980 TE RAPA ROAD
PAK’nSAVE

Engineering Report

For Foodstuffs North Island Limited

Date of Issue: 19 July 2018
Revision: For Resource Consent
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1.0 INTRODUCTION

Babbage Consultants Limited (Babbage) have been engaged by Foodstuffs North Island Limited (Foodstuffs) to prepare an engineering report for the proposed redevelopment of 980 and 986 Te Rapa Road, Hamilton.

The proposed development consists of the construction of a new supermarket and associated carpark, fuel depot, loading bays, and landscaped areas.

This report provides information on the civil engineering aspects of the proposed development, including earthworks, erosion and sediment control, pavement works, stormwater drainage, stormwater treatment, flooding, sanitary sewer drainage, water supply, power and telecommunications.

We understand this report will be used to support a Land Use Resource Consent application to Council for the proposed redevelopment of the site.

We note the assessment and design associated with this report is preliminary in nature. The final construction details for the proposed development will be subject to detailed design, and engineering and building consent approvals.
2.0 THE SITE

The existing site is located at 980 Te Rapa Road, Hamilton. The site is currently owned by The Porter Group and has been utilised as their national base and head office for over 40 years. The Porter Group are currently in the process of applying for a resource consent to subdivide the property into 8 lots. Foodstuffs intend to purchase Lot 8, 2.033 Ha in area, for their proposed development.

For the purposes of this report, all references to the existing site and existing infrastructure assumes that The Porter Group have been granted their consent application and completed the works required under the consent conditions, and that Foodstuffs are in possession of the 2.033 Ha site. Our design considerations have also been undertaken on this basis.

The extent of the site and the existing boundaries and features are shown on the Existing Site plan (drawing C01) in Appendix B.

The proposed supermarket site is bound by Te Rapa road to the south, Eagle Way to the east and industrial developments to the north and west. The Porter Group’s subdivision application requires construction of a new public link road between Karewa Place and Maui Street, which will be located immediately to the north of the proposed supermarket site.

The site is relatively flat and generally falls from the Te Rapa Road (southern) boundary to the north western corner of Maui Street link road (yet to be constructed). The HCC GIS information indicates approximate site levels as follows:

- North-west corner= RL 32.0 m, North-east corner= RL 32.0 m, South-east corner= RL 33.0 m, South-west corner= RL 33.5 m
- There is an existing low point in the site of RL 31.5 m near the north-west corner of the site
The topographical information has been extracted from HCC’s GIS information and combined with information acquired from utility providers; and is shown on Existing Site Plan (drawing C01) in Appendix B.
3.0 PROPOSED DEVELOPMENT

The site is proposed to be developed as a supermarket, along with associated carpark, fuel depot, loading bays, and landscaped areas. The layout of the proposed development is shown on Wingate Architect Drawing A024 in Appendix A.

The proposed supermarket building is located near the north-east corner and the proposed carpark in the north-east and southern areas of the site. A goods delivery area for the supermarket is to be located between the proposed supermarket and Maui Street link road.

The GFA of the proposed building is approximately 6,358 m$^2$, including the delivery canopy on the northern side of the building. The total area of the proposed carparking and pavements (including footpaths, and service delivery area) is approximately 13,100 m$^2$. The remaining area of the site is approximately 850m$^2$ which is made up of the stormwater treatment devices (grassed swales) and landscaped areas.

There are three (3) proposed vehicle entrances/exits for the proposed carpark. One entrance on the southern boundary from Te Rapa Road, one on the eastern boundary from Eagle Way and one on the northern boundary from Maui Street link road. There are also two (2) vehicle entrances proposed for service/delivery vehicles located off Maui Street link road.

A finished floor level (FFL) of RL 33.0 m is proposed for the supermarket building in order to direct stormwater away from the storefront and meet Foodstuffs preferred carpark gradients. The elevated level (which is up to approximately 1.2 m above the existing ground level) would also reduce excavation of potentially contaminated fill materials during drainage and pavement construction.

Earthworks will be required to form the platform for the proposed building and the subgrades for the proposed the carpark and delivery access subgrades (see section 5 of this report).

Due to the relatively flat nature of the site no retaining walls are proposed at this stage.
Specific information on the civil components of the proposed development is provided in the subsequent sections of this report.
4.0 SITE CLEARANCE

4.1 GENERAL

The construction of the proposed development will require the demolition of the Porter Group office building and removal other features such as existing kerbs, fences, paving and landscape features. The existing buildings and features to be removed are shown on the Existing Site plan (drawing C01) in Appendix B.

The clearing is likely to include the uplifting of existing hardfill and stockpiling on site as well as crushing of existing concrete pavements and floor slabs and stockpiling on site. It is intended to reuse the stockpiled hardfill and crushed concrete to backfill excavations for demolished building foundations and drainage lines. Any excess of this material is likely to be placed in bulk fill for the building platform.

4.2 DISCONNECTION AND REMOVAL OF EXISTING SERVICES

There are a number existing private stormwater, sanitary sewer and water supply features (e.g. manholes, catchpits, pipelines and water meters) that would be disconnected and removed as part of the site clearance process.

All third party services currently servicing the properties within the site would be disconnected through the service providers prior to being demolished and removed off site.
5.0 EARTHWORKS

5.1 EROSION AND SEDIMENT CONTROL

There is the potential for soil erosion and sedimentation during the site clearance, fill importation and pavement construction works. Erosion and sediment control measures will be installed in accordance with Hamilton City Councils (HCC) Erosion and Sediment Control guidelines.

The measures to be utilised on the site are shown on drawings C02 and C03 in Appendix B and consist of stabilised construction entrance, sediment retention pond, silt fence, and diversion channels and bunds. Design calculations for these features are included in Appendix C.

5.2 EARTHWORKS DETAILS

The proposed earthworks for the site are shown on Babbage drawings C05 and C06 in Appendix B. The total earthworks area is approximately 2.03 hectares.

Babbage was commissioned to undertake shallow and deep geotechnical ground investigations on the site in July 2017. The ground investigation indicated the site to be generally underlain by non-engineered fill (comprising of asphalt, fine to coarse grained sand, gravel, and silt with organic inclusions) generally around 1.2 m in depth overlying natural alluvial sands and silts deposits with interbedded thin clayey layers.

Further testing is required during the detailed design phase to confirm the suitability for building over of this non-engineered fill layer. As the majority of the non-engineered fill consists of gravel and hard fill and currently utilised as pavement foundation for vehicle storage, it is likely to be an adequate subgrade for carparking/pavement areas. However, under the proposed building (refer Babbage geotechnical report) there is a potential liquefaction risk associated with the underlying material which may require undercut and replacement as controlled compacted fill.
In general, material is to be cut from the southern area of the site and placed as controlled fill in the northern area of the site. The maximum depth of cut will be the expected undercut underneath the proposed building foundation of 1.2 m. The maximum depth of fill is approximately 1.4 m (excluding replacement of 1.2 m undercut layer) in the same location.

The existing site is assumed to be 100% impervious apart from a small area of lawn (approx. 30 m²) around the existing office building. Prior to earthworks, the existing topsoil will be stripped from this grassed area and will be stockpiled on site for later respread in proposed landscaped areas. Existing hardfill and crushed concrete slabs will be stripped and stockpiled as discussed in section 4 of this report.

The estimated earthworks quantities are shown on Babbage drawing C05 in Appendix B and are also summarised below:

**Topsoil**
- Topsoil strip to stockpile to respread 5 m³
- Imported topsoil from offsite for landscaped/swale areas 50 m³

**Existing Hardfill and Crushed Concrete**
- Hardfill / crushed concrete to demolition backfill 60 m³

**Earthworks**
- Cut to fill (undercutting non-engineered fill layer under building foundation) 6,900 m³
- Bulk Cut to fill (carpark areas) 1,700 m³
- Imported Hardfill for pavements 5,000 m³

**Subgrade Undercuts**
- Subgrade undercuts to off site (provisional) 550 m³

The above quantities are solid measure.

In summary, the total volume of earthworks is approximately 13,600 m³; including topsoil stripping, undercutting of non-engineered fill layer and replacing as certified fill and importing/placing of hardfill for pavement areas. Approximately 550 m³ of
unsuitable subgrade undercut (beneath existing non-engineered fill layer) is provisioned to be encountered and disposed of offsite.

5.3 STABILISATION

The completed earthworks will be progressively stabilised as the earthworks are completed. Stabilisation within the building platform and pavement areas is to be done by placement of the pavement hardfill. Stabilisation within landscaping areas will be by placement of topsoil and grassing or planting.

5.4 EARTHWORKS TIMEFRAMES

Earthworks are intended to be undertaken in the standard summer earthworks season, i.e. October to April.

The estimated total duration for implementation of sediment controls, stripping of existing materials, construction of bulk earthworks and stabilisation is approximately 3 months.
6.0 ON-SITE PAVEMENTS

6.1 LAYOUT

The layout for the proposed pavements for the proposed development are shown on drawing A024 in Appendix A.

The layout is based on the architectural site layout plan prepared by Wingate Architects and traffic engineering input from Traffic Planning Consultants.

6.2 FINISHED LEVELS AND GRADIENTS

The proposed surface gradients within the southern and eastern carpark are typically between 0.75 % and 1.4 % (1 v to 133 h and 1 v to 72 h). The proposed surface gradients within the northern carpark and service vehicle delivery/loading area are typically between 1.5 % and 1.8 % (1 v to 65 h and 1 v to 55 h). The gradients in this loading area comply with Foodstuffs’ preferred maximum gradient of 5.0 % (1 v to 20 h) and are below the building code requirement for common ramps i.e. 12.5%.

6.3 STRUCTURAL DESIGN

The preliminary structural design of the pavements has been based on a subgrade CBR of 3% as advised in Babbage Geotechnical Report, July 2017. The design profiles for the various pavements and footpath are shown on drawing C08 in Appendix B. The total pavement thicknesses are also summarised below:

- Carpark asphalt pavement 425 mm
- Delivery area concrete pavement 325 mm
- Concrete footpath 175 mm

We recommend an allowance of 550 m³ for undercut of soft areas in the proposed subgrade, which is equivalent to an undercut of 200 mm over 20% of the proposed pavement area.
7.0 FLOOD HAZARDS

7.1 CATCHMENT OVERVIEW

The site is located within the wider St Andrews Catchment, a completely urban catchment within the Hamilton City boundaries. The catchment generally drains in an easterly direction initially through the industrial land within and surrounding the site before entering the residential land within the suburb of Pukete. Catchment stormwater discharges to the Waikato River via a large existing outfall structure near the intersection of Pukete Road and Moreland Avenue.

7.2 OVERLAND FLOW PATHS

The Hamilton City Council (HCC) GIS information (refer Figure 1 below) indicates there is one minor overland flow path that commences in the northern area of the site and exits in the north western corner.

A localised depression exists within the site in the location of the proposed supermarket building and levels will be regraded to ensure stormwater runoff is directed towards adjacent road carriageways.

Eagle Way and Karewa Place act as existing overland flow paths directing flows to a low point at the corner intersection of the two roads. Overland flows travelling north from Eagle Way, and west from Karewa Place, spill over the carriageway at this low point and are then directed north towards Ashurst Park and ultimately discharge in to the Waikato River.
HCC GIS information indicates the site is not affected by any other flooding hazards.

7.3 INTEGRATED CATCHMENT MANAGEMENT PLAN (ICMP)

A final comprehensive sub-catchment integrated catchment management plan (ICMP) was prepared by Wainui Environmental in May 2018 to support Porter Group’s subdivision consent application. This ICMP provides guidance on how to manage the stormwater diversion and discharge effects associated with the proposed development of the sites within the subdivision. The proposed stormwater management approach is detailed in subsequent sections below.
8.0 STORMWATER DRAINAGE

8.1 EXISTING PRIMARY (PIPED) STORMWATER DRAINAGE

There are existing 1200 mm and 2300 mm diameter SW pipelines running through the site discharging to a manhole in the north-western corner of the site (MH ID: SWL 13029). A 2300 mm pipe discharges from this manhole to the north-east, through Ashurst Park and ultimately discharges into the Waikato River.

The ICMP states the existing stormwater pipes are all approximately 6-6.5 m deep from existing ground levels. There are a number of catch-pits located within the site which discharge to the existing reticulation. Figure below shows the existing stormwater reticulation within and adjacent to the site.

Figure 2 Existing Stormwater Network (HCC GIS)
8.2 PROPOSED STORMWATER MANAGEMENT STRATEGY

8.2.1 OVERALL STRATEGY

As noted in the ICMP and as per HCC District Plan, the overall development shall be advanced based on water sensitive design principles and integration of stormwater management into all design stages of the proposed developments.

Water sensitive urban design practices, such as minimising hard stand areas, clustering development, providing at-source treatment measures, and using a treatment train approach, are all applicable. When selecting stormwater management solutions the following HCC hierarchy has been adopted with regards to stormwater management and disposal.

a) Retention of rainwater/stormwater for reuse;
b) Soakage techniques;
c) Treatment and detention and gradual release to a watercourse;
d) Treatment and detention and gradual release to a piped stormwater system.

8.2.2 STORMWATER QUANTITY MANAGEMENT

The existing site is considered to be 100% impervious, with runoff currently discharged to HCC pipe infrastructure and ultimately discharging into the Waikato River. The ICMP states that Retention, Volume Control and Extended Detention (to prevent stream channel erosion) is not considered to be required for the site as flows will remain the same as pre-development levels and are conveyed to the Waikato River within pipe reticulation (i.e. with no conveyance in natural channels).

The ground investigations for the Babbage geotechnical report indicated the site to be generally underlain by fill to generally around 1.2m in depth overlying natural alluvial sands and silts deposits with interbedded thin clayey layers. These materials are typically slow draining and are unlikely to meet the minimum HCC soakage rates/retention rates. As a result, ground soakage has not been considered in the proposed stormwater management strategy.
8.2.3 STORMWATER QUALITY MANAGEMENT

As runoff from the site ultimately discharges directly to the Waikato River, a high level of water quality treatment is required.

In general accordance with the HCC Infrastructure Technical Specifications (Table 4-1), the following stormwater quality design parameters are recommended for all discharges:

- Total suspended solids (TSS) (75% removal of post development loads taken as being at the discharge point from site);
- Total Metals (copper, zinc) to achieve maximum practical removal possible; Temperature (<25°C);
- Nutrients (total nitrogen, total phosphorus and ammoniacal nitrogen) to achieve maximum practical removal rates;
- Hydrocarbons to achieve maximum practical removal rates;
- Removal of gross pollutants (litter and commercial waste). Infrastructure Technical Specifications

As per HCC ITS and after discussions with HCC’s Stormwater team (Refer Appendix F for correspondence) stormwater treatment via green infrastructure is the preferred treatment option and recommends stormwater treatment devices are to be designed in accordance with the Auckland Council’s TP 10.

Inert/low contaminant generating cladding and materials will be used to construct the building and hence a separate pipe system is proposed to direct roof runoff directly into the existing stormwater pipe network.

The development proposes to install two grassed treatment swales along the northern and eastern boundaries of the site to provide water quality treatment for new pavement areas as shown on drawing C04 in Appendix B.

The design calculations are attached in Appendix D.
8.3 PROPOSED PRIMARY (PIPED) STORMWATER DRAINAGE

The primary network for the industrial development shall be sized to provide a 5 year ARI level of service in accordance with Table 4-5 of the HCC ITS.

Primary stormwater from the roofs of the proposed building and delivery canopy will be collected and discharged via a separate system to the existing 2300 mm public pipeline. Primary stormwater from the proposed carpark and delivery area pavements will be discharged to the same public drainage system via two grassed treatment swales located along the northern and eastern boundaries of the development.

The primary stormwater drainage layout for the proposed development is shown on drawing C401 in Appendix B.

As mentioned above, the existing site is considered to be 100% impervious and hence post-development flows will match the pre development scenario (or slightly lower due to runoff being diverted down grass swales). As such, the capacity of the existing network will not be adversely affected by the proposed development.

It is proposed to leave the existing large diameter 1200 mm and 2300 mm stormwater mains in their current positions and build over the pipelines. Appropriate building foundation design will be required and will be undertaken in accordance with Section 5.2.10 of the ITS and NZ Building Code requirements.

8.4 SECONDARY (OVERLAND) STORMWATER DRAINAGE

As discussed above, there are no upstream overland flow paths affecting the site. The HCC GIS information indicates there is one minor overland flow path that commences in the northern area of the site and exits in the north western corner.

Levels will be regraded within the site to ensure overland flow is directed away from proposed buildings and ensure the risk of downstream flooding risk remains unchanged post development. The secondary (overland) flow from the roof of the proposed building will discharge to the carpark areas, and from those areas will
discharge to via the proposed vehicle entrances to the new Maui Road link road and Eagle Way carriageways. The overland flow from the proposed paved areas will also discharge via the proposed vehicle entrances to the new Maui Road link road and Eagle Way carriageways.
9.0 WASTEWATER DRAINAGE

9.1 EXISTING WASTEWATER DRAINAGE

Existing 225 mm trunk mains will be located adjacent to the site within Eagle Way and Maui Street Road corridors as indicated in Porter Group’s subdivision development plans (Refer Figure 3 below).

Figure 3: Existing Wastewater Network
9.2 PROPOSED WASTEWATER DRAINAGE

It is proposed to connect the new supermarket building to the proposed 225 mm public pipeline in the proposed link road as shown on drawing C04 in Appendix B.

The peak wet weather wastewater flow from the two existing commercial office buildings currently onsite is estimated to be 1.0 l/s.

The peak wet weather flow provided by the proposed supermarket building has been determined based on experience (with other Pak’nSave Stores of a similar size currently in operation) and is estimated to equate to 2.0 l/s.

The post development wastewater flows will generally match the predevelopment discharge rates (replacing 2 x commercial office building with a commercial supermarket building), i.e. an increase of approximately 1.0 l/s and hence it is envisioned that the proposed development will have negligible impact on the existing networks capacity.

9.3 TRADE WASTE

The supermarket will discharge its trade waste to Hamilton City’s sewerage system. This discharge will be subject to a trade-waste agreement with Hamilton City Council, which is currently under negotiation.
10.0 WATER SUPPLY

10.1 EXISTING PUBLIC WATER SUPPLY RETICULATION

Existing 225 mm bulk mains will be located adjacent to the development site within Maui Street and Te Rapa road corridors as indicated in Porter Group’s subdivision development plans (Refer Figure 4 Below).

Figure 4: Existing Water Supply Network
10.2 PROPOSED WATER SUPPLY

The proposed supermarket will have sprinkler fire protection. Based on Pak’nSave Stores of a similar size currently in operation, it expected that the proposed sprinkler system will likely to require approximately 5,000 litres/minute at a pressure of at least 200 kPa.

The peak potable water supply demand for the proposed supermarket development has also been based on information gathered from Pak’nSave Stores of a similar size, and is likely to be equate to an average daily consumption of 10 m3 with a total probable maximum demand design flow rate of 2 litres/second.

There are existing 250 mm water mains in adjacent Maui Street and Te Rapa Road corridors and these are likely to have sufficient flow capacity for the proposed supermarket development.

Pressure and flow testing is currently being arranged to confirm capacity of the existing network for servicing potable water and fire supply to the proposed development.

The proposed water reticulation on the supermarket and retail site, including the water meter and backflow prevention devices are shown on drawing C07 in Appendix B.
11.0 ELECTRICAL SUPPLY

Information obtained from BeforeUdig show there are existing 400 V and 11 kV power cables, and streetlight cables, extending from Te Rapa Road to a transformer at the proposed northern boundary of the site as shown on attached WEL service plan (Appendix G). These cables are expected to have sufficient capacity for the proposed development but will need partial relocation as well as the transformer as they conflict with the location of the proposed store.

12.0 TELECOMMUNICATIONS

Information obtained from Ultrafast Fibre Limited show there are ultrafast fibre optic cables in the northern berm of Te Rapa Road and both berms of Eagle Way (Appendix G). These cables are expected to have sufficient capacity for the proposed development.

Information from Vodafone show there are also fibre optic cables in the northern berm of Te Rapa Road (Appendix G). These cables are expected to have sufficient capacity for the proposed development.

The Chorus plans are unclear but it is likely there are standard telecommunication cables in Te Rapa Road that would provide a connection for the proposed development.
13.0 WATER IMPACT ASSESSMENT

As per HCC’s District Plan a Water Impact Assessment is required for the development. A Type 2 water impact assessment has been provided in Appendix E to address the criteria stipulated in Table 1.2.2.5b (HCC District Plan).
14.0 SUMMARY

13.1 The existing site is part of a wider site that is currently owned by The Porter Group and is in the process of being subdivided to form smaller lots for future development.

13.2 The site is proposed to be developed as a supermarket, along with associated parking, fuel depot, loading bays, and landscaping areas.

13.3 Demolition and removal of the existing building and ancillary features is to be undertaken prior to construction of the new development. Existing utility services are to be disconnected and existing private drainage removed.

13.4 Bulk earthworks are required to form pavement subgrades for the proposed development. Undercutting and replacement of the existing material located under the proposed building foundation is likely required and will need to be investigated during the detail design phase of the development. The earthworks will generally involve on-site cut to fill of approximately 8,600 m$^3$, importation of approximately 5,000 m$^3$ of fill material and removal and disposal off-site of approximately 550 m$^3$ of unsuitable undercut material. Existing hardfill and crushed existing slabs will be primarily utilised for backfilling of demolition excavations.

13.5 Sediment generated during earthworks will be mitigated by sediment control measures in accordance with Hamilton City Councils (HCC) Erosion and Sediment Control guidelines and undertaking the earthworks within the standard summer earthworks season.

13.6 The structural design of on-site pavements is based on subgrade strength recommended in the Babbage geotechnical report and has been undertaken in accordance with industry standard practice. Pavement surface gradients are below Foodstuffs’ preferred maximum and comply with Building code requirements (clause D1) for Access Routes.

13.7 The HCC GIS information indicates there is a minor 100 year overland flow path and flood plain affecting a small localised area in the northern portion of the existing site. In our opinion, the proposed development is not affected by the overland flow path.
and flood plain, and the overland flow will be safely conveyed within the property towards surrounding roads.

13.8 The existing site is considered to be 100% impervious in its pre-development state, and hence stormwater quantity control is not required the sub-catchment ICMP.

13.9 Primary (piped) stormwater flows from the site have been designed in accordance with the Council’s standards and will be collected and discharged to proposed public reticulation currently located within the site.

13.10 Secondary (overland) stormwater flows from the proposed development will be discharged to surrounding roads in accordance with HCC’s ITS.

13.11 Stormwater treatment for runoff from new paved areas is to consist of two grassed swales designed in accordance with Auckland Council’s TP 10.

13.12 The wastewater from the proposed development is to be collected and discharged to proposed public reticulation located adjacent the site. We expect this reticulation will have sufficient capacity for the proposed development.

13.13 Public water supply reticulation is being developed as part of the adjacent site. We expect this reticulation will have sufficient capacity for the proposed development.

13.14 There are existing power and telecommunication services adjacent to the site that are expected to have sufficient capacity for the proposed development.

13.15 We consider the effects associated with the site development, including earthworks, stormwater, flooding, and infrastructure are less than minor and/or mitigated to an acceptable degree.
APPENDIX A

Architectural Site Plan
**PROPOSED SITE**

- Site Boundary: 20,013m²

**PARKING SCHEDULE - OPTION 2**

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</table>

**PLANNING REQUIREMENTS**

- Permeable Surfaces:
  - Required: 19% (2,091m²)
  - Provided: 6.7% (1,353m²)

- Planting:
  - Specimen trees required: 57
  - Specimen trees provided: 31
APPENDIX B

Babbage Civil Engineering Drawings
CLEANWATER RUNOFF DIVERSION BUND CROSS SECTION

RUNOFF DIVERSION CHANNEL CROSS SECTION

PERSPECTIVE VIEW
SILT FENCE DETAIL

FOR RESOURCE CONSENT

CROSS SECTION
LEVEL SPREADER

NOTES

1. ALL EROSION AND SEDIMENT CONTROL MEASURES MUST BE OPERATIONAL PRIOR TO ANY OTHER WORK COMMENCING ON SITE. THE CONTRACTOR SHALL ARRANGE AND ATTEND A PRELIMINARY SEDIMENT CONTROL MEETING WITH THE CONTROLLER AS REQUIRED BY THE RELEVANT RESOURCE CONSENT.

2. A COPY OF THE EROSION AND SEDIMENT CONTROL PLAN SHALL BE AVAILABLE ON SITE DURING WORK HOURS. ALL PERSONNEL INVOLVED IN THE EARTHWORKS ACTIVITIES ON SITE (INCLUDING SUBCONTRACTORS) SHALL BE FAMILIAR WITH THE CONSENT AND PLAN REQUIREMENTS AS THEY RELATE TO EROSION AND SEDIMENT CONTROL.

3. ALL CLEAN WATER RUNOFF FROM THE STABILIZED SURFACES INCLUDING CATCHMENT AREAS ABOVE THE SITE, SHALL BE DIVERTED AWAY FROM THE ERATIKONE EARTHWORKS AREAS.

4. ALL EROSION AND SEDIMENT CONTROL SHALL COMPLY WITH RELEVANT HAMILTON CITY COUNCIL GUIDELINES.

5. DIVERSION OF "CLEAN WATER" FROM THE UPSTREAM CATCHMENTS AROUND THE EARTHWORKS AREA SHALL BE BY MEANS OF DIVERSION DRAINS OR OTHER APPROVED METHODS.

6. FURTHER EROSION CONTROL WORKS MAY BE REQUIRED BY THE CONTROLLER IF THE PROJECT MODIFICATIONS ARE MADE AS AND WHEN REQUIRED BY THE ENGINEER, THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ENSURING THAT THE SITE IS EROSION AND SEDIMENT CONTROL MEASURES OPERATING AT ALL TIMES.

TEAM DRAFTING NO. 1/5 R0110797 60729 C03

TE RAPA ROAD, HAMILTON

FOODSTUFFS NORTH ISLAND LIMITED

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DATE: 23rd July 2018
FOR RESOURCE CONSENT

PROPOSED DRAINAGE PLAN

TE RAPA ROAD, HAMILTON

NOTES:
1. ALL DESIGN CONSIDERATIONS HAVE BEEN BASED ON THE PORTER GREEN ENGINEERS AND ADELAIDE CONSULTANT APWORKING IN THE FIELD.
2. THE EXISTING INFRASTRUCTURE LOT BOUNDARIES, UTILITIES AND SERVICES DERIVED FROM SLC, CONSTRUCTION OF NEW WASTE LINE, ROAD, ETC. DRAWN ON THESE DRAWINGS ARE ONLY EXTRACTS FROM WHAT EXISTED, AND THE PORTER GREEN AND ASSUMES NO RESPONSIBILITY OR RESPONSIBILITY FOR ANY INFORMATION PATTERNS OR ALIGNMENTS SHOWN.
3. COORDINATE DATA NEW ZEALAND EODETIC DATUM 2000, NTS 83 PROJECT.
4. EXISTING STORMWATER AND WASTEWATER MANHOLE AND INFILTRATION LINES SHOWN WERE PLANTED FROM ON-SITE COORDINATION, ISSUES AND ALIGNMENTS SHOULD BE INDICATED AS IMMEDIATELY.
5. ALL EXISTING SERVICES ARE TO BE LOCATED AND PROTECTED BY THE CONTRACTOR PRIOR TO ANY WORK COMMENCING ON SITE.
6. ALL PRIVATE STORMWATER AND WASTEWATER DRAINAGE WORKS SHALL FOLLOW THE PROVISIONS, SPECIFICATIONS, AND MOUNT BUILDING CODE.
7. ALL PROPOSED MANHOLE COVERS LOCATED WITHIN THE EAVEMENT AREAS ARE TO BE HEAVY DUTY.
8. REFER TO DRAWING C04 FOR LOCATION OF UNDERGROUND SERVICES.

Babbage Consultants Limited
63 Waipa Road, Hamiton 3204
Auckland 1142, New Zealand
E: info@babbage.co.nz  www.babbage.co.nz

CLIENT: PROJECT
FOODSTUFFS NORTH ISLAND LIMITED

DRAWING TITLE
PROPOSED DRAINAGE PLAN

DRAWING NUMBER
C04

DRAWING SCALE
1:500 @ A1
1:1000 @ A3

DRAWING NUMBER
60729 C04
FOR RESOURCE
CONSENT

EARTHWORKS AREAS AND VOLUMES

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUT VOLUME (SOLID MEASURE)</td>
<td>1200m³</td>
</tr>
<tr>
<td>FILL VOLUME (SOLID MEASURE)</td>
<td>700m³</td>
</tr>
</tbody>
</table>

KEY

- = EARTHWORKS SITE BOUNDARY
- = FILL CONTOURS AT 2.5m INTERVALS
- = CUT CONTOURS AT 2.5m INTERVALS
- = ZERO CUT/FILL LINE
- = CUT REGIONS

NOTES

1. ALL DESIGN CONSIDERATIONS HAVE BEEN BASED OFF THE PORTER GROUPS SUBMISSION AND LAND USE CONSENT APPLICATION BEING GRANTED.
2. COORDINATES DATUM NEW ZEALAND GEODETIC DATUM 2000, AT EMISSION CIRCUIT.
3. CONTOURS ARE SHOWN AT 2.5M INTERVALS.
4. CUT AND FILL CONTURS ARE BETWEEN THE EXISTING SURFACE AND PROPOSED DESIGN SURFACE.
5. FILL SUBSURFACES TO BE INSPECTED BY GEOTECHNICAL ENGINEER PRIOR TO START OF FILL PLACEMENT.
6. ALL CUT MATERIAL TO BE INSPECTED AND TESTED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT AS FILL TO ENSURE COMPLIANCE WITH SPECIFICATION.
7. CUTTED OUT SUBSURFACES TO BE INSPECTED BY GEOTECHNICAL ENGINEER TO CONFIRM ANY ADDITIONAL CUTTING REQUIREMENTS.
8. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE INSTALLED AND APPROVED BY THE ENGINEER PRIOR TO ANY WORKS COMMENCING.

TE RAPA ROAD,
HAMILTON

DRAWING TITLE
CUT AND FILL
ISOPACH PLAN

DRAWN
60729 C05
STORE DELIVERY CONCRETE PAVEMENT CONTROL JOINT DETAIL

CONCRETE PAVEMENT NOTES

CONCRETE PAVEMENT DETAILS:
1. CRUSHED AGGREGATE TO BE MAX. 16mm.
2. SUMP FOR CONCRETE TO BE 60mm MAXIMUM.
3. ANY CONCRETE ADDITIVES TO BE APPROVED BY ENGINEER.

CONCRETE PAVEMENT JOINT DETAILS:
1. JOINT LAYOUT TO BE AGREED ON SITE WITH ENGINEER.
2. CONSTRUCTION JOINTS TO BE DOWELLED WITH 50mm LONG GALvanized 9.2 mm REINFORCING BARS AT MAX. 200mm SPACING. FIRST PLACED JOINT TO BE CIPPED WITH A 50MM PLASTIC LINING. CURING COMPOUND NOT MORE THAN 14 DAYS PRIOR TO PLACING ADJACENT CONCRETE.
3. TRENCHES TO BE 900MM WIDE AND 400mm DEEP.
4. CURING COMPOUND FOR THE CONCRETE TO BE MIN. 28 DAYS.
5. WIRE MAT TO BE PLACED AT MAX 200mm SPACING. TRENCHES TO BE 900MM WIDE AND 400mm DEEP.
6. CONCRETE TO BE COMPACTED USING BOTH INTERNAL VIBRATORS AND VIBRATING SCREEDS.
7. CURING COMPOUND FOR THE CONCRETE TO BE MIN. 28 DAYS.
8. WIRE MAT TO BE PLACED AT MAX 200mm SPACING. TRENCHES TO BE 900MM WIDE AND 400mm DEEP.

GENERAL NOTES:
1. ALL WORKS TO BE IN ACCORDANCE WITH HAKANSON TONDBERG STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED.
2. ALL PAVEMENT SUBBASES TO BE INSPECTED AND TESTED BY GEOTECHNICAL ENGINEER TO CONFIRM SUBBASE CSR VALUE OF 3%.
3. REFER TO STRUCTURAL DRAWINGS FOR OTHER CONCRETE PAVEMENT DETAILS.
4. CONCRETE TO BE DOWELLED AT MAX. 20mm DEEP AT MULTIPLE CENTRES BID.
5. FOR LINE STABILIZATION DRAINAGE TO BE 4% BID TO BE USED.

FOR RESOURCE CONSENT

Babbage Consultants Limited
Leahy’s Block, Alexandra 9130
38 New Regent Street, Christchurch 8011, New Zealand
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CLIENT - PROJECT
FOODSTUFFS NORTH ISLAND LIMITED
TE RAPA ROAD, HAMILTON

PROPOSED PAVEMENT DETAILS

DATE INITIAL
DETAILED BY: 26/06/2018 BV
DRAWN: 30/06/2018 JA
DESIGNED BY: 18/07/2018 FT
CHECKED DRAWING: 18/07/2018 NA
APPROVED: 18/07/2018 MM
NOT TO SCALE

JOB NO.: 60729 DRAWING NO.: C08 REVISION
APPENDIX C

Erosion and Sediment Control Calculations
### Universal Soil Loss Equation

<table>
<thead>
<tr>
<th>Sub-Catchment</th>
<th>USLE Parameters</th>
<th>Area (ha)</th>
<th>Time (years)</th>
<th>Estimated Sediment Generated (tonnes)</th>
<th>Sediment Delivery Ratio</th>
<th>Sediment Control Efficiency (%)</th>
<th>Estimated Sediment Yield (Tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire Site</td>
<td>R 89, K 0.54, LS 0.19, C 1.00, P 0.90</td>
<td>2.03</td>
<td>0.33</td>
<td>5.53</td>
<td>0.30</td>
<td>75%</td>
<td>0.41</td>
</tr>
</tbody>
</table>

### Sub-Catchment Description

- **Exposed Catchment Area (ha):** 2.03
- **Average Catchment Slope (%):** 1.50
- **Rainfall Erosion index:** Henderson (85) 89
- **Soil Erodibility Factor:** K Bare Soil - 40% Clay, 40% Silt, 20% Sand 0.54
- **Slope Length and Steepness Factor:** LS Contour Drains Maximum Slope Length 50 0.19
- **Ground Cover Factor:** C Bare Soil - rough irregular surface 1.00
- **Roughness Factor:** P Bare Soil - rough irregular surface 0.90
- **Sediment Delivery Ratio:** 0.30
- **Sediment Control Measure Efficiency:** 76%
- **Duration of Exposure:** 4.00 months

### Catchment details

<table>
<thead>
<tr>
<th>Sub-Catchment</th>
<th>USLE Parameters</th>
<th>Area (ha)</th>
<th>Time (years)</th>
<th>Estimated Sediment Generated (Tonnes)</th>
<th>Sediment Delivery Ratio</th>
<th>Sediment Control Efficiency (%)</th>
<th>Estimated Sediment Yield (Tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire Site</td>
<td>R 89, K 0.54, LS 0.19, C 1.00, P 0.90</td>
<td>2.03</td>
<td>0.33</td>
<td>5.53</td>
<td>0.30</td>
<td>75%</td>
<td>0.41</td>
</tr>
</tbody>
</table>
## CATCHMENT AREA:
- **2.03** ha
## WORKING AREA:
- **2.03** ha
## AVERAGE SITE SLOPE:
- **1.00%**
## SITE LENGTH:
- **180** m

### MINIMUM TREATMENT VOLUME

<table>
<thead>
<tr>
<th>Component</th>
<th>Minimum Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. pond size</td>
<td>2% of contributing catchment area</td>
<td></td>
</tr>
<tr>
<td>Min. total volume</td>
<td>406 m³</td>
<td></td>
</tr>
<tr>
<td>Min. forebay volume</td>
<td>60.9 m³</td>
<td>15% of total volume</td>
</tr>
<tr>
<td>Min. main pond volume</td>
<td>406.0 m³</td>
<td></td>
</tr>
<tr>
<td>Min. dead storage</td>
<td>122 m³</td>
<td>30% of total volume</td>
</tr>
<tr>
<td>Min. live storage</td>
<td>284 m³</td>
<td>70% of total volume</td>
</tr>
</tbody>
</table>

### DESIGN TREATMENT VOLUME

**Main Pond**
- Pond Length = 28.5 m
- Pond Width = 9.5 m (1 in 3)
- Pond Depth = 2 m (Not to exceed 1.2 unless max. 1m deep)
- Side Slopes = 1vt : 1hz
- Pond Volume = 406 m³
- Dead Storage Volume (30% Main Pond) = 122 m³
- Live Storage Volume (70% Main Pond) = 284 m³

**Forebay**
- Forebay Width = 9.5 m
- Forebay Length = 7.9 m
- Forebay Depth = 1.5 m (Not to exceed 2m (Typical 1m))
- Side Slopes = 1vt : 2hz
- Forebay Volume = 61 m³

**Total Design Volume**
- Forebay and Main Pond (live + dead storage) = 467 m³
- Forebay and Main Pond (live + dead storage) = 183 m³

### SEDIMENT POND EMERGENCY SPILLWAY SIZING

**Spillway**
- Rational Formula Runoff Equation: $Q = 2.78CIA$
- Runoff Coefficient, $C = 0.7$
- Remaining Area: $I = 169.9$ mm/hr
- $1\%$ AEP Flow: $Q = 0.67$ m³/s
- Spillway Height: $R = 0.14$ m
- Trapezoidal Spillway: $Q = CH^{3/2}$
- Mannings $n = 0.07$
- Spillway width, $L = 6$ m
- Freeboard = 0.30 m
- Broad crested weir: $C = 2$
- Spillway Height (incl. freeboard) = 0.45 m

**Channel**
- Peak Flow ($Q_{100}$): 671 l/s
- Flow Depth: 0.15 m
- Area: 0.92 m²
- Perimeter: 6.65 m
- Normal Capacity: 1.112 l/s

**DECANTING OUTLET SIZING**
- Max Flow Rate = 3 litres/sec/ha
- Max Flow Rate for Each Decant = 6.09 litres/sec
- Number of Decant required = 3
APPENDIX D

Stormwater Treatment Calculations
### TP108 peak flow calculations for swales assuming a small catchment

<table>
<thead>
<tr>
<th>Land use</th>
<th>Group A Soil (volcanic granular loam)</th>
<th>Group B Soil (alluvial)</th>
<th>Group C Soil (mudstone/sandystone)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bush, humid climate, not-grazed</td>
<td>30</td>
<td>55</td>
<td>70</td>
</tr>
<tr>
<td>Pasture, lightly grazed, good grass cover</td>
<td>39</td>
<td>61</td>
<td>74</td>
</tr>
<tr>
<td>Urban lawns</td>
<td>39</td>
<td>61</td>
<td>74</td>
</tr>
<tr>
<td>Crops, straight rows, minimal vegetative cover</td>
<td>72</td>
<td>81</td>
<td>88</td>
</tr>
<tr>
<td>Sealed roads, roofs</td>
<td>98</td>
<td>98</td>
<td>98</td>
</tr>
</tbody>
</table>

**Data Entry Cells | Result cells | Drop Down Menu**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impervious area</td>
<td>1.3</td>
</tr>
<tr>
<td>Pervious area</td>
<td>0.14</td>
</tr>
<tr>
<td>Total area</td>
<td>1.44</td>
</tr>
<tr>
<td>Impervious SCS curve number</td>
<td>98</td>
</tr>
<tr>
<td>Hydrological soil group</td>
<td>Group B</td>
</tr>
<tr>
<td>Pervious SCS curve number</td>
<td>61</td>
</tr>
<tr>
<td>2 yr 24-hour rainfall depth</td>
<td>mm</td>
</tr>
<tr>
<td>Reticulation design rainfall depth</td>
<td>mm</td>
</tr>
<tr>
<td>Water Quality Storm (WQS) rainfall depth (2yr/3)</td>
<td>mm</td>
</tr>
<tr>
<td>WQS peak rainfall rate from TP108 (10-minute duration)</td>
<td>mm/hr</td>
</tr>
<tr>
<td>Reticulation design rainfall rate (e.g. 5yr, 10yr)</td>
<td>mm/hr</td>
</tr>
<tr>
<td><strong>Impervious surfaces</strong></td>
<td></td>
</tr>
<tr>
<td>Storage S</td>
<td>5.2</td>
</tr>
<tr>
<td>Runoff/Rainfall at peak of rainfall</td>
<td>mm</td>
</tr>
<tr>
<td>Peak runoff rate (WQS)</td>
<td>m³/s</td>
</tr>
<tr>
<td>Peak runoff rate (Reticulation design storm)</td>
<td>m³/s</td>
</tr>
<tr>
<td><strong>Pervious surfaces</strong></td>
<td></td>
</tr>
<tr>
<td>Storage S</td>
<td>162.4</td>
</tr>
<tr>
<td>Runoff/Rainfall at peak of rainfall</td>
<td>mm</td>
</tr>
<tr>
<td>Peak runoff rate (WQS)</td>
<td>m³/s</td>
</tr>
<tr>
<td>Peak runoff rate (Reticulation design storm)</td>
<td>m³/s</td>
</tr>
<tr>
<td><strong>Combined flow for Water Quality Storm</strong></td>
<td></td>
</tr>
<tr>
<td>Peak runoff from surfaces</td>
<td>m³/s</td>
</tr>
<tr>
<td>Peak outflow from catchment (allowing for lag)</td>
<td>m³/s</td>
</tr>
<tr>
<td><strong>Combined flow for reticulation design storm</strong></td>
<td></td>
</tr>
<tr>
<td>Peak runoff from surfaces</td>
<td>m³/s</td>
</tr>
<tr>
<td>Peak outflow from catchment (allowing for lag)</td>
<td>m³/s</td>
</tr>
</tbody>
</table>
### TP10 Swale (150mm grass)

#### Data entry cells

<table>
<thead>
<tr>
<th>Water Quality Flow</th>
<th>Reticulation Design (e.g. 5yr,10yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate Q m³/s</td>
<td>Q m³/s</td>
</tr>
<tr>
<td>Channel slope S 0.4%</td>
<td></td>
</tr>
<tr>
<td>Depth d m</td>
<td>d m</td>
</tr>
<tr>
<td>Sideslope Z=1/?</td>
<td></td>
</tr>
<tr>
<td>Manning’s n for 150mm grass 0.073</td>
<td>n 0.047</td>
</tr>
<tr>
<td>Base width b=Qn/d^1.67.S^0.5-Zd</td>
<td></td>
</tr>
<tr>
<td>Is b&lt; 2 m ? (required for grassed swales)</td>
<td>OK</td>
</tr>
<tr>
<td>Width at water level T=b+2dZ</td>
<td>T m</td>
</tr>
<tr>
<td>Cross-sectional area A=bd+Zd^2</td>
<td>A m²</td>
</tr>
<tr>
<td>Velocity V=Q/A m/s</td>
<td>V m/s</td>
</tr>
<tr>
<td>Is velocity V &lt; 0.8m/s ?</td>
<td>V &lt; 1.5m/s ? OK</td>
</tr>
</tbody>
</table>

#### To meet TP10 stormwater treatment specification:

- Required Swale Length m 159.05
- Swale Length Provided m 160.00
- Travel time t (should be >9 mins) minutes 9.05

#### Swale Dimensions (m)

- Top width = 2.10
- Depth = 0.32
- Bottom width = 0.18
- e = 0.96

Adjust depth until "OK". This excludes freeboard allowance for settling, construction tolerances, etc.
APPENDIX E

WATER IMPACT ASSESSMENT
980 TE RAPA ROAD
PAK’nSAVE

WATER IMPACT ASSESSMENT

For Foodstuffs North Island Limited

Date of Issue: 19 July 2018
Revision: For Resource Consent Issue
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5.0 ASSESSMENT OF EFFECTS (3 WATERS) ..................................................................... 5
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APPENDICES

Appendix A:  Operations and Maintenance Plan for Onsite Stormwater Treatment Swales
1.0 INTRODUCTION

Babbage Consultants Limited (Babbage) have been engaged by Foodstuffs North Island Limited (Foodstuffs) to prepare a Water Impact Assessment to support a Land Use Resource Consent application for the proposed redevelopment of 980 and 986 Te Rapa Road, Hamilton.

The proposed development consists of the construction of a new supermarket and associated carpark, fuel depot, loading bays, and landscaped areas.

The assessment and design strategy associated with this assessment has been carried out in general accordance with Table 1.2.2.5b of Hamilton City Councils District Plan (OiP).

This assessment should also be read in conjunction with Babbage’s Infrastructure and Engineering Report and Wainui Environmental’s Sub-catchment Integrated Catchment Management Plan (ICMP submitted to council in May 2018 to support Porter Group’s subdivision consent application).
2.0 THE SITE

The existing site is located at 980 Te Rapa Road, Hamilton. The site is currently owned by The Porter Group and has been utilised as their national base and head office for over 40 years. The Porter Group are currently in the process of applying for a resource consent to subdivide the property into 8 lots. Foodstuffs intend to purchase Lot 8, 2.033 Ha in area, for their proposed development.

For the purposes of this report, all references to the existing site and existing infrastructure assumes that The Porter Group have been granted their consent application and completed the works required under the consent conditions, and that Foodstuffs are in possession of the 2.033 Ha site. Our design considerations have also been undertaken on this basis.

The extent of the site and the existing boundaries and features are shown on Engineering Drawings.

The proposed supermarket site is bound by Te Rapa road to the south, Eagle Way to the east and industrial developments to the north and west. The Porter Group’s subdivision application requires construction of a new public link road between Karewa Place and Maui Street, which will be located immediately to the north of the proposed supermarket site.

The site is relatively flat and generally falls from the Te Rapa Road (southern) boundary to the north western corner of Maui Street link road (yet to be constructed).
3.0 PROPOSED DEVELOPMENT

The site is proposed to be developed as a supermarket, along with associated carpark, fuel depot, loading bays, and landscaped areas. The layout of the proposed development is shown on Wingate Architect Drawing A024.

The proposed supermarket building is located near the north-east corner and the proposed carpark in the north-east and southern areas of the site. A goods delivery area for the supermarket is to be located between the proposed supermarket and Maui Street link road.

The GFA of the proposed building is approximately 6,358 m², including the delivery canopy on the northern side of the building. The total area of the proposed carparking and pavements (including footpaths, and service delivery area) is approximately 13,100 m². The remaining area of the site is approximately 850 m² which is made up of the stormwater treatment devices (grassed swales) and landscaped areas.

There are three (3) proposed vehicle entrances/exits for the proposed carpark. One entrance on the southern boundary from Te Rapa Road, one on the eastern boundary from Eagle Way and one on the northern boundary from Maui Street link road. There are also two (2) vehicle entrances proposed for service/delivery vehicles located off Maui Street link road.

A finished floor level (FFL) of RL 33.0 m is proposed for the supermarket building in order to direct stormwater away from the storefront and meet Foodstuffs’ preferred carpark gradients.

Earthworks will be required to form the platform for the proposed building and the subgrades for the proposed the carpark and delivery access subgrades.
4.0 INTEGRATED CATCHMENT MANAGEMENT PLAN (ICMP)

A final comprehensive sub-catchment integrated catchment management plan (ICMP) was prepared by Wainui Environmental in May 2018 to support Porter Group’s subdivision consent application.

For the purposes of this Water Impact Assessment, it has been assumed that HCC has accepted Wainui Environmental’s ICMP and the guidance and strategies within.

Our assessment, as detailed in subsequent sections of this report, has been made to align with the recommendations, measures and targets of Wainui Environmental’s ICMP in addition to the objectives and policies set out in Hamilton City Council’s District Plan (OiP).
5.0 ASSESSMENT OF EFFECTS (3 WATERS)

5.1 STORMWATER
5.1.1 EXISTING PRIMARY (PIPED) STORMWATER DRAINAGE

There are existing 1200 mm and 2300 mm diameter SW pipelines running through the site discharging to a manhole in the north-western corner of the site (MH ID:SWL 13029). A 2300 mm pipe discharges from this manhole to the north-east, through Ashurst Park and ultimately discharges into the Waikato River.

The ICMP states the existing stormwater pipes are all approximately 6-6.5 m deep from existing ground levels. There are a number of catch-pits located within the site which discharge to the existing reticulation. Figure below shows the existing stormwater reticulation within and adjacent to the site.

![Figure 1 Existing Stormwater Network (HCC GIS)](image)
5.1.2 STORMWATER QUANTITY MANAGEMENT STRATEGY

The existing site is considered to be 100% impervious, with runoff currently discharged to HCC pipe infrastructure and ultimately discharging into the Waikato River. The ICMP states that Retention, Volume Control and Extended Detention (to prevent stream channel erosion) is not considered to be required for the site as flows will remain the same as pre-development levels and are conveyed to the Waikato River within pipe reticulation (i.e. with no conveyance in natural channels).

The ground investigations for the Babbage geotechnical report indicated the site to be generally underlain by fill to generally around 1.2 m in depth overlying natural alluvial sands and silts deposits with interbedded thin clayey layers. These materials are typically slow draining and are unlikely to meet the minimum HCC soakage rates/retention rates. As a result, ground soakage has not been considered in the proposed stormwater management strategy.

5.1.3 STORMWATER QUALITY MANAGEMENT STRATEGY

As runoff from the site ultimately discharges directly to the Waikato River, a high level of water quality treatment is required.

In general accordance with the HCC Infrastructure Technical Specifications (Table 4-1), the following stormwater quality design parameters are recommended for all discharges:

- Total suspended solids (TSS) (75% removal of post development loads taken as being at the discharge point from site);
- Total Metals (copper, zinc) to achieve maximum practical removal possible; Temperature (<25°C);
- Nutrients (total nitrogen, total phosphorus and ammoniacal nitrogen) to achieve maximum practical removal rates;
- Hydrocarbons to achieve maximum practical removal rates;
- Removal of gross pollutants (litter and commercial waste). Infrastructure Technical Specifications

As per HCC ITS and after discussions with HCC’s Stormwater team, stormwater treatment via green infrastructure is the preferred treatment option and stormwater
treatment devices are to be designed in accordance with the Auckland Council's TP 10. It is the supermarket owner’s responsibility to provide maintenance for these treatment swales—A copy of the Proposed operations and maintenance plan is attached in Appendix A.

Inert/low contaminant generating cladding and materials will be used to construct the building and hence a separate pipe system is proposed to direct roof runoff directly into the existing stormwater pipe network.

The development proposes to install two grassed treatment swales along the northern and eastern boundaries of the site to provide water quality treatment for new pavement areas (Refer Engineering Drawings for details)

**5.1.4 PROPOSED PRIMARY (PIPED) STORMWATER DRAINAGE**

The primary network for the industrial development shall be sized to provide a 5 year ARI level of service in accordance with Table 4-5 of the HCC ITS.

Primary stormwater from the roofs of the proposed building and delivery canopy will be collected and discharged via a separate system to the existing 2300 mm public pipeline. Primary stormwater from the proposed carparks and delivery area pavements will be discharged to the same public drainage system via two grassed treatment swales located along the northern and eastern boundaries of the supermarket and retail site (Refer Engineering Drawings for details)

As mentioned above, the existing site is considered to be 100% impervious and hence post-development flows will match the pre development scenario (or slightly lower due to runoff being diverted down grass swales). As such, the capacity of the existing network will not be adversely affected by the proposed development.

It is proposed to leave the existing large diameter 1200 mm and 2300 mm stormwater mains in their current positions and build over the pipelines. Appropriate building foundation design will be required and will be undertaken in accordance with section 5.2.10 of HCC’s ITS and NZ Building Code requirements.

**5.1.5 SECONDARY (OVERLAND) STORMWATER DRAINAGE**
The HCC GIS information indicates there is one minor overland flow path that commences in the northern area of the site and exits in the north western corner.

Levels will be regraded within the site to ensure overland flow is directed away from proposed buildings and ensure the risk of downstream flooding risk remains unchanged post development. The secondary (overland) flow from the roof of the proposed building will discharge to the carpark areas, and from those areas will discharge to via the proposed vehicle entrances to the new Maui Road link road and Eagle Way carriageways. The overland flow from the proposed paved areas will also discharge via the proposed vehicle entrances to the new Maui Road link road and Eagle Way carriageways.

Figure 2: Existing OLFP's
### 5.1.6 ASSESSMENT OF STORMWATER RELATED EFFECTS

The table below outlines the effects of the proposed site (post development) compared to the effects of the existing site (left in its predevelopment state) in accordance with the objectives and policies set out in section 25.13.2 of Hamilton City Councils District Plan (OiP).

<table>
<thead>
<tr>
<th>Criteria to be met</th>
<th>Solution/Proposed Strategy</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimise the effects of urban development on downstream receiving waters and groundwater.</td>
<td>• Install private pipe network to service 5 year ARI event (including climate change)</td>
<td>Due to the existing site being considered as 100% impervious in its pre-development state the proposed development will not contribute to additional downstream flooding or further impact on stream channel erosion.</td>
</tr>
<tr>
<td></td>
<td>• Maintain same discharge point of existing onsite OLFP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Treatment of runoff from pavements in accordance with TP10</td>
<td></td>
</tr>
<tr>
<td>Ensure that the capacity, efficiency and sustainability of upstream and downstream infrastructure will not be compromised.</td>
<td>• Install private pipe network to service 5 year ARI event (including climate change)</td>
<td>As above. Proposed development will not discharge additional runoff into existing stormwater network.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facilitate access, maintenance and operational requirements.</td>
<td>• Existing public large diameter 1200 mm and 2300 mm stormwater pipelines are to remain in their current locations within the development site. Maintenance of this network for the most part will be easily accessible within the proposed carpark areas.</td>
<td>A small portion of this network is proposed to be built over/covered by the proposed building and appropriate building foundation design will be required. Correspondence with HCC has indicated that this will be allowed on the basis that maintenance existing structures (manholes) can be accessed within the building.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cater for the potential effects of climate change.</td>
<td>• Install private pipe network to service 5 year ARI event (including climate change)</td>
<td>The impermeable area of the site will be slightly reduced and as such climate change effects will also be reduced.</td>
</tr>
<tr>
<td></td>
<td>• Treatment devices (swales) to factor in climate change</td>
<td></td>
</tr>
<tr>
<td>Ensure appropriate standards of public health, safety and amenity.</td>
<td>• Built infrastructure to comply with the HCC ITS and NZ Building Code requirements</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>
| Ensure that surface water runoff is appropriately managed in accordance with the following drainage hierarchy.  
1. Retention for reuse.  
2. Soakage techniques.  
3. Detention and gradual release to a watercourse.  
4. Detention and gradual release to stormwater reticulation. | • Install private pipe network to service 5 year ARI event (including climate change)  
• Site soils not suitable for soakage  
• Detention not required as per sub-catchment ICMP  

As mentioned above - Due to the existing site being considered as 100% impervious in its pre-development state the proposed development will not contribute to additional downstream flooding or further impact on stream channel erosion; and hence retention/detention is not proposed on this basis |
| Maintain or improve the quality of stormwater entering the receiving environment. | • Install grassed treatment swales around the perimeter of the site in order to achieve desired stormwater quality treatment targets (to comply with HCC ITS requirements).  
• Inert/low contaminant generating cladding and materials will be used to construct proposed building  

Porter Group activities still operating on the site are the storage and dismantling of scrap machinery. Information is limited on the current treatment devices/operations plan used to treat spills and runoff discharging over exposed storage areas. No green stormwater treatment infrastructure is currently installed onsite. It is envisioned that the proposed treatment devices will maintain or improve the quality of stormwater entering the receiving environment. |
| Avoid or mitigate off-site effects from surface water runoff. | • As outlined in strategies above |
| Sustainably manage the volume and rate of discharge of stormwater to the receiving environment. | • As outlined in strategies above |
5.2 WASTEWATER DRAINAGE

5.2.1 EXISTING WASTEWATER DRAINAGE

Existing 225 mm trunk mains will be located adjacent to the site within Eagle Way and Maui Street Road corridors as indicated in Porter Group’s subdivision development plans (Refer Figure 3 below).

Figure 3: Existing Wastewater Network
5.2.2 PROPOSED WASTEWATER DRAINAGE

It is proposed to connect the new supermarket building to the proposed 225 mm public pipeline in the proposed link road as shown on Engineering Drawings.

The peak wet weather wastewater flow from the two existing commercial office buildings currently onsite is estimated to be 1.0 l/s.

The peak wet weather flow provided by the proposed supermarket building has been determined based on experience (with other Pak’nSave Stores of a similar size currently in operation) and is estimated to equate to 2.0 l/s.

The post development wastewater flows will generally match the predevelopment discharge rates (replacing 2 x commercial office building with a commercial supermarket building), i.e. an increase of approximately 1.0 l/s and hence it is envisioned that the proposed development will have negligible impact on the existing networks capacity.

5.2.3 TRADE WASTE

The supermarket will discharge its trade waste to Hamilton City’s sewerage system. This discharge will be subject to a trade-waste agreement with Hamilton City Council, which is currently under negotiation.
5.2.4 ASSESSMENT OF WASTEWATER RELATED EFFECTS

The table below outlines the effects of the proposed site (post development) compared to the effects of the existing site (left in its predevelopment state) in accordance with the objectives and policies set out in section 25.13.2 of Hamilton City Councils District Plan (OiP).

Table 2: Assessment of Wastewater related effects

<table>
<thead>
<tr>
<th>Criteria to be met</th>
<th>Solution/Proposed Strategy</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Wastewater is treated and disposed of in a way that minimises effects on public health, the environment, and cultural values. | • Install private pipe network to service development and connect into existing public network  
• Negotiate trade-waste agreement with HCC for tradewaste generated from supermarket |          |
5.3 WATER SUPPLY

5.3.1 EXISTING PUBLIC WATER SUPPLY RETICULATION

Existing 225 mm bulk mains will be located adjacent to the development site within Maui Street and Te Rapa road corridors as indicated in Porter Group’s subdivision development plans (Refer Figure 4 Below).

Figure 4: Existing Water Supply Network
5.3.2 PROPOSED WATER SUPPLY

The proposed supermarket will have sprinkler fire protection. Based on Pak’nSave Stores of a similar size currently in operation, it expected that the proposed sprinkler system will likely to require approximately 5,000 litres/minute at a pressure of at least 200 kPa.

The peak potable water supply demand for the proposed supermarket development has also been based on information gathered from Pak’nSave Stores of a similar size, and is likely to be equate to an average daily consumption of 10 m3 with a total probable maximum demand design flow rate of 2 litres/second.

There are existing 250 mm water mains in adjacent Maui Street and Te Rapa Road corridors and these are likely to have sufficient flow capacity for the proposed supermarket development.

Pressure and flow testing is currently being arranged to confirm capacity of the existing network for servicing potable water and fire supply to the proposed development.

The proposed water reticulation on the supermarket and retail site, including the water meter and backflow prevention devices are shown on Engineering Drawings.

<table>
<thead>
<tr>
<th>Criteria to be met</th>
<th>Solution/Proposed Strategy</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water supply infrastructure is designed and constructed to meet consumption, hygiene, water-sensitive design and firefighting requirements.</td>
<td>• Built infrastructure to comply with the HCC ITS and NZ Building Code requirements</td>
<td>Hydrant pressure testing to be carried out to confirm capacity of the existing network for servicing potable water and fire supply to the existing development.</td>
</tr>
</tbody>
</table>
6.0 MEASUREABLE TARGETS AND PERFORMANCE INDICATORS

The table below summarizes a list of measureable targets and performance indicators to allow the efficient and effective monitoring for each of the three waters and to better ensure the criteria listed in this Water Impact Assessment (as listed Section 5 above) are met.

Table 4: WIA target and performance indicators

<table>
<thead>
<tr>
<th>3 Waters Type</th>
<th>Measuring/Monitoring Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormwater</td>
<td>• Comply with O&amp;M (Appendix A) for maintenance requirements and inspections for on site grassed swales</td>
</tr>
<tr>
<td></td>
<td>• Provide annual inspections of onsite private drainage manholes/sumps/catchpits /strip drains/downpipes and remove accumulation of debris and sediment</td>
</tr>
<tr>
<td>Wastewater</td>
<td>• Provide 6-monthly inspections of onsite private wastewater manholes/downpipes/gully traps and remove accumulation of debris and sediment</td>
</tr>
<tr>
<td>Water Supply</td>
<td>• Staff to comply with companies cleaning and hygiene policies and promote the sustainable use of potable water. Monitor monthly meter readings to ensure daily consumption is below 15m3 (target typically 10m3 for this size supermarket)</td>
</tr>
</tbody>
</table>
APPENDIX A

Operations and Maintenance Plan for Onsite Stormwater Treatment Swales
What are swales and filter strips?

Swales, also known as bioretention, filter or infiltration strips, are broad, grass channels used to treat stormwater runoff. They direct and slow stormwater across grass or similar ground cover and through the soil. Swales also help filter sediments, nutrients and contaminants from incoming stormwater before discharging to downstream stormwater system or waterways. Some swales have liners to direct filtered runoff, or rocky linings to slow fast flows. Swales are simple to maintain and can fit well in urban design.

Fig.1 Swale in Waitakere City
Seven key components of swales and filter strips

1. **Inflow points**
   Stormwater flow entry, via pipe outlet or surface runoff.

2. **Side slopes**
   Total channel width. Slope less than 3:1 for mower access and to prevent scour.

3. **Channel base**
   Low flow path, may have gravel or rip rap reinforcing to prevent erosion.

4. **Underdrain (if present)**
   Usually perforated pipe, buried under channel to capture filtered flow and connected to stormwater system.

5. **Plants and soil**
   Grass or other low lying plants in permeable soil for filtering stormwater.

6. **Outlet**
   Discharge point for filtered stormwater.

7. **Flow controls**
   Check dams or spreaders, used to slow and spread flows to improve filtering. Often used on swales with slopes over 5%.
Fig. 2 Waitakere City Hospital car park swale

- Slotted kerbs not too close to edge of swale.
- Sign post in centre of swale are compromising underdrain.

Fig. 3 Henderson Valley Road – newly constructed road side swales

- Geotextile used to protect catchpit (swale outlet) during construction.
- Dish channels for each driveway controls flows and allow high flows to pass above.

Fig. 4 Manawa Wetland vegetated swale

- Native vegetated swale following contours and overland flow paths.
- Check dams used to slow flow and allow for filtration.
### MAINTENANCE SCHEDULE

#### TIMING

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflow points</td>
<td>• Check for scouring, channelling and erosion, and repair as necessary.</td>
</tr>
<tr>
<td>Side slopes</td>
<td>• Check for scouring, channelling and erosion, and repair by adding soil and replanting as necessary.</td>
</tr>
<tr>
<td>Channel base</td>
<td>• Check for scouring, channelling and erosion, and repair by adding soil and replanting as necessary.</td>
</tr>
</tbody>
</table>
| Plants and soil    | • Check stormwater is filtering through soil following storm runoff.  
                    • Remove weeds.                                                      |
| Outlet             | • Check outlet for scouring or erosion and repair to suit.             |
| Inflow points      | • Remove rubbish and debris.                                          |
| Channel base       | • If grassed, mow channel no shorter than 150mm length.               
                    • Use catcher and remove clippings.                                  |
| Plants and soil    | • If planted, check plants are healthy and growth is dense.           
                    • Remove weeds.                                                      
                    • Replant gaps and water new plants in dry conditions until established. |
| Outlet             | • Remove rubbish and debris from outlet grate or catchpit.           |
| Grass, plants and soil | • Check for boggy patches and ponding water.       
                        • Check soil is not compacted, and aerate surface or top up dips to repair. |
|                    | • Remove weeds, rubbish and debris.                                  
|                    | • Replant gaps and re-seed bare patches, and water if required to establish. |
|                    | • Aerate soil to prevent natural compaction, similar to coring sportsfields and lawn bowls greens. |
|                    | • Check stormwater is filtering through soil, by either monitoring after storm runoff or by running water across swale. |
# Troubleshooting

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Problems</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water not draining. Ponding</td>
<td>Soil compacted</td>
<td>• Aerate soil with rotating aerator or core, as for sports fields.</td>
</tr>
<tr>
<td></td>
<td>Soil clogged with fine sediments</td>
<td>• Remove top layer of soil and replace, turning soil.</td>
</tr>
<tr>
<td></td>
<td>Underdrain, if present, may be blocked – check for discharge at outlet.</td>
<td>• Re build underdrain.</td>
</tr>
<tr>
<td>Water flowing straight to outlet</td>
<td>Soil not free-draining.</td>
<td>• See above - aerate soil, replace top layer of soil, replace soil with free draining mix.</td>
</tr>
<tr>
<td></td>
<td>Swale slope too steep.</td>
<td>• If slope over 5%, construct check dams to slow flows.</td>
</tr>
<tr>
<td></td>
<td>Plants or grass not dense enough.</td>
<td>• Leave grass longer, and re-seed to increase density. Mow less frequently during dry periods.</td>
</tr>
<tr>
<td>Scouring / Channels appearing</td>
<td>Inflow concentrated at inlets.</td>
<td>• Remove blockages including rubbish, debris and sediment build up.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fill channels as necessary, replanting.</td>
</tr>
</tbody>
</table>
Quick maintenance check

✔ Maintain grass length to between 50-150mm.

Avoid

❌ On roadside swales, keep plant height below line-of-sight for motorists.

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FORM “DEVICE-SPECIFIC O&M DETAILS – SWALE OR FILTER STRIP”

Note: One form required for each OSM device on a site

(A) SITE & OSM DEVICE DETAILS:

Site Address: __________________________________________________________

Location on site (describe): ____________________________________________

Device Details:

Ref No (as shown on Form “OSM-O&M-Plan”): __________

Type: ________________________________________________________________

Size: _________________________________________________________________

Special Features (if any): _____________________________________________

Source of Runoff (eg roof, paving): _____________________________________

Impervious Area Feeding to OSM Device: ________ m²

Installation Date: __________________________

(B) DESCRIPTION OF SWALE / FILTER STRIP AND GENERAL O&M NEEDS

Swales and filter strips are open channels, generally grassed, that act as stormwater treatment devices. The swale is longer and narrower and may have a gravel base. These devices remove contaminants by slowing flows and allowing particles to settle out.

The following operational points should be noted:

• Filter strips are often preceded by a spreader device (such as a gravel filled pit) to create sheet flow of rainwater. Alternatively, impervious areas may be designed to drain evenly onto the filter strip.
• Grassed swales or filter strips are designed to operate with a grass length of 50 mm to 150 mm - it is important that the grass length is kept within this range.

O&M needs are primarily concerned with:

• Removal of debris and sediment from the swale or filter strip and its inlet/oulet
• Rectification of erosion
• Care of grass, including watering, mowing, fertilising and weed removal
• Care of gravel check-dams (applies to swales only)
• Maintenance of correct slope

(C) INSPECTION & RECORD KEEPING BY THE OWNER/OPERATOR:

Inspection records are to be kept to track the progressive development and operation of the OSM device over time, covering (note that these are to be available to the maintenance contractor and/or the City/ACE, as may be required):

• general condition of vegetation area(s), predominant plant species, distribution, and success rate (where applicable)
• condition and depth of erosion
• condition and depth of sediment accumulations
• water elevations/observations (sheen, smell, etc.)
• condition of the inlet, outlet, and overflow structures/devices, etc
• unscheduled maintenance needs
• components that do not meet performance criteria and require immediate maintenance
- common problem areas, solutions, and general observations
- aesthetic conditions

(D) ROUTINE MAINTENANCE PROVISIONS – CHECKLIST

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regularly</td>
<td></td>
</tr>
<tr>
<td>Quarterly</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>General: Remove any debris accumulations and waste vegetation</td>
</tr>
<tr>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Inlets &amp; outlets: remove sediment</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Grass: mow (with catcher) to maintain grass length 50 – 150 mm</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Grass:</td>
</tr>
<tr>
<td></td>
<td>• remove nuisance weeds</td>
</tr>
<tr>
<td></td>
<td>• fertilise or treat to maintain vigorous growth, as required</td>
</tr>
<tr>
<td></td>
<td>• fill any erosion holes &amp; re-seed</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Gravel (gravel-bed swale &amp; check-dams only): rectify any erosion holes and/or check-dam damage (with larger stones)</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Flow spreader (filter strip only):</td>
</tr>
<tr>
<td></td>
<td>• remove sediment</td>
</tr>
<tr>
<td></td>
<td>• replace aggregate if necessary</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Flow spreader (filter strip only):</td>
</tr>
<tr>
<td></td>
<td>• check alignment &amp; re-level if necessary</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Pipework (if any): check for debris/blockages/leaks &amp; rectify</td>
</tr>
</tbody>
</table>

* These items checked & repairs made by the contractor

Contractors Signature _______________________________ Date __________

OSM MANUAL
AUCKLAND CITY
**STORMWATER COMPLIANCE INSPECTION ADVICE**
(Under Section 332 of the Resource Management Act 1991)

**Site Name:**
**File No.:**
**Consent Holder:**
**Consent No.:**
**Engineer:**
**Catchment:**

<table>
<thead>
<tr>
<th>Swale and Filter Strip Facility Maintenance Inspection Checklist</th>
<th>X</th>
<th>Needs Immediate Attention</th>
<th>?</th>
<th>Okay</th>
<th>Clarification Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;As built&quot;</td>
<td>Required</td>
<td>Y / N</td>
<td>Available</td>
<td>Y / N</td>
<td>Adequate</td>
</tr>
<tr>
<td>&quot;Operation &amp; Maintenance Plan&quot;</td>
<td>Required</td>
<td>Y / N</td>
<td>Available</td>
<td>Y / N</td>
<td>Adequate</td>
</tr>
<tr>
<td>&quot;Planting Plan&quot;</td>
<td>Required</td>
<td>Y / N</td>
<td>Available</td>
<td>Y / N</td>
<td>Adequate</td>
</tr>
</tbody>
</table>

**Swale And Filter Strip Components:**

<table>
<thead>
<tr>
<th>Items Inspected</th>
<th>Checked</th>
<th>Maintenance Needed</th>
<th>Inspection Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEBRIS CLEANOUT</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>1. Swales and filter strips and contributing grass clear of debris</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. No dumping of yard wastes into swales or filter strips</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Litter (branches, etc) have been removed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VEGETATION</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Plant height not less than design water depth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Fertilised per specifications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. No evidence of erosion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Grass height not greater than 250mm;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Is plant composition according to approved plans</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. No placement of inappropriate plants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEWATERING</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Swales and filter strips dewaters between storms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. No evidence of standing water</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Inspection Frequency Key:**
A = Annual, M = Monthly

**OFFICERS REMARKS:**

---

*Auckland Regional Council* 9-19  
*Technical Publication # 10*
OVERALL CONDITION OF FACILITY:

In accordance with approved design plans? Y / N  
In accordance with As Built plans? Y / N

Maintenance required as detailed above? Y / N  
Compliance with other consent conditions? Y / N

Comments: ____________________________________________________________

Dates by which maintenance must be completed: / / 

Dates by which outstanding information as per consent conditions is required by: / /

Officers signature: ________________________________________________

Consent Holder/Engineer/Agent's signature: ______________________________
APPENDIX F

Hamilton City Council (HCC) Communications
Good Afternoon Jonathon,

With regard to the ICMP we would generally agree with the strategy proposed, thus if the ICMP were to be accepted, I believe our views on Stormwater Quantity Management would align with that proposed in the ICMP.

With regard to climate change I would make the case that, as the existing site is considered to be approximately 100% impervious, and due to our development proposing even less impervious area (landscaped areas within carparks, grass swales etc.), that the effects of development would be a positive one. That is to say that if the site were to be left as is (undeveloped), it would actually provide a worse situation (more runoff volume) for future scenarios, than compared to our proposal (even with no detention provided).

Climate change will be addressed within our report and rainfall values (for water quality treatment volumes) will be adjusted for climate change.

I will also include in our report (as appendices) calculations and details/dimensions for the swale and also an operations and maintenance plan, as I assume HCC will not want to take ownership of these swales; and they will be maintained privately.

Kind Regards,

Ivan Walynetz  BE (HONS)
Civil Engineer
Hi Ivan,

Thank you for your email. I look forward to working with you on this proposal.

Quantity Management:
I understand the argument you are making around not required detention or retention. The previous job I dealt with Babbage (Tainui hotel), detention was not provided due to the small scale of the redevelopment from a stormwater perspective, I agreed with this argument and potential adverse effects of not addressing climate change.

I am unsure where the ICMP for the subdivision has landed but I would be questions the effects of climate change on the post-development runoff for a development and subdivision of this scale. The water impact assessment asks for an assessment of any potential effects, climate change is considered an effect under the RMA and therefore should be addressed.

Quality Management:
Grass swales are acceptable concepts for treatment. The plan doesn’t provide much detail on the grass swale and that is what we will need to see to understand that the required treatment will occur.

Hope that helps.

Cheers,

Jonathon Brooke
Senior Development Engineer | City Development

DDI: 958 5920 | Email: jonathon.brooke@hcc.govt.nz
We have since progressed with our design/approach and I thought it best discuss our proposal with you, prior to lodgement of the resource consent, in the hope of saving time during the review process. For the sake of this discussion I have attached the relevant sections from our draft infrastructure report detailing our stormwater management approach. In Particular:-

In relation to Stormwater Quantity Management:
At this stage we are proposing not to provide onsite Retention and Detention. The reason being, and as reflected in the ICMP generated (and submitted) as part of Porter Hires subdivision application, is due to the existing site being considered as 100% impervious in its pre-development state. Our proposal will thus not contribute to additional downstream flooding or further impact on stream channel erosion; and hence we believe retention/detention is not required on this basis. Ground investigations also indicate that underlain soils are slow draining and are unlikely to provide adequate soakage rates.

In relation to Stormwater Quality Management:
We are proposing to install grassed treatment swales around the perimeter of the site in order to achieve desired stormwater quality treatment targets (to comply with HCC ITS requirements). I have attached a plan of our proposal for reference.

Hoping to get your feedback on our current approach and I am happy discuss any other queries you may have at this stage.

Kind Regards,

Ivan Walynetz  BE (HONS)
Civil Engineer

Babbage Consultants Limited
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From: Mary Wong [mailto:Maryw@barker.co.nz]
Sent: Tuesday, 12 June 2018 5:33 PM
To: Michael Martin
Cc: Nick Hanson; Matt Norwell
Subject: FW: PaknSave Hamilton

Hi Michael
Please see responses to your queries from Council following our pre-app meeting today.

The district plan requires that the resource consent application is accompanied by a “water impact assessment” because it involves the development of a new building for a non-residential activity with a GFA greater than 300m².

I have attached relevant extracts from the district plan which sets out what the water impact assessment needs to include.

Please can you read through the attachments and ensure that your civil report addresses all the relevant matters? Jonathon advised us that stormwater mitigation will be really important for the development so a proposed design for this on-site will need to be included too.

In terms of details around the subdivision we will ask Council to provide us a copy of the application lodged and we’ll circulate this to the team thereafter.

Please give me a call if have any queries on the above and Jonathan’s contacts are as below if you had any other specific engineering queries.

Kind regards,

Mary Wong
Senior Planner

B&A
Urban & Environmental
DD + 649 375 0916 M + 6421 0310291 T + 649 375 0900

From: Jonathon Brooke [mailto:Jonathon.Brooke@hcc.govt.nz]
Sent: Tuesday, 12 June 2018 4:09 PM
To: Mary Wong
Cc: Sam Le Heron
Subject: FW: PaknSave Hamilton

Hi Mary,

Replies below in red. I am happy to have my details passed onto your engineering team.

BBO has received the new consents for the traffic model and will be awaiting John to contact them.

Cheers,

Jonathon Brooke
Senior Development Engineer | City Development

DDI: 958 5920 | Email: jonathon.brooke@hcc.govt.nz
From: Sam Le Heron
Sent: Tuesday, 12 June 2018 4:03 PM
To: Jonathon Brooke <Jonathon.Brooke@hcc.govt.nz>
Subject: FW: PaknSave Hamilton

Hi JB

Following on from today’s meeting can you please provide a response to Mary.

Thanks Sam

From: Mary Wong [mailto:Maryw@barker.co.nz]
Sent: Friday, 8 June 2018 12:07 PM
To: Sam Le Heron <Sam.LeHeron@hcc.govt.nz>
Subject: PaknSave Hamilton

Hi Sam

Please see concept drawings attached for discussion in our meeting next Tuesday.

Other than general discussions, the specific queries we want to get some direction from council is as follows:

Engineering

- Can the store can be built over the existing 2,300 mm public stormwater pipeline given that other buildings along Te Rapa Road have been constructed over the pipeline? Yes. Council has specific requirements if building over to protect our infrastructure and they will need to be complied with.
- Is Council okay with the public stormwater manhole being located within the loading area of the proposed store? Yes
- Whether on site detention will be required to attenuate the 5 or 10 year storm event? 5-year attenuation is required. Treatment will need to be required, as part of the subdivision consent to create the lot a sub-catchment ICMP was provided. A consent notice or similar will be placed on the created titles to ensure the treatment outcomes of that ICMP are adhered to.

We are proposing an associated fuel facility on site. What supporting technical reports will be required as part of this?

Kind regards,

Mary Wong
Senior Planner

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Level 4, Old South British Building,
3-13 Shortland Street, Auckland
Whangarei | Warkworth | Auckland | Napier | Christchurch
barker.co.nz
APPENDIX G

Utilities Plans
WARNING
Strategic Pipelines

Gas Strategic Pipelines are present. Please contact Firstgas to arrange a Close Approach Consent on 0800 800 393
WARNING Strategic Pipelines

Gas Strategic Pipelines are present. Please contact First Gas to arrange a Close Approach Consent on 0800 800 305
Overview

The plan is indicative only. Ultrafast Fibre Limited (Ultrafast Fibre) does not warrant or represent the completeness, accuracy or reliability of the information and Ultrafast Fibre is not liable to you (or any person) in respect of the information (or your use of the same). Plant position is subject to reasonable tolerance and depth of cover may have altered since installation. Position and depth must be verified by way of piloting by the excavating contractor to ensure plant position. If you do damage any Ultrafast Fibre plant you must notify us immediately on ph: 0800 833 622.

If you plan to dig within the red shaded area, i.e. within 2m of any duct, it is recommended that you request an on-site location service – this is a free service. You can request your on-site location service using the attachment in the email sent to you.

Scale: 1:1000

Sequence Number: 6411687
Address: Intersection of Te Rapa Road and Te Rapa Waikato 3200

5 10 15 20

Meters

Digsite
Fibre Duct
Area Within 2m of Duct
Area Within 5m of Duct

ultrafast FIBRE
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Scale: 1:1000

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Sequence Number: 6411687
Address: Intersection of Te Rapa Road and Te Rapa Waikato 3200

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Digsite
Fibre Duct
Area Within 2m of Duct
Area Within 5m of Duct

If you plan to dig within the red shaded area, i.e. within 2m of any duct, it is recommended that you request an on site location service — this is a free service. You can request your on site location service using the attachment in the email sent to you.
WEL NETWORKS ELECTRICITY SERVICE PLAN

Sequence No: 641683
Job No: 1274530
Location: Intersection of Te Rapa Road and Eagle Way, Te Rapa, Waikato 3200

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