

**BEFORE INDEPENDENT HEARING COMMISSIONERS APPOINTED BY THE  
WAIMAKARIRI DISTRICT COUNCIL**

**IN THE MATTER OF**

The Resource Management Act 1991 (**RMA** or  
**the Act**)

**AND**

**IN THE MATTER OF**

Hearing of Submissions and Further  
Submissions on the Proposed Waimakariri  
District Plan (**PWDP** or **the Proposed Plan**)

**AND**

**IN THE MATTER OF**

Hearing of Submissions and Further  
Submissions on Variations 1 and 2 to the  
Proposed Waimakariri District Plan

**AND**

**IN THE MATTER OF**

Submissions and Further Submissions on the  
Proposed Waimakariri District Plan by  
**Momentum Land Limited**

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**EVIDENCE OF MANU ROBERT MISKELL  
ON BEHALF OF MOMENTUM LAND LIMITED REGARDING STREAM 12  
REZONING OF LAND**

DATED: 5 March 2024

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## INTRODUCTION

- 1 My name is Manu Robert Miskell of Christchurch.
- 2 I am a Civil Engineer and Senior Associate at Wood & Partners Consultants Limited (Woods).
- 3 I hold a Bachelor of Engineering in Natural Resources Engineering (Honours) and am a Chartered Professional Engineer (CPEng) and Chartered Member of Engineering New Zealand (CMEngNZ).
- 4 I have 14 years of experience as a professional consulting engineer with expertise in land development and infrastructure including earthworks, stormwater, water supply, wastewater and road design.
- 5 I have read the Environment Court's Code of Conduct and agree to comply with it. My qualifications as an expert are set out above. The matters addressed in my evidence are within my area of expertise, however where I make statements on issues that are not in my area of expertise, I will state whose evidence I have relied upon. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in my evidence.

## SCOPE OF EVIDENCE

- 6 In my evidence I address the following:
  - (a) Assessment of the existing infrastructure capacity and new infrastructure requirements to service the **North Block** (Block of land at 142-151 Ferry Road, Kaiapoi, North of the Beach Grove Development.)
  - (b) Assessment of the existing infrastructure capacity and new infrastructure requirements to service the **South Block** (Block of land at 310 Beach Road, Kaiapoi, West of the Beach Grove Development.)

## SUMMARY OF EVIDENCE

- 7 My evidence demonstrates that,
  - (a) Stormwater treatment for the Momentum land can be provided and managed on site to meet the residential water quality discharge requirements of the Waimakariri District Council.

- (b) Stormwater attenuation is not required for the proposed residential development of the Momentum land.
- (c) Wastewater servicing for the Momentum land can be managed via a combination of the future development allowance within existing Beach Grove low pressure sewer network and an upgrade of the existing Moorcroft wastewater pumpstation.
- (d) The Kaiapoi wastewater treatment plant has adequate capacity available to service residential development of the Momentum land.
- (e) The Kaiapoi potable water network has adequate capacity available to service residential development of the Momentum land.
- (f) The electrical and telecommunication network can be extended to service the residential development of the Momentum land.

## EVIDENCE

### Context

- 8 Wood & Partners Consultants Ltd (**Woods**) have been engaged by Momentum Land Ltd (**Momentum**) to provide an assessment of infrastructure requirements to service the block of land at 142-151 Ferry Road, Kaiapoi (the block north of the Beach Grove Development), referred to as the **North Block**.
- 9 Woods have also been engaged to provide an assessment of infrastructure requirements to service the block of land at 310 Beach Road, Kaiapoi, referred to as the **South Block**, (or collectively as the **Momentum land**).
- 10 The purpose of this evidence is to assess the existing infrastructure capacity and confirm that the submission by Momentum to rezone the Momentum land from Rural Lifestyle Zone to Medium Density Residential Zone (**MDRZ**) can be supported from an infrastructure perspective.
- 11 Based on the concept masterplan, it is expected that the development of the North Block will deliver approximately 600-900 residential dwellings with a small neighbourhood centre of mixed-use lots.
- 12 It is expected that the development of the South Block will deliver approximately 96-144 lots.
- 13 My evidence summarises the approach for servicing development of the Momentum Blocks with regard to earthworks, stormwater, wastewater, water
- Evidence of Manu Miskell for Momentum dated 5 March 2024 (Infrastructure)

supply, power & telecommunications, and road access based on the expected development lot yields noted above.

- 14 My evidence also considers the maximum theoretical lot yield when applying the MDRZ standards. This is based on 904-1055 dwellings for the North Block and 144-168 dwellings for the South Block.
- 15 My colleagues have carried out an initial design (which I have reviewed) to service development of the North Block and South Block that is reflected in the Concept Civil Engineering Drawings provided in **Appendix 1** and **Appendix 5**. The drawings are provided to illustrate the proposed concept to service the development and as evidence that the development can be adequately serviced to the requirements of the Waimakariri District Council (**WDC**).

## **NORTH BLOCK**

### **Development Proposal**

- 16 It is proposed the North Block will create approximately 600-900 residential lots ranging in area from 200m<sup>2</sup> to 450m<sup>2</sup> with a small neighbourhood centre of mixed-use lots. A road network will be extended from the consented Stage 6 of Beach Grove connecting through to Magnolia Boulevard in Moorcroft Estate, branching out through the area to provide access for the proposed lots. Another connection will be made creating access to Isa Lei Road in Stage 3 of the Beach Grove development.
- 17 The proposal involves the realignment of a section of McIntosh Drain which runs north to south along the eastern boundary of the site. The realignment will increase the amenity and function of the drain as well as provide room for the construction of a stormwater management area (**SMA**).
- 18 The site is earmarked in the Proposed Waimakariri District Plan (**Proposed Plan**) as part of the Kaiapoi Future Development Area.

### **Site Description**

- 19 The North Block is located east of Moorcroft Estate and north of the Beach Grove Development and is contained within Lot 5 DP 313322, Lot 2 DP 4532 & Lot 1 DP 5010 with the SMA in Lot 1 and Lot 2 DP 4102. The total area of the North Block is approximately 34.5ha, including a 6ha area east of the

existing McIntosh drain that is proposed as the stormwater management area. The subject land and land further to the east and north are currently in pasture and do not contain any buildings within the vicinity, excluding a dilapidated farm shed.

- 20 To the west of the site lies Lot 3005 DP 342273, a local purpose reserve that contains a man-made stormwater pond servicing Moorcroft Estate at the end of Magnolia Boulevard adjacent to the development site. This pond outlets to a small drain that follows a fence line through the site down to the McIntosh drain at the eastern boundary of the site. There are no other significant drainage features on the site. This reserve also contains a sewer pump station that services Moorcroft Estate.
- 21 Moorcroft Estate and the development site are separated by an unformed paper road that is currently used as a makeshift walkway and maintenance access to the local purpose reserve.



**Figure 1: Site Location**

## **EARTHWORKS**

### **Description**

- 22 The site is rather flat with a natural gradient towards McIntosh drain. Elevations range from approximately RL 1.60m on the west side of the site down to RL 0.90m in the east (Lyttleton Vertical Datum 1937). The proposal is dependent on filling the site to provide minimum finished ground RL of
- Evidence of Manu Miskell for Momentum dated 5 March 2024 (Infrastructure)

≈2.6m within each allotment and road levels which enable stormwater to drain to the proposed SMA. These levels allow for a minimum floor level of ≈2.9m (derived from Tonkin & Taylor flood modelling).

- 23 The earthworks operation will involve stripping the existing vegetation and topsoil prior to the importation of approximately 430,000m<sup>3</sup> of fill material which will be placed as certified fill to achieve the proposed design levels. All earthworks will be completed as per the requirements of the ECAN and WDC earthworks standards and will be monitored by a suitably qualified geotechnical consultant.
- 24 Similar earthworks and filling were undertaken for the existing Beach Grove development.

### **Geotechnical**

- 25 Tonkin & Taylor (**T&T**) have been engaged as the Geotechnical Engineering Consultant for the site investigation and have completed the Geotechnical Investigation Report. All future filling operations would be monitored by a suitably qualified geotechnical consultant to ensure compliance with the design standard.

## **INFRASTRUCTURE ASSESSMENT**

### **Road Access**

- 26 A transportation assessment has been completed by Carriageway Consulting which is to be read in conjunction with this evidence.
- 27 The proposed Outline Development Plan (**ODP**) at **Appendix 2** provides a general concept of the main roading connections through the development. The concept minor roading layout is shown on the Concept Roding Design Plan provided in **Appendix 1**. Access to the proposed residential lots will be provided via the extension of the collector road (McGarry Drive) from Beach Grove, connecting through to Magnolia Boulevard in Moorcroft Estate. Another connection will be made through to Isa Lei Road in Beach Grove. Future access points will be provided at the northern boundary for future development.

### Unformed Paper Road

- 28 The western edge of the site is bounded by an unformed paper road. The proposal is to utilise this road to provide access to the new allotments fronting this boundary. The shared path that extends part-way up the paper road will be extended up to Magnolia Boulevard / the new collector road.
- 29 A portion of this unformed road extends into the development site. While the new layout mostly aligns with this road boundary, there is a portion of the unformed road that will likely be vested as local purpose reserve. Therefore, it would be prudent to stop the part of the road that is running east-west into the development site.

### Road Stormwater Run-off

- 30 Stormwater runoff within the road corridors will be collected via street sumps which will discharge directly into the primary stormwater reticulation system. These sumps will be in the kerb and channels adjacent to the formed carriageway. Road corridors will be used as secondary flow paths to direct stormwater runoff should there be a blockage of the sump intakes or in larger rainfall events. Filling the site gives great scope to be able to achieve the secondary flow requirements.

### **Wastewater**

- 31 In areas where land is very flat and groundwater levels are high, conventional gravity sewer systems are difficult and expensive to install. A viable alternative is a pressure sewer system (**PSS**) which uses small-diameter polyethylene (PE) pipe and grinder pump stations to collect the wastewater, grind it into a slurry, and pump it to a larger sewer main which is directed to the treatment plant. In addition to being a cost-effective method of servicing these types of areas, the PSS has proven to have the highest resilience to earthquakes compared with the other options.

### Existing Network

- 32 The existing Beach Grove development is serviced by a pressure sewer system that discharges to the Kaiapoi wastewater treatment plant (**WWTP**). As part of that development, an allowance was made in the system to service a residential development on this portion of land. There is a 180OD PE pressure

sewer main terminating in Lot 400 DP 571107 (Future Road) which was constructed through Beach Grove Stage 3 at the southern boundary of the site and is currently being built through Beach Grove Stages 5 & 6 to connect to the main in Beach Road – these works are projected to be complete in 2024. This main was designed specifically to cater for future development of the North Block and has capacity to service approximately 600 lots.

- 33 Chris Bacon (WDC Network Planning Team Leader) has confirmed that the WWTP has adequate capacity to service the residential development of the North Block. It is expected that incremental upgrades to the WWTP will be required over time, in response to increased demand and these will be undertaken by WDC and funded through development contributions imposed on new lots.

#### Proposed Reticulation Layout

- 34 The North Block development would first look to utilise the remaining capacity within the existing reticulation network established in the Beach Grove Development. The proposed system will extend the existing 180OD PE trunk sewer main with smaller service mains branching off. The proposed pipelines are to be PN16 PE100 with sizes ranging from 40mm up to 180mm diameter.
- 35 The proposed reticulation will be positioned within the berm of the road reserves with pressure lateral connections (40mm PN16 PE100) servicing each allotment. Boundary kits will be installed for each lot and will house stainless steel check valve, flushing tee, and ball isolation valve. PSS grinder pumps for each allotment will be positioned within the boundary and house connections can be made via a short private lateral (100mm diameter PVC) during building construction.
- 36 A full hydraulic analysis of the PSS network with design flows, pressures, velocities, and pipe diameter is provided in **Appendix 3**. This analysis shows there is capacity within the PSS network to service approximately 600 lots and includes the existing Beach Grove development, remaining future stages of Beach Grove, the future development of the South Block and the addition of this proposed North Block site.



- 37 Chris Bacon has also advised that WDC's high level proposal at this stage is to replace and upsize the existing Moorcroft pumpstation and run a new rising main to the WWTP. This pumpstation would be sized with capacity to service Moorcroft, Sovereign Palms, the Momentum North Block, the future development area north of the Momentum block up to Lees Road and a possible allowance to service the golf course land if that were to be developed in the future.
- 38 This upgraded pumpstation would service the balance of the North Block if the development yield was at the higher end of the expected range. The use of different wastewater pump controllers to distribute the peak flow times, along with upsizing a portion of the existing PSS main within Beach Road could also be an option to maximise the capacity of the existing PSS network.

### **Water Supply**

#### Existing Water Supply Reticulation

- 39 The existing Kaiapoi Township is supplied by six deep artesian wells with two headworks located at Peraki Street and Darnley Square. An extensive piped reticulation network from these headworks provides potable water and firefighting flows to properties within the township.
- 40 The "Kaiapoi Water Supply Scheme Activity Management Plan" indicates there is sufficient source capacity for future developments and upgrades are planned for expected increased future demand. This has been confirmed with Chris Bacon.
- 41 There are various connection points surrounding the development:
- (a) 300mm Dia. PVC main in Allison Crescent, Moorcroft
  - (b) 250mm OD PE main at Lot 400 DP 571107 (Future Road) in Beach Grove Stage 3
  - (c) 250mm OD PE main the south-eastern corner of the site. This is Stage 6 Beach Grove which is currently under construction.

### Proposed Reticulation Layout

- 42 The proposed reticulation will be designed in accordance with the WDC "Engineering Code of Practice". The network will consist of continuing the existing trunk mains from Beach Grove to meet the 300mm diameter main in Allison Crescent. A new 250mm OD PE main will extend north to provide for future development with a 180mm OD PE main looping off this. The remainder of the site will be serviced by a combination of 125mm OD PE diameter mains and 63mm OD PE rider mains servicing all lots.
- 43 Individual domestic supplies will be provided from these mains/rider mains as per WDC standards.
- 44 Fire hydrants and valves will be provided to comply with WDC standards and SNZ PAS 4509:2008.
- 45 The proposed water supply network layout has been attached under **Appendix 1**. The final layout, details, and pipe sizing can be agreed upon with WDC after inclusion within their water model during the consenting and detailed design phases of the development.

### **Stormwater**

- 46 A Flooding Assessment has been completed separately by Tonkin + Taylor (T&T) which is to be read in conjunction with this report.

### Existing Features

- 47 There is a man-made stormwater treatment and attenuation basin servicing Moorcroft Estate at the end of Magnolia Boulevard adjacent the development site. This basin outlets to a small drain that follows a fence line through the site down to the McIntosh drain at the eastern boundary of the site. There are various minor farm drains through the site all leading to McIntosh drain.

### Concept

- 48 The management of the stormwater in the proposed development is primarily designed to achieve the following:
- (a) Primary reticulation shall collect and convey the 5-year ARI in a pipe network to a Stormwater Management Area.

- (b) The primary reticulation discharges to two new treatment basins to contain the treat the first flush volume of 25mm of rainfall on impervious areas.
- (c) Secondary reticulation via overland flow paths designed to contain the 50-year ARI event within prescribed limits on depth of surface flooding.
- (d) Finished floor level set with 500mm freeboard from largest 200-year flood event from T&T modelling.
- (e) Modification to the existing Moorcroft basin to allow for the road connection through to Magnolia Boulevard.

#### Primary Reticulation

The primary stormwater pipe reticulation will be designed in accordance with the WDC "Engineering Code of Practice". An indicative stormwater pipe network has been provided in the attached plans in **Appendix 1**. This pipe network will be sized to convey the 5-year ARI event. Individual lots will be connected to the system via 100mm kerb adaptors which will drain via kerb and channel to appropriately spaced sumps connected to the main stormwater pipe network.

#### Stormwater Management Area

- 49 The McIntosh Drain will be realigned and enhanced to allow for two stormwater treatment basins. The basins are sized to contain the treat the first flush volume of 25mm of rainfall on impervious areas. Impervious area calculations are provided in **Appendix 4**.
- 50 Stormwater exceeding the first flush volume will bypass the basins via a manhole weir, discharging directly to the realigned McIntosh Drain.
- 51 The basins have been sized by T&T - refer to the attached T&T Memo, dated February 2023 (**Appendix 4**).
- 52 WDC have confirmed that stormwater attenuation is not required for the site, due to the proximity to the coast and the recently constructed stormwater pump stations that have been built with funding from the government shovel ready projects.

### Secondary Reticulation via Overland Flow Paths

- 53 The secondary flow for storm events exceeding the capacity of the primary network will be conveyed via the public road network and comply with the relevant Council Standards for maximum depth at the centreline. The secondary flow paths are to be contained within the road network and will be designed to contain the runoff from a 50-year ARI event in combination with the primary network within the prescribed limits on the depth of surface flooding.
- 54 The minimum floor levels for the site have been assumed to be at  $\approx 2.9\text{m RL}$ , based off the flood modelling completed by T&T. This determined the maximum 200-year flood level was from the Coastal Inundation Model with 1m sea level rise at  $\approx 2.4\text{m RL}$ . A 500mm freeboard allowance was then applied to this level to set the floor levels.

### Moorcroft Estate Stormwater Treatment and Attenuation Basin (Lot 3005 DP 342273)

- 55 The basin servicing the primary stormwater run-off from Moorcroft Estate aligns directly with the future road connection to Magnolia Boulevard. The basin inlet structure will need to be moved further north and a portion of the basin filled to allow for the road connection. I propose extending the northern side of the basin to compensate for the volume lost to the road connection.
- 56 Currently, the pond outlet structure discharges to an open drain that flows to McIntosh Drain. It is proposed to pipe this directly to the re-aligned drain.
- 57 It should be noted that the pond does not receive any secondary flow from Moorcroft Estate as it is flowing west away from the proposed development – this will remain the case.

### **Power and Telecommunications**

- 58 The utility companies have been made aware of the development and have not raised any concerns. The surrounding subdivisions have made provisions for future development. The underground networks can be extended from Beach Grove and Moorcroft to provide power and telecommunication connections to each lot. The exact design solution requires detailed design to be completed which is not available at this stage.

59 An 11kv overhead line crosses the site which will be re-aligned and undergrounded as part of the infrastructure works.

### **MDRZ Theoretical Maximum Yield Infrastructure Capacity**

60 I have also considered the effect on infrastructure servicing that would result from developing the North Block to the full theoretical yield allowed for under the MDRZ standards.

#### Earthworks

61 There would be no significant impact on earthworks levels or volumes resulting from a higher density. The whole site would still need to be filled to similar levels to achieve the minimum floor levels required from the flooding assessment.

#### Roading

62 I do not expect the higher density to change the overall road configuration concept or sizing significantly. Traffic volumes and trip generations would increase, which has been addressed in the traffic assessment.

#### Wastewater

63 The Beach Grove PSS network will be at capacity based off the likely yield, but as outlined above, WDC have plans to upgrade the Moorcroft pumpstation to service a much larger catchment. This pumpstation can be designed to service the maximum theoretical yield.

64 Incremental upgrades are planned to occur at the WWTP as development requires, so this doesn't pose any restriction on the proposed development density.

#### Water

65 The potable water network has the capacity to service the maximum theoretical yield of the North Block. Incremental upgrades to the headworks will be carried out by WDC as development requires.

### Stormwater

66 The stormwater treatment and primary piped network are based off pervious / impervious areas. I would expect the roading network to stay a similar size, so creating the extra lots would be a result of smaller sections. The MDRZ rules still limit building site coverage to 50%, meaning the stormwater calculations would remain similar to those already calculated. I expect this change would be able to be accommodated within the proposed Stormwater Management Area.

## **SOUTH BLOCK**

### **Development Proposal**

67 It is proposed that the development of the South Block will create approximately 96-144 residential lots ranging in area from 200m<sup>2</sup> to 350m<sup>2</sup>.

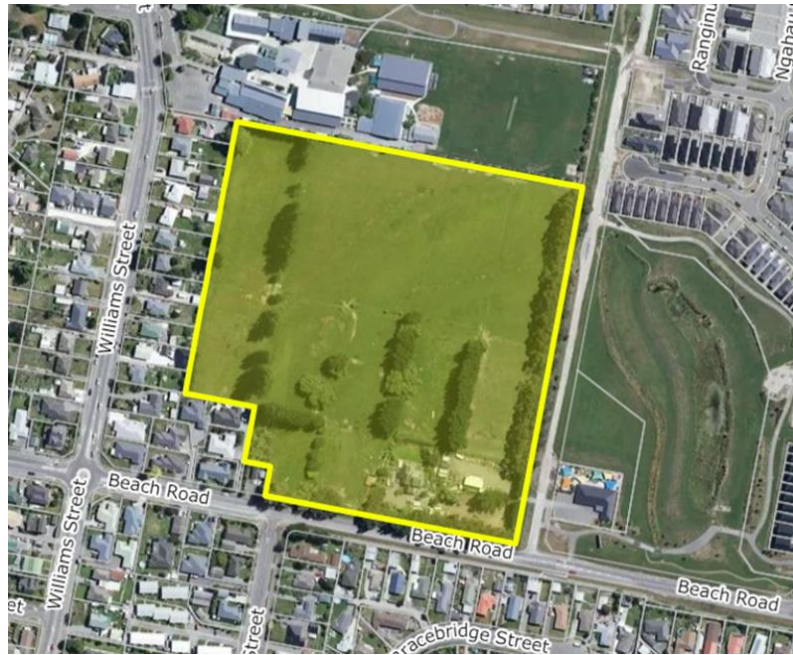
68 A road network would be extended from Beach Road, through the site with another connection extending the formed portion of the Paper Road to the east of the site.

69 The site is earmarked in the Proposed Waimakariri District Plan (Proposed Plan) as part of the Kaiapoi Future Development Area.

### **Site Description**

70 The South Block is located at 310 Beach Road, Kaiapoi, west of the existing Beach Grove development (Figure 2). The legal description of the site is Lot 2 DP 83191 (RT CB48A/608) and covers a total area of approximately 6.04ha.

71 The existing landform consists of low-lying grazing pastures and is located approximately 650m northeast of the Kaiapoi Town Centre. A shallow channel transects the site from southwest to northeast, and the south and east site boundaries are bounded by existing swales.



**Figure 2: Site Location**

## **EARTHWORKS**

### **Description**

- 72 The site is relatively flat, with a natural gradient towards the southeast, elevations range from approximately RL 1.30m on the northwest side of the site down to RL 0.90m in the east (Lyttleton Vertical Datum 1937). The proposal is dependent on filling the site to provide a minimum finished ground level RL of  $\approx 2.6\text{m}$  within each allotment and road levels which enable stormwater to drain away. These levels allow for a minimum floor level of  $\approx 2.9\text{m}$  (derived from T&T flood modelling).
- 73 The earthworks operation will involve stripping the existing vegetation and topsoil prior to the importation of approximately  $95,000\text{m}^3$  of fill material which will be placed as certified fill to achieve the proposed design levels. All earthworks will be completed as per the requirements of the ECAN and WDC earthworks standards and will be monitored by a suitably qualified geotechnical consultant.
- 74 Similar earthworks and filling were undertaken for the existing Beach Grove Development.

## **Geotechnical**

- 75 Tonkin & Taylor have been engaged as the Geotechnical Engineering Consultant for the site investigation and have completed the Geotechnical Investigation Report. All future filling operations would be monitored by a suitably qualified geotechnical consultant to ensure compliance with the design standard.

## **INFRASTRUCTURE ASSESSMENT**

### **Road Access**

- 76 A transportation assessment has been completed by Carriageway Consulting which is to be read in conjunction with this evidence.
- 77 The basic roading layout is shown on the Concept Servicing Plan provided in **Appendix 5**.
- 78 Access to the development will be via two new access roads. The main entrance will provide access from the southern boundary at Beach Road, just east of Meadow Street. The second will provide access through the eastern boundary, from the existing unformed legal road which is proposed to have the existing formation extended. The layout is a simple loop road with interconnecting local roads between to provide access to the new residential lots.
- 79 The full frontage with Beach Road will be upgraded with kerb & channel, along with extending the existing footpath (which currently terminates outside #332 Beach Road) along to connect with the unformed legal road shared path and provide a link to the Beach Grove development.

### Unformed Paper Road

- 80 The existing road formation at the beginning of the unformed paper road is proposed to be extended approximately 90m to the north, providing connection to the site. The existing shared path will be realigned along the upgraded portion of the legal road.



### Road Stormwater run-off

- 81 Stormwater runoff within the road corridors will be collected via street sumps which will discharge directly into the primary stormwater reticulation system. These sumps will be in the kerb and channels adjacent to the formed carriageway. Road corridors will be used as secondary flow paths to direct stormwater runoff should there be a blockage of the sump intakes or in larger rainfall events. Filling the site gives great scope to be able to achieve the secondary flow requirements.

### **Wastewater**

- 82 It has been confirmed by WDC wastewater team that the wastewater pump station adjacent the site is already at peak capacity and no further connections to the catchment can be made. Therefore, the site is required to be serviced by the PSS network that services the neighbouring Beach Grove development.
- 83 The existing Beach Grove development is serviced by a PSS that discharges to the Kaiapoi WWTP. As part of that development, an allowance was made in the system to service residential development within the adjacent future development area.

### Proposed Reticulation Layout

- 84 The development will utilise the existing reticulation network established in the Beach Grove Development. A concept design drawing can be found in **Appendix 5**.
- 85 A connection will be made to the 160OD PE main at the corner of Beach Road and Tuhoe Ave, extending a 90OD PE main west along Beach Road to service the site. The proposed pipelines are to be PN16 (SDR11) PE100 with sizes ranging from 40mm up to 90mm diameter.
- 86 A full hydraulic analysis with design flows, pressures, velocities, and pipe diameter is provided in **Appendix 3**. This analysis shows there is capacity within the network to service the South Block and includes the existing Beach Grove development, future stages of Beach Grove, the future North Block and the addition of this South Block site.

## Water Supply

### Existing Water Supply Reticulation

- 87 The existing Kaiapoi Township is supplied by six deep artesian wells with two headworks located at Peraki Street and Darnley Square. An extensive piped reticulation network from these headworks provides potable water and firefighting flows to properties within the township.
- 88 The “Kaiapoi Water Supply Scheme Activity Management Plan” indicates there is sufficient source capacity for future developments and upgrades are planned for expected increased future demand. This has been confirmed with Chris Bacon. There are two ideal connection points surrounding the development:
- (a) 300mm distribution main in unformed legal road
  - (b) 100mm Dia. PVC main in Beach Road

### Proposed Reticulation Layout

- 89 The proposed reticulation will be designed in accordance with the WDC “Engineering Code of Practice”. Connection will be made to the existing 300mm diameter distribution main running parallel to the site’s eastern boundary within the unformed legal road, while another connection could be made to the existing 100mm dia. PVC main in Beach Road. The site will be serviced by a combination of 180mm OD PE and 125mm OD PE diameter mains and 63mm OD PE rider mains providing connections to all lots.
- 90 Individual domestic supplies will be provided from these mains/rider mains as per WDC standards.
- 91 Fire hydrants and valves will be provided to comply with WDC standards and SNZ PAS 4509:2008.
- 92 The proposed water supply network layout has been attached under **Appendix 5**. The final layout, details, and pipe sizing can be agreed upon with WDC after inclusion within their water model during the consenting and detailed design phases of the development.

## **Stormwater**

93 A Flooding Assessment has been completed separately by T&T which is to be read in conjunction with this report.

### Existing Features

94 There is a short section of open drain on the northern side of Beach Road along the site frontage that is between two sections of piped reticulation. This open drain is to be filled in, and the existing pipeline extended to connect to the culvert under the unformed legal road to the east of the site.

### Concept

- 95 The management of the stormwater in the South Block is primarily designed to achieve the following:
- (a) Primary reticulation shall collect and convey the 5-year ARI in a pipe network to a proprietary stormwater treatment device.
  - (b) The device to treat the first flush flow of 10mm/hr on impervious areas.
  - (c) Secondary reticulation via overland flow paths designed to contain the 50-year ARI event within prescribed limits on depth of surface flooding.
  - (d) Finished floor level set with 500mm freeboard from largest 200 year flood event from T&T modelling.
  - (e) Swales surrounding the development area to contain larger events and avoid any flooding in neighbouring sites.

### Primary Reticulation

96 An indicative layout of the primary stormwater pipe network has been provided in the attached plans in **Appendix 5**. The network will collect and convey the stormwater runoff from the Site up to the 5-year ARI event. The network will discharge into the proposed swales that surround the site. Individual lots will be connected to the system via 100mm kerb adaptors which will drain via standard kerb and channel to appropriately spaced sumps connected to the main network.

### Treatment / Attenuation

- 97 It is proposed the drainage will be treated via a proprietary device, prior to discharge to the swale. The tight site constraints mean a proprietary treatment device has been determined to be the most effective treatment solution. Rain gardens could be another treatment device that works for the site.
- 98 Due to the tail water constraints within the surrounding swale, it is desirable that the device has a low driving head requirement to allow the outlet to be set as high as possible, minimising any effects from upstream surcharge. There are several devices available in the market that meet this requirement.
- 99 The concept design drawings depict a stormwater network utilising one proprietary device for the full catchment area. Further design and analysis is required to determine the optimal solution.
- 100 WDC have confirmed that stormwater attenuation is not required for the site, due to the proximity to the coast and the recently constructed stormwater pump stations that have been built with funding from the government shovel ready projects.

### Secondary Reticulation via Overland Flow Paths

- 101 The minimum floor levels for the site have been assumed at  $\approx 2.9\text{m RL}$ , based off the flood modelling completed by T&T. This determined the maximum 200-year flood level was from the Coastal Inundation Model with 1m sea level rise at  $\approx 2.4\text{m RL}$ . A 500mm freeboard allowance was then applied to this level to set the floor levels.
- 102 The swales around the external boundary of the site have been designed to accommodate these larger events and minimise flooding in the surrounding area.
- 103 The secondary flow for storm events exceeding the capacity of the primary network will be conveyed via the public road network and comply with the relevant WDC Standards for maximum depth at the centreline. The secondary flow paths are to be contained within the road network and will be designed to contain the runoff from a 50-year ARI event in combination with the primary network within the prescribed limits on the depth of surface flooding.

**Power and Telecommunications**

104 The utility companies have been made aware of the development and have not raised any concerns over capacity within their respective networks. The underground networks can be extended to provide power and telecommunication connections to each lot. The exact design solution requires detailed design to be completed which is not available at this stage, but they are confident there is a suitable solution.

**MDRZ Theoretical Maximum Yield Infrastructure Capacity**

105 I have also considered the effect on infrastructure servicing that would result from developing the South Block to the full theoretical yield allowed for under the MDRZ standards. I do not believe that the extra lots would have any significant impact on the infrastructure capacity reviewed above.

**CONCLUSION**

106 Based on my evidence above, I do not see any reason related to infrastructure servicing or capacity, why the Momentum Blocks should not be zoned Medium Density Residential Zone.

107 Thank you for the opportunity to present my evidence.

Manu Robert Miskell  
5 March 2024

**APPENDICES**

Appendix 1 – North Block Concept Engineering Drawings  
Appendix 2 – Proposed ODP  
Appendix 3 – Pressure Sewer System Design Calculations  
Appendix 4 – T&T Stormwater Basin Memo & Woods SW Catchment Calculations  
Appendix 5 – South Block Concept Engineering Plan