expert Witness Code of Conduct

6. I have a copy of the Code of Conduct for Expert Witnesses contained in the Environment Court's Practice Note dated 1 December 2014. I have read and agree to comply with that Code. This evidence is within my area of expertise, except where I state that I am relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

PURPOSE AND SCOPE OF EVIDENCE

7. The purpose of this evidence is to assess the three waters effects of PPC55.

8. PPC55 would see the current General Rural and Rural Production zoning of the subject site changed to a newly created Settlement Zone.
9. The scope of my evidence is the following:
 - a) An assessment as to whether the three waters infrastructure (Stormwater Quantity and Quality, Water Supply and Wastewater) and water sensitive design aspects of PPC55 can be considered to be complete, correct, adequate, appropriate, technically robust and fit for purpose;
 - b) The consistency of PPC55 with any relevant three waters infrastructure and water sensitive design requirements and directions of, or relating to, any national policy statement, the Regional Policy Statement, the Greater Wellington Regional Council (GWRC) Natural Resources Plan (NRP), the Upper Hutt District Plan, and any relevant non-statutory policy or plan of Upper Hutt City Council (including any relevant Wellington Water standards and guidelines);
 - c) Comment on the adequacy of the proposed provisions relating to three waters infrastructure, including water sensitive design; and
 - d) The appropriateness of PPC55 based on the above.

Basis of evidence

10. The following documents were consulted in preparing my evidence
 - a) Infrastructure Report Proposed Gabites Block Plan Change prepared by Envelope Engineering dated October 2021 (referred to hereafter as The Infrastructure Report;
 - b) Preliminary Ecological Assessment Gabites Block Maymorn prepared by Bioresearches (Babbage Consultants Ltd) dated 8 October 2021;
 - c) Gabites Block Private Plan Change Landscape Report prepared by Hudson Associates Landscape dated March 2022; and
 - d) Geotechnical Investigation - Gabites Block by Engeo dated 04 November 2021.
 - e) The proposed three waters related planning provisions contained within PPC55 - Proposed Amendments to the Upper Hutt District Plan – Including Additional Amendments in Response to Submissions (proposed by Applicant)
11. I have also discussed PPC55 with Wellington Water's Chief Advisors for Stormwater and Climate change, Wastewater, and Water Supply.

12. I have also discussed PPC55 with members of Wellington Water's modelling team.

SUMMARY

13. In my opinion:
- a) the information which the Applicant has provided is not sufficient to understand:
 - 1. the stormwater and flood risk effects of future development should the Site be rezoned through PPC55.
 - 2. The proposed stormwater and flood risk management system to mitigate these effects and whether this is sufficient to mitigate the effects on the receiving environment.
 - b) to rectify this, the Applicant needs to undertake a flood hazard assessment for PPC55. The flood hazard assessment needs including hydraulic modelling of the existing site to understand the existing flow paths, flood levels and flood extents and to provide a baseline for assessing the effects of PPC55 and future development both within the Site and the downstream of the Site. The assessment must also include hydraulic modelling of the Site with future development to assess the effects on stream hydrology, flood levels and flood risk at the Site and in the wider area,
 - c) the site subject to PPC55 (the Site) can be adequately serviced with a reticulated pressure sewer network with private on lot storage, with a smart control system, that discharges to a single connection to the existing wastewater network,
 - d) the Site cannot be serviced with a reticulated water supply network, however an on site water supply is feasible and acceptable.

STORMWATER - FLOOD HAZARD EFFECTS

14. During discussions with the Applicant in June 2021 prior to lodgement of PPC55 Wellington Water indicated that they did not have a hydraulic model for this area.
15. Wellington Water advised the Applicant that they would need to carry out appropriate and comprehensive investigations and modelling into flooding, minimum floor levels and possible overland flow paths for any future development.
16. The initial development of Wellington Water's Upper Hutt North Flood Model for the design event 1% Annual Exceedance Probability event

with climate change was completed by August 2021.

17. The freeboard model was completed by February 2022. This model is considered suitable for estimating inundation extents and recommended finish floor levels.
18. The model is still to be subjected to an external peer review and has not been used to generate Council flood hazard layers for public consultation yet.
19. The model indicates that the Site is subject to inundation during the design event, see Appendix 1.
20. In my opinion, the key stormwater and flood risk issues as a consequence of the rezoning of the Site for future development are:
 - a) The potential for progressive development of individual subdivisions (or stages) which could be consented individually and may not adequately account for the cumulative effects of the whole development on stormwater and flood risk.
 - b) Increased runoff peak flows and volumes and concentrated discharges, which could increase flood risk at nearby sites and/or downstream, and increase erosion in overland flow paths and waterways.
 - c) The proposed stormwater management system(s) (to provide treatment and mitigate the effects of changes in hydrology with the development), which will also change the hydrological response of the catchment and will have effects downstream.
 - d) Understanding the geomorphology of the existing waterways and existing catchment sediment loads and the increases in stream erosion and sediment supply from development. Also, the effects of the existing and future sediment loads on the any proposed stormwater and flood management system, the downstream stormwater system, and the flow paths and waterways both within the Site and downstream.
 - e) Possible new development within the existing overland flow paths or the overland flow paths.
 - f) The cumulative effects of staged development on the above issues, and the lack of a validated stormwater management plan comprehensively addressing those cumulative effects and their mitigation.
21. The stormwater and flood risk issues at the Site are complex and inter-related and need to be addressed at a catchment level.
22. There is no stormwater master plan or catchment management plan

(or other spatial plan) for the future development under PPC55 showing the constraints, indicative arrangement and scale of the future development, proposed stormwater management and flood risk management, and interaction with other disciplines.

23. PPC55 proposes that flood hazard assessment will be completed at the subdivision consent stage rather than Plan Change stage.
24. I do not agree with this approach and consider that the flood hazard assessment needs to be completed at the plan change stage as:
 - a) There is no opportunity for site-wide master planning and catchment-scale stormwater planning, including interdisciplinary coordination.
 - b) The lack of a site wide plan Makes it is difficult to assess and mitigate catchment-scale effects and cumulative effects of staged development on an individual subdivision basis of only a limited part of the Site.
 - c) The proposed provisions, and the existing provisions in the UHCC District Plan on their own, in the absence of the site wide master plan may not be sufficient to address the effects of development, especially the catchment-scale and cumulative effects, and also where existing controls (e.g. flood overlays) are based on the existing development will not correctly reflect the future developed form and flood extent.
25. From my experience working for both councils and applicants around New Zealand, it is common practice for councils to require that master planning and catchment or stormwater management planning (including hydraulic modelling) are undertaken at plan change stage. Refer to Appendix 1 for a figure from Auckland Council's Guideline Document 2015/04 (GD04) Water Sensitive Design for Stormwater illustrating this.
26. Without a stormwater management plan is difficult to provide for a continuous integrated system through multiple subdivisions, such as treatment and/or attenuation facilities which also receive runoff from the upstream subdivision.
27. It is not uncommon for the progressive development of multiple subdivisions with no overarching stormwater management plan to lead to problems with stormwater and flood risk management through the development stage and to leave councils with residual issues to address once vested. Examples of these issues include:
 - a) Providing insufficient primary and/or secondary flow capacity and attenuation storage for stormwater runoff from upstream development.
 - b) Neglecting to assess the combined effects of multiple

subdivisions or stages of development on flows, velocities and flood risk downstream.

Further Information Requirements

28. In my opinion, the following additional conceptual information is required at Plan Change stage to:
 - a) Demonstrate the feasibility of the proposed stormwater and flood risk management system and its ability to mitigate the effects of future development, and
 - b) Inform the outcomes or critical elements required to mitigate the effects of the future development and, therefore, the Plan provisions required for the PPC to guide and manage the effects of the future development of this Site.
29. Additional information required:
 - a) The results of hydraulic modelling of the existing site to understand the existing flow paths, flood levels and flood extents and to provide a baseline for assessing the effects of PPC55 and future development both within the PPC55 area and downstream of the Site.
 - b) The results of hydraulic modelling of the proposed PPC55 and with future development to assess the effects on stream hydrology, flood levels and flood risk at the Site and in the wider area.
30. This work can be used to generate flood hazard layers for the Site.
31. Wellington Water's model is suitable for the generation of district plan flood hazard layers for this Site, but they may require some ground proofing and may be subject to change following the external peer review.
32. Alternatively, flood hazard layers could be generated using modelling undertaken by the Applicant, provided that modelling work was completed in accordance with the Wellington Water Regional Stormwater Hydraulic Modelling Specifications V5 dated December 2017, which is available from the Wellington Water Modelling Team.
33. Any modelling of improvements to reduce the extent of inundation on the Site would also have to demonstrate that there was no increase in inundation upstream or downstream of the Site.

Reasons for information required at the Plan Change Stage

34. PPC55 proposes rezoning of the Site in a manner that would provide for development upstream of existing residential development; development in the Site adjacent to a waterway which has not been modelled (so flood extents are not known).

35. The PPC55 request has assumed that it will be possible to treat and attenuate stormwater from the development but has not demonstrated that this is feasible within the constraints of the Site. The indicative future development and future stormwater system layout, and the locations and sizing should be developed to concept design to demonstrate that this is practicable. Hydraulic modelling should also be provided to demonstrate the performance of the concept design and its effects.
36. The attenuation requirements cannot be confirmed without modelling of the proposed system. This is because if separate attenuation facilities for multiple subcatchments each attenuate peak flows to 100% of pre-development peak flow, the increased volume discharged from each attenuated subcatchment will result in flows being high for longer. Downstream where flows from multiple subcatchments combine, the discharge hydrographs (flow varying over time) will accumulate and depending on the timing this may lead to a higher total peak flow from the whole catchment than pre-development. This is illustrated in the figure below, Figure 9 from Auckland Council's GD04.

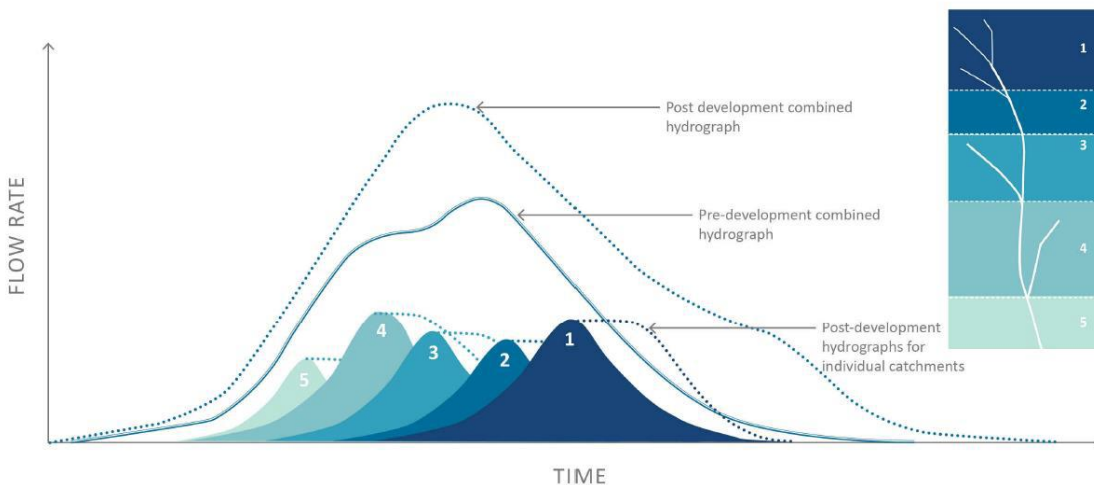


Figure 1 GD04 Figure 9 demonstrating cumulative effect of de-centralised detention facilities

37. Rezoning of land within the floodplain is proposed, which may need to be filled to be developed. This filling would affect flood levels nearby and potentially downstream. Depending on the extent of the filling offset storage may be required to mitigate the effects
38. If required, providing offset storage to mitigate the effects of filling in the floodplain is complex. Even if an equivalent volume of storage is provided to that lost, with a different level-volume (stage-storage) relationship this cut and filled floodplain will behave differently to the existing floodplain. The maximum possible extent of filling under PPC55 and offset storage to mitigate this should be modelled to understand the effects and demonstrate performance. This includes

the effects on wider flood risk. This work should be carried out at plan change stage to ensure sufficient land is set aside for offset storage.

Proposed Provisions

39. DEV3-SW-P2 seems to allow development up to a specified impervious area. To adequately manage effects, this provision would require a flood hazard management assessment to demonstrate how the impacted of the specified imperious areas could be managed:
40. There are no provisions that relate to Flood Hazard. The Site is current subject to inundation and requires a Flood Hazard framework included spatial layers that show where the framework is applied.

STORMWATER - STREAM HEALTH EFFECTS

41. The adverse effects of urban stormwater runoff on stream health relate to the generation and flushing of contaminants and increased imperviousness that leads to increases in peak flow, runoff volume and frequency of runoff from the Site during low flow high frequency, less than 50% AEP events. If not managed, both these effects can have detrimental impacts on downstream ecological and cultural values.
42. There has been no assessment of the receiving environment for stormwater runoff from the provided by the Applicant. However, it is proposed to treat road runoff in accordance with Wellington Water's given the low traffic environment the proposal to treat runoff from roads Water Sensitive Design for Stormwater: Treatment Device Design Guideline December 2019 Version 1.1.
43. This is an acceptable approach as this will provide treatment to minimise concentrations of copper, zinc and sediment to the smallest amount practicable prior to discharge. The guideline also provides for the use of internal water storage volumes to provide a retention function to minimise the changes in low flow high frequency hydrological regime.
44. The use of rainwater harvesting for on-site water supply will provide a suitable volume retention for the on-lot changes in imperviousness. The control of building materials is a suitable form of source control to prevent generation of contaminants from the lots.

Further information required

45. There are no further information requirements for the plan change stage of the project.
46. At the subdivision consent stage, the receiving environments should be assessed to confirm their sensitivity to the proposed development in case additional design requirements need to be imposed over and

above the guidelines, for example cultural requirements from mana whenua.

Proposed provisions

47. DEV3-SW-P3 would be improved if item 2 was removed, so that it only required "building material must be finished in a manner that prevents water runoff from containing copper or zinc".
48. The requirement for a receiving environment assessment is incorporated in my discussion regarding a Stormwater Management Plan in a later section of my evidence.

STORMWATER - WATER SENSITIVE DESIGN

49. Water Sensitive Design applies a set of principles to land development to reduce or minimise negative effects on the receiving environment.
50. It is my opinion that following a water sensitive design process is an appropriate method to demonstrate ki uta ki tai, as required by the Te Mana o te Wai, or an integrated management approach as required by the NPS-FM.
51. The emphasis is on the appropriate location, layout and design of a development, including the integration of stormwater design, with the natural landscape and urban elements. A Water Sensitive Design approach considers the multiple objectives influencing project outcomes, including urban design, landscape amenity, and community issues and aspirations. In my opinion, a water sensitive design review should also assess the appropriateness of the zoning and Structure Plan layout proposed in PPC55.
52. Water Sensitive Design has the following key principles:
 - a) Promote inter-disciplinary planning and design
 - b) Protect and enhance the values and functions of natural ecosystems
 - c) Address stormwater effects as close to the source as possible
 - d) Mimic natural systems and processes for stormwater management
53. Auckland Council's "Water Sensitive Design for Stormwater Guideline Document 2015/004" GD04 is recognised as national best practice by Stormwater Management experts and provides details on the design process to be completed to develop a concept design in support of a Plan Change.
54. I have adopted GD04 as the basis for my review as it is referred to as a Water Sensitive Design guidance document Wellington Water's Water Sensitive Design for Stormwater: Treatment Device Design

Guideline.

55. The following figure describes the different phases of a Water Sensitive Design process as outlined in GD04 and adopted for the PPC55 Water Sensitive Design review process.

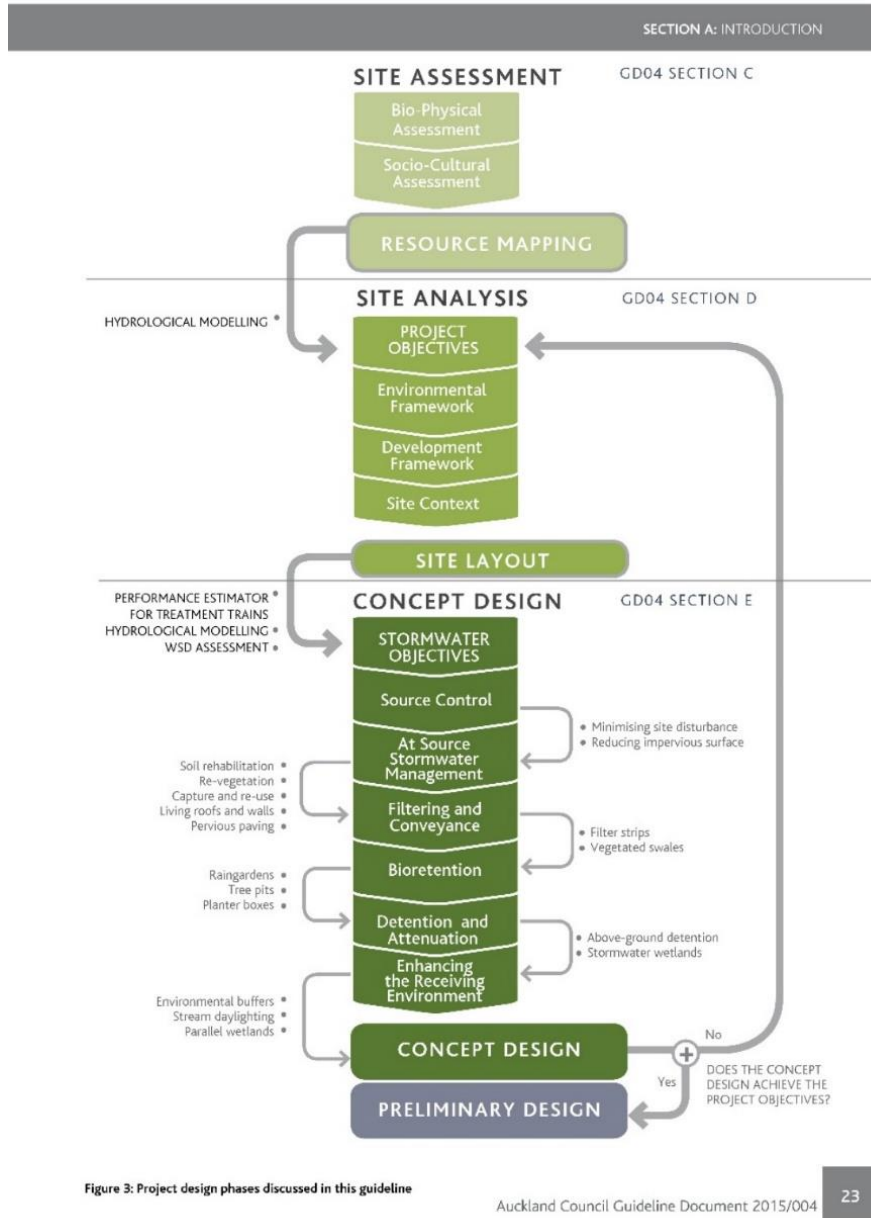


Figure 3: Project design phases discussed in this guideline

Figure 2 GD04 Project design phases

Review of documentation

56. The PPC55 supporting documents demonstrate that the Applicant has undertaken the Site Assessment phase of a Water Sensitive Design process, excluding engagement with mana whenua. These assessments have not been brought together in the resource mapping task, as described in GD04 and quoted below:

"The attributes identified in the site assessment should be integrated into one or more analysis drawings, referred to as

resource mapping This analysis begins to draw out the logical land use patterns for a site, while taking into account its context and connectivity within the broader urban and ecological landscape." (G04 p74)

Site Analysis

57. It is my opinion that the Site Analysis phase of the process has not been undertaken to a suitable level of detail. Project objectives are missing, and the Environmental Framework and Development Framework tasks have not been completed.
58. In my view:
- a) an Environmental Framework needs to include:
 1. Existing freshwater network (wetlands, streams (permanent, intermittent, ephemeral) and seeps);
 2. Existing terrestrial network, including existing indigenous vegetation and habitat;
 3. Geotechnical (soils, topography and hazards);
 4. Landscape/Visual;
 5. Cultural; and
 6. Flooding (1%AEP).
 - b) and a Development Framework needs to include:
 1. provisional road hierarchy;
 2. proposed environmental corridors/linkages (through any a restoration strategy or as a result of proposed mitigation of habitat loss);
 3. modelled post-development flood extents (both 10% AEP and 1% AEP);
 4. overland flowpaths; and
 5. an indication that any centralised stormwater management devices (treatment devices (wetlands or bioretention devices) are able to be located out of the 10% AEP flood extents).
59. Once completed the Environmental Framework and the Development Framework can be used to demonstrate that the outcome required is achieved and to then assess the effectiveness of the existing provisions to:
- a) provide the protections required by the Environmental Framework;

- b) enable the development envisioned by the Development Framework; and
 - c) ensure that the development envisioned by the Development Framework is the minimum acceptable standard.
 - d) Any gaps identified in this assessment should be addressed through site specific provisions.
60. As stated above typically this information would be provided at Plan Change Stage. But upon a review the Ecology and Landscape reports and the proposed provisions in my opinion there are no impediments in the proposed plan change to a Water Sensitive Design outcome being able to be achieved at subdivision stage. Specifically, I consider that the proposed zoning does not create any barriers to blue/green corridors being created or centralised treatment devices like a wetland being used.
61. However, the site wide stormwater solution for the site should produce both these frameworks, or equivalent plans, with the first subdivision application.

Further information required

62. There are no further information requirements for the plan change stage of the project.
63. At the first subdivision consent stage, the site wide stormwater solution for the site should produce both an environmental and a development framework, or equivalent plans.

Proposed provisions

64. The requirement for a Water Sensitive Design approach is incorporated in my discussion regarding Stormwater Management Plan in the following section of my evidence.

STORMWATER MANAGEMENT PLAN

65. A level of master planning, catchment management planning and assessment is required at plan change stage to demonstrate that the proposed zoning is feasible from a stormwater and flood risk perspective, including catchment-wide and cumulative effects, and that there are adequate rules in place to deliver the required outcome. The plan change application does not include a Stormwater Management Plan.
66. A draft Stormwater Management Plan should be provided as part of the plan change application and assessment process that sets out the stormwater management for PPC55. It should demonstrate that the stormwater management approach for large scale development is the Best Practicable Option (BPO) and seeks to protect te mauri o

te wai (the life supporting capacity of water). The stormwater management plan should demonstrate how urbanisation enabled by PPC55 can meet the requirements, objectives and outcomes of the Natural Resources Plan, Upper Hutt District Plan and Proposed PPC55 provisions, together with Wellington Water's Regional Standard for Water Services and Water Sensitive Design for Stormwater: Treatment Device Technical Guideline.

67. The SMP should be prepared, reviewed and updated in line with the Structure plan/Subdivision design process. It may need to build on the outcomes from any relevant earlier versions by refining the stormwater management approach according to the level of information and data available at the time of preparation. As the design of specific development areas commences, the SMP will need to be revisited to confirm methods of stormwater management are updated to reflect latest available data sets.
68. Earlier iterations of an SMP enable the consideration of the catchment-wide issues which ensures that sub-catchments are developed in accordance with the catchment wide requirements.
69. As an example, the use of SMP's in Auckland is based around a specified template¹ that allows the SMP to evolve through the Structure Plan, the Plan Change and the Subdivision stages. Specific sections of the template that are filled out as detailed design are completed.
70. In general terms, a stormwater management plan should include the following elements. While some of these relate to other disciplines, and are therefore outside the immediate scope of my evidence and my area of expertise, they need to be addressed as part of a multi-disciplinary spatially integrated stormwater management plan:
 - a) A catchment plan or plans including: the catchment boundary; natural features; sites of cultural and/or historical significance; surface water bodies; existing stormwater infrastructure; existing road network, three waters services and utilities; existing development and land uses; proposed future development and land uses; the existing infrastructure and waterway system that has been assessed.
 - b) A description and indicative conceptual plans of the future development and land use intensification within the catchment, including anticipated yield.
 - c) An assessment (including plans) of the baseline or existing state of the catchment and stormwater receiving environment/s including: topography; natural hazards

¹ <https://content.aucklanddesignmanual.co.nz/regulations/technical-guidance/ndc/details/guidance/plans-and-templates/sections/plans-and-templates/Pages/default.aspx>

(including geotechnical); soils; hydrogeology; ecology including ecological sensitivity; landscape; waterways and stormwater infrastructure; erosion; sediment transport; water quality; hydrology; flooding (including overland flow paths); any relevant existing resource consents.

- d) A description and plans of the future works affecting natural water bodies and the proposed stormwater and flood risk management system (including water sensitive design), including concept design layouts and sizing and basis of design. In particular, sufficient engineering assessment is needed to be confident in the land footprints required, so that adequate land is set aside as reserve as part of PPC55 for future works affecting natural water bodies and there is adequate land is available for the future stormwater and flood risk management.
- e) An assessment of the environmental effects, including cumulative effects over time, on the receiving environment of the future development under PPC55 and stormwater and flood risk management works, stream diversions, and any other works affecting and surface water bodies. This should include effects on: natural features; sites of cultural and/or historical significance; landscape; surface water bodies; groundwater; flood hazards including overland flow paths; other natural hazards including geotechnical; receiving water body hydrology, erosion, sediment, and water quality; receiving water riparian vegetation, habitat, fish passage, ecology and ecosystem health.
- f) The analysis informing the assessment of the effects on waterway hydrology, erosion and flood risk should use hydrological and hydraulic modelling.

71. Note that in preparing the above list I have referred to Hamilton City Council's Three Waters Manage Practice Note HCC10 Integrated Catchment Plans, Auckland Council's GD04, and Auckland Council Stormwater Management Plan template explanatory notes document.

Further information required

72. As discussed in my Stormwater – Flood Hazard review, the flood hazard aspects of the SMP are required at the plan change. The reasons for this are addressed in my flood hazard review.
73. However, it is my opinion, as outlined in my Stormwater – Stream Heath Effects and Stormwater – Water Sensitive Design sections, that these aspects of a SMP can be provided at the first subdivision.

Proposed Provisions

74. A provision that both requires SMP and details the information to be contained an SMP should be added to the proposed provisions. In the absence of an equivalent Wellington Water document, it could be based on the Auckland Council template. The Auckland Council also has a resource that provides a detailed explanation of what is required in each section. This resource increases the ease of preparation and review.
75. Ideally provisions would all the SMP to be a living document that is compiled within and/or updated with subsequent development of the site.

WASTEWATER

76. During discussions with the Applicant in July 2021 before lodgement of PPC55, Wellington Water indicated that the wastewater network is over capacity and additional connections would need to not increase impacts to the downstream network. Network capacity upgrades or storage with a smart control system linked to downstream constraints would be required.
77. The Infrastructure Report proposes that the Site could be serviced with storage provide as either a centralised public asset or de-centralised on-lot private storage discharging to a public pressure sewer system.
78. Wellington Water's Chief Wastewater Advisor has confirmed that the Site will have to be serviced via de-centralised on-lot private storage with smart controllers discharging to a public pressure sewer system. The low-pressure sewer system will have to be designed in accordance with Wellington Water's Pressure Sewer Design Guide Version 0 dated October 2021.
79. The Site will only be permitted a single discharged to the existing gravity wastewater network with a telemetered flowmeter. The discharge location and private storage requirements would have to be confirmed in consultation with the Wellington Water.

Further information required

80. There are no further information requirements for the plan change stage.
81. At the subdivision consent stage Wellington Water will require the Applicant to demonstrate the proposed pressure sewer reticulation can service the entire proposed development. This matter would also need to be addressed prior to Wellington Water allowing any new connection to the wastewater reticulation.

Proposed provisions

82. I suggest that a provision that details Wellington Water's requirements for a low pressure sewer system are included in the proposed provisions.
83. Suggested wording for this wastewater servicing provision should be generally in accordance with the following;
- All allotments must be serviced via separate and direct connection to a reticulated low pressure sewer network designed in accordance with Wellington Water's Pressure Sewer Design Guide Version 0 dated October 2021.*
84. The requirement for the pressure sewer reticulation to have a single discharge point to the existing gravity wastewater can be controlled via the Engineering Approval and request for connection processes. Therefore, does not require additional provisions.

Water Supply

85. During discussions with the Applicant in July 2021 prior to lodgement of PPC55 Wellington Water indicated that the water supply network had no spare capacity (both in terms of pressure and storage) to service the proposed development. The Applicant was informed at the time that hydraulic modelling is currently underway and would be available in 3-4 months. This work would recommend the preferred solution to service this area.
86. This work has completed in April 2022 and is detailed within Upper Hutt City Water Supply report prepared by GHD dated April 2022. The Site sits within the Maymorn demand management area (DMA), as this DMA is supplied from the Plateau Road reservoir is it grouped in the report as one zone for the development of a Zone Management Plan (ZMP).
87. The preferred ZMP option for the Plateau Road and Maymorn zone is a two new reservoirs for the Maymorn DMA that a fed directly from the new pump station connected to the bulk water supply. As well as increased storage at the Plateau Road Reservoir, see Figure 3 below.

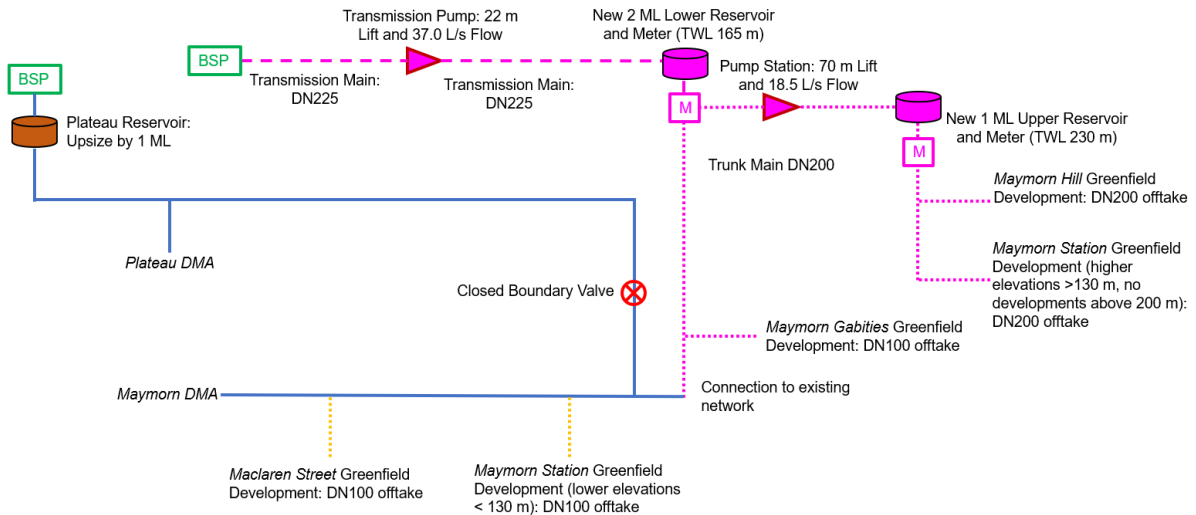


Figure 3 Preferred ZMP for the Plateau Road and Maymorn zone

88. Funding for this ZMP is not included in UHCC's current long term plan, so there is no certainty when and if this ZMP will be implemented.
89. Therefore, the only option for water supply for the Site is on lot water supply. Wellington Water's Wellington Water's Regional Standard for Water Services Version 3.0 December 2021 (RSWSR) is silent regarding on site water supply requirements. Therefore the on site water storage will need to meet the requirements of UHCC Code of practice for Land Development 1998 (COP) and the SNZ PAS 4509:2008 New Zealand Fire Service Firefighting Water Supplies Code of Practice.
90. The UHCC COP section B9.10 requires rainwater harvesting on-site water supply stems to provide storage of 180 l/person/day, assuming two months without rain over the summer. This requirement is equivalent to 10,800 L/person (60 days x 180L/person/day = 10,800L/person).
91. Wastewater reticulation design requirements of COP and Wellington Water's Regional Standard for Water Services Version 3.0 December 2021 both require a design occupancy of 3.5.
92. Using this occupancy figure results in a potable water storage volume of 54,000L ($3.5 * 10,800 = 37,800L$).
93. The New Zealand Fire Service Firefighting Water Supplies Code of Practice table 2 (see Figure 3 below) requires 45,000L for non-sprinklered (FW2) houses and 7,000L for sprinklered (FW1) houses.

Table 2 – Method for determining firefighting water supply

Fire water classification	Reticulated water supply			Non-reticulated water supply	
	Required water flow within a distance of 135 m	Additional water flow within a distance of 270 m	Maximum number of fire hydrants to provide flow	Minimum water storage within a distance of 90 m (see Note 8)	
				Time (firefighting) (min)	Volume (m ³)
FW1	450 L/min (7.5 L/s) (See Note 3)	–	1	15	7
FW2	750 L/min (12.5 L/s)	750 L/min (12.5 L/s)	2	30	45

Figure 4 Table 2 from New Zealand Fire Service Firefighting Water Supplies Code of Practice

94. For a non-sprinklered house the total water storage volume required is 37,800L + 45,000L = 82,800L storage
95. The New Zealand Fire Service Firefighting Water Supplies Code of Practice also requires, where plastic tanks are used for storing firefighting water, consideration needs to be given to shielding them from the effects of radiated heat from a fire.
96. The fire service coupling from the tanks can be no closer than 6m to fire hazard.
97. 82,800 L would require three 30,000L tanks per dwelling. I have not been provided with any information that demonstrates that this can be accommodated within 1,000m² while meeting the access requirements SNZ PAS 4509:2008 New Zealand Fire Service Firefighting Water Supplies Code of Practice and proposed provisions of PPC55.

Further information required

98. Provided there are provisions that detail minimum water storage requirement of 10,800 L/person then there are no further information requirements for the plan change stage of the project.
99. At the subdivision consent stage Wellington Water will be required to confirm that proposed allotments can meet the water storage requirements.

Proposed provisions

100. I suggest that a water supply provision that details a minimum requirement of 10,800 L/person, with a minimum volume of potable water supply storage of 37,800L.

CONCLUSIONS

101. In my opinion, the information which the Applicant has provided is not sufficient to understand the stormwater and flood risk effects of future development should the Site be rezoned through PPC55, the proposed stormwater and flood risk management system to mitigate these effects, and whether this is sufficient to mitigate the effects on the receiving environment. The existing UHCC District Plan provisions and proposed PPC55 provisions together do not provide sufficient control on future subdivisions to manage cumulative effects and mitigate the effects on the receiving environment.
102. The Site can be adequately serviced with a reticulated pressure sewer network with private on lot storage, with a smart control system, that discharges to a single connection to the existing wastewater network
103. The Site cannot be serviced with a reticulated water supply network. However, an on site water supply is feasible and acceptable.

RECOMMENDATIONS

104. For the reasons set out above, there is not sufficient information provided to demonstrate that the water quantity and flood risk from future development of the PPC55 Site can be effectively managed and that the existing UHCC District Plan and proposed PPC55 plan provisions will provide sufficient control to mitigate the effects.
105. This can be rectified by the Applicant undertaking a flood hazard assessment and the provision of a draft SMP.
106. If the Plan Change is approved, then I recommend that the provisions regarding flood hazard and stormwater management plans are included.



David Patrick Wilson

22 September 2022

Appendix 1 Modelled inundation extents during 1% AEP with Climate Change Event

