Appendix S19 - Cambridge C1 and C2/C3 Structure Plans

S19.1 Purpose

S19.1.1 Cambridge has been identified as a high growth area, and the Waipa District Growth Strategy forecasts that approximately 13,456 additional households will be required to match a population of approximately 30,257 by 2050 (or roughly 212 households per annum). Current residential growth within Cambridge, as at 2017, is serviced by Cambridge Park, St Kilda and Cambridge North. However, as these areas get closer to capacity, Council must look forward and plan for the next identified areas of residential growth within Cambridge – the C1 and C2/C3 Growth Cells. Developing Structure Plans for these areas when a new Growth Cell is close to being needed, means that a plan is ready and in place to meet the demands of the market. A Structure Plan is essential to avoid piecemeal development by providing a high-level enabling framework.

S19.1.2 These Structure Plans offer details on anticipated land use, necessary infrastructure and establish an associated planning context for how the implementation of the Structure Plan areas are to be managed. The Structure Plans provide a broad framework within which landowners and developers can prepare development proposals in a flexible manner while maintaining an integrated approach to development. Well planned residential areas consistent with the amenity and character expected within Cambridge are sought, together with providing for an adequate provision of services and appropriate walking, cycling and street connections.

S19.1.3 C1 Structure Plan

S19.1.3.1 The C1 Structure Plan area is bound by The Waikato Expressway (State Highway 1) to the north, Victoria Road to the east, the town belt to the south and Abergeldie Way in the west. The C1 Structure Plan area includes approximately 46.2 hectares of land and is generally rectangular in shape (see Figure 1).

S19.1.3.2 The site has a largely rural use at present, primarily associated with the equine industry (particularly along the sites western edge). There are however a number of commercial / light industrial uses to the east, and the northern portion previously provided a spill over works area for the NZ Transport Agency associated with the construction of the Cambridge section of the Waikato Expressway.

S19.1.3.3 The site is largely flat, predominantly pastoral, with vegetation largely comprising single trees, shelter belts or small clusters of vegetation. There appears to be no notable vegetation stands or water bodies on the site.

S19.1.4 C2/C3 Structure Plan

S19.1.4.1 The C2/C3 Structure Plan area is made up of two Growth Cells – the C2 and C3 Growth Cells. These Growth Cells have been combined to minimise serviceability complications, provide a coordinated approach to the western gateway to Cambridge and enable a more comprehensive approach to design. The Growth Cells are located to the west of the Cambridge town belt and north of the Waikato River, with the area being characterised by rural and rural residential land uses. The Growth Cells are bisected by Cambridge Road, with land to the north (C2) being largely flat, and land to the south (C3) being characterised by a series of river terraces which step down towards the Waikato River (see Figure 1).

S19.1.4.2 The C2 Growth Cell is generally square in shape, measuring approximately 1.3km by 1.25km and 161.6 hectares in area. Approximately 8.8 hectares of land to the south-east is currently developed as residential (Kelly Road). The site is flat, with very littlecontour.

S19.1.4.3 Growth Cell C3 is made up of 4 distinct terraces (ranging from RL 65m to RL 37m), with steep escarpments between each terrace and down to the Waikato River. C3 is generally rectangular in shape, measuring roughly 1.56km by 0.6km and 120.3 hectares in area. Unlike Growth Cell C2, the C3 Growth Cell contains large areas of land (approximately a third of the overall Structure Plan area) that are less suited to development due to topography, waterways, large power pylons and archaeological areas.

S19.1.4.4 A key element of the C3 Growth Cell is the Te Awa Cycleway which runs along the Waikato River and links Cambridge town centre with the velodrome cycle facilities and St Peters School. The Te Awa Lifecare Village is also located within C3. Once complete, this development will contain a number of care beds, villas, serviced apartments and a childcare facility.

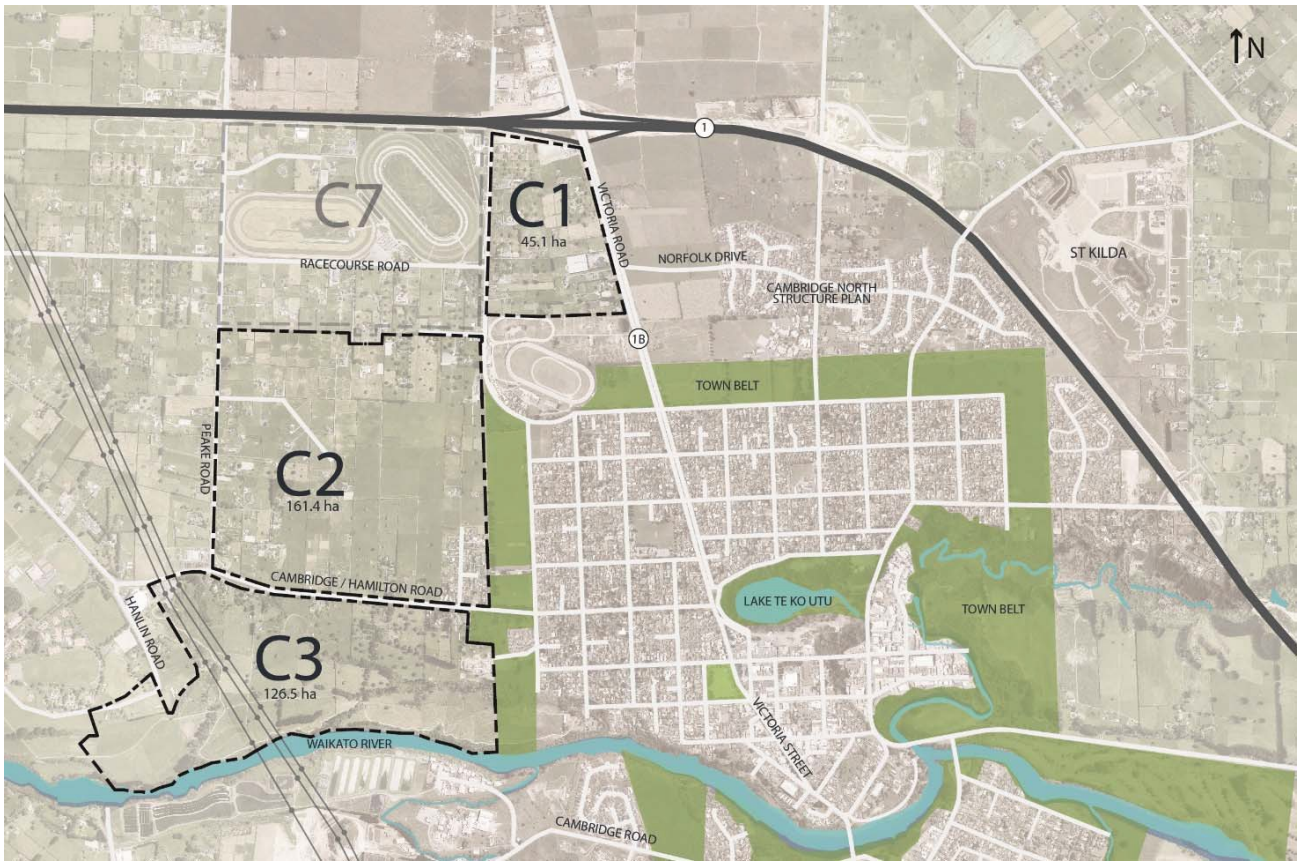


Figure 1: C1 and C2/C3 Growth Cell areas within the Cambridge Context

S19.1.5 Future Proof

S19.1.5.1 Future Proof is a growth strategy developed to ensure the long term success of the Hamilton, Waipa and the Waikato sub-region by managing growth in a collaborative manner.

S19.1.5.2 Specific guidance provided by Future Proof for the future development of the C1 and C2/C3 Growth Cells include the residential density targets of 12-15 dwellings per hectare/gross in Greenfield Cambridge (a higher density than currently provided in residential Cambridge). It also outlines the projected population increase in Cambridge between 2006 and 2061, with the population expected to almost double in the next fifty years.

S19.1.5.3 As outlined further within this document, the Structure Plans for the C1 and C2/C3 Growth Cells seek to respond to the Future Proof targets through a balanced approach of providing an overall density target of 12-15 dwellings per hectare/net[1], responding to local character attributes and infrastructure requirements, and also providing opportunities for higher densities (compact housing) in appropriate areas.

S19.1.6 Waipa District Plan

S19.1.6.1 As at September 2018, those areas earmarked for future development within Growth Cells C1 and C2/C3 are zoned 'Deferred'. Deferred zonings can be uplifted to the zoning depicted in the Structure Plan once the triggers or requirements of the Structure Plan have been met. If the identified Structure Plan triggers or requirements have been met, this uplifting process can occur via Council resolution, not via a standard Schedule 1 Plan Change process. For the purposes of uplifting the zoning pursuant to the district plan provisions, Growth Cells C2 and C3 shall be treated as one growth cell, albeit they may be uplifted in part for the purposes of staging.

S19.1.7 Iwi Management Plans

S19.1.7.1 Waipa's Māori culture and identity is an important part the community's heritage, both past and future. Waipa District Council is committed to working alongside mana whenua to promote Te Aranga Māori Design Principles and facilitate outcomes that respond to the intrinsic Māori cultural values of Cambridge and the wider district.

S19.1.7.2 Iwi Management Plans have been developed and approved by Iwi to address matters of resource management significance within their respective rohe (region). The plans contain information relating to specific cultural values, historical accounts, descriptions of areas of interest (hapū/iwi boundaries) and consultation and engagement protocols for resource consents and plan changes. These plans are taken into account by the council in the management of the region's natural resources, providing a formal way for iwi interests to be incorporated into the council's decision making. The Raukawa Environmental Management Plan (2015) and the Waikato Tainui Environmental Plan (2013), include the C1/C2/C3 Structure Plan area and surrounds as a place that is important to their iwi, and Waipa District Council is committed to working with mana whenua to facilitate the outcomes of those plans as growth occurs in the future.

S19.1.7.3 Waipa District Council has joint management agreements in place with the iwi that have rohe within the district. During the preparation of the Cambridge C1-C3 Structure Plans and formulation of the associated plan change, Council staff have discussed with and provided information on the draft plan change in accordance with those joint management agreements.

S19.2 Plan Overview

S19.2.1 The Structure Plan design is formed through the arrangement of land uses, public spaces, transport systems, services and amenities. It is this design that gives form, shape and character to neighbourhoods – defining place and ultimately contributing to the quality of life in

[1] As per Future Proof, gross density is the total residential units over the total development land area excluding roads. For the purpose of this Structure Plan, net density is the total residential units over the total residential land area excluding roads and, in addition, land not suitable or available for residential development including open spaces, areas constrained by topography, commercial areas, schools, and land required for environmental buffers and stormwater infrastructure (including any buffer areas or setbacks from the stormwater infrastructure).

Cambridge as a whole. The overarching Structure Plan diagrams for C1 and C2/C3 are included as Attachment A.

S19.2.2 Vision

S19.2.2.1 The vision for the design of the Structure Plan is to enable residential development consistent with the character of Cambridge while providing for increased housing choice and placing a strong emphasis on the provision and quality of public open space. The framework for the design process is based on a methodology emphasising environmental, community and economic outcomes.

Environmental

(a) Acknowledge the relationship between land, water and communities that exists for iwi in developing integrated communities that knit with the existing Cambridge fabric (considering social infrastructure, reserves, walking and cycling connections).

(b) Tie in with existing Cambridge character (historic town layout – with gridded streets surrounded by a town belt, wide berms, street trees, low fences, generous yards, pitched roofs).

(c) Preserve, and where possible, enhance existing natural areas, parks, walkways, wildlife corridors and water resources throughout the community - and integrate them into the development to provide a sense of place and amenity for future residents.

(d) Enable the development of strong 'gateways' for Cambridge (from the north and west).

(e) Promote sustainable design solutions, e.g. stormwater system design.

(f) Creating a greater connection to the Waikato River and taking the opportunity to actively engage with this iconic feature.

Community

(g) Create healthy, safe, liveable and complete communities with services and amenities in close proximity to homes.

(h) Respond to demographic pressure by providing housing choice and alternative housing typologies – appealing to a range of residents at various stages of their life.

(i) Design for communities and public spaces to support the lifestyle and activities of residents of all ages and levels of mobility.

(j) Respect the character of development within adjacent communities and plan for complementary activities or adequate buffering between land uses.

Economic

(k) Keep the Cambridge town centre intact, providing for local convenience retail and service, and not undermining the commercial function of the Cambridge town centre.

(l) Promote sustainable, cost and resource efficient design solutions (infrastructure and buildings).

(m) Promote high quality environmental and community outcomes whilst enabling development to occur in a timely manner.

(n) Build upon Cambridge's reputation as a national 'Centre of Excellence' for sports and education.

(o) Provide design solutions that enable flexibility in years to come.

(p) Provide additional opportunities to accommodate visitors in Cambridge - promoting local trade and tourism.

(q) Identify appropriate areas for neighbourhood and local centres within the Structure Plan areas.

S19.2.3 Goals and Objectives

S19.2.3.1 The goals and objectives underpinning the C1 and C2/C3 Structure Plan areas are based on best practices for designing liveable, sustainable communities. These include development guidelines for mixing land uses, supporting transportation choices, and aiming to provide for increased quality of life through good neighbourhood design.

S19.2.3.2 The following strategies help to identify the key design moves underpinning the Structure Plan layout, as illustrated in the photographs and thumbnail images below.

Character

S19.2.3.3 Maintain and enhance the existing local character of Cambridge through:

(a) Provision of tree-lined streets and grass berms, where appropriate.

(b) Low, visually permeable fences.

(c) Provision of private open space (low site coverage).

(d) Unique elements such as integrated stormwater corridors, walkways / cycleways, heritage features.

(e) Integrated movement and open space networks.

(f) Central focal points and community meeting places.

(g) Recognising areas of cultural significance and doing so in collaboration with iwi.

Wide berms and tree lined streets define the existing residential character of Cambridge

Large front setbacks, low fencing and mature trees

New development retaining characteristic pitched roof form and overlooking adjacent public open space

Figure 2: Built form characteristics of Cambridge

Connected Streets

S19.2.3.4 An open, well-connected street network extends from the existing Cambridge grid pattern where topography allows for this (albeit at a smaller scale), promoting safe and efficient connections for pedestrians and cyclists.

S19.2.3.5 A well-linked movement and circulation plan provides opportunities for future public transit and safe routes for pedestrians and cyclists.

Neighbourhood and Local Centres

S19.2.3.6 Central, accessible Neighbourhood and Local Centres form a focal point for each of the new residential communities, providing local convenience retail and services.

Open Space

S19.2.3.7 Generous provision of parks and open space provide opportunities for social gatherings, recreation and leisure within a short walking distance of the majority of residents (i.e. as identified within the five minute / 400m walking circles depicted below), including facilities such as children's playgrounds and public toilets.

S19.2.3.8 Stormwater conveyance and treatment areas are co-located with areas of public open space creating multi-functional features of the Structure Plan areas.

Walking and Cycling Connections

S19.2.3.9 A network of off and on-road walkways and cycleways connect residents with each other and to community focal points (the neighbourhood and local centres, local parks, existing recreation features, public transit stops, etc.)

S19.2.3.10 Within the C2/C3 Structure Plan area, a central stormwater corridor links residents to community focal points through off-road cycle connections, and provides a multi-functional space for stormwater conveyance as well as recreation and amenity opportunities.

Figure 3: C1 and C2/C3 Concept Thumbnails – Connected Streets; Open Space; and Walking and Cycling Connections

Housing Choice

S19.2.3.11 The C1 Structure Plan will accommodate approximately 275-375 dwellings and the C2/C3 approximately 1,750-2,375 dwellings in a variety of forms including low-density single-family

homes, small-lot detached homes, and with potential for town houses. Higher densities can be expected within those areas identified for compact housing.

S19.2.3.12 A variety of housing types and sizes are supported to accommodate a diverse population, with different household structures and income levels.

S19.2.3.13 Densities vary across the Structure Plan area with lower density areas further away from the neighbourhood amenities, and higher densities closer to the neighbourhood amenities and central areas of open space.

S19.2.3.14 The Structure Plans for the C1 and C2/C3 Growth Cells seek to respond to the Future Proof targets through a balanced approach of providing an overall density target of 12-15 dwellings per hectare/net, responding to local character attributes and infrastructure requirements, and also providing opportunities for higher densities (compact housing) in appropriate locations.

S19.3 Land Use

S19.3.1 Overview

S19.3.1.1 The Structure Plan accommodates a variety of land uses including varied residential densities, local convenience retail, services and civic uses (within the neighbourhood and local centres), and parks. Residential densities have been laid out in a deliberate pattern with lower density blocks located on the edges of the Structure Plan areas (particularly in the north and west), moving to slightly denser residential areas around the neighbourhood centre and local open spaces.

S19.3.1.2 The land use categories included in the Structure Plans are summarised below and within Table 1 and illustrated in Figure 4:

(a) **Residential:** The District Plan provides for lots of 500-1,000m^2; the Structure Plan envisions that blocks within this zone will consist mostly of single family detached dwellings on lots of 600-800m^2.

(b) **Compact Housing Overlay**: Blocks within this overlay will consist of a mix of residential and compact housing typologies, including duplexes, terraces, apartments and town houses.

(c) **Neighbourhood Centre:** Land identified for the C1 Neighbourhood Centre will accommodate convenience retail and services and supporting community amenities, including open space where appropriate.

(d) **Visitor Accommodation:** A new overlay for visitor accommodation is provided in a location easily accessed by adjacent Arterial Roads, in close proximity to the Neighbourhood Centre and to existing visitor accommodation located along Peake Road.

(e) **Reserves (Parks and Open Space):** Reserve areas include local neighbourhood parks, connecting green spaces (such as stormwater management areas) and landscaped buffers (such as the buffer to the Cambridge Section of the Waikato Expressway / State Highway 1 in the North). These areas will perform multiple functions, including recreation, stormwater management, buffer strips and environmental reserve areas. Opportunity for provision of a café is provided for within the centrally located sports fields in C2 Structure Plan area.

Table 1: C2/C3 Land Use Breakdown (Indicative areas only; subject to detailed design)

	C1		C2		C3	
	Area (hectares)	Yield (dwellings)	Area (hectares)	Yield (dwellings)	Area (hectares)	Yield (dwellings)
Residential*	22	275-375	100.3	1250-1700	39.4	500-675
Neighbourhood and Local Centres	2.6		0.2		0.1	
Public open space	1.4		5.2		3.3	
Stormwater areas	5.2		11.1		2.3	
Environmental reserve	1.5		0		16.2	
St Peters School Zone			0		26.5	
Existing development	0		8.8 (Kelly Road)	47 dwellings	23.5 (Te Awa and Chartwell)	332 Villas and serviced apartments
Road corridor	12.4		35.8		15.3	
Totals	**45.1**		**161.4**		**126.5**	

**Yields based on minimum 12.5 dwellings per hectare / 600m^2 - 800m^2 average lot size; higher densities will ensue where compact housing occurs.*

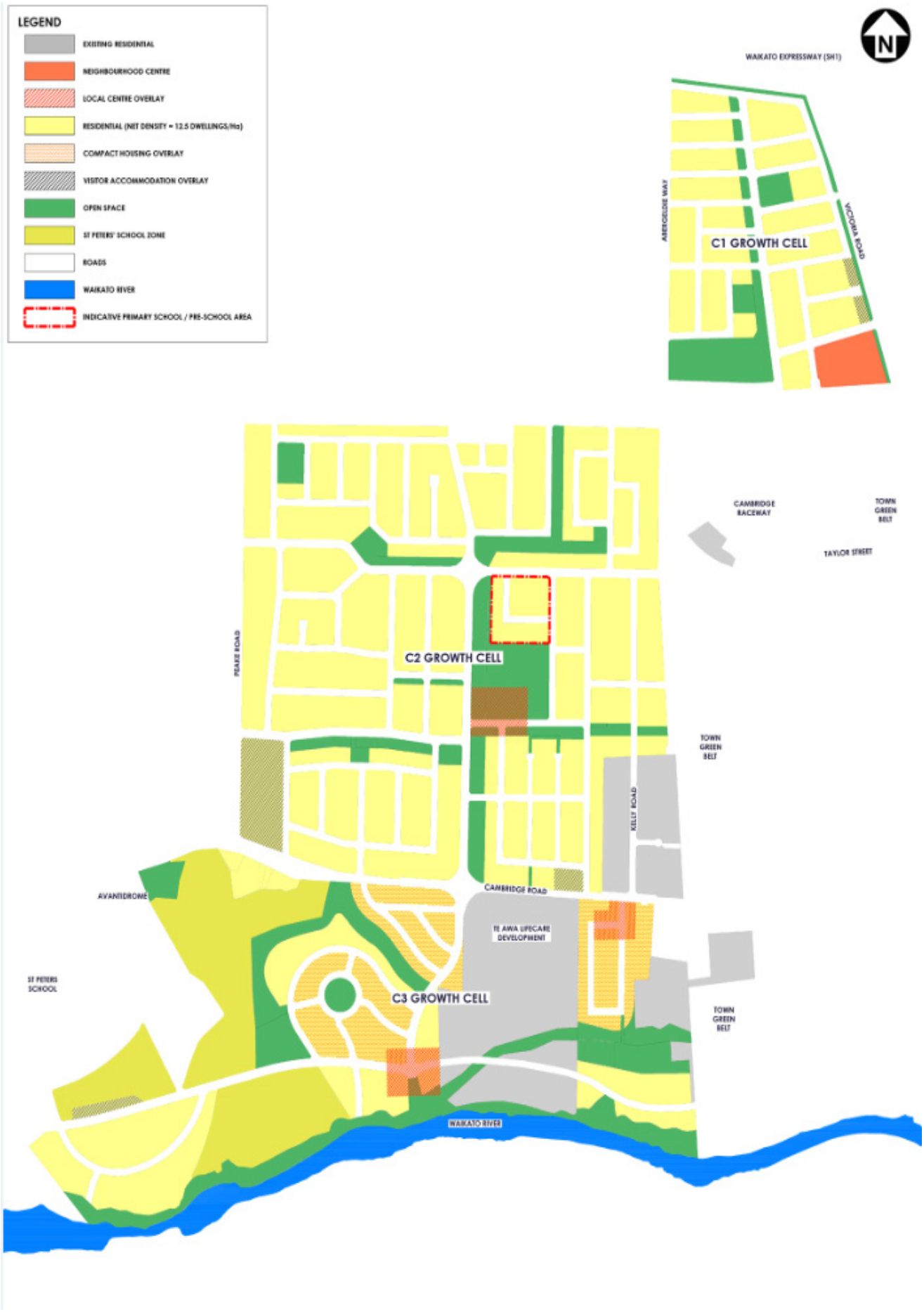


Figure 4: C1 and C2/C3 Land Use Plan, including Compact Housing Overlay

S19.3.2 Residential

S19.3.2.1 The Structure Plan recognises and reflects the need to provide a mix of land uses and densities within the community. Proposed residential dwelling types reflect the underlying principles of the Plan to facilitate future development in a manner that meets Council's aspirations around sustainability, community-orientation and orderly growth. Appropriate population density is the key to vitality and supports vital community services. As such, the Plan seeks to facilitate a balanced approach of providing an overall density target of 12-15 dwellings per hectare/net, responding to local character attributes and infrastructure requirements, and also providing opportunities for higher densities (compact housing) in appropriate areas.

S19.3.2.2 The following outcomes sought are facilitated through the relevant district plan provisions, including the relevant objectives, policies, rules and assessment matters relating to residential and compact housing land use. Where there is any conflict or inconsistency between the structure plan outcomes and guidance and any zone rule, the zone rule shall prevail.

Outcomes Sought

S19.3.2.3 The following outcomes are sought for residential development within the Structure Plan:

(a) Walkable, safe community that is well connected to the surrounding context, providing good access to nearby community amenities, open space, St Peter's School and the Waikato River.

(b) Clear orientation and wayfinding aided by a logical layout, street hierarchy and pedestrian network.

(c) Residential subdivision that contributes to establishing positive character outcomes through a contextually appropriate design that promotes local characteristics to create a strong community identity.

(d) Distributed residential density with a mix of useable lot types, sizes, uses and activities.

(e) Lots oriented to maximise solar access and address streets and public spaces.

(f) Development that is responsive to existing natural features and landform in terms of residential layout, road network and provision of services.

(g) Development that is seen as a natural, seamless progression of the existing Cambridge urban area, rather than being a standalone development.

(h) Development that accentuates and reflects the open relationship of residences to street frontages, with generous front yards and low fencing.

Figure 5: Precedent images showing open front yard with landscaping fronting the street; and low wire mesh fencing with trellised vegetation fronting public open space.

Compact Housing Development

S19.3.2.4 The proposed Structure Plans allow for compact housing development within close proximity to active recreation, local open space, local and neighbourhood centres, schools and Cambridge Road.

S19.3.2.5 Within these areas compact housing may include duplexes, terraces, apartments and town houses. Rules for development within the Compact Housing Overlay are set out in the Residential Zone provisions of the District Plan.

S19.3.2.6 Compact Housing will remain voluntary unless otherwise required as part of a Comprehensive Residential Subdivision consent.

Pitched roof form

Clearly visible main pedestrian entry

Align buildings along the landscaped front yard setback

Visually permeable boundary fences

Figure 6: Compact housing desirable built form

Comprehensive Residential Subdivision

S19.3.2.7 Retaining an overall density of 12-15 dwellings per hectare remains a key objective of the structure plan, while also providing for:

(a) Good quality urban design and amenity outcomes.

(b) A mix of densities and living opportunities.

(c) Appropriate densities in relation to access to surrounding amenities.

(d) Development flexibility in terms of timing of development topologies.

S19.3.2.8 In order to achieve S19.3.2.7, a dual approach is proposed through the District Plan provisions:

(a) Retaining the existing residential subdivision rules for C1 and C2/C3, with a requirement for a minimum 12.5 dwellings per hectare net excluding roads and, in addition, land not suitable or available for residential development including open spaces, areas constrained by topography, commercials, schools and land required for environmental buffers and stormwater infrastructure (including any buffer areas or setbacks from the stormwater infrastructure) to be demonstrated as part of any subdivision, unless undertaken in accordance with a Comprehensive Residential Subdivision consent.

(b) Comprehensive Residential Subdivision consent – provide opportunity to achieve a minimum of 12.5 dwelling per hectare net over a larger development area (thus achieving greater flexibility in the distribution of densities), enabled by agreeing a concept plan and staged approach to a wider Comprehensive Residential Subdivision area, including proposed densities.

S19.3.2.9 A number of bottom-line thresholds are required as part of the proposed provisions for Comprehensive Residential Subdivision areas:

(a) A Comprehensive Residential Subdivision approach may be applied to any land area within the overall structure plan area within common ownership and/or control.

(b) The Provision of an overall concept plan for the 'Comprehensive Residential Subdivision' area will be required, to illustrate:

(i) How the average densities will be maintained over the course of a staged development.

(ii) A logical distribution of densities taking into account access to surrounding amenities such as open space.

(iii) Appropriate graduation between densities, including regularity in densities along streets (i.e. to achieve consistency in character outcomes).

(iv) The concept plan may continue to evolve over time (as part of subsequent subdivision consents) provided that the average densities are maintained.

(c) A minimum 2.5% net land area or 2,000m^2 of the Comprehensive Residential Subdivision area (whichever is larger) must be developed as Compact Housing, pursuant to the district plan provisions.

(d) Where compact housing is proposed, this must be in accordance with the Compact Housing requirements (i.e. in accordance with any consent granted).

(e) The minimum lot size where development does not form part of a compact housing development shall be 400m^2.

(f) The maximum lot size shall be 1,500m^2.

S19.3.3 Neighbourhood and Local Centres

S19.3.3.1 The Neighbourhood and Local Centres strategy for the Structure Plans aims to provide primarily local convenience retail and services for the daily needs of Structure Plan residents as well as those in immediately adjacent residential communities. The Neighbourhood and Local Centres should not detract from the Cambridge Town Centre, but rather provide a focal point and sense of community – enabling residents to undertake the quick stop shopping that they do frequently – within easy walking and cycling distance of their homes. One Neighbourhood Centre and three Local Centres are proposed:

(a) **Cambridge North Neighbourhood Centre:** For the C1 Growth Cell, a neighbourhood centre of 16,000m^2 has been enabled, with potential to include; convenience retail and services; a supermarket; and, office or residential above ground floor level. Alongside the commercial activities, the area earmarked for 'Neighbourhood Centre' will also include parking areas, internal roads, civic open space and community facilities.

(b) **Local Centres:** For the C2/C3 Growth cells, three local centres are proposed. Each local centre may include up to 550m^2 GFA at ground level, with the potential to include local retail and commercial services, café and dining and ancillary activities, along with offices or residential activities limited to above ground floor. Within the C2 Growth Cell, a sports centre and/or art and cultural centre, no greater than 500m^2 GFA in total is also provided for.

S19.3.3.2 The following outcomes sought are facilitated through the relevant district plan provisions, including the relevant objectives, policies, rules and assessment matters relating to residential and compact housing land use. Where there is any conflict or inconsistency between the structure plan outcomes and guidance and any zone rule, the zone rule shall prevail.

Outcomes Sought

S19.3.3.3 The following outcomes are sought for Neighbourhood and Local Centres:

(a) Centrally located – within 10-minute walk of the majority of residents.

(b) A community focal point / meeting place – bringing people together to as they go about their daily activities.

(c) Of a scale that is sympathetic to the surrounding residential form and does not detract from the commercial offering within the existing Town Centre.

(d) An enhanced public realm and improved pedestrian safety and amenity through considered design of buildings and open space.

Figure 7: Indicative visualisation of a local centre showing desired outcomes. Maximise outlook onto adjacent streets, locate active uses along the street frontage, and consider provision of verandahs

Figure 8: For the Neighbourhood Centre, provide landscape treatment for carpark areas, and clear, direct pedestrian routes through on-site parking areas to building entries

S19.3.4 Visitor Accommodation

S19.3.4.1 A visitor accommodation overlay has been proposed for both the C1 and the C2/C3 Structure Plans. The areas identified for visitor accommodation are located along the main entrance roads to Cambridge from the north (Victoria Road) and west (Cambridge / Hamilton Road), and the collector road in the western extent of the C3 Cell. These areas are within close walking distance to the Neighbourhood Centre, or the St Peter's School Zone, and are in close proximity to existing visitor accommodation facilities (i.e. Peake Road).

S19.3.4.2 Existing Objectives (2.3.5) and Policies (2.3.5.1) within Section 2 (Residential Zone) of the Waipa District Plan provide guidance for the form and articulation of visitor accommodation facilities.

S19.3.5 School (C2 Growth Cell)

S19.3.5.1 A preferred location has been identified for a future primary school and daycare facility within the C2 Structure Plan area. Notwithstanding, the exact / final location for the school site will need to be agreed between Ministry of Education, Waipa District Council and relevant landowners. For the final location, an approximate area of 3.0-3.5 hectares will be required and the following criteria must be taken into account (as per the Ministry of Education school location guidelines):

(a) Facilitate a complementary relationship with existing / proposed open spaces.

(b) Provide adequate connectivity to surrounding residential areas and to the wider Cambridge Road network, through an interface with main roads (I.e. Collector Roads and key Local Roads).

(c) Provide sufficient road frontage to enable parking / drop off areas to be created.

(d) Be positioned on fairly flat land for ease of construction and creation of useable space.

(e) Sit outside of floodable or contaminated areas.

(f) Have adequate clearance from existing transmission lines / cell phone sites.

(g) Be easily connected to existing water, wastewater, stormwater, electricity, services.

S19.4 Stormwater Strategy

S19.4.1 Overview

S19.4.1.1 Good stormwater management is a key design driver for development of the C1 and C2/C3 Structure Plan areas. This is due to the proposed change in land use from what is currently a predominantly rural-residential setting into an urban landscape. This change will interfere with current drainage systems, flow paths and flood extents and also bring about a significant increase in impermeable surfaces due to the creation of additional roads and buildings. This will result in a substantial increase in stormwater runoff which the existing drainage systems were not designed to accommodate. There are also large areas that currently have no formal drainage system. As such, the creation of a stormwater concept for each Growth Cell is vital, and must consider:

(a) How stormwater will be treated to avoid or mitigate adverse water quality effects on the downstream receiving environments;

(b) How increases in flow rate and volume will be managed to avoid or mitigate adverse flood and scour effects on the downstream environments;

(c) How stormwater will move through the three cells in an integrated, flexible and robust fashion while appropriately managing flood risk to infrastructure, people and property (both inside and outside the cells); and

(d) How stormwater could be managed in the adjacent Growth Cell, C7, so that future stormwater management in this cell is not made unnecessarily difficult when that area develops.

S19.4.1.2 For further detail of the stormwater investigation and assessments undertaken as part of the Structure Plan project, refer Cambridge C1 and C2/C3 Structure Plans: Stormwater Report (Beca, 2018). This report also sets out the stormwater management requirements for C1 and C2/C3. It is noted that these requirements will be refined and confirmed when Council obtains resource consents from the Waikato Regional and/or the Waipa District Council for the overall discharge of stormwater from C1, C2 and C3 (subsequent to Plan Change 7). Development within C1 and C2/C3 will need to comply with these resource consents and the conditions thereof.

S19.4.1.3 For clarity, the resource consents will define the performance requirements of the stormwater system. The Structure Plan and the Cambridge C1 and C2/C3 Structure Plans: Stormwater Report (Beca, 2018) will be used to support the resource consents. The Waikato Regional Council's (WRC) Waikato Stormwater Management Guide will then be used to help implement the requirements of both the Structure Plan and the resource consents.

S19.4.1.4 In line with the overarching goals and objectives (S19.2.3), stormwater features (that manage conveyance, treatment, flooding and scour) will be strategically placed to provide a clearly defined drainage spine that serves all three cells as well as offering ecologically friendly and aesthetic solutions that are integrated into the wider open space network. The solution will aim to provide a sustainable approach that takes into consideration the existing character of Cambridge.

S19.4.1.5 Stormwater will be managed using a range of approaches including, for the more frequent storms, water re-use, soakage disposal (where hydrogeological conditions are appropriate), water quality treatment and then conveyance of larger flows (from less frequent storms) to the Waikato River.

S19.4.1.6 The stormwater concept shares the responsibility of managing runoff from both private property and from what will eventually be Council owned, public, land (such as road corridors and reserves etc.). That is, there will be "on-lot" devices associated with each household/property that will be the responsibility of private owners to build and maintain and then there will be the larger devices and networks that that will manage the runoff from public land, as well as stormwater overflowing from private properties when the capacity of the "on-lot" devices is exceeded. The larger devices and networks will eventually be vested to the Council to own, operate and maintain. The private devices will still connect into the public system by way of overflows.

S19.4.1.7 To ensure stormwater moves through the C1, C2 and C3 growth cells in an integrated, flexible and robust fashion, WDC will be responsible for seeking the necessary approvals under the Resource Management Act 1991 for a permanent stormwater solution that manages all stormwater flows generated from the cells. To ensure subsequent development within the cells (where connection to the permanent stormwater solution will be required in the future) is compatible with the permanent stormwater solution, the uplifting of any deferred zoning shall be contingent on the necessary consents first being obtained by WDC.

S19.4.1.8 WDC shall engage with affected landowners who have a direct interest in the permanent stormwater solution, in designing and seeking consents / approvals for such infrastructure.

Soakage Testing & Groundwater Monitoring

S19.4.1.9 Limited geotechnical and soakage testing was carried out in late 2016 to understand the make-up of the soils underlying the Cells and also to inform selecting appropriate soakage rates for concept design. At the same time piezometers were installed to identify and record groundwater levels, again needed for soakage design and future effects assessments of likely groundwater drawdown. The groundwater level monitoring is ongoing and seeks to document its variation across the site over time and through a full range of season variation.

S19.4.1.10 Initial soakage testing looked at a five test sites and more focused site specific testing will be required with each future stage of design all the way through to construction (both for public soakage devices and for "on- lot" devices).

Preferred Stormwater Strategy

S19.4.1.11 A number of feasible options have been identified to convey the majority of stormwater runoff from C1, C2 and C3 south through the C2 and C3 to the Waikato River. The proposed approach outlined below has been identified as the preferred option based on investigations undertaken to date (including further investigations and consultation carried out in response to submissions on Plan Change 7). It is noted the layout, sizes and detailed performance requirements of the features described below (both private and public) will be refined during future assessment and design stages, in particular the aforementioned resource consent applications.

S19.4.1.12 It is also recognised that there may be alternative measures available to manage stormwater and it is not intended to exclude these provided they are acceptable to both Council and the WRC and are consistent with stormwater outcomes of the Structure Plan and the Cambridge C1 and C2/C3 Structure Plans: Stormwater Report (Beca, 2018).

S19.4.1.13 Within each Growth Cell, the stormwater strategy incorporates different elements as outlined below and shown indicatively in the following Figures 9 and 10.

C1 Growth Cell

(a) The overall stormwater management approach will be designed in accordance with WRC's Waikato Stormwater Management Guideline (2018) and Council's RITS (2018) and include a variety of low impact features to manage stormwater from its source to its outlet in the receiving environment(s).

(b) Private properties will be required to provide stormwater management with "on-lot" measures with overflows into the central drainage system. These will be selected in accordance with WRC's Waikato Stormwater Management Guideline (2018) and Council's RITS (2018) and will involve a hierarchy of measures subject to site specific testing and design.

(c) Stormwater within the C1 catchment will be drained via piped drains or shallow swales into a central road-side conveyance open channel drain.

(d) The open channel drain will run parallel to the main north-south collector road and convey stormwater to a soakage basin in the south-west corner of C1.

(e) The basin will be sized to soak away runoff from the road corridor for all of the 2 year ARI storm for durations up to 24 hours, unless regional and/or district resource consents for the Structure Plan stormwater system allow a lesser standard and is justified by the use of alternative measures for stormwater management and disposal.

(f) Flows exceeding the capacity of the basin will overflow and be conveyed by culvert into the top of the C2 central open channel drain.

(g) No other peak flow attenuation is required as the central open channel drain in C2 will convey flows to the river (although some attenuation will inherently occur in the basin).

(h) Water quality treatment will be provided by an infiltration area within the soakage basin (or by other approved measures).

C2 Growth Cell

(i) The overall stormwater management approach will be designed in accordance with WRC's Waikato Stormwater Management Guideline (2018) and Council's RITS (2018) and include a variety of low impact features to manage stormwater from its source to its outlet to the receiving environment(s).

(j) Private properties will be required to provide stormwater management with "on-lot" measures with overflows into the central drainage system. These will be selected in accordance with WRC's Waikato Stormwater Management Guideline (2018) and Council's RITS (2018) and will involve a hierarchy of measures subject to site specific testing and design.

(k) A large, deep (varies along its length from 3 to 5m), centrally located open channel drain will convey stormwater though C2. The depth of the drain will be designed to avoid and/or mitigate hazards associated with liquefaction and slope stability under seismic conditions.

(l) The central open channel drain will also be designed to receive flows from C1 and other surrounding areas, namely part of C7 (in the order of 50% by area), C1 Extension and that part of north-west Cambridge that currently runs onto C2 via the Kelly Road / Vogel Street open channel drain.

(m) A number of smaller branch drains (secondary conveyance open channels) will feed stormwater into the central open channel. Several of these feeder drains will be located along the same alignment as existing farm drains or other proposed green corridors such as cycleways.

(n) A number of soakage features (either basins or other devices incorporated in the wider drainage corridors) will be located around C2 for soakage disposal of runoff. These locations are subject to topography, ground conditions, roading layout and the layout of the wider drainage network. Stormwater will be treated prior to being discharged by soakage.

(o) Soakage will be sized to soak away all the 2 year ARI storm for durations up to 24 hours unless regional and/or district resource consents for the Structure Plan stormwater system allow a lesser standard and justified by the use of alternative measures for stormwater management and disposal.

(p) Flows in excess of that to be soaked away will be conveyed to the central stormwater open channel and from there discharged to the Waikato River via the C2/C3 piped outfall.

(q) A second pipe will connect the open channel drain to the top of the existing stream in C3 with the purpose of maintaining low flows within the stream for ecological reasons. This pipe may also need to allow for fish passage up from C3 into C2 (although it is assumed fish passage is not feasible given the pipe length involved, but this is subject to a specialist ecological assessment to be carried out to support future resource consent applications).

(r) Drainage will be conveyed by pipes or swales (subject to topographical limitations and design falls etc.) into the soakage basins and/or the open channels.

(s) No other peak flow attenuation is required for runoff being discharged direct to the Waikato River. However, attenuation will inherently occur in the open channel given the size and shallow gradient of the drainage.

(t) Water quality treatment will be provided by infiltration in the soakage basins or by off-line swales (or by other approved measures).

(u) Both the central open channel and the open channel serving that part of Cambridge running on to C2 (i.e. the east-west drain running from Vogel Street passing north of Kelly Road) will be designed to provide an enhanced / restored stream with a naturalised form including ecological / stream habitat features.

(v) A part of C2 (approximately 15ha in the north-west corner of the cell) will be drained out to the Pukeroro Scheme Drain. The effects of this discharge will be offset and balanced such that no additional flow or volume is discharged into the Scheme Drain in a 10 year ARI 72 hour storm. This will be achieved by a combination of the following measures:

  (i) Diverting part of the catchment within cells C1, C2 and C7 (that currently drains to the Pukeroro Scheme Drain) into the central C2 open channel;

  (ii) Disposing of runoff from the more frequent storms with soakage;

  (iii) Providing extended detention if soakage is not feasible as a means of managing stream scour; and

  (iv) Other measures listed in WRC's Waikato Stormwater Management Guideline (2018).

(w) Runoff discharged into the Pukeroro Scheme Drain will also be attenuated such that the post development peak flow is no more than 80% of the existing development peak flow during a 100 year ARI 24 hour duration storm.

C3 Growth Cell

(x) The overall stormwater management approach will be designed in accordance with WRC's Waikato Stormwater Management Guideline (2018) and Council's RITS (2018) and

include a variety of low impact features to manage stormwater from its source to its outlet to the receiving environment(s).

(y) Private properties will be required to provide stormwater management with "on-lot" measures with overflows into the central drainage system. These will be selected in accordance with WRC's Waikato Stormwater Management Guideline (2018) and Council's RITS (2018) and will involve a hierarchy of measures subject to site specific testing and design.

(z) Stormwater will drain from C2 through C3 in pipes that outlet into the Waikato River.

(aa) Any stages of development within the C3 cell that connect to the C1/C2/C3 conveyance network will not require extended detention.

(ab) The existing C3 stream reach from between Cambridge / Hamilton Road and its confluence with the smaller velodrome tributary further downstream will be restored to a naturalised stream form (the velodrome tributary and reaches downstream of the confluence have already been restored with native riparian planting undertaken as part of other separate projects).

(ac) Off-line stormwater management areas (lined wetlands or other approved alternative methods) will be located within C3 to provide for water quality treatment prior to discharge to the Waikato River. Extended detention (for stream scour control) will also be required should the final system outlet to any other existing watercourses/streams in C3 other than the Waikato River.

(ad) No peak flow attenuation is required given the direct connections to the Waikato River.

(ae) The pipe outlets to the river will include energy dissipation structures.

(af) Road crossings over the existing streams in C3 (be it bridge or culvert) shall be designed to not increase the potential for downstream scour, and will provide for fish passage.

(ag) Stormwater soakage to ground will not be used in C3 given the potentially unstable nature of the river terrace topography.

(ah) Separate stormwater discharge outlets may be required for the areas of C3 that do not connect to the C1/C2/C3 conveyance network (subject to further investigation to be undertaken as part of resource consenting for C3 discharges). If those stormwater discharge outlets discharge directly to the Waikato River, then extended detention is not required. However, if the discharges are to any stream or gully which is a tributary of the Waikato River, then appropriate stormwater management measures (such as extended detention for private properties and road reserve) will be required in accordance with the WRC Waikato Stormwater Management Guideline 2018.

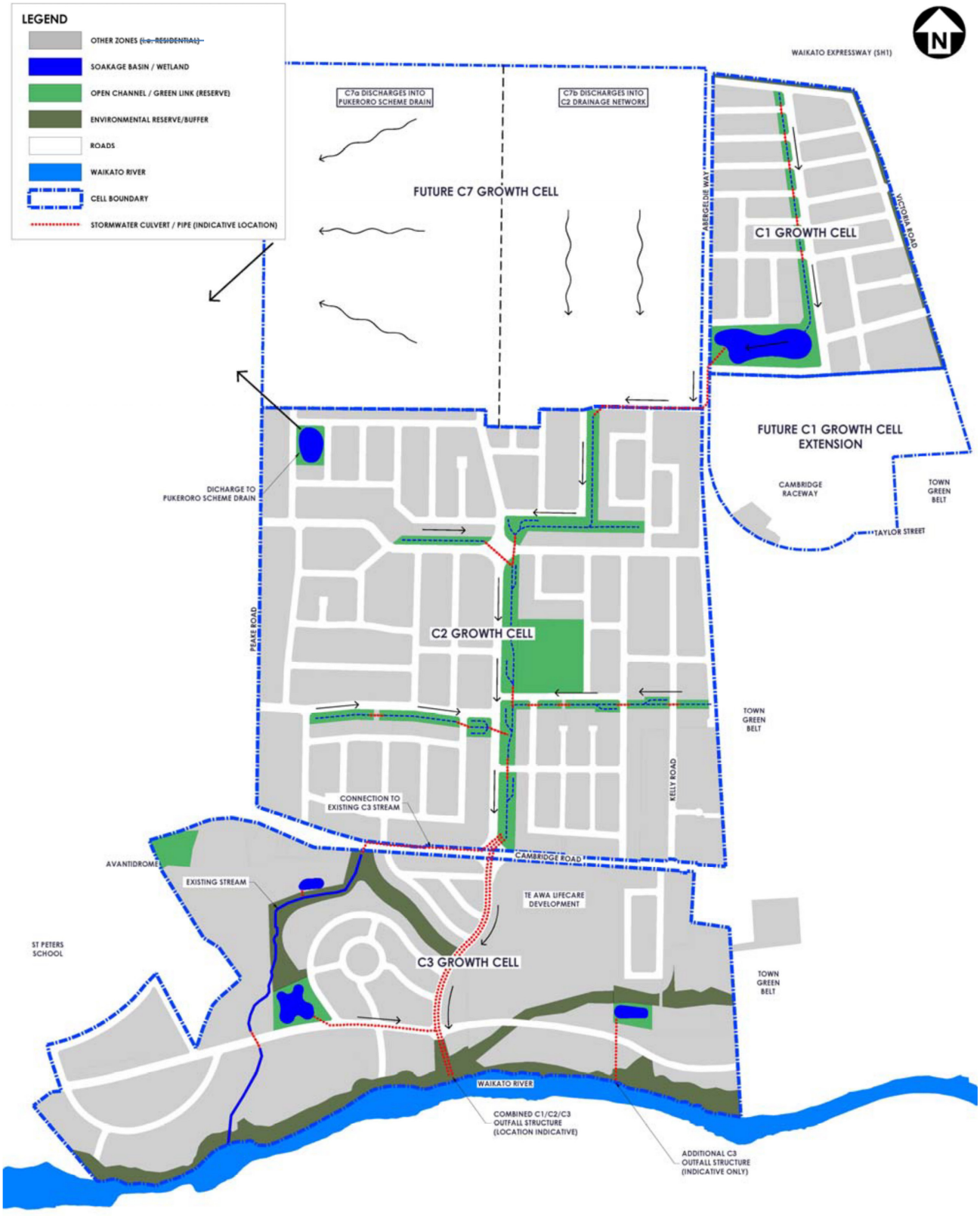


Figure 9: Proposed schematic stormwater layout for the C1 and C2/C3 Growth Cells (also showing future growth cells C7 and C1 Extension)

Figure 10: Indicative illustration of a secondary (feeder) stormwater open channel within C2 edged by road and housing, with cycle path connections.

S19.4.2 Outcomes Sought

S19.4.2.1 The following outcomes are sought for stormwater management within the C1 and C2/C3 Structure Plans:

(a) A holistic, resilient, robust response to stormwater for all three growth cells and for adjacent existing and future residential areas;

(b) A stormwater system that manages and accommodates flood risk and avoids or mitigates the effects of intensive urban developments on sensitive receiving environments, focusing on flood hazard management, groundwater recharge, water quality and stream scour controls for both private and public areas;

(c) A stormwater system that manages groundwater risks and effects (such as drawdown, recharge, mounding, land stability, impact on liquefaction risk etc);

(d) Strategically placed stormwater features that provide ecologically friendly and aesthetic solutions that are integrated into the wider open space network;

(e) A stormwater strategy that integrates off-road pedestrian and cycle movement – connecting residents to each other, to local attractors and to the wider community;

(f) A stormwater network that is activated and overlooked by adjacent land uses;

(g) Provides for the opportunity to consider value-engineering interventions along the open channel edges where located outside the 100 year flood extent, such as including varied open space uses, or reducing the corridor width to allow for housing where appropriate (refer Figure 11); and

(h) A stormwater management response that meets the requirements of the Waikato Regional Council, providing a sustainable solution that incorporates flexible low impact design features so as not to detract from the existing natural environment.

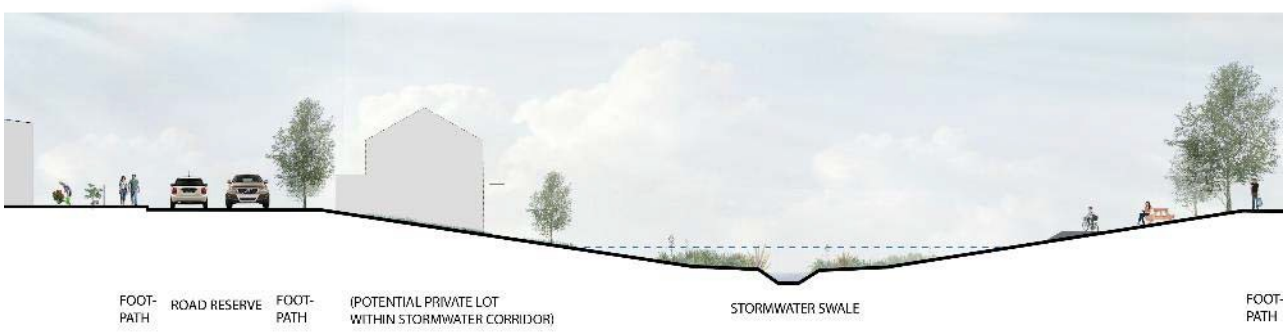


Figure 11: Potential value engineering of central stormwater swale to include housing

S19.4.3 Urban Design Guidelines

S19.4.3.1 The following urban design guidelines relate to the development of stormwater management areas within the Structure Plan:

(a) Stormwater management areas to utilise plant species that are functional, durable, low in maintenance and contribute to local ecology and amenity.

(b) Stormwater management areas to be co-located with areas of public open space for activation and local amenity.

S19.4.3.2 Within the C2 Growth Cell Area:

(a) Develop a comprehensive open space plan for the central C2 swale, including vegetation management, provision of walking and cycling ways, key activities nodes (e.g. playgrounds and other open space amenities), and interface with adjoining land uses.

(b) Edge the central C2 stormwater corridor on at least one side by a public road and design it so that it is overlooked by adjacent land uses on both sides (except adjacent to the proposed school site) (see Figure 11).

(c) Include a continuous pedestrian and cycle trail along the length of the central C2 stormwater corridor – connecting residents and visitors through the C2 Structure Plan area, past the central reserve area and local centre, to the C3 Growth Cell.

(d) Provide a number of vehicular and pedestrian connections across the central C2 stormwater corridor in an east-west orientation through the provision of bridge / culvert structures.

(e) Restore and enhance the remaining section of the existing C2/C3 stream that has yet to be restored to a naturalised stream.

Figure 12: Indicative illustration of the central stormwater swale edged by road and housing, with cycle paths

S19.4.4 Staging

S19.4.4.1 It is likely that the drive for residential development within these growth cells will precede the designation and construction of the proposed stormwater network. As such, a staged approach to stormwater management is considered appropriate, to enable initial stages of development to occur without reliance on the wider stormwater solution. The temporary solution includes opportunity to provide for a centrally located stormwater management area that, once the permeant stormwater solution is in place, could be converted back to open space or residential development.

S19.4.4.2 There are significant risks with a staged approach that will need to be worked through in further detail by developers in consultation with Council if a staged approach is to proceed. These will depend on the location, size and nature of development areas being considered. Further, triggers regarding the uplifting of Deferred Zones are contained within Section 14 (Deferred Zone), provision 14.4.1.9 of the Waipa District Plan; and these triggers must be met prior to the Deferred Zoning being uplifted or any temporary solution being implemented.

S19.4.5 Further Investigation, Assessment and Design

S19.4.5.1 A number of feasible options have been identified to convey stormwater from C1, through C2 and C3 to the Waikato River. The proposed approach outlined above has been identified as the preferred option based on investigations and land owner/stakeholder consultation undertaken to date. However, prior to designation of the stormwater corridor, a number of further investigations will need to be undertaken as part of the next design stages. These include:

(a) Further geotechnical investigations and groundwater assessments/modelling.

(b) More detailed hydrological/hydraulic modelling including confirming the balance and/or offsetting of C2 runoff discharged into the Pukeroro Scheme Drain.

(c) Preparing a developed concept or preliminary design of key / trunk infrastructure.

(d) Further liquefaction risk assessment and preparing concept mitigation measures.

(e) Stakeholder, property owner and developer consultation and negotiations.

(f) Constructability review.

(g) Obtaining resource consents for the Structure Plan stormwater discharge(s), including identification of resource consenting and designation requirements (including assessing ecological effects, proving C2/C3 fish passage feasibility, groundwater effects assessment and further flood modelling).

S19.5 Movement Network

S19.5.1 Overview

S19.5.1.1 Movement within the C1 and C2/C3 Structure Plans is facilitated through a network of roads – accommodating both vehicles and cyclists alongside high quality pedestrian oriented paths. It is also supported by off-road walkways and cycleways, linking through the central stormwater channel in C2 and connecting the community to its surrounds.

S19.5.2 Street Hierarchy

S19.5.2.1 Streets have been organised in a hierarchical pattern, according to street width, character and carrying capacity. The Structure Plans provide for two tiers of road typology within Growth Cell boundaries – Collector Roads and the Local Roads. Council are responsible for funding Collector Roads within the Structure Plan areas, and all remaining Local Roads are to be funded by the developer and designed in collaboration with Council. Where necessary, any notices of requirement required to give effect to a Local Road will be prepared by Council as the Requiring Authority.

S19.5.2.2 **Collector Roads**, as shown on the Structure Plans and within Figure 13: C1 and C2/C3 Movement Network, are generally fixed in location, subject to the outcomes of detailed design.

S19.5.2.3 **Local Roads**, as shown on the Structure Plans and within Figure 13: C1 and C2/C3 Movement Network, are indicative in terms of their location. In this regard, the layout as shown is considered appropriate and reflects appropriate block depths and widths, street lengths, orientation and location adjacent to open space and other land uses; notwithstanding, it is acknowledged that exact alignment of these roads is likely to be modified as further detailed design is undertaken. What remains important is that the outcomes outlined below and intent behind the plans is retained through detailed design.

S19.5.2.4 Many of Cambridge's existing streets are characterised by wide berms and street trees. It is important that this character is continued within the C1 and C2/C3 Growth Cells. The street hierarchy will be supported by a palette of preferred tree species along key routes, to be provided by Council based on existing tree specifications.

S19.5.2.5 Typical cross sections are included within Attachment B and illustrate the key elements of each road typology. Two cross sections are provided for local roads based on 20m and 15m widths. This provides for some flexibility and it is envisioned that these narrower roads could be located adjacent to areas of public open space (local parks, stormwater management areas,

central swale etc.) and in other locations deemed appropriate. An indicative layout of local roads is included in Figure 13.

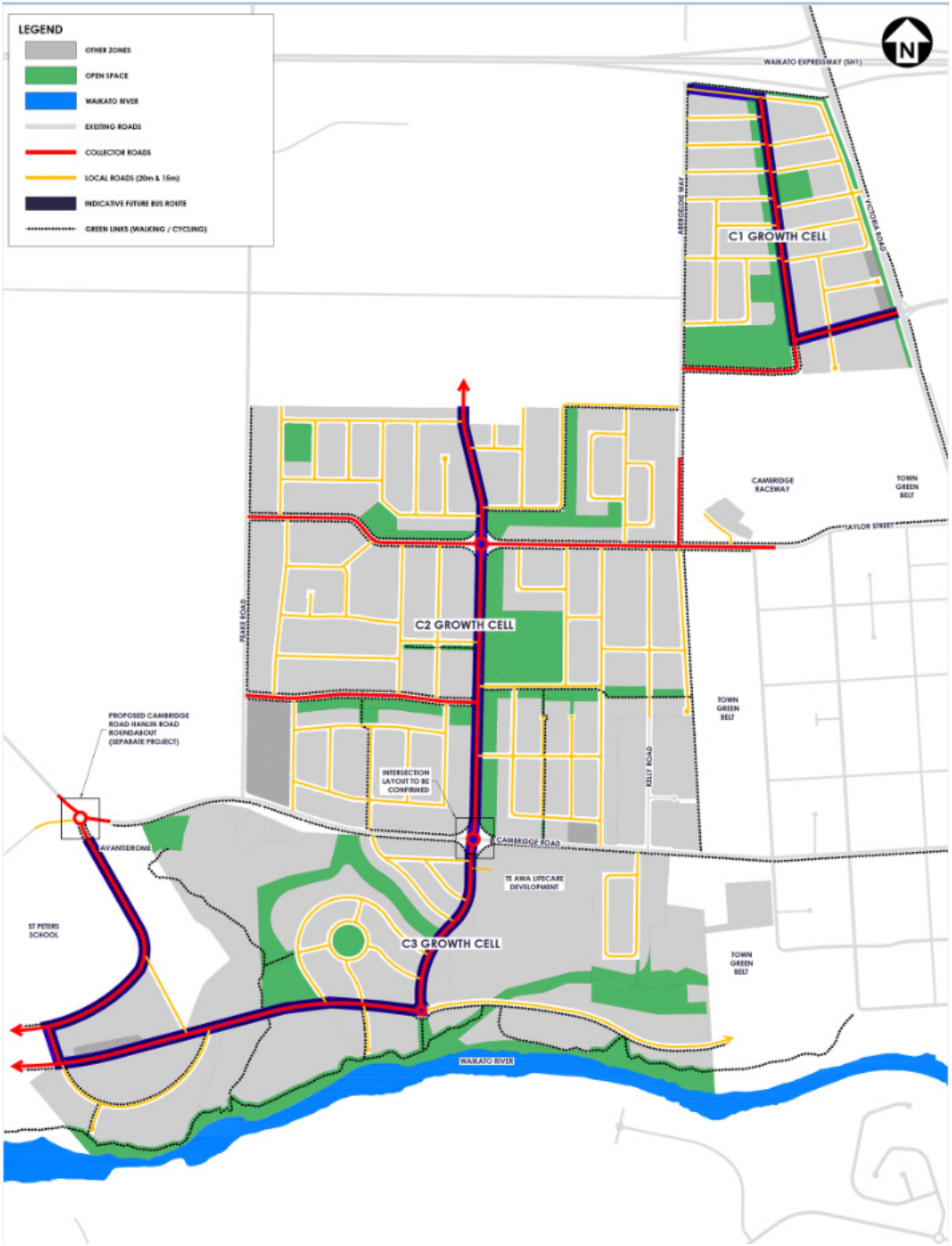


Figure 13: C1 and C2/C3 Movement Network

S19.5.3 Structure Plan Circulation

S19.5.3.1 The movement of pedestrians, cyclists and vehicles through the Structure Plan and connecting to the surrounding environment is guided by the following outcomes and guidelines.

General Outcomes Sought

S19.5.3.2 The following outcomes have been established for the Structure Plan to help guide future development:

(a) A road network based on a modified grid structure – supporting Cambridge's established grid system and supporting connectivity.

(b) A range of transportation choices provided with priority given to walking, cycling and a future provision of public transport.

(c) Integration of transportation and land use planning.

(d) Vehicle, pedestrian and cycling safety promoted through design – with streets designed as public spaces where pedestrians feel safe.

General Guidelines

S19.5.3.3 The following general guidelines have been developed to help guide movement, circulation and access within the C1 and C2/C3 Structure Plans:

(a) Support a fine grained network of connected streets to provide multiple alternate routes for local traffic and reduce congestion caused by limited entry points.

(b) Minimise cul-de-sacs. Where cul-de-sacs are unavoidable, minimise their length and include pedestrian/cyclist linkages to the surrounding movement or open space network (to provide shortcuts and a choice of routes).

(c) Increase connectivity and permeability by:

(i) Establishing walkable blocks averaging 200m by 80m, based on a formal or informal grid wherever possible.

(ii) Facilitating the creation of new connections, mid-block spaces, and green linkages, for walking, and particularly where larger block sizes are proposed.

(d) Prioritise pedestrians first, followed by cyclists then future public transport (buses) and other vehicles at street intersections within the Structure Plan area.

S19.5.4 Streetscape Guidelines

S19.5.4.1 The following guidelines relate to the provision of new roads within the Structure Plan area and the interface between the proposed Structure Plan development and the existing adjacent road network.

Street Trees

S19.5.4.2 The following guidelines relate to the provision of street trees within the Structure Plan area, some of which are illustrated in Figure 14:

(a) Provide street trees at 10 metre centres, located to avoid interference with services, light poles, driveways and parking bays.

(b) Use different types of street trees and vegetation to highlight the street hierarchy and key destinations such as public open spaces.

(c) Provide adequate berms or tree-pits to allow trees to grow to maturity and minimise pavement maintenance requirements.

(d) Provide tree species with an appropriate height and canopy for the location, width of street, and ongoing maintenance. Use larger trees on wider streets to create the impression of an avenue.

(e) Avoid low shrubs or low canopy trees that block sightlines of pedestrians and vehicles.

Figure 14: Place street trees at regular intervals, within ample berm space and enable clear sightlines between pedestrians and vehicles

Victoria Road Interface – Guidelines (C1 Structure Plan)

S19.5.4.3 Outside of the Structure Plan boundary, the main arterial road adjacent to the site is Victoria Road. Although this is an existing road and the design of this area is outside of the scope of the Structure Plan, the interface between the Structure Plan and Victoria Road is important – particularly as this area forms the northern gateway to Cambridge. Some general guidelines relating to the interface with the Victoria Road arterial are included below:

(a) Avoid on-street parking along Victoria Road, retaining the road as a key movement corridor and encouraging people to park on side roads or designated neighbourhood centre parking.

(b) Maximise passive surveillance by requiring low front walls/fences/landscaping along the street frontage. A height of 1200mm high allows for passive observation of the street when standing within dwellings. Fence materials should be sympathetic to surrounding built form but retain a level of transparency (visually permeable) so as not to provide a blank façade adjacent to the street edge.

(c) Provide landscaped yards along the road boundary for residential sites, to create a privacy buffer and contribute to the visual amenity of both the private and public realm.

S19.5.4.4 An indicative cross section for the Victoria Road interface is included as Figure 15.

Figure 15: Victoria Road edged by a green walking / cycling connection containing mature street trees to visually narrow the carriageway and provide an attractive entry to Cambridge.

Cambridge / Hamilton Road – Guidelines (C2/C3 Structure Plan)

S19.5.4.5 The Cambridge / Hamilton Road is an important road corridor due to its central location within the overall C2/C3 Structure Plan area and as the western gateway to Cambridge. The future design of this road will be influenced by the development of the C2/ C3 Structure Plans, including its relationship with the adjoining Te Awa Lifecare Village, local centres and surrounding residential growth. The following guidelines shall apply to this road corridor:

(a) Enhance the overall pedestrian and visual amenity of Cambridge Road, integrated with the surrounding land uses.

(b) Reduce the speed limit to 50km / hour along the Structure Plan area boundaries to enhance safety and amenity.

(c) Provide for signalised north south pedestrian crossing points between the C2 and C3 Structure Plan areas.

(d) Avoid on-street parking along Cambridge / Hamilton Road.

(e) Maximise passive surveillance by requiring low front walls/fences/landscaping along the street frontage. A height of 1200mm high allows for passive observation of the street when standing within dwellings. Fence materials should be sympathetic to surrounding built form but retain a level of transparency (visually permeable) so as not to provide a blank façade adjacent to the street edge.

(f) Provide landscaped yards (for residential sites) along the road boundary to create a privacy bufferand contribute to the visual amenity of both private and public realm.

(g) Provide a dedicated cycle shoulder on either side of Cambridge Road to facilitate movement between this Structure Plan area, other destinations in the west (i.e. Velodrome) and the TownCentre.

(h) Provide a minimum 4m shared path on the southern side of Cambridge Road to connect St Peters, the Velodrome and Te Awa Lifecare Village with the Cambridge Town Centre

S19.5.4.6 An indicative cross section for Cambridge / Hamilton Road is included as Figure 16.

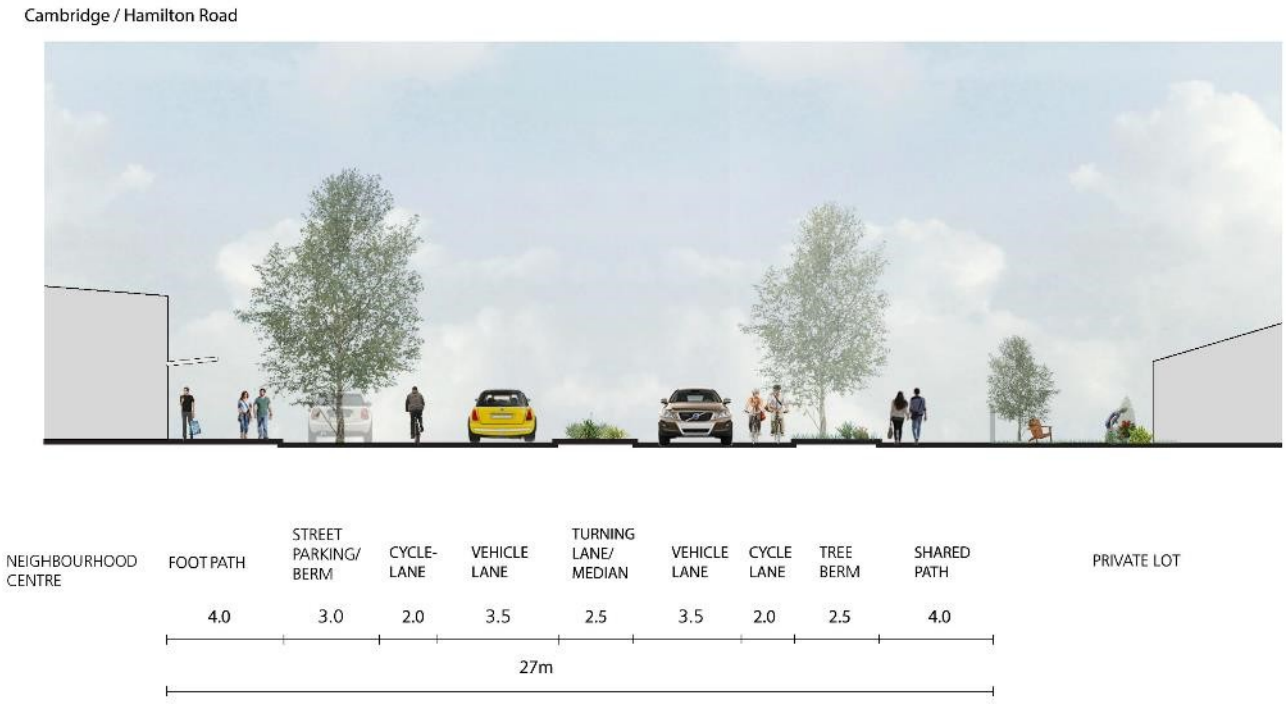


Figure 16: Indicative cross section of the Cambridge / Hamilton Road

Peake Road – Guidelines (C2/C3 Structure Plan)

S19.5.4.7 The western edge of the C2 Growth Cell is bound by Peake Road. This road will form the interface or transition point between rural residential land to the west and new residential development to the east (within C2). Softening this edge is therefore important and some general guidelines relating to the interface with Peake Road are included below:

(a) Avoid on-street parking along Peake Road, retaining the road as a key movement corridor and encouraging people to park on side roads.

(b) Maximise passive surveillance along C2's western boundary by requiring low front walls/fences/landscaping along the street frontage. A height of 1200mm high allows for passive observation of the street when standing within dwellings. Fence materials should be sympathetic to surrounding built form and retain a level of transparency (visually permeable) so as not to provide a blank façade adjacent to the street edge.

(c) Provide landscaped yards (for residential sites) along the road boundary to create a privacy buffer and contribute to the visual amenity of both the private and public realm.

(d) Provide a 3m shared path along the eastern side of Peake Road, within a green corridor that provides for landscaping and visual screening.

S19.5.4.8 An indicative cross section for Cambridge / Hamilton Road is included as Figure 17.

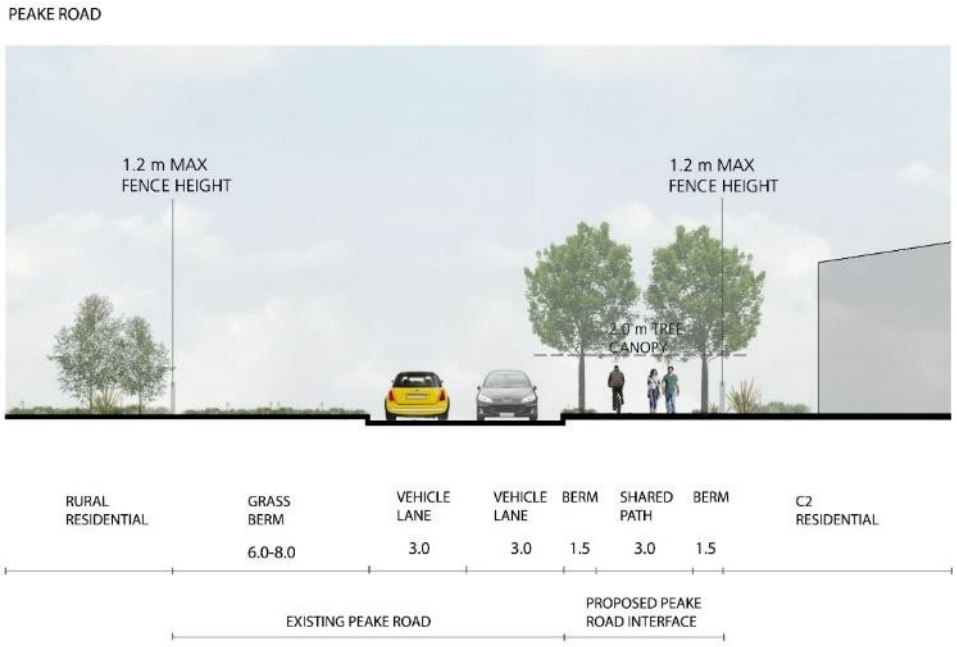


Figure 17: Indicative cross section of Peake Road illustrating the proposed C2 interface

S19.5.5 Pedestrian and Cycling Network

S19.5.5.1 In an effort to encourage human-powered, sustainable transit and maintain pedestrian friendly walkable development, the Structure Plan accommodates a well-integrated cycling network – with connectivity to the wider Cambridge Cycling network.

S19.5.5.2 In order to promote a walkable and human-scale development, the Structure Plan incorporates an extensive network of pedestrian oriented spaces and connective elements including footpaths, off-road walking paths and open spaces (refer Figure 13: C1 and C2/C3 Movement Networks).

S19.5.6 Public Transportation

S19.5.6.1 Although a bus network isn't currently in place in Cambridge, it is likely that in years to come a bus network will link residents and visitors with key destinations. As such, provision has been made in the plan for an indicative bus route, connecting the residents to the neighbourhood centre, key areas of open space and to the wider Cambridge community (refer Figure 13: C1 and C2/C3 Movement Networks).

S19.6 Parks and Open Space

S19.6.1 Overview

S19.6.1.1 A cohesive and integrated public realm network is critical to developing the C1 and C2/C3 Growth Cells as distinctive places with unique character and identity. The open space strategy proposed is one that aims to provide public spaces with a range of scales and functions to cater to the differing and sometimes competing recreational and amenity needs of the community. The intention of the Structure Plan is to:

(a) Create a public realm that relates to the existing natural features of the site;

(b) Create a centre and sense of identity within Cambridge;

(c) Develop a green network that connects the Structure Plan community and the rest of Cambridge; and

(d) Utilises a mixture of natural and formed open spaces (with references to the sites former rural and agricultural character).

S19.6.1.2 The parks and open space strategy will create a number of open spaces, buffer spaces and connecting spaces that are evenly distributed throughout the community and are linked to provide a continuous and uninterrupted open space network. The open space network is illustrated in Figure 18.

S19.6.1.3 There are approximately 7 hectares of land allocated as reserve space within C1 and about 70 hectares of land allocated to reserve space in C2/C3. These uses include, local parks, sports fields, stormwater management areas, civic spaces, and environmental reserve / buffer areas. The character of each open space area should meet the outcomes for each park type set out in the Parks and Open Space hierarchy below. The supply of park land meets the national guidance for the provision of open space within existing and future growth areas (New Zealand Recreation Association Parks Categories and Levels of Service Guidance, 2011).

S19.6.1.4 The St Peter's School Zone as depicted in Figure 18 does not comprise an area of park and/or open space to be developed in accordance with S19.6. Development of land within the St Peter's School Zone shall be undertaken in general accordance with the underlying St Peter's School Zone rules.

General Outcomes Sought

S19.6.1.5 The following outcomes have been established for the Structure Plan to help guide future development:

(a) Inclusive, accessible, conveniently located and well-designed open spaces that provide for a range of different functions, activities and users.

(b) A high-quality public realm developed through appropriate landscaping and provision of park amenities.

(c) Opportunities for residents and stakeholders to provide input into the detailed parks planning process.

(d) Provision of public spaces for community and cultural events (e.g. gathering spaces, markets, community gardens).

(e) Opportunities for public art initiatives, particularly within any civic spaces provided within the Neighbourhood Centre.

(f) Designed to support year-round activities and recreational opportunities.

General Guidelines

S19.6.1.6 The following general guidelines have been developed to help guide the provision and articulation of open spaces within the Structure Plan:

(a) Design the entrance to public spaces so they are easily identified, including signage/ wayfinding to increase legibility and safe use.

(b) Provide public open spaces with edges that are activated or overlooked by adjacent streets and dwellings. This will improve the perceived safety and encourage use of these open spaces. Generally, at least 50% of the edges shall be surrounded by streets so

there is a sense of public ownership and overlooking.

(c) Provide public open spaces that enable a variety of recreational and social activities to occur within them.

(d) Provide for adequate distribution of playgrounds and public toilets.

(e) Incorporate existing landscape features, significant vegetation, and sites of cultural significance into public open spaces.

(f) Avoid "dark areas" (areas that are not overlooked, not well lit, or hidden from view) and blank walls. This combination is likely to attract graffiti and other undesirable activities. Instead, introduce appropriate landscape treatment, lighting, and ensure neighbouring land uses provide windows that overlook and activate these spaces.

(g) Connect new and existing public open space to the wider green and public open space network with walkways / cycleways and consider the provision of cycle rack facilities.

S19.6.2 Local Parks / Sports Fields

S19.6.2.1 Local parks within the Structure Plan area have been evenly distributed throughout the community providing for local recreation and amenity. These parks will be utilised for a mixture of active and passive recreation to cater to all community needs – with some spaces acting as gardens and retreats and others for playgrounds and sports fields. Local parks may be a mixture of both hard and soft spaces and will provide local amenity – particularly in those areas with increased residential density.

S19.6.2.2 Opportunity for provision of a café is provided for within the centrally located sports fields in the C2 Structure Plan area, subject to appropriate design (including transport and visual amenity impacts).

S19.6.3 Cultural Sites of Significance

S19.6.3.1 Cultural sites of significance were identified within the C1 and C2/C3 Growth Cells following a preliminary desktop archaeological investigation. A number of these sites have been indicated on the Structure Plans (see Figure 18) and incorporated within areas of open space where possible. It is anticipated that Council and future developers will work with Iwi to determine how these (and other) sites can be appropriately acknowledged and respected through detailed design. These sites have potential to provide educational and amenity opportunities through preservation and interpretation.

S19.6.4 Stormwater Corridors

S19.6.4.1 A stormwater corridor will run through the centre of C2 in a north-south direction, it will then be piped beneath the Cambridge / Hamilton Road and continue as a swale corridor down the western side of C3. This area will provide for stormwater conveyance from C1 (and future development within C7) south to the Waikato River. This area will not only provide for stormwater conveyance, but will also provide for stormwater treatment and will be utilised within C2 for recreation, pedestrian / cycle movement and as an amenity feature.

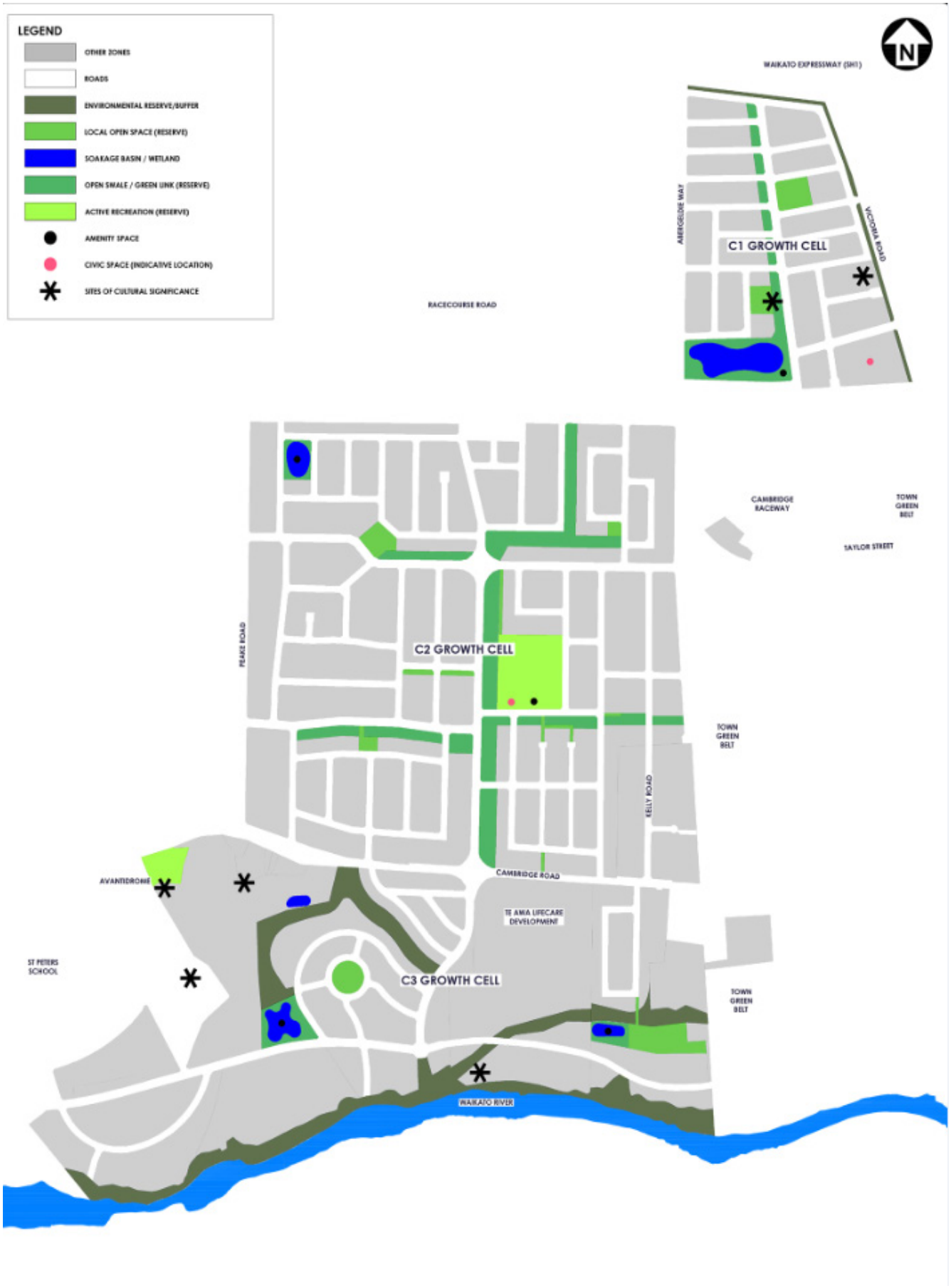


Figure 18: C1 and C2/C3 Open Space Network

S19.6.5 Stormwater Management Areas

S19.6.5.1 A number of stormwater management areas will be distributed throughout the Growth Cells to retain and treat stormwater before it enters into the central conveyance corridor. These areas will be co-located with pockets of local open space – activating and integrating them within the community.

S19.6.6 Civic Space

S19.6.6.1 A central civic space is envisioned to be located within the C1 Neighbourhood Centre. This landscaped space will act as a central focal point for the community – a meeting place and an area of high amenity within the commercial core. The design of this space is not set and may be facilitated in various ways, potentially including hard and/or soft open space, children's play or other activities, co-located with appropriate community and/or commercial activities.

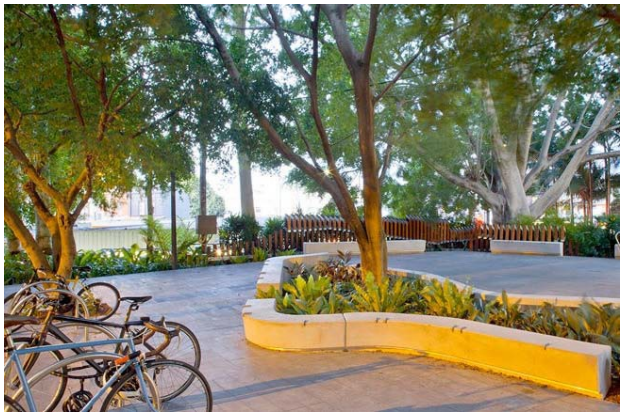


Figure 19: Precedent images showing examples of civic space that can be integrated alongside supermarkets and within neighbourhood centres, with a mix of hard and soft landscaping, cycle parking, cultural features and seating space.

S19.6.7 Buffer / Environmental Reserve Areas

S19.6.7.1 An area of green space has been created along the northern boundary of the C1 Growth Cell to provide a buffer for residential development from the Cambridge Section of the Waikato Expressway (State Highway 1) – and the potentially adverse impacts associated with this. It is anticipated that this space will be used for unstructured leisure activities and will comprise of naturalised, low maintenance landscapes.

S19.6.7.2 Buffer areas have been created within the C3 Growth Cell to protect steep slopes, existing streams and more sensitive areas along the river edge. It is anticipated that these spaces will comprise of naturalised, low maintenance landscapes and in certain locations may be utilised for unstructured leisure activities.

S19.6.8 School Sites

S19.6.8.1 A preferred location has been identified for a future primary school and daycare facility within the C2 Structure Plan area. Once a final location has been decided, it will comprise of an area of approximately 3.0-3.5 hectares. The school location is considered within the context of the public open space network as their grounds and facilities are often public in nature and shared between education and community uses.

S19.6.9 Existing Open Space / Recreation Features

S19.6.9.1 The interface between proposed development and existing areas of open space and/or recreation features is important. Council wants to ensure that these areas continue to be connected to surrounding communities, are activated by adjacent land uses and the current experiences offered by them are not compromised.

S19.6.9.2 The C1 Growth Cell is bound to the south by the existing town belt. This is a strong underlying feature of Cambridge and a space is used for the Cambridge Raceway and the Cambridge East Maungakawa Pony Club. The C2/C3 Structure Plan interfaces with the Town Belt to the east and the Te Awa Cycleway from the C3 Growth Cell. The Te Awa Cycleway is a popular recreational feature of Cambridge and its existing green and open character should be protected. Creating a strong interface between the town belt and the Te Awa Cycleway with the Growth Cells is very important and the following guidelines outline how this might be achieved.

Guidelines

S19.6.9.3 The Cambridge Town Belt is to be edged by a public road and overlooked by adjacent land uses through a requirement for no or low fences (maximum 1.2m in height)

S19.6.9.4 Access to the Town Belt is to be provided for:

(a) From the green pedestrian / cycle link running alongside Victoria Road (C1).

(b) From the Neighbourhood Centre (C1).

(c) From adjacent areas of compact housing.

S19.6.9.5 The green and open nature of the Te Awa Cycleway is to be protected through:

(a) The establishment of a 5m environmental buffer / open space along its northern side, between the cycleway and adjoining land uses.

(b) Ensuring that any fencing facing the Te Awa Cycleway shall be a maximum of 1.2m in height and visually permeable in design, and planting along this edge should remain low-scale and visually permeable.

S19.6.9.6 Access to the Te Awa Cycleway is to be provided from the adjacent roading network at regular intervals.

S19.6.10 Walkways and Cycleways

S19.6.10.1 A comprehensive walking and cycling network will link all types of public open space, creating a residential area that can be safely and easily accessed without the use of private vehicles. Figure 13: C1 and C2/C3 Movement Networks illustrate the location of existing and proposed walking and cycling tracks in relation to public open space.

S19.6.11 Wayfinding and Signage

S19.6.11.1 An integral part of both the movement and open space networks is the provision of simple, clear and attractive wayfinding – to ensure that residents and visitors can safely and efficiently reach destinations and move between spaces. To reinforce legibility and integration, a signage and wayfinding strategy should be prepared. This strategy will link with existing Council wayfinding and signage provisions and help to highlight specific character areas to strengthen neighbourhood identity and support a sense of place.

S19.6.12 Landscape and Vegetation

S19.6.12.1 Cambridge has been known as the 'town of trees' over a hundred years, and tree-lined streets are a key characteristic of Cambridge. The following guidelines highlight how the Structure Plan seeks to continue to reinforce the leafy nature of Cambridge.

Guidelines

S19.6.12.2 The following guidelines relate to the provision of trees and landscape areas within the Structure Plan area:

(a) Retain existing mature vegetation on site, where possible.

(b) Provide sufficient space / soil depth to support healthy trees.

(c) Undertake tree planting as part of park and open space development to support amenity provision, place making and sustainability outcomes.

(d) Select a diverse range of tree species to prevent disease susceptibility and visual uniformity.

(e) Plant landscape areas with species that are low maintenance, hardy and well suited to local conditions.

(f) Provide an emphasis on native or indigenous plants that are appropriate to the site and landscape character of the area – particularly within wetland areas and ecological corridors.

(g) Undertake remnant soil studies within wetland areas and ecological corridors, to determine the types of previous plants that originally grew in these locations to influence species selection and placement.

(h) Select appropriate street trees to enable sunlight penetration on streets and within adjoining public open spaces during winter months.

(i) Provide landscaping that enables the preservation of important views and vistas.

S19.7 Water and Wastewater Servicing

S19.7.1 An assessment of the required water and wastewater infrastructure has been undertaken and is detailed in the supporting Water Supply and Wastewater Technical Assessment report for the Structure Plan areas. In summary.

Water supply

S19.7.2 The proposed water supply network has been designed assuming that the demand can be supplied from two different connection points. The head loss has been calculated for the furthest hydrant to the connection points when considering 12.5l/s water supplied from each connection.

S19.7.3 Hydrants are proposed on the main lines every 135m. The pipe sizes determined in this high level design are sensitive to head and flow availability at the connection points to the Growth Cells.

S19.7.4 All local roads will have a rider main.

Wastewater

S19.7.5 The proposed wastewater reticulation has been designed on the basis that the existing network and treatment plant has sufficient capacity to cater for the proposed development.

S19.7.6 Two connection points have been allowed for connection to the existing wastewater network. The growth area C1 will be connected to the existing Taylor Street pump station. A manhole at 15 Vogel Place will convey the wastewater from Growth Cells C2 and C3.

S19.7.7 Gravity pipe trench depths have been checked considering the furthest property connection to the local collector and the main sewer. Self-cleaning velocity and minimum gradient have been considered in designing the proposed wastewater reticulation.

S19.7.8 Due to relatively flat topography of the areas (excluding some locations at C3), pump stations are utilised where the gravity pipe trench depths are 5.5m or deeper.

S19.7.9 The proposed Structure Plan water and wastewater network concept plans are have been designed assuming there is available capacity in the existing systems. It is understood that proposed network upgrades in the LTP will provide adequate capacity to and from the Growth Cells. Before any preliminary design for the C1 and C2/C3 Growth Cells is undertaken it is recommended that the water supply and wastewater network models are updated to confirm the capacity of these systems. The Growth Cell infrastructure layouts and sizing can then be adjusted accordingly if required. Proposed water and wastewater network layouts and connections are illustrated in Figures 20 and 21 as follows.

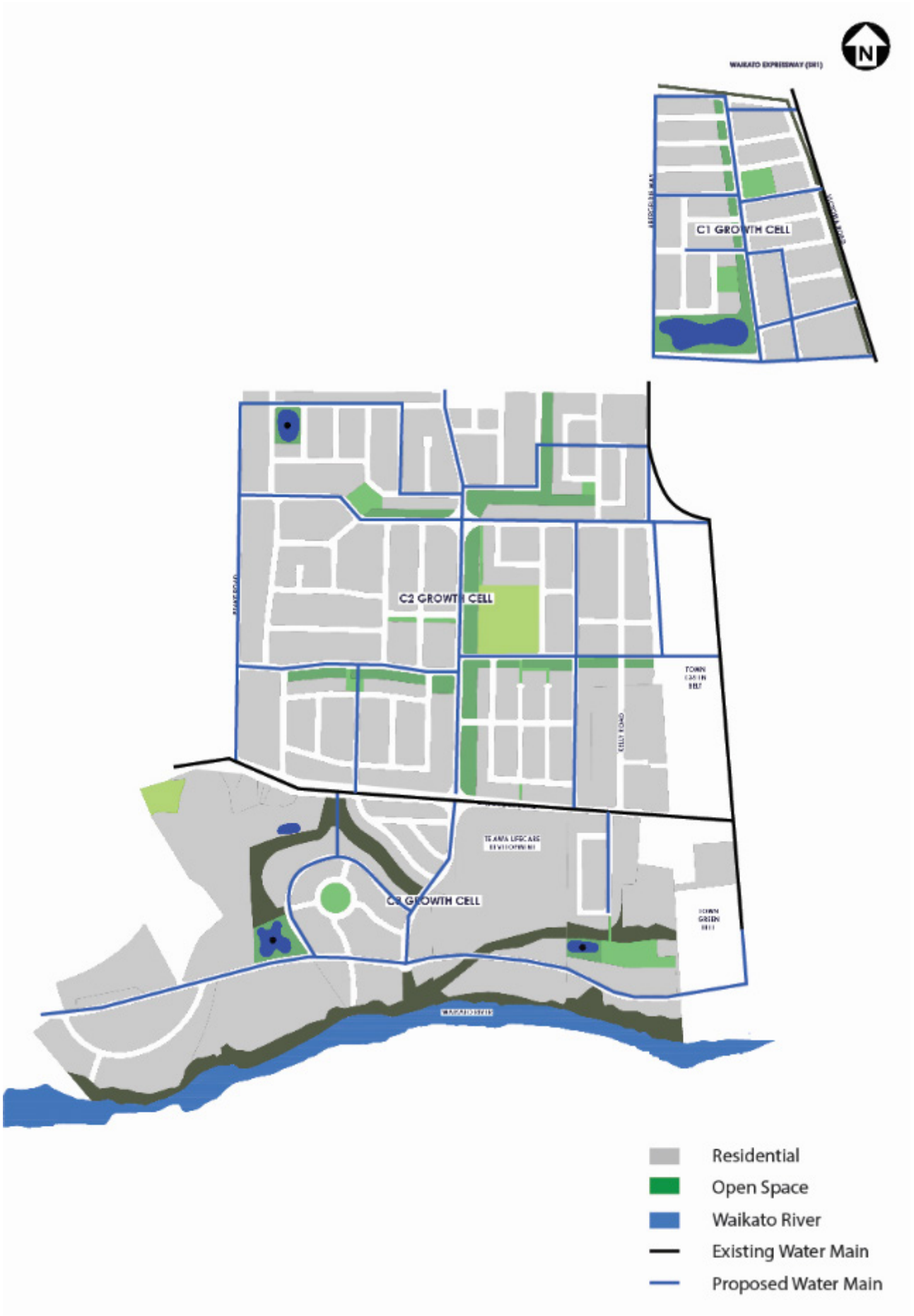


Figure 20: Indicative Water Network, C1 and C2/C3 Structure Plan Areas

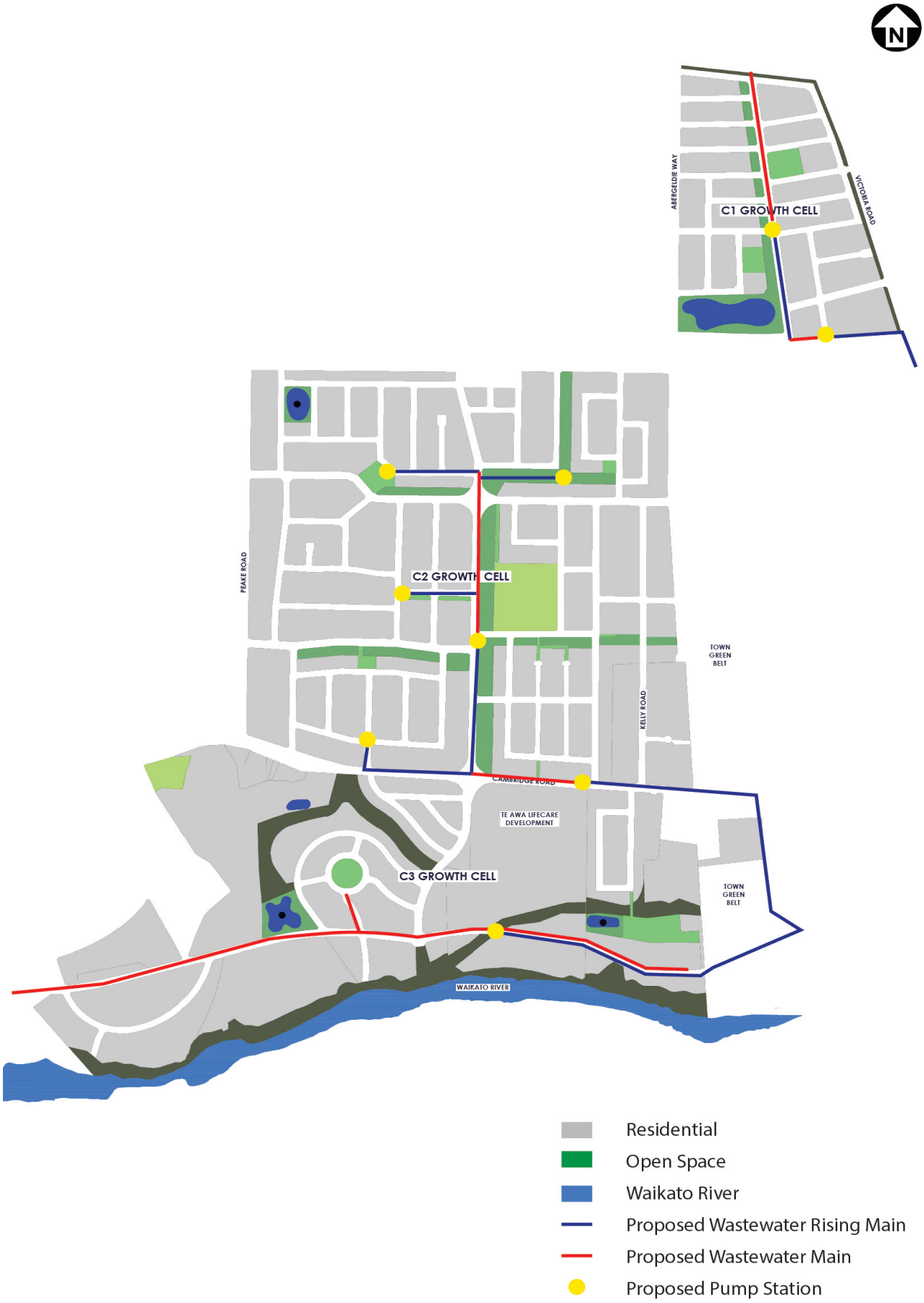


Figure 21: Indicative Wastewater Network, C1 and C2/C3 Structure Plan Areas

S19.8 Implementation

S19.8.1 Overview

S19.8.1.1 The scale of envisaged growth and therefore development proposed within the Structure Plan areas means that it is necessary to stage the development of the community over time. This will provide a logical approach to constructing infrastructure services, while also focusing the construction process in one area. The stages have been identified based on the physical characteristics of the site, plus the need to provide a mix of housing choice. In addition, Council's approach to funding infrastructure development means that smaller stages are proposed rather than providing single / large opportunities for ad hoc development to occur.

S19.8.1.2 Figure 22 illustrates the proposed indicative staging plan.

S19.8.1.3 Staging provides a mechanism for directing development and investment activity to specified locations to coordinate provision of community, social and physical infrastructure in tandem with construction of new homes. A key issue in staging is to, wherever possible, provide infrastructure as close to demand as possible, so that the new community can establish patterns of local use, sense of place and connectedness. It is not possible to predict with certainty the rate of housing construction. Many economic and planning related factors affect this growth rate. However, based on the Waipa District Growth Strategy, it is understood that 200-300 dwellings per year can be expected while population growth continues.

S19.8.1.4 Staging is focused on achieving the following principles:

(a) Residential growth that is well-connected with existing residential areas.

(b) Growth patterns that facilitate neighbourhood amenities within walking distance of local residents, including open space, sports amenities, schools and local shops.

(c) Facilitating 'residential neighbourhoods', while avoiding ad-hoc, disconnected development.

(d) Investment in local neighbourhood amenities such as open space, playgrounds and walking and cycle ways at a balanced rate with growth and demand.

(e) Provision of supporting infrastructure that responds appropriately to residential market demands through timely supply.

(f) Supporting sustainable use of infrastructure funding through appropriate staging.

Movement Network

S19.8.1.5 The development of the road network would occur during the course of the construction of the various stages within each Structure Plan area. The internal connector roads should be constructed prior to or concurrently with development occurring in each of the stages. These roads will provide the major connections to residential areas and perform a vital function which should be protected by the careful planning and construction of the roads in accordance with the indicative road layouts shown.

S19.8.1.6 The residential local streets, laneways and walking and cycling connections should be developed as and when required to fit the urban form of each stage by each developer. As more overlap with adjoining landowners occurs, Council will require complete certainty that in the fullness of time, all streets will be connected and assist to create a permeable network.

C1 Neighbourhood Centre

S19.8.1.7 The development of the Neighbourhood Centre is proposed for Stage 1 of development. A balance is required between provision of neighbourhood centre activities that provide for local communities, and that attract future residential development. Accordingly, some demand is considered appropriate prior to development. Development of the C1 Neighbourhood Centre will benefit from existing development in Cambridge North.

Open Space Provision

S19.8.1.8 The provision of open space should be incorporated within each stage of development – to provide an area for community gathering, recreation and amenity. As each additional stage is brought online the connections between these open spaces becomes increasingly important – in order to provide a linked and comprehensive open space network. The proposed Open Space Network is further detailed in S19.6.

Primary School

S19.8.1.9 A new primary school is to be provided within the C2 Growth Cell. A preferred location within Stage 1 has been identified, with the final location to be determined through ongoing engagement between the developer and the Ministry of Education. The Ministry has provided a number of guidelines which must be met in relation to the location of the school, as outlined in S19.3.5.

Stormwater, Wastewater and Water Supply

S19.8.1.10 An overarching Stormwater Strategy is included within S19.4. This strategy details the long-term holistic vision for the conveyance, management and treatment of stormwater within the C1 and C2/C3 Growth Cells. The strategy also outlines likely short-term or temporary stormwater management solutions for initial stages of development – ensuring that stormwater is adequately managed in initial stages before the broader solution is brought online.

Natural Hazard Management

S19.8.1.11 Prior to development occurring, Council shall be satisfied that the liquefaction risk for each structure plan area (C1 and C2/C3) has been assessed through an appropriately detailed area-wide assessment (refer Ministry for the Environment's Planning and engineering guidance for potentially liquefaction-prone land), and feasible measures to mitigate any potential risks to an acceptable level have been identified.

S19.8.2 Structure Plan Staging

S19.8.2.1 Triggers regarding the uplifting of Deferred Zones are contained within Section 14 (Deferred Zone), provision 14.4.1.9 of the Waipa District Plan. These triggers must be met prior to the Deferred Zoning being uplifted.

S19.8.2.2 Figure 22 outlines indicative staging for each Growth Cell which reflects a potential logical rollout of infrastructure and landowner/developer indications oftiming.

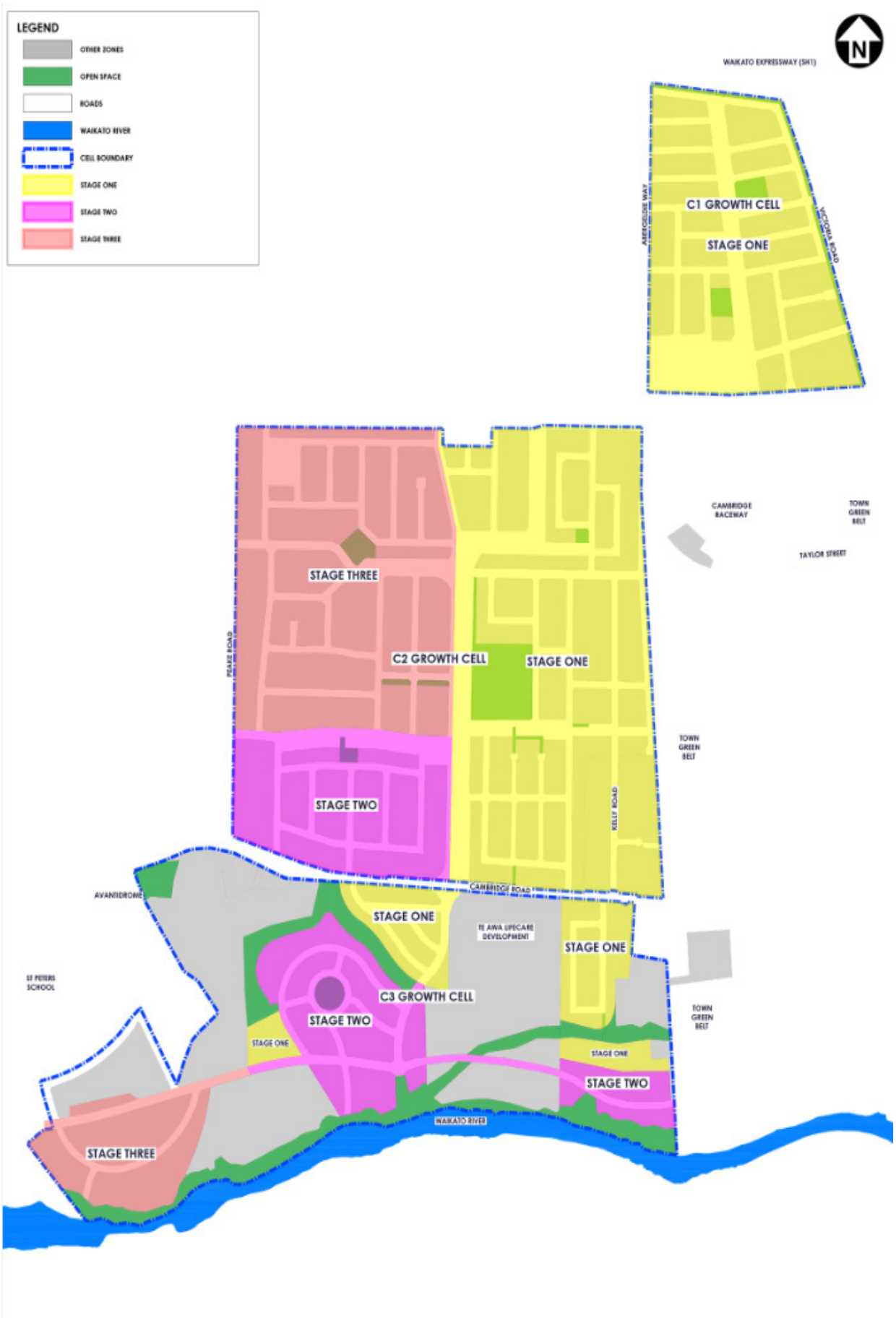


Figure 22: Indicative Staging Plan

S19.8.3 Liquefaction Investigations

S19.8.3.1 Liquefaction describes a phenomenon whereby a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress, usually earthquake shaking, causing it to behave like a liquid. Potential effects of liquefaction can include soil strength loss, ground settlement and lateral ground movement. These effects can result in significant damage to land, buildings and infrastructure, potentially resulting in loss of life and/or negative, environmental, social and economic impacts.

S19.8.3.2 In April 2018 a liquefaction investigation and assessment (Cambridge C1 C2 & C3 Plan Change Liquefaction Hazard Assessment, Beca Limited, dated 16 April 2018) was undertaken in accordance with the Ministry of Business, Innovation and Employment (MBIE) guidelines on Planning and Engineering Guidance for Potentially Liquefaction Prone Land (2017) for the Cambridge Structure Plan areas. The assessment report presents the findings of a 'Level B calibrated desktop assessment' within C1 and C2 Growth Cells and a 'Level C detailed area-wide assessment' within C3 Growth Cell. Liquefaction and seismic vulnerability will need to be further assessed in accordance with good practice and national guidance (e.g. MBIE guidelines on Planning and Engineering Guidance for Potentially Liquefaction Prone Land (2017)) undertaken by a suitably qualified geo-professional, as part of the 'site suitability' of land for any relevant subdivision, land use or building consent. Where necessary, the following measures need to be taken to avoid, reduce or mitigate risk associated with liquefaction or seismic vulnerability:

(a) Controlling the type and intensity of land development.

(b) Improving the ground to reduce severity of ground deformation and strength loss.

(c) Improving the structure so it is better able to tolerate ground deformation.

S19.8.3.3 The outcomes of further liquefaction vulnerability assessment will also assist in informing the design of stormwater and other infrastructure across the site, to assist in reducing risks associated with seismic events should they occur.

S19.8.4 Slope Stability Investigations

S19.8.4.1 The liquefaction assessment for the Cambridge Structure Plan areas (Cambridge C1 C2 & C3 Plan Change Liquefaction Hazard Assessment, Beca Limited, dated 16 April 2018) identified slope stability risks from both liquefaction and non-liquefaction causes. The report found that the Waikato River bank slopes and steeper terrace slopes would not likely meet stability design margins for residential development or associated infrastructure. Future slope instability of these slopes could be triggered by storm events, ongoing river or groundwater erosion, earthquakes, or concentrated stormwater discharges.

S19.8.4.2 Development is recommended to be set back from the crest of river banks, and sloping ground that does not meet, or cannot be stabilised sufficiently to meet, required stability design margins and to allow for future instability losses of these slopes. Residential stormwater discharges near steeper slopes will require specific design to avoid increasing the slope instability or erosion hazard. Sloped areas (escarpments) will require provision for vehicle access to the slope crest and base to allow for inspection and maintenance by Council.

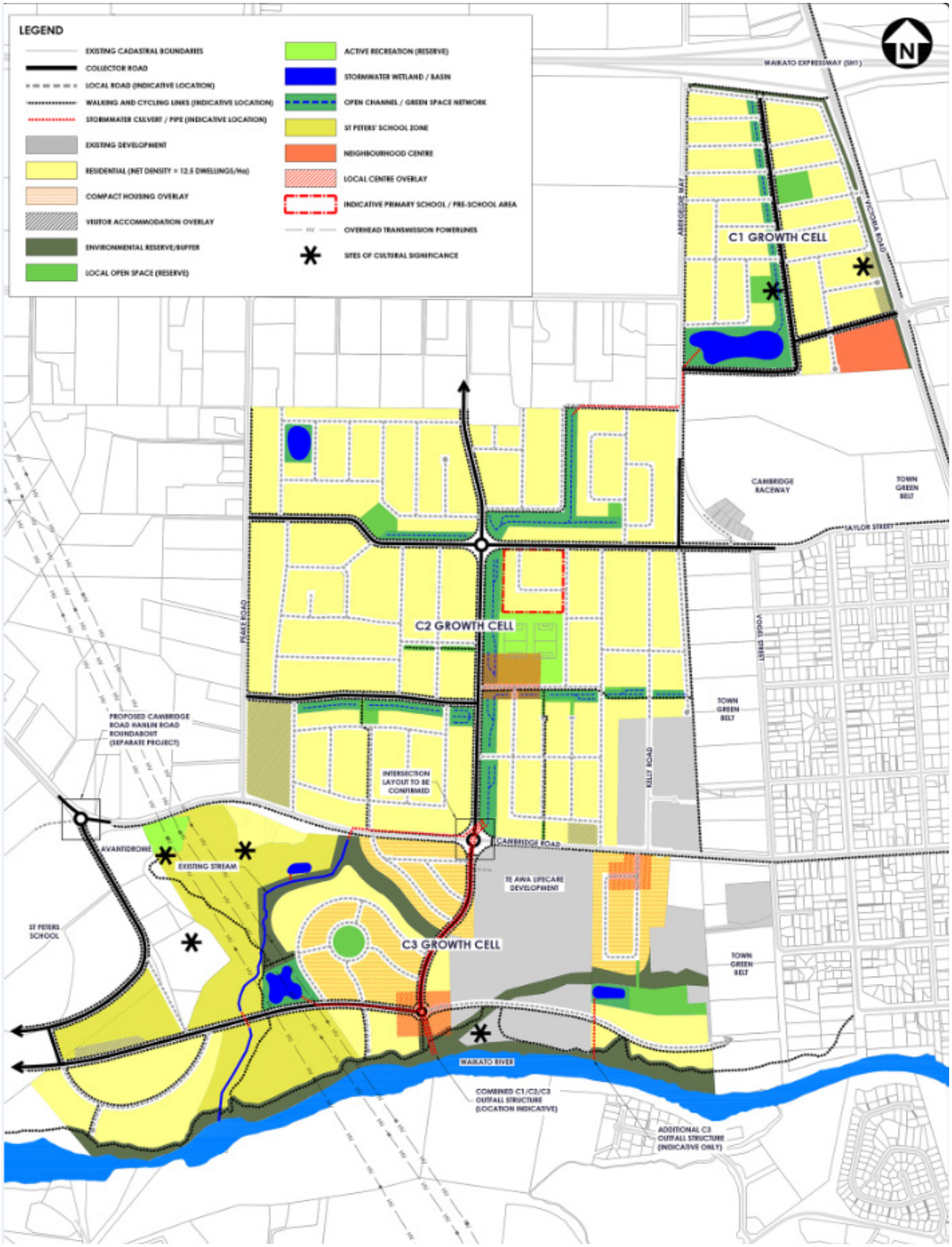
S19.8.4.3 The Waikato River bank, terrace slopes and other sloping ground will be assessed as part of proposed development in accordance with the district plan provisions, as part of the 'site suitability' of land for any relevant subdivision, land use or building consent. Where necessary, the following measures will be taken to avoid, reduce or mitigate risk associated with slope stability:

(a) Controlling the type and intensity of land development, including setbacks from slopes.

(b) Controlling surface water discharges near slopes.

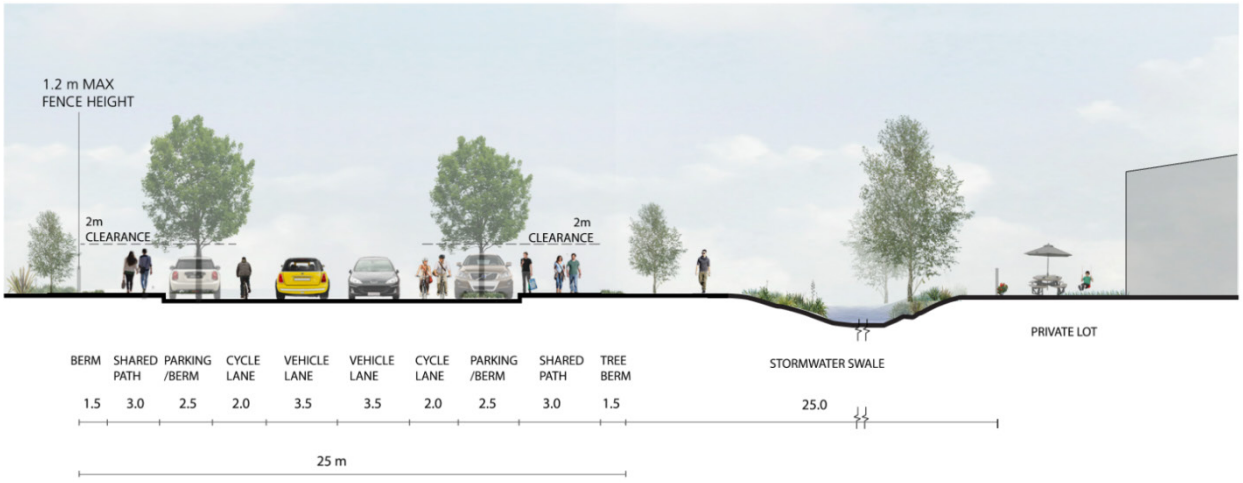
(c) Slope stabilisation measures.

Attachment A - C1, C2/C3 Structure Plans

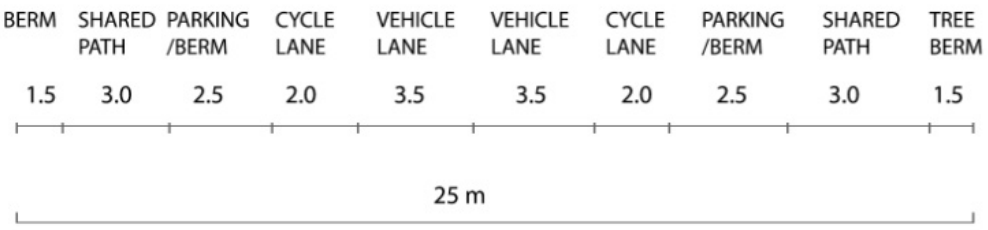


Attachment B - Typical Street Cross Sections

COLLECTOR ROAD ADJOINING SWALE (SECONDARY CONVEYANCE CHANNEL): 25m Street Corridor



TYPICAL COLLECTOR ROAD: 25M



PEAKE ROAD

RURAL RESIDENTIAL	GRASS BERM	VEHICLE LANE	VEHICLE LANE	BERM	SHARED PATH	BERM	C2 RESIDENTIAL
	6.0-8.0	3.0	3.0	1.5	3.0	1.5	

EXISTING PEAKE ROAD

PROPOSED PEAKE ROAD INTERFACE

TYPICAL LOCAL ROAD: 20M

BERM	FOOT PATH	TREE BERM	PARKING	VEHICLE LANE	VEHICLE LANE	PARKING	TREE BERM	FOOT PATH	BERM
1.0	2.0	1.5	2.5	3.0	3.0	2.5	1.5	2.0	1.0

20 m

TYPICAL LOCAL ROAD: 17m

BERM	FOOT PATH	BERM/ PARKING	VEHICLE LANE	VEHICLE LANE	TREE BERM	FOOT PATH	BERM
1.5	2.0	2.5	3.0	3.0	1.5	2.0	1.5

17 m

KEY LOCAL ROAD (TE AWA LIFECARE VILLAGE CONNECTOR ROAD) : 15m

BERM	FOOT PATH	BERM	VEHICLE LANE	VEHICLE LANE	BERM	FOOT PATH	BERM
1.0	2.0	1.5	3.0	3.0	1.5	2.0	1.0

15 m