

Appendix B: Horotiu CMP Assessment

REPORT

Waikato District Council

Appendix B

Catchment Management Plan
Horotiu Structure Plan Area



Tonkin & Taylor

ENVIRONMENTAL AND ENGINEERING CONSULTANTS



REPORT

Waikato District Council

Appendix **B**

Catchment Management Plan
Horotiu Structure Plan Area

Report prepared for:
Waikato District Council

Report prepared by:
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1 Catchment description

1.1 Location

The Horotiu SPA surrounds the township of Horotiu, and is located on the western side of the Waikato River, approximately 13 km north of Hamilton City. The Waikato Expressway and interchange with Great North Road is adjacent to the southeast boundary of the SPA. The North Island Main Trunk Line railway line runs through Horotiu. The location of the Horotiu SPA is presented in Figure 1. The SPA (red outline) covers approximately 258 ha.

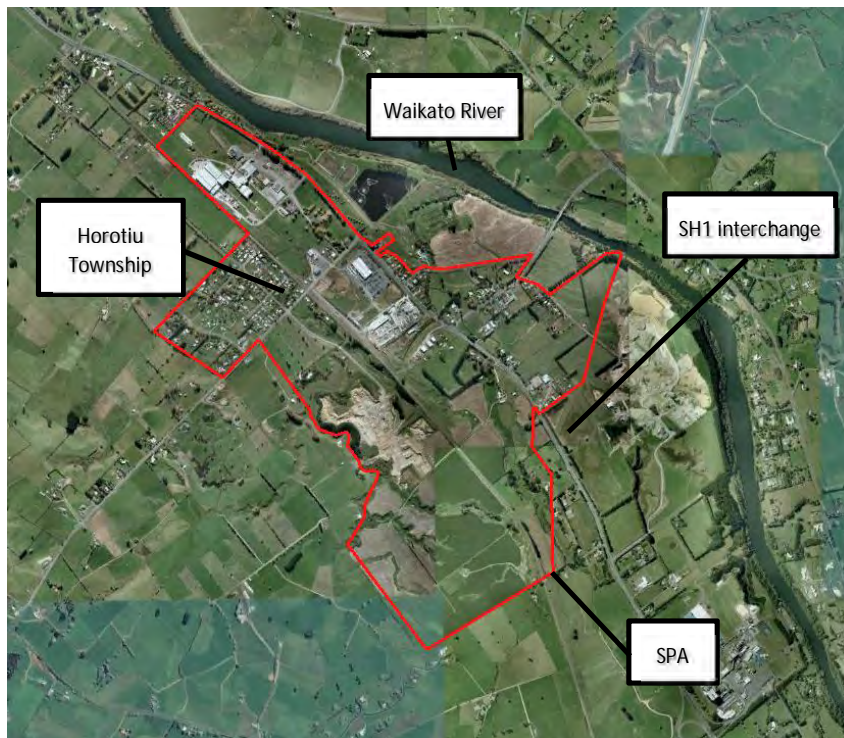


Figure 1. Horotiu SPA location (Image sourced from Google Earth, 2014)

1.2 Topography

The topography of the catchment and SPA comprises a relatively flat terrace incised by natural water courses including the Waikato River. The area generally falls to the northeast towards the Waikato River. There are low lying plains present beyond the southern and western boundaries of the SPA.

1.3 Geology and hydrogeology

The published geology of the area indicates that the majority of the Horotiu SPA is underlain by interbedded alluvial sands, silts and peats of the Hinuera Formation of the Piako Subgroup, overlying in places older sands and silts of the Walton Subgroup. Both the Pleistocene Age Walton Subgroup and the younger Holocene age Piako Subgroup are mapped as belonging to the Tauranga Group.

Recent alluvial sediments comprising sands, silts and peats are present in the bases of gullies or stream beds (Edbrooke, 2005) as shown in the Geological map in Figure 2 below.

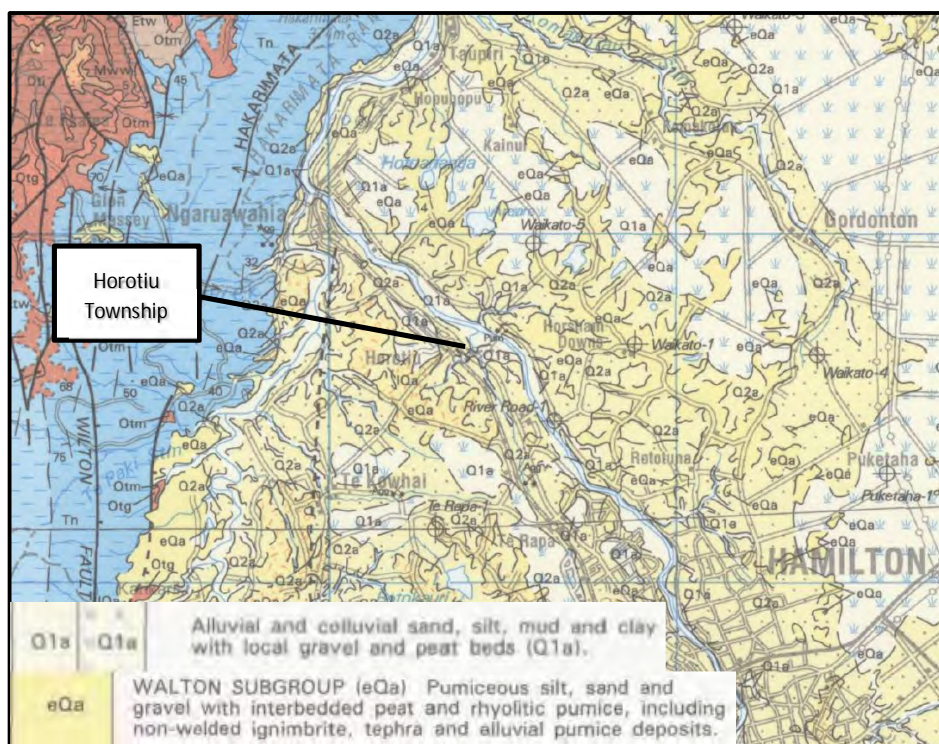


Figure 2. Geological map of Horotiu structure plan area

The hydrogeology of the Tauranga Group is characterised by a series of shallow unconfined and deeper semi-confined aquifers, which are variable in their horizontal and vertical distributions, and show varying degrees of connectivity with one another.

Groundwater is recharged from rainfall infiltration and a significant proportion of groundwater discharges to streams through the incised gullies. Marshall and Petch (1985) estimated that up to 85% of mean annual stream flow is sustained by groundwater discharges.

1.4 Watercourses

There are two main watercourses flowing through the existing Horotiu Township; the Te Rapa Stream and an unnamed tributary of Te Rapa Stream labelled tribHOR01. These streams are described below and shown (light blue) in Figure 3 below.

The Te Rapa Stream drains a portion of land in the east SPA and significant areas of rural land and industrial land in the north of Hamilton City. The upper and middle reaches south of the SPA receive runoff from Hamilton City and agricultural lands with the lower reach (the majority of which is within the SPA) receiving runoff from a mix of industrial and agricultural land. Only a small section of the land currently discharging to the unnamed tributary is residential land. Te Rapa Stream discharges into the Waikato River northeast of Horotiu just outside the SPA. From the Waikato River to its headwaters, the Te Rapa Stream is approximately 8.3 km long with approximately 6 km upstream of the SPA boundary.

The unnamed tributary drains the majority of the SPA and a significant portion of rural land to the southwest of the SPA. The upper reach southwest of the SPA receives runoff from mainly agricultural lands with the middle and lower reaches (the majority of which are within the SPA) receives runoff from a mix of industrial and agricultural land. As per the Te Rapa Stream, only a small section of the land currently discharging to the unnamed tributary is residential land. The unnamed tributary discharges into the Te Rapa Stream within the SPA.

The Waikato River runs adjacent to a small section of the SPA, with the remaining portion of the SPA separated from the Waikato River by agricultural land uses.

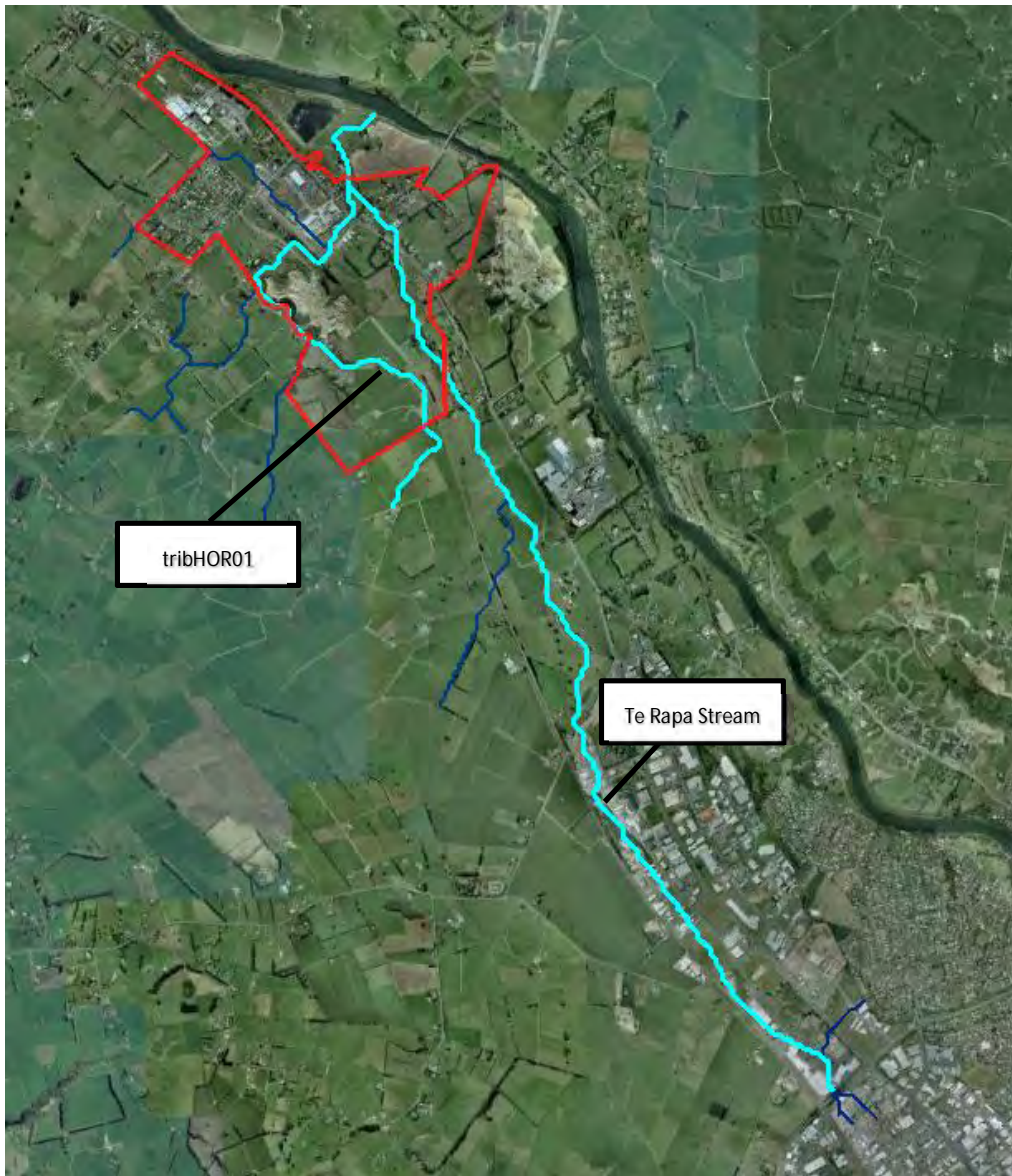


Figure 3. Main water courses (light blue) and tributaries (dark blue) within the catchment.

There are a number of smaller unnamed tributaries within the Horotiu SPA that feed into the Te Rapa Stream and tribHOR01. The unnamed tributaries drain a mixture of industrial, agricultural and residential land. These unnamed tributaries are shown in Figure 3 above.

There are also a number of small unnamed tributaries within and bordering the Horotiu SPA which drain directly to the Waikato River. The unnamed tributaries generally drain industrial and agricultural land. These tributaries also include the lower flood plain areas of the Waikato River.

Figures 242 to 243 in Appendix BA shows the locations of these streams, and their proximity to the Waikato River northeast of Horotiu.

1.5 Receiving environments

The identified surface water receiving environments within or adjacent to the Horotiu SPA include:

- Te Rapa Stream.
- Waikato River.
- Unnamed tributaries of the Waikato River.

1.6 Existing WRC resource consents

1.6.1 General

WRC's online database has been used to broadly identify the types of resource consents held within the SPA and these are summarised in Table 1 below.

Table 1. WRC Resource Consents

Resource Consent Type	Number	Growth Sector
Discharge - Air	1	-
Discharge - Land	4	C(2)
Discharge - Water	5	-
Land Use – Bore/Well	1	-
Land Use – Other	4	-
Water Take - Ground	1	-
Water Take - Surface	0	-
Water Take - Other	2	-

1.6.2 Comprehensive stormwater discharge consent

Waikato District Council holds Resource Consent No. 105653, being a Comprehensive Stormwater Discharge Consent (CSDC) associated with urban Horotiu.

Relevant extracts from the resource consent are reproduced below:

Consent Type:	Discharge permit
Consent Subtype:	Discharge to land and water
Activity authorised:	To divert and discharge urban stormwater and associated contaminants at multiple locations to land and a tributary of the Waikato River, and use discharge structures, within the Horotiu urban area.
Consent duration:	Granted for a period expiring on 22 September 2028

It is noted that the extent of the above consent (reticulated urban area of Horotiu) is significantly smaller than the extent of the SPA.

2 Land use in Horotiu

2.1 Current land use

Land within the SPA is dominated by agricultural and light and heavy industrial land uses, with the residential areas of Horotiu also occupying a portion of the central area. Other land uses currently occurring within the SPA include rural residential and commercial land uses.

The North Island Main Trunk Line (NMTL) railway line runs through the centre of the SPA and the centre of Horotiu. Key arterial routes to the north and south (SH 1 Waikato Expressway) and to the west and east (Horotiu Road) are notable transport corridors.

Horotiu is dominated by industrial land across the SPA. This industrial land includes AFFCO meatworks to the north, Waikato aggregates in the centre and the newly developed Northgate business park to the south. The residential areas of Horotiu Township are located in blocks in the western and eastern parts of the SPA. The remainder of land within the SPA is made up of agricultural land, within minimal commercial land.

2.2 Future land use

Future growth within the SPA has been provided by WDC and is shown in Figure 4 below. The figure shows that the future land use is anticipated to be only residential.

For reporting purposes, the growth area defined by WDC have been categorised into "Growth Sector" C. This is also presented in Figure 4. It is noted that the growth area provided by WDC and presented in Figure 4 extends beyond the SPA boundary provided by WDC.

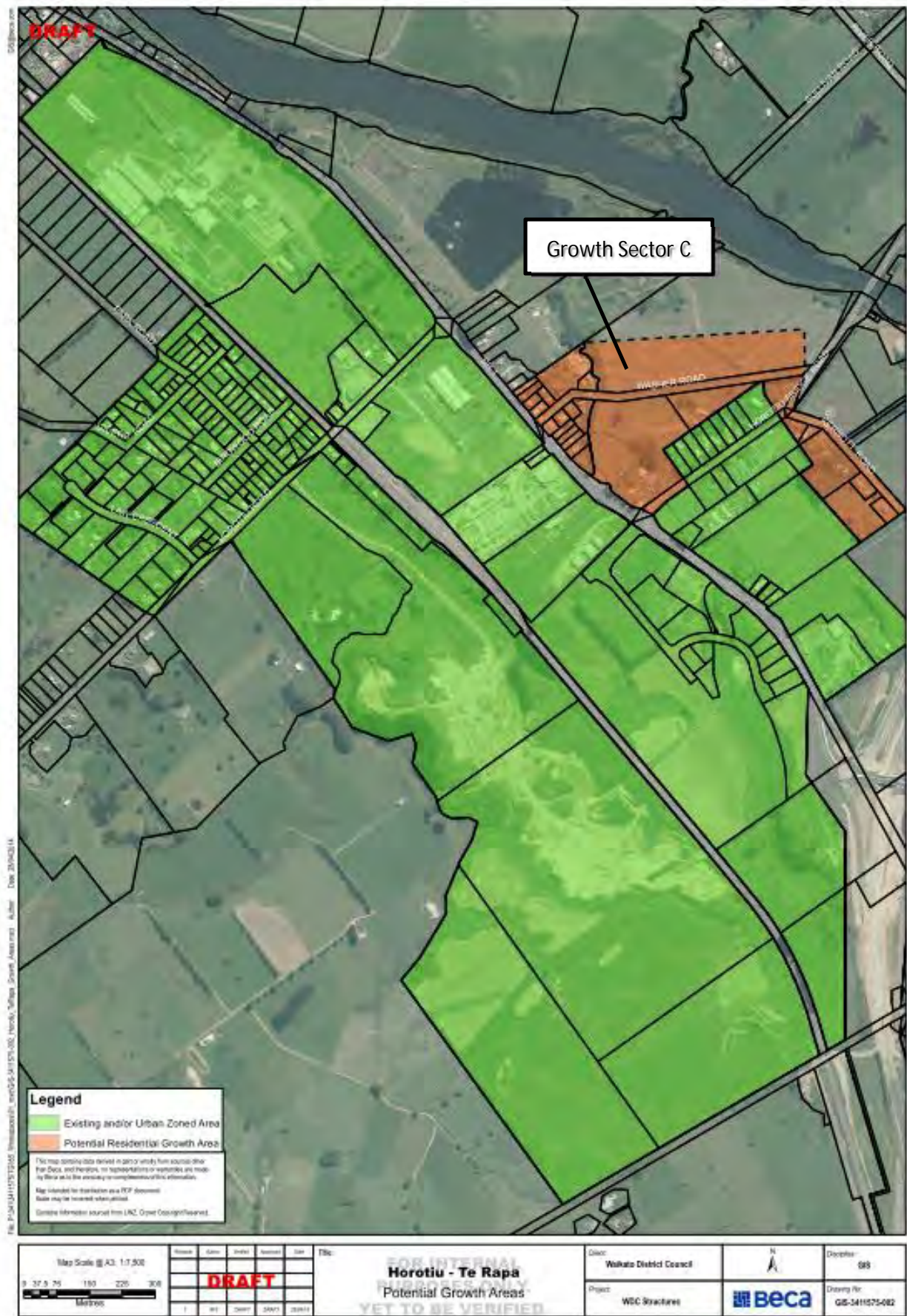


Figure 4. Horotiu growth plan provided by WDC and Growth Sector used for reporting

3 Ecological review

This section presents the results of our review and assessment of the ecological status of stream resources in the Horotiu SPA. The assessment is based on a review of existing ecological information with a brief site visit to publicly accessible parts of the SPA.

3.1 Assessment methods

There has been no ecological assessments of Horotiu and its surrounds provided by Waikato District Council. Our assessment has reviewed the information available within national and regional ecological databases.

In addition, a site walk over of streams at publicly accessible locations was conducted by a T&T ecologist on 9 April 2014 to confirm levels of development, observe in stream structures, assess fish passage conditions and visually assess habitat condition. The sites assessed during the field assessment are shown on Figure 252 in Appendix BA.

3.2 Summary of existing ecological information

3.2.1 Operative District Plan

The Operative Waikato District Plan and associated maps were reviewed for any ecological features of note. The Horotiu SPA is included on Planning Map 20 and 26. There was no ecological features of note within the Horotiu SPA.

3.2.2 Waikato Regional Plan maps

Waikato Regional Plan (WRP) water management and stock exclusion maps were reviewed to check for any specific values that apply to SPA streams.

The Waikato River is classified as Indigenous Fish Habitat Area (Map S14). This classification is applied to significant habitats or areas that are characterised by high water quality.

The Waikato River is also designated as Trout Habitat and Contact Recreation.

All permanent watercourses within the area are classified as Waikato Surface Water (Map S14) and will be subject to the relevant standards in Section 3.2 of the WRP in regard to discharges of contaminants.

3.3 T&T's 2014 field assessment

A site inspection of publicly accessible locations on the Te Rapa stream and its unnamed tributaries within the SPA was conducted on 9 April, 2014. Locations inspected are shown on Figure 252 in Appendix BA.

Observations from site inspections concluded that majority of the stream channel was open and in places had large areas of macrophyte growth within stream channel. The likely factors contributing to excessive macrophyte growth are the lack of significant areas of riparian vegetation providing shade to the stream channel and the presence of nutrients in the stream due to the agricultural land use in the catchment. In places along the main stream channel macrophyte growth had been sprayed to increase the drainage capacity.

In-stream habitat at the sites inspected was generally limited to slow moving runs and pools with undercut banks, and overhanging vegetation present at limited locations. There was a lack of large woody debris providing hard substrate habitat for macroinvertebrate species. Schools of the At Risk species inanga (*Galaxias maculatus*) were observed upstream and downstream of the

culvert under Horotiu Bridge Rd (Goodman et al., 2014). It is noted that inanga are present within the catchment and are classified as nationally vulnerable (Goodman et al, 2014).

No barriers to upstream fish passage were identified within the SPA. The culvert under Horotiu Bridge Rd had been retrofitted with baffles and riprap to attenuate flow. The culvert under Washer Rd has recently been replaced with fish passage provided. Culverts under the state highway and the North Island Main Trunk Line were not able to be assessed due to no access being available. The ability of fish to migrate upstream of these points is unknown.

4 Ecological assessment

4.1 Introduction

This section provides an assessment of the potential effects of development of the Horotiu SPA on surface water resources. The assessment has considered the general issues outlined within Section 2 of the main report. This section provides an assessment of the significance of these issues for each of the growth areas identified by WDC.

4.2 Assessment of effects

The main ecological issues associated with future urban development in the Horotiu SPA are described below and the significance of proposed development to a range of issues for each growth area is presented in Table 2.

Table 2. Significance of potential adverse effects from proposed development

Growth Sector	C - Low density residential
Issue	
Stormwater	
Contaminants	Low
Increase in peak flows leading to stream bed/bank erosion	Low
Hydrological	
Reductions in base flow	Low
Reduction in flow variability leading to reduced habitat quality	Low
Habitat	
Culverting or infilling of perennial streams reducing habitat	Low
Protection of riparian margins	Low to medium
Barriers to fish movement	Low
Overall potential adverse effect on surface water	Low

5 Flood assessment

5.1 Introduction

A ponding map of the Horotiu SPA has been produced. The purpose of the ponding map is to determine the areas which may be inundated if no pipe network is available. The ponding map is a valuable tool to provide an indication of where potential flooding hazards may occur and where future modelling efforts should be concentrated. This approach assumes that the reticulated network (pipes, culverts and catchpits) are blocked but does include rainfall-runoff analysis.

5.2 Methodology

To create the ponding maps, a GIS tool has been used to infill and map all topographic depressions based on the LiDAR survey provided. We note that LiDAR provided was collected in 2007 and 2008 so is considered somewhat out of date. The mapped depressions represent all areas where stormwater could *potentially* pond.

A key issue is that the mapping does not allow for culverts or other sub-surface drainage features which could convey stormwater and reduce or eliminate ponding. Overall the largest ponding areas are generally caused by road embankments, bridges or culverts.

From the ponding maps, critical areas have been identified and a field assessment has been undertaken to identify sub-surface drainage features that could significantly affect the ponding areas shown.

The key culverts that may influence the ponding areas have been identified on Figures 242 and 243 in Appendix BA and also in Table 3.

5.3 Information provided by WDC

5.3.1 Waterway and reticulated assets

WDC did not provide any information on any bridges or significant culverts within the catchment.

Some stormwater reticulation data was provided but in general layout information only was provided and infrastructure elements such as pipe sizes, lengths, and invert levels were generally not provided. It is also noted that road culverts were generally not shown on the stormwater asset layer provided and we understand that culvert information may be available on WDC's RAMM database but these were not available at the time of this assessment.

Stormwater from the village is generally collected via open drains and is eventually discharged into the Waikato River to the northeast, or its tributaries to the west of the village. There is limited stormwater reticulation within Horotiu.

5.3.2 Buildings

WDC provided building footprints within the Waikato but no information on any floor levels.

5.3.3 Drainage operational issues

No drainage issues or flood reports were noted or provided by WDC. Land drainage around Horotiu is part of the Te Rapa Drainage Scheme.

5.3.4 Waikato River flooding, 2009.

T&T has liaised with WRC to obtain flood model data for the Waikato River.

Waikato River 1D flood model (MIKE 11) cross sections including 1% AEP (with no climate change) flood levels from the Karapiro Dam to Port Waikato were available as well as an interpolated 2D flood extent.

The WRC cross sections indicate that the Waikato River 1% AEP (with no climate change) flood level ranges from approximately 15 mRL to 14.8 mRL within the Horotiu SPA. The interpolated 1% AEP river flood extents (with no allowance for climate change) are presented in Figures 242 to 243 in Appendix BA.

5.4 Reporting

For reporting purposes, the area of potential growth has been labelled a "Growth Sector". Within the Horotiu SPA, there is one Growth Sector – C. The location of this Growth Sector can be seen in Figure 4 above and Figures 242 to 243 in Appendix BA. The Growth Sector contains only proposed residential land.

5.5 Results

The results from the ponding assessment are presented in Figures 242 and 243 in Appendix BA. The ponding assessment entails a high level overview of the model provided in these figures and reviews the feasibility of the proposed residential area.

Flooding of the Growth Sector has been reviewed in the following sections. The areas within the SPA but outside of the proposed growth area have not been considered as they are existing and not anticipated to change.

5.5.1.1 Growth Sector C

Growth Sector C is generally bounded by the Waikato Expressway to the southeast, agricultural land to the northwest and northeast and rural land to the southeast. The Thermal Explorer Highway (formerly SH1) passes north south through the SPA.

The unnamed tributary tribHOR01 flows through the western section of the growth sector from underneath the Thermal Explorer Highway (cHOR101), while the Te Rapa Stream flows into the growth sector from beneath Horotiu Bridge Road (cHOR102). The confluence of these two streams is upstream of a culvert under Washer Road (cHOR100) within the growth sector. Both tribHOR01 and the Te Rapa Stream above are incised channels and subject to backwater flooding from the Waikato River. These channels will also be prone to flooding during large storm events.

Key waterway structures in the area of the growth sector have the potential to restrict flow and/or block and create localised flooding or overland flow paths. Culverts on tribHOR01 may restrict flow and cause flooding upstream and/or create an alternative overland flow path, most likely over the road. Culverts cHOR101 and cHOR102 are on the edge of the growth sector and have the potential to create overland flow paths into the growth sector.

As these streams have localised restrictions which are subject to flooding, these areas will need to be managed accordingly with any development or the border of the growth sector may need to be altered to exclude these streams.

There is a potential overland flow path flowing over Horotiu Bridge Road and into the growth sector as identified as olfHOR01. No culvert has been identified at this location and there is no incised channel to indicate a culvert.

Within the growth sector there are isolated low areas subject to flooding which will need to be managed with any development in the growth sector through local contouring and/or drainage systems.

The area is not significantly affected by flooding from the Waikato River although there are some backwater effects within the Te Rapa Stream up to the Thermal Explorer Highway.

5.5.1.2 Infrastructure

Table 3 below summarises the existing critical infrastructure within the Horotiu SPA which is considered a potential restriction on the flow of major overland flow paths, watercourses or streams. Refer to Figure 242 and 243 in Appendix BA which shows the locations of these restrictions. The ponding map was used to determine which infrastructure assets were considered 'restrictions'. WDC have provided stormwater asset details but unfortunately this did not include the majority of culverts and bridges identified herein as constrictions.

Table 3. Summary of critical infrastructure

Infrastructure ID	Length (m)	Diameter (mm)	IL's – US/DS	Capacity check required?	Other notes
cHOR100	No data	4000 high, 3000 wide box	No data	Yes	New culvert
cHOR101	No data	No data	No data	Yes	-
cHOR102	No data	2400	No data	Yes	-

5.6 Summary of flooding issues

This section provides an assessment of the potential effects of flooding on the Horotiu SPA. The assessment includes an evaluation of potential ponding areas on future residential development, and on the capacity of infrastructure critical to managing flood hazard within the SPA.

In this table we have made the following assumptions on the constraint that potential ponding might pose to development in the growth sector:

- Low constraint to development has been categorised as a growth sector with large areas not affected by flooding, and overall no significant flood mitigation required.
- Medium and high constraints to development would probably need to be managed through land use policies, and/or rules in the District Plan, or modifications to the Development Manual.
- For critical infrastructure, those structures that are unable to pass the 1% AEP peak flow (without heading up to above road crown level and/or causing upstream flooding) would likely pose a significant constraint to development.

Table 4. Summary of flooding issues

Flooding Assessment	Growth Sector C - Residential
Existing buildings affected by ponding?	Yes
Existing potentially critical infrastructure	cHOR100
Overall constraint ¹	Low

1. Based on area affected by ponding and ability of the land use type to avoid or mitigate the adverse effects of flood hazards on the built environment.

5.7 Information gaps

Through our review of available information and our assessment of issues and constraints we have identified the following information gaps:

- Information about existing culvert levels, diameters, lengths and materials. This information would be useful in verifying the capacity of existing culverts that are of concern and is essential for more detailed modelling efforts.
- Existing building floor levels to clarify potential flood vulnerability.
- More detailed information on future growth areas including road layout and waterway crossings.

6 References

- Edbrooke, S. W. (2005). *Geology of the Waikato area. 1:250000 geological map 4*. Lower Hutt: Institute of Geological and Nuclear Sciences.
- Goodman, J. (2014). *Conservation status of New Zealand freshwater fish, New Zealand Threat Classification Series 7*. Wellington: Department of Conservation .
- Marshall, T. W., & Petch, R. A. (1985). *A Study of Groundwater and Surface Water Resources in the Hamilton Basin*. Waikato Valley Authority Technical Publication 30.
- NIWA. (2004). *New Zealand River Environment Classification*. Wellington: Ministry for the Environment.
- T&T Ltd. (2009). *Waikato District council Stormwater Management Plan*. Hamilton: Tonkin & Taylor Ltd. .
- T&T Ltd. (2014). *Waikato District Council Ngaruawahia Structure Plan area Preliminary contaminated land assessment*. Hamilton : Tonkin & Taylor Ltd.
- White, P. A., & Rosen, M. R. (2001). *Groundwaters of New Zealand*. Wellington: New Zealand Hydrological Society.
- WRC. (2014, July 18). *Waikato Regional Council - Environment - Waikato River*. Retrieved from Waikato Regional Council: <http://www.waikatoregion.govt.nz/Environment/Natural-resources/Water/Rivers/Waikato-River/>

7 Applicability

This report has been prepared for the benefit of Waikato District Council with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

Tonkin & Taylor Ltd

Environmental and Engineering Consultants

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Peter Cochrane

Civil Engineer/Project Manager

Project Director

BMQ

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Appendix BA: Figures

- **Figures 242 & 243 Flooding Maps Sheets 1 & 2**
- **Figure 252 Ecological Map**



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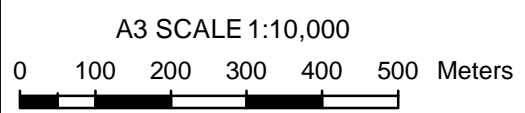
- Horotiu Structure Plan boundary
- Waikato River 1% AEP Flood Extents (interpolated)
- Horotiu observations
- WDC Stormwater assets
- WDC Building outlines
- Growth area
- State Highway 1 designation
- North Island Main Trunk Rail boundary
- North Island Main Trunk Railway

POTENTIAL PONDING AREAS

Water Depth (m)

- 0.05 - 0.1m
- 0.1 - 0.3m
- > 0.3m

Notes: Aerial photograph supplied by Waikato District Council
 State Highway 1 designation supplied by: NZ Transport Agency.



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**WAIKATO DISTRICT COUNCIL
 CATCHMENT MANAGEMENT PLAN
 HOROTIU STRUCTURE PLAN AREA
 Flooding Map - Sheet 1 of 2**

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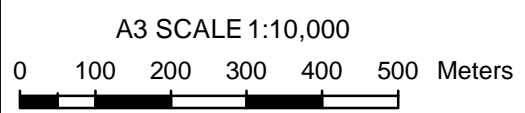
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POTENTIAL PONDING AREAS

Water Depth (m)

- 0.05 - 0.1m
- 0.1 - 0.3m
- > 0.3m

Notes: Aerial photograph supplied by Waikato District Council
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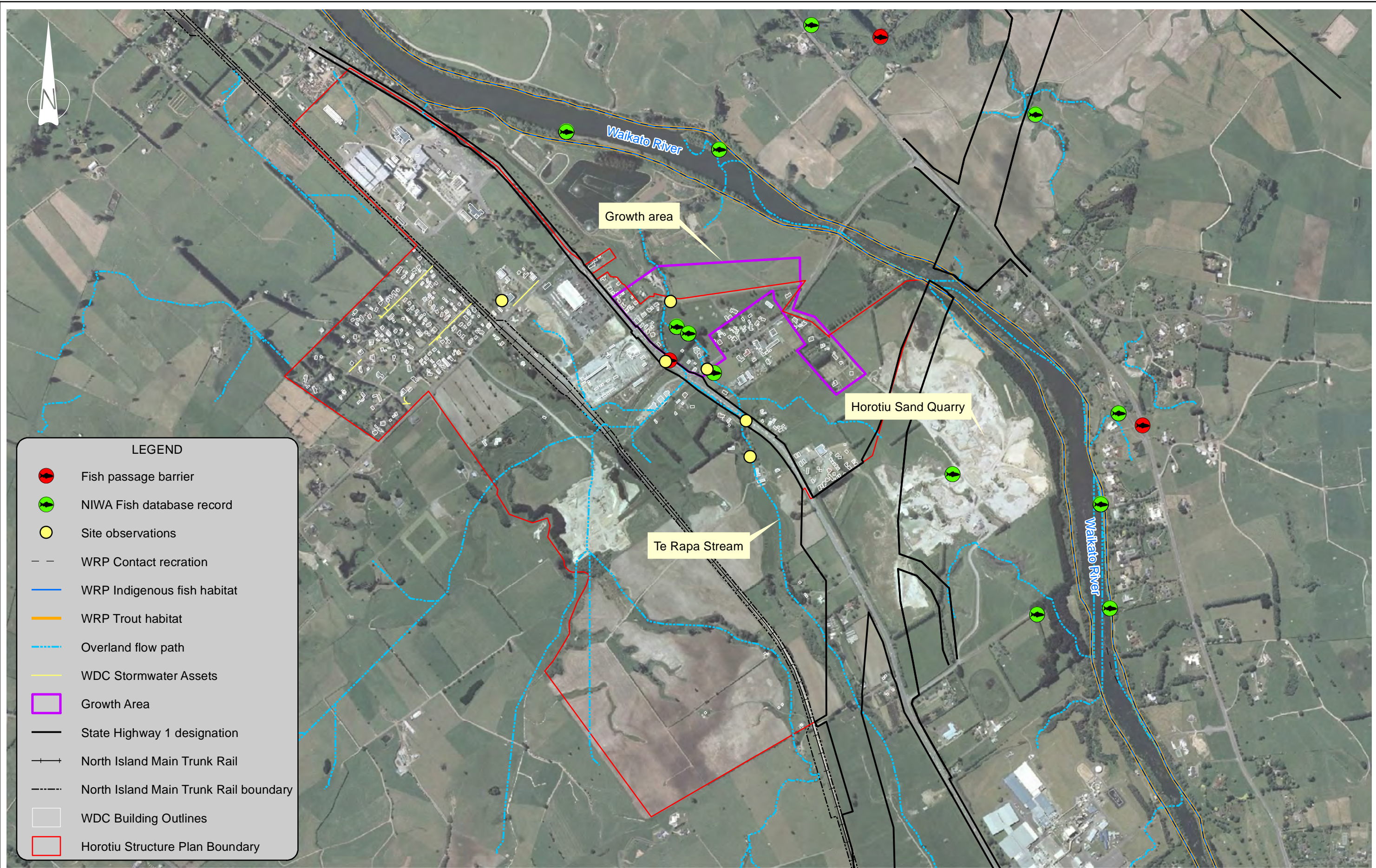


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






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**WAIKATO DISTRICT COUNCIL
CATCHMENT MANAGEMENT PLAN
HOROTIU STRUCTURE PLAN AREA
Flooding Map - Sheet 2 of 2**

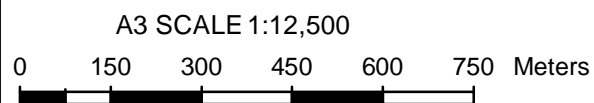
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-  Fish passage barrier
-  NIWA Fish database record
-  Site observations
-  WRP Contact recreation
-  WRP Indigenous fish habitat
-  WRP Trout habitat
-  Overland flow path
-  WDC Stormwater Assets
-  Growth Area
-  State Highway 1 designation
-  North Island Main Trunk Rail
-  North Island Main Trunk Rail boundary
-  WDC Building Outlines
-  Horotiu Structure Plan Boundary

Notes: Aerial photograph Copyright 2002-2005 Terralink International Limited




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**WAIKATO DISTRICT COUNCIL
CATCHMENT MANAGEMENT PLAN
HOROTIU STRUCTURE PLAN AREA
Ecological Map**

FIGURE No. Figure 252 Rev. 0