Whanganui District Council

MILL ROAD STRUCTURE PLAN

FEBRUARY 2020

Executive summary

This structure plan, prepared in collaboration with Whanganui District Council staff, seeks to guide and inform the provision of infrastructure in the Mill Road Manufacturing zone as provided for by the existing District Plan which identifies the subject area as Manufacturing Zone. The subject area is mapped in Appendix A and referred to as the 'SP area'. The intent of the structure plan is to enable industrial development in this SP area.

The structure plan is guided by Council policy and plans and works with the zone's existing infrastructure and context to address key development. Specific matters identified as having the potential to constrain development of the SP area include large gas mains bisecting the site, overland stormwater flow paths, and the potential for reverse sensitivity issues (complaints from adjacent residential properties). Early engagement with stakeholders on-site has also identified the importance of urban design to the landowners and occupiers of the site, as well as the need for flexibility of development.

The structure plan acknowledges these requirements and recommends an infrastructure layout to service the entire SP area, while promoting flexibility of development of individual sites. It addresses the existing stormwater issues and proposes wastewater and water infrastructure to accommodate the potential for future development of light or medium industry in the area. The structure plan also incorporates feedback from non-council infrastructure providers (gas, electricity and telecommunications) which alongside other stakeholder feedback, has influenced how development across the SP area is recommended to come forward. A staged approach to development is proposed.

To enable Council to identify and plan for the timely provision of road and three waters investment required for infrastructure development, three waters and road infrastructure likely to be vested to Council on completion, is accompanied by a high level costing for each stage of development.

To promote the amenity and safety of the SP area, reduce the potential for reverse sensitivity issues, and incorporate stakeholder's prioritisation of urban design principles, a high level landscape approach has been prepared to integrate transport and stormwater infrastructure, and create a distinct boundary between the SP area and the nearby residential environment.

A number of recommendations have been made to further guide the timely provision of infrastructure and development of the SP area:

- Prepare an implementation plan to ensure orderly staging and implementation of key infrastructure projects in anticipation of future development
- Implement Action 31 of the Whanganui Urban Transportation Strategy 2011 being:
  - Upgrade the road connection between Mill Road and Manuka Street to provide additional route security from Castlecliff; and
  - Install traffic calming along Manuka Street to protect residential street from increased traffic volumes.
- Upgrade and extend the water main from Mill Road to Fitzherbert Avenue as provided for in the Long Term Plan budget
- Prepare and implement a consultation strategy to ensure all relevant parties are engaged, including:
  - Landowners within and adjacent to the SP area
  - Castlecliff residential community

- Prospective industrial businesses and general industrial business community;
- Aranui School - with particular regard to the proposed shared path and how they would like to use the shared path;
- FirstGas – to work through the costs and requirements of building infrastructure over and alongside the gas-mains easement bisecting the zone;
- Powerco – to ensure that their plans continue to align with and keep abreast of development;
- Other key stakeholders and partners including developers, Iwi and Hapu (partners), statutory organisations and other key interest groups or individuals; and
- The public and local communities.

The strategy should also encompass the implementation stages of development to ensure that Council has a good understanding of forward development plans and can ensure the timely provision of infrastructure.

- Consider designating the elements of the stormwater system that are required for Stage 1 and Stage 2 and the essential elements required to manage stormwater across the SP area. This includes:
  - The southern and northern open drains;
  - The stormwater attenuation area;
  - The overland flow path parallel to Mill Road; and
  - The Mill Road drain between the attenuation area and Mosston Road.
- Incorporate the key elements of this structure plan into the District Plan by way of a plan change. This should include associated changes to Plan provisions including investigation of:
  - Identify appropriate mechanisms to enable the proposed staging (e.g. rules making development dependent on infrastructure provision);
  - Identify appropriate mechanisms to limit access onto Waitai Road (e.g. under the Local Government Act 1974 – limited access roads, traffic calming treatments, road closure or stopping);
  - Consider whether a requirement for noise insulation should be applied to noise sensitive activities establishing in zones adjacent to the SP area; and
  - Identify landscape and urban design provisions appropriate to an industrial amenity in the SP area. These should address both CPTED and amenity matters.
- Extend the Springvale/Otamatea Development Contributions Policy to incorporate growth projects in the Mill Road Structure Plan area.
- Design connections between the Mill Road shared pathway and the wider Whanganui cycling network and update the Active Transport strategy accordingly.
- Confirm a timeframe and approach for the upgrade of the intersection between Mill Road and Mosston Road when traffic numbers using the intersection require it.
- Advise the developers of 103 Manuka Street or 15 Rakau Road of their obligation to undertake contaminated site investigations when developing to ascertain whether consent and contaminated land management is required.
- Review the design and construction recommendations arising from the 2019 geotechnical and hydro-geological investigations when designing infrastructure for the remaining stages of development to reduce the likelihood of settlement, static and seismic instability or lateral spreading.

- Confirm the water infrastructure and connection to the existing water supply network is also required following the survey currently being carried out by Council to locate the cause of an anomaly identified in the water model.

LIMITATIONS

This report has been prepared by GHD for and may only be used and relied on for the purpose agreed between GHD and Whanganui District Council. GHD otherwise disclaims responsibility to any person other than those arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

GHD prepared this report on the basis of information provided by Whanganui District Council and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD prepared the preliminary cost estimates set out in section 5 of this report ("Cost Estimate") using information reasonably available to the GHD employee(s) who prepared this report, and based on assumptions and judgments made by GHD. The cost estimate has been prepared for the purpose of this structure plan and must not be used for any other purpose.

The cost estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the cost estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD does not represent, warrant or guarantee that the project can or will be undertaken at a cost which is the same or less than the cost estimate.

Table of contents

Table index

Figure index

Appendices

1. Introduction

1.1 Overview

Whanganui District Council commissioned GHD to prepare an infrastructure structure plan for an area of 107 hectares on the outskirts of Whanganui known as the Mill Road Manufacturing zone (SP area). The area was previously known as Westbourne Estate and it has been zoned to provide for industrial / manufacturing development since the 1980s. As of February 2020, only a limited portion of the SP area has been developed for industrial purposes. This is thought to be due in part to the lack of available on-site infrastructure and known stormwater management issues.

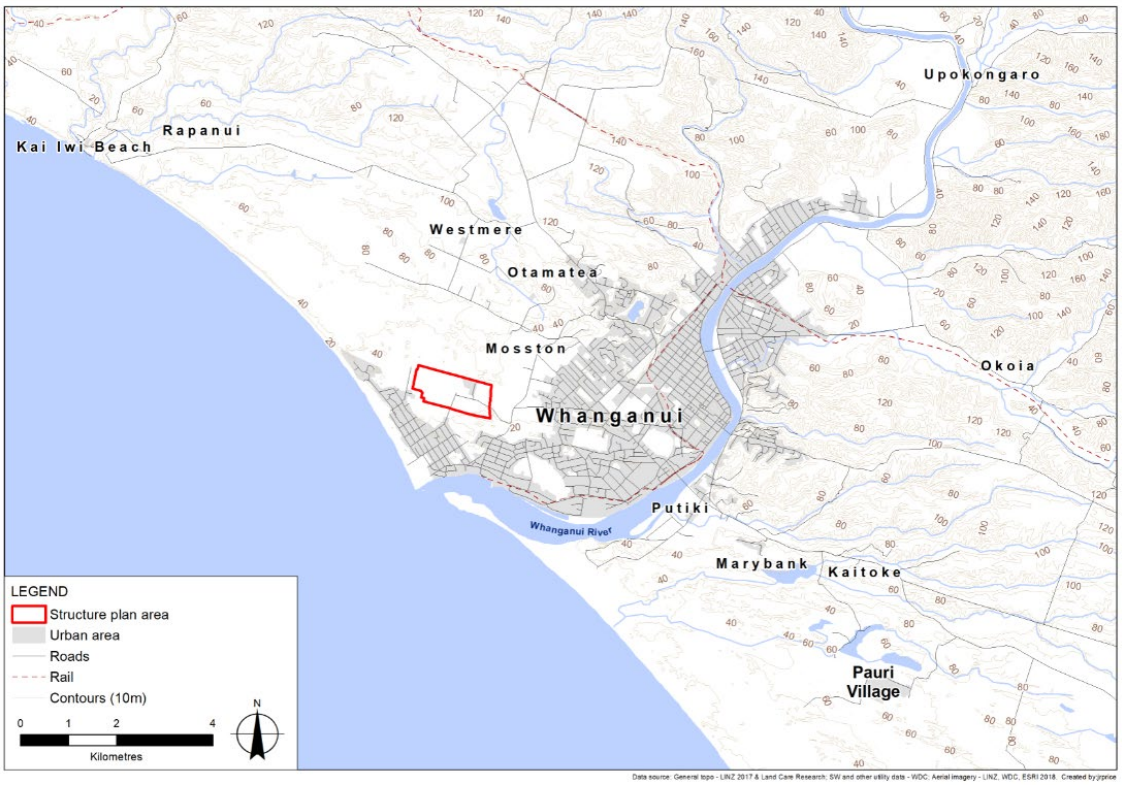

Figure 1: Site location (see Appendix A for a larger version)

The purpose of commissioning the structure plan is to establish a plan to guide development of the entire zone, and manage the effects and demands of development in an orderly, integrated manner. It provides guidance and direction to developers and the community about potential development and infrastructure services available to support the development. Taking a whole of SP area and co-ordinated approach to infrastructure allows for cost effective and efficient provision of infrastructure.

This document is set out in two parts: Part 1: Context, and Part 2: Future development. Part 1 provides the basis for the recommendations and proposed layout in Part 2. This provides a basis for engagement with landowners and the wider community to ensure that layout and infrastructure the Mill Road SP area is fit for purpose, and will enable and facilitate future industrial development in the area.

1.2 How was the structure plan developed?

GHD worked with Council officers to achieve four key outcomes through the structure plan process:

1. Identify the infrastructure necessary to support the expansion of industry in the SP area;
2. Provide an indicative roading and active transport layout within the SP area;
3. Develop a stormwater management system which maximises the potential for industrial development within the SP area and identifies where ponding and flow paths / swales should be located; and
4. Develop a plan to integrate all infrastructure components in a manner which maximises the development potential and amenity of the area.

The process to develop the structure plan involved site visits, consultation with landowners and network utility providers, review of strategic documents, desktop geology and hydrogeology studies, development of a landscape design, concept plans for three waters services and road transport infrastructure. Documentation of these processes is included in the appendices.

Figure 2: Mill Road structure plan area from the east (photo courtesy of GHD)

1.3 How will the structure plan be implemented?

Council intends that the structure plan be incorporated into the District Plan, Long Term Plan, and Infrastructure Strategy. Once incorporated, the structure plan will be given effect to by developers, infrastructure providers and Council.

Before the structure plan is incorporated into the District Plan, it can still be considered as 'another matter' when assessing a resource consent application, pursuant to section 104(1)(c).

1.3.1 District Plan

Council is currently reviewing District Plan provisions relating to industrial activities and environments (Plan Change - PC54). Relevant provisions of this structure plan will be incorporated into the Plan via PC54. PC54 will be subject to a consultation process in accordance with Schedule 1 of the Resource Management Act 1991 (RMA), and will be publicly notified (in full) once approved for notification by the Council in 2020.

This process will give the community and other stakeholders including affected landowners, other infrastructure providers, Aranui School, community, and Iwi and hapu the opportunity to provide feedback on the structure plan approach within the context of the wider industrial development resource management considerations.

1.3.2 Long Term Plan, Annual Plan and Infrastructure Strategy

The first stages of the infrastructure projects and budget required to support the structure plan will be included in Council's next annual plan review process, which will be open to consultation, giving stakeholders the opportunity to further comment on the proposed investment.

The identified infrastructure and the staged approach to provision set out in the structure plan will also be incorporated into Council's 30 year Infrastructure Strategy as part of the next review of the Long Term Plan, which again will be open to public consultation.

Part 1: Structure Plan Context

2. Structure Plan Purpose and Objectives

2.1 Mill Road Structure Plan purpose

The purpose of the structure plan is to provide a co-ordinated and strategic approach to developing the infrastructure needed to service the Mill Road zone in an efficient, cost-effective manner, and enable industrial development.

2.2 Mill Road Structure Plan objectives

To achieve the structure plan purpose, the following objectives were established to guide the structure plan development:

- Identify key three waters servicing and infrastructure requirements for industrial development as per the existing zoning;
- Set out a high level, indicative road layout which retains maximum flexibility for the industrial site requirements whilst providing a services 'spine' throughout the SP area;
- Identify staging opportunities for infrastructure provision across the SP area;
- Provide high level indicative infrastructure costs;
- Provide a high level landscape approach for the SP area; and
- Integrate measures to treat stormwater into the landscape design.

Figure 3: Current dominant land-use across the zone (photo taken from the edge of Rakau Road looking south - courtesy of GHD)

3. Strategic Context

This section sets out the key documents and matters that provide the design principles, statutory environment and overall principles guiding the structure plan.

3.1 National Policy Statement on Urban Development Capacity (NPS-UDC)

The NPS-UDC came into effect at the end of 2016. It requires local authorities to provide sufficient developable land (i.e. land with sufficient infrastructure support) to meet the projected housing and business growth demand over the next 30 years. This structure plan, in combination with other growth planning, will assist Council meet its NPS-UDC obligations.

3.2 Whanganui Leading Edge

The Council adopted its vision document "Whanganui Leading Edge" in 2014. This document sets out: goals, actions and monitoring measures which Whanganui District Council can build upon to create a progressive and exciting district. Important themes include community, connectivity and creativity. The structure plan aligns with the "Leading Edge" philosophy by planning infrastructure for the zone, including transport infrastructure that promotes industrial growth in Whanganui.

The following strategic objectives of the "Leading Edge" vision are directly advanced through this structure plan and development of the Mill Road Manufacturing zone:

- *Pursue integrated and rejuvenated urban design, place-making and landscape approaches*
- *Look after our infrastructural network and assets with a view to the future – making sure that we couple this to the sustainable use of technology and other materials*
- *Ensure our services and facilities reflect the diverse and changing needs of our community*
- *Act as a facilitator and enabler for development*

3.3 Economic Development Strategy for Whanganui

Whanganui's "Economic Development Strategy for Whanganui" was approved by the Council in 2019. It builds on 'Whanganui Leading Edge' by setting out economic priorities to drive growth and achieve a prosperous Whanganui. This structure plan sets out an enabling framework for infrastructure provision to support economic growth, as per the Economic Development Strategy.

3.4 Whanganui District Plan

The Whanganui District Plan is a legally binding statutory document prepared in accordance with the Resource Management Act 1991 (RMA). The District Plan defines the zoning of all land in the District and sets out objectives, policies and rules for development in each zone. Detailed discussion of the existing zone and provisions that regulate development in and around the Mill Road Manufacturing Zone is provided in Section 4.2.2 below.

3.5 NZS 4404:2010 Land Development and Subdivision Infrastructure and Whanganui District Plan Appendix I WDC Engineering Document 2016

NZS 4404:2010 Land Development and Subdivision Infrastructure (NZS 4404: 2010 Standard) is a produced by Standards New Zealand., which sets out criteria for design and construction of land development and subdivision infrastructure. It covers the three waters, roads, earthworks, geotechnical needs and other network utility services.

Whanganui District Council has adopted NZS 4404: 2010 as the standard that all infrastructure regulated in the District Plan must meet. The Whanganui District Plan includes an Appendix I, which amends and provides notations to some of the NZS 4404: 2010 provisions to refine requirements to achieve best practice design appropriate for the Whanganui environment.

Where possible, the structure plan will use the standard to guide the design of the proposed infrastructure. Adherence to NZS 4404: 2010 and Appendix I promotes sustainable development, modern design, and incorporate urban design principles to deliver high quality, long-lasting and fit for purpose infrastructure for the zone.

3.6 Whanganui District Council 10-year Plan

Long Term Plans (LTPs) are required under the Local Government Act and have a number of functions, including describing desired community outcomes, outlining the role the Council will play in achieving those outcomes, and identifying some of the key challenges facing the Council over the next 10 years.

The LTP also provides a detailed overview of the activities Council will carry out, including: the costs of activities and services Council is planning to provide, and how they will be funded. Any upgrades or additional infrastructure required in the SP area, which are not entirely paid for by developers, or are beyond what set out in the current LTP, will need to be considered for inclusion in a future LTP.

3.7 Whanganui Urban Transportation Strategy 2011 (WUTS)

The WUTS identifies key transport objectives and actions the Council and community will take to reach Whanganui's wider strategic goals. Of the six themes set out in the strategy, of particular relevance to the structure plan are:

- *Theme 4 – Enhancing Freight Movement;*
- *Theme 5 – Real Transport Choices; and*
- *Theme 6 – Integrating Land Use and Transport Processes.*

The WUTS prioritised a number of actions to give effect to these themes. Specific (summarised) actions which affect the zone are:

- *Action 31: Design and construct an extension to Mill Road to link to Manuka Street and undertake treatments on Manuka Street to discourage use of the street by industrial traffic (high priority)*
- *Action 41: Pedestrian Improvements across the district (medium priority)*

These priority actions and themes have been considered within the development of the structure plan and are incorporated into the structure plan recommendations.

3.8 Whanganui District Council Street Tree Strategy

The 2016 strategy identifies trees as essential assets, which are to be provided in new urban development, and considered at sub-division planning level. Trees have been integrated into the high level landscape design for the structure plan, and are an important feature as both a buffer, and to integrate existing landscape elements into the plan.

3.9 Natural Hazards and Climate Change

Amendments to the Resource Management Act (RMA) in 2017 require recognition and provision for the management of significant risks from natural hazards as a matter of national importance[1]. Section 7 of the RMA also requires that particular regard shall be given to matters related to climate change.

Climate change effects expected in Whanganui include warmer temperatures, changing rainfall patterns and increased risk of flooding[2]. These have the potential to exacerbate existing flooding and potential erosion issues in the Mill Road zone.

Infrastructure within the zone should be designed to provide resilience to natural hazards and conditions, and to accommodate risk of exacerbated flooding and erosion issues.

3.10 Urban Design Protocol and Crime Prevention through Environmental Design

The Whanganui District Council incorporated the NZ Urban Design Protocol into its key guiding documents including *Whanganui: Leading Edge,* and the Whanganui District Plan. The Whanganui District Plan incorporates the key principles of the Urban Design Protocol and Crime Prevention through Environmental Design (CPTED) to promote liveability, and people focused spaces. The structure plan incorporates these principles:

Context The structure plan acknowledges and understands the site specific and broader context that the Mill Road Manufacturing Zone sits within, including consideration of the natural environment, processes, adjacent transport corridors and land uses. This includes utilising the existing topography to manage stormwater and integrate the landscape and infrastructure.

Connections The importance of connections both to and within the site is emphasised, as is the need to provide for different transport modes to promote the safe and easy movement of people.

Collaboration The structure plan has been developed by contributions from different disciplines and perspectives in order to design a plan, which integrates land use, structure and networks.

CPTED A design approach, which considers what opportunities an area or type of activity (in this case industrial) could offer for crime or undesirable activities. With this in mind, the area is designed to avoid or minimise these opportunities. Specific issues addressed in the structure plan include:

- providing well-connected, well defined easy to read routes which avoid industrial cul-de-sacs;

[1] Resource Management Act, 1991, s 6(h)

[2] http://www.mfe.govt.nz/climate-change/how-climate-change-affects-nz/how-might-climate-change-affect-my-region/manawatu-and (sourced 25 September 2017)

- routes which are easy to navigate and orient to;
- promoting public space design that achieves visibility and lighting to improve people's ability to passively observe activity and identify other individuals; and
- landscape design which preserves visibility across the site, and avoids opportunities for offenders to hide.

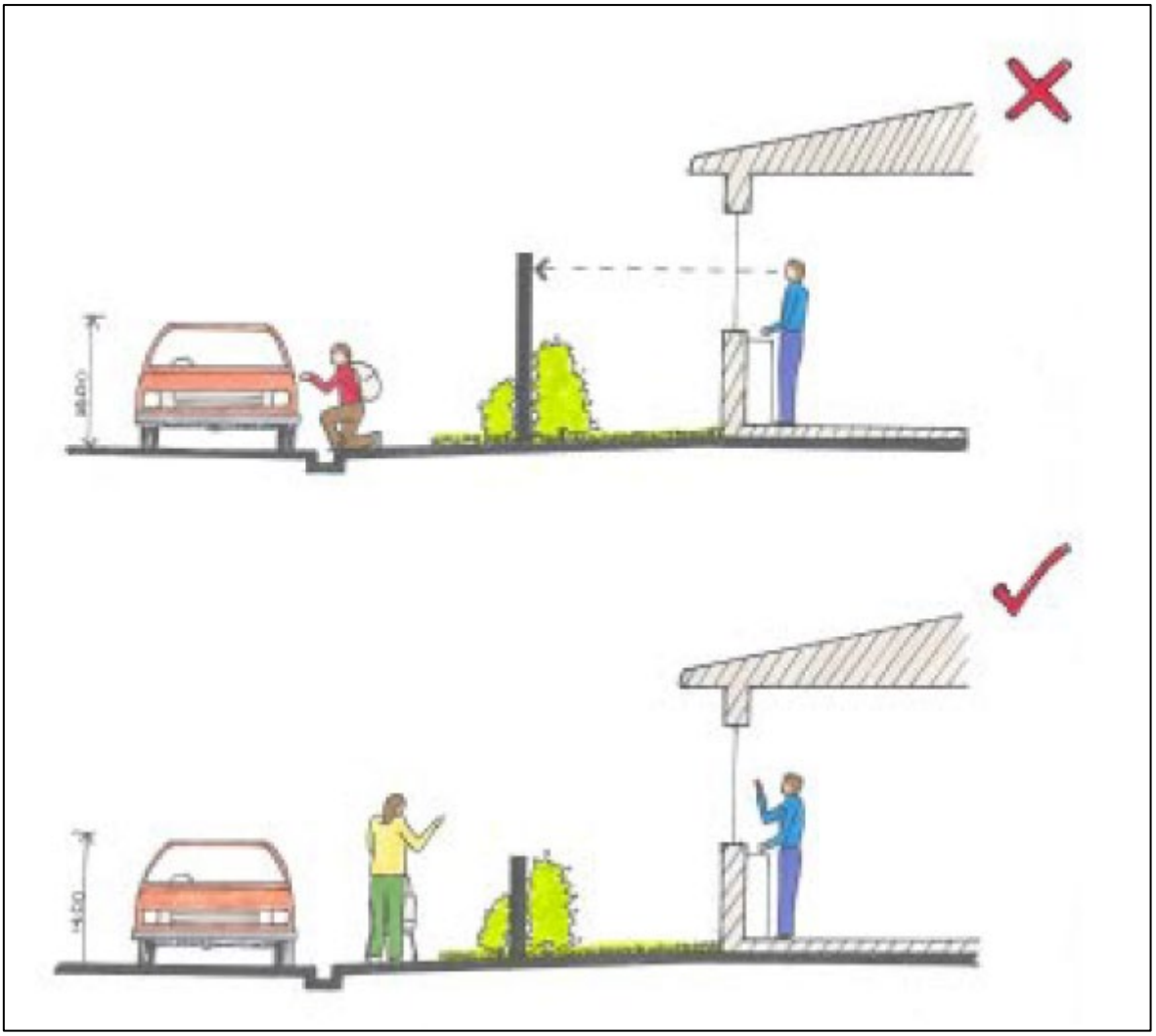

Figure 4: Example of CPTED improvements to a streetscape (image sourced from Safer Canterbury, Creating Safer Communities (2004))

4. Site Context and Description

4.1 Site history

Whanganui District Council created the area now known as the Mill Road Manufacturing Zone in the late 1980s in response to a perceived lack of industrial land available. The new zone was initially named Westbourne Industrial Estate[3].

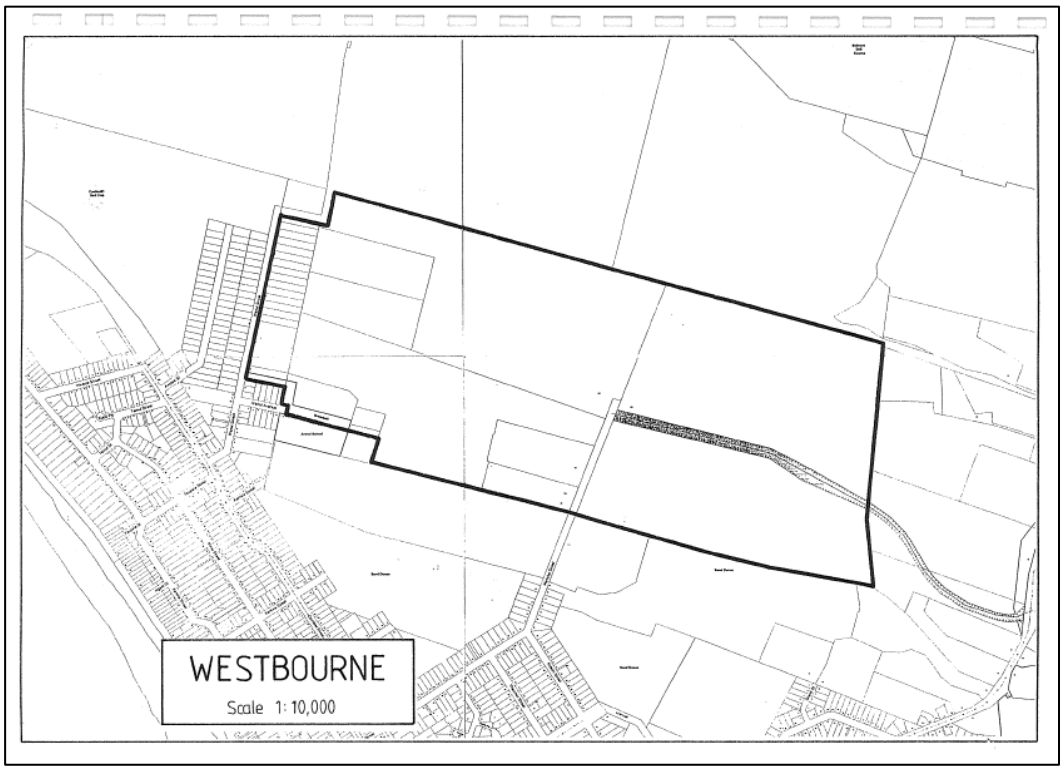

Figure 5: Westbourne Estate circa 1998[4]

Little development occurred onsite until the 2000s when Mill Road was constructed, alongside the installation of limited gas, electricity and three water services. The infrastructure was provided in part to attract a pine timber mill to Whanganui, which was subsequently built on Council-owned land and became the first industrial-type development within the Estate. The mill operation was eventually unsuccessful, and closed in 2004[5].

Subsequently, Council sold the 14ha lot that once held the mill[6] and in 2011, the former mill site was developed into a 15 lot industrial subdivision (the Rakau Road Development). This area is now the larger of two pockets of industrial development in the SP area.

Commercial interest in the SP area is growing. In October 2019 Council approved a 26-lot development for Wights Aluminium on the eastern lot bordering the Rakau Road development. Developers have also shown interest and drawn up indicative subdivision plans for a site at the western boundary of the Rakau Road Development

[3] MWH NZ Ltd, Wanganui Water Services Westbourne Estate Service Options Report 3 (2005)
[4] Truebridge Callender Beach LTD, Industrial Growth Study for the Wanganui Urban Area (1998)
[5] Excitement Builds at Industrial Sites. Available at http://www.nzherald.co.nz/wanganui-chronicle/business/news/article.cfm?c_id=1503422&objectid=11047608, Accessed on 11/09/17.
[6] Ibid

4.1.1 Westbourne Estate Service Options Report

In 2005, Whanganui District Council commissioned a report into the feasibility and costs to provide infrastructure servicing for the then Westbourne Estate[7]. The report focused on the three water infrastructure services, as these were identified as a major infrastructure constraint limiting development in the area[8]. The report proposed only enabling industry with light to medium water usage to develop on-site due to wastewater infrastructure constraints. The report also set out a recommended approach for the provision of roading, power and telephone infrastructure across the entire Estate area.

The bulk of the report's recommendations were not implemented, and the zone is still largely unserviced, except for the Rakau Road development area, which either utilises the services built for the previous timber mill, or is self-serviced to the boundary.

4.2 Site description and land use

4.2.1 Physical characteristics, geology and geomorphology

The topography of the site is dominated by sand dune morphology, with relic dune features running east-west across the site. The dune features typically range between 1m to 3m in height and the general surface gradient of the site is from north to south, towards the Whanganui River, with some undulating areas associated with the sand deposits across the site[9]. See Figures 6 and 7 which shows some relic dune features across the site. Small scale instability of the relic sand dunes was observed on a site walk-over undertaken in September 2017 by a GHD hydrogeologist.

Figure 6: Remnant dunes (looking west from Manuka ST - photo courtesy of GHD)

[7] MWH NZ Ltd, Wanganui Water Services Westbourne Estate Service Options Report 3 (2005)
[8] MWH NZ Ltd, Wanganui Urban Growth Strategy Review (2005)
[9] GHD Ltd, Mill Road Structure Plan – Groundwater Desktop Review for Whanganui District Council (2017)

Low-lying areas within the depressions between the sand dunes are prone to becoming boggy, or have standing water present during winter and high rainfall events. This indicates poor drainage and potentially high groundwater levels at the site[10]. Investigations indicate that ponded surface water may be caused by a combination of high groundwater levels in some locations and/or top soil of low permeability causing low infiltration rates[11].

According to the geological studies and maps of the area, the site is underlain by loose, poorly consolidated sand mainly in fixed dunes[12]. These conditions, alongside results of recent geotechnical and hydro-geological investigations, suggest there is risk of interstitial[13] settlement and subsidence.

Site investigations[14] also indicate the presence of acid sulphate soils (ASS) across the SP area which can lead to problems including:

- Corrosion of infrastructure,
- Subsidence,
- Generation of acidic run-off,
- Other potential environmental and ecological concerns affecting soil, surface water and groundwater quality.

These issues are likely to arise during soil excavation or lowering the water table at the site (i.e. dewatering). In Appendix C, a summary of ASS conditions in the SP area is provided along with high level information about how landowners or developers can manage these risks during any sub-surface works, or works that may potentially lower the water table in the SP area[15].

Moderate to strong earthquakes have caused damage to earthquake prone structures, liquefaction, and some landslides elsewhere in Whanganui,[16] which indicates the potential for similar effect in the SP area[17].

[10] Ibid
[11] Ibid
[12] Ibid
[13] Interstitial settlement is settlement that occurs in in intervening spaces
[14] GHD Ltd, Mill Road Industrial Zone Structure Area Acid Sulphate Soil Notification for Whanganui District Council, March 2019
[15] Ibid
[16] Mill Road Structure Plan – Groundwater Desktop Review for Whanganui District Council (2017)
[17] Ibid

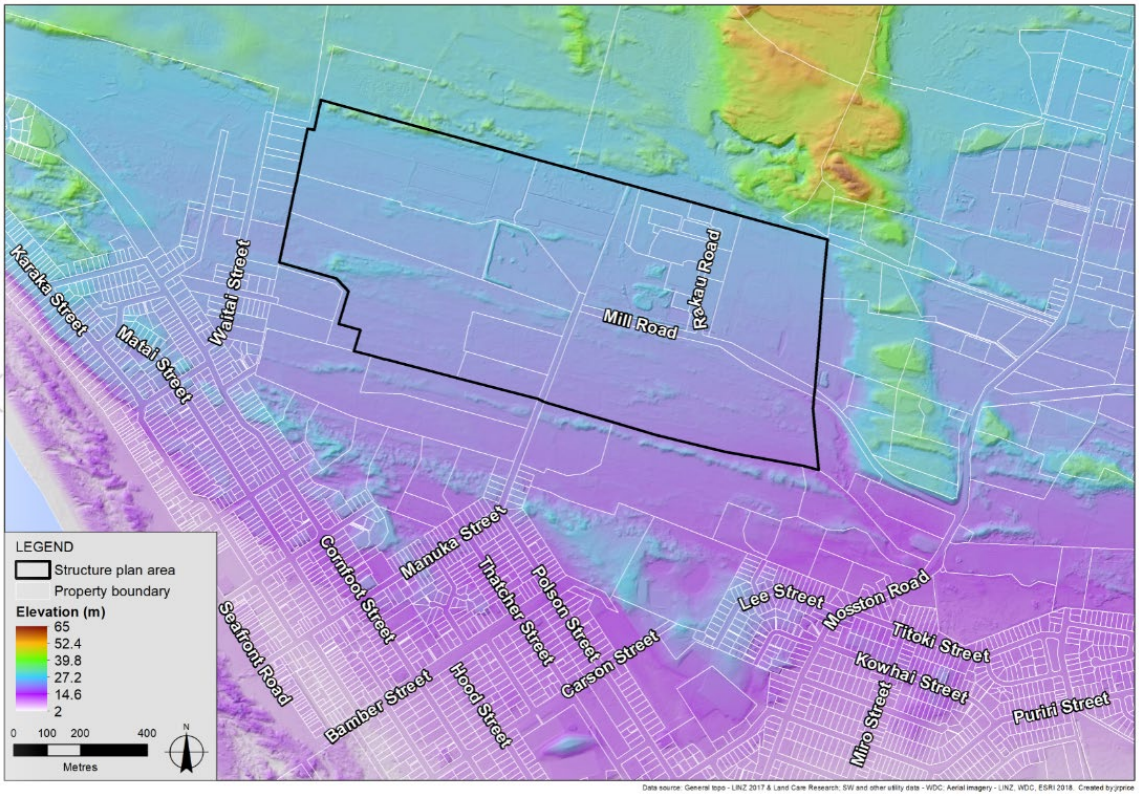

Figure 7: LIDAR Map Displaying the Topography of the Site (see Appendix A for a larger version)

Implications of the physical and geological characteristics

The unevenness of the topography across the site needs to be utilised in the infrastructure design, so as much gravity driven infrastructure can be incorporated as possible.

The on-site conditions, in particular the potential for slope instability, ground settlement, liquefaction and volume reduction, have the potential to result in unstable buildings and flooding. Hydrogeological and geotechnical investigations undertaken in 2019 have resulted in construction and design recommendations which should be taken into account when designing or building within the SP area.

Landowners and developers should be advised of the ASS conditions and the need to develop an ASS Management Plan when developing their sites.

4.2.1 Tenure and Land use

The SP area is dominated by large areas of flat to rolling areas of pasture generally used for grazing. There are scattered stands of trees and shelterbelts at paddock boundaries, butvery little of the on-site vegetation is native. Approximately 19ha of the land is owned by Whanganui District Council, the area of which is shown below in Figure 8. The remaining land is in private ownership.

The smaller of the two existing developed areas is used for a family operated storage and distribution business. The larger pocket of industrial development is held in a number of separate titles with three waters and electricity infrastructure services provided to the boundary. A range of businesses are located there, including manufacturing services such as heating

systems and doors, a farm bike maintenance workshop, landscaping suppliers and a medical centre.

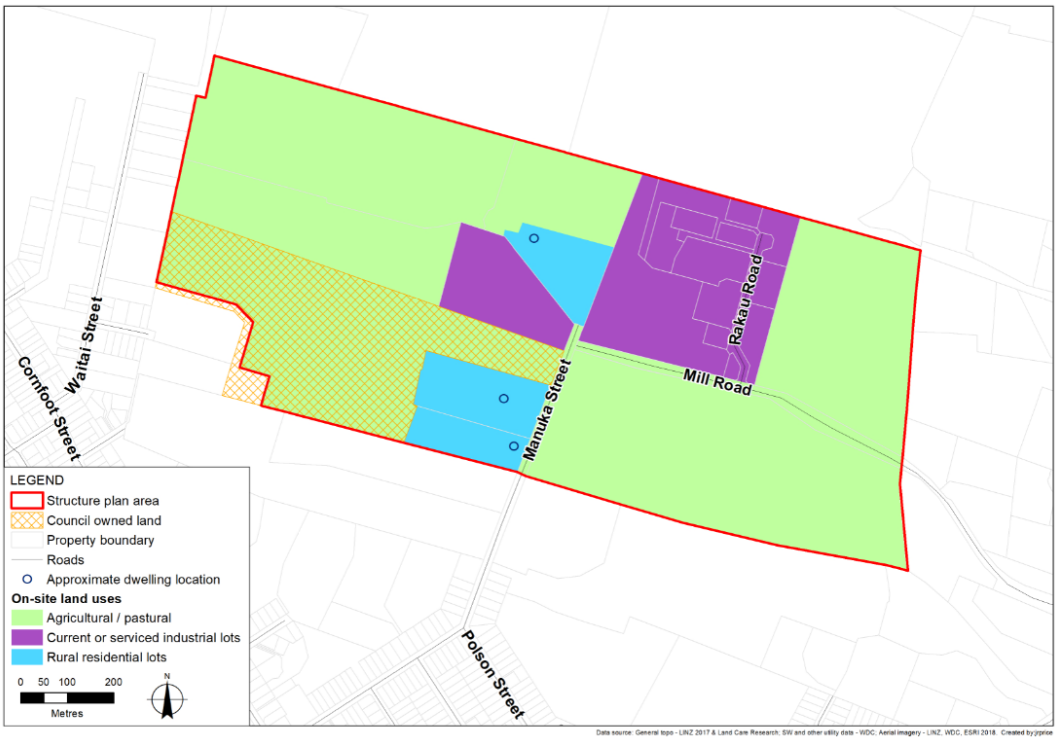

Figure 8: Land use (See Appendix A for a larger version)

4.2.2 Site surrounds and Whanganui District Plan zoning

In the main, the SP area's immediate surrounds have a strong rural feel to them. The western edge of the site is bordered by either rural residential or pastural lots. As seen in Figure 9, more rural-residential lots also border the SP area to the north-east and the south-west, while land bordering the SP area along the northern border is predominantly pastural in nature.

Aranui School is located to the south-west, separated from the SP area by a field. As the Whanganui wind direction is predominantly north-west and westerly, noise and any other emissions from the SP area activities are unlikely to travel toward the school and the western boundary rural-residential lots.

The residential suburb of Castlecliff is found to the south of SP area, but distinctly separate as a line of 2-3m high line of remnant dunes create a natural southern border to the SP area. The dunes are visible in Figure 9, while the zoning is shown in Figure 10.

Figure 9: Site surrounds (see Appendix A for a larger version)

District Plan zoning

The SP area is zoned Manufacturing, which permits industrial and manufacturing activities[18] and associated commercial activities, subject to performance standards. These standards relate to managing light and noise effects (standards 6.5.1 and 6.5.2), height and recession planes (standard 6.5.5) and hazardous substances (standard 6.5.4).

The light, height and recession plane and noise standards manage potential effects from activities in the Manufacturing Zone on the surrounding environment. There are also noise insulation standards that are required to be met by new development within the Manufacturing Zone (Provision 17.5.2). Subdivision in the Manufacturing zone is a controlled activity under the District Plan, but as set out by the standard 13.7.2, there is no minimum or maximum lot size in the Zone.

As shown in Figure 10, the area immediately surrounding the SP area is dominated by land zoned for Rural General activities. There is a small amount of Residentially-zoned land surrounding Aranui School to the southwest.

Between the SP area and Castlecliff, stretches of land are zoned as Reserves or Open Space. It is understood that these areas were zoned in this way to protect the SP area from residential creep up from Castlecliff. This separation from residential Castlecliff is particularly important as development in the zones surrounding the SP area is not subject to the aforementioned light, height, recession, noise insulation and hazardous substance standards required of development within the Manufacturing Zone. The separation creates a buffer reducing the potential for adverse effects and complaints between the different zone occupants (reverse sensitivity).

[18] Meaning any activity which involves the processing, production, assembly, packaging, testing, repair, storage of materials, goods, products, vehicles and/or equipment (includes funeral parlours and living quarters for a caretaker) (Whanganui District Plan, Chapter 2 - Manufacturing Activities,

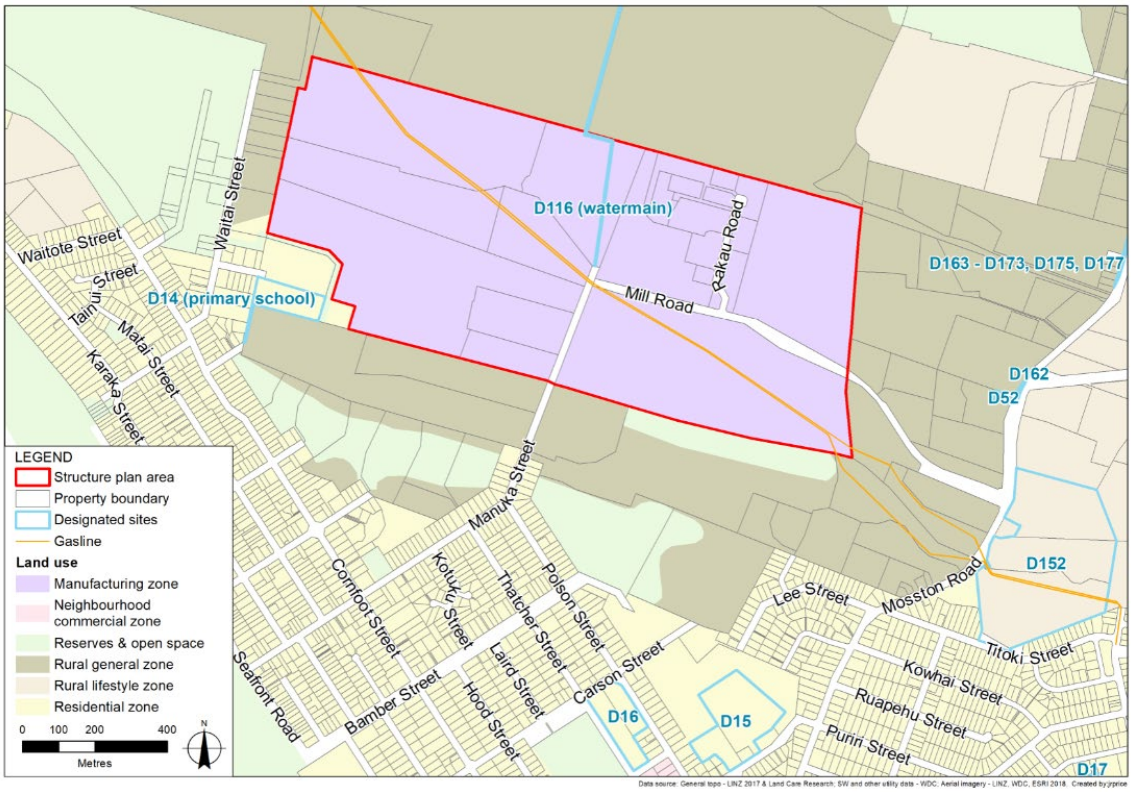

Figure 10: District Plan zoning and relevant features (see Appendix A for a larger version)

Designations and Easements

As shown in Figure 10, a designation for the purpose of water supply runs through the middle of the zone, and two high pressure gas pipes also cross the area. The gas pipes are protected by an easement which does not permit any development within 9m of the gas pipes, unless permission is given by the pipeline owners FirstGas. The exact location of the pipes is still to be confirmed.

Site surround and District Plan zoning implications

The SP area is already zoned for industrial activity, and historically has been surrounded by rural land uses. Council has successfully retained a separation between suburban Castlecliff and the SP area by the use of strategic zoning, but there are a number of rural-residential lifestyle blocks which have developed in the rural surrounds. While new development within the SP area is required to meet noise insulation standards, the surrounding residential dwellings are also noise sensitive, and it is worth considering whether noise insulation, or other reverse sensitivity protection measures should also be required of new development in the surrounding area.

As subdivision is not constrained by District Plan lot size restrictions, the infrastructure and space requirements of any new industrial development can drive new subdivision, rather than planning requirements.

Archaeology and cultural heritage

The District Plan identifies no sites of archaeological or cultural heritage within the SP area. A separate archaeological assessment was completed by Archaeology North Ltd in 2020[19]. It records no evidence of sites within the SP area, but does record a recent midden discovered in road reserve adjacent to 79 Mosston Road, approximately 400m from the eastern end of Mill Road (R22/583). The report concludes that:

> "*The Mill Road review area has a comparatively low risk for the presence of archaeological remains. However, limited archaeological remains could potentially to be present within the review area. Archaeological remains of Māori origin are most likely to originate from short term seasonal utilisation of swamp and scrub land resources, such as birds, fish, koura and eels, as well as raupo, or other wetland plant resources…..*
>
> *….However, there is also a possibility that evidence of stone working and the hunting and cooking of moa, as described by the 19th century commentators, may extend into the Mill Road area. If such sites are present they are likely to be buried under the Mosston series of dunes. Evidence associated with early Māori settlement or moa hunting would be of very significant scientific value."*[20]

The low dunes at the Mosston Road and the dunes west of Manuka Street have the highest potential for archaeological remains. Generally the dunes across the SP area have the highest potential for discovery of buried remains.

Archaeological sites, whether registered or not, are protected under the Heritage New Zealand Pouhere Taonga Act 2014 (s 42).

Contaminated Land

Horizons Regional Council has previously confirmed that none of the lots within the zone are identified as having a history of hazardous activity or industry use. Whanganui Council's own records indicate that 15 Rakau Road and 103 Manuka Street have a land use history which includes activities on the Hazardous Activities and Industries List. Any development or subdivision on either of these lots will require an investigation to determine the effects of any potential contamination, and identify whether resource consent is required for development in a contaminated site.

Designations, contaminated land and heritage implications

The Council is committed to working together with hapu and iwi to address cultural implications of development in the SP area. This has commenced as part of the mandatory review of the District Plan provisions relating to industrial activities and the Manufacturing zone currently underway.

Development or subdivision of two lots in the SP area will likely require contaminated land investigation, and potentially require consent if contamination is found.

[19] Archaeological Review of Mill Road Manufacturing Zone, Whanganui for Whanganui District Council, Michael Taylor and Annetta Sutton (Archaeology North Ltd) February 2020.

[20] Ibid page 36

4.3 Three Waters Infrastructure Services

The three waters services available in the study area or its vicinity are shown in Figure 11 and are discussed in more detail below.

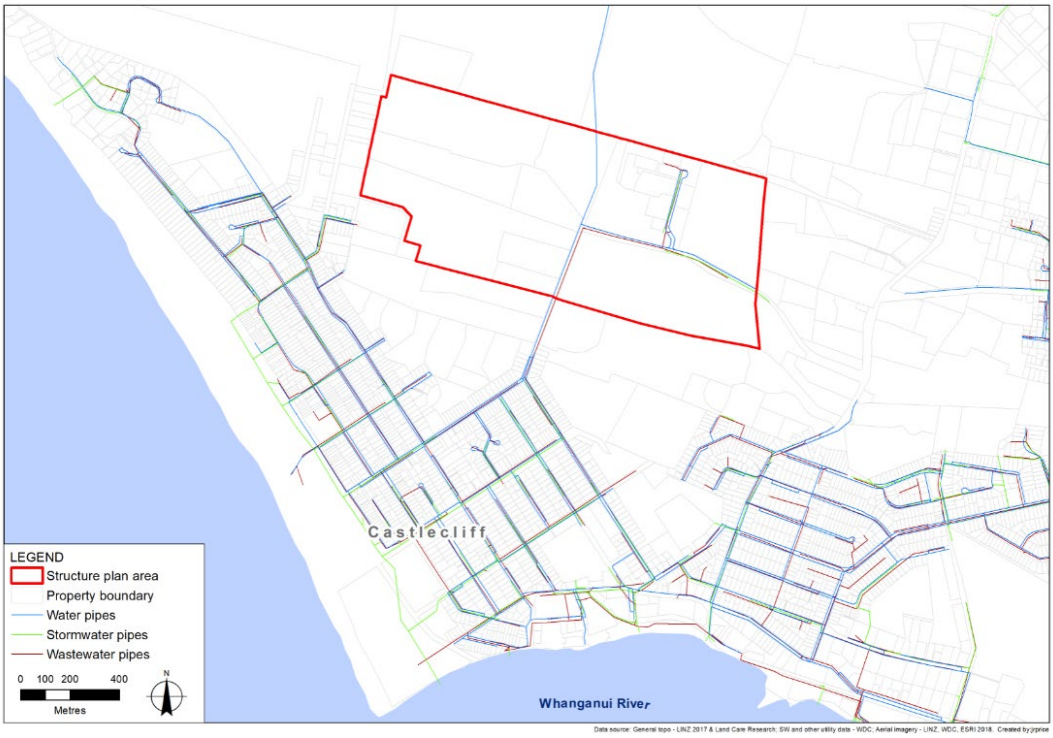

Figure 11: Existing three waters infrastructure (see Appendix A for a larger version)

4.3.1 Water supply

The Castlecliff trunk water main runs north / south along Manuka Street. This is a 450 mm diameter main that conveys water from the Westmere Reservoirs to the Castlecliff residential zone and the Heads Road industrial area. There are a set of pressure reducing valves (PRVs) near the intersection of Mill Road and Manuka Street, which currently reduce the pressure in the trunk main and to the existing Mill Road reticulation to 400 Kpa.

A 225 mm water main branches off the trunk main at Mill Road (downstream of the PRVs) and extends along Mill Road to the eastern boundary of the zone. It is understood that Council intends to extend this main to connect into the 225 mm main on Fitzherbert Avenue in the future. This is expected to improve the resilience of the water supply to the zone or in the reverse direction, to the central city.

There is a nominal bore 150 mm water main and 63 mm outside diameter rider main in Rakau Road, which branches off the 225 mm main. The reticulation in Rakau Road is of sufficient capacity to meet peak demand but has insufficient capacity to provide adequate fire protection to some of the buildings currently being developed in Rakau Road. The upgrades required to resolve this issue are already planned, as they are required for both the current and proposed future level of development. As such the costs of these upgrades are not allowed for in this structure plan. From the GIS data, it appears that the only properties in the zone currently connected to existing water reticulation system are those on Rakau Road and one other property along Manuka Street.

Hydraulic modelling has been completed that shows the existing water supply to the zone has sufficient capacity to cope with the additional demand associated with the structure plan. Therefore no upgrades to the supply system are required.

4.3.2 Wastewater

The existing wastewater reticulation in the SP area is limited to:

- A 300 mm gravity main draining southwards along Manuka Street;
- A 300 mm gravity main in Mill Road which drains from Rakau Road to the Manuka Street main; and
- A 150 mm gravity main which services the properties in Rakau Road and conveys the flows to the Mill Road main.

Also installed but not commissioned is a wastewater pump station (wetwell only, no pumps or mechanical installation completed) and associated rising main in Mill Road. It is understood that this is designed to cater for future development for part of the SP area.

The Manuka Street main drains into the Castlecliff reticulation, which conveys the flows via gravity to Tregenna Street Pump Station. This pump station lifts the flows into the Castlecliff interceptor from where it drains, via gravity, into the terminal Beach Road Pump Station. Within the Castlecliff reticulation there is a cross-connection between catchments that allows some of the flow to bypass the Tregenna Pump Station and flow via gravity into the Castlecliff interceptor.

Previous modelling work carried out by GHD has shown that there are capacity constraints at Tregenna Pump Station and the Castlecliff interceptor is also nearing capacity during the level of service targeted 1 in 1 year flow event. The additional flows associated with the zone will exacerbate the capacity constraints. To resolve this issue, significant downstream wastewater infrastructure upgrades are required.

4.3.3 Stormwater

There is very limited formal stormwater infrastructure within the SP area, and considerable ponding occurs on-site, as evidenced in Figure 12 below. The only stormwater feature owned by Council is a 300 mm diameter stormwater pipe running along Mill Road, and a 300/375 mm diameter main in Rakau Road. These mains provide limited stormwater management services to the Rakau Road development, as well as collecting the Mill Road carriageway stormwater run-off.

The Mill Road stormwater main discharges into an open drain referred to as the Mill Road drain. Currently, the Mill Road drain discharges into the Titoki Wetland (to the south east of the SP area), which then discharges to the Whanganui River via the Heads Road industrial area stormwater reticulation. Although recent system upgrades have taken place, which have partly reduced this issue, there are known capacity constraints in the downstream Heads Road industrial area stormwater system. That is to say flooding currently occurs downstream of the zone in rainfall events with a return period of less than 1 in 200 years.

The increase in hard surface area associated with the proposed development in the zone will significantly increase the amount of stormwater runoff entering the downstream system. Without significant upgrades to the stormwater system, and requirements to use low impact urban design methods that maximise retention of permeable surfaces, the risk of flooding downstream of the zone will be increased.

The Rakau Road development also has its own on-site stormwater detention pond, but the introduction of an integrated stormwater management system for the entire SP area, may enable the property owners to work with Council to review the need for a separate on-site detention pond.

Figure 12: On-site ponding near Rakau Road in spring, 2017 (photo courtesy of GHD)

Three waters infrastructure implications

The existing water supply to the SP area is sufficient to service the proposed development without further upgrade works being required. Two upgrades to the water network need to progress, but these are already planned and not included in the scope of the structure plan.

The land currently zoned for industrial activities cannot be developed for such purposes without significant expenditure to upgrade the downstream stormwater and wastewater systems. Currently, if development proceeded as provided for in the District Plan, it would cumulatively cause unacceptable levels of stormwater flooding and wastewater spills to the environment downstream of the SP area.

4.4 Telecommunications, Power and Gas Services

There is capacity for telecommunication services across the bulk of the site, by way of either broadband or VDSL services. Across the 107 hectare area of the SP area, there is one lot (located east of Rakau Road and north of Mill Road) without connection to either service. However, Chorus has advised that either VDSL or potentially broadband services can be provided to the lot when development occurs.

Powerco has assessed the capacity of the electricity distribution network supporting the area and have advised that there is an existing 11kv electricity distribution line with available capacity running along Manuka Street. This line was originally built to accommodate the former timber processing mill. Expansion of capacity is planned for 2026, although this may be deferred if there is no clear evidence of need. Even if there is sufficient capacity left on this feeder to service development, Powerco states that it is nevertheless undesirable to have an industrial area reliant on a single line, and therefore advises that a second line would be required.

For any development west of Manuka Street, power can also be supplied from an existing distribution line along Waitai Road to the west of the zone. This indicates that there is more immediate electricity capacity available for development to occur on the western side of the SP area. However, in the future, and dependent on the development occurring in the area, further

electricity capacity and resilience will need to be built into the area – likely along Manuka Street to connect to Mill Road.

GasNet (the gas distributor for the area) has identified that, while the Rakau Road development has gas supply appropriate for light industrial activity, servicing the remainder of the SP area would need to be assessed on a case by case basis. It recommends that a staged approach be taken when assessing the viability of future gas provision. This recommendation is also based on its' knowledge that a 'typical' light industrial site commonly does not require gas services.

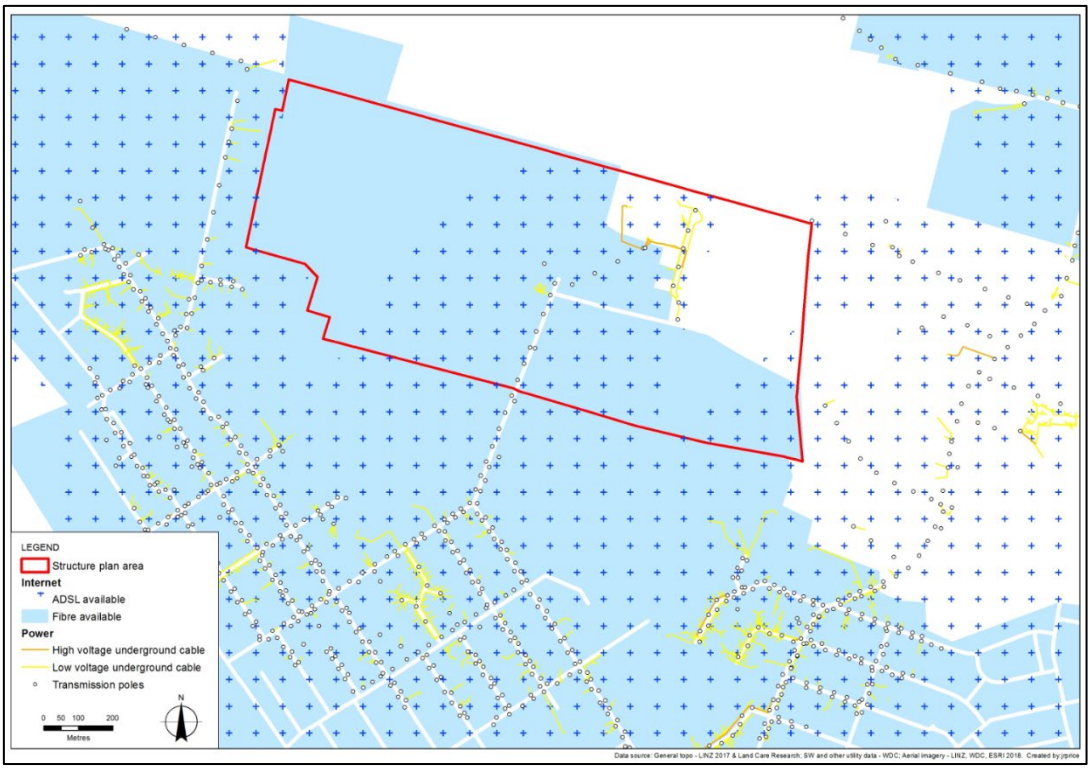

Figure 13: Electricity, gas and telecommunication services available (see Appendix A for a larger version)

Power, gas and telecommunication implications

These services can be provided as the SP area develops, but a planned and staged approach to the development of the area is supported.

4.5 Transport and Accessibility

4.5.1 Road Connections

The site is served by two access roads connecting the SP area to the surrounding area.

The first - Mill Road - connects the area to Mosston Road, which is the key freight arterial for western Whanganui. This connection, and its proximity to the future Fitzherbert Avenue connection and State Highway 3, has been identified, through early consultation, to be an asset which could attract developers to the zone. The New Zealand Transport Agency has approved the financing of the Fitzherbert Avenue extension and construction is anticipated to occur in the 2020/21 season.

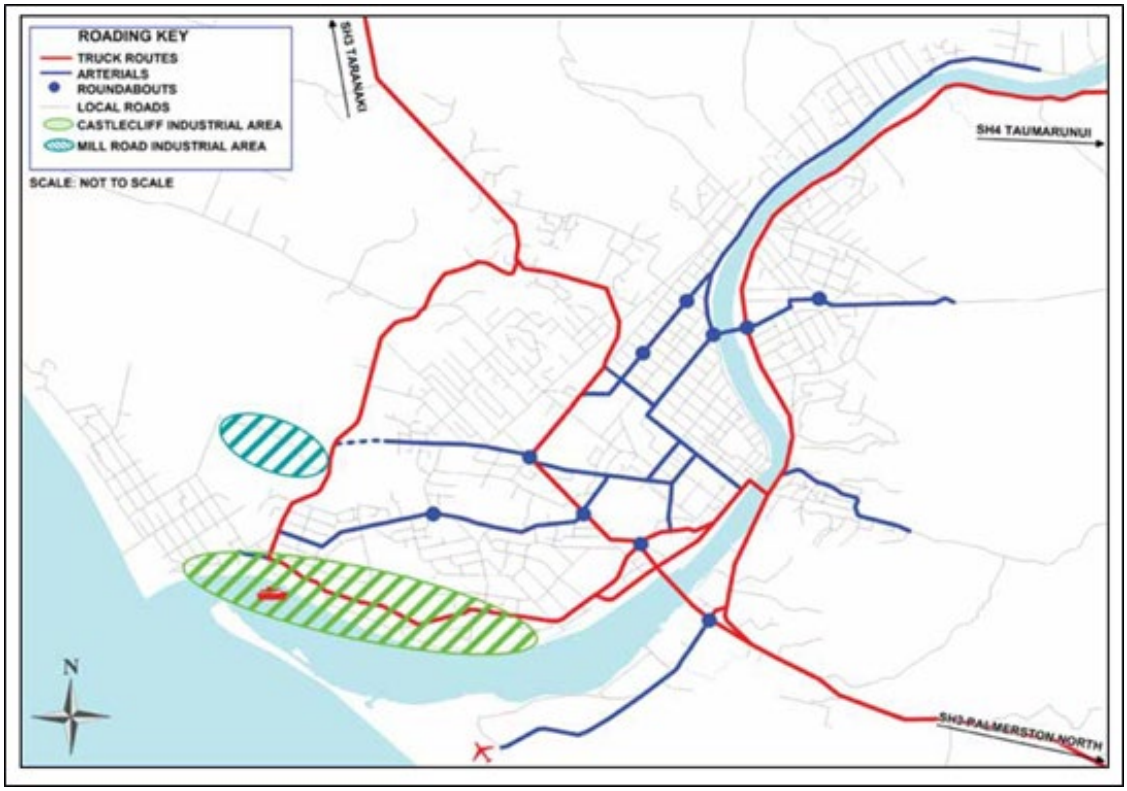

Figure 14: Heavy vehicle routes in Whanganui (WUTS, 2011)

The second - Manuka Street - connects the site to the residential suburb of Castlecliff. Although both Manuka Street and Mill Road extend into the middle of the Manufacturing Zone, these are poor quality road connections. Action 31 of the Whanganui Urban Transport Strategy 2011 (WUTS) prioritises the establishment of a formal connection between these two roads as a high priority to provide a secondary route to Castlecliff, and improve route security[21]. To complement this, the Action also implements traffic calming to protect the nearby residential streets from the impacts of the expected increase in traffic flow.

The larger on-site industrial development is served by the site's sole internal road – Rakau Road. Rakau Road is a cul-de-sac developed for the interim and sole purpose to serve the early developments in the SP area, and connects to Mill Road.

Technically, there are two more access points from Waitai Street into two SP area lots. These lots are undeveloped (greenfield) and the access points are either unformed with a farm-gate only, or entirely fenced off.

[21] Whanganui District Council, *Whanganui Urban Transportation Strategy*, 2011, page 22.

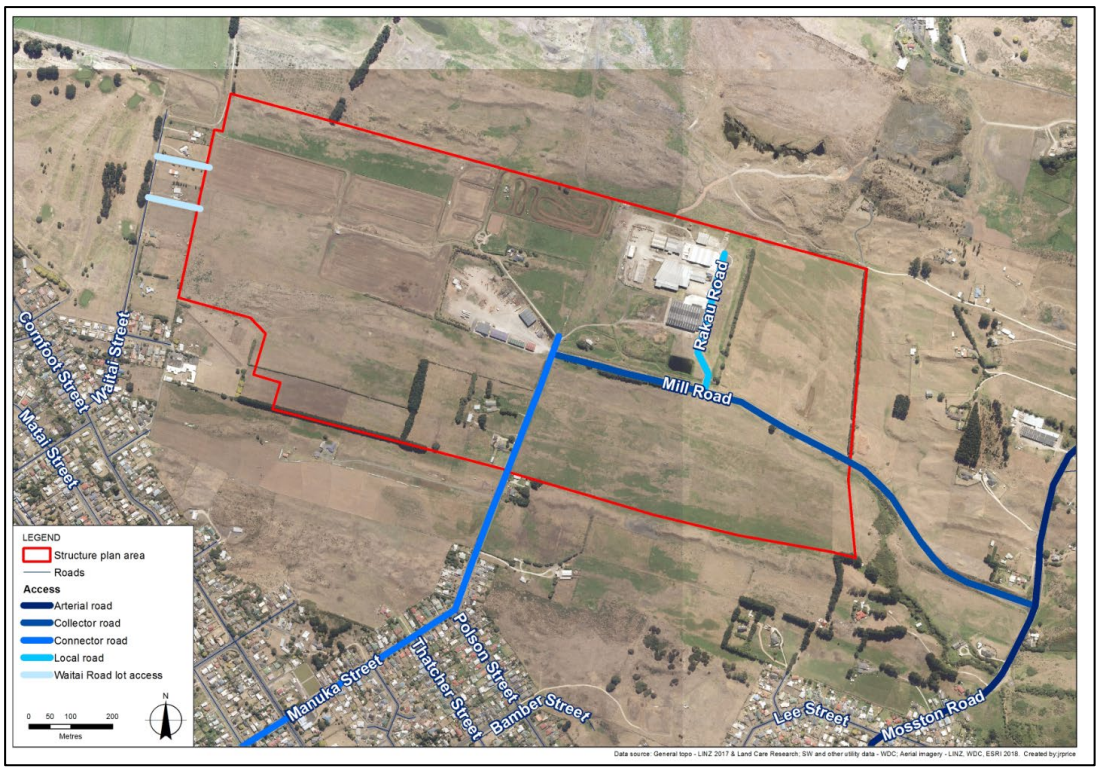

Figure 15: Transport connections to and within the zone (see Appendix A for a larger version)

Road transport implications

Mill Road should continue to serve as the main route into the site, as it connects the zone to a key freight route.

The intentions and relevant actions of the WUTS should be given effect to in the structure plan as they promote the safety and functionality of SP area, and better integrate the site into the wider network.

4.5.2 Public transport

The Castlecliff #1 bus route passes along the intersection of Manuka and Polston Streets, and loops back to the Whanganui town centre regularly between 7am and 5pm on weekdays[22]. This service could be used by future employees in the SP area as it develops.

There is another Castlecliff bus route (#2 bus route), that also travels frequently on weekdays. As seen in Figure 16, the nearest bus stop for this service is approximately 1.1km away from the bottom of Manuka Street in a south south-west direction, and consequently may not be considered as viable a transport option because of the distance from the SP area.

[22] Existing bus routes in Whanganui Available at http://letsgowhanganui.org.nz/getting-around/bus-timetable/ Accessed 14/02/2020

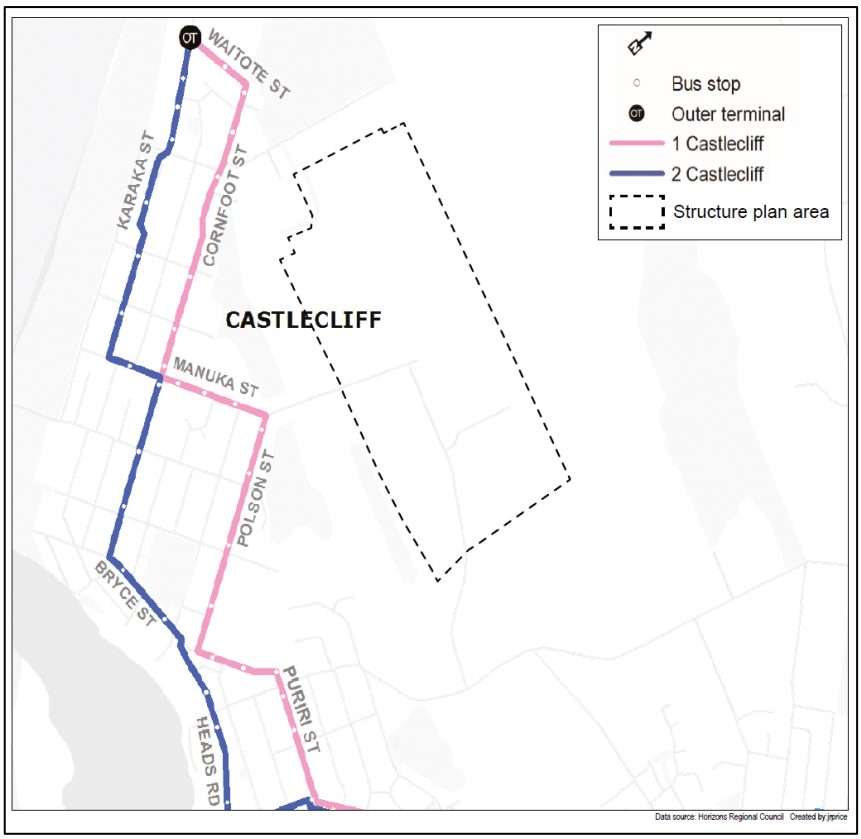

Figure 16: Nearby bus services

4.5.3 Walking and cycling

As a largely undeveloped area, the SP area has very little existing infrastructure to support walking or cycling. To the south, Castlecliff has a connected network of footpaths and pedestrian facilities, which cease at Manuka Street. The treatment of Manuka Street to discourage the use of the street by industrial vehicles as discussed in section 4.5.1 above, and general pedestrian improvements across the district, are identified as a priority (Action 41) in the WUTS[23]

Rakau Road (servicing the Rakau Road development only) has a footpath along one side of the road, but this does not connect further into the site. Mill Road has neither walking nor cycling facilities.

Figure 17 provides an image extracted from the 2017 *Active Transport Strategy*, which shows Council's current programme of urban cycleways. It is understood that Council is developing its planned cycle network further, and expects to have more cycle lanes available near to the zone through the suburbs of Springvale and Castlecliff by 2023[24]. As Whanganui's cycle network becomes more connected and extends further into the suburbs, cycling accessibility will improve across Whanganui, including to the SP area. The Structure Plan will implement the relevant portions of the *Active Transport Strategy* through the design of the transport network.

[23] Whanganui District Council, Whanganui Urban Transportation Strategy, 2011, page 35
[24] Whanganui Active Transport Strategy (2017)

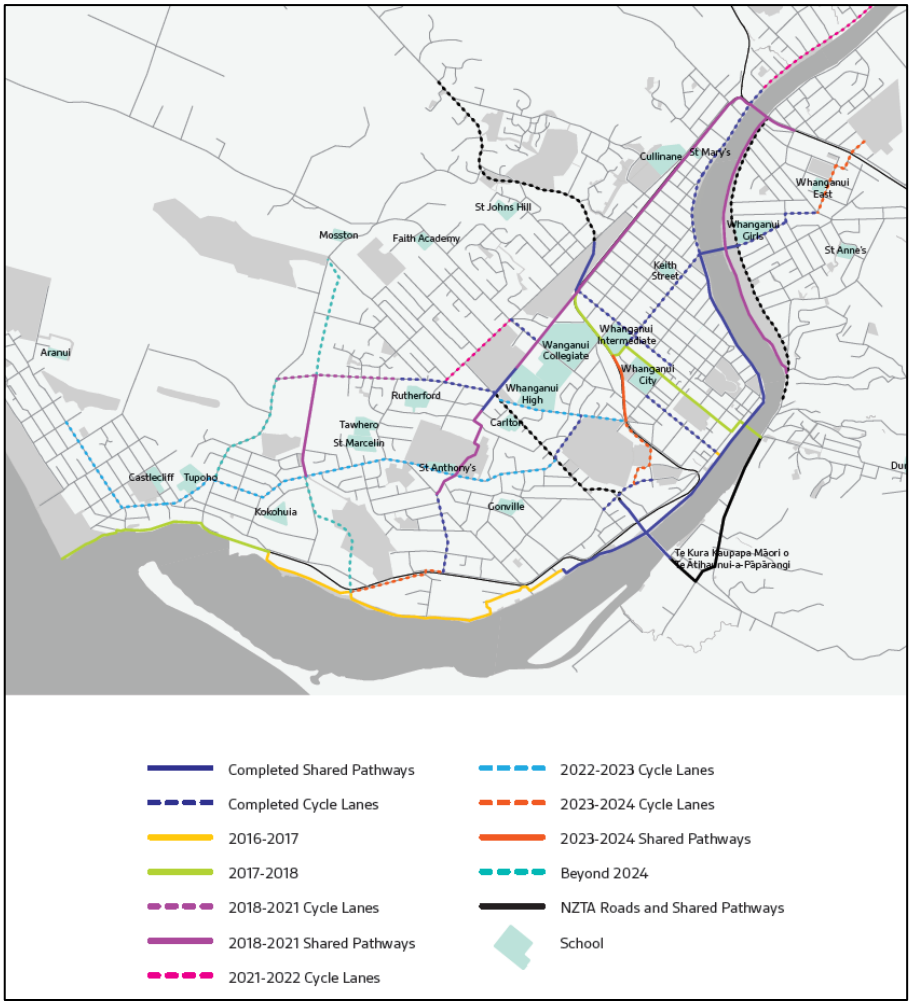

Figure 17: Whanganui District Council's existing and planned cycling network (sourced from Whanganui District Council Active Transport Strategy)

Active transport implications

Provision should be made for walking and cycling facilities as part of the Structure Plan, and the importance of connections into the wider walking, cycling and bus network should be taken into account

Part 2: Future Development

5. Structure Plan Features

5.1 Guiding design principles

The Mill Road Manufacturing Zone's strategic context and constraints, and the engagement with Council and other key stakeholders, have led to the following design principles being incorporated into this process to guide the overall design and layout of the zone and to give effect to the following structure plan objectives:

- ✓ Maximise the potential and capacity for sustainable industrial development on-site.
- ✓ Amalgamate infrastructure with landscape design where possible.
- ✓ Minimise the potential for reverse sensitivity effects.
- ✓ Give effect to the Urban Design Protocol, in particular the elements of context, connections, collaboration and CPTED.

Figure 18: Predominant landscape across the site (photo taken looking west from Manuka Street – courtesy of GHD)

5.2 Land use and landscaping

The SP area is zoned Manufacturing in the operative District Plan. This zone provides for industrial land use, which the structure plan has been designed to enable. The District Plan Manufacturing Zone and subdivision rules and standards do not prescribe either a minimum or maximum lot size, as this maximises flexibility in the scale of development that could establish in this Zone. Where possible, the Structure Plan layout has incorporated the existing lots and development.

Preliminary consultation with landowners identified a strong desire for good quality urban design, which should be promoted and integrated into infrastructure, landscaping and design of future development. A high-level landscaping plan is attached in Appendix B, which would assist to meet the aspirations of existing landowners.

Any new noise sensitive non-industrial land uses proposing to locate within the zone are already required by Rule 17.5.2 of the Manufacturing Zone to protect themselves from noise effects. However, these requirements do not apply to the residents of adjacent zones i.e. lifestyle block dwellings in the Rural General Zone. This creates the potential for adverse effects and complaints (reverse sensitivity). Consequently, it is recommended that consideration is given to whether noise insulation standards or some other form of management technique are necessary for any new noise sensitive activities in the adjacent zones.

As noted in Section 5.2.1 above, acid sulphate soils (ASS) have been found on-site. Information about acid sulphate soils and their management should be provided to anyone undertaking work in the SP area, so an ASS management plan can be prepared.

Two of the lots (103 Manuka Street and 15 Rakau Road) will require the developers to undertake a detailed contamination site investigation before they can be developed. Resource consent may consequently be required, dependent on the investigation outcome.

Standards relating to public space landscaping, fencing treatment and / or urban design plans should be encouraged where possible and appropriate, through inclusion as future District Plan standards.

The transport layout of the SP area is a connected system with no cul-de-sacs for drivers or pedestrians to become trapped and isolated within. It provides alternate routes to access different parts of the sites, and transport options for active modes, which encourages travel through the SP area for leisure activities such as cycling or walking. More public presence creates more 'eyes on the street', an important CPTED principle which deters criminal behaviour and encourages people to feel safer[25].

[25] Auckland Council, Auckland Design Manual; Public Perceptions of Safety, http://www.aucklanddesignmanual.co.nz/design-subjects/design-safety/perceptions/guidance/CPTEDintro/CPTEDprinciples accessed 20/02/2020

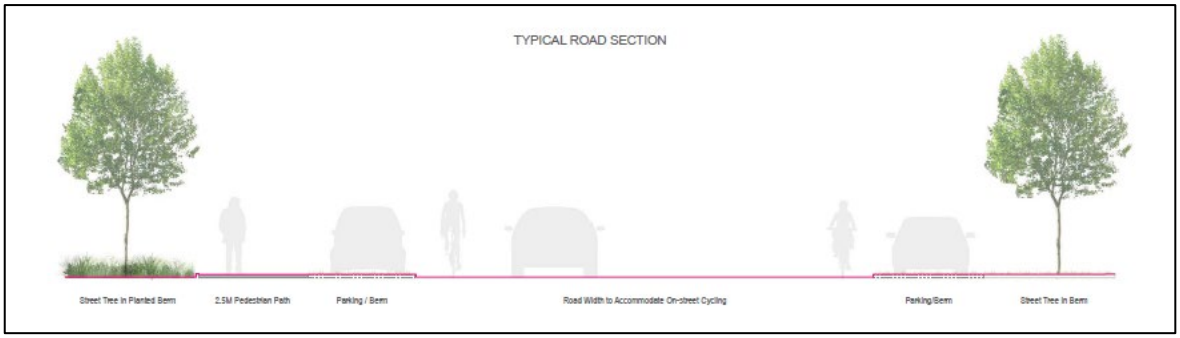

Figure 19: Proposed road layout where there is no shared path (see Appendix B for a larger version)

Inclusion of CPTED principles and incorporating good quality urban design into the SP area design will help to avoid the traditional unwelcoming nature of developments within industrial areas (large buildings with little street frontage), and promote the creation of an area that is attractive and worth visiting.

5.3 Development phasing

The Structure Plan proposes an integrated approach to development of the 107Ha site. However, it also recognises that development will come forward as a series of discrete development blocks over a long period of time because of the individual land ownership.

Staging development enables an integrated approach to infrastructure provision across the site, but allows for staggered investment of infrastructure, making it a more feasible proposition for Council and developers. It also ties the infrastructure to specific areas, which promotes a user pays and fair distribution of the costs of the infrastructure. The mechanisms to implement the staging will need to be considered, as the purpose of the Structure Plan is to enable development. Staging limitations should not unduly restrict development if a developer is willing to pay for the necessary infrastructure and it will not unduly affect the overall development of the SP area.

As seen in Figure 20, the development phasing acknowledges that development has already occurred and is occurring in Rakau Road, which consequently is identified as Stage 1. The infrastructure for the Stages 2 -7 have been designed to extend from a core spine of three waters services running along the existing roads running through the centre of the SP area. This has heavily influenced the staging order, as without building the core infrastructure in the early stages, the three waters infrastructure extending out to the other stages will not function. Feedback from stakeholders has also influenced the proposed staging plan, for example, in response to early engagement, the staging now runs along property boundaries where possible, and the early stages align with sites where formal applications for development have already been made.

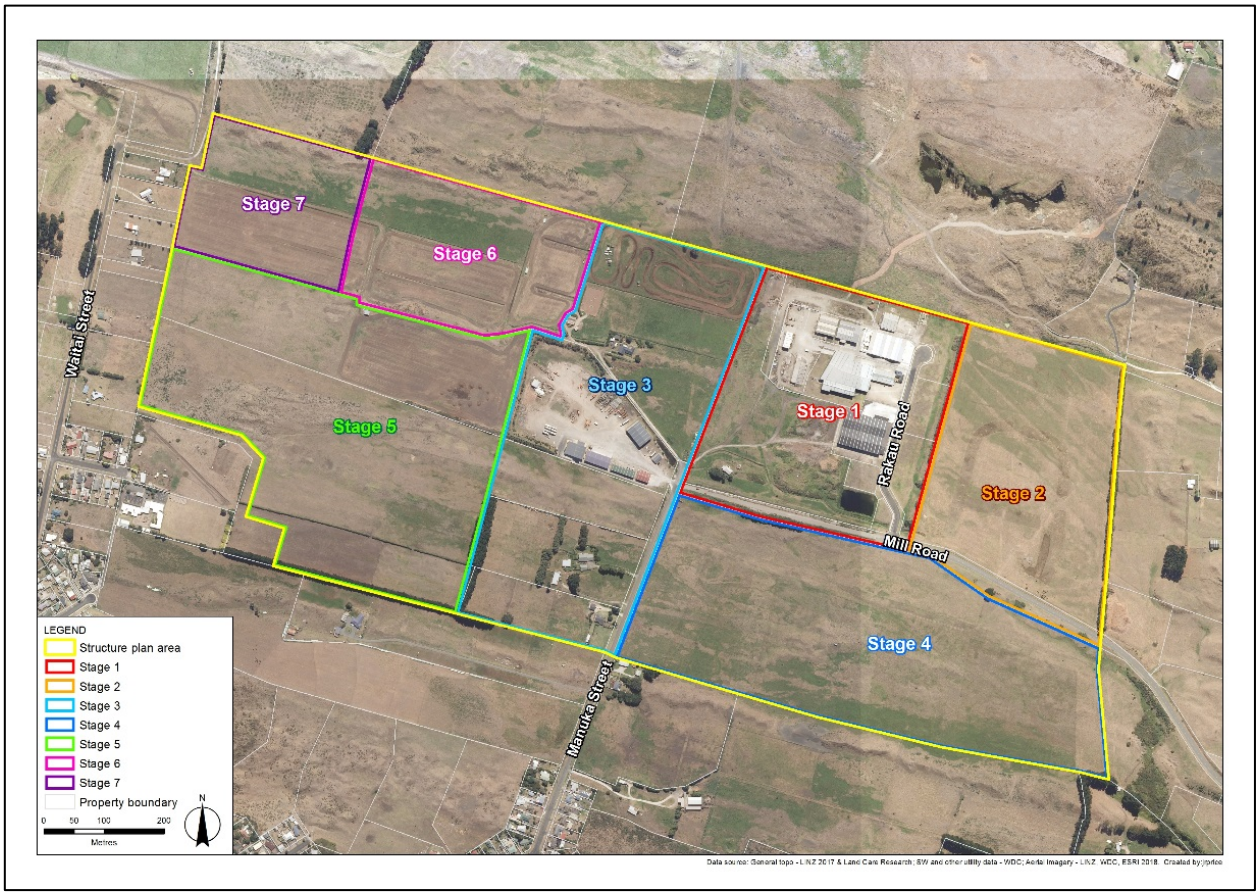

Figure 20: Mill Road structure plan staging

5.4 Transport links / connectivity

The proposed road network provides the SP area with a transport spine to enable access to the entire SP area, rather than servicing specific lots. This provides access options for lots with a range of sizes and orientation to accommodate a range of different industrial activities and any specific layout requirements.

Where possible, the roads are mapped to align with the designated FirstGas gas mains crossing the site, as FirstGas has stated that it may be comfortable with roads constructed over the pipes, subject to provision for ongoing maintenance of the existing gas pipes, and specific road design criteria being met. This relates to the road weight over the pipe, and the depth between the pipe and the road. They are unlikely to approve any other sort of developments over their easement and pipeline, therefore aligning the road along the gas mains (where possible) maximises the development potential of the rest of the SP area.

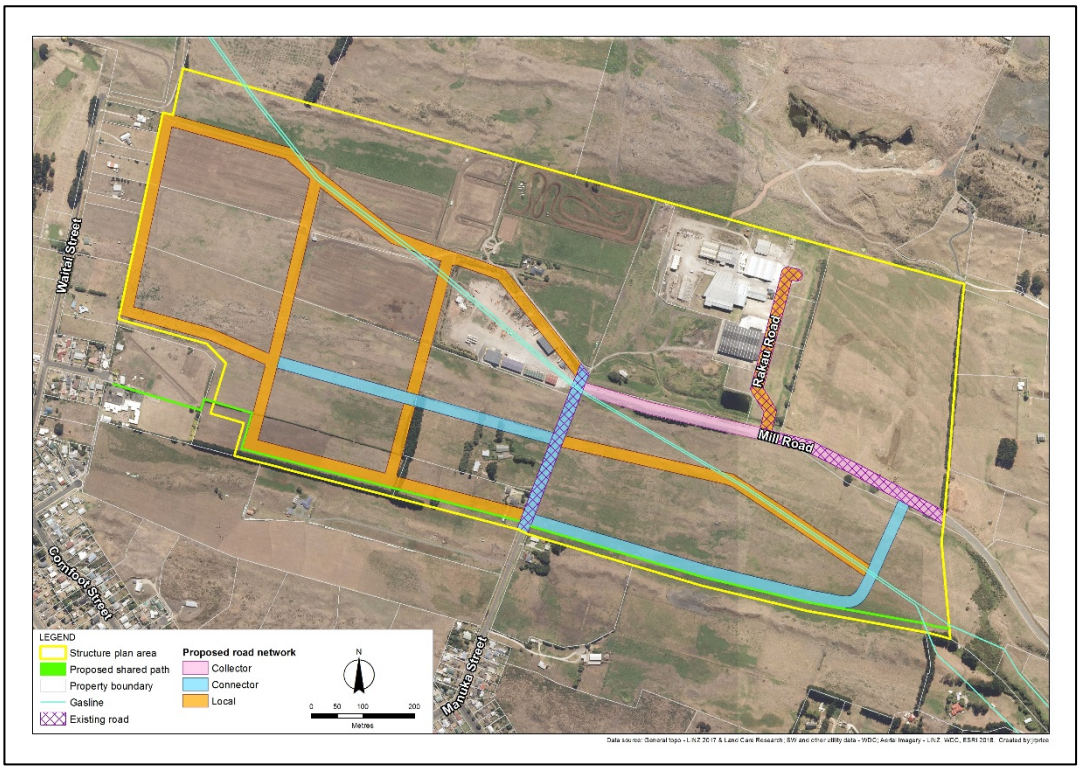

Figure 21: Proposed road layout and gas mains alignment (see Appendix A for a larger version)

Mill Road is the site's principal road and it is the gateway to the SP area. It connects the SP area to the heavy vehicle arterial and freight route of Mosston Road. Manuka Street is extended out to become another 'connector' within and to the site, to which the proposed local roads connect. Being a link to Castlecliff, far fewer heavy vehicles are anticipated to use this road to enter the SP area, and instead it is expected to be used by future employees from the Castlecliff area and beyond using a variety of transport modes.

The remainder of the proposed roads in the zone are designed to be local roads, and are deliberately contained within the zone. This layout contains and separates the industrially zoned land from the surrounding rural environment, reducing the potential for conflict between the future industrial development on-site and the surrounding differently zoned land.

5.4.1 Road design details

Road design and layout are based on the Whanganui District's adapted *NZS 4404:2010 Land Development and Subdivision Infrastructure Standards (NZS4404:2010)*, which provide standards for road design to accommodate the surrounding land use, and use low impact design where possible. Specifically, the roads are designed to enable industrial and manufacturing activity, promote accessibility and to allow for freight access.

Mill Road

The transport layout establishes Mill Road as the conduit to the SP area for heavy vehicles coming from the key freight route of Mosston Road. The design of Mill Road will enable access for up to 8,000 vehicles per day as the main road to and from the SP area.

Heavy vehicles will be accommodated by a 23m wide road reserve, potential for on-street parking, kerb and channels, stormwater drainage and grassed berms. The road will be upgraded to provide pedestrians with a street-lit 2.5m wide footpath on one side of the road.

Manuka Street

Manuka Street will be upgraded to give effect to the intentions set out in the Action 31 of *Whanganui Urban Transportation Strategy* by extending the road to connect to Mill Road and implementing traffic calming measures including the new 2.5m wide street-lit footpath on one side of the Street. The new pedestrian facilities and pedestrians themselves will help to calm the speed of the traffic, protecting the adjacent residential streets in Castlecliff and those using active transport in and around the SP area.

Design details for the local roads

While Mill Road and Manuka Street form the axis of the SP area, the remaining new 'local' roads are designed for circulation across the SP area, and can safely accommodate 2,000 heavy vehicles per day. They are designed with 18-20m road reserve width, narrower carriageways (8.4m), kerb and channels stormwater drainage infrastructure and a footpath

5.4.2 Walking and cycling

Provision for a 3m wide shared pathway for walkers and cyclists has been included in the design of the new road adjacent to the southern boundary of the SP area. Cyclists will share the carriageway with other vehicles on other roads within the SP area. Throughout the remainder of the SP area, the road design includes a 2.5m wide street-lit footpath to provide pedestrian access along one side of the road.

The shared pathway has been integrated into the plans for the stormwater design and conveyance. The integration of walkways and low maintenance planting with stormwater conveyance provides a means of enhancing and activating otherwise utilitarian areas. Stacking functions together in these areas has the effect of increasing accessibility and connectivity to create an efficient, high amenity, living green corridor which people enjoy using. These designs begin giving effect to Council's *Street Tree Strategy*, but an urban streetscape plan for the zone could be considered to ensure the integration of trees into future development within the zone.

The shared pathway concept has been designed to run alongside Aranui School (see Figure 22) and engagement with Aranui School is recommended to understand how the school wishes to interact with and use the path. The shared path also provides a commuting route and an alternate route back into the Whanganui CBD for those completing the central North Island Mountains to Sea cycle trail. To enable the shared path opportunities outlined above, it is necessary that the shared pathway connects into Whanganui's wider cycling network.

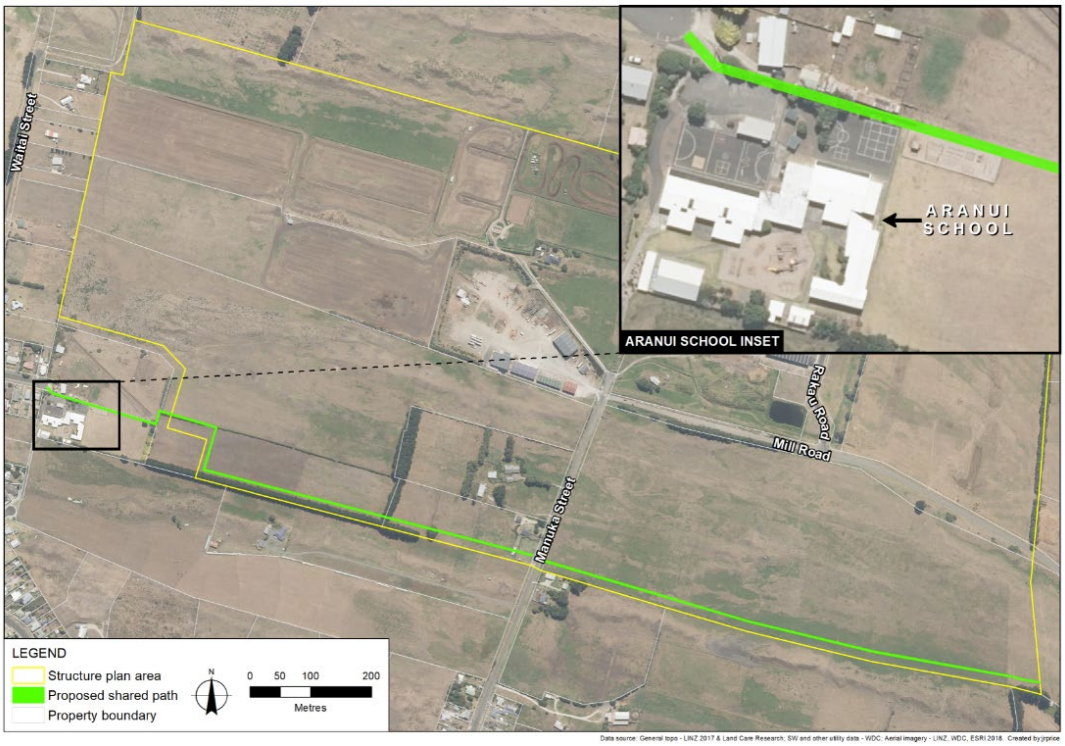

Figure 22: Proposed shared path location (see Appendix A for a larger version)

5.4.3 Access to Waitai Road

It is recommended that the two existing legal accesses onto Waitai Road from the SP area be closed, or access restricted. Planning mechanisms to do so include using Limited Access Road or road stopping powers under the Local Government Act, 1974. Other measures such as traffic calming could also be considered so the route is less feasible for larger vehicles. This will reduce the likelihood of heavy vehicles travelling to the site via Waitai Street, and protect the rural-residential amenity of Waitai Street.

5.4.4 Mill Road / Mosston Road intersection

The impacts of development in the SP area on the functioning of the Mill Road / Mosston Road intersection have also been considered. At present, there are poor sightlines and a lack of manoeuvring space. Development within the SP area has the potential to generate up to 8,000 vehicles per day through this intersection. Consideration will need to be given to upgrading the intersection to accommodate the additional turning movements.

Figure 23: Poor sightlines from Mill Road into Mosston Road (image courtesy of Google maps)

5.4.6 Public transport

Connectivity to the Castlecliff #1 bus route will be improved by development of footpaths alongside the proposed roads and the existing Manuka Street and Mill Road. The connected nature of the roading layout lends itself well to future public transport connections which could use Manuka Street and the extended Mill Road. The proposed new local road design accommodates buses and other large vehicles.

5.5 Three Waters

The three waters (water, wastewater and stormwater) concept has been developed in conjunction with the transportation layout as the majority of the three waters infrastructure will be contained in the proposed and existing road reserves. This means that the three waters infrastructure is reliant on the transport layout, which should be a consideration if changes to the proposed transport layout are sought during future stakeholder consultation or District Plan change processes.

The structure plan has been designed to make the most of the natural topography, which allows for efficient gravity based drainage (wastewater and stormwater) systems with minimal pump stations to keep the water moving. The design has been developed to align with the requirements of NZS4404:2010 and Council's associated supplementary document and makes use of existing infrastructure where possible.

The following paragraphs summarise the development of the concept design for each of the three waters. A more detailed discussion is provided in Appendix E.

5.5.1 Stormwater

The stormwater concept was developed using the following key assumptions:

- The entire SP area will be roofed and/or sealed in the future;
- No allowance has been made for further development upstream of the zone; and

- The 2018 version of Council's validated 1D/2D stormwater model[26] for this area has been used to size both the internal and downstream stormwater infrastructure.

Hydro-geological and geotechnical investigations (attached in Appendix C and D) to support the concept designs have resulted in design and construction recommendations relating to timing of construction, and dewatering. The aim of the recommendations is to reduce the potential for channel erosion, and to safely enable dewatering in the SP area. These recommendations will need to be taken into account during the further design stages of the stormwater infrastructure.

Internal stormwater infrastructure

A map of the proposed configuration of the stormwater network within the structure plan area is provided in Appendix F. This has been selected to follow the general topography of the site (falling from the north-western corner down to the southeast) and to discharge into the downstream section of the existing Mill Road drain. This configuration minimises the extent of earthworks required for the creation of the primary and secondary stormwater systems. The stormwater general configuration was also selected to enable a staged approach to development.

In general, the proposed system will be consist of a primary stormwater pipe network sized to convey flows from a 1 in 10 year storm event. Secondary overland flow paths will be provided by way of the road corridors and/or road side swales and are sized to cope with a 1 in 200 year rainfall events as per Council requirements. Both storm events include an allowance for climate change as per Council's supplementary document to NZS 4404: 2010.

The key stormwater features within the structure plan area are:

- The southern open drain – this receives the runoff from the entire zone
- The northern open drain – this cuts off the overland flow paths from the rural catchment to the north

Figure 24 is an example of a high level approach that achieves integration of shared pathway, footpath and low maintenance planting and stormwater open drains as a means of enhancing these otherwise utilitarian areas. Integrating these services increases accessibility, connectivity and amenity.

Stormwater channels are recognised as being particularly problematic from a CPTED perspective, particularly when located between land uses with little to no physical access or passive surveillance. This structure plan addresses that issue by locating the stormwater channel along the edge of the site, and along roads where possible.

Downstream stormwater infrastructure

A map showing the extent of the downstream stormwater upgrades required to cater for the development associated with the SP area is included in Appendix F.

The downstream upgrades required are:

- A new 1350 mm stormwater main from Mill Road drain culvert under Mosston Road to the Whanganui River;
- Augmentation of the Mill Road Drain; and
- A new attenuation area near the south-eastern corner of the SP area.

The visible components of the stormwater infrastructure required can be found in Appendix F.

[26] Model 1in1Y – 1600-M12 Gravity SI-Combined Growth SI-Springvale Devel-Mill Rd Industrial v3-Light Industry. Model Version 168 – 19/08/2018

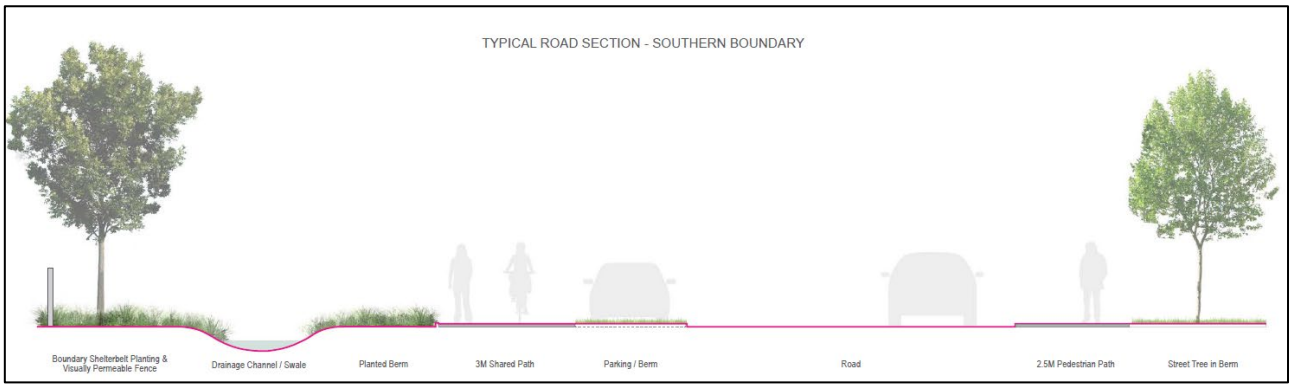

Figure 24: Integration of open stormwater drain alongside the proposed shared path and road

5.5.2 Wastewater

Both the historic land-use and the companies showing interest in the SP area indicate no interest in developing heavy industry (with high water demands) on-site[27]. This is consistent with the economic focus areas set out in the Whanganui Economic Strategy[28]. Further, historic site investigation has indicated that wastewater capacity in the area is constrained[29] Two options relating to the type of industry that may occupy the SP area were therefore considered when creating the wastewater concept for the structure plan:

- Light Industry – Design flow rate = 0.4 l/s/ha
  - Typical industry types would include manufacturing activities with minimal water demand other than for sanitary/staff purposes.
- Medium Industry – Design flow rate = 0.7 l/s/ha
  - Typical industry types would include manufacturing activities with some process water demand plus allowances for sanitary/staff purposes.

These design flow rates are sourced from NZS 4404: 2010 and include allowances for both sanitary wastewater and trade waste flows, including the associated peaking factors.

The 2018 version of Council's calibrated citywide wastewater model[30] has been used to size both the internal and downstream wastewater infrastructure. The target level of service is to allow for zero untreated wastewater discharges to the environment in flow events equal to or less than a 1 in 1 year flow event. This is the common target adopted across Council's existing wastewater network.

- **Internal wastewater infrastructure** - Maps of the proposed configuration of the wastewater network within the zone for both light and medium industry types are given in Appendix G. The general configuration has been selected to: make use of the topography (so that a traditional gravity system can be utilised with minimal pump stations), tie into the existing infrastructure where possible and be cognisant of the proposed development staging.

- **Light industry internal wastewater infrastructure -** To cater for light industry, the majority of the gravity pipelines will be 150 mm in diameter (the minimum allowable size

[27] Phone conversation with Rhonda Morris (strategic lead – manufacturing, logistics and commercial lead, Whanganui and Partners) 24/02/2020,
[28] Whanganui District Council, Economic Growth Strategy, 2019, page 11
[29] MWH NZ Ltd, Wanganui Water Services Westbourne Estate Service Options Report 3 (2005)
[30] Model 1in1Y – 1600-M12 Gravity SI-Combined Growth SI-Springvale Devel-Mill Rd Industrial v3-Light Industry. Model Version 168 – 19/08/2018

for wastewater reticulation as per NZS 4404: 2010) with the exception of 415 m of 225 mm diameter wastewater main along the southern boundary road west of Manuka Street. The existing 300 mm main in the structure plan portion of Manuka Street is of sufficient capacity to cater for light industry and will not require up grade. Three pump stations are required.

Table 1: Pump station requirements – light industry

Location	Catchment	Design Flow Rate	Rising Main
Towards the southeast corner of the Structure plan area	South-eastern quadrant of the zone (bounded by Mill Road and Manuka Street).	8 l/s	570 m long, 150 mm diameter to discharge into the Manuka Street main.
Towards the southwest corner of the Structure plan area	Eastern quarter of zone.	12 ls	25 m long, 150 mm diameter to discharge into proposed 225 mm gravity main.
Existing wetwell on Mill Road	Area north of Mill Road and east of the Rakau Road properties.	6 l/s	Existing 355 m long, 150 mm diameter rising main in Mill Road.

- **Medium industry internal wastewater infrastructure** - To cater for medium industry, the majority of the gravity pipelines will be 150 mm in diameter (the minimum allowable size for wastewater reticulation as per NZS 4404: 2010) with the exception of 745 m of 225 mm diameter wastewater main along the southern boundary road west of Manuka Street. The existing 300 mm main in Manuka Street is of sufficient capacity to cater for medium industry and will not require up grade.
- The same three pump stations are required for medium industry, however they will require increased flow capacity as summarised below in Table 2.

Table 2: Pump station requirements – medium industry

Location	Catchment	Design Flow Rate	Rising Main
Towards the southeast corner of the zone	South-eastern quadrant of the zone (bounded by Mill Road and Manuka Street).	14 l/s	570 m long, 150 mm diameter to discharge into the Manuka Street main.
Towards the southwest corner of the zone	Eastern quarter of the zone.	20 l/s	25 m long, 150 mm diameter to discharge into proposed 225 mm gravity main.
Existing wetwell on Mill Road	Area north of Mill Road and east of the Rakau Road properties.	11 l/s	Existing 355 m long, 150 mm diameter rising main in Mill Road.

- **Downstream wastewater infrastructure -** The wastewater concept allows for the zone to drain into the existing 300 mm Manuka Street wastewater pipe. Maps showing the extent of the downstream wastewater upgrades required to cater for the development associated with the zone under both the light and medium industry scenarios are provided in Appendix G.
- Much of the wastewater from the zone will pass through the Tregenna Pump Station. This pump station requires upgrading to cope with the wastewater flows from the current level of service. The costs provided in this structure plan are for the increase in upgrades required as a result of the additional flows from the fully developed zone only.

- **Light industry downstream wastewater infrastructure -** The existing network on Carson Street has insufficient capacity to convey the additional flow from Mill Road. Approximately 245m of 300mm diameter gravity pipe is required to accommodate Mill Road light industrial growth.
- **Medium industry downstream wastewater infrastructure** - The existing network on Carson Street and Polson Street has insufficient capacity to convey the additional flow from Mill Road. The following upgrades are required to accommodate Mill Road medium industrial growth:

- 480m of 300mm diameter gravity main on Carson Street; and
- 195m of 375mm diameter gravity main on Polson Street

5.5.3 Water supply

As with the wastewater, two options relating to the type of industry that may occupy the zone were considered when creating the water concept for the structure plan. These are light and medium industries.

NZS 4404: 2010 does not give design flows for industrial water demand in the manner that it does for wastewater. The flows that enter the wastewater network are intrinsically linked to the flow drawn from the water network. Therefore the wastewater flows were used to estimate the typical water demand based on the assumption that 20% of the total water supplied will not enter into the wastewater network. The 20% is a figure identified through engineering and water supply experience. It is intended to account for water losses / consumption and buffering in industrial processes and evaporation/soakage that may occur.

The water concept has been sized using the following key assumptions:

- Peak water demand for light industry = 0.50 l/s/ha;
- Peak water demand for medium industry = 0.88 l/s/ha;
- Minimum allowable pressure at peak demand is 25 m;
- The maximum fire water demand is 100 l/s; this equates to a FW4 fire water classification as per the New Zealand Fire Service Firefighting Water Supplies Code of Practice (SNZ PAS 4509:2008);
- The ultimate peak demand = 2/3 the peak water demand plus fire flow (as per SNZ PAS 4509:2008); and
- Minimum allowable pressure at the ultimate peak demand is 10 m (as per SNZ PAS 4509:2008).

The 2018 version of Council's calibrated citywide water model[31] has been used to size the water infrastructure required to service the zone.

- **Internal water infrastructure -** A map of the proposed configuration of the water network within the zone is provided in Appendix H. In general, the reticulation in each road will consist of a 200 mm nominal bore water main on one side of the road and a 50 mm nominal bore rider main on the other, as instructed by Council. It is noted that this deviates from NZS 4404: 2010 which states that dual water mains should be used in industrial zones, but results in a lower cost installation and is consistent with what is already constructed in Rakau Road.

[31] Model 1in1Y – 1600-M12 Gravity SI-Combined Growth SI-Springvale Devel-Mill Rd Industrial v3-Light Industry. Model Version 168 – 19/08/2018

- The fire demand is the determining factor as to the pipe size required, as such there is no difference in the water main sizing between the light and medium industry options.
- **Connecting water infrastructure -** The Castlecliff trunk water main runs along Manuka Street and is the main point of water supply to the zone. There are two existing pressure reducing valves (PRVs) near the Mill Road / Manuka Street intersection, all connections to the trunk main will be made on the low pressure side of these. Additionally, as part of the Springvale Structure plan a 225 mm main is proposed to be constructed to connect the existing Mill Road water main to the Fitzherbert Avenue water main. This is already planned and budgeted for in the Long Term Plan Therefore, it is not included in the structure plan, but is important for supporting development in the SP area. The extended main will also provide additional resilience to the water reticulation in the zone.

Based on Council's calibrated citywide water model, no upgrades are required to the existing water network to service the development in the SP area. However it should be noted that an anomaly was discovered in the model relating to the Castlecliff trunk main. Council is currently investigating the source of this anomaly, and the results of the investigation may alter the existing capacity.

5.6 Other Services

5.6.1 Power

Powerco advised there is capacity in the existing single line power supply to the Mill Road Manufacturing zone, with more capacity being provided in 2026, if demand justifies it. Powerco states that it is nevertheless undesirable to have an industrial area reliant on a single line, and therefore advises that a second feed would be required. Powerco advises that the best alternative supply would be from Waitai Street, and therefore Powerco has a strong preference for the development staging to run from west to east. The development of a road reserve corridor between Manuka Street and Waitai Street would provide for this alternative supply into the area.

A second feed could be run from the east, however there would be reduced capacity available on this line, meaning a full supply to all industrial consumers may not be possible. Development to the east could feasibly be fed via the road reserve corridor between Manuka Street and Waitai Street if this was in place. However, this could make cost recovery potentially difficult for Powerco as, while the developer usually pays the bulk of the cost to install the reticulation in their subdivision, in this case the cable to be run would be external to the development area. While not an insurmountable problem, it is significant enough for Powerco to retain a strong preference for west-to-east staging which has given effect to where possible in the staging plan.

5.6.2 Gas

GasNet has advised that new gas servicing in the area would be determined as each stage develops, and would be dependent on the financial viability of servicing each development. It is likely that GasNet would lay gas mains along all roads if multi-utility trenches were provided. GasNet's design practice is to lay gas pipes on both sides of any new road (where there are new properties on both sides) to enable the connection of properties without having to cross under the carriageway, but this would depend on the number of properties in each stage and an understanding of the type of business that is likely to operate in the SP area.

The proposed grid road layout is ideal from a gas network point of view, as it will allow for a ringed main system. This will provide increased capacity and allow GasNet to provide for further interconnection without loss of supply while the installation is occurring.

5.6.3 Ultrafast broadband & telecommunications

It has been confirmed by Chorus that the SP area can easily be provided with ultrafast broadband infrastructure, the staging of which can be confirmed with a finalised structure plan.

5.7 Transport and three waters infrastructure phasing

Infrastructure phasing is critical to ensuring that development is supported by the necessary infrastructure. The proposed phasing is designed bearing in mind early feedback from Council regarding where development interest is focused. Both Council and the Whanganui development agency Whanganui & Partners are regularly in touch with developers and their plans for the SP area. It is recommended that this existing interaction is continued and formally supported by the implementation of a Mill Road Structure Plan communications strategy. This will promote integrated and co-ordinated infrastructure provision, giving effect to the structure plan design and layout. Table 3 below identifies the infrastructure necessary for each planned stage.

Table 3: Infrastructure required for each stage

Stage	Transport infrastructure required	Three waters infrastructure required
Stage 1	Upgrade of the Mill Road extension through to Manuka Street	**Stormwater:** Mosston Road pipe, Mill Road pipe, north Manuka pipe and overland flow path and east side of the north drain. **Wastewater:** Nil required within the SP area. Upgrade Tregenna Pump Station and install new rising main. **Water:** Confirm cause of anomaly and install meters[32]
Stage 2		**Stormwater:** Augment open drain from SP area to Mosston Road. **Wastewater:** Infrastructure within Stage 2 area including one pump station. **Water**: Nil
Stage 3	Connector roads within Stage 3 area Local roads with shared path within Stage 3 area	**Stormwater:** Infrastructure within Stage 3 and the south drain in Stage 4 area, the remainder of the north drain and the attenuation area. **Wastewater:** Infrastructure within, or along the boundary of, the Stage 3 area. **Water:** Infrastructure within, or along the boundary of, the Stage 3 area
Stage 4	Connector roads including shared path within Stage 4 area Local roads including shared path within Stage 4 area	**Stormwater:** Infrastructure within Stage 4 area and the Mill Road overland flow path. **Wastewater:** Infrastructure within Stage 4 area including one pump station. **Water:** Infrastructure within the Stage 4 area, including the Mill Road rider main.

[32] Council are currently carrying out an investigation into the water modelling anomaly. The water supply should be confirmed once this investigation has been completed.

Stage	Transport infrastructure required	Three waters infrastructure required
Stage 5	Connector road within Stage 5 area Local roads and shared path within Stage 5 area	**Stormwater:** Infrastructure with in Stage 5 including the south drain. **Wastewater**: Infrastructure within Stage 5 area including one pump station. **Water:** Infrastructure within the Stage 5 area.
Stage 6	Local road within Stage 6 area	**Stormwater:** Infrastructure within Stage 6 area. **Wastewater:** Infrastructure within Stage 6 area. **Water**: Infrastructure within the Stage 6 area.
Stage 7	Local road within Stage 7 area	**Stormwater:** Infrastructure within Stage 7 area. **Wastewater:** Infrastructure within Stage 7 area. **Water:** Infrastructure within the Stage 7 area.

It is recommended that the infrastructure corridors required for Stage 1 and base stormwater infrastructure are designated as a priority, to protect the infrastructure layout. This includes:

- The southern and northern open drains;
- The stormwater attenuation area;
- The overland flow path parallel to Mill Road; and
- The Mill Road drain between the attenuation area and Mosston Road.

5.8 Transport and three waters infrastructure costs

The following infrastructure costs have been estimated on the basis of the proposed layout and applying 2018 cost rates and industry good practice and design standards. Where possible, these costs have been set out to acknowledge which development phases rely on specific infrastructure installation or upgrades. Note that the infrastructure costs do not include land purchase or costs associated with planning or designation processes.

5.8.1 Roading

Indicative costs for roading infrastructure are based on an NZS4404: 2010-compliant road design. These do not include the cost of building over the gas pipe lines and it is recommended that costs in relation to this aspect are developed in partnership with FirstGas. It is also acknowledged that roads will be built as required for development as it comes forward. The costs are further detailed in Appendix I, and the amounts below are overall summaries.

Table 4: High Level Cost Estimate for Roading Infrastructure

Type of road	Quantity	Cost
Collector – Mill Road 23m road reserve, 12.6m carriageway	355m @ $1,845.00 per metre	$ 617,766.00
Connector – Stages 3, 4 & 5 23m road reserve, 12.6m carriageway	1,115m @ $1,938 per metre	$ 2,159,759.00

Type of road	Quantity	Cost
Connector - Stage 4 South Boundary (including shared path) 20m road reserve, 11m carriageway	640m @ $1,837 per metre	$ 1,213,719.00
Local Industrial - Stages 3, 4, 5, 6 & 7 18m road reserve, 12.6m carriageway	3,285m @ $1,688 per metre	$ 5,542,247.00
Local Industrial - Stage 3 & 5 South Boundary (including shared path) 20m road reserve, 11m carriageway	570m @ $1,9378per metre	$ 1,192,781.00
TOTAL	**5,945m**	**$10,726,272.00**

5.8.2 Three waters

Table 5 provides a summary of the high-level cost estimate for the light industry type. More detailed cost estimates for both light and medium industry are included in Appendix I.

Table 5: High level cost estimate for three waters infrastructure

Description	Amount
Stormwater	
Part portion with Springvale Structure Plan	$ 688,500
Fully Funded By Council or Development Contributions (DCs) (TBC)	$ 6,700,495
Required for on-site development (paid by developer)	$ 3,722,700
Wastewater (Light Industry)	
Fully Funded By Council or Development Contributions (DCs) (TBC)	$ 760,378
Required for on-site development (paid by developer)	$ 2,117,600
Water	
Fully Funded By Council or Development Contributions (DCs) (TBC)	$ 100,000
Reticulation required for on-site development (paid by developer)	$ 2,217,250
TOTAL	**$ 16,306,923**

6. Recommendations

This section summarises the recommendations developed in Section 5 of this document to enable the zone's infrastructure provision and development.

6.1.1 Implementation Plan

An implementation plan to ensure works are programmed and completed in time for any forthcoming development.

6.1.2 Existing Projects

a. Implement the projects identified as Action 31 of the *Whanganui Urban Transportation Strategy*.

b. Implement the water upgrades relating to the SP area currently as provided for in the Long Term Plan.

These projects are important to the overall development of the SP area:

- upgrades to the road connection between Mill Road and Manuka Street;
- Traffic calming along Manuka Street to protect residential amenity values; and
- Upgrade and extend the water main from Mill Road to Fitzherbert Avenye.

6.1.3 Consultation

Implementation of a consultation strategy is recommended to ensure all relevant parties are engaged, including:

- Landowners within and adjacent to the SP area;
- Castlecliff residential community;
- Prospective industrial businesses and general industrial business community;
- Aranui School - with particular regard to the proposed shared path and how they would like to use the shared path;
- FirstGas – to work through the costs and requirements of building infrastructure over and alongside the gas-mains easement bisecting the zone;
- Powerco – to ensure that their plans continue to align with and keep abreast of development
- Other key stakeholders and partners including developers, Iwi and Hapu (partners), statutory organisations and other key interest groups or individuals; and
- The public and local communities.

The strategy should also encompass the implementation stages of development to ensure that Council has a good understanding of forward development plans by landowners and can ensure the timely provision of infrastructure.

6.1.4 Urban Design, Policy and Planning

a. It is recommended to designate all elements of the stormwater system that are required for the Stage 1 and 2 development and the stormwater system. This includes:

   – The southern and northern open drains;
   – The stormwater attenuation area;

- The overland flow path parallel to Mill Road; and
- The Mill Road drain between the attenuation area and Mosston Road.

b. Incorporate the key elements of this structure plan into the District Plan by way a plan change. This should include associated changes to Plan provisions including investigation of the following:
   - Identify appropriate mechanisms to enable the proposed staging (e.g. rules making development dependent on infrastructure provision);
   - Identify appropriate mechanisms to limit access onto Waitai Road (e.g. under the Local Government Act 1974 – limited access roads, traffic calming treatments, road closure or stopping);
   - Consider whether noise insulation standards should be applied to noise sensitive activities establishing in zones adjacent to the SP area;
   - Identify landscape and urban design provisions appropriate to an industrial amenity in the SP area. These should address both CPTED and amenity matters.

c. Confirm a timeframe and approach for the upgrade of the intersection between Mill Road and Mosston Road when traffic numbers using the intersection require it

d. Extend the Springvale/Otamatea Development Contributions Policy to incorporate growth projects in the SP area.

e. Design connections between the Mill Road shared pathway and the wider Whanganui cycling network and update the Active Transport strategy accordingly.

f. Notify landowners and developers of the presence of Acid Sulphate Soil (ASS) in the SP area, and make them aware of the need for a project-specific ASS management plan.

g. Advise the landowners and / or developers of 103 Manuka Street and 15 Rakau Road of their obligation to undertake contaminated site investigations if developing to ascertain whether consent and contaminated land management is required.

6.1.5 Further modelling and design inputs

The geotechnical and hydro-geological reports in Appendix C and D include recommendations for the design and construction of infrastructure in the SP area. It is recommended that these design and construction recommendations are reviewed when designing infrastructure for the remaining stages of development, to reduce the likelihood of settlement, static and seismic instability or lateral spreading.

Confirmation of the water infrastructure and connection to the existing water supply network is also required following the survey currently being carried out by Council to locate the cause of the anomaly identified in the water model.

Appendices

Appendix A – Figures

Appendix B – Landscape Design Report

Appendix C – Geotechnical Assessments

Appendix D - Hydro-geological Reporting

Appendix E – Three Waters Design Summary

Appendix F – Stormwaters Maps

Appendix G – Wastewater Maps

Appendix H – Water Maps

Appendix I – Cost Estimates

Appendix J – Consultation Report

Appendix K - Archaeology Report

GHD

Level 1, Grant Thornton House
215 Lambton Quay
T: 64 4 472 0799 F: 64 4 472 0833 E: wgtnmail@ghd.com

© GHD 2020

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	Caitlin Kelly	Sarah Jenkin				
2	Caitlin Kelly	Sarah Jenkin				

www.ghd.com