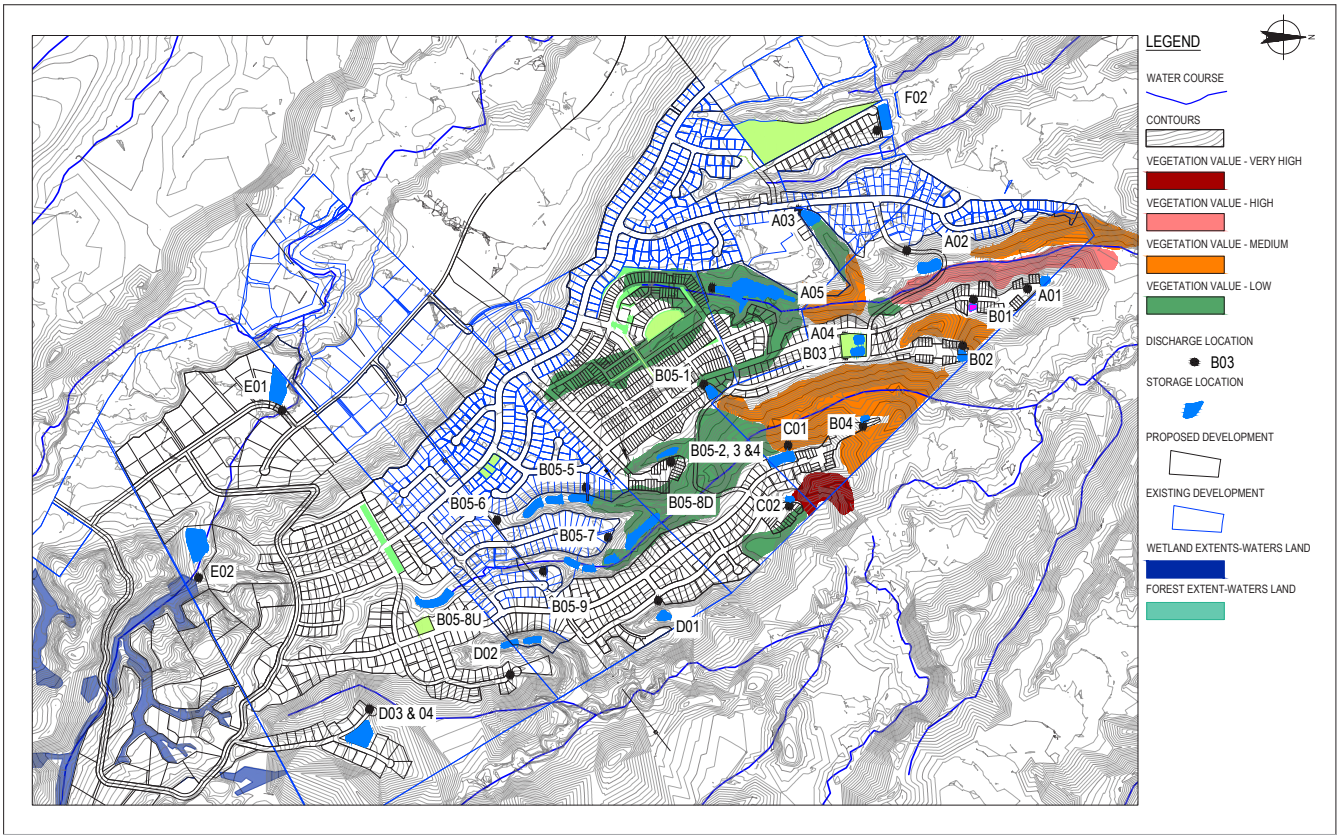


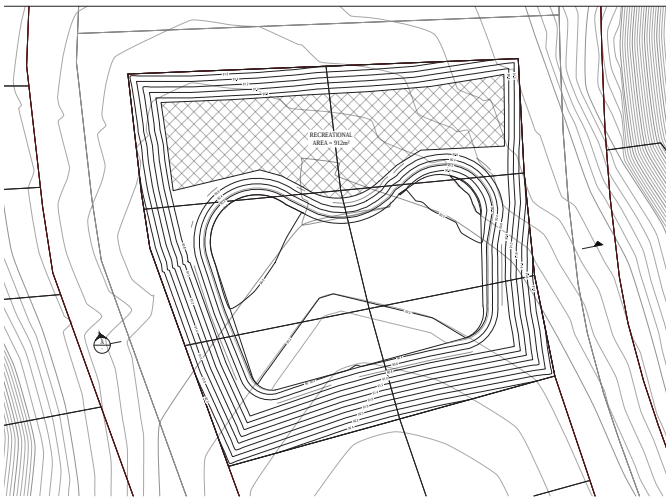
Stormwater Concept Design Overview (source: GHD)

Stormwater Management

Stormwater management will be undertaken in a sustainable manner to maintain ecosystem health. Use of permanent hard structures such as culverts will be avoided where possible. Where such structures are unavoida-ble, these will be designed to facilitate fish passage for all species actually and potentially present. Existing impediments to fish passage will be modified to restore connectivity between habitats.

Stormwater quality and quantity will be managed so that freshwater receiving environments are not further impacted by urban development. Detention basins, raingardens and planted swales will provide the main means for sustainably managing stormwater quality and quantity.

GHD have provided a comprehensive stormwater report, which includes flood and erosion assessments. Deten-



Detention pond illustrative design for A04 and B03 combined. Source: GHD (top left), Hudson Associates (below and right)

tion basins can be utilised to mitigate flood and erosion impacts from urban runoff. The GHD report provides the recommended sizes and locations of detention areas throughout Aokautere. The locations are determined by subcatchments and discharge points as well as ecological constraints identified in the ecology report.

Urban developments can negatively affect water quality through the introduction of contaminants, such as metals and petroleum hydrocarbons. Damage can also result from the increased temperature of runoff. The GHD report details the footprint of biorention areas required for each sub-catchment in Aokautere.

Raingardens and planted swales have been incorporated throughout the roading network. These features improve the quality of stormwater runoff before it enters the gully system (see section 3.5 for street cross sections).

GHD have also proposed an indicative 5m top-of-slope setback from steeper gully walls. Downstream of detention facilities, stormwater discharge will be piped into receiving gullies. This avoids destructive overland flow. These measures provide further erosion protection for sensitive gully slopes.

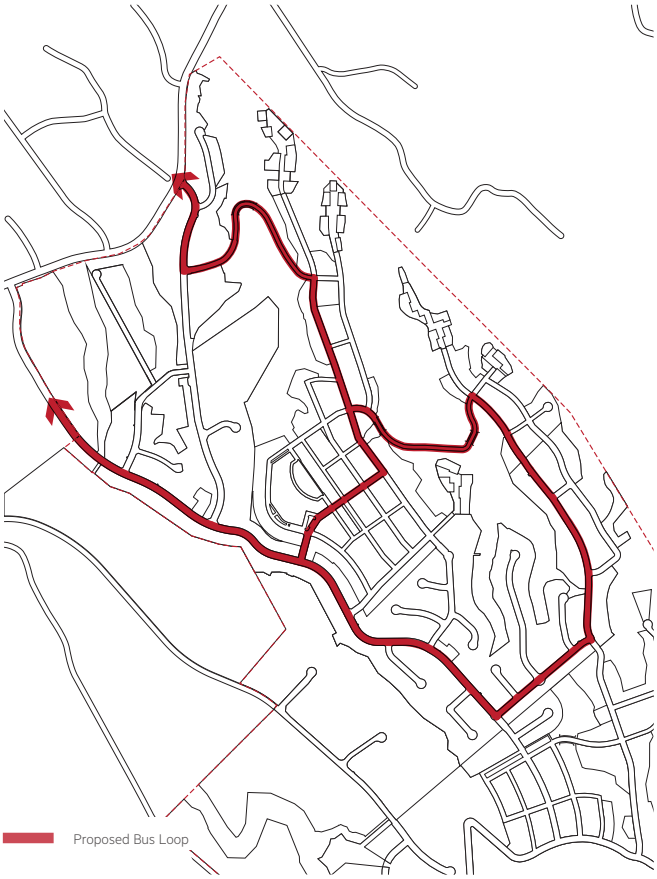
3.4 Access & Movement

Movement Network

The masterplan proposes a new street network supporting multi-modal access across the plan area where private vehicles, public transport (buses), cycling and walking are all delivered in a balanced manner.

The proposed network has been established to address the current lack of connectivity between clusters of development, helping to establish more sustainable neighbourhood patterns. A strategically located local centre is proposed, linked into public transport and Urban Connector streets with dedicated cycle paths.

A hierarchy of street types has been established, informed by Waka Kotahi's One Network Framework and PNCC's Street Design Manual. Cross-sections indicating the preferred design of each type are provided later in this section. The provision of cycle routes within existing streets, particularly Pacific Drive, has been considered and the retrofitting of a cycling provision is proposed.



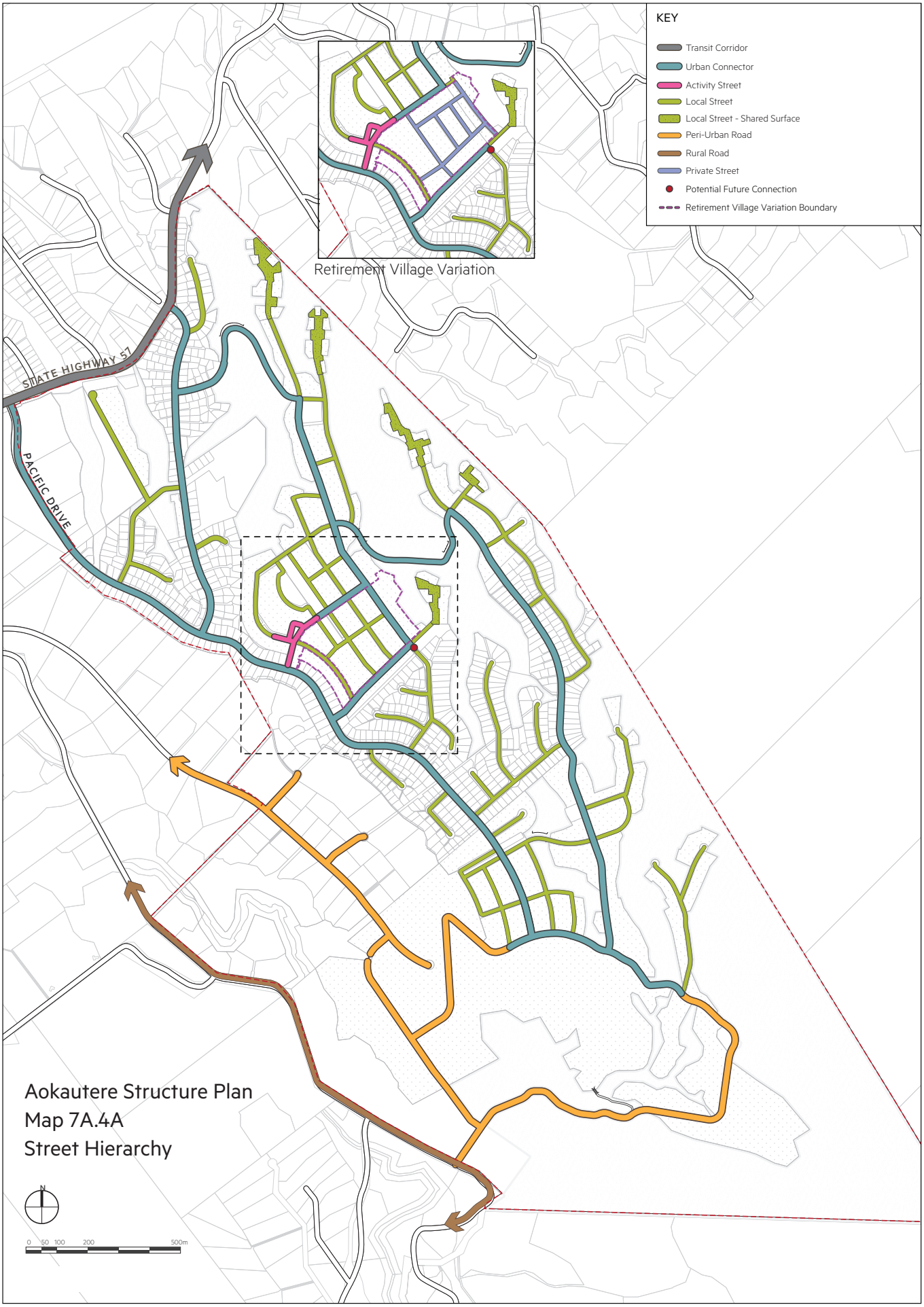
The overall layout and alignment of the network is heavily influenced by several key factors, namely:

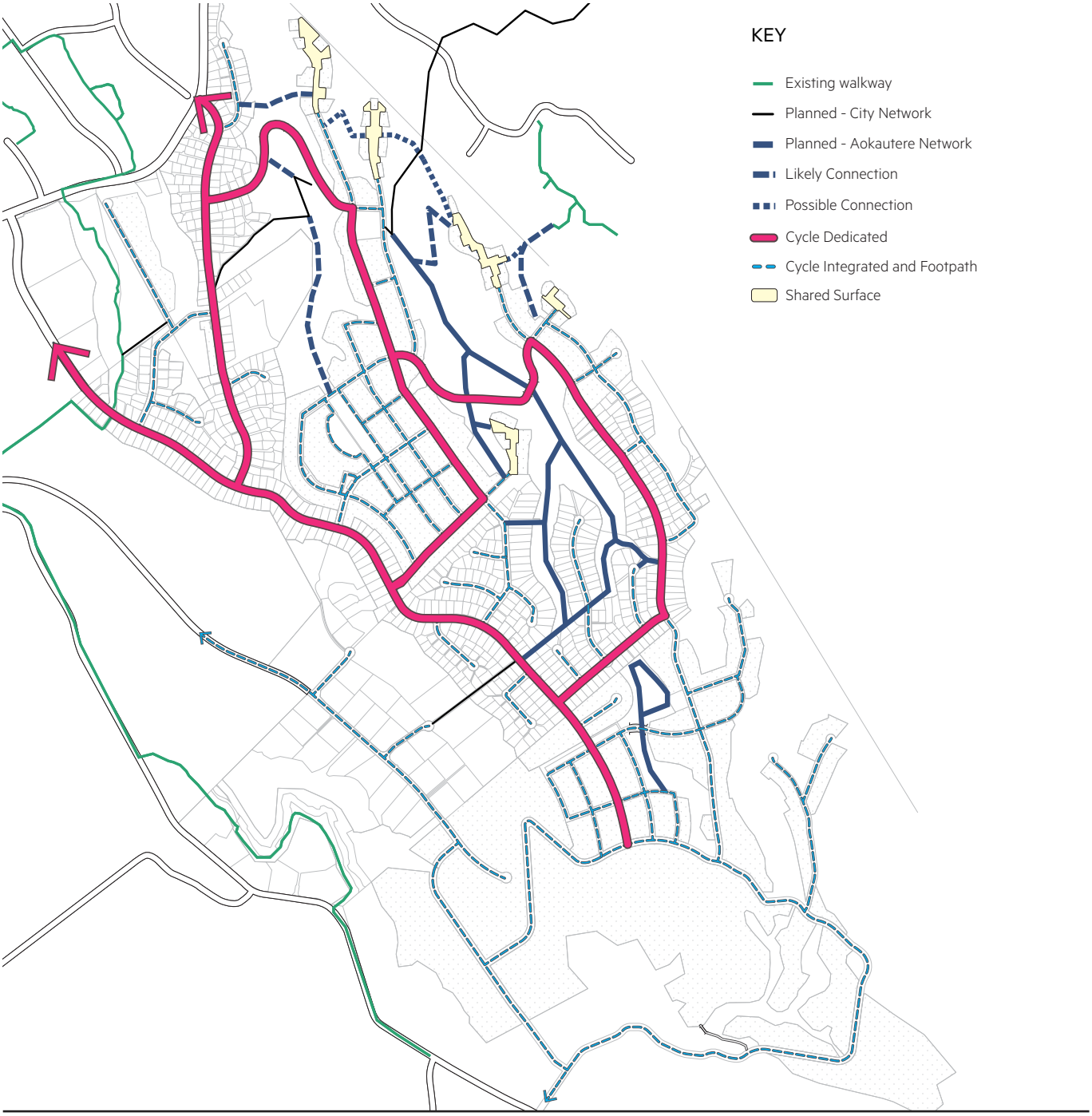
- Establishing connected streets where routes link to other routes.
- Topography and land stability as informed by Tonkin+Taylor.
- Inviting public access along the top edges of gullies allowing adjacent dwellings to front these open spaces.

Public Transport

Engagement with Horizons Regional Council and PNCC has identified the benefits of extending the existing bus loop into Aokautere. Increased bus provision will become viable when the plan is built out and the local population grows.

A proposed bus loop utilises Urban Connectors, namely Pacific Drive and the new streets connecting to the east.


KEY
Transit Corridor
Urban Connector
Activity Street
Local Street
Local Street - Shared Surface
Peri-Urban Road
Rural Road
Private Street
Potential Future Connection
Retirement Village Variation Boundary
Retirement Village Variation
STATE HIGHWAY 57
PACIFIC DRIVE
Aokautere Structure Plan
Map 7A.4A
Street Hierarchy
N
0 50 100 200 500m

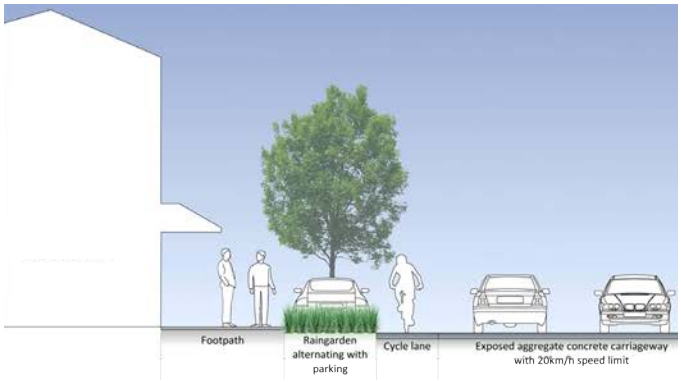


Pedestrians & Cyclists

Encouraging active modes of movement is central to the current sustainable development agenda. The masterplan proposes an extensive network of footpaths and cycle lanes, which offer greater mode choice to residents and visitors. Routes include recreational pathways, which run across and along the gullies. These paths connect to the Turitea Valley and link areas of housing on adjacent plateaus.

Streets and rural roads are designed with footpaths unless a shared surface is proposed. Generous footpath widths are provided through the local centre.

In places, gully reserves are bounded by public streets. These high-amenity routes have good provision for walking and cycling. All streets are overlooked by dwellings or commercial frontages. This increases safety and adds visual interest.



Cycle lanes are an essential part of the movement system. Dedicated routes occur on Urban Connector street types, where higher volumes of movement are anticipated. Cycle movements are anticipated along all streets, even where dedicated routes are omitted. In the latter case, cycle lanes are integrated within the carriageway. The design of footpaths and cycle lanes is provided in the street cross-sections later in this report.

3.5 Public Realm

A new public realm structure forms a backbone to Aokautere, knitting housing and landscape areas together. The public realm includes streets and open spaces as described in this section.

Hitherto, development has emerged with minimal investment in high-quality green open space. Likewise, existing housing mostly 'turns its back' on the gullies. Reversing this pattern, the masterplan recognises the gully system as a highly valuable amenity, habitat and stormwater asset. Accordingly, the plan configures new housing areas to positively address the gullies as accessible public spaces. Streets are arranged to provide access along the gully edges. Key thoroughfares are designed to provide stormwater attenuation and amenity, transitioning between housing and the natural gully landscapes.

Open Spaces

Different types of open spaces have been designed and distributed across the masterplan area. These include:

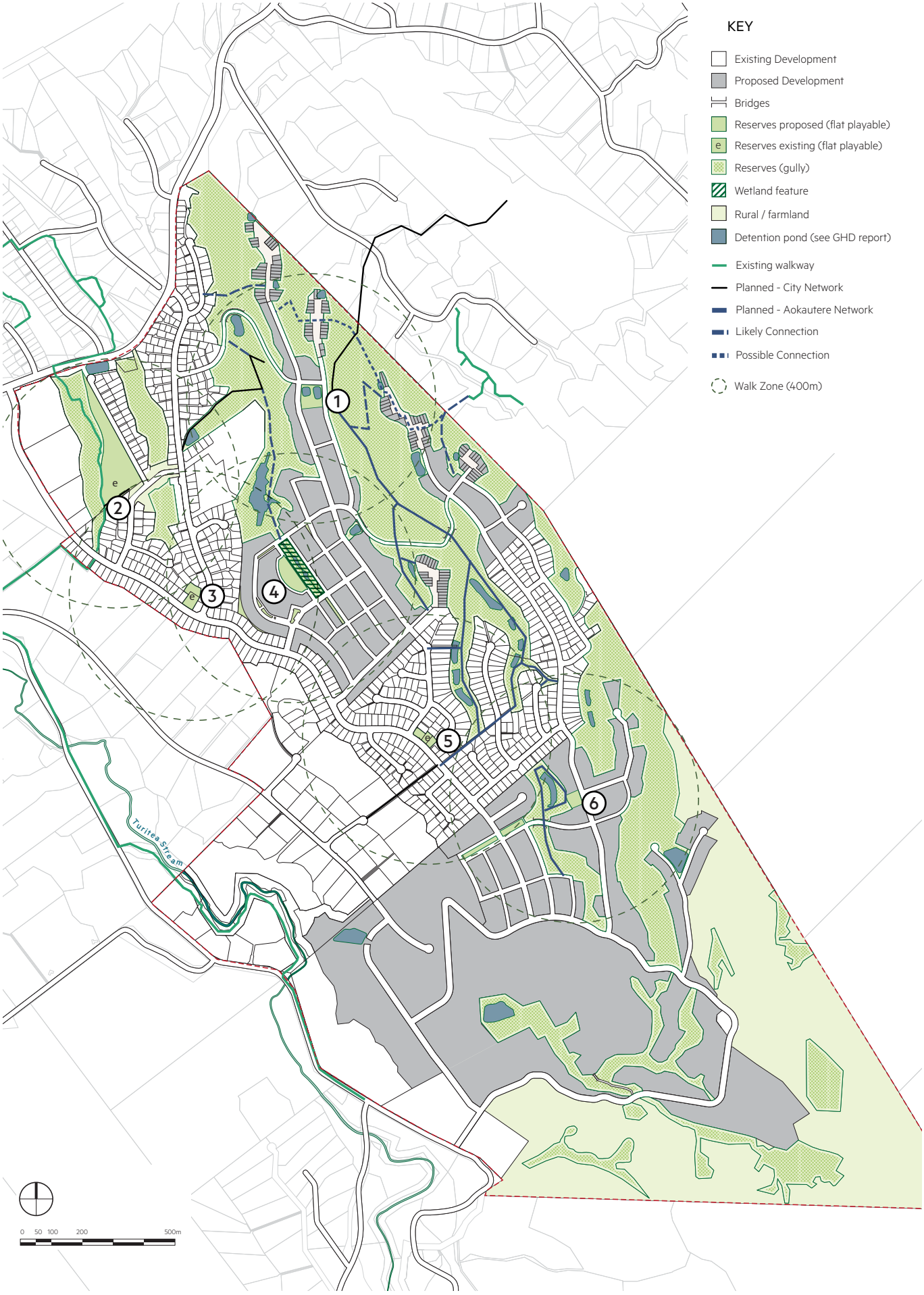
- Natural gully reserves.
- Flat playable reserves.
- Detention basins and stormwater systems, including street-based swales and raingardens.

Six new or existing reserves provide an appropriate level of recreational amenity. The accompanying plan shows each reserve at the centre of a 400m walk zone.

Reserve areas are as follows:

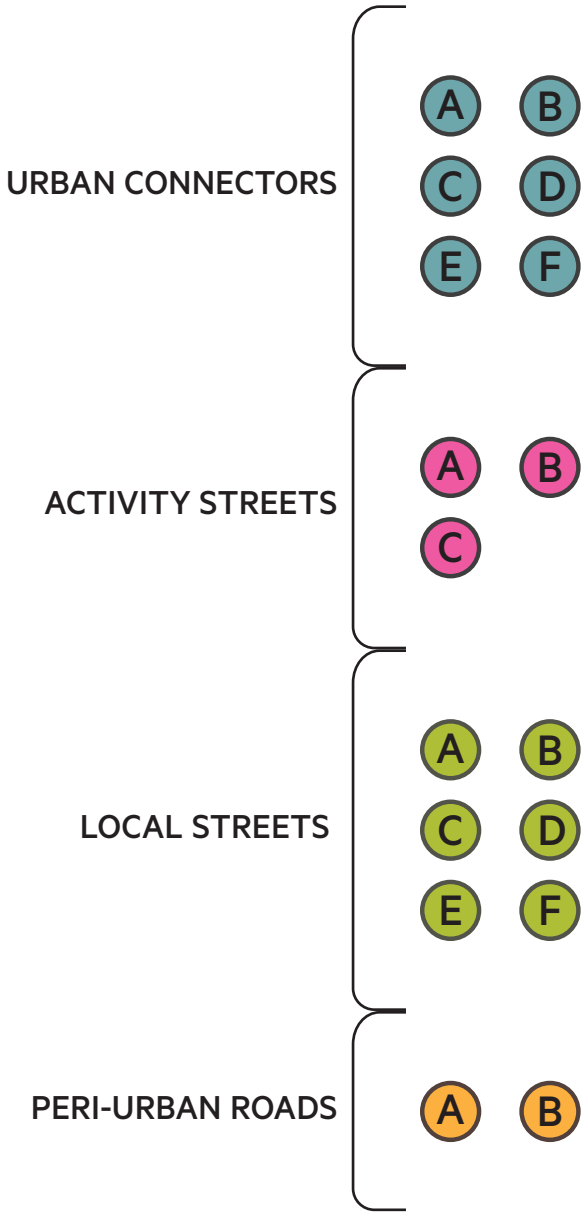
1 - 3,800sq.m (excl. detention pond)
2 - 9,066sq.m (existing)
3 - 3,247sq.m (existing)
4 - 4,900sq.m
5 - 2,348sq.m (existing)
6 - 2,080sq.m

In addition the plan provides some 197Ha of natural gullies and rural open land with recreational trails that complement the spaces listed above.


KEY
Existing Development
Proposed Development
Bridges
Reserves proposed (flat playable)
Reserves existing (flat playable)
Reserves (gully)
Wetland feature
Rural / farmland
Detention pond (see GHD report)
Existing walkway
Planned - City Network
Planned - Aokautere Network
Likely Connection
Possible Connection
Walk Zone (400m)
1
2
3
4
5
6
e
Turitea Stream
0 50 100 200 500m

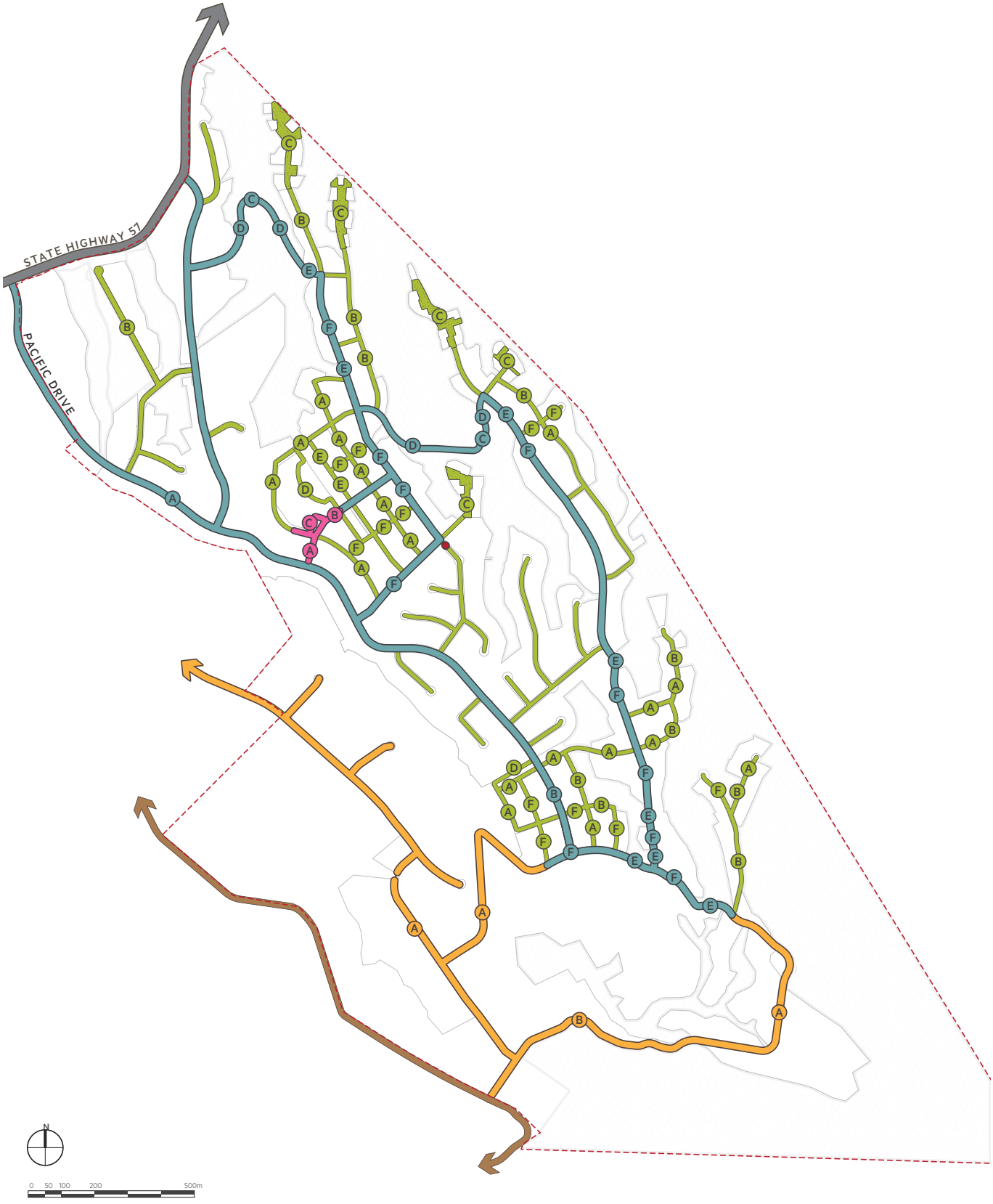
Streets

As noted earlier in this section, the masterplan proposes a street network to serve the Aokautere area and Turitea Valley. The movement hierarchy and street typology are shown in the adjacent diagram. The design of each street type is provided in a series of street cross-sections. These are repeated at a larger scale in Appendix A.



KEY

- Transit Corridor
- Urban Connector
- Activity Street
- Local Street
- Local Street - Shared Surface
- Peri-Urban Road
- Rural Road
- Private Street
- Potential Future Connection


STATE HIGHWAY 51
PACIFIC DRIVE
N
0 50 100 200 500m

Urban Connector - Pacific Drive
Types A & B

Urban Connectors carry high traffic volumes including buses and active modes. They provide strategic access into SH57 and the City Centre. The existing section of Pacific Drive (Type A) is wide and designed primarily for through traffic by motor vehicles. This thoroughfare is upgraded to provide better streetscape amenity including improved pedestrian and cycle facilities. The southern extension of Pacific Drive (Type B) is also classed as an Urban Connector. This section of the route has a narrower carriageway and wider footpaths, reflecting the shift towards a multi-modal environment.

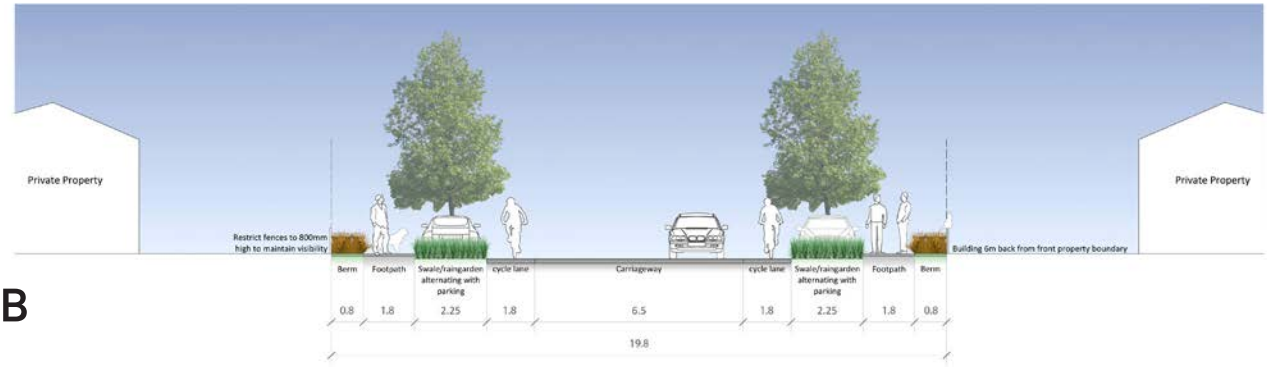
Type A metrics:

- Legal Road: 21.4m
- Carriageway: 7.5m
- Cycle lanes: 1.8m (each)
- Footpaths: 1.6m (each)
- Parking (one side): 2.1m
- Swales: 2.0m (each)
- Berms/services: 0.5m (each)

Type B metrics:

- Legal Road: 19.8m
- Carriageway: 6.5m
- Cycle lanes: 1.8m (each)
- Footpaths: 1.8m (each)
- Parking/swales: 2.25m (each)
- Berms/services: 0.8m (each)

Urban Connectors



Urban Connector - Gully Crossing
Types C & D

Some Urban Connectors cross Aokautere's gullies, linking the residential areas on either side. These routes level out briefly on the gully floors (Type C), where they are bordered by natural landscape. To one side, there is a shared footpath/ cycle lane with a planted buffer. Bus movement is anticipated. For most of their length, cross-gully Connectors are set into sloping terrain (Type D). Here, the cross-section accommodates a detached path within the downslope berm. Vertical and horizontal separation from the carriageway allows the path to have an informal trajectory.

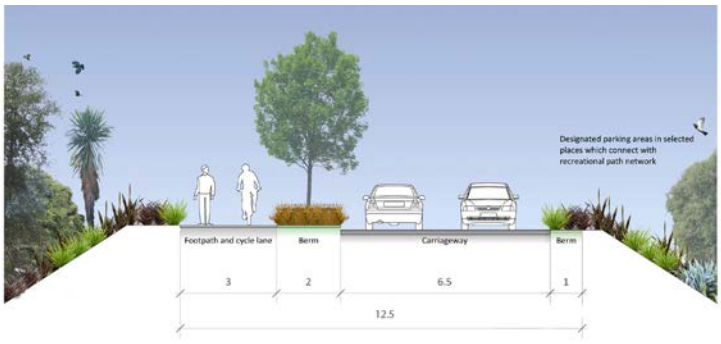
Type C metrics:

- Legal Road: 12.5m
- Carriageway: 6.5m
- Shared footpath/cycle lane: 3.0m
- Planted berms: 1.0m & 2.0m
- No parking

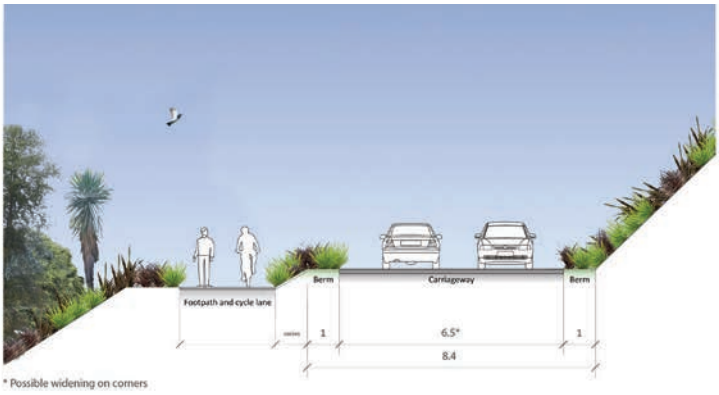
Type D metrics:

- Carriageway plus berms: 8.4m min.
- Carriageway: 6.5m
- Shared footpath/cycle lane: 3.0m
- Planted berms: 1m min. (each)
- No parking

Urban Connectors



C



D

Urban Connector - Residential
Types E & F

Most Urban Connectors serve two purposes. As well as acting as through-streets, they provide access to residential lots. Various edge conditions are catered for, including building frontages and gully margins. Type E Connectors are built up along one frontage and have a gullly edge on the opposite side. Their asymetrical cross-section produces exceptional visual and recreational amenity for residents and passers-by. Type F Connectors are more conventional with houses along both sides.

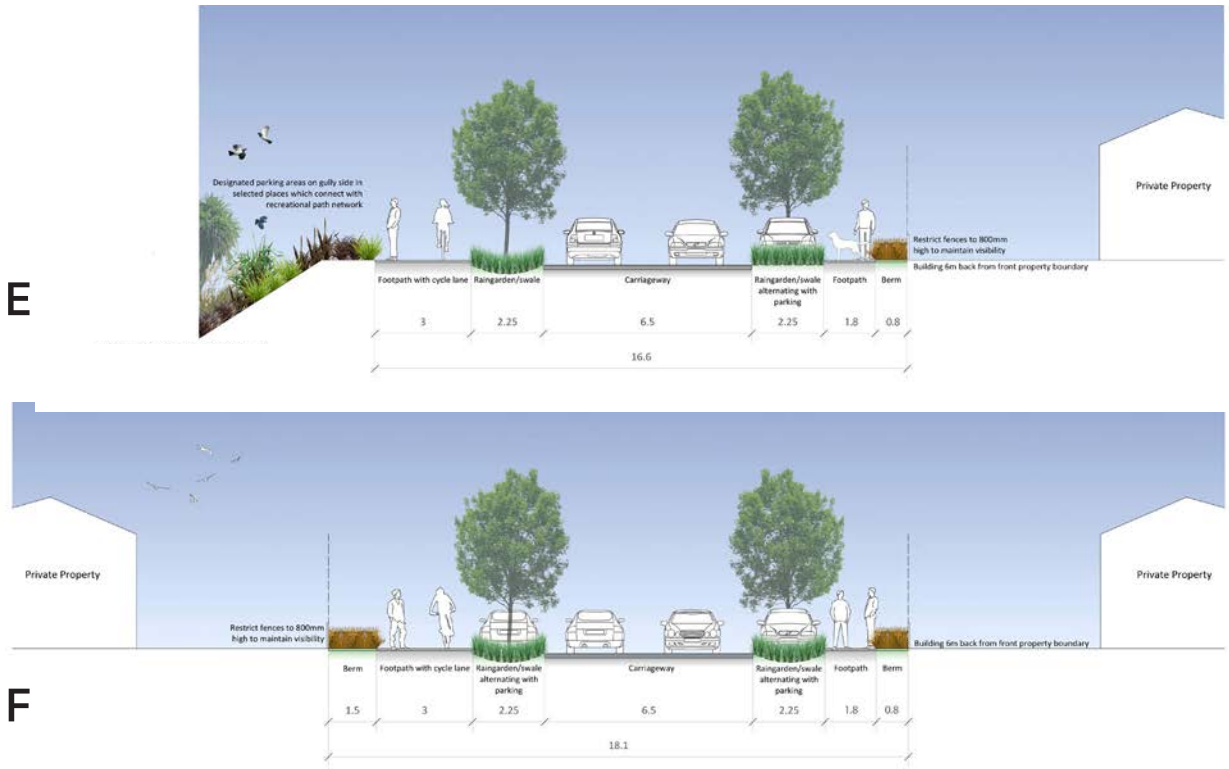
Type E metrics:

- Legal Road: 16.6m
- Carriageway: 6.5m
- Shared footpath/cycle lane: 3.0m
- Footpath: 1.8m
- Parking/swales: 2.25m (each)
- Berm/services: 0.8m

Type F metrics:

- Legal Road: 18.1m
- Carriageway: 6.5m
- Shared footpath/cycle lane: 3.0m
- Footpath: 1.8m
- Parking/swales: 2.25m (each)
- Berms/services: 0.8m & 1.5m

Urban Connectors



Activity Street - Local Centre
Types A, B & C

Activity Streets access the proposed Local Centre. Shops occur on one side (Type A) or both sides (Type B) of these streets. A one-way loop (Type C) provides access to the superette and associated retail. This route is separated from the through street by a landscaped island. Wider footpaths accommodate higher foot counts and street edge activity. Dedicated cycle lanes within the carriageway avoid conflict with pedestrians and retail frontages. Where necessary, bus stops replace parking and swales.

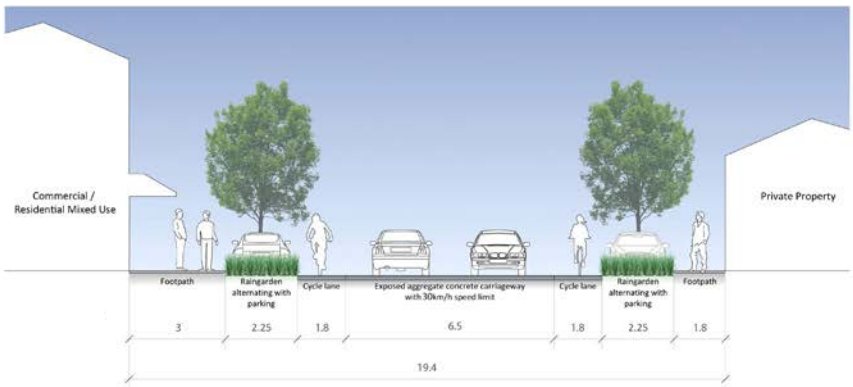
Type A metrics:

- Legal Road: 19.4m
- Carriageway: 6.5m
- Cycle lanes: 1.8m (each)
- Footpaths: 1.8m & 3.0m
- Parking/swales: 2.25m (each)
- Bus stop replaces parking/swale

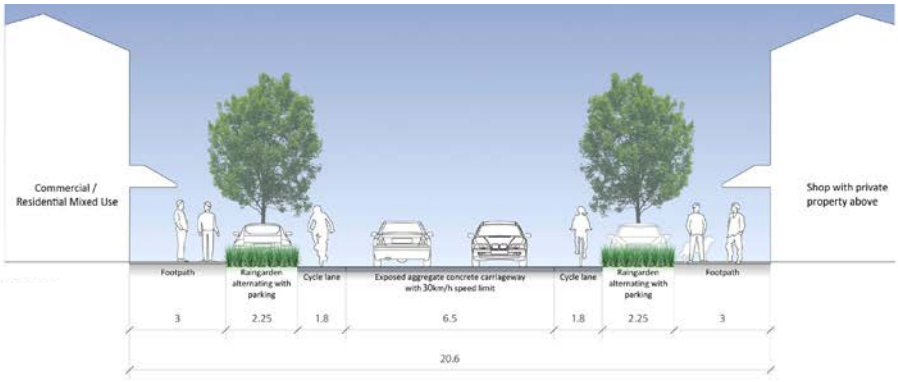
Type B metrics:

- Legal Road: 20.6m
- Carriageway: 6.5m
- Cycle lanes: 1.8m (each)
- Footpaths: 3.0m (each)
- Parking/swales: 2.25m (each)
- Bus stop replaces parking/swale

Activity Streets



A



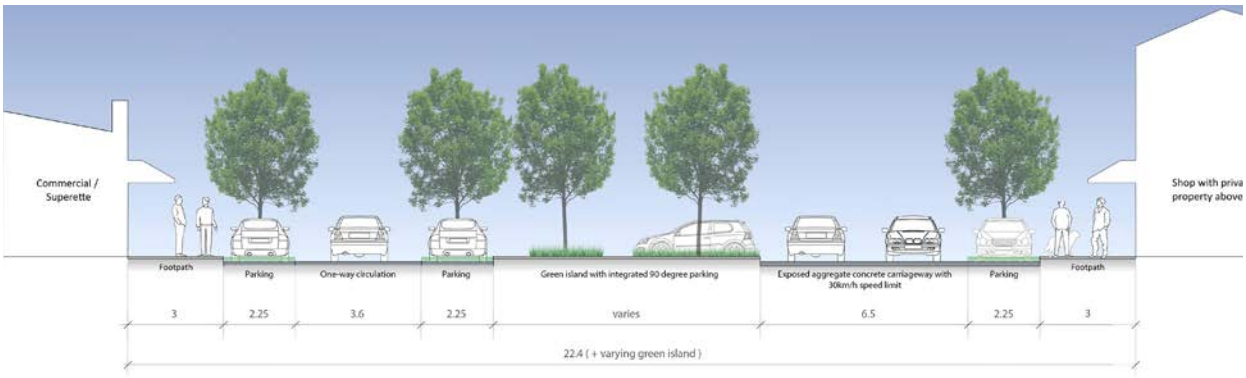
B

Type C metrics:

- Legal Road: 22.4m + island (varies)
- Carriageway (two-way): 6.5m
- Carriageway (one-way): 3.6m
- Footpaths: 3.0m
- Parking/swales: 2.25m (each)
- Bus stop replaces parking/swale

Activity Streets

C



Local Street
Types A & B

Local Streets account for the majority of residential thoroughfares within the Aokautere suburban area. Their primary function is to provide access to residential properties. A narrower carriageway is part of a low-speed environment. Streetscape is designed to incorporate frequent curb-cuts. Local Streets do not provide for public transport. However, they do support high levels of pedestrian movement with dedicated footpaths on both sides of the right-of-way. Cycling is integrated within the carriageway.

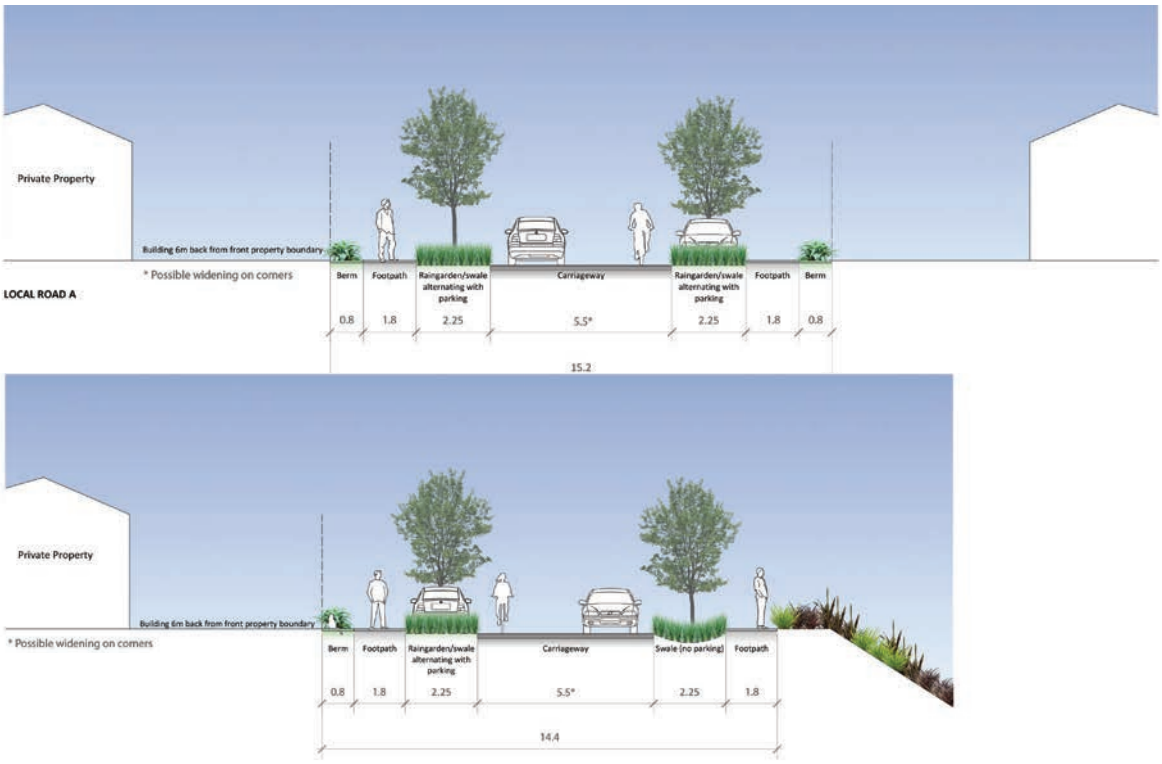
Type A metrics:

- Legal Road: 15.2m
- Carriageway: 5.5m
- Cycling in carriageway
- Footpaths: 1.8m (each)
- Parking/swales: 2.25m (each)
- Berms/services: 0.8m (each)

Type B metrics:

- Legal Road: 14.4m
- Carriageway: 5.5m
- Cycling in carriageway
- Footpaths: 1.8m (each)
- Parking/swales: 2.25m (each)
- No parking on gully edge
- Berm/services: 0.8m

Local Streets



Local Street
Types C & D

Type C Local Streets access clusters of townhouses at the ends of Aokautere's ridges. With irrgular plans and strongly built-up edges, these routes resemble mews or courts rather than conventional streets. Shared surfaces create an informal landscape in a low-speed environment. Type D Local Streets front formal public open spaces. They are built up along one side. A narrow, one-way carriageway contributes to a low-speed environment. A separate footpath matches the formal landscape.

Type C metrics:

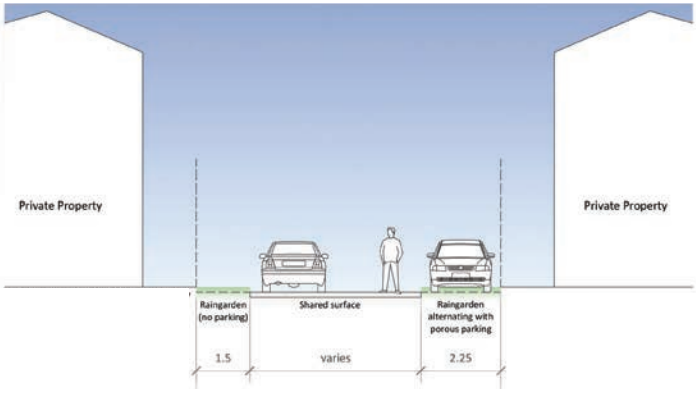
- Legal Road: varies
- Shared surface: varies
- Cycling in shared space
- Walking in shared space
- Parking/raingarden: 2.25m
- Raingarden: 1.5m

Type D metrics:

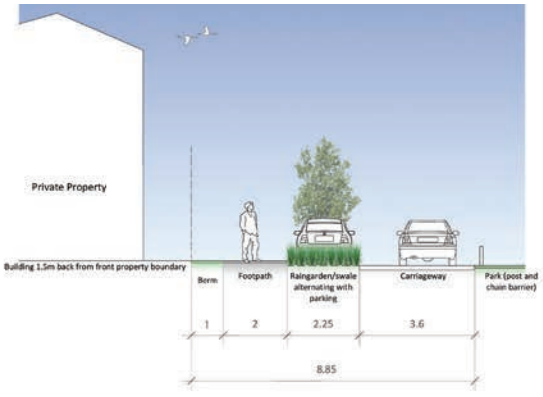
- Legal Road: 8.85m
- Carriageway: 3.6m
- Cycling in carriageway
- Footpath: 2.0m
- Parking/swale: 2.25m
- Berm/services: 1.0m

Local Streets

C



D



Local Street
Types E & F

The Type E Local Street runs along one side of the Wetland Park. It provides a high-amenity interface between medium-density housing and open space. The street's cross-section is asymmetrical. On the built-up side, there is a conventional layering of berm, footpath and parking/swale. On the park side, there is a boardwalk that can meander into the wetland. Type F Local Streets are also asymmetrical. Because they access few properties, footpath and parking/swale are provided on one side only.

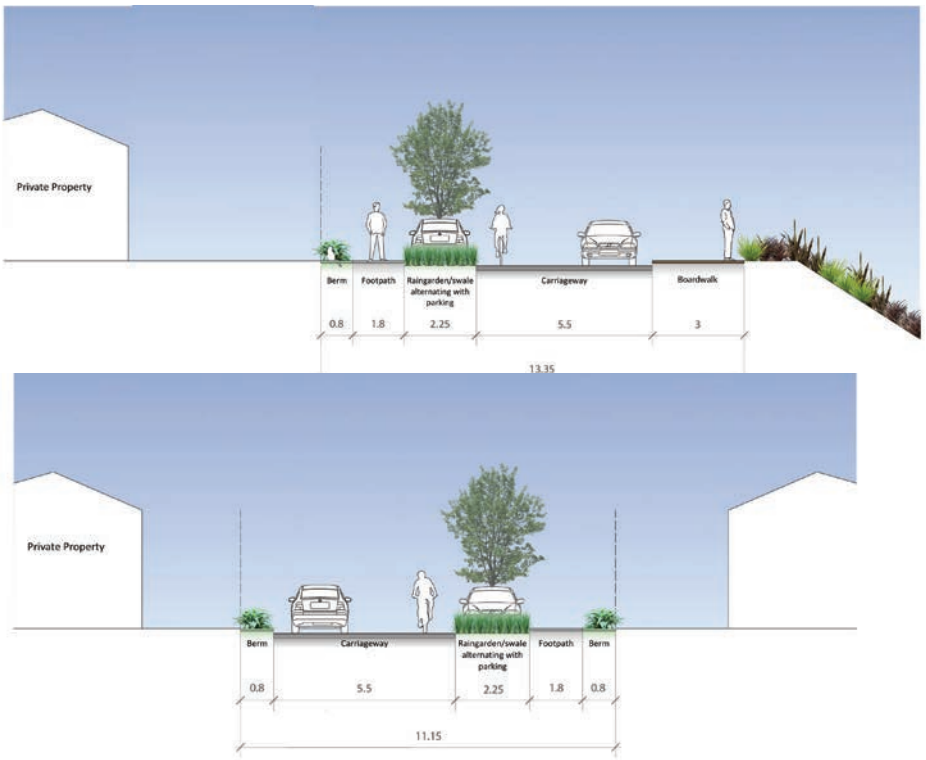
Type E metrics:

- Legal Road: 13.35m
- Carriageway: 5.5m
- Cycling in carriageway
- Footpath: 1.8m
- Boardwalk: 3.0m
- Parking/swale: 2.25m
- Berm/services: 0.8m

Type F metrics:

- Legal Road: 11.15m
- Carriageway: 5.5m
- Cycling in carriageway
- Footpath: 1.8m
- Parking/swale: 2.25m
- Berm/services: 0.8m

Local Streets



Peri-Urban Road
Types A & B

Peri-Urban Roads serve lifestyle properties in the Rural Residential zone. Some routes also provide strategic links between Turitea Valley and Pacific Drive. Dwellings are usually set well back from the road, and frontages are intensively planted. Type A roads have lifestyle properties on either side. Type B roads have re-vegetated gullies on either side. Some roads have a different condition on each side. In all cases, berms can accommodate raingardens or swales.

Type A metrics:

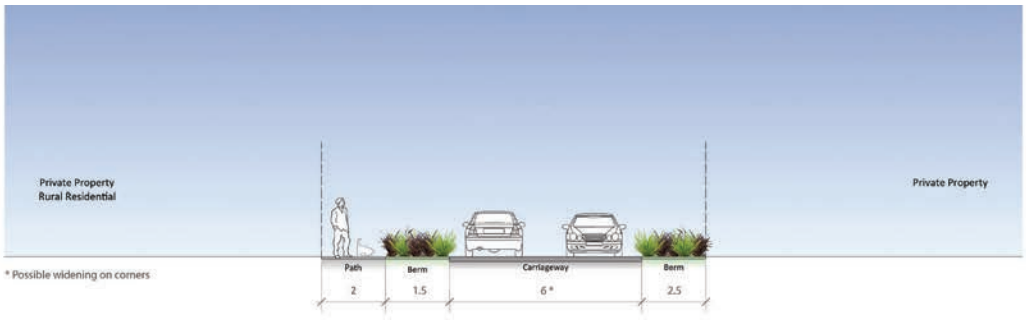
- Legal Road: 12.0m
- Carriageway: 6.0m
- Cycling within carriageway
- Footpath (informal): 2.0m
- Berms (planted): 1.5m and 2.5m
- No parking

Type B metrics:

- Legal Road: 12.0m
- Carriageway: 6.0m
- Cycling within carriageway
- Footpath (informal): 2.0m
- Berms (planted): 2.0m (each)
- No parking

Peri-Urban Roads

A



B