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Report to the Environment Committee
From Sarah Van Erp, Resource Advisor

Applications by Hutt City Council for Stage 2 of Silverstream Landfill

1. Purpose

To report to the Environment Committee, on the resource consent applications by the Hutt City Council, under the Resource Management Act 1991, for Stage 2 of Silverstream Landfill.

2. Application

2.1 Applicant

Hutt City Council
30 Laings Road
Private Bag 31912
Lower Hutt

2.2 Consents applied for

2.2.1 [**23248**] (Discretionary activity)

Discharge permit to discharge waste, fugitive leachate and other site-generated liquid to land, in circumstances where contaminants may enter water.

2.2.2 [**23251**] (Discretionary activity)

Discharge permit to discharge uncontaminated stormwater, groundwater and treated stormwater from a sedimentation pond to Tip Stream.

2.2.3 [**23249**] (Discretionary activity)

Discharge permit to discharge landfill gas, exhaust gases, dust, odour and other contaminants to air from a landfill.

2.2.4 [**23250**] (Discretionary activity)

Water permit to dam and divert Tip Stream for the purposes of creating a sedimentation pond.

2.2.5 [**23254**] (Discretionary activity)

Water permit to divert ephemeral streams and existing drains to a sedimentation pond.

2.2.6 [**23258**] (Discretionary activity)

Water permit to take groundwater from beneath the landfill via monitoring bores or through collection of underdrainage.

2.2.7 [**23257**] (Discretionary activity)

Water permit to take fresh water from Tip Stream (via a sedimentation pond) for dust control and ancillary purposes.

2.2.8 [**23262**] (Discretionary activity)

Land use consent to construct bores for monitoring groundwater quality.

2.2.9 [**23263**] (Discretionary activity)

Land use consent to reclaim a section of Tip Stream for landfilling purposes.

2.2.10 [**23252**] (Discretionary activity)

Land use consent to disturb the bed and banks of Tip Stream for the construction of a sedimentation pond and flow control structures.

2.2.11 [**23253**] (Discretionary activity)

Land use consent to construct a sedimentation pond, dam, lined channel and drop structures in the bed of Tip Stream.

2.2.12 [**23255**] (Discretionary activity)

Land use consent to disturb the beds and banks of tributaries of Tip Stream during construction of diversion structures for stormwater management.

2.2.13 [**23256**] (Discretionary activity)

Land use consent to construct diversion structures in the beds of tributaries of Tip Stream for the purpose of stormwater management.

2.2.14 [**23259**] (Restricted Discretionary activity)

Land use consent to undertake earthworks associated with the formation of roads and tracks.

2.2.15 [**23260**] (Restricted Discretionary activity)

Land use consent to excavate the floor and side slopes of the landfill and to operate borrow areas for the supply of construction and cover materials.

2.2.16 [**23261**] (Restricted Discretionary activity)

Land use consent to clear vegetation from the landfill footprint, access roads, drains and the borrow area.

Note: Consents [23252] and [23253], and [23255] and [23256] have been merged as the consent conditions address related issues. Therefore, the number of consents granted will be two fewer than what the applicant originally applied for and what was notified.

2.3 Location

Silverstream Landfill is located immediately north of Stokes Valley, and is within the jurisdictional areas of Hutt City Council and the Greater Wellington Regional Council. This proposal is for the Stage 2 development of the existing landfill and is within the valley, immediately downstream of the existing landfill, at or about map reference NZMS 260:R27;775.035.

3. Background

The Silverstream Landfill has been operating since 1972. It is operated by Hutt City Council (HCC) on behalf of both Upper Hutt City Council (UHCC) and HCC.

The landfill is located in a valley between the suburbs of Stokes Valley and Silverstream. It is the only municipal landfill in the Hutt Valley, and currently receives approximately 105,000 tonnes of residential, commercial and industrial refuse per year. It services a population of over 116,000 people. It includes in its catchment some of the major industrial areas in the Wellington area, and receives some waste from other areas in the region, including the Wairarapa.

Stage 1A of the landfill is now close to capacity and investigations have been undertaken to develop the next stage of the landfill, to cater for demand over approximately the next 50 years.

Therefore, the applicant is seeking resource consents from the Wellington Regional Council under the Resource Management Act 1991 (RMA) to allow the landfill operation to be extended as "Stage 2". Fifteen consents are sought to allow Stage 2 to be constructed, operated and maintained.

4. Proposal

Material in this section has been derived from the application and its supporting documents, dated November 2003.

Stage 2 involves constructing an extension to the landfill in the valley below the existing Stage 1/1A area. It will include a section of the Stage 2 footprint (approximately 60% of the total) founded on natural ground, with a fully engineered liner. The remaining 40% will be an "overlay" of the Stage 1 area, with a separation layer and fully engineered overlay liner designed to ensure that the entire Stage 2 area functions as a separate landfill, with a separate leachate collection system. The general site layout is shown in Figure 1.2 attached.

All works associated with the Stage 2 development will be within the area currently known as the "Silverstream Landfill" which is designated for landfill in the Hutt City Council district plan. The Stage 2 extension will have an estimated capacity of approximately 5.3 million m^3 of net air space with a nominal life of approximately 50 years, based on current predicted volumes of waste generated. The filling of the Stage 2 landfill extension area will be undertaken in five principal phases.

The Stage 2 works will generally incorporate the following activities:

- Vegetation clearance;
- Development of roading;
- Earthworks to create waste disposal area, including benching, liner and underdrains;
- Earthworks in a borrow area to provide base and ongoing cover material;
- Installation of an engineered liner system on the base and sides of the landfill footprint;
- Installation of a leachate collection system;
- Installation of a stormwater control and collection system, including diversion structures, perimeter drains, and a sedimentation pond;
- Placement of waste material in the prepared area;
- Collection, treatment and disposal of stormwater;
- Collection and disposal of leachate to the main Hutt Valley sewer;
- Installation of monitoring bores;
- Management and discharge of dust and odour;
- Collection and management of landfill gas, including its transfer to an existing power generation plant for beneficial re-use;
- Management of litter and vermin; and,
- Site rehabilitation works.

4.1 Overall design philosophy

The applicant proposes to design and operate the landfill extension to meet the requirements of the Centre of Advanced Engineering 2000 Guidelines (CAE) and will also generally follow the design objectives United States Environmental Protection Agency Subtitle D regulations for municipal solid waste landfills in relation to the liner.

The Silverstream landfill site is geohydrologically favourable and offers a high degree of natural secondary containment. The underlying geology provides good natural containment over most of the proposed Stage 2 footprint. The

Stage 1/1A area has functioned as a landfill for some 30 years without any engineered liner, and with little detectable impact on local surface or groundwater systems. No local groundwater resources of significance are either present, or in use.

The following issues and environmental sensitivities relevant to landfill design are recognised by the applicant:

- The environmental/ecological sensitivity of the lower Silverstream catchment, adjacent Hutt River and the Hutt aquifer
- Site topography and drainage constraints
- The location of the landfill in a region of high seismic activity
- The presence of hard greywacke rock in the lower valley and parts of the valley sides
- The zone of groundwater discharge in the lower valley floor
- The generally good hydraulic containment at the site
- The existence of the first Stage of the landfill uphill and upstream of the proposed Stage 2 development and the need to ensure ongoing drainage of leachate from Stage 1
- Buffer distance requirements (maintaining a minimum buffer zone of 300m from the nearest neighbours)

The applicant has stated that these issues affect the technical design approach to be adopted.

4.1.1 Seismic issues

A detailed seismo-tectonic study has been undertaken by HCC to assess the level of fault activity at the site. This study (Appendix O of the application) concluded that active faulting is not evident at the site which is located in a "pod" of greywacke basement bounded on either side by regional fault systems.

The Stage 2 footprint area does, however, contain old "relic" fault features and the potential for minor movement on these lineaments related to regional seismicity has been recognised. The applicant has catered for this in the design by:

- Thickening the effective attenuation layer with additional fill in the base liner area;
- Provision of extensive base area subsoil drainage which would act as a back-up to the leachate collection system in the unlikely event of liner rupture; and,
- Provision of redundancy zones in the base drainage systems to provide for the maximum expected displacement of piped drainage systems, including the drainage from the Stage 1 area.

4.1.2 Leachate system redundancy

The approach taken has been to keep the Stage 2 landfill essentially "separate" from Stage 1. An overlay liner has been designed for the area where Stage 2

abuts and overlies Stage 1 and is intended to limit the amount of leachate leakage from Stage 2 into the Stage 1 landfill, to a minimal amount. However, the applicant states that some minor leakage into the Stage 2 liner subgrade layer will occur, albeit that this will have negligible effect on the environment and will be undetectable.

The existing Stage 1 leachate collection system is old and poorly engineered. Over time as Stage 1 settles, it may become less effective. However, a significant flow of relatively weak leachate is currently collected by this leachate drain system and this needs to be catered for in the design long term. The approach adopted is as follows:

- Stage 1 leachate collection system to be terminated in a drain sump at the Stage 1 toe
- Permanent drainage to be provided in a solid pipe founded in the fill zone below the Stage 2 base liner and close to a major subsoil drain (for seismic redundancy)
- Additional fault zone redundancy provided by way of rock-filled drainage shear zones across major fault features
- Supplementary face drainage to be installed beneath the Stage 2 overlay liner and directed to the collection sump

4.1.3 Geotechnical considerations

The aim of the geotechnical design is to provide a stable landfill design and construction scenario, with a high level of stability under static conditions, continued stability in the event of elevated leachate and or natural groundwater levels or landfill drainage system failure, and stability under seismic loading, with expected design maximum surface and liner displacements limited to acceptable levels.

- The principal geotechnical issues taken into account in the design are:
- The profile of the hard greywacke rock surface
- The depth of the overall “rind” of weathering
- The locations of relic fault features, their influence on site topography and consequently sidewall fill zones and related subsoil drainage
- The nature and thickness of colluvial soils in the valley floor
- Borrow sources and material properties in terms of fill and clay liner zone construction.

Principal criteria have been adopted for geotechnical design based on generally accepted best practice for landfill design in the USA and New Zealand.

The design of the landfill overall falls within usual geotechnical parameters and all required stability criteria are met, including rigorous criteria for liner stability under earthquake loadings. In practical terms this means the liner can be designed conventionally as no active faulting affects the site. However, as a precaution, additional base drainage and redundancy in liner and sub-liner pipe systems is appropriate in the base area and at the major relic fault feature sidewall liner zones. This includes the need for additional subsoil / sub-liner drainage associated with the fault traces.

The completed landfill will be very well contained and buttressed by two lower valley ridges and all relevant stability criteria are able to be satisfied.

4.1.4 Base grades

The basegrade geometry for the site is relatively complex. It comprises a conventional lower zone (Type A Liner zone) with slopes typically 1V:3H. Above this is a "stepped" sidewall (Type B Liner zone). In this area, 5m wide benches are provided at 6m vertical intervals, with vertical cut angles of 1V:0.5H. This gives an overall slope of 1V:2.7H (maximum). Longitudinal gradients on the benches follow the valley floor profile of typically 1V:20H, but gradients flatten to 1V:100H (minimum) in re-entrant areas.

At the upper and lower limits of the basegrades, transition benches and bench drainage tie-in (transition) zones will be required. This will be configured during detailed design. Basegrade slopes fall within conventional limits for leachate drainage, and are typically 1-5% along pipe alignments.

4.2 Staging of landfill development

The proposed Stage 2 development will comprise five principal phases each of nominally 5-6 years duration (but likely of average 10 years duration).

Landfill development will commence in the valley floor immediately below the existing Stage 1 area toe. In broad terms the construction sequence will be:

- Construct western perimeter road and drain
- Re-locate sedimentation pond to lower valley
- Divert western drain into sedimentation pond
- Construct eastern drain
- Construct Stage 1 area leachate toe sump and related permanent leachate drainage
- Construct the lower zones of the Stage 2 Phase 1 liner and leachate control
- system, including overlay to toe of Stage 1 area
- Commence landfilling of Stage 2 Phase 1 area
- Capping and closure, including both intermediate and final cap areas, depending on location.

Once filling of Phase 1 of the Stage 2 development commences, further prestripping and preparation for subsequent lifts of the Phase 1 liner will be ongoing, ultimately moving up to the Phase 2 level to establish gravity drainage to the western perimeter drainage system prior to commencement of base preparation and liner construction in Phase 3. Subsequent Phase development will generally follow the same overall approach, but it is noted that due to settlement effects, Phases 2, 4 and 5 will likely take significantly longer to fill.

4.3 Liner design

The landfill liner is a critical engineered component of the design. Its objective is to contain leachate and landfill gas (LFG) generated within the landfill and

limit their migration into the underlying soil and groundwater. The liner will be augmented by a leachate collection system that enables leachate to be removed from the landfill and prevents it from ponding and creating a head on the liner.

The applicant states that a comprehensive approach to liner design has been adopted, recognising:

- The inherent natural containment of the site;
- The attenuation properties of some site soils (in-situ or re-compacted soil liner zones are utilised in the design);
- The influence of relic fault traces and site geohydrology in general; and
- Accepted modern landfill liner design practice and the need for a precautionary approach to liner design.

That applicant states that a conservative approach has been taken to liner design for the control and management of leachate. This has resulted in the development of a site-specific liner design that features:

- Four different liner details to be applied in various areas of the basegrades;

- A robust liner design for the critical base area of the landfill (equivalent to the USEPA Subtitle D default design). This comprises a drainage layer, HDPE Flexible Membrane Liner (FML) and a Compacted Clay Liner (CCL);

- A practical sidewall liner design for the steep central portion of the landfill, based on the use of a high performance primary membrane with attenuation provided either by in-situ soils, or using a Geosynthetic Clay Liner (GCL) component beneath the primary membrane where natural subgrade attenuation is not available;

- A combined HDPE/CCL liner detail in the sidewall fill zones and upper sidewall areas; and

- A robust HDPE/CCL liner detail in the Stage 1 overlay area, aimed at catering adequately for expected settlement so as to achieve effective separation of the Stage 2 area from the Stage 1.

The applicant considers that the liner design follows a robust (default) design approach in the lower part of the landfill where leachate loadings are higher. In the upper areas, a site-specific design has been adopted recognising:

- Construction practicality;
- Cost of construction versus risk of effects;
- Natural site containment and attenuation properties;
- The long-term environmental performance record of Stage 1; and
- Overall state of practice and the RMA-led design approach to modern landfills in New Zealand.

In summary, the applicant expects the proposed liner design layout and details to:

- Provide a high level of leachate containment and redundancy in the critical base zone of the landfill.

- Provide a practical liner design for the topographically difficult sidewall zone through adoption of a drape liner zone with a high level of primary containment backed up by either in-situ soil attenuation capacity or engineered attenuation using zones of geosynthetic clay liner. Overall this provides a system that, while not Subtitle D compliant, is appropriate to the site setting, liner gradients available, and site geology/geohydrology.

- Provide appropriate site-specific designs for the less critical areas of the upper sidewalls and Stage 1 overlay.

The applicant commissioned an independent review by technical specialists to assess the consent application. The review was undertaken by SCS Engineers (Reston, Virginia) and review comments were provided on 2 December 2003. In their review, SCS Engineers stated that the proposed liners to be used in the Stage 2 development are commonly used in the US for sanitary landfills to prevent leachate from discharging into the environment. SCS Engineers advise that, while the lack of groundwater impacts might suggest that bottom liner or leachate collection system are not absolutely necessary, it is their considered opinion as landfill design professionals that installation of an engineered liner is warranted and reasonable as a means to prevent groundwater impacts from occurring in the future.

Based on the findings from the review undertaken by SCS Engineers, I consider the proposed liners to be adequate for the Stage 2 development of Silverstream Landfill.

4.4 Leachate management system

Leachate is contaminated water generated within a landfill as a result of water (predominantly from rainfall) percolating through the refuse, down to the landfill liner. A minor component of the leachate derives from refuse decomposition.

The leachate collection system is designed to intercept leachate that collects on the liner, and convey it by gravity to a low point, ultimately at the northern end of the landfill. The collection system consists of central collector drains, perimeter base collector drains, and a series of supplementary laterals on the sidewall liner benches, through which leachate gravity-drains.

Provision will be made for routing the existing leachate outlet from the Stage 1/1A area, beneath Stage 2 in a separate piped system, with redundancy to ensure leachate is always able to drain from the Stage 1 area even if existing base leachate drainage systems within the Stage 1 footprint ultimately fail over time. Leachate from the Stage 2 landfill area will be extracted from a sump at the landfill toe by pumping and will then gravity-drain to join the flow from Stage 1 at a main leachate manhole. From there the combined flow will gravitate to the main Hutt Valley sewer near Eastern Hutt Road.

For the design of the Silverstream landfill extension, the applicant estimates of the long-term, pre-closure peak leachate generation rate (based on Hydrological Evaluation of Landfill Performance [HELP] modeling and field data) is approximately 3.1 m^3/ha/d (9.3% of annual precipitation). Postclosure, the figure drops to 2.2 m^3/ha/day (or 6% of annual precipitation). This estimate is based on leachate generation rates estimated by HELP over a period of 25 years. Average daily peak leachate generation rates corresponding to preclosure and post-closure phases of the landfill extension are approximately 68 m^3/d and 48 m^3/d, respectively.

During the initial phase where the developed cell area will be less than 5 hectares, the applicant expects leachate generation to average less than 20 m^3/d.

4.5 Landfill gas management

4.5.1 Landfill gas generation & control

The applicant's estimates of LFG generation prepared in 2003 forecast total LFG generation rates for Stage 1 of approximately 1700m^3/hr (current 2003 rate), rising to approximately 2100m^3/hr for Stage 2. The increase in generation rate over time is low, as the rate of filling the site is relatively slow.

LFG control will be affected by a range of means, both active and passive, as follows:

Passive

- Heavy compaction of refuse
- Application of daily and intermediate cover
- Application of final cover progressively as cells are completed

Active

- Control of stormwater entering active cell areas
- Early installation and ongoing operation of an active LFG extraction and system. Extracted LFG will either be combusted for energy recovery, or will be flared.

The applicant expects this overall system to result in an LFG collection efficiency of 80 – 90%. Consequent emissions of uncombusted methane or other organic compounds will be low as an enclosed ground flare will be installed during initial cell filling to augment the existing LFG to an energy conversion plant operated by the Landfill Gas Joint Venture (LFGJV).

The applicant states that the flare system design and specification will be aimed at achieving the new UK standard, as follows:

- Minimum combustion temperature of 1000°C for a retention time of > 0.3 s
- Emission concentrations at NTP and 3% O2:

- carbon monoxide <50 mg/Nm3
- NOx <150 mg/Nm3
- unburned hydrocarbons <10 mg/Nm3

Active LFG extraction will be via combined horizontal and vertical gas wells in the deeper, central area of the Stage 2 landfill. Gas system details are given on Drawings 50 and 51 (Volume 2) of the application.

Construction of the LFG system will proceed in parallel with cell filling. The gas wells/trenches will be extended as phases are completed, with final well heads and reticulated pipework for long-term gas extraction to be installed as the final cover layer is completed. Up to 50 vertical wells with a number of horizontal collectors would be part of the final configuration.

The gas will be piped to the existing landfill gas power station for energy production. The power station was commissioned in 1994 and is located just south of the landfill's administration building. It currently utilises gas collected from the Stage 1 and 1A areas of the landfill, and will also receive gas from the Stage 2 expansion. At present, the applicant has advised that approximately 1.8 MW- 2.2MW of power is being produced by the station.

Mighty River Power Limited holds a Discharge to Air permit to discharge to air contaminants associated with the operation of the power station. The power station building has capacity for the installation of an additional generator to cope with the additional LFG produced by the Stage 2 development.

4.5.2 Final cover

As no firm New Zealand design standards or criteria have been established for the design of landfill final cover layers, the approach generally adopted by the applicant has been to develop a cost-effective final cover design which keeps long-term leachate generation to a practical minimum while providing for appropriate final end use of the site.

The end use for the site has yet to be finally determined, but is likely to be passive recreation/reserve or light maintenance grazing. Hence, final cover requirements may need future amendment depending on the use ultimately decided upon.

Design cover slopes at the Silverstream landfill range from 1:4 to 1:20, averaging 1:6.

The cover design can be summarised as:

- Maximum 4H:1V slopes for final cover grade;
- Minimum 5% slope on the central portion of the landfill;
- Minimum 1.5m thick final cover consisting of 1200mm of compacted greywacke soils with a maximum hydraulic conductivity of 1 x 10^{-7} m/sec, a 200mm vegetative sub-layer and 100mm of top material (topsoil or growth medium) to support re-grassing; and

- Contour drains at vertical increments of 10-15m to control runoff and provide vehicular access during landfill development.

In addition, in some areas (those where final capping is not placed for some time after cell completion) an intermediate cover layer will also be provided, with a minimum thickness of 400mm.

4.6 Stormwater management

4.6.1 General

Stormwater management at the site has been a key element of the design. Key issues in stormwater management for the site are to divert as much stormwater as possible away from the active face of the landfill; to provide effective drainage of the final surface of the landfill to prevent scour and seepage; to control sediment runoff; and to control the peak storm flow from the site so that the peak outflow from the sedimentation pond is no greater than that from the pre-development condition.

At present for the Stage 1/1A landfill, a large perimeter drain conveys flows from the upper catchment around the southern and western side of the site to discharge into a side gully and two small silt ponds. From there, flow is directed to Tip Stream.

Construction of Stage 2 will result in several existing drainage paths being built over, requiring significant upgrading of the overall stormwater system. A stormwater system is therefore proposed that comprises two separate perimeter drains (draining the western and eastern flanks of the valley respectively), both of which will discharge into a single sedimentation pond located at the final landfill toe. Terrace drains (or berm drains) are proposed for conveying stormwater runoff from the finished landfill surface to the main perimeter drain. Thus, with the exception of the active landfill face, all stormwater from the catchment will be routed through the sediment retention pond.

The applicant has advised that ‘clean’ stormwater from the surrounding catchment that does not come into contact with the landfill can not be diverted away from the landfill and discharged directly into Tip Stream. This is because the stormwater collected in terrace drains that drain the landfill site itself also drain into the perimeter drains that collect ‘clean’ the stormwater from the surrounding catchment and therefore may contaminate it. Ed Breese from Tonkin and Taylor advised that it would not be practicable to install a separate stormwater system at the top of the landfill to cater for the ‘clean’ stormwater as this would required a complete duplicate of the proposed perimeter stormwater system.

The proposed system extensions result in significant improvement over the existing system, including a reduction of silt carry-over into the lower Hulls Creek catchment, upgrade of the current drainage system, and a reduced effect of litter on surface drainage systems.

For all permanent stormwater drainage channels or conduits, the design capacity is the maximum flow from the critical 50-year return period (or 2% AEP) storm.

4.6.2 Perimeter and terrace drain system

The western perimeter drain will be a concrete-lined open channel, ultimately draining an area of 68.5 hectares. The future Stage 2 landfill cap terrace drains will all discharge to this perimeter drain through culverts under the perimeter access road. The western perimeter drain entails an approximately 650m long extension to the existing Stage 1 drain.

The eastern piped stormwater system includes an approximately 200 m long existing open channel which drains part of the Stage 1 borrow area. This system will be upgraded over time. A total catchment of 41.2 hectares drains to this system.

Terrace or berm drains are proposed to capture and drain stormwater from the finished landfill cap. Ongoing maintenance of the terrace drains may be required to eliminate any areas of ponding which result from settlement of the landfill over time.

4.6.3 Stormwater sedimentation pond

A single stormwater treatment pond is proposed in the valley downstream of the toe of the final landfill (refer Drawing 46 Volume 2 of the application). The available pond site has relatively poor storage characteristics because of the narrow valley and steep gradient of the streambed. Therefore, a reasonably high embankment of about 10 to 12 m is required to provide the treatment volume needed.

The sedimentation pond will function as a sedimentation pond for discharges from exposed earthworks, act as a stormwater treatment pond for all other discharges and will reduce peak flows from the whole catchment above the landfill.

Both the "Erosion and Sediment Control Guidelines for the Wellington Region" and the Auckland Regional Council (ARC) publication "Stormwater Management Devices: Design Guidelines Manual" (ARC TP10, 2002 revision) were used as guidelines for the design of the sedimentation pond.

The New Zealand dam safety guidelines (NZSOLD, November 2000) are also relevant as the pond embankment meets the definition of a dam, albeit with low downstream hazard potential in case of dam failure and uncontrolled release of its stored contents.

A floating T-bar dewatering device will be used in line with the "Erosion and Sediment Control Guidelines for the Wellington Region". The floating decant would be sited to draw down at a rate that empties the operational pond storage (RL 68.4m to RL 65.3m) over a period of not less than 24 hours. Decant time would be adjusted to achieve effective sedimentation, but ensuring that low

flows continue much as under the existing situation, with very minor attenuation.

The decant and primary spillway would include provision for access for both continuous monitoring and facilities to enable the pond outflow to be shut off in the event of leachate contamination being detected.

The pond would be configured so that it could be shut off for all flows other than peak flows during significant storm events. In the latter case, there would be flow over the auxiliary spillway into Tip Stream, but the applicant expects that dilution would be significant during such events.

De-silting of the forebay will be undertaken on a regular basis. De-silting of the main pond will be done on an as required basis. Material that is removed will be placed in the landfill.

Because of the flat gradient, the applicant has advised that it may be practical to discharge the silt pond overflow through a wetland area before it returns to Tip Stream. Several groundwater springs have been observed on the side slopes and valley floor in this area. I consider this to be an excellent addition to the proposed sediment retention pond and would encourage any move by the applicant to incorporate a wetland treatment system.

4.7 Borrow areas

Provision has been made for further borrow excavation in addition to that for the existing borrow area. The applicant considers the face east of the existing landfill access road to be a favourable location (see Drawing 1, Volume 2 of the application). The borrow area will predominantly be used for sourcing liner and cover material and the balance of materials required for the final cap in the later years of the landfill. The borrow area will be reshaped to provide a contour that blends in with the surrounding landform. The revegetation of the borrow area will be on-going throughout the life of the project.

4.8 Access & services

Access to the landfill will continue to be via the Eastern Hutt Road and Reynolds Bach Drive. No new access roads to the site are required. The Eastern Hutt Road is the major arterial road, with in excess of 10,000 traffic movements per day, including current landfill traffic.

A perimeter road will be developed progressively around the landfill footprint to provide maintenance and service access to the completed landfill and surface drains.

Access roads to the landfill face will be constructed progressively off the existing road as shown on Drawings 18-22 of the application. These access roads will be used throughout the landfilling and will be re-routed as the landfill develops.

Water is required for a range of site uses including dust control, fill conditioning, odour control, fire fighting and irrigation for rehabilitating areas.

Where possible, water for dust control and general earthworks will be drawn from the sedimentation pond. All other water requirements will be supplied from the mains supply to the site, with storage tanks to be provided if required to provide supplementary capacity for firefighting.

The landfill is already serviced by potable water supply, sewage disposal and electricity systems. No new services are required, nor will existing services need to be extended.

4.9 Landfill operation & management

4.9.1 Introduction

Site operations will follow a strict management system detailed in a "Landfill Management Plan" to be submitted by the applicant. The operation of the landfill to date has been in accordance with an existing management plan (Tonkin & Taylor, 1998). That Plan is now being updated to incorporate the Stage 2 extension.

The key elements of site management are summarised below.

4.9.2 Site management

The landfill will continue to be operated on behalf of HCC by a contractor. The HCC's Street Services Manager will be responsible for landfill operation and ensuring that the landfill contractor operates the landfill as prescribed in the landfill management plan and landfill operation contract.

The general public and light commercial vehicles will not be permitted to travel to the working area, but will be limited to the recycling area (including car body storage area) and drop-off facility.

Access to the landfill will continue to be by the main landfill access road, and via the landfill kiosk. The Kiosk Operator is responsible for ensuring the incoming refuse to the landfill complies with the landfill waste acceptance criteria and for checking that the incoming loads are securely tied down.

4.9.3 Waste acceptance

The landfill design is based on standard Municipal Solid Waste Landfill (MSWL) waste acceptance criteria. That is, acceptance of only Municipal Solid Waste (MSW) as defined in the CAE Landfill Guidelines. In practice this means that MSW is all waste other than hazardous and liquid wastes. The applicant proposes to regulate this by defining and excluding from acceptance both hazardous and liquid wastes.

At present the acceptance of waste to the landfill is covered by guidelines prepared by the HCC. The guidelines are entitled "Guide to the Disposal of Wastes at Hutt Valley Landfills" dated May 1999, and are included as Appendix Q (Volume 3) of the application. Additional guidelines will be prepared to cover waste that may present operational problems to the landfill in their disposal.

4.9.4 Waste placement, compaction & cover

(a) Normal operation

Generally refuse will be placed in a cellular fashion incorporating daily and intermediate cover, in accordance with accepted landfill practice. Each daily filling operation will begin with the cutting of "windows" nominally 10 metres square through the previous layer of daily or intermediate cover.

Refuse will be placed within the cell in layers typically 1m thick and compacted by the landfill compactor which will make no fewer than four passes over each layer of refuse. The target minimum refuse density is a minimum 900 kg/m^3.

(b) Waste cover

The working surface of each refuse cell will be minimised in order to reduce the exposed refuse surface and optimise the quantity of daily and intermediate cover required. The thickness of each refuse cell will be not more than 2.5 metres. The working face will be operated with a slope not steeper than 4 horizontal to 1 vertical or flatter than 6 horizontal to 1 vertical, but will be finished with a slope of 4 horizontal to 1 vertical prior to placing daily cover.

Landfill cells which are completed and are not to be covered over by refuse in the medium to long term (3 months or more) will be capped with an intermediate cover and contoured to ensure that stormwater is collected and discharged to the stormwater system. These areas will also be grassed. Intermediate cover layers will be a minimum of 400 mm thick.

4.9.5 Nuisance management

(a) General Measures

Nuisances that can occur at landfill sites can largely be prevented by following sound landfilling practices. The applicant proposes that the following practices will continue to be utilised at the Silverstream Landfill:

- The working face will be kept as small as possible (typically less than 900m^2 unless special circumstances require a larger area short-term).
- All refuse placed will be well compacted
- All refuse placed will be promptly covered, at least on a daily basis
- The site will be kept clean and tidy.

Specific management procedures will be applied, as detailed in the following sections.

(b) Litter

Movable screen fences will be erected immediately downwind of the working face and in any other places where windblown litter is a problem. Debris will not be allowed to accumulate on the screens.

Screens will be a minimum of 3m high with a mesh size no greater than 50 mm. The site will be cleared of wind-blown litter weekly, and particularly after high wind events. All litter collected will be disposed of at the working face.

(c) Dust

The following dust control measures will be applied:

- The extent of unvegetated areas will be minimised. Areas which are not required for landfilling for a period of 3 months or more will be grassed;
- Vehicle speed restrictions will be enforced, particularly on any unsealed roads;
- Approach roads and sealed surfaces within the site will be washed/swept as required;
- A water cart will be used on any unsealed roads; and
- The tracking of refuse and dirt from the landfill face will be monitored.

(d) Odour

The site is relatively remote and hence, odour is not expected to be a problem. The landfill has almost no history of odour complaints from neighbouring properties. However, in consultation undertaken by the applicant prior to submitting the application, residents noted that there had been occasions in the past where odour emissions had been a nuisance.

The main sources of odours on a landfill site are:

- LFG generated from refuse decomposition;
- Highly putrescible loads of refuse; and
- Excavation into old refuse (e.g. for special burials).

The measures outlined in the AEE will be used to avoid offensive odours. In addition, the applicant advises that the following specific steps will be taken:

- Waste will be delivered prior to putrefaction, and/or may require suitable odour suppressing chemicals to be applied before delivery;
- Wastes will be worked as soon as they arrive at the landfill and potentially odorous loads will be required to be delivered early in the day;
- Compaction and control of the face gradient will ensure that water ingress is minimised; and
- Any standing water near the working face will be drained.

The applicant has stated that all staff at the landfill will continue to receive training to identify odours and will be instructed to report all unusual, concentrated or significant odours on-site, so that measures may be taken to identify the source of the odour and eliminate it.

4.9.6 Hazardous substances management

Hazardous waste is not accepted at the landfill. However, hazardous waste may appear in the waste stream as part of the kerbside collection, in domestic waste disposed of at the drop-off facility, or in commercial waste.

To help reduce the potential for hazardous waste being disposed of in the domestic waste stream, HCC undertakes a household hazardous waste collection programme on an annual basis where households can dispose of any unwanted chemicals.

At the public drop-off facility at the landfill, HCC provides an oil recycling tank. The applicant states that the landfill operators are trained to be vigilant for any hazardous waste that may be concealed amongst general refuse. The procedures for dealing with hazardous waste are covered in the Landfill Management Plan.

4.10 Monitoring

The current landfill operation monitors surface water, groundwater, leachate, climate, landfill gas, refuse and contractor's performance. It is proposed that a similar level of monitoring will continue for Stage 2.

Monitoring will be undertaken to:

- Provide an early warning should the landfill not perform as designed;
- Validate the predictions of effects;
- Allow remedial responses to be undertaken if required;
- Monitor compliance with resource consent conditions;
- Monitor compliance with Hutt Valley Waste Water bylaws; and
- Monitor the performance of the landfill operator.

If any monitoring results show potential non-compliance or poor performance, action would be taken. Such action will be identified in the contingency section of the Landfill Management Plan.

Monitoring will also be undertaken of construction activities to ensure that the landfill is constructed to conform to the design requirements. In particular, this is to ensure the liner is constructed to specification.

Once the resource consents for the Stage 2 extension of the landfill are granted, a monitoring programme will be submitted to the Consents Manager, Greater Wellington for approval. This is in accordance with proposed Conditions 17, 28, and 15 of consents WGN040184 [23251], [23249] and [23258] respectively.

The types of monitoring to be included in the monitoring plan are summarised as follows:

- Surface water – conductivity, water quality and macroinvertebrate monitoring;

- Groundwater – groundwater quality and levels;
- Leachate – flow, quality and levels;
- Air quality - gas levels on landfill surface, and gas composition;
- Waste – composition, volumes and exhaust;
- Operator's performance – refuse placement, compaction, cover, litter and seagull control, customer service and kiosk operation;
- Climate – rainfall, wind; and
- Vermin – flies and rats.

The applicant proposes to measure **surface water** quality at the inlet to the sedimentation pond, the outlet from the sedimentation pond, and below the landfill site in Tip Stream at the boundary of the landfill. The daily monitoring of conductivity will be designed to detect the unlikely event of leachate entering surface water.

An extensive network of **groundwater** monitoring bores already exists on the landfill site. Monitoring will continue at all of these bores. However additional bores will be required to replace those bores that lie in the landfill footprint or on the site of the sedimentation pond, as well as to ensure appropriate coverage of the area potentially affected by Stage 2.

Leachate flow and quality will be monitored at the toe of the landfill prior to the leachate being piped to the sewer. Leachate levels will be monitored in the leachate riser pipe.

Air quality monitoring will include measuring the exhaust from the landfill flare to ensure the combustion process is effective, and the composition of landfill gas. In addition monitoring of the landfill surface will be undertaken to ensure the intermediate or final cover provide a good seal to contain landfill gas within the landfill.

The Council is already committed to regular surveys of the composition of **waste** entering the landfill. These surveys will be continued and undertaken in accordance with the MfE Solid Waste Analysis Protocol.

At this stage the applicant envisages the daily operation of the landfill will be contracted out. To ensure that the landfill is operated to the standard required by HCC, the **operator's performance** will be continually monitored. This monitoring will cover operational activities such as litter and bird control, maintenance of stormwater drains and the sedimentation pond, daily and intermediate cover, refuse placement and compaction, kiosk operation and customer service.

The **climatic factors** that influence the site will continue to be continuously monitored by the automatic weather recording station located adjacent to the landfill amenity block.

Although there are no recorded problems with either rats or flies at the landfill it is possible that they could become a source of nuisance in the future. In the event of **vermin** becoming a nuisance, monitoring will be undertaken by the

applicant to quantify the problem and to record the effectiveness of dealing with it.

4.11 Landfill closure and aftercare

The objectives of landfill closure and aftercare are to:

- Ensure the final landfill surface remains in a stable, vegetated condition;
- Minimise groundwater and stormwater infiltration into the landfill and hence minimise long-term leachate generation; and
- Control gas migration for the duration of the post closure period.

How these objectives are achieved is discussed in the following sections.

4.11.1 Factors affecting landfill closure

The factors primarily affecting landfill closure and aftercare are settlement, gas control and leachate control. These are addressed below.

(a) Settlement

A key aim of landfill cell construction will be to ensure that settlement occurs as evenly as possible. The applicant states that the bulk of the settlement occurs in the first 5 years following refuse placement and is generally complete (i.e. the landfill becomes relatively stable dimensionally) after 10 years. It should be noted that the drainage systems are designed to withstand settlement.

Generally, differential effects due to uneven cover settlement will be dealt with by either adding additional topsoil/growth medium locally or re-grading and regrassing as necessary. If differential settlement is too extensive either in area or in height to make this practical, then the affected areas of cap will need to be stripped of top material, re-graded using additional cover material, and then covered with –topsoil/growth medium and restored as necessary.

(b) Leachate control

The objective is to minimise long-term leachate generation by providing a dense, low permeability cap and maintaining the cap in a stable, grassed, crack-free condition.

(c) Gas control

Gas pressures within the landfill will be controlled by the collection of gas for the landfill gas power station. This will minimise the tendency for gas penetration of the cap material which could result in oxygen displacement and possibly grass die-off.

Given the expected low permeability of the cap materials, gas penetration is likely to be minimal. However, any "hot spots" showing evidence of gas penetration will need to be sub-excavated, gas control measures implemented, and a fresh layer of cover, growth medium and vegetation applied.

4.11.2 Activities Involved in landfill closure & ongoing post closure management

The activities involved in landfill closure and ongoing management are:

Closure:

- Final cell closeout and final cap placement (the bulk of the cap would have already been placed and some of it would have been under maintenance for many years);
- Revegetation of filled areas and rehabilitation of disturbed areas;
- Completion of LFG system pipework;
- Completion of surface drainage network; and
- Decommissioning of some site facilities (office, weighbridge etc.).

Post-closure:

- Ongoing removal of leachate;
- Operation and maintenance of the LFG system (possibly involving overhaul or replacement of the landfill flare during the period);
- Cap maintenance including surface drain and crack repair, and mowing;
- Maintenance of fences and landscaping;
- Maintenance of minor site infrastructure (power, telephone);
- Maintenance of sedimentation ponds and related structures (the sedimentation pond dam may ultimately be removed); and
- Maintenance of revegetated and rehabilitated areas.
- The main activities are addressed below.

(a) Final capping

The landfill surface will be capped as each area reaches its final level. This is to ensure that surface erosion is minimised and that grass is well established over the bulk of the landfill surface by the time filling is complete.

(b) Cap maintenance

Areas which have been finally capped will be protected by rubber tyre rolling to seal the surface against erosion prior to grassing. The top layer will be lightly cultivated and contoured to improve the establishment of grass cover.

Cap drainage will be established by contouring the final cover to form drainage swales. All cap drainage will be carefully monitored and drainage swales maintained to mitigate the effects of:

- Uneven settlement (requiring adjustment of swale gradient/surface);
- Localised erosion due to uneven grass strike (for example); and
- Cracking (due to settlement or desiccation).

In areas of drainage swale construction, final cap thickness will be increased to 1-1.5m depending on location, to mitigate the effects of settlement-induced cracking. In areas where experience shows drainage swales may be prone to

erosion or de-vegetation, appropriate additional protection measures will be implemented (e.g. riprap, matting or close turfing).

(c) Planting

Top cover material will be checked by a soil scientist once a year during initial restoration to determine its depth, fertility, texture and condition. Additional growth medium, fertiliser and compost will be applied if considered necessary following this inspection.

4.11.3 Contingency & aftercare

The HCC is responsible for full aftercare and environmental maintenance of the landfill. These responsibilities cover the following:

- Ensuring that routine environmental monitoring is undertaken and that the records and reporting procedures associated with the monitoring are regularly and properly implemented.
- Regularly inspecting the site in accordance with the defined programme, covering all permanent structures, environmental monitoring systems and landscaping/planting areas.
- Implementing programmes of routine site care and facility maintenance and reviewing these regularly.
- Recording any complaints received from local residents following facility closure, and taking appropriate action.
- Preparing regular reports and data summaries for internal information records, and for provision to the Regional Council.
- Arranging and administering all maintenance contracts associated with site maintenance, leachate and gas disposal.

A final end-use of the site in the long term is likely to be for passive recreational activities. In the short term, public access will be limited.

5. Other consents and approvals required

There are no other consents or approvals required from Greater Wellington. As the site is designated for landfill purposes, Hutt City Council does not require the applicant to apply for any consents.

6. Consultation

The applicant undertook an extensive consultation programme prior to lodging the resource consent application. The consultation process for the Stage 2 development commenced in October 2002. The consultation was built on longer term and ongoing consultation by HCC associated with the overall landfill operation. The applicant has stated that the purpose of the consultation process was three-fold:

(i) To provide the design team with appropriate information through the planning of the extension and the design of mitigation measures;

(ii) To ensure that affected parties and the overall community were kept informed of all aspects of the project; and

(iii) To satisfy the best practice consultation principles of the Resource Management Act 1991, recognising that undertaking consultation is not a specific requirement of the Resource Management Act 1991.

The consultation process focused on informing and involving the general public and specific interest groups of the Stage 2 proposal through letters, a website, an open day, and a series of meetings and phone conversations.

The applicant undertook to set up a Residents Liaison Group in November 2002 with whom they held three meetings in addition to four public meetings. The Liaison Group were also taken on an inspection of Auckland landfills.

6.1 Response cards

The Applicant sent a letter in October 2002 to all adjoining landowners of the landfill and to landowners and occupiers in the upper Kingsley Street area, upper Lord Street area and Robson Street. The letter introduced the proposed Stage 2 development and included a response card. The response card invited individuals or organisations to signal if they wished to be consulted, the preferred method of consultation and any issues they wished to discuss.

One hundred and thirty two response cards were sent out, and 30 responses were received. Of the 30 responses only 2 did not want to be consulted further.

6.2 Public meetings

Four public meetings were held from November 2002 to July 2003. An invitation was sent to all groups and individuals who received the response card to attend the first public meeting and landfill tour on 30 November 2002. The meetings were held at St Philips Anglican Church in Stokes Valley. Thirty-three people attended the first meeting, 20 the second, 14 the third and 19 the last meeting.

The meetings helped to identify issues that concerned the attendees, and included seagulls, rats, mosquitoes, flies, odour, visual impacts, noise, waste reduction, compensation, impact on property values and litter control on access routes to the landfill.

Other issues identified were questions regarding:

- The long-term plan for the site after the completion of Stage 2; whether there would be more landfilling on site;
- The impact of the power station tripping out; and,
- Options to remove vehicle reversing alarms.

6.3 Issues raised during consultation

The consultation process identified a number of issues that needed to be considered in the assessment of environmental effects and the design and operation of the Stage 2 development including odour, noise, seagulls, impact on house values, visual impacts, litter, vermin, flies and insects, water quality in Tip Stream, operating practices, waste minimisation, proximity to houses, and access to forestry blocks.

7. Notification and submissions

Pursuant to Section 93(2) of the Resource Management Act 1991, the resource consent application lodged with Greater Wellington was publicly notified in the *Dominion Post* on Saturday 6 December 2003, in *The Leader* on the Wednesday 10 December 2003 and in *Hutt News* on Tuesday 9 December 2003. Two signs were placed at the site on Tuesday 9 December 2003, one at the turnoff to Reynolds Bach Drive and another at the entrance to the landfill.

Persons considered by Greater Wellington to be directly affected by the proposal were individually notified. Those parties were as follows:

- Hutt City Council;
- Department of Conservation;
- Wellington Tenths Trust;
- Te Runanganui o Taranaki Whanui ki te Upoko o Te Ika a Maui;
- Wellington Fish & Game Council;
- Regional Public Health;
- Wellington Regional Council – Bulk Water Supply;
- Silverstream Landfill Residents Liaison Group;
- Housing New Zealand; and
- Residents and businesses adjacent to the landfill on Lord, Robson, and Kingsley Streets, and McManaway Grove.

A total of 12 parties made submissions before the submission period closed on Thursday 29 January 2004. Six of these were in support, three were in opposition and three gave conditional support. Submissions made in accordance with Section 96 of the Act are summarised in Appendix 1.

Only one submission was received in opposition to the application where the submitter wished to be heard. The applicant undertook to negotiate an outcome with the one submitter in order to address their concerns. The submitter subsequently withdrew their wish to be heard.

A hearing was not required as all submitters that wished to be heard, both in support and opposition to the application, withdrew their wish to be head.

The submitters in support of the application are as follows:

Wellington Regional Housing Trustees

Wish Greater Wellington to make the following decision:

Approve consents that are sought.

Upper Hutt City Council

Wish to support the applicant and note that the Silverstream Landfill is very important to Upper Hutt City and it's residents.

Wish Greater Wellington to make the following decision:

Approve all resource consents required for the development of Stage 2 of the Silverstream Landfill.

Robson Street Landfill Committee

Wish to support the applicant and note while the group was at first opposed to the Stage 2 development, the work done by HCC officers has considerably allayed their fears.

Still have some concerns about the ability of Excel (the contractor on site) to perform to the required standard. Are therefore seeking to ensure that there is a written contract comprising local residents, the consent officer and landfill operators to monitor performance. Also want to have a charter agreed between the local residents, Greater Wellington and the landfill operators, and would like to have regular access to any reporting on performance.

Fish & Game

Wish to support the applicant and congratulated HCC on their outstanding approach to the Silverstream Landfill extension. Are confident the Council has thought through the implication of the extension and planned well to avoid or reduce any negative effects.

Silverstream Railway Inc.

Wish to support the applicant and believe that the best practical management procedures will be adopted and accept that there is no alternative site for solid waste disposal in the Hutt valley.

Wish Greater Wellington to make the following decision:

Grant the application, however, in the event of some major incident occurring which could have any adverse affect on the society's activities, a condition be in place that requires that it be advised immediately via the resident caretaker.

The submitters in conditional support of the application are as follows:

Silverstream Retreat

Wish to support the applicant but are concerned about air and water pollution.

Would like to have assurance that the smell and debris that come down the stream are eliminated.

Advise that:

- the smell varies according to the weather conditions
- after heavy rain, debris of various types comes down the stream that runs from the landfill and then down through their property

Question why, if the stream is guaranteed to be clean, a sign on Reynolds Bach Drive says the stream is unfit for recreational swimming.

Wellington Tenths Trust & Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui

Support the overall application with the proviso that the Land Use Consents are approved with the following condition:

"That if during the excavation process koiwi (bones) or artefacts are unearthed, the contractor shall cease work immediately and contact Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and the Wellington Tenths Trust to allow appropriate rites and ceremonies to occur. That the article(s) may be removed after such a ceremony, if necessary and agreement is reached as to their final disposal with the Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and the Wellington Tenths Trust and any other relevant authority. This may involve contacting the Historic Places Trust".

Agree likelihood of cultural material being present is low. Care should be taken where there has been minimal disturbance of topsoil and possibly flora, such as around the stream beds. If it is suspected that there may be reason during the clearance works, then a further examination by the archaeologist may be a very useful precaution.

Point out sensitivity of surface and ground water to leachate. Concerned about impact of Stage 2 overlay. Are satisfied however that the proposal does adequately deal with this aspect.

Support use of site as has few drawbacks from Maori perspective provided it is adequately designed, constructed, maintained and monitored. Believe this proposal meets those requirements.

Support application with respect to air discharges, control of dust, odour and other contaminants and recognise that particularly for neighbours care needs to be taken with these factors.

Satisfied that landscape and visual values are not adversely affected. Although they are not aware of any specific cultural landscape features of significance to tangata whenua (past and present), consideration should be given to the overall impact of the proposal on the wider Hutt Valley and Upper Hutt Valley landscapes. Believe this proposal meets those requirements.

Support the use of the sedimentation pond for flood detention and reducing sediment.

Regional Public Health

Are concerned about the potential for leachate contamination of groundwater and surface waters in the landfill valley catchment. State that, as drinking water is abstracted from the aquifer, any contamination from the landfill could seriously compromise the sustainability of the aquifer as a continuing future source of drinking water.

Based on the information provided in the applicant's AEE, consider it unlikely that leachate derived from the landfill will have a measurable effect on the quality of water abstracted for drinking purposes.

However, Regional Public Health (RPH) maintain that there is evidence for the leachate influencing groundwater quality in the landfill valley. Bore Hole 11, by virtue of being up-gradient from the landfill, provides some indication of the quality of water without leachate influence. Using the chemistry of this water as a benchmark, a large number of determinands are seen to increase in samples taken further down the valley, e.g. conductivity, hardness (calcium), and alkalinity.

RPH recommends that to minimise potential adverse public health effects associated with the application, consent conditions be imposed to the effect of the following:

- Current conditions (in particular 15) for Water Permits 970164(02) and (03) be included as part of any permits granted for Stage 2.

- A new condition be adopted that requires any parameters found in the annual monitoring for surface water and groundwater which significantly increase in concentration (compared to past annual monitoring data), be included in the monthly sampling suite. Greater Wellington shall determine the length of time the parameters will continue to be monitored monthly.

- Proposed future groundwater monitoring and mitigation measures as outlined in the AEE Appendix D, Part 1 – 8.1 (page 26) be adopted as part of any consents issued for Stage 2.

- Proposed future surface water monitoring and mitigation measures as outlined in the AEE Appendix H, 4.3 & 4.4 (pages 11 & 12) be adopted as part of any consents issued for Stage 2.

- Recommend that the proposed new groundwater bores outlined in the AEE be subject to approval by Greater Wellington (both for location and numbers of bores) to help ensure that they will be representative of the groundwater quality in the valley and therefore potential adverse effects on the Hutt Valley aquifer.

The submitters in opposition to the application are as follows:

Terry Tiari Rangi – Thompson

Oppose the following: sedimentation pond; placement of waste material in a prepared area; collection and management of landfill gas including its transfer to an existing power generation plant for beneficial use.

Is currently experiencing problems with odour and is concerned that continued residential development will generate an environmental battle. Would like the well being of people to be considered as opposed to the thousands spent on upgrading.

Wish Greater Wellington to make the following decision:

To take into consideration the residential homes currently in the area as the landfill generates bad smells, encourages seagulls, devaluation of homes and lack of interest to expand or grow within our region.

George Andrew Hutchinson

Oppose all of the resource consents applied for. The smell, the noise and the dust levels are already problems. Is also concerned about property valuation, and believes the resale values will be affected.

Point out that they pay the same rates as every one else in Stokes Valley, and also have to put up with the smell etc.

State that when the tip was put in, the original proposal had no mention of Stage 2 and the site was only supposed to last for 100 years at the current location.

Wish Greater Wellington to make the following decision:

Opposed the Stage 2 development to this site and wish the site to be left as it is now. When the site is full and can no longer be used, find another location away from residential area with a foresight to extensions available in the future which will cause no problems to the population or environment.

Question whether they will be given free dumping fees if this goes ahead, as the development is in their backyards.

Clywdd Mark Tredrea

Opposes all of the resource consents applied for. The smell, the noise and the dust level are already a problem. Is also concerned about the health risks due to excess flies, rats, vermin, wild dogs and cats all killing native bush and animals. Is concerned about property valuation, and believes the resale values will be affected.

Point out that they pay the same rates as every one else in Stokes Valley, and also have to put up with the smell.

State that when the tip was put in, the original proposal had no mention of Stage 2 and the site was only supposed to last for 100 year at the current location.

Wish Greater Wellington to make the following decision:

Opposed the Stage 2 development to this site and wish the site to be left as it is now. When the site is full and can no longer be used, find another location away from residential area with a foresight to extensions available in the future which will cause no problems to the population or environment.

Question whether they will be given free dumping fees if this goes ahead, as the development is in their backyards.

8. Further information and meetings

Since the close of submissions the applicant has held discussions and site inspections with individual submitters. I have not been privy to the detail of those discussions. No formal pre-hearing meeting has been held.

No further information was required from the applicant post submission closure.

9. Statutory reasons for requiring resource consents

9.1 Discharge permits

Section 15 – Discharge of contaminants into environment

Section 15(1)(a) of the RMA 1991 provides as follows:

> *(1) No person may discharge any –*
>
> *(a) Contaminant or water into water; or ...*
>
> *unless the discharge is expressly allowed by a rule [in a regional plan and in any relevant proposed regional plan], a resource consent, or regulations.*

WGN040184 [23248] in relation to the discharge of waste, fugitive leachate and other site-generated liquid to land, in circumstances where contaminants may enter water is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

The relevant plan is the Regional Plan for Discharges to Land for the Wellington Region (RPDL). Rule 10 of the RPDL classifies landfills, rubbish dumps and tips, except as allowed by Rule 9(1), the discharge of contaminants onto or into land used for the disposal of waste materials, with the exception of land used exclusively for cleanfill disposal, but including disposal at a landfill, rubbish dump or tip, as a ***Discretionary Activity.*** The discharge of waste,

fugitive leachate and other site-generated liquid to land falls within the ambit of this rule, and therefore requires a resource consent.

WGN040184 [23251] in relation to the discharge of uncontaminated stormwater, groundwater and treated stormwater from a sedimentation pond to Tip Stream is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

The relevant plan is the Regional Freshwater Plan for the Wellington Region (RFP). Rule 5 of the RFP classifies all remaining discharges to freshwater that are not provided for in Rules 1, 2, 3, and 4, and which cannot meet the requirement of Rules 1,2,3, and 4, and which is not a non-complying activity in Rule 6 as a ***Discretionary Activity.*** The discharge of uncontaminated stormwater, groundwater and treated stormwater from a sedimentation pond to Tip Stream falls within the ambit of this rule, and therefore requires a resource consent.

WGN040184 [23249] in relation to the discharge of landfill gas, exhaust gases, dust, odour and other contaminants from a landfill to air is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

The relevant plan is the Regional Air Quality Management Plan for the Wellington Region (RAQMP). Rule 23 of the RAQMP classifies the discharge of contaminants into air from any process of activity explicitly excluded from Rules 1-22, or any process or activity covered by Rules 1-22, but which does not meet the conditions attached to those rules, or any process or activity on an industrial or trade premises not covered by Rules 1-22 as a ***Discretionary Activity.*** The discharge of landfill gas, exhaust gases, dust, odour and other contaminants from a landfill to air falls within the ambit of this rule, and therefore requires a resource consent.

9.2 Water permits

Section 14 – Restrictions relating to water

Section 14(3)(a) of the RMA 1991 provides as follows –

> *(3) A person is not prohibited by subsection (1) from taking, using, damming, or diverting any water, heat, or energy if—*
>
> *(a) The taking, use, damming, or diversion is expressly allowed by a rule in a regional plan and in any relevant proposed regional plan or a resource consent; or…*

WGN040184 [23250] relates to the damming and diversion of Tip Stream for the purposes of creating a sedimentation pond, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

WGN040184 [23250] relates to the damming and diversion of Tip Stream for the purposes of creating a sedimentation pond, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

WGN040184 [23254] in relation to the diversion of ephemeral streams and existing drains to a sedimentation pond, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

WGN040184 [23258] relates to taking groundwater from beneath the landfill via monitoring bores or through collection of underdrainage, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

WGN040184 [23257] relates to taking fresh water from Tip Stream (via a sedimentation pond) for dust control and ancillary purposes, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

Rule 16 of the RFP provides for the taking, use, damming, or diversion of any fresh water, or the transfer to another site of any water permit to take or use water, that is not provided for in any other rules in this Plan, and which cannot meet the requirements of those rules, and that for takes of water from the Lower Hutt Groundwater Zone would not cause the maximum rate of takes authorised by resource consents to exceed 32.85 million cubic metres per year; and that is not a non-complying activity in Rules 17, 18 or 19, as a ***Discretionary Activity.***

The damming and diversion of Tip Stream for the purposes of creating a sedimentation pond; the diversion of ephemeral streams and existing drains to a sedimentation pond; the taking of groundwater from beneath the landfill via monitoring bores or through collection of underdrainage and the taking of fresh water from Tip Stream (via a sedimentation pond) for dust control and ancillary purposes all fall within the ambit of this rule, and therefore require a resource consent.

9.3 Land use consents

Section 13 – Restrictions on certain uses of bed of lakes and rivers

Section 13(1)(a) and (b) of the RMA 1991 provides as follows -

> *(1) No person may, in relation to the bed of any lake or river,-*
>
> *(a) Use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on, under, or over the bed; or*
>
> *(b) Excavate, drill, tunnel, or otherwise disturb the bed; or ..... unless expressly allowed by a rule in a*

regional plan and in any relevant proposed regional plan or a resource consent.

9.3.1 Bores

WGN040184 [23262] relates to the construction of bores for monitoring groundwater quality, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

The relevant plan is the Regional Freshwater Plan for the Wellington Region (RFP). Rule 15 of the RFP classifies bore construction as a ***Discretionary Activity.*** The construction of bores for monitoring groundwater quality falls within the ambit of this rule, and therefore requires a resource consent.

9.3.2 Reclamation and structures

WGN040184 [23263] relates to reclaiming the section of the Tip Stream diverted for land filling purposes, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

WGN040184 [23252] relates to disturbing the bed and banks of Tip Stream for the construction of a sedimentation pond and flow control structures, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

WGN040184 [23253] relates to the construction of a sedimentation pond, dam, lined channel and drop structures in the bed of Tip Stream, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

WGN040184 [23255] relates to disturbing the beds and banks of tributaries of Tip Stream during construction of diversion structures for stormwater management, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

WGN040184 [23256] relates to constructing diversion structures in riverbeds of tributaries of Tip Stream for the purpose of stormwater management, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

The relevant plan is the Regional Freshwater Plan for the Wellington Region (RFP). Rule 49 of the RFP classifies all remaining uses of river and lake beds, that are not specifically provided for in Rules 22 to 48, and which cannot meet the requirements of those rules and that are not a non-complying or prohibited activity in Rules 50 and 51, as a ***Discretionary Activity.*** The reclaiming the section of the Tip Stream diverted for land filling purposes; the disturbance of the beds and banks of Tip Stream for the construction of a sedimentation pond and flow control structures; the construction of a sedimentation pond, dam, lined channel and drop structures in the bed of Tip Stream; the disturbance of

the beds and banks of tributaries of Tip Stream during construction of diversion structures for stormwater management and the construction of diversion structures in riverbeds of tributaries of Tip Stream for the purpose of stormwater management all fall within the ambit of this rule, and therefore require a resource consent.

9.3.3 Roading

WGN040184 [23259] relates to earthworks associated with the formation of roads and tracks, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

The relevant plan is the Regional Soil Plan for the Wellington Region (RSP). Rule 1 of the RSP states that any roading or tracking activity that is located in Area 1 and, during any 12 month period, will result in a road or track having a continuous length of new upslope batter extending for greater than 200 metres, with a height of greater than 1.5 metres measured vertically; or located in Area 2 and, during any 12 month period, will result in a road or track having a continuous length of new upslope batter extending for greater than 200 metres, with a height of greater than 2 metres measured vertically; excluding any roading or tracking activity that is undertaken in accordance with conditions on a subdivision consent is a ***Restricted Discretionary Activity.*** The earthworks associated with the formation of roads and tracks fall within the ambit of this rule, and therefore requires a resource consent.

9.3.4 Soil disturbance

WGN040184 [23260] relates to excavating the floor and side slopes of the landfill and the operation of borrow areas for the supply of construction and cover materials, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

Rule 2 of the RSP states that any soil disturbance on erosion prone land that involves the disturbance of greater than or equal to 1,000 m^3 of soil, within any 10,000 m^2 area (calculated using a minimum width of 10 m) and within any continuous 12 month period; or involves root raking over an area greater than 10,000 m^2 in any continuous 12 month period excluding any soil disturbance associated with roading and tracking activities or undertaken in accordance with conditions on a subdivision consent, is a ***Restricted Discretionary Activity.*** The excavation of the floor and side slopes of the landfill to operate borrow areas for the supply of construction and cover materials falls within the ambit of this rule, and therefore requires a resource consent.

9.3.5 Vegetation

WGN040184 [23261] relates to the clearing of vegetation from the landfill footprint, access roads, drains and the borrow area, which is not expressly allowed by a rule in a regional plan, an existing resource consent, or regulations, therefore resource consent is required.

Rule 4 of the RPS states that any vegetation disturbance activity which is provided for by Rule 2 but does not comply with any of the conditions in Rule 3, is a ***Restricted Discretionary Activity.*** The clearing of vegetation from the landfill footprint, access roads, drains and the borrow area falls within the ambit of this rule, and therefore requires a resource consent.

10. Matters for consideration

Section 104 of the RMA 1991 states the matters that a consent authority shall have regard to. These matters are:

- Various sections of the RMA 1991;
- The Regional Policy Statement for the Wellington Region;
- The Regional Freshwater Plan for the Wellington Region;
- The Regional Plan for Discharges to Land in the Wellington Region;
- The Regional Air Quality Management Plan for the Wellington Region;
- The Regional Soil Plan for the Wellington Region;
- The Centre for Advanced Engineering Landfill Guidelines;
- Ministry for the Environment Guidelines; and,
- United States Environmental Protection Authority Municipal Solid Waste Landfill Criteria.

The relevant sections are listed in Appendix 2 of this report.

11. Assessment of effects on the environment

In the following section, I have considered the potential adverse environmental effects of the proposed Stage 2 of Silverstream Landfill on natural and physical resources, including groundwater, surface water, ecology, air, existing land and water users and on cultural and archaeological resources.

11.1 Performance of existing landfill in comparison with proposed Stage 2

The Silverstream Landfill was developed in the early 1970s, with filling commencing in 1972. The existing Stage 1/and 1A parts of the landfill are unlined.

With few exceptions, the monitoring has shown that the existing landfill complies with the existing resource consent conditions and relevant guidelines, and that no significant adverse environmental effects have occurred.

The applicant points out that this compliance has been achieved by a landfill that was designed with no liner system and only basic leachate control. In comparison, the proposed Stage 2 extension incorporates state-of-the-art design and management features.

11.2 Surface water effects

11.2.1 Potential effects on surface water

Potential effects on surface water and its associated local ecology from the landfill are from:

- Suspended sediment from earthworks areas;
- Run-off contaminated from contact with waste material in working areas (including possible fugitive leachate);
- Modification of streambeds and flows due to surface water diversions and storage; and
- Reclamation of streambeds.

Unless runoff is properly managed, earthworks associated with the construction and operation of the landfill have the potential to result in increased levels of suspended solids being carried by stormwater runoff to Tip Stream and Hulls Creek.

Excessive sediment in runoff could have an adverse impact on aquatic life in Tip Stream and Hulls Creek (and possibly the Hutt River, if very severe). The effect of elevated sediment levels is to smother aquatic life, reduce light availability to instream plants, and reduce the ability of predators to see their prey. Similarly, toxins present in leachate have the potential to cause deleterious effects.

The potential effect of the landfill on water quality is significant. By expanding the landfill operation and extending it downstream, it could be assumed that levels of contaminants in discharges could increase, and that the zone of impact could be extended over a further distance downstream.

In their submission, Silverstream Retreat advise that following heavy rain, debris of various types comes down the stream that runs from the landfill and then down through their property. I have proposed Condition 13 for consent WGN040184 [23251] that controls the quality of the all water entering Tip Stream that is discharged from the landfill site. In addition to this, Condition 14 of this consent requires the applicant to carry out monthly inspections of Tip Stream following moderate to heavy rainfall for compliance with condition 14.

In their submission, Regional Public Health (RPH) express concern for potential leachate contamination of the Hutt Aquifer. RPH recommend that if any determinant in the annual monitoring for surface and groundwater shows a significant increase in concentration, then it should be included in the suit to be sampled monthly. I have proposed condition 12 of consent WGN040184 [23258] to address this concern.

In their submission, RPH request that the proposed new groundwater bores outlined in the AEE be subject to approval by Greater Wellington. I have proposed condition 13 of consent WGN040184 [23258] to address this request.

11.2.2 Mitigation of effects on surface water

(a) Sediment

The proposed Stage 2 development has been designed to ensure that all stormwater (from unaffected areas above the landfill, and from earthworks areas) will be diverted to a sedimentation pond prior to being discharged into Tip Stream. This system is designed to allow suspended material and associated contaminants to settle out in the pond, and therefore greatly reduce the amount of suspended material entering the stream. All stormwater from the landfill working face will be discharged to the leachate system, and from there it is discharged to sewer.

The proposed sedimentation pond and all related drainage measures have been designed in accordance with the Wellington Regional Council's and Auckland Regional Council's guidelines, and include overflow structures, and an emergency spillway for extreme events. The sedimentation pond has been sized for the entire landfill catchment area and includes a sediment forebay. It is designed to discharge stormwater to Tip Stream at a design rate of approximately 7.5m^3/s for the critical 1% AEP storm.

The applicant maintains that the adoption of a conservative design approach to the sedimentation pond will ensure good pond performance and reduced sediment discharges. In addition, the applicant outlined other operational measures designed to limit sediment generation at source, including:

- Grading of cut / fill areas;
- Local silt control measures (e.g. silt fences);
- Diversion drains and bunding;
- Effective diversion drainage;
- Protection of drain inverts and outlets;
- Use of local sediment sumps;
- Hydroseeding of batters and benches;
- Rapid and progressive rehabilitation of disturbed areas, including Stage 1/1A area; and
- Minimising exposed areas.

As a consequence of these measures, I consider that any effects due to sediment discharges will not be more than minor, and will be a major improvement over the current landfill's sediment control system. Overall, water quality is expected to improve as a result of the stormwater system upgrade.

As mentioned in the proposal section of this report, the applicant has advised that it may be practical to discharge the silt pond overflow through a wetland area before it returns to Tip Stream. Several groundwater springs have been observed on the side slopes and valley floor in this area. I consider this an excellent addition to the proposed sediment retention pond and would encourage any move by the applicant to incorporate a wetland.

I consider the proposed mitigation measures to be adequate for the purposes of minimising the adverse effects of sediment on Tip Stream. The proposed sediment retention pond and additional operational measures designed to limit sediment generation at source are in line with the Greater Wellington's *"Erosion and Sediment Control Guidelines for the Wellington Region"* dated September 2002. The applicant has also stated that any rubbish that accumulates in the sedimentation pond will be removed on a weekly basis. Such cleanup measures are likely to minimise any debris moving downstream following heavy rain and therefore satisfy the concerns of Silverstream Retreat.

(b) Leachate

The applicant considers that the chance of leachate contaminating surface water will be reduced by the advanced design of the liner system and leachate collection system. Leachate (as well as stormwater from the landfill working face) will be piped to the main sewer line and transferred to the Hutt Valley Wastewater Treatment Plant.

The proposed surface water control and diversion, careful attention to cell filling arrangements, and effective containment of refuse will minimise any risk of leachate breakout. The applicant considers it unlikely that any significant volumes of fugitive leachate would reach the surface water system.

The applicant proposes the following mitigation measures to be incorporated to minimise the risk of indirect leachate contamination (as a result of either poor management allowing leachate or refuse to contact surface water runoff, or surface breakout from final cap areas):

- strict operational procedures to separate areas that are potentially contaminated with leachate (to be diverted to leachate control system), from clean runoff areas (to be diverted to sedimentation pond);
- careful construction of cells, cell perimeter drainage and windowing, together with final cap to avoid surface breakout of leachate;
- routine monitoring of the sedimentation pond inflow and outflow for leachate;
- contamination indicator parameters (early warning system using grab samples for testing); and
- sedimentation pond outlet control devices that enable the pond to be shut off in the event of contamination occurring. This enables any stormwater retained as a result of leachate contamination to be diverted to the leachate disposal system.

Accordingly, the applicant considers that the likelihood of any leachate reaching Tip Stream is extremely low.

In terms of the likelihood of groundwater contaminating surface waters, groundwater from the greywacke beneath the landfill footprint will discharge to the drainage relief blanket beneath the liner and, subsequently, discharge to the sedimentation pond. When the proposed liner design is considered in combination with the favourable geohydrological characteristics of the site, then the risk of adverse effects on groundwater or the wider environment is

very low. This would remain the case even in the event of liner rupture (e.g. as a result of a very severe earthquake), since:

- The liner system provides primary containment, augmented by demonstrated excellent secondary containment provided by the base soils and rocks at the site;
- The natural subgrade soils are generally of low permeability and have significant attenuation capacity; and
- Distances and travel times to viable groundwater resources are significant and further contingency mitigation options are available.

As a result, the applicant considers the effect of any unexpected groundwater contamination on surface water quality to be negligible. However, monitoring of groundwater will ensure detection of any leachate seepage to groundwater, enabling further mitigation measures to be put in place if necessary.

In their submission, the Wellington Tenths Trust and Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui point out the sensitivity of surface water to leachate contamination. They emphasise the importance of the surface water resource to tangata whenua and the people of the Lower Hutt valley. Their concern is that the elevation of the Stage 2 development above the original landfill and to lower down the valley may result in an increased risk of contaminants reaching either or both the surface water of the Hutt River and ground water recharge area in this vicinity. Wellington Tenths Trust, however, is satisfied that the proposal adequately deals with these issues.

(c) Flow changes through diversion of water

Diversion of all surface water into the sedimentation pond could result in the potential for summer low flow reductions in Tip Stream following small rainfall events when pond levels are low (e.g. following a dry period) and hence runoff is retained rather than being discharged. However, the applicant considers the following factors mitigate the potential effects of this:

- The pond system is designed so that a discharge will occur from the pond for as long as the pond level is at, or greater than, the permanent pond level (which will be most of the time);
- Low flows will be enhanced by contribution from natural springs in the middle and lower catchment;
- Existing stream ecological values in the catchment are low;
- Storage attenuation provided by the sedimentation pond will reduce the peak flows from storm events and prolong the base flows (low to medium flows) after rainfall events; and
- The decant discharge structure draws water from the surface layer of the pond, which contains less suspended solids than the lower part of the water column during the decant cycle.

In summary, the applicant expects that, regardless of the run-off diverted to the leachate system, the overall mean flow below the dam will not be significantly different to the existing situation. However, the inflows to the sedimentation pond will be attenuated by the pond storage, which means that peak flows

during storm events will be reduced and the base flow in the stream (low and medium flows) will persist for longer compared with a "no pond" scenario, or with the current situation of two smaller ponds higher in the catchment receiving only part of the flow.

Submitters did not raise any concerns with respect to flow changes in Tip Stream. I consider the above mentioned mitigation factors to be adequate for the purposes of the proposed works. I consider that the flow of Tip Stream is unlikely to be affected as a result of the proposed works given the continuous outflow from the sedimentation pond.

(d) Fuel spills/contamination

Fuelling of bulldozers, motorscrapers and other earthworks machinery may result in fuel or lubricating oil spills entering drains and passing through the stormwater system, possibly affecting downstream water quality. Similarly, ground spills of diesel or lubrication products can cause (localised) contamination.

Mitigation measures proposed by the applicant that will be adopted and which will be detailed in the proposed Landfill Management Plan and conditions of the construction contract are that:

- Fuelling will be undertaken in active landfilling areas where stormwater is
- discharged to the leachate system;
- Designated fuelling areas will be identified and bunded;
- Equipment will be parked overnight or long-term only in designated areas; and
- Fuel tankers will be required to carry spill kits.

I consider the above mitigation measures to be adequate to control potential contamination of surface water by machinery. In addition to these measures, I have proposed Conditions 10 and 11 of consent WGN040184 [23253] that the release of contaminants into water.

11.3 Groundwater effects

11.3.1 Potential effects

Potential effects on groundwater associated with the proposed landfill extension are:

- Effects on groundwater quality from contaminated leachate;
- Consequent effects on groundwater and possibly surface water quality/resource availability; and
- Consequent effects on users of groundwater and surface water.

When considering a landfill development, the main geohydrological issue is usually the potential for contamination of groundwater by leachate, particularly due to possible rupture of the liner and/or failure of the leachate collection system. Concern often focuses on how this may affect groundwater use in the

surrounding area. The potential severity of this risk needs to be assessed considering the likelihood of leachate losses on the one hand and the availability/viability of a groundwater resource on the other.

Minor discharges of leachate to groundwater are possible from liner imperfections. However, the applicant maintains that these will be minimised at the Silverstream landfill by the adoption of a multi-layered liner and underdrainage system, incorporating a comprehensive leachate collection system. Leachate is then piped off-site (to the Hutt Valley Wastewater Treatment Plant) for treatment.

The most significant hazard that could lead to leachate escaping into groundwater at the site is liner rupture as a result of a large seismic event. However, even in such an event, at Silverstream, the applicant maintains that the presence of a great thickness of underlying massive, highly sheared, but relatively low permeability greywacke siltstone / sandstone means that in practical terms the site generally provides good natural containment with groundwater circulation limited and controlled by topography. Overall, the risk of significant leachate loss to groundwater, even locally within the site, is extremely low for the design approach adopted. I concur with this assessment.

No local groundwater resources of significance are either present, or in use, although the overall site area lies within a major catchment recharging the regionally important Hutt Aquifer system. As the applicant has pointed out, some 30 years of landfilling to date on the site in the absence of any engineered liner have not resulted in any detectable adverse effect on local surface water systems, or on the Hutt Aquifer.

Consequently, the risk to local groundwater resources, or the adjacent Hutt Aquifer from the proposed extension to the landfill is considered to be minimal. I have spoken to both Nick Hewer-Hewitt from the Utility Services Division and Andrew Jones, from Resource Investigations Division of Greater Wellington. Both Nick and Andrew are satisfied that any potential adverse effects from the proposed Stage 2 development on the groundwater resource will be no more than minor.

11.3.2 Mitigation of effects on groundwater

Mitigation measures provided with the application for groundwater protection include the adoption of a robust, engineered liner and leachate collection system, the adoption of early warning monitoring systems, and developing contingency plans to deal with potential effects for the low risk scenario of the liner ever being breached by ground displacement greater than that allowed for in the landfill design. Details of the landfill liner design are given in Section 3.0 and in the Preliminary Engineering Report (Appendix B) of the application. Key features in relation to groundwater protection include:

- Provision of a robust primary liner system over the entire footprint;
- Provision of further low permeability clay sub-liner fill on the landfill floor;
- Provision of a network of subsoil drains beneath the liner;

- Minimisation of leachate generation through effective active area management and cover placement; and
- Providing positive liner drainage to a central leachate drainage system and extraction of leachate to minimise head on the liner.

I consider that the above mitigation measures are adequate to protect groundwater from leachate contamination.

11.4 Loss of habitat

The Stage 2 extension will result in destruction of approximately 450-500m of the existing bed of Tip Stream, downstream from the existing silt ponds. A new, larger sedimentation pond will be constructed at the toe of the Stage 2 footprint, moving the "source" of Tip Stream from the existing silt ponds to the discharge point from the new sedimentation pond.

This extension will result in the loss of aquatic habitat over this stretch of Tip Stream. However, the habitat of Tip Stream is of limited value due to the direct impact of the landfill over the last 30 years, in that the catchment is physically interrupted and effectively "cut off" in its middle reaches. The habitat further downstream is in a reasonable state, comprising of steep sided banks with overhanging scrubby vegetation or undercut stream banks grassed with some scrub.

As the landfill currently occupies the bulk of the head of the catchment, no favourable aquatic habitat exists upstream of the affected reach. A fish species survey for Tip Stream and Hulls Creek was undertaken by the applicant in October 2003. The survey results showed the occasional presence of Redfinned Bullies, Shortfinned Eels, Longfinned Eels and Koura in various parts of the Tip Stream and Hulls Creek. Redfinned Bullies were only found upstream of the Silverstream Retreat. The concrete barrier would prevent their passage further upstream. Other barriers lower in the catchment (such as the weir beneath the Eastern Hutt Road bridge) including the concrete barrier effectively block fish passage from the Hutt River. The loss of habitat for aquatic fauna or the impedance of passage for native fish species is therefore not considered to be significant.

I consider the proposed loss of habitat to be negligible given the current state of the stream and barriers to fish passage lower in the catchment. If the applicant does implement their suggestion to include a wetland below the sediment retention pond, this will help to mitigate the loss of existing habitat by providing for birds while adding to the water quality entering Tip Stream.

11.5 Air quality

There are a number of activities that may result in effects on air quality as a result of landfill activities. The following is a summary of these.

11.5.1 Dust

(a) Potential effects

Dust at a landfill site can arise during dry, windy conditions, either during earthworks or associated with daily landfilling operations. The potential for dust generation during landfilling operations is usually associated with traffic movements on site access roads, particularly any unsealed site roadways, areas of exposed earthworks (including borrow areas) or from tipping of dusty loads of refuse at the working face.

The applicant states that the dust generated at landfills is generally in the larger (> 20 μm) "deposited particle" size range. The adverse effects of deposited particulate matter are primarily soiling of structures causing nuisance effects.

(b) Assessment of dust effects

The closest residential properties are approximately 350m north-west of the landfill, and beyond a high boundary ridgeline. The applicant maintains that considering the distance to neighbours, the topography of the area and the prevailing wind direction (north-east towards the southern end of Stokes Valley), it is unlikely that dust would have any significant off-site effects.

(c) Mitigation of dust effects

The following specific dust control measures are proposed by the applicant to mitigate any potential adverse effects of dust:

- Covering (as appropriate) of inbound dusty loads (a contractor performance requirement);
- Sealing of the access road and maintenance to remove dust from the access road (as necessary) to minimise tracking of dust from the site;
- Use of a water tanker vehicle in periods of dry, windy weather to dampen down active areas of the site and site roads;
- Controlled tipping of dusty loads at the working face (by dampening down and/or immediate coverage);
- Limiting vehicle speeds on unsealed roads to levels that do not raise visible dust, particularly during dry or windy weather; and
- Minimising the area of exposed earthworks.

I consider that these dust control measures will minimise dust emissions from the site and should ensure that any effects of dust on the environment will be no more than minor.

11.5.2 Odour

(a) Potential effects

Odours at landfill sites can originate from a number of sources, with the most significant being:

- Odorous loads entering the landfill;

- The working face itself;
- Excavations into old refuse;
- LFG generated by leachate collected in sumps; and
- LFG generated from the operating area and closed cells of the landfill.

Whether an odour has an objectionable or offensive effect will depend on the frequency, intensity, duration, offensiveness/character, and location of the odour. However, it is recognised that the likely level of odour is closely related to face management/cover practices, the timing and efficiency of LFG collection system installation, and the direct effects of transporting odorous loads.

(b) Assessment of odour effects

The topography of the area around the landfill affects the dispersion of emissions by influencing wind patterns. According to the applicant, the predominant wind direction recorded at the nearest NIWA weather station at Wallaceville is either a north-easterly or north-westerly, which would tend to blow any emissions from the landfill towards the southern end of Stokes Valley and away from the closest receptors located to the north-west of the landfill. The nearest houses in southern Stokes Valley are located on Lowry Crescent and Horoeka Street, approximately 1 km away from the landfill.

Winds from the south-east would carry odours from the landfill towards the closest receptors at Kingsley or Robson Streets in Stokes Valley. However, south-easterly winds are infrequent (6.5% of the time).

The Silverstream Retreat is located approximately 1km to the north of the landfill. Southerly winds are infrequent (about 10% of the time). However, this site could be affected by down-valley LFG drainage flows under calm conditions. No calms (wind speed less than 1m/s or 1km/hr) were recorded over the 1999 – 2002 period at the NIWA monitoring site. These conditions are therefore considered likely to be rare.

Steep slopes at RL 240m surround the eastern and southern sides of the site, sheltering the landfill from easterly to southerly winds. However, according to the applicant high winds from the north to west quadrants, which were common in 2002, will tend to recirculate in the cavity downwind of the landform causing a "wake" effect. Odour concentrations will tend to be elevated in the "wake" within the landfill. The closest houses to the east of the landfill are located at Wyndham Road in Pinehaven, approximately 1km away over a ridge. Therefore, off-site odours are considered to be unlikely in this area.

South of the landfill, the area is mainly in bush; no potential receptors have been identified in this area by the applicant. I concur with their opinion.

(c) Mitigation of odour effects

The following mitigation measures will be adopted in order to minimise odour generation at the site:

Active face/tipping of odorous loads:

- Separate general and special wastes;
- Special waste burial;
- Mix with fresh refuse;
- Immediate covering;
- Odour neutralising sprays, applied as necessary; and
- Workface covered progressively during day (minimise open area).

Removal of daily/intermediate cover (exposure of old refuse):

- Exposed refuse sprayed with odour neutralising spray, as necessary; and
- Covered quickly with fresh refuse.

Special waste pit

- Use of odour neutralising sprays;
- Control size of pit excavations; and
- Fit opening with steel covers and close immediately when not in use.

Passive venting through landfill cover

- Adequate cover thickness;
- Adequate liner design;
- Installation of hybrid type gas extraction wells;
- Earliest practicable connection to blower; and
- Surface emission monitoring and cap maintenance.

In addition, HCC has in place guidelines for the acceptability of wastes, and will not accept waste from operators who do not conform.

The applicant states that there are likely to be occasions when odours occur off-site due to LFG or refuse, but the improved LFG management system and waste handling procedures proposed (as set out in the Preliminary Landfill Management Plan (Appendix F) of the application) will ensure that odours occur only infrequently and should be of low intensity (i.e. not offensive or objectionable).

The odour control measures that are now in place at the landfill are in accordance with best practice. Therefore, provided that these measures are consistently implemented at the landfill, off-site odours should occur only infrequently and will be kept to a practicable minimum.

Several submitters expressed concern over odour issues associated with the proposed Stage 2 development. Ms Rangi-Thompson submitted that she is currently experiencing problems with odour and is concerned that continued residential development will generate an environmental battle.

Silverstream Retreat would like assurance that odour will be eliminated. In their submission, they advise that the smell can vary according to weather conditions.

Both Mr Hutchinson and Mr Tredrea expressed concern about the impact of continued odour on property resale values.

As outlined by the applicant in Appendix M of the application, improvements have been made to the existing operation to reduce odour emissions. Unlike the current landfill, a gas collection system is an essential element in the basic design. Improved management practices will reduce the potential odour discharge as demonstrated by the current landfill management practices.

I consider the mitigation measures provided by the applicant above, along with the improved design and operational practises proposed, will ensure the effects of odour will be minor. I have recommended Condition 6 of consent WGN04184 [23249] which limits any discharges to air that are offensive or objectionable beyond the boundary of the site. I have proposed Condition 17 of consent WGN040184 [23248] to ensure that by the end of each working day, the refuse and waste is fully covered.

11.6 Landfill gas

11.6.1 Potential effects

There is a range of potential adverse effects associated with LFG emissions if LFG is not adequately controlled and managed. The potential environmental and human health effects are:

- Flammability and explosion hazards from methane;
- Asphyxiation hazard from carbon dioxide;
- Vegetation stress (die-back) from carbon dioxide and trace organics toxicity, and soil heating from methane; and
- Odour nuisance.

11.6.2 Landfill gas effects assessment

The potential odour nuisance from LFG has been addressed in Section 11.5.2. Adverse environmental and/or human health effects from LFG may potentially arise through several scenarios.

Firstly, LFG build-up within buildings, service ducts etc. (were this to occur) could give rise to asphyxiation, explosion and flammability hazards. However, according to the applicant, the comprehensive liner system, relatively low permeability of the natural strata and the significant distance between the landfill and the nearest property will combine to prevent LFG from migrating from the site and posing a flammability and/or explosion hazard.

Secondly, build up of LFG in confined spaces/areas within the confines of the landfill itself could pose an asphyxiation hazard to site personnel involved in the daily running and maintenance of the site, due to a combination of the presence of carbon dioxide and/or oxygen depletion. Implementation of safe working practices and use of appropriate health and safety equipment (such as breathing apparatus in confined spaces) will mitigate any such hazard.

Vegetation die-back may occur in the immediate vicinity of passive gas vents, although the anticipated extent of the die-back is very limited. Similarly, landfill gas migrating laterally from the site could cause stress to nearby

vegetation. However, the applicant proposes to minimise the use of passive vents. The effective collection of the gas, together with the installation of a full sidewall liner system is intended to prevent both the build up and lateral migration of LFG from the site.

I consider that the adoption of best practice LFG collection technology will minimise the risk of any adverse effects from LFG at the landfill site to well within internationally accepted levels.

11.6.3 Mitigation of landfill gas effects

During the operation and aftercare of the landfill, the following LFG control and management measures will be implemented by the applicant to mitigate possible LFG effects:

- Use of a low permeability landfill liner to prevent LFG from migrating laterally from the site;
- Construction of a low permeability cap at the site to prevent the uncontrolled venting of LFG to atmosphere. (Because the final cap is relatively thick (1500mm excluding intermediate cover) it will act as an effective barrier for LFG and will reduce the risk of direct LFG loss via cracks in the cap.);
- Installation of an active LFG control system - this will prevent the build-up of LFG within the site and enable any LFG generated to be managed and controlled safely;
- Transfer of LFG to the power generation plant for beneficial re-use incorporation in the power generation plant of additional mitigation measures such as monitoring and alarm systems, adequate generator capacity, secure site electricity supply and redundant blower as back-up provision of standby flare;
- Implementation of an LFG monitoring programme will verify that the LFG control measures are operating satisfactorily and that LFG is not migrating from the site; and
- Adoption of safe working practices and use of appropriate health and safety equipment on the landfill, in accordance with standard health and safety protocols, will prevent any possible landfill gas related adverse human health effects from arising.

With appropriate LFG control and management systems in place, I consider that there should be no significant environmental or human health effects from LFG at the Silverstream landfill and there should be little or no impact beyond the site boundary.

11.7 Archaeological effects

No archaeological sites have been recorded within the area affected by the proposed landfill extension, and neither of the two closest existing sites (Upper Hutt Blockhouse, and Hutt Railway Museum) will be affected.

Based on this assessment, there is no requirement for an Authority from the New Zealand Historic Places Trust for this project (unless any archaeological

evidence is subsequently found). The applicant also considers that there is no requirement for archaeological monitoring during construction and development work.

However, the applicant maintains that all contractors will be educated about the possible presence of archaeological sites, what they may look like, and the relevant provisions of the Historic Places Act if any sites are discovered. Protocols will also be developed for the involvement of tangata whenua and the Historic Places Trust if evidence of sites is discovered.

The Wellington Tenths Trust and Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui agree that the likelihood of cultural material being present in the site is low, especially given the degree of modification of the site. However, they suggest that care should be taken in areas where there has been minimal historical disturbance of the original topsoil and possibly the flora, such as around the stream beds.

Wellington Tenths Trust and Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui support the overall application with the proviso that the Land Use Consents are approved with the following condition:

"That if during the excavation process koiwi (bones) or artefacts are unearthed, the contractor shall cease work immediately and contact Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and the Wellington Tenths Trust to allow appropriate rites and ceremonies to occur. That the article(s) may be removed after such a ceremony, if necessary and agreement is reached as to their final disposal with the Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and the Wellington Tenths Trust and any other relevant authority. This may involve contacting the Historic Places Trust".

I have recommended that this condition be imposed.

11.8 Hazards and contingency planning

11.8.1 Fire

The risk of landfill fires occurring at Silverstream is typical of a medium-sized landfill. The principal prevention of fire will be by heavy compaction applied to the waste, together with daily soil cover. Waste placement and specific fire control measures are detailed in the Preliminary Landfill Management Plan (Appendix F, Volume 3 of the application). The applicant concluded that provided cover measures are effective and other standard landfill management procedures are followed, the risk of fire is relatively low and the ability to deal effectively with any fire is high.

11.8.2 Adverse climatic conditions

The Preliminary Landfill Management Plan (Appendix F, Volume 3 of the application) contains specific mitigation measures for litter related to wind speed. In summary, the risk mitigation would be based on a tiered approach as follows:

(a) General mitigation

- Provision of shelter bunds and retaining forest block areas;
- Topographic shelter, particularly in the lower landfill cells; and
- Phase shaping/bunding (to provide shelter to unloading operations).

(b) Active mitigation

- Perimeter and semi-permanent litter fencing;
- Moveable litter fencing (around active filling face);
- Application of additional cover;
- Physical recovery of litter;
- Control or limitation of filling operations, including holding of containers in the transfer area – note container transfer / unloading is able to be physically sheltered using bunds or fences; and
- Under severe conditions cessation of waste placement until conditions improve.

Rainfall intensities expected at Silverstream will rarely exceed 100 mm over a period of 6 hours (based on historic data) and hence rainfall intensity has little potential to significantly affect site development.

Damage-causing lightning is a relatively rare event in New Zealand, but has the potential to bring down trees and/or directly cause power outages. This is expected to be a rare occurrence, but power outage effects could occur, with possible effects on the LFG system.

I consider any effects as a result of adverse climatic conditions to be no more than minor.

11.8.3 Earthquake

The landfill and its ancillary infrastructure are designed to resist ground shaking and possible displacements due to earthquakes up to the Design Basis Earthquake (DBE) or greater (equivalent to magnitude 7.3). This aspect of the design is described in the Geotechnical Report and Seismic Hazard Assessment (Appendices C and O of Volume 3 of the application).

The landfill liner is expected to deform and possibly yield under an earthquake approaching the Maximum Credible Earthquake (MCE). However, under such a regional MCE scenario, damage to regional infrastructure can be expected to be very severe. It is expected that such an earthquake would cause extensive damage to regional transport routes (roads and bridges), communications and other public utilities. Under such conditions the emergency responses and contingency procedures set out in the Landfill Management Plan would be implemented consistent with wider emergency responses in the region.

The release of leachate to surface water could conceivably occur if there were a rupture of the toe dam and damage to the leachate collection system such that leachate was released to the sedimentation pond. A release of accumulated leachate from the leachate blanket zone or lower sump area is conceivable, but

of very low risk. Under this scenario, assuming leachate had been allowed to accumulate for up to a week (this would not be normal practice), up to 200m^3 of leachate could be released (this is a conservative [high] estimate).

If uncontrolled release were to occur during toe bund rupture, all this leachate could potentially reach the sedimentation pond. For a worst-case scenario it could be assumed that if the event were so severe that the toe bund failed, then the sedimentation pond dam could fail as well. Therefore it could be assumed that all the released leachate and silt from the failed sedimentation pond dam would enter Tip Stream below the main dam over a period of approximately one hour. Under such a scenario, it could be expected that downstream properties would be affected to some degree. Some parts of the Silverstream Retreat could be affected – however, even at the building closest to the stream, water is expected to reach a depth of less than 1 m.

For this absolute worst case scenario, the adverse effects on downstream conditions resulting from the release of sediment and water that would be involved in a lower dam failure, would overwhelm any measurable impact from the parallel release of up to 200m^3 of leachate.

The risk of dam failure is mitigated through:

- Effective dam design minimising the risk of complete failure; and
- Maintaining low water levels in the sedimentation pond through the use of a decant outlet.

The likelihood of leachate being released to groundwater as a result of a severe earthquake scenario and causing off-site effects is considered to be low given:

- The inherent containment ability of the site (generally very “tight” low permeability greywacke bedrock);
- The secondary containment and attenuation capacity of site soils overlying the bedrock;
- The likely residual containment ability of the liner and leachate collection system even following (unlikely) displacement;
- The relatively low risk of such an event; and
- The ability to further mitigate (e.g. through groundwater recovery and pumping to sewer).

Leachate loss could conceivably occur if spreading, over-stressing or direct rupture of the liner were to occur in a severe earthquake. Depending on the location, all or part of the landfill could potentially contribute leachate to the area of actual liner rupture and hence contribute to a “leak”.

Given the spacing of the leachate drains and the liner slope configuration, only a small part of the landfill footprint is likely to be affected at any time. In some circumstances, again depending on rupture location and “timing” in relation to the state of landfill completion or post-closure age, the area affected might be able to be exhumed and repaired. However, if the failure occurred deep beneath the landfill, or low down in the valley part way through the landfill’s life then a

contingency situation could exist requiring control of leachate leakage rather than repair of the liner.

The likely maximum area contributing to a major rupture(s) is assessed by the applicant as not greater than 5% of the total footprint. At the worst case, in terms of ability to remediate, the landfill footprint could cover 1 ha. Therefore, on the basis of a 1 ha area contributing on average 3 m^3/ha/day of leachate, the worst case scenario for assessing offsite leachate migration potential under such conditions is some 32m^3/day of leachate of moderate (mature) strength. This figure is considered very conservative given the redundancy in the leachate collection system; actual maximum values are likely to be an order of magnitude less.

11.8.4 Other potential liner and leachate collection system failure scenarios

Other potential scenarios include:

- Overstressing of the liner during construction;
- Defects in the liner;
- Protection of the liner;
- Leachate loading exceeding design;
- Physical displacement of the leachate collection system; and
- Blockage of the leachate collection system.

Overstressing of artificial liners placed on steep slopes can occur if filling is carried out inappropriately. Under static, unloaded conditions, failure of the liner would not occur and this aspect is specifically dealt with in the design.

If problems were encountered with any area of the liner, mitigation would include:

- Moving to another unaffected filling area; and
- Excavation (as necessary) and repair of the affected liner area.

Liner placement will be undertaken within a framework of strict Quality Assurance/ Quality Control (QA/QC) controls. A liner QA/QC Plan will be prepared to accompany the liner specification and all aspects of liner placement will be subject to independent observation and verification testing, thus minimising the risk of significant post construction defects. This is standard practice for geosynthetic liner construction.

Once placed, the liner will require protection, particularly from ultraviolet (UV) degradation, until the soil protection layer is placed. As placement of the soil protection layer will occur progressively with cell filling given the typical slopes and the need to avoid over-stressing the liner, interim protection will be provided by a sacrificial plastic film or by adopting a high-performance HDPE product.

Blockage of the leachate collection system and or displacement /disruption of the liner is a very low probability risk event. However it could conceivably occur. In the event that there is accidental discharge of leachate to surface

water, contingency plans will include diverting surface water via temporary diversion drains, containment of contaminated water in the sedimentation pond, removal and treatment of contaminated surface water, and excavation of any contaminated sediment. The primary contingency measure in this case is the sedimentation pond, which can be totally isolated to contain any upstream spills onsite.

In the event of an accidental discharge to groundwater, in addition to the secondary containment features of the site, possible contingency measures include installation of groundwater recovery measures such as cut-off trenches and/or leachate abstraction via recovery wells followed by treatment.

11.8.5 Other events

The applicant states that any accidental discharges which do not occur as a result of an event detailed above will necessarily initiate a full investigation into the incident, and will require effective response to minimise the effect of any such unexpected discharge.

12. Statutory evaluation

12.1 The Resource Management Act

The matters to which Greater Wellington Regional Council (as consent authority) shall have regard to when considering applications for resource consents and related submissions is set out in Section 104 of the Act and the circumstances in which it can make a decision to grant a resource consent are set out in Sections 104A – 104D. Section 105 relates to matters relevant to certain applications, including coastal permits and discharge permits. The relevant sections of the Act are set out in Appendix 2.

In summary, subject to Part II of the Act, the following matters in Section 104(1) are relevant to this application:

(a) Any actual or potential effects on the environment of allowing the activity; and any relevant provisions of-

(b) (i) a national policy statement:

(ii) a New Zealand coastal policy statement:

(iii) a regional policy statement or proposed regional policy statement:

(iv) a plan or proposed plan; and

(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.

Section 104(2) states when forming an opinion for the purposes of subsection (1)(a), a consent authority may disregard an adverse effect of the activity on the environment if the plan permits an activity with that effect.

Section 104(3) states that when an application is for a discharge permit to do something that would otherwise contravene Section 15, the consent authority shall have regard to the actual and potential effects on the environment. This includes having regard to the nature of the discharge and the sensitivity of the receiving environment, and any possible alternative methods of discharge.

Section 104(5) states that a consent authority may grant a resource consent on the basis that the activity is a controlled activity, a restricted discretionary activity, a discretionary activity, or a non-complying activity, regardless of what type of activity the application was expressed to be for.

Section 104A states that after considering an application for a resource consent for a ***controlled activity***, a consent authority –

(a) must grant the application; but

(b) may impose conditions on the consent under section 108 for matters over which it has reserved control in its plan or proposed plan.

Section 104B states that after considering an application for a resource consent for a ***discretionary activity*** or non-complying activity, a consent authority –

(a) may grant or refuse the application; and

(b) if it grants the application, may impose conditions under section 108.

Section 105(1)(a) states that after considering an application for a resource consent for a controlled activity, a consent authority shall grant the consent, but may impose conditions under Section 108 in respect of those matters over which it has reserved control.

Section 105(1)(b) states that after considering an application for a resource consent for a discretionary activity, a consent authority may grant or refuse consent, and (if granted) may impose conditions, provided that where the consent authority (Greater Wellington) has restricted the exercise of its discretion consent may only be refused and conditions may only be imposed in respect of those matters specified in the plan.

The consent authority's power to grant consent is restricted by section 107.

Section 107 reads as follows:

> *"107* ***Restriction on grant of certain discharge permits***
>
> *(1) Except as provided in subsection (2), a consent authority shall not grant a discharge permit or a coastal permit to do something that would otherwise contravene section 15 or section 15A allowing—*
>
> *(a) The discharge of a contaminant or water into water;*
>
> *or*

(b) A discharge of a contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water; or

(ba) the dumping in the coastal marine area from any ship, aircraft, or offshore installation of any waste or other matter that is a contaminant,- if, after reasonable mixing, the contaminant or water discharged (either by itself or in combination with the same, similar, or other contaminants or water), is likely to give rise to all or any of the following effects in the receiving waters:

(c) The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials:

(d) Any conspicuous change in the colour or visual clarity:

(e) Any emission of objectionable odour:

(f) The rendering of fresh water unsuitable for consumption by farm animals:

(g) Any significant adverse effects on aquatic life.

(2) A consent authority may grant a discharge permit or a coastal permit to do something that would otherwise contravene section 15 or section 15A that may allow any of the effects described in subsection

(1) if it is satisfied—

(a) That exceptional circumstances justify the granting of the permit; or

(b) That the discharge is of a temporary nature; or

(c) That the discharge is associated with necessary maintenance work— and that it is consistent with the purpose of this Act to do so.

(3) In addition to any other conditions imposed under this Act, a discharge permit or coastal permit may include conditions requiring the holder of the permit to undertake such works in such stages throughout the term of the permit as will ensure that upon the expiry of the permit the holder can meet the

requirements of subsection (1) and of any relevant regional rules.

The effect of section 107 is such that a consent authority cannot grant consent for discharges which have the effects described in section 107(1)(c) –(g) after "reasonable mixing" except in the circumstances recognised in section 107(2).

I consider that the discharge of waste, fugitive leachate and other site-generated liquid to land, the discharge of stormwater, treated stormwater and groundwater to water, via the sedimentation pond, will not result in any of the above mentioned effects on Tip Stream. However, should the effects of these discharge permits fall outside the restrictions outlined in Section 107(1), I consider that the proposed discharges would fall within Section 107(2), as the potential for any significant discharge, aside from leachate, would be of a temporary nature.

Section 108(2) specifies the types of conditions that may be included in resource consents, and section 108(3) authorises conditions requiring monitoring. I have recommended conditions in accordance with Section 108.

Sections 2 and 3 – Interpretation and application

Section 104(1)(a) of the Act requires that consideration is given to the actual or potential effects on the environment of allowing the activity. In the Act the terms *"environment"* and *"effects"* have been defined as follows.

The term *"environment"* includes *"...ecosystems and their constituent parts, including people and communities; all natural and physical resources; amenity values and the social, economic, aesthetic and cultural conditions..."* which affect the aforementioned matters or are affected by those matters.

The term *"effect"* includes *"...any positive or adverse effect; any temporary or permanent effect; any past, present or future effect; and any cumulative effect which arises over time or in combination with other effects regardless of the scale, intensity, duration, or frequency of the effect, and also includes; any potential effect of high probability; and any potential effect of low probability which has a high potential impact."*

Section 5 – Purpose and principles

The purpose of the Act is to promote sustainable management of natural and physical resources.

In this Act, "sustainable management" means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while –

(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and

(c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.

Within this framework, it is considered that approving this resource consent application, subject to conditions, will enable the people and community of the Stokes Valley environs, and the wider Wellington region to provide for their social, economic and cultural well-being and for their health and safety. The proposed Stage 2 development will provide a refuse for waste for the present and future generations.

Section 6 – Matters of national importance

In exercising its powers and functions under the Act, the Regional Council is required to recognise and provide for the matters set out in Section 6, which are considered to be of national importance. However, in relation to this application, most of the matters addressed by Section 6 are not relevant.

Although the application is not considered to be a matter of national importance, I have addressed the effects of the proposal with particular reference to Sections 6(c) and 6(e).

Section 6(c) provides for the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna. The proposed Stage 2 development has the potential to affect native vegetation by removal of vegetation from borrow areas, landfill gas migration and dust deposition. The applicant has proposed management measures to minimise effects from these sources on vegetation. While the vegetation that will be affected is not considered nationally or regionally significant, there will be a net loss of native vegetation.

Section 6(e) provides for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga. The applicant undertook a preliminary archaeological investigation of the site and held discussion with iwi. The site is not known to contain any sites of cultural significance and in line with iwi concerns. Section 11.7 of this report addresses archaeological effects.

Section 7 – Other matters

The other matters to which the Regional Council must have particular regard are listed in Section 7 of the Act.

Section 7(a) provides opportunities for tangata whenua, through the practical expression of kaitiakitanga and ethic of stewardship to be involved in managing the use, development and protection of their ancestral taonga (resources). The Wellington Tenths Trust representing the tangata whenua has stated that there were no cultural issues associated with the proposed scheme.

The maintenance and enhancement of amenity values (Section 7c), the maintenance and enhancement of the quality of the environment (Section 7(f))

and finite characteristics of natural and physical resources (section 7(g)) are discussed in Section 11 of this report.

Section 8 – Principles of the Treaty of Waitangi

In considering the application, the Council is required to take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi). The Waitangi Tribunal and Courts continue to establish the principles of the Treaty of Waitangi and it is recognised that the principles are continuing to evolve. Two key principles that are of relevance to this application are active protection and consultation.

The general requirements of consultation have been well established by the judiciary and Courts both within and outside the Act. Consultation should facilitate tangata whenua understanding of the effects of a proposal on their relationship with the area in question to a point where the applicant can consider how those effects might be avoided, remedied or mitigated. Greater Wellington requires this kind of information to be able to assess how it can meet its statutory responsibilities.

The principle of active protection has been described as a "guarantee to Maori to continue a relationship with resources that was as much about their use as about their conservation" *NZ Cooperative Dairy Company Limited v Commerce Commission* (1991). In the context of this application, active protection must be taken into account when considering the tangata whenua relationship with their ancestral land, water, *waahi tapu* and other *taonga.*

The applicant has consulted extensively with local iwi about the proposed Stage 2 development. The Wellington Tenths Trust (Morris Te W Lowe) and Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui representing the tangata whenua supported the proposed development.

12.2 Regional Policy Statement for the Wellington Region (RPS)

The RPS (operative May 1995) is a statement about the resource management issues of significance to the region and the objectives, policies and methods which are designed to achieve integrated management of the natural and physical resources of the whole region. Greater Wellington in exercising its functions and powers needs to have regard to the relevant provisions of this document as follows:

Chapter 4 – The iwi environmental management system

Chapter 4 states the broad issues of resource management significance to tangata whenua of the region. In general, it states that: there are increased opportunities for the cultural aspirations and tikanga of tangata whenua with regard to resources; and the principles of the Treaty of Waitangi need to be taken into account in resource management.

- Objectives 4.3.1, 4.3.2, 4.3.3, 4.3.4
- Policy 4.4.2

- Method 4.5.4

Objective 4.3.2 calls for the principles of the Treaty of Waitangi to be taken into account in resource management. Policy 4.4.4 states that Greater Wellington, as the consent authority is to recognise and provide for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga.

The Wellington Tenths Trust and Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui support the application as the likelihood of cultural material being present in the site is low. I consider that the proposed Stage 2 development is consistent with these objectives and policies.

Chapter 5 – Fresh Water

Chapter 5 contains the objectives, policies and methods, which recognise the need to enhance freshwater water quality, the increasing use of water, the needs of future generations, loss of freshwater habitats, activities in the beds of rivers and streams and access to water bodies, and stormwater run-off from city streets. Objectives, policies and methods relevant to the application include:

- Objectives 5.3.1, 5.3.2, 5.3.3

- Policy 5.4.5

- Method 5.5.1

Policy 5.4.5 states that Greater Wellington should seek to improve water quality and restore contaminated water. The Stage 2 development incorporates stormwater enhancement by significantly upgrading the existing stormwater system. All stormwater from the catchment will be routed through a sedimentation pond, which is expected to improve the quality of water being discharged into the Tip Stream.

Overall, I consider that the proposed Stage 2 development is consistent with these objectives and policies.

Chapter 6 – Soil and Minerals

Chapter 6 contains the objectives, policies and methods, which address soil and mineral erosion, extraction, contamination and quality. Objectives, policies and methods relevant to the application include:

- Objective 6.3.1

- Policies 6.4.1, 6.4.6

- Methods 6.5.5, 6.5.20

Policy 6.4.6 seeks to avoid the adverse effects of harmful waste and contaminants on soil, and to dispose of these in ways which respect the assimilative capacity of the soil. A site-specific liner has been designed for the Stage 2 of the landfill.

I consider that the proposed Stage 2 development is consistent with these objectives and policies.

Chapter 8 – Air

Chapter 8 contains the objectives, policies and methods, which address climate change, ozone depletion and the management of odours. Objectives, policies and methods relevant to the application include:

- Objective 8.3.3, 8.3.4
- Policies 8.4.4, 8.4.5, 8.4.6, 8.4.9, 8.4.11, 8.4.12
- Method 8.5.4

The management practices for control of odour, dust generation and collection and utilisation of LFG will ensure that these objectives and policies are met.

Policy 8.4.12 seeks to avoid, remedy or mitigate the adverse effects of odours on public amenity. Various mitigation measures will be adopted in order to minimise odour generation at the source, these include immediate covering, use of odour neutralising sprays, gas extraction wells, and adequate cover thickness.

I consider that the proposed Stage 2 development is consistent with these objectives and policies.

Chapter 9 – Ecosystems

Chapter 9 contains the objectives, policies and methods, which address ecosystems and generally address the sustainable management of ecosystems. Objectives, policies and methods relevant to the application include:

- Objectives 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5
- Policy 9.4.1
- Method 9.5.2

I consider the application to be consistent with these objectives and policies.

Chapter 13 – Waste Management and Hazardous Substances

Chapter 13 deals with the production and disposal of hazardous substances and recognises the need dispose of contaminants containing human sewage appropriately to avoid adverse effects and to minimise the risk of damage to the environment and human health from contaminated sites. Objectives, policies and methods relevant to the application include:

- Objectives 13.3.1, 13.3.2, 13.3.3, 13.3.4
- Policies 13.4.1, 13.4.2, 13.4.5, 13.4.6, 13.4.7, 13.4.8, 13.4.9, 13.4.13

- Method 13.5.8, 13.5.9, 13.5.10, 13.5.11, 13.5.13

Objectives 13.3.1, 13.3.2 address waste minimisation and recycling initiatives. While the Stage 2 development is not strictly in line with such objectives, initiatives at the landfill that encourage recycling and public education about waste minimisation are. Policy 13.4.6 seeks to provide opportunities for the reuse of waste materials, recycling, and the recovery of resources from waste. Again the recycling facilities available at the landfill are in line with this policy.

Overall, I consider the application to be generally consistent with these objectives and policies.

12.3 Regional Plans`

12.3.1 Regional Freshwater Plan for the Wellington Region (RFP)

The RFP contains several objectives and policies aimed at avoiding, remedying or mitigating the potential adverse effects of use and development on fresh water resources. I consider that the application is consistent with the objectives and policies in Sections 4, 5, 6 and 7 of the RFP.

Section 4 considers the general objectives and policies in the RFP. In particular, Policy 4.2.5 has regard for the values and customary knowledge of the tangata whenua for the use and development of streams. Even though the Tip Stream is a highly modified watercourse, it must be considered in the light of tangata whenua values. The proposal has the support of the tangata whenua.

Section 5 considers the water quality of fresh water. In particular, policies 5.2.6 and 5.2.7 manage groundwater and surface water so that there are no net adverse affects on water quality as a result of discharges to surface water or groundwater. Policy 5.2.14 encourages the treatment of stormwater discharges to reduce the adverse effects of such discharges on the receiving water body. The landfill will be equipped with a liner, providing excellent primary containment. Some 30 years of landfilling to date on the site in the absence of any engineered liner have not resulted in any detectable adverse effect on local water systems or on the Hutt Aquifer. All water discharged from the site is diverted to a sedimentation pond prior to being discharged to Tip Stream.

Section 6 considers the taking and diversion of fresh water. In particular, Policy 6.2.2 provides for the taking of water from streams not identified in Policy 6.2.1, by having regard to the significance of amenity values. The creation of the sedimentation pond will affect the natural flow of Tip Stream. The taking of water from the stream is required, in order to divert the water through the sediment pond. Flow conditions in the streambed are expected to improve overall as flood peaks will be attenuated in the sedimentation pond and base flows in the stream will persist for longer. I consider the taking of water for the purpose of creating a sediment pond to be enhancing the amenity value and improving the water quality of the Tip Stream, and therefore not contrary to this policy.

Policy 6.2.3 seeks to manage the aquifers in each groundwater zone in Tables 6.2-6.5 using the safe yield shown and to maintain discretion over the allocation of aquifers not identified in the Tables. Policy 6.2.4 seeks to ensure that land use permits to construct a bore/well avoid damage to the structural integrity or contamination of the aquifer. It is proposed that groundwater will be monitored to ensure any leachate seepage to groundwater can be detected. The amount extracted for monitoring purposes does not exceed the safe yield as shown in table 6.4 for the Lower Hutt aquifer.

Policy 6.2.8 seeks to ensure that water permits to take groundwater consider excessive reductions in the yields of nearby bores and avoid significant adverse effects on surface water bodies. The proposal includes a water permit to take groundwater from beneath the landfill via monitoring bores or through collection of underdrainage for the purpose of monitoring groundwater. I do not consider that the taking of groundwater for monitoring purposes will have adverse effects on surface water bodies or the yields of nearby bores.

Policy 6.2.15 seeks to allow the diversion of water providing there is regard to avoiding, remedying or mitigating adverse effects. The water to be diverted from the Tip Stream is for the purpose of creating a sedimentation pond. The function of the sedimentation pond is to protect downstream environments from excessive sedimentation and water quality degradation.

Section 7 considers the appropriate use of beds of streams. In particular, Policies 7.2.1 and 7.2.2 list the appropriate uses within the beds of rivers and lakes and the characteristics of rivers and lakes that should not be significantly affected by uses of river and lake beds. The disturbance to the beds and banks of tributaries of Tip Stream and the construction of diversion structures in the riverbeds is for the purpose of stormwater management, which is expected to increase the current quality of Tip Stream.

12.3.2 Regional Plan for Discharges to Land for the Wellington Region (RPDL)

The RPDL contains several objectives and policies aimed at avoiding, remedying or mitigating the potential adverse effects of discharges of contaminants to land and discharges associated with contaminated sites. I consider that the application is consistent with the objectives and policies in Section 4 of the RPDL.

Policy 4.2.1 encourages all organisations and individuals who manage waste to implement the waste management hierarchy to the greatest extent practicable. The hierarchy includes reducing, re-using, recycling recovering, taking responsibility and rehabilitating resources and materials. Initiatives are proposed at the landfill that encourage recycling and public education about waste minimisation, in line with this policy.

Policy 4.2.6 discourages the siting of new landfills in areas which are vulnerable to natural hazards including flood plains, margins of lakes and rivers, areas with active geological faulting and unstable or erosion prone land. The Silverstream Landfill Stage 2 development site is located close to the active Wellington fault and is in an area which is subject to tectonic activity.

No evidence for active faulting within the footprint of the proposed Stage 2 landfill has been identified and the likelihood of ground rupture within the site is judged to be low. Overall, the risks are considered to be low to moderate and may be managed by appropriate liner and landfill design.

Policy 4.2.8 seeks to ensure that discharges of residual wastes to land occur only by way of disposal in municipal or private landfills which have the appropriate discharge consents. The proposal is in line with this policy.

Policy 4.2.9 sets out the matters which the Council will consider when assessing applications for discharge permits for landfills. The Policy applies to any discharges to land, including any discharges which occur when the landfill is no longer used for waste disposal.

Policy 4.2.10 requires the effects of discharges to and from landfills to be managed in accordance with site-specific landfill management plans. The Stage 2 development will be managed according to site-specific management plans.

Policy 4.2.11 allows the temporary discharge of solid contaminants onto land, provided that any adverse effects on water quality, soils and amenity values can be avoided, remedied or mitigated. The Stage 2 development will be managed according to site-specific management plans, which are specifically designed to avoid adverse effects on water quality, soils and amenity values.

Policy 4.2.19 allows the discharge of liquid contaminants to land that are not likely to have adverse effects on soil, water quality and amenity values, particularly where the effects of the contaminants would be greater if they were discharged directly to water. The proposed sedimentation pond will improve the quality of the stormwater which would otherwise be discharged directly into Tip Stream.

Policy 4.2.32 promotes provision for adequate treatment and disposal facilities for hazardous wastes in order to reduce quantities entering landfills. Hazardous waste will not be accepted at the landfill. At the public drop-off facility at the landfill, HCC provides an oil recycling tank.

Policy 4.2.43 gives priority to identifying contaminated sites with a history of storing hazardous substances, using ANZECC Guidelines. The Greater Wellington Selected Landuse Register classifies the Silverstream Landfill as "contamination confirmed".

Policy 4.2.44 gives priority to identifying contaminated sites including current and closed landfills. The Silverstream Landfill is recognised as a contaminated site. Throughout the planning and construction phase for the Stage 2 development, mitigation measures will be in place to control hazards associated with contaminated sites of this nature.

Policy 4.2.48 considers the potential to contaminate surrounding groundwater and surface water from a contaminated site. The landfill has been designed to ensure that all stormwater will be diverted to a sedimentation pond prior to being discharged into Tip Stream. This system will allow suspended material

and associated contaminants to settle out in the pond, and greatly reduce the amount of suspended material entering the stream. Similarly, the chance of leachate contaminating surface water is reduced by the advanced design of the liner system and leachate collection system. I consider the discharge of contaminants will be temporary in nature during the construction phase.

I consider that the proposed mitigation measures outlined in the application, together with the suggested conditions of consent will meet the intentions of the relevant policies. The policies are outlined in full in Appendix 2.

12.3.3 Regional Air Quality Management Plan for the Wellington Region (RAQMP)

The RAQMP contains several objectives and policies aimed at avoiding, remedying or mitigating the potential adverse effects of use and development on air quality. I consider that the application is consistent with the objectives and policies in Section 4 of the RAQMP.

Section 4 considers the general objectives and policies in the RAQMP. In particular, Policy 4.2.1 has regard for the Regional Ambient Air Quality Guidelines in Appendix 2 of the plan.

Policy 4.2.4 seeks to avoid, remedy or mitigate any adverse effect of the discharge of contaminants to air that are noxious, dangerous, offensive, or objectionable. Odours at landfill sites can originate from a number of sources. The predominant wind direction at the site would blow any emissions from the landfill towards the southern end of Stokes Valley and away from the closest residences located approximately 350m north-west of the landfill. Various mitigation measures will be adopted in order to minimise odour generation, these include immediate covering, use of odour neutralising sprays, gas extraction wells, and adequate cover thickness. I consider that given the good track record for a lack of odour issues at the site, along with the proposed mitigation measures, that the discharge of contaminants to air from the landfill site will be mitigated.

Policy 4.2.5 seeks to avoid or minimise, where appropriate and practicable, the discharge of contaminants to air at their source. Various mitigation measures will be adopted in order to minimise odour generation at the source, these include immediate covering, use of odour neutralising sprays, gas extraction wells, and adequate cover thickness. I consider these measures to be appropriate.

Policy 4.2.6 seeks to ensure that any measures adopted to avoid, remedy or mitigate the effects of discharges of contaminants to air, take account of the sensitivity of alternative receiving environments (e.g., water or soil). I consider that the mitigation measures adopted take into account of the sensitivity of alternative receiving environments.

Policy 4.2.7 seeks to avoid, remedy or mitigate the adverse effects of the discharge of contaminants to air on amenity values. The proposed design,

operation, and management of the landfill with regard to landfill gas, dust and odour will ensure consistency with this policy.

Policy 4.2.9 sets out the matters to which the Council will give particular consideration when assessing an application to discharge a contaminant to air. HCC has in place guidelines for the acceptability of wastes, and will not accept waste from operators who do not conform. I consider that provided the odour and dust mitigation measures are consistently implemented at the landfill, the discharge of contaminants to air should only occur infrequently and will be kept to a practicable minimum.

Policy 4.2.10 sets out the Council's approach to developing conditions on permits for the discharge of contaminants to air. The proposed conditions for the resource consents for the Stage 2 development are in line with the approach outlined in this policy.

Policy 4.2.12 outlines the matters to be assessed when determining whether any conditions should be placed on a resource consent and the nature of any such condition. The proposed conditions for the resource consents for the Stage 2 development are in line with this policy.

Policy 4.2.13 outlines the matters which a condition on a consent may relate to. Where appropriate, the proposed consent conditions relate to the matters outlined in this policy. The proposed conditions for the resource consents for the Stage 2 development are in line with this policy.

Policy 4.2.14 seeks to avoid, remedy or mitigate any adverse effects, (including on human health or amenity values) which arise as a result of the frequency, intensity, duration, offensiveness, time and location of the discharge to air of odorous contaminants. I consider that provided the odour and dust mitigation measures are consistently implemented at the landfill, the discharge of contaminants to air should only occur infrequently and will be kept to a practicable minimum.

12.3.4 Regional Soil Plan for the Wellington Region (RSP)

Policy 4.2.14 seeks to avoid, remedy or mitigate the adverse effects of vegetation disturbance. The Stage 2 development will require vegetation disturbance where borrow areas are located. Borrow areas will be used for sourcing liner and cover material and the balance of materials required for the final cap in the later years. The borrow area will be reshaped to provide contour that blends in with the surrounding landscape. The revegetation of the borrow area will be on-going throughout the life of the project.

Policy 4.2.15 seeks to regulate soil disturbance activities to ensure that they are unlikely to have significant adverse effects on erosion rates, soil fertility, soil structure, flood mitigation structures and works, water quality, downstream locations, bridges, culverts and other water crossing structures, aquatic ecosystems, and historic sites with tangata whenua values.

Policy 4.2.16 seeks to ensure that recognised erosion control and land rehabilitation techniques are adopted to avoid, remedy or mitigate any adverse effects resulting from soil disturbance activities.

13. Conclusions

The proposed Stage 2 development of Silverstream Landfill will cater for demand over the next 50 years and will therefore provide benefits to the people of Lower Hutt. The landfill has been designed to comply with *the Centre for Advanced Engineering Landfill Guidelines 2000* and is generally consistent with the United States Environmental Protection Agency Municipal Solid Waste Landfill (MSWLF) criteria, 40 CFR Part 258 (commonly referred to as USEPA Subtitle D).

The adverse effects have been considered and mitigation measures proposed to address them as far as practicable whilst recognising that landfills are contaminated sites and generally not well accepted by the public. I consider, that providing the proposed conditions are adhered to, effects during construction and operation, such as, site contamination, leachate, groundwater, site run-off, water discharges, odour, are able to be managed to ensure the level of effects are minimised.

On assessment, the Stage 2 development satisfies the requirements of the Resource Management Act 1991 and is consistent with the objectives, policies and rules of Greater Wellington's Regional Plans.

Consultation has identified matters of concern and support. The main concerns of submitters included odour, noise, impact on housing values, visual impacts, litter, vermin, flies and water quality in Tip Stream. The aspects of concern have been responded to as practicable. Some aspects of concern have been addressed through proposed consent conditions. All submitters that wished to be heard subsequently withdrew their wish to be heard.

My assessment concludes that the proposed Stage 2 development is a positive addition to the current Silverstream Landfill which will extend the landfill life considerably and allow it to function essentially as a new, "stand alone" landfill, largely independent of the Stage 1/1A landfill that it in part overlays and abuts.

14. Recommendation

I recommend, pursuant to Sections 104B, 105, 107 and 108 of the Resource Management Act 1991, that the Environment Committee grant the consents WGN040184 [23248-51, 23253-54, and 23256-63], subject to the suggested conditions of consent.

If the consents are granted, I recommend the following terms for the consents and suggested conditions to avoid, remedy or mitigate adverse environmental effects.

It should be noted that consents [23252] and [23255] have been deleted as the activities can be covered more simply by consents [23253] and [23256] respectively. Applications [23253] and [23256] were for streambed disturbance construction of the structures applied for in applications [23253] and [23256]. I consider it more appropriate that all activities relating to each structure be covered by one consent. Therefore, the consents finally issued will be two fewer than what the applicant originally applied for, and what was notified.

15. Term of consents

15.1 Lapse of consents

The applicant has not sought a lapse period for the proposed consents.

I consider a lapse period of five years for all permits under Section 125 of the Resource Management Act 1991 to be appropriate to allow the maximum time for works to commence and this is consistent with the amendments to the RMA, which came into effect on 1 August 2003.

15.2 Duration of consents

I have considered the duration of **thirty five years** appropriate under Section

123 (c) of the Act, for structures intended to be permanent;

[23255] Land use consent to disturb the beds and banks of tributaries of Tip Stream during construction of diversion structures for stormwater management.

[23256] Land use consent to construct diversion structures in the beds of tributaries of Tip Stream for the purpose of stormwater management.

[23252] Land use consent to disturb the bed and banks of Tip Stream for the construction of a sedimentation pond and flow control structures.

[23253] Land use consent to construct a sedimentation pond, dam, lined channel and drop structures in the bed of Tip Stream.

I have considered the duration of **thirty five years** appropriate under Section

123 (c) of the Act, for activities associated with landfilling, as these activities are to be undertaken for the life of the landfill.

[23248] Discharge permit to discharge waste, fugitive leachate and other site-generated liquid to land, in circumstances where contaminants may enter water.

[23251] Discharge permit to discharge uncontaminated stormwater, groundwater and treated stormwater from a sedimentation pond to Tip Stream.

[23250] Water permit to dam and divert Tip Stream for the purposes of creating a sedimentation pond.

[23254] Water permit to divert ephemeral streams and existing drains to a sedimentation pond.

[23249] Discharge permit to discharge landfill gas, exhaust gases, dust, odour and other contaminants to air from a landfill.

[23260] Land use consent to excavate the floor and side slopes of the landfill and to operate borrow areas for the supply of construction and cover materials.

[23261] Land use consent to clear vegetation from the landfill footprint, access roads, drains and the borrow area.

[23262] Land use consent to construct bores for monitoring groundwater quality.

[23259] Land use consent to undertake earthworks associated with the formation of roads and tracks.

I have considered the duration of **ten years** appropriate under Section 123 (d) of the Act, for diversions, and water takes, as this allows Greater Wellington to reassess the proposed consents with regard to water quality issues as required.

[23258] Water permit to take groundwater from beneath the landfill via monitoring bores or through collection of underdrainage.

[23257] Water permit to take fresh water from Tip Stream (via a sedimentation pond) for dust control and ancillary purposes.

I have considered an **unlimited** duration appropriate under Section 123 (a) of the Act, for the reclamation of Tip Stream.

[23263] Land use consent to reclaim a section of Tip Stream for landfilling purposes.

16. Suggested conditions

WGN040184 [23248] - Discharge permit to discharge waste, fugitive leachate and other site-generated liquid to land, in circumstances where contaminants may enter water.

General conditions

1. The location, design, implementation and operation of the discharge shall be generally as described in the resource consent application for Stage 2 development of the Silverstream Landfill and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents and the conditions, the conditions shall prevail.

2. The permit holder shall pass a copy of this consent and associated documents to any operator or contractor carrying out works permitted by this permit prior to the works commencing.

3. At least three months prior to commencing the landfilling activity, a Landfill Management Plan (LMP) shall be forwarded to the Manager, Consents Management, Wellington Regional Council for approval.

   The LMP shall provide details of the procedures to be put into place to operate the landfill in compliance with conditions of this permit and to minimise the potential for adverse effects due to the operation of the landfill. The LMP shall include, but not be limited to:

   - Description of the maintenance and development of the landfill;
   - Description of the monitoring programme and record keeping relating to this permit;
   - Description of hazardous waste acceptance criteria as specified in the *"Guide to the Disposal of Wastes at Hutt City Council Landfills*", dated May 1999 and methods of handling any unacceptable materials and the disposal of such material to an alternative facility;
   - The emergency procedures to be followed in the event of natural emergencies and hazardous waste spills;
   - The methods of controlling dust and odour emissions including the criteria for assessing when, and how regularly, roadways and the current landfill stages are dampened by water cart, or otherwise;
   - Methods for reducing fugitive dust and odour emissions during deposition of materials to the landfill face; and
   - Description of how landfill nuisances (including dust, litter, odour, noise, vermin, insects and birds) will be dealt with.

   The permit holder, by 1 October of each year, shall complete a review of the LMP to ensure that management practices result in compliance with the conditions of these consents. Proposed revisions shall be forwarded to the Manager, Consents Management, Wellington Regional Council for approval.

4. Landfill operations shall at all times be in accordance with the current provisions of the LMP.

5. The permit holder shall liase and work with the Silverstream Landfill Residents Liaison Group ('the Group') from the date of grant of this permit to develop a charter addressing issues as agreed between the Group and the permit holder. The permit holder shall report in writing to the Manager, Consents Management, Wellington Regional Council, annually as to the consultation and activities undertaken.

6. The permit holder shall pay to Wellington Regional Council any administrative charge fixed in accordance with Section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under Section 36 of the Act.

7. Pursuant to Section 128 of the Resource Management Act 1991 the Wellington Regional Council may commence a review of any of the

conditions of any of the consents, at any time within six months of the second, fifth, tenth, fifteenth, twenty-fifth and thirtieth anniversaries of the date of grant of this permit for any of the following purposes:

- To deal with any actual or potential adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; and/or
- To review the adequacy of any plan prepared for this permit and incorporating any requirements into relevant conditions; and/or
- To require additional monitoring to assess impacts, or specific action to be taken to mitigate demonstrated environmental impacts; and/or
- To allow a reduction in the level of monitoring.

8. Not less than six months prior to the expiry or surrender of this consent, the permit holder shall apply for such consents as are required for either the closure or future management of the landfill.

9. The permit holder's interest in this permit may not be transferred to any owner or occupier of the site pursuant to Section 137 of the Resource Management Act 1991.

Specific conditions

10. Waste and any fugitive leachate and other site-generated liquid shall only be discharged onto, or into, land on those areas of the site identified as the Proposed Stage 2 Landfill Footprint (see drawing No. 2 "*Landfill Catchment Topography*" of the application).

11. No waste, other than Municipal Solid Waste (MSW), shall be accepted for disposal.

    Note: For the purposes of this permit, the definition of MSW shall be any non-hazardous, solid waste from a combination of domestic, commercial and industrial sources.

12. No liquid waste, other than site generated liquid waste, shall be accepted for disposal. The definition of liquid waste shall be any waste that has a solids content of less than 20%, except such waste that passes the Paint Filter Liquids Test (EPA Method 9095A).

13. Medical wastes shall be acceptable for disposal in accordance with NZS 4304:2002 "*Health Care Waste Management*".

14. Hazardous waste shall not be accepted for disposal at the Landfill.

    Note: For the purposes of this permit, the definition of "hazardous waste" shall be:

    (i) Any waste that:

(a) contains hazardous substances at sufficient concentration to exceed the minimum degrees of hazard specified by *Hazardous Substances (Minimum Degrees of Hazard) Regulations 2000* under the *Hazardous Substances and New Organism Act 1996*, or

(b) Meets the definition for radioactive material included in the *Radiation Protection Act 1965 and Regulations 1982.*

(ii) Wastes which exhibit the characteristics of toxicity and eco-toxicity which following testing using the US EPA Toxicity Characteristic Leaching Procedure (TCLP) result in leachable concentrations of contaminants in excess of the leachable concentration values in NSW EPA "*TCLP Values for Solid Waste Landfills (1998)*". Where NSW EPA TCLP values do not exist for a substance for which a disposal request is made, the TCLP limit shall be set at the lesser of:

(a) NZS 9201 Trade Waste Bylaw limits; or

(b) 100 times the New Zealand Drinking Water Standard (2000); or

(c) 1000 times the 95 percent level of protection trigger values for freshwater as listed in Table 3.4.1 of "*Australian and New Zealand Guidelines for Fresh and Marine Water Quality"* (ANZECC, 2000).

15. The permit holder shall maintain daily records of:

- The quantities and types of waste accepted at the landfill; and
- The actual location of the disposal of any special and odorous wastes.

A copy of this record shall be forwarded to the Manager, Consents Management, Wellington Regional Council by 1 October each year, unless otherwise agreed in writing by the Manager, Consents Management, Wellington Regional Council.

16. The permit holder shall monitor the volume of leachate withdrawn from the landfill and record this volume on a daily basis. This record shall be reported in writing to the Manager, Consents Management, Wellington Regional Council by 1 October each year, unless otherwise specified in writing by the Manager, Consents Management, Wellington Regional Council.

17. The permit holder shall, by the end of each working day, fully cover the refuse and waste at the landfill with suitable cover. Sufficient supplies of suitable cover material shall be stock piled on site at all times.

18. A final compacted soil capping layer of at least 1.5 metres shall be applied by the permit holder to each completed landfill stage.

19. The permit holder shall take all practicable measures to prevent windblown litter from leaving the active landfilling area. These measures shall include, but not be limited to, the use of movable screens.

20. The permit holder shall regularly monitor the landfill site for build-up of litter, paper and other deposits outside the active landfilling area, and remove any such material on a weekly basis.

21. The permit holder is to take effective precautions to ensure that refuse and dirt is not tracked or otherwise taken off the landfill site. The methods of controlling this shall be addressed in the LMP required under Condition 3 of this permit.

WGN040184 [23249] Discharge permit to discharge landfill gas, exhaust gases, dust, odour and other contaminants to air from a landfill.

General conditions

1. The location, design, implementation and operation of the discharge to air shall be generally as described in the resource consent application for Stage 2 development of the Silverstream Landfill and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents and the conditions, the conditions shall prevail.

2. The permit holder shall pay to Wellington Regional Council any administrative charge fixed in accordance with Section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under Section 36 of the Resource Management Act 1991.

3. Pursuant to Section 128 of the Resource Management Act 1991 the Wellington Regional Council may commence a review of any of the conditions of any of the consents, at any time within six months of the second, fifth, tenth, fifteenth, twenty-fifth and thirtieth anniversaries of the date of grant of this permit for any of the following purposes:

    - To deal with any actual or potential adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; and/or
    - To review the adequacy of any plan prepared for this permit and incorporating any requirements into relevant conditions; and/or
    - To require additional monitoring to assess impacts, or specific action to be taken to mitigate demonstrated environmental impacts; and/or
    - To allow a reduction in the level of monitoring.

4. Not less than six months prior to the expiry or surrender of this consent, the permit holder shall apply for such consents as are required for either the closure or future management of the landfill.

5. The permit holder's interest in this permit may not be transferred to any owner or occupier of the site pursuant to Section 137 of the Resource Management Act 1991.

Specific conditions

6. There shall be no discharges to air that are noxious, dangerous, offensive or objectionable at or beyond the legal boundary of the permit holder's property. These discharges include odour and dust.

Complaints and incidents

7. The permit holder shall keep a permanent record of any complaints received alleging adverse effects from the permit holder's operations. The complaints record shall contain the following where practicable:

   (a) the name and address of the complainant, if supplied;

   (b) identification of the nature of the complaint;

   (c) date and time of the complaint and alleged event;

   (d) weather conditions at the time of the alleged event;

   (e) results of the permit holder's investigations; and,

   (f) any mitigation measures adopted.

   The complaints record shall be made available to the Wellington Regional Council on request.

   The permit holder shall notify the Manager, Consents Management, Wellington Regional Council, of any complaints received, which relate to the exercise of this permit, within 24 hours of being received, or on the next working day.

8. The permit holder shall keep a permanent record of any incident that could have caused or have caused adverse effects on the environment at or beyond the boundary or caused a breach of any condition of this resource consent.

   The permit holder shall notify the Manager, Consents Management, Wellington Regional Council, of any incident within 24 hours of the incident being brought to the attention of the permit holder or on the next working day.

   The permit holder shall forward an incident report to the Manager, Consents Management, Wellington Regional Council within seven

working days of the incident occurring, unless otherwise agreed with the Manager, Consents Management, Wellington Regional Council.

Odour control

9. Refuse shall be covered with cleanfill or soil cover to a minimum depth of 150mm at the end of each working day. Alternative daily cover materials, such as tarpaulins, may be used in lieu of the clean fill or soil cover, with the approval in writing from the Manager, Consents Management, Wellington Regional Council. No refuse shall remain exposed overnight.

Gas management

10. The concentration of methane in monitoring probes outside the landfill footprint shall not exceed 5% by volume.

11. There shall be no visible emission, other than water vapour, light, heat haze, or steam, from any landfill gas flare.

12. The concentration of methane at the surface of landfill areas with intermediate or final cover shall not exceed 0.5% by volume.

13. The permit holder shall install a landfill gas extraction system in general accordance with drawings 50 ("*Landfill Gas Extraction Well Layout"*) and 51 ("*LFG System – Typical*") and associated plans included in the consent application, dated November 2003.

14. All extraction wells shall be connected to the gas extraction system no later than 12 months after placing wastes within the radius of influence of the wells. Gas venting from the wells prior to connection to the gas extraction system may be burnt by passive flares.

15. Except as provided in Condition 14, all extracted landfill gas shall be combusted in a flare or generator. The gas collection and treatment system shall be restored as soon as practicable in the event of a malfunction, fault, or power outage.

Monitoring and reporting

16. The permit holder shall undertake a weekly walkover site inspection. Any evidence of actual or potential landfill gas leaks, such as odour, cracks in the landfill surface, gas bubbles, leaks in the gas extraction system, or vegetation damage, shall be investigated. Where necessary remedial action shall be undertaken as soon as practicable to minimise fugitive gas discharges. Monitoring of surface emissions shall be carried out to demonstrate compliance with this condition on a quarterly basis.

17. Methane concentrations shall be measured and recorded on a monthly basis in each of the monitoring probes outside of the landfill footprint to demonstrate compliance with Condition 10.

18. Landfill gas shall be monitored at each extraction well head or, if more appropriate, at manifold points, on a three-monthly basis. The following parameters shall be measured and recorded:

    (a) gas flow rate;

    (b) gas composition (% methane, % oxygen, % carbon dioxide);

    (c) gas temperature;

    (d) ambient temperature;

    (e) gas pressure;

    (f) barometric pressure;

    (g) ppm carbon monoxide if residual nitrogen exceeds 15%;

    (h) hydrogen sulphide; and

    (i) total non-methane organic compounds.

19. The permit holder shall measure and record on-site weather conditions every 30 minutes. The parameters measured shall include:

    (a) wind velocity and direction;

    (b) barometric pressure;

    (c) rainfall; and

    (d) temperature.

20. The permit holder shall maintain a permanent log of all inspections, investigations and actions taken with respect to the landfill gas system.

21. If monitoring demonstrates that the methane gas concentration limit specified in Condition 12 is exceeded, then remedial action shall be carried out and the concentrations re-tested within 14 days. If this is not practicable, the permit holder shall prepare a programme of remedial action, including a timetable, within 14 days of the exceedance. The proposed programme shall be implemented within the proposed time period.

22. The permit holder shall provide sufficient on-site electrical generation, or other appropriate measures, to ensure the operation of landfill gas flare equipment is not interrupted for more than two hours through loss of mains power supply.

Reporting

23. The permit holder shall produce and submit a quarterly report, including the results from all monitoring required under this consent, and shall forward the report to the Manager, Consents Management, Wellington Regional Council within three weeks of the completion of that quarter.

24. The permit holder shall submit a monitoring and contingency plan to the Manager, Consents Management, Wellington Regional Council for approval one month prior to commencing monitoring. The plan shall:

    - Set out responsibilities for carrying out the monitoring;
    - Evaluate results; and
    - Set out both groundwater and surface water response standards and contingency measures to be implemented should those standards be exceeded.

WGN040184 [23250] Water permit to dam and divert Tip Stream for the purposes of creating a sedimentation pond.

General conditions

1. The location, design, implementation and operation of the dam and diversion shall be generally as described in the resource consent application for Stage 2 development of the Silverstream Landfill and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents and the conditions, the conditions shall prevail.

2. The permit holder shall pass a copy of this permit and associated documents to any operator or contractor carrying out works permitted by this permit prior to the works commencing.

3. The permit holder shall pay to Wellington Regional Council any administrative charge fixed in accordance with Section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under Section 36 of the Resource Management Act 1991.

4. Pursuant to Section 128 of the Resource Management Act 1991 the Wellington Regional Council may commence a review of any of the conditions of any of the consents, at any time within six months of the second, fifth, tenth, fifteenth, twenty-fifth and thirtieth anniversaries of the date of grant of this permit for any of the following purposes:

    - To deal with any actual or potential adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; and/or
    - To review the adequacy of any plan prepared for this permit and incorporating any requirements into relevant conditions; and/or

- To require additional monitoring to assess impacts, or specific action to be taken to mitigate demonstrated environmental impacts; and/or
- To allow a reduction in the level of monitoring.
- Not less than six months prior to the expiry or surrender of this consent, the permit holder shall apply for such consents as are required for either the closure or future management of the landfill.

Specific conditions

6. The Manager, Consents Management, Wellington Regional Council, shall be given a minimum of 48 hours notice prior to the works commencing.

Works/design conditions

7. Any erosion of the stream bank or bed that is attributable to the works carried out as part of this permit shall be repaired by the permit holder.

8. Diversion channels and cut-off drains shall be maintained to minimise the infiltration and run-off of stormwater onto the landfill from areas outside the landfill footprint.

9. All diverted stormwater shall be treated in the sedimentation pond as shown on Drawing 1 "*Proposed Stage 2 Development*" and Drawing 40 "*Permanent Stormwater Drainage Catchment Plan*", submitted as part of the application.

10. The permit holder shall ensure that any fish that are stranded during construction and dewatering are immediately placed back in the active flowing channel. Dewatering is the process of the former area of active flowing channel losing water after the new channel begins to operate.

WGN040184 [23251] Discharge permit to discharge uncontaminated stormwater, groundwater and treated stormwater from a sedimentation pond to Tip Stream.

General conditions

1. The location, design, implementation and operation of the discharge shall be generally as described in the resource consent application for Stage 2 development of the Silverstream Landfill and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents, and the conditions, the conditions shall prevail.

2. The permit holder shall pass a copy of this permit and associated documents to any operator or contractor carrying out works permitted by this permit prior to the works commencing.

3. The permit holder shall pay to Wellington Regional Council any administrative charge fixed in accordance with Section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under Section 36 of the Resource Management Act 1991.

4. Pursuant to Section 128 of the Resource Management Act 1991 the Wellington Regional Council may commence a review of any of the conditions of any of the consents, at any time within six months of the second, fifth, tenth, fifteenth, twenty-fifth and thirtieth anniversaries of the date of grant of this permit for any of the following purposes:

   - To deal with any actual or potential adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; and/or
   - To review the adequacy of any plan prepared for this permit and incorporating any requirements into relevant conditions; and/or
   - To require additional monitoring to assess impacts, or specific action to be taken to mitigate demonstrated environmental impacts; and/or
   - To allow a reduction in the level of monitoring.

5. Not less than six months prior to the expiry or surrender of this permit, the permit holder shall apply for such consents as are required for either the closure or future management of the landfill.

6. The permit holder's interest in this permit may not be transferred to any owner or occupier of the site pursuant to Section 137 of the Resource Management Act 1991.

Specific conditions

7. The discharge of stormwater from the sedimentation pond shall not result in any of the following effects in Tip Stream at or beyond the boundary of the landfill property:

   (a) The production of any conspicuous oil or grease films, scums or foams or floatable or suspended material;

   (b) Any conspicuous change in colour or visual clarity;

   (c) Any emissions of objectionable odour;

   (d) The rendering of fresh water unsuitable for consumption by farm animals;

   (e) Any significant adverse effect on aquatic life; and/or

   (f) Any visible deposition of iron oxide.

Surface water monitoring

8. The permit holder shall carry out monthly inspections of Tip Stream below Silverstream Landfill and following moderate to heavy rainfall for compliance with Condition 7 of this consent.

9. All stormwater coming into contact with refuse shall be discharged into the leachate collection system and not into the sedimentation pond.

10. The permit holder shall place and maintain an appropriate sign near Tip Stream on the south-western boundary of the landfill to the satisfaction of the Manager, Consents Management, Wellington Regional Council. This sign shall:

    (a) Provide clear identification of the location and nature of the discharge and advise that the stream is not suitable for contact recreation; and

    (b) Be visible to the public visiting the area without unnecessarily detracting from the visual amenity of the area.

11. The permit holder shall monitor water quality in Tip Stream at sampling locations to be approved by the Manager, Consents Management, Wellington Regional Council. The permit holder shall provide the sampling protocols to the Manager, Consents Management, Wellington Regional Council, at least one month before sampling commences. To this end, the permit holder shall monitor for the following parameters twice a year, to coincide with low flow during the winter groundwater level maximum (September) and summer groundwater minimum (April):

    - estimate of flow
    - pH (field and laboratory)
    - conductivity (field and laboratory)
    - BOD_5
    - Chloride
    - Potassium
    - ammoniacal nitrogen
    - nitrate nitrogen
    - dissolved reactive phosphorous
    - potassium
    - total zinc
    - total boron
    - suspended solids.

    Sampling shall be undertaken in accordance with protocols approved in writing by the Manager, Consents Management, Wellington Regional Council. The results of such monitoring shall be reported in writing to the Manager, Consents Management, Wellington Regional Council within two months of completion of the sampling.

12. The permit holder shall monitor (15-minute readings) water entering the sedimentation pond and water flowing from the pond outlet for the following parameters:

    - pH
    - Conductivity

    The trigger levels set shall be supplied to the Manager, Consents Management, Greater Wellington Regional Council within one month of monitoring commencing.

    Note: For the purposes of this permit, trigger levels to indicate potential leachate contamination shall be set using the following:

    pH = the mean plus or minus three standard deviations of baseline stormwater pH data from three months of continuous monitoring of the Tip Stream surface water system prior to refuse deposition in Stage 2.

    Conductivity = the mean plus three standard deviations of baseline stormwater conductivity data from three months of continuous monitoring of the Tip Stream surface water system prior to refuse deposition in Stage 2.

13. The monitoring system shall be fitted with an alarm to indicate when trigger levels for pH or conductivity have been exceeded at either the pond inlet or the outlet. The sedimentation pond shall be configured such that in the case of contamination being detected at the outlet, the outflow can be stopped for conditions which do not result in flow over the auxiliary spillway, and shall include provision for pumping to enable contaminated stormwater to be re-circulated to the landfill or diverted to the leachate system for treatment as leachate.

14. If the trigger levels for continuous pH and conductivity monitoring are exceeded, the permit holder shall take a grab sample of water from the sampling point at the outlet from the sedimentation pond, as shown on Drawing 46 "*Stormwater Sedimentation Pond Layout*" of the application and analyse this sample for the parameters listed below:

    pH
    Conductivity
    Ammoniacal nitrogen
    Nitrate nitrogen
    Alkalinity
    Chloride
    Potassium
    Total organic carbon

    Sampling shall be undertaken in accordance with protocols to be approved by the Manager, Consents Management, Wellington Regional Council under condition 11 of this permit.

The results of the grab sample analysis shall be reported to the Manager, Consents Management, Wellington Regional Council within two weeks of sampling, unless otherwise agreed in writing by the Manager, Consents Management, Wellington Regional Council.

15. All water quality sample analyses required shall be undertaken using standard methods as detailed in the "Standard Methods for the Examination of Water and Waste Water 1998", twentieth edition by APHA and AWWA and WEF or by some other method approved in advance in writing by the Manager, Consents Management, Wellington Regional Council. A laboratory that is accredited to ISO/IEC Guide 25 for those specific tests shall carry out all testing.

16. If monitoring of the discharge system indicates leachate contamination, then the permit holder shall take immediate steps to prevent further leachate contamination and immediately report to the Manager, Consents Management, Wellington Regional Council on actions taken and further actions proposed to address leachate contamination.

Reporting

17. The permit holder shall produce and submit a quarterly report, including the results from all monitoring required under this consent, and shall forward the report to the Manager, Consents Management, Wellington Regional Council within three weeks of the completion of that quarter.

18. The permit holder shall submit a monitoring and contingency plan to the Manager, Consents Management, Wellington Regional Council for approval one month prior to commencing monitoring. The plan shall:

- Set out responsibilities for carrying out the monitoring;
- Evaluate results; and
- Set out both groundwater and surface water response standards and contingency measures to be implemented should those standards be exceeded.

WGN040184 [23253] Land use consent to construct, use and maintain a sedimentation pond, flow control structures, dam, lined channel and drop structures in the bed of Tip Stream, and to carry out the associated disturbance of the bed and banks of Tip Stream.

General conditions

1. The location, design, implementation and operation of the Stage 2 development of the Silverstream Landfill shall be generally as described in the resource consent application and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents and the conditions, the conditions shall prevail.

2. Detailed designs of all 'principal' works shall be forwarded to the Manager, Consents Management, Wellington Regional Council at least ten working days prior to works commencing.

   Note: For the purposes of condition 2, 'principal' works means the sedimentation pond, the flow control structures, the dam, and the lined channel and drop structures.

3. The consent holder shall pass a copy of this consent and associated documents to any operator or contractor operating the landfill or carrying out works permitted by the consent on their behalf prior to the works commencing.

4. The consent holder shall pay to Wellington Regional Council any administrative charge fixed in accordance with Section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under Section 36 of the Resource Management Act 1991.

5. Pursuant to Section 128 of the Resource Management Act 1991 the Wellington Regional Council may commence a review of any of the conditions of any of the consents, at any time within six months of the second, fifth, tenth, fifteenth, twenty-fifth and thirtieth anniversaries of the date of grant of this permit for any of the following purposes:

   - To deal with any actual or potential adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; and/or
   - To review the adequacy of any plan prepared for this permit and incorporating any requirements into relevant conditions; and/or
   - To require additional monitoring to assess impacts, or specific action to be taken to mitigate demonstrated environmental impacts; and/or
   - To allow a reduction in the level of monitoring.

6. Not less than six months prior to the expiry or surrender of this consent, the consent holder shall apply for such consents as are required for either the closure or future management of the landfill.

Specific conditions

7. The Manager, Consents Management, Wellington Regional Council, shall be given a minimum of 48 hours notice prior to the works commencing.

Works/design conditions

8. All material used to construct the dam in Tip Stream shall be inert and have no potential to produce harmful effects on the environment.

9. A certificate signed by the person or persons (or suitably qualified person) responsible for designing the 'principal' works and structures,

outlined in Condition 2, shall be submitted to the Manager, Consents Management, Wellington Regional Council within one month of completion of the works to certify that the works were carried out in accordance with the design plans submitted.

10. All practicable steps shall be taken to minimise sedimentation and turbidity in the stream, during the implementation, construction and operation of the works. These steps shall include, but not be limited to:

    - Separating construction activities from flowing water; and
    - Not cleaning, storing or refuelling machinery within 10 metres of the stream.

11. No contaminants (including but not limited to oil, petrol, diesel, hydraulic fluid) shall be released into water from equipment being used for the activity.

12. All works affecting the watercourse, including tidy-up on completion of the works shall be completed to the satisfaction of the Manager, Consents Management, Wellington Regional Council.

13. The works shall remain the responsibility of the consent holder and shall be maintained so that:

    - Any erosion of the stream bank or bed that is attributable to the works carried out as part of this consent is repaired by the consent holder;
    - The structural integrity of the structures remains sound; and
    - The batters of the dam structure shall be 'stabilised' against erosion within three months of completion of the structure.

    Note: For the purposes of Condition 13, 'stabilised' in relation to any site or area means inherently resistant to erosion or rendered resistant, such as by using indurated rock or by the application of basecourse, colluvium, grassing, mulch, or another method to the reasonable satisfaction of the Manager, Consents Management, Wellington Regional Council and as specified in Wellington Regional Council's "*Erosion and Sediment Control Guidelines for the Wellington Region"*. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once, on reasonable visual inspection by the Manager, Consents Management, Wellington Regional Council, an 80% vegetative cover has been established.

14. Scour protection works of concrete, rock or timber construction shall be placed at the outlet of the sedimentation pond to prevent scour.

15. If koiwi, taonga or other artefact material is discovered in any area during the works, the consent holder shall ensure that Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and Wellington

Tenths Trust are immediately contacted, and construction work in that area shall be stopped immediately to allow a site inspection by these groups and their advisors. The consent holder shall then consult with Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and Wellington Tenths Trust on appropriate steps to recover the artefacts in order that work can resume.

WGN040184 [23254] Water permit to divert ephemeral streams and existing drains to a sedimentation pond.

General conditions

1. The location, design, implementation and operation of the diversion shall be generally as described in the resource consent application Stage 2 development of the Silverstream Landfill and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents and the conditions, the conditions shall prevail.

2. The permit holder shall pass a copy of this consent and associated documents to any operator or contractor carrying out works permitted by this permit on their behalf prior to the works commencing.

3. The permit holder shall pay to Wellington Regional Council any administrative charge fixed in accordance with Section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under Section 36 of the Resource Management Act 1991.

4. Pursuant to Section 128 of the Resource Management Act 1991 the Wellington Regional Council may commence a review of any of the conditions of any of the consents, at any time within six months of the second, fifth, tenth, fifteenth, twenty-fifth and thirtieth anniversaries of the date of grant of this permit for any of the following purposes:

    - To deal with any actual or potential adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; and/or
    - To review the adequacy of any plan prepared for this permit and incorporating any requirements into relevant conditions; and/or
    - To require additional monitoring to assess impacts, or specific action to be taken to mitigate demonstrated environmental impacts; and/or
    - To allow a reduction in the level of monitoring.

5. Not less than six months prior to the expiry or surrender of this consent, the permit holder shall apply for such consents as are required for either the closure or future management of the landfill.

Specific conditions

6. The Manager, Consents Management, Wellington Regional Council, shall be given a minimum of 48 hours notice prior to the works commencing.

Works/design conditions

7. All diversion channels shall be designed to manage a 1% Annual Exceedance Probability (AEP) design flood. The diversion channels shall be designed such that if this capacity is exceeded the preferential secondary flow path is away from the landfill.

8. Diversion channels and cut-off drains shall be designed and maintained to minimise the infiltration and run-off stormwater onto the landfill from areas outside the landfill footprint.

9. All diverted stormwater shall be treated by the Sediment Pond as shown on Drawing 1 "*Proposed Stage 2 Development*" and Drawing 40 "*Permanent Stormwater Drainage Catchment Plan*", submitted as part of the application.

10. The consent permit holder shall ensure that any fish that are stranded during construction and dewatering are immediately placed back in the active flowing channel. Dewatering is the process of the former area of active flowing channel losing water after the new channel begins to operate.

11. The diversions shall remain the responsibility of the permit holder and shall be maintained to the satisfaction of the Manager, Consents Management, Wellington Regional Council.

WGN040184 [23256] Land use consent to construct, use and maintain diversion structures in riverbeds of tributaries of Tip Stream for the purpose of stormwater management and to carry out the associated disturbance of the beds and banks of tributaries of Tip Stream during construction of diversion structures for stormwater management.

General conditions

1. The location, design, implementation and operation of the Stage 2 development of the Silverstream Landfill shall be generally as described in the resource consent application and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents and the conditions, the conditions shall prevail.

2. Detailed designs of all 'principal' works shall be forwarded to the Manager, Consents Management, Wellington Regional Council at least ten working days prior to works commencing.

Note: For the purposes of Condition 2, 'principal' works means the diversion structures to be placed in riverbeds of tributaries of Tip Stream for the purpose of stormwater management.

3. The consent holder shall pass a copy of this consent and associated documents to any operator or contractor operating the landfill or carrying out works permitted by the consent on their behalf prior to the works commencing.

4. The consent holder shall pay to Wellington Regional Council any administrative charge fixed in accordance with Section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under Section 36 of the Resource Management Act 1991.

5. Pursuant to Section 128 of the Resource Management Act 1991 the Wellington Regional Council may commence a review of any of the conditions of any of the consents, at any time within six months of the second, fifth, tenth, fifteenth, twenty-fifth and thirtieth anniversaries of the date of grant of this permit for any of the following purposes:

   - To deal with any actual or potential adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; and/or
   - To review the adequacy of any plan prepared for this permit and incorporating any requirements into relevant conditions; and/or
   - To require additional monitoring to assess impacts, or specific action to be taken to mitigate demonstrated environmental impacts; and/or
   - To allow a reduction in the level of monitoring.

6. Not less than six months prior to the expiry or surrender of this consent, the consent holder shall apply for such consents as are required for either the closure or future management of the landfill.

Specific conditions

7. The consent holder shall take all practicable steps to minimise sedimentation and turbidity of the tributaries due to the works. These steps shall include, but not be limited to, carrying out the works during low flows, and diverting the stream flow around the works area during works in the stream.

8. All machinery shall be well maintained at all times to prevent leakage or spill of oil or other chemicals into the tributary.

9. No machinery shall be cleaned, stored or refuelled within ten metres of the tributary.

10. Diversion channels shall be designed such that if this capacity is exceeded the preferential secondary flow path is, as far as practicable, away from the landfill.

11. Diversion channels and cut-off drains shall be maintained to minimise the infiltration and run-off of stormwater onto the landfill from areas outside the landfill footprint.

12. The consent holder shall ensure that any fish that are stranded during dewatering of the section of the streambed being diverted are immediately placed back in the active flowing channel.

13. The works shall remain the responsibility of the consent holder and shall be maintained so that any erosion or scour attributable to the works is minimised and repaired.

14. If koiwi, taonga or other artefact material is discovered in any area during the works, the consent holder shall ensure that Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and Wellington Tenths Trust are immediately contacted, and construction work in that area shall be stopped immediately to allow a site inspection by these groups and their advisors. The consent holder shall then consult with Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and Wellington Tenths Trust on appropriate steps to recover the artefacts in order that work can resume.

15. All works affecting the stream including tidy-up on completion of the works shall be to the satisfaction of the Manager, Consents Management, Wellington Regional Council.

16. Suitable scour protection of concrete, rock or timber construction shall be placed at the inlet and outlet of any channels and, if required, at intermediate locations.

17. Any sediment control measures used shall be constructed and carried out in accordance with the "*Erosion and Sediment Control Guidelines for the Wellington Region"*, dated September 2002.

WGN040184 [23257] Water permit to take fresh water from Tip Stream (via a sedimentation pond) for dust control and ancillary purposes.

General conditions

1. The location, design, implementation and operation of the water take shall be generally as described in the resource consent application for Stage 2 development of the Silverstream Landfill and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents and the conditions, the conditions shall prevail.

2. The permit holder shall pass a copy of this permit and associated documents to any operator or contractor carrying out works permitted by this permit prior to the works commencing.

3. The permit holder shall pay to Wellington Regional Council any administrative charge fixed in accordance with Section 36 of the

Resource Management Act 1991, or any charge prescribed in accordance with regulations made under Section 36 of the Resource Management Act 1991.

4. Pursuant to Section 128 of the Resource Management Act 1991 the Wellington Regional Council may commence a review of any of the conditions of any of the consents, at any time within six months of the second, fifth, tenth, fifteenth, twenty-fifth and thirtieth anniversaries of the date of grant of this permit for any of the following purposes:

   - To deal with any actual or potential adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; and/or
   - To review the adequacy of any plan prepared for this permit and incorporating any requirements into relevant conditions; and/or
   - To require additional monitoring to assess impacts, or specific action to be taken to mitigate demonstrated environmental impacts; and/or
   - To allow a reduction in the level of monitoring.

5. Not less than six months prior to the expiry or surrender of this permit, the permit holder shall apply for such consents as are required for either the closure or future management of the landfill.

Specific conditions

6. The irrigation system to control dust shall be designed, operated and maintained so that water does not run to waste.

7. If any modifications are made to the pump or intake, the permit holder shall notify the Manager, Consents Management, Wellington Regional Council within one month of the changes occurring.

8. The rate of take shall not exceed 150 m^3/hour, 4 hr/day, 5 days/week for thirteen weeks/year, and shall not exceed 150m^3/day for the remainder of the year.

   Note: For the purposes of this permit, a year will be deemed to run from 1 July to 30 June.

WGN040184 [23258] Water permit to take groundwater from beneath the landfill via monitoring bores and through collection of underdrainage.

General conditions

1. The location, design, implementation and operation of the water take shall be generally as described in the resource consent application for Stage 2 development of the Silverstream Landfill and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents and the conditions, the conditions shall prevail.

2. The permit holder shall pass a copy of this permit and associated documents to any operator or contractor carrying out works permitted by the permit prior to the works commencing.

3. The permit holder shall pay to Wellington Regional Council any administrative charge fixed in accordance with Section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under Section 36 of the Resource Management Act 1991.

4. Pursuant to Section 128 of the Resource Management Act 1991 the Greater Wellington Regional Council may commence a review of any of the conditions of any of the consents, at any time within six months of the second, fifth, tenth, fifteenth, twenty-fifth and thirtieth anniversaries of the date of grant of this permit for any of the following purposes:

   - To deal with any actual or potential adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; and/or
   - To review the adequacy of any plan prepared for this permit and incorporating any requirements into relevant conditions; and/or
   - To require additional monitoring to assess impacts, or specific action to be taken to mitigate demonstrated environmental impacts; and/or
   - To allow a reduction in the level of monitoring.

5. Not less than six months prior to the expiry or surrender of this permit, the permit holder shall apply for such consents as are required for either the closure or future management of the landfill.

Specific conditions

6. To the extent practicable the permit holder shall measure and record the volume of groundwater taken from the groundwater under-drainage system and from any monitoring bore. The volume of groundwater taken per month shall be reported in writing to the Manager, Consents Management, Wellington Regional Council in the quarterly report required by condition 15 of this permit.

7. If requested by the Manager, Consents Management, Wellington Regional Council, the permit holder shall make the bore available for monitoring of water levels and water quality.

8. No groundwater contaminated with leachate shall be discharged to any watercourse or returned to ground.

Ground water monitoring and reporting

9. Groundwater monitoring shall involve the following:

- Trigger levels shall be set to identify significant deviations of baseline groundwater quality for each parameter specified in condition 11 and be based on the mean plus three standard deviations of the baseline groundwater quality data measured after a minimum of four sampling rounds over at least 12 months.

- If monitoring demonstrates that the trigger levels are exceeded, then further samples shall be taken and tested within 14 days of exceedence being detected.

10. If the exceedance of the trigger levels is confirmed, the permit holder shall immediately advise the Manager, Consents Management, Wellington Regional Council and shall:

    - Immediately investigate the reason why the criteria were exceeded;

    - Immediately identify and undertake as soon as practicable whatever appropriate remedial action is required to mitigate the effects; and

    - Prepare a report providing reasons for the exceedance and details of monitoring and remedial measures that shall be undertaken to mitigate any adverse environmental effects. This report shall be forwarded to the Manager, Consents Management, Wellington Regional Council within one month of receipt of the monitoring results confirming the exceedance of trigger levels.

11. The permit holder shall monitor groundwater levels every three months, and analyse for the following parameters twice a year, to coincide with the winter groundwater level maximum (September) and summer groundwater minimum (April):

    - Groundwater level
    - pH (field and laboratory)
    - Conductivity (field and laboratory)
    - Dissolved oxygen (field)
    - Total organic carbon
    - Alkalinity
    - Sulphate
    - Dissolved reactive phosphorus
    - Chloride
    - Sodium
    - Potassium
    - Calcium
    - Magnesium
    - Ammoniacal nitrogen
    - Nitrate nitrogen
    - Soluble boron
    - Soluble zinc

- Silica

12. The permit holder shall monitor for the following parameters once every year, to coincide with the summer groundwater minimum (April):

    - SVOCs
    - VOCs

13. A sample of leachate from the Stage 2 leachate outlet manhole shall be taken annually concurrent with a measurement of leachate flow and tested for the following parameters:

    - Temperature
    - PH
    - Conductivity
    - Nitrate-N
    - Ammonium-N
    - Chloride
    - Sulphate
    - Sodium
    - Aluminium
    - Arsenic
    - Boron
    - Cadmium
    - Copper
    - Chromium
    - Iron
    - Manganese
    - Nickel
    - Mercury
    - Lead
    - BOD
    - COD
    - Dissolved Oxygen
    - Faecal Coliforms
    - Total Coliforms
    - Total Petroleum Hydrocarbons
    - VOC (incl. BTEX)
    - SVOC
    - Phenols (total)
    - Organochlorine pesticides
    - Organophosphous pesticides
    - Calcium
    - Magnesium
    - Potassium
    - Carbonate
    - Bicarbonate

The results of this analysis shall be included in the next quarterly report required by Condition 15 of this permit.

If sampling results for any of the parameters above shows the concentration to have increased from the previous year, the applicant shall immediately notify the Manager, Consent Management, Wellington Regional Council. The frequency of monitoring of any such parameters shall then be determined in consultation with Wellington Regional Council and Regional Public Health.

14. The permit holder shall monitor groundwater quality at sampling locations to be approved by the Manager, Consents Management, Wellington Regional Council. The permit holder shall submit a plan for approval from the Manager, Consents Management, Wellington Regional Council that shows the number, location and design of the proposed monitoring bores, at least one month prior to commencing monitoring.

Reporting

15. The permit holder shall produce and submit a quarterly report, including the results from all monitoring required under this consent, and shall forward the report to the Manager, Consents Management, Wellington Regional Council within three weeks of the completion of that quarter.

16. The permit holder shall submit a monitoring and contingency plan to the Manager, Consents Management, Wellington Regional Council for approval one month prior to commencing monitoring. The plan shall:

- Set out responsibilities for carrying out the monitoring;
- Evaluate results; and
- Set out both groundwater and surface water response standards and contingency measures to be implemented should those standards be exceeded.

WGN040184 [23259] Land use consent to undertake earthworks associated with the formation of roads and tracks.

General conditions

1. The location, design, implementation and operation of the Stage 2 development of the Silverstream Landfill shall be generally as described in the resource consent application and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents and the conditions, the conditions shall prevail.

2. The consent holder shall pass a copy of this consent and associated documents to any operator or contractor operating the Landfill or carrying out works permitted by the consent on their behalf prior to the works commencing.

3. The consent holder shall pay to Wellington Regional Council any administrative charge fixed in accordance with Section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under Section 36 of the Resource Management Act 1991.

4. Pursuant to Section 128 of the Resource Management Act 1991 the Wellington Regional Council may commence a review of any of the conditions of any of the consents, at any time within six months of the second, fifth, tenth, fifteenth, twenty-fifth and thirtieth anniversaries of the date of grant of this permit for any of the following purposes:

   - To deal with any actual or potential adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; and/or
   - To review the adequacy of any plan prepared for this permit and incorporating any requirements into relevant conditions; and/or
   - To require additional monitoring to assess impacts, or specific action to be taken to mitigate demonstrated environmental impacts; and/or
   - To allow a reduction in the level of monitoring.

5. Not less than six months prior to the expiry or surrender of this consent, the consent holder shall apply for such consents as are required for either the closure or future management of the landfill.

Specific conditions

6. The Manager, Consents Management, Wellington Regional Council, shall be given a minimum of 48 hours notice prior to the works commencing.

7. Earthworks shall be constructed and carried out in accordance with the principles contained within the "*Erosion and Sediment Control Guidelines for the Wellington Region"*, dated September 2002.

8. If koiwi, taonga or other artefact material is discovered in any area during the works, the consent holder shall ensure that Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and Wellington Tenths Trust are immediately contacted, and construction work in that area shall be stopped immediately to allow a site inspection by these groups and their advisors. The consent holder shall then consult Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and Wellington Tenths Trust on appropriate steps to recover the artefacts in order that work can resume.

9. The consent holder shall take all practicable steps to ensure that the works do not result in vegetation, soil, slash or other debris entering any surface water body.

10. All construction works shall be 'stabilised' in the minimum time practicable.

Note: For the purposes of Condition 10, 'stabilised' in relation to any site or area means inherently resistant to erosion or rendered resistant, such as by using indurated rock or by the application of basecourse, colluvium, grassing, mulch, or another method to the reasonable satisfaction of the Manager, Consents Management, Wellington Regional Council and as specified in the Wellington Regional Council's "*Erosion and Sediment Control Guidelines for the Wellington Region",* dated September 2002. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once, on reasonable visual inspection by the Manager, Consents Management, Wellington Regional Council, an 80% vegetative cover has been established.

11. The works shall remain the responsibility of the consent holder and shall be maintained to minimise effect on slope stability, erosion and sedimentation to the satisfaction of the Manager, Consents Management, Wellington Regional Council.

WGN040184 [23260] Land use consent to excavate the floor and side slopes of the landfill and to operate borrow areas for the supply of construction and cover materials.

General conditions

1. The location, design, implementation and operation of the Stage 2 development of the Silverstream Landfill shall be generally as described in the resource consent application and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents and the conditions, the conditions shall prevail.

2. The consent holder shall pass a copy of this consent and associated documents to any operator or contractor operating the Landfill or carrying out works permitted by the consent on their behalf prior to the works commencing.

3. The consent holder shall pay to Wellington Regional Council any administrative charge fixed in accordance with Section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under Section 36 of the Resource Management Act 1991.

4. Pursuant to Section 128 of the Resource Management Act 1991 the Wellington Regional Council may commence a review of any of the conditions of any of the consents, at any time within six months of the second, fifth, tenth, fifteenth, twenty-fifth and thirtieth anniversaries of the date of grant of this permit for any of the following purposes:

    - To deal with any actual or potential adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; and/or

- To review the adequacy of any plan prepared for this permit and incorporating any requirements into relevant conditions; and/or
- To require additional monitoring to assess impacts, or specific action to be taken to mitigate demonstrated environmental impacts; and/or
- To allow a reduction in the level of monitoring.

5. Not less than six months prior to the expiry or surrender of this consent, the consent holder shall apply for such consents as are required for either the closure or future management of the landfill.

Specific conditions

6. The Manager, Consents Management, Wellington Regional Council, shall be given a minimum of 48 hours notice prior to the works commencing.

7. Earthworks shall be constructed and carried out in accordance with the principles contained in the "*Erosion and Sediment Control Guidelines for the Wellington Region"*, dated September 2002.

8. If koiwi, taonga or other artefact material is discovered in any area during the works, the consent holder shall ensure that Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and Wellington Tenths Trust are immediately contacted. Construction work in that area shall be stopped immediately to allow a site inspection by these groups and their advisors. The consent holder shall then consult with Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and Wellington Tenths Trust on appropriate steps to recover the artefacts in order that work can resume.

9. The consent holder shall take all practicable steps to ensure that the works do not result in vegetation, soil, slash or other debris entering any surface water body.

10. The works shall remain the responsibility of the consent holder and shall be maintained to minimise effect on slope stability, erosion and sedimentation to the satisfaction of the Manager, Consents Management, Wellington Regional Council.

11. All construction works shall be 'stabilised' in the minimum time practicable.

    Note: For the purposes of Condition 11, 'stabilised' in relation to any site or area means inherently resistant to erosion or rendered resistant, such as by using indurated rock or by the application of basecourse, colluvium, grassing, mulch, or another method to the reasonable satisfaction of the Manager, Consents Management, Wellington Regional Council and as specified in the Wellington Regional Council's "*Erosion and Sediment Control Guidelines for the Wellington Region",* dated September 2002. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion,

the surface is considered stabilised once, on reasonable visual inspection by the Manager, Consents Management, Wellington Regional Council, an 80% vegetative cover has been established.

WGN040184 [23261] Land use consent to clear vegetation from the landfill footprint, access roads, drains and the borrow area.

General conditions

1. The location, design, implementation and operation of the Stage 2 development of the Silverstream Landfill shall be generally as described in the resource consent application and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents and the conditions, the conditions shall prevail.

2. The consent holder shall pass a copy of this consent and associated documents to any operator or contractor operating the Landfill or carrying out works permitted by the consent on their behalf prior to the works commencing.

3. The consent holder shall pay to Wellington Regional Council any administrative charge fixed in accordance with Section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under Section 36 of the Resource Management Act 1991.

4. Pursuant to Section 128 of the Resource Management Act 1991 the Wellington Regional Council may commence a review of any of the conditions of any of the consents, at any time within six months of the second, fifth, tenth, fifteenth, twenty-fifth and thirtieth anniversaries of the date of grant of this consent for any of the following purposes:

    - To deal with any actual or potential adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; and/or
    - To require additional monitoring to assess impacts, or specific action to be taken to mitigate demonstrated environmental impacts; and/or
    - To allow a reduction in the level of monitoring.

5. Not less than six months prior to the expiry or surrender of this consent, the consent holder shall apply for such consents as are required for either the closure or future management of the landfill.

Specific conditions

6. The Manager, Consents Management, Wellington Regional Council, shall be given a minimum of 48 hours notice prior to the works commencing.

Erosion and sediment control

7. All practicable steps shall be taken to minimise sediment loading and increased turbidity of the Tip Stream during vegetation clearance,

including but not limited to, the installation of silt fences around the excavation areas.

8. The silt fences shall remain in place until the areas of excavated material are 'stabilised'. The permit holder shall ensure the areas of excavated material are 'stabilised' as soon as practicable after completion of the earthworks, and within four months of that completion.

   Note: For the purposes of condition 8, 'stabilised' in relation to any site or area means inherently resistant to erosion or rendered resistant, such as by using indurated rock or by the application of basecourse, colluvium, grassing, mulch, or another method to the reasonable satisfaction of the Manager, Consents Management, Wellington Regional Council and as specified in the Wellington Regional Council's "*Erosion and Sediment Control Guidelines for the Wellington Region",* dated September 2002. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once, on reasonable visual inspection by the Manager, Consents Management, Wellington Regional Council, an 80% vegetative cover has been established.

9. All sediment control measures shall be operated and maintained efficiently in accordance with the Wellington Regional Council's *"Erosion and Sediment Control Guidelines for the Wellington Region"*, dated September 2002, and to the reasonable satisfaction of the Manager, Consents Management, Wellington Regional Council.

Water quality

10. No contaminants (including but not limited to oil, petrol, diesel, hydraulic fluid) shall be released into water from equipment being used for the activity, and no machinery shall be cleaned, stored or refuelled within ten metres of any waterbody.

11. The works shall remain the responsibility of the consent holder and shall be maintained to minimise effect on slope stability so that any erosion of the bed or banks of any watercourse as a result of the works is minimised.

12. The consent holder shall take all practicable steps to ensure that the works do not result in vegetation, soil, slash or other debris entering any surface water body.

Artefacts

13. If koiwi, taonga or other artefact material is discovered in any area during the works, the consent holder shall ensure that Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and Wellington Tenths Trust are immediately contacted, and construction work in that area shall be stopped immediately to allow a site inspection by these groups and their advisors. The consent holder shall then consult with

Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui and Wellington Tenths Trust on appropriate steps to recover the artefacts in order that work can resume.

Completion of works

14. All works, including tidy up on completion of the works, shall be to the satisfaction of the Manager, Consents Management, Wellington Regional Council.

WGN040184 [23262] Land use consent to construct bores for monitoring groundwater quality.

General conditions

1. The location, design, implementation and operation of the bores shall be generally as described in the resource consent application for Stage 2 development of the Silverstream Landfill and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents and the conditions, the conditions shall prevail.

Specific conditions

2. Prior to the bores being constructed, the consent holder shall provide a copy of this consent to the driller who will construct the bores.

3. The bores shall be constructed and maintained in accordance with the New Zealand Environmental Standard for Drilling of Soil and Rock (NZS 4411:2001).

4. Within one month of the completion of the bores, the consent holder shall submit to the Manager, Consents Management, Wellington Regional Council, a copy of the Bore Log form as completed by the driller who constructed the bores.

5. All monitoring bores shall be constructed and secured so as to prevent ingress of surface waters or other contaminants.

WGN040184 [23263] Land use consent to reclaim a section of Tip Stream for land filling purposes.

General conditions

1. The location, design, implementation and operation of the reclamation shall be generally as described in the resource consent application for the Stage 2 development of the Silverstream Landfill and associated documents dated November 2003, except where amendments are required by conditions of these consents. In the event of differences or conflict between the measures described in the documents and the conditions, the conditions shall prevail.

2. The consent holder shall pass a copy of this consent and associated documents to any operator or contractor carrying out works permitted by this consent prior to the works commencing.

3. The consent holder shall pay to Wellington Regional Council any administrative charge fixed in accordance with Section 36 of the Resource Management Act 1991, or any charge prescribed in accordance with regulations made under Section 36 of the Resource Management Act 1991.

Specific conditions

4. The Manager, Consents Management, Wellington Regional Council, shall be given a minimum of 48 hours notice prior to the works commencing.

Construction conditions

5. All practicable steps shall be taken to prevent silt run-off from the fill in the streambed. Such steps shall be to the satisfaction of the Manager, Consents Management, Wellington Regional Council.

6. All works affecting the bed of the stream, including tidy up on completion of the works shall be completed to the satisfaction of the Manager, Consents Management, Wellington Regional Council.

7. The consent holder shall ensure that any fish that are stranded during construction and dewatering are immediately placed back in the active flowing channel. Dewatering is the process of the former area of active flowing channel losing water after the new channel begins to operate.

8. No fill shall be placed in the streambed until the stream has been dewatered.

17. Reasons for conditions

Adherence to the above suggested conditions for the land use consents, water permits and discharge permits associated with resource consent application WGN040184 should ensure that any adverse environmental effects associated with the activities and works involved in the development Stage 2 of the Silverstream landfill should be avoided, remedied or mitigated.

The **general conditions** seek to ensure that the effects of the proposed works and activities outlined in the application are the same as those effects which have been assessed by Greater Wellington, and any adverse environmental effects can be avoided, remedied or mitigated. All contractors involved in the project should be aware of all conditions and measures which must be undertaken to avoid, remedy or mitigate any adverse environmental effects. The applicant retains overall responsibility for the works undertaken and shall ensure that all works and activities are maintained in accordance with the application and suggested conditions.

The **review conditions** enable Greater Wellington to review any conditions of the consents in circumstances where the effects on the environment could not be assessed, or were unknown, at the time of the application. In addition, these conditions allow review of consent conditions in light of the monitoring results received during implementation of the works and activities, while allowing for recovery of costs by Greater Wellington from any review carried out. The duration of consent condition specifies the maximum term for each consent, which varies depending on the purpose.

The condition relating to the **development of a Landfill Management Plan** provides Greater Wellington with the opportunity to ensure that the procedures to be put into place for the operation of the Landfill are in compliance with the proposed consent conditions.

The **erosion and sediment control** conditions require the applicant to take all practicable steps to minimise increased sedimentation and turbidity of Tip Stream. Any erosion or sediment control works are to be undertaken in accordance with the "*Erosion and Sedimentation Control Guidelines for the Wellington Region"*, dated September 2002.

The **notice of commencement** of works allows Greater Wellington to inspect the works and activities on the site during the construction phase to ensure compliance with consent conditions and that adverse effects on the environment are being avoided, remedied or mitigated.

Conditions relating to **complaints and incidents records** will ensure that any adverse effects on the environment are remedied or mitigated immediately.

The condition relating to the **discovery of artefacts** ensures that the appropriate iwi are contacted in event of any such discovery and appropriate steps can be undertaken to ensure that such artefacts are protected or preserved, as necessary. This condition was a request of the local iwi and was agreed to by the applicant.

All conditions relating to **monitoring requirements** have been set to ensure that any potential ongoing adverse environmental effects can be detected and where there may be significant impacts, these can be addressed through remediation or mitigation measures.

A condition requiring HCC to continue to **liase** with the Silverstream Landfill Residents Liaison Group has been set to ensure any concerns raised by the group are addressed through a charter.

A **capping layer** condition has been suggested to minimise both gas and leachate generation and to ensure that contaminated material does not discharge off-site in an uncontrolled manner.

Water quality conditions have been suggested to ensure the quality of Tip Stream is not adversely affected by any discharges or takes to or from the stream.

The applicant proposed several conditions that detailed requirements for peer review of the design, construction, operation and after-care of the landfill, and to assess whether the work is undertaken by appropriately qualified personnel. I have not included the suggested peer review conditions as the proposed monitoring conditions and assessment should be adequate to identify any problems with the operation with regard to the proposed consents.

Report prepared by:	Recommendation approved by:
SARAH VAN ERP Resource Advisor, Consents Management	LUCI RYAN Manager, Consents Management