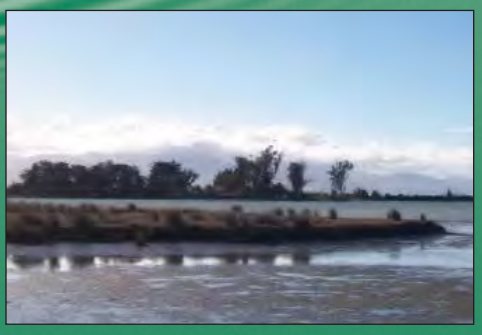
Assessment of Environmental Effects for Upgrading of the Blenheim Sewage Treatment Plant

Summary Report



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Prepared for

Marlborough District Council (Client)

By

CH2M Beca Ltd

December 2007

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Marlborough District Council
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19 December 2007
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Dear Stuart

Assessment of Environmental Effects for Upgrading of the Blenheim Sewage Treatment Plant-Summary Report

Please find attached one bound and one unbound copy of the above report. An electronic copy will be forwarded to you shortly.

Yours sincerely
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on behalf of
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Action	Name	Signed	Date
Prepared by	Graeme Jenner		
Reviewed by	Bridget O'Dempsey		
Approved by	Humphrey Archer		
on behalf of	**CH2M Beca Ltd**		

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1 Introduction

The Marlborough District Council (MDC) owns and operates the Blenheim Sewage Treatment Plant (BSTP), which treats wastewater from Blenheim residential and commercial premises (termed domestic flows), as well as industrial flows and tankered wastes. Drawing 6513042-C-621 in Appendix A shows the location of the BSTP.

The existing BSTP consists of two separate treatment systems. A fine screen, as well as aerated, facultative and maturation ponds, is used to treat domestic flows. Industrial flows are treated using a fine screen, mechanically aerated ponds, as well as facultative ponds. Treated domestic effluent is continuously discharged to the Opawa River. Treated industrial effluent is discharged to the Wairau Estuary on the ebb tide.

The BSTP requires upgrading to accommodate predicted increases in both residential population and industrial development (mainly wineries) in the vicinity of the plant. MDC is applying for new resource consents for constructing and operating the upgraded BSTP and for designating additional MDC land for "Sewage Treatment Plant Purposes".

1.1 Proposed Staged Upgrading Strategy

MDC has carried out a comprehensive consultation process as part of developing the upgrading strategy. This included regular meetings with a Consultative Working Group (CWG), as well as individual meetings with iwi and other key stakeholders.

The short-listed scheme upgrade options for the BSTP were presented to the CWG on 2 April 2007. The CWG recommended that the staged upgrade scheme summarised in Table 1.1 be adopted and this decision was ratified by MDC on 26 April 2007.

MDC is only applying for resource consents for the Stage 1 upgrade scheme. Separate applications would be required for resource consents for discharge of effluent to other land areas at a future time.

Table 1.1

BSTP Upgrade Scheme Adopted by Working Party

Stage	Description
Stage 1	■ Apply combined domestic and industrial treated effluent to MDC land around the BSTP, mainly during summer. ■ Decommission the existing Opawa River outfall and discharge effluent that is not able to be irrigated through new constructed wetlands to a new outfall in the Wairau Estuary on the ebb tide.
Stage 2	■ Investigate opportunities for applying treated effluent to land on the lower slopes of Vernon Station and other land areas.

Since MDC confirmed the upgrade strategy, it has been determined that there was a higher than predicted increase in winery wastewater loadings at the BSTP during the 2007 vintage. MDC will be treating the expected increases in loading at the BSTP during the 2008 vintage, by increasing mechanical aeration on the industrial treatment ponds. However, this upgrading will have high energy costs. MDC is therefore also considering

the option of applying the predominantly winery flows (which make up a significant portion of the industry flows) during vintage, to land by rapid infiltration. Diverting most of this wastewater to land will reduce the biological oxygen demand (BOD) load on the ponds, and so reduce the amount of aeration energy required. Reducing energy use at the BSTP is consistent with MDC and national policies that promote environmentally sustainability.

MDC plan to undertake a rapid infiltration basin pilot trial during the 2008 vintage to confirm design parameters for the application of winery wastewater to land. This pilot trial is the subject of a separate consents application.

Areas of the site where it is proposed to irrigate treated effluent to land and apply winery wastewater to rapid infiltration basins, as well as the location of the new wetlands and outfall, are shown in Figure 1.2 (see Appendix A).

2 Environmental and Cultural Values

2.1 Environmental Values

The BSTP ponds are located on approximately 370 ha of MDC land on Hardings Road (see Figure 1.2 in Appendix A). Apart from the existing treatment ponds, the site is relatively flat and vegetated by modified saltmarsh (*Sarcocornia quinqueflora*) communities with introduced grasses and weeds. Soils are sandy loams to clay loams. Shallow groundwater under the site fluctuates in depth but can be near the surface in winter. There is also a deeper productive aquifer, but this is confined (i.e. no risk of surface contaminants leaking into it).

There is mainly farmland to the west and northwest, although there are several houses about 500m from the existing ponds. The Opawa River lies about 200 m to the northwest of the BSTP at its closest point. The river is used for a variety of recreational purposes including boating, kayaking, swimming, whitebaiting, fishing and bird watching. However, the nature of the catchment (including farming and urban development) has degraded the water quality and ecological values.

The Vernon Lagoons lie about 1000 m to the east of the BSTP. They are the most significant tidal wetland between the Waimea Inlet in Nelson and the Waituna Lagoon in Southland (DoC, 1993). The lagoons consist of a large expanse of shallow water (an area of about 2,300 ha), and are designated as a nationally important bird habitat.

The Wairau Estuary, which lies about 2 km northeast of the BSTP and is a popular area for both recreational and commercial fishers. Other uses of the Estuary include boating and windsurfing and duck shooting.

The Wairau Estuary discharges into Cloudy Bay about approximately 2.5 km northeast of the BSTP.

2.2 Cultural Values

The BSTP and surrounding area lies within the traditional rohe of Rangitane, Ngati Rarua and Ngati Toa iwi. A Cultural Impact Assessment (Buddy Mikaere and Associates, 2007) was prepared that describes the cultural significance of the area including the Wairau

Estuary and Vernon Lagoons. The high cultural and spiritual importance that iwi place on Te Pokohiwa O Kupe (the Boulder Bank), Te Wahanga a Tangaroa (the Wairau Estuary complex) and the land bordering the lower reaches of the Wairau River and out to the mouth are described. These areas were used extensively for food gathering (birds, fish and shellfish) and also contain important sites (wahi tapu).

3 Alternative Disposal and Treatment Options

As the requirements of the receiving environment dictate the quality of the effluent discharged, it is normal to consider disposal options before treatment options.

A number of reuse and disposal options were assessed and the advantages and disadvantages of these are summarised in Table 3.1.

Table 3.1

Summary of Advantages and Disadvantages of Effluent Disposal Options

Option	Advantages	Disadvantages
Industrial/ domestic reuse	■ Water is an important resource in Marlborough	■ Requires costly further treatment ■ Possible community resistance to reuse
Application to land by irrigation	■ Has significant community support ■ Some existing infrastructure in place around BSTP ■ Good source of supplementary irrigation water and nutrients ■ Meets requirements of iwi and NZ Coastal Policy Statement	■ Significant application only possible during summer period ■ Year-round system would be costly and require large land areas
Application into land by rapid infiltration	■ Meets requirements of iwi and NZ Coastal Policy Statement ■ Small area required with little potential for odour or aerosol creation ■ Relatively low cost ■ Could be used for seasonal (March-May) application of predominantly winery flows	■ Limited by high groundwater levels in winter ■ Would require extensive system of under-drainage for year-round operation
Aquifer recharge	■ May assist in future protection of aquifer for upstream users	■ Would require very high quality effluent ■ Would require extensive fieldwork to understand local groundwater conditions
Disposal to Opawa River (continuous)	■ Existing consented discharge ■ Could be retained for wet weather discharge	■ Existing discharge is having adverse effects on water quality of river ■ Not supported by any stakeholders
Disposal to Wairau Estuary (ebb tide)	■ Existing consented discharge with low environmental effects ■ Relatively low cost	■ Discharge into area of recognised cultural, conservation and recreational values ■ Not supported by iwi

Option	Advantages	Disadvantages
Disposal to Vernon Lagoon	■ Relatively low cost ■ Additional flows may increase bird habitat	■ Discharge into area of with recognised cultural, conservation and recreational values ■ May require high quality discharge to avoid eutrophication of lagoon
Disposal to Cloudy Bay	■ Low environmental effects with discharge into area of significant dilution and dispersion away from areas of high conservation and recreational values ■ Supported by iwi	■ High costs (~$25M) ■ Possible consenting issues for landline across Boulder Bank (although iwi indicate that this could be possible)

Both pond-based and in-tank treatment upgrading options that would provide a suitable effluent quality for discharge to land or water were assessed (CH2MBeca, 2007) and the advantages and disadvantages of these are summarised in Table 3.2.

Table 3.2

Summary of Advantages and Disadvantages of Treatment Upgrade Options

Option	Advantages	Disadvantages
Pond-Based Upgrade Options	■ Simple to construct and operate ■ Robust and able to cope with peak flows and loads ■ Lower capital and operating costs than in-tank options ■ Generally good effluent quality in combination with constructed wetland before discharge ■ Sludge management inherent and delayed for decades	■ Large land requirements (including buffers) ■ Potential for odour if overloaded ■ Risk of inconsistent effluent quality if pond is upset
In-tank Upgrade Options	■ Small land requirements with high capacity for treatment ■ Consistently high effluent quality ■ Easier odour control	■ Higher capital and operating costs than pond options ■ Ongoing requirement for sludge management at significant costs ■ More complex operation ■ Risks from power and mechanical failure

4 Consultation with Key Stakeholders

MDC has consulted with potentially affected and interested parties throughout the development of the BSTP upgrade strategy. A Consultative Working Group (CWG) was set up in May 2006 with representatives from a number of interest groups. This group met with representatives from MDC and its consultants on a number of occasions. Individual discussions were also had during 2006 and 2007, with representatives of the three local iwi

(Ngati Rarua, Ngati Toa and Rangitane), business groups, residents and government agencies (Ministry for the Environment, Marlborough Public Health and Ministry of Fisheries).

A meeting was held in February 2007, which also included MDC Councillors, CWG representatives and the local media. A media release discussing the upgrading proposal was published in the Marlborough Express. The CWG continued to meet during the early part of 2007, including a site visit.

The upgrading strategy was ratified by MDC's Assets and Services Committee on 26 April 2007.

MDC met with iwi groups in early July 2007 to carry out a site visit and further discuss the proposed upgrading strategy. A hui was held later in July among the iwi groups to share ideas and formulate a position on the upgrading strategy. A Cultural Impact Assessment was submitted by iwi following initial briefings with MDC representatives and interviews with kaumatua and kuia.

The consultation process that was carried out is set out in Figure 4.1 (see Appendix A).

5 Proposed Upgrading Strategy

5.1 Introduction

The following proposed staged upgrade strategy incorporates that agreed by MDC in April 2007, as well as the application of predominantly winery wastewater to land via rapid infiltration basins during vintage.

Table 5.1

Proposed Upgrading Strategy (Incorporating Rapid Infiltration Basins)

Stage	Description
Stage 1	■ Applying combined treated domestic and industrial effluent to MDC land around the BSTP during summer ■ Applying screened winery wastewater to MDC rapid infiltration basins during vintage (March to June). ■ Decommissioning of the existing Opawa River outfall with discharge of the balance of treated effluent, through new constructed wetlands, to an upgraded outfall in the Wairau Estuary on the ebb tide.
Stage 2	■ Investigation of opportunities for application of treated effluent to land on the lower slopes of Vernon Station and other land areas.

5.2 Treatment Ponds

5.2.1 Pre 2008 Vintage Upgrade

Some modifications to the treatment ponds will be carried out before the 2008 vintage. This will include adding additional mechanical aerators to treat the high organic loading from wineries. These operational changes do not require new resource consents.

5.2.2 Stage 1 Upgrade

Once resource consents have been obtained, it is proposed that treated wastewater from the final domestic pond (Pond 5), together with treated industrial flows from Ponds I1 and I2 will be discharged into Pond 6. These combined flows will then be either irrigated to land (after Pond 6), or conveyed to the wetland for further treatment before discharging on the ebb tide to the Wairau Estuary (see Drawing 6513042-C-624 in Appendix A).

Opportunities also exist to further subdivide Pond 6 to reduce microbiological organisms, prior to discharge to the Estuary. However, it is expected that similar improvements in effluent quality will be achieved by constructing the new wetland.

It is also proposed to construct a new utility building, for storage of mechanical equipment and chemicals, next to the existing treatment ponds and within the designated area. A silo may also be built for storage of lime, which will be used to correct the pH of the wastewater. Enclosures to house one, possibly two, on-site diesel generators will also be constructed within the designated area.

5.3 Application of Treated Effluent to Land

The BSTP produces a good quality effluent that is characterised by relatively low nutrients, metals and microorganisms. With appropriate mitigation measures, this effluent is considered suitable for applying to MDC land around the BSTP on a deficit irrigation basis (i.e. when it is needed).

It is estimated that there is 190 ha of potentially irrigable MDC land, once allowances are made for buffers to surface water (Pattle Delamore Partners, 2007).

Applying treated effluent to land can cause risks to public health, if not properly managed. The proposed approach at the BSTP will be to use application methods appropriate to the land area being irrigated. Irrigation is proposed on two zones as follows (see Figure 1.2 in Appendix A):

- Land immediately inside the boundaries of MDC land (or land accessed by the public on MDC land) would be irrigated by surface or subsurface drip systems. No spray irrigation would occur in this zone. The width of this zone, where MDC land does not directly border neighbouring rural properties, is 25 m. However, where MDC land borders neighbouring rural properties, it is proposed to use drip irrigation up to 80 m from the boundary.
- Greater than 25 m from the MDC property boundary (or 80 m for the MDC land bordering neighbouring properties), application with travelling irrigators (such as the existing Briggs Rotorainers, centre pivots or linears) would occur.

The annual volume that could be applied to land will depend on the area irrigated and weather conditions. It is proposed to limit irrigation to when the groundwater depth is greater than 0.3 m below ground level.

5.4 Application of Screened Winery Wastewater to Rapid Infiltration Basins

The winery wastewater during vintage is characterised by high concentrations of BOD, low concentrations of nutrients and fats and a low (acidic) pH. While the wastewater only contains small quantities of human wastes (from staff toilets at the wineries), monitoring shows relatively high concentrations of indicator bacteria (faecal coliforms and enterococci).

It is proposed to discharge some of the screened winery wastewater to land by rapid infiltration during the vintage. This would reduce the peak organic (BOD) loading on the industrial ponds, thereby reducing the high energy demand (and costs) associated with mechanical aeration. The wastewater would be screened and dosed with lime (or similar) to increase pH, before being discharged to the rapid infiltration basins. The rapid infiltration basins would treat the wastewater by reducing BOD and other contaminants such as pathogenic bacteria. Underflow collection drains would be constructed beneath the perimeter of the rapid infiltration basins to intercept most of the discharged wastewater. These would offset any increase in groundwater level beneath the rapid infiltration basins caused by the wastewater discharge, as well as intercepting contaminants. These intercepted flows, which would have significantly lower BOD and other contaminants than the winery wastewater, would then be pumped back to the treatment ponds. Pilot trials are proposed during the 2008 vintage to confirm design parameters.

The proposed location of the rapid infiltration basins is shown in Figure 1.2 (see Appendix A).

5.5 Constructed Wetland

It is proposed to discharge treated combined domestic and industrial flows that are not applied to land, via a new long wetland, to the deep channel in Wairau Estuary, near to the existing outfall location. The wetland would provide sufficient storage for an ebb tide discharge. A proposed layout for the wetland is shown on Drawing 6513042-C-624 in Appendix A.

The proposed wetland would have a minimum area of about 10 ha and consists of a series of planted and open water sections (effectively maturation ponds and numbered Ponds 7-10 in Drawing 6513042-C-624), which are the best configuration for hydraulic efficiency, wastewater polishing and natural habitat creation. The wetland will attract additional birdlife, given its proximity to the Vernon Lagoons.

5.6 New Outfall to Estuary

It is proposed to construct a new 400 m long, 1050 mm diameter outfall pipe and diffuser from the final wetland pond (Pond 10), parallel to the existing 375 mm diameter pipeline, to the Wairau Estuary (see Drawing 6513042-C-624 in Appendix A). Treated effluent would be discharged under all but extreme wet weather conditions for 4 hours per tidal cycle, commencing about 1 hour after high tide. This discharge scenario has been shown by modelling to be the most effective for transport of effluent from the Estuary into Cloudy Bay.

The ponds/wetlands will be designed with available storage to store up to the 90 percentile effluent flow case, between each tidal cycle. However, under prolonged wet weather conditions, peak effluent flows (including rainfall on the ponds and wetlands), will substantially increase. When the storage capacity of the wetland is exceeded, it will be necessary to extend the discharge period for longer than 4 hours on each ebb tide. Provision for storage of effluent plus rainfall under all weather conditions is not practical.

Discharge of domestic pond effluent to the Opawa River will continue until the BSTP upgrade work is commissioned.

5.7 Target Upgrade Programme

It is proposed to implement the Stage 1 upgrade works as soon as practicable after resource consents are granted. Assuming consents are granted by end of June 2008 and there are no appeals, construction of the upgrade work could be completed by the autumn of 2010.

6 Effects on the Environment and Proposed Mitigation

6.1 Construction Effects

The Stage 1 upgrade includes constructing a long wetland and outfall pipe (over two summers to allow for unforeseen adverse weather). Excavating significant quantities of soil to create the wetland has the potential to cause nuisance to surrounding landowners and short-term adverse environmental effects, unless properly managed. Constructing other components of the upgrade, including the new irrigation infrastructure and estuarine outfall, involve the removal of smaller quantities of soil and the potential for adverse effects is considered to be less than for the wetlands.

6.1.1 Construction Management Plan

Prior to construction, the Contractor would be required to complete a Construction Management Plan (CMP) that identifies procedures for minimising potential construction effects on the environment. The CMP will be approved by MDC.

6.1.2 Construction of the Upgraded BSTP- Environmental Issues, Proposed Mitigation and Expected Outcomes After Mitigation

The environmental issues, proposed mitigation and expected outcomes after mitigation, during the construction of the BSTP upgrade, are summarised in Table 6.1.

Table 6.1

Construction of BSTP Upgrade- Environmental Issues, Proposed Mitigation and Expected Outcomes

Issue	Mitigation	Expected Outcomes
Increased traffic flows along State Highway 1 and Hardings Road	■ Material for wetland sourced mainly onsite, minimising bulk cartage	■ Small increases in traffic at start-up and completion of work
Increased noise and vibration nuisance at	■ Best practice measures in CMP including restricting work hours,	■ No significant increase in noise/vibration levels at

Issue	Mitigation	Expected Outcomes
neighbouring houses	adequate muffling of machinery and meeting requirements of Regional Plan. ■ Nearest houses about 500 m from main area of construction	neighbouring houses
Increased dust nuisance at neighbouring houses	■ Best practice measures in CMP including regular watering during windy conditions, locating stockpiles away from boundaries and revegetation, as soon as practicable after work completed. ■ Nearest houses about 500 m from wetland construction area	■ No significant increase in dust levels at neighbouring houses
Land disturbance and vegetation clearance	■ Minimise vegetation clearance and rehabilitate disturbed areas as part of Erosion and Sediment Control Plan	■ Vegetation to be removed not of ecological significance ■ Net loss minor in context of adjoining DoC areas
Sediment runoff to waterways	■ Work will be carried out mainly during summer/autumn. ■ Best practice measures in CMP including temporary bunding of work, use of sediment traps and other controls, locating stockpiles away from waterways.	■ No significant discharge of sediment runoff
Effects on estuarine ecology and tidal movement from construction of outfall	■ Construction methods will depend on outcome of tendering process. ■ Work will be of relatively short duration.	■ Temporary localised increase in suspended sediments if sheet piling and trenching used which will be quickly flushed from estuary. ■ No significant effects on ecology if directional drilling or micro-tunnelling used. ■ No significant effects on tidal flows from any construction method
Transport and onsite storage of hazardous substances and construction wastes	■ Best practice measures in CMP including bunding of any fuel tanks, compliance with requirements of HAZNO Act and Regional Plan, sealed waste bins regularly removed from site.	■ No significant public health or environmental risks
Archaeological Artefacts	■ No items of cultural or historic significance noted at site during consultation or in Cultural Impact Assessment. ■ Pre-construction survey and requirement for Contractor to provide for accidental discovery of taonga and koiwi.	■ Meet requirements of Historic Places Act , iwi and MDC.
Public Access and Safety	■ Work will occur on MDC land	■ No significant risks to public

Issue	Mitigation	Expected Outcomes
	with access for authorised personnel only. ■ Suitable signage will be erected at all public access points.	
Visual and Aesthetics	■ Neighbours about 500 m from main construction area. ■ All Contractor's machinery, temporary buildings and materials removed from site after completion of work.	■ No significant visual effects for neighbours

6.2 Operation Effects

6.2.1 Positive Effects

The proposed upgraded BSTP will have a number of environmental and community benefits. These are:

- A cost-effective and efficient BSTP that can cater for the growth needs of the district for the foreseeable future.
- A sustainable effluent disposal strategy that seeks to maximise the application of effluent to MDC land, without significant risks to public health or the environment.
- A new wetland that will have enhanced habitat values, particularly for birds.
- A net improvement in the water quality of the Opawa River and Vernon Lagoons with the decommissioning of the existing Opawa River outfall.
- A net improvement in the water quality of the Wairau Estuary and Cloudy Bay with no significant risks to public health or adverse effects on the ecological or aesthetic values of the area.

6.2.2 Operations Manual

A key component for the environmentally sustainable operation of the upgraded BSTP will be the preparation of an Operations Manual. The Manual would provide the basis for instruction of MDC staff and the day-to-day operation of the plant to meet performance and consents requirements. It is usual practice for a consent condition to be agreed that requires the preparation of an Operations Manual within a specified time after the commissioning of the new and upgraded works.

6.2.3 Discharges to Land and Air

The environmental issues arising from the proposed discharges to land and air, the proposed mitigation and the expected outcomes after mitigation are summarised in Table 6.2.

Table 6.2

Proposed Discharges to Land and Air- Environmental Issues, Proposed Mitigation and Expected Outcomes

Issue	Mitigation	Expected Outcomes
Ponds and Wetland		
Effects on groundwater quality	■ Seepage low because of low permeability liner from natural silts	■ No significant adverse effects on groundwater quality or increase in public health risk
Effects on surface waters quality (Opawa River, Vernon Lagoon and Wairau Estuary)	■ Seepage low because of low permeability liner from natural silts and self sealing of pond base ■ 200 m buffer to river from ponds provides further attenuation of any contaminants	■ No significant adverse effects on adjacent surface waters
Effects on air quality (odour) at nearby residences	■ Maintenance of pond health by provision of adequate concentrations of dissolved oxygen in primary ponds with mechanical aeration to promote mixing ■ Buffers of at least 500 m to nearest houses ■ Proactive pond management and appropriate complaint response strategy	■ No significant adverse nuisance odour at nearby residences
Irrigation of Treated Effluent		
Effects on soils structure	■ High quality effluent applied on deficit irrigation basis	■ Reduction in soil salinity and increase in soil fertility
Effects on groundwater quality	■ High quality effluent applied on deficit irrigation basis. ■ Shallow groundwater not used for potable supply. ■ Deep aquifer not at risk due to low permeability confining layer and upward gradient in aquifer ■ Regular groundwater monitoring	■ No significant adverse effects on groundwater quality or increase in public health risk
Effects on surface waters quality and ecology (Opawa River and Vernon Lagoon)	■ High quality effluent applied on deficit irrigation basis. ■ Buffers to flowing drains on site.	■ No significant adverse effects on adjacent surface waters
Effects on air quality (odour) at nearby residences and public health effects of spray droplets(aerosols) on nearby residents and public	■ High quality, low BOD effluent applied over large area at relatively low rates ■ Restrictions on where spray irrigation may be used with low impact driplines used around perimeter of site and where public may have access. ■ Maintenance of existing shelter tress and new plantings along boundaries	■ No significant adverse nuisance odour at nearby residences ■ No increased public health effects from aerosols at nearby residences or to public accessing MDC site

Issue	Mitigation	Expected Outcomes
	with residential land and public roads ■ Ceasing spray irrigation under adverse wind conditions (i.e. when wind exceed 15 km/hour from east, northeast or southeast)	
Application of Winery Wastewater to Rapid Infiltration Basins		
Effects on vegetation and soil structure	■ Winery wastewater has high BOD, and low pH which could affect vegetation and soil structure. Daily BOD loading to each basin will be limited, with pH correction before discharge.	■ No significant adverse effects on vegetation and soil structure (which could limit infiltration rates)
Effects on groundwater quality	■ Shallow groundwater not used for potable supply ■ Deep aquifer not at risk due to low permeability confining layer and upward gradient in aquifer ■ Under drainage collection pumped to treatment ponds ■ Regular groundwater monitoring	■ No significant adverse effects on groundwater resource or public health
Effects on surface waters quality (Opawa River and Vernon Lagoon)	■ 200m buffer to river from rapid infiltration basins ■ Under drainage collection pumped to treatment ponds ■ Regular groundwater monitoring	■ No significant adverse effects on adjacent surface waters
Effects on air quality (odour) at nearby residences.	■ Winery wastewater has high BOD, which could cause odour nuisance ■ Daily BOD loading to each basin will be limited (based on outcomes of pilot trial) ■ Basins will be used on a 7 day rotation to allow drying and maintain aerobic conditions	■ No significant adverse nuisance odour to nearby residences

6.2.4 Discharges to Water

The environmental issues arising from the proposed discharges to water, the proposed mitigation and the expected outcomes after mitigation are summarised in Table 6.3.

Table 6.3

Proposed Discharges to Water- Environmental Issues, Proposed Mitigation and Expected Outcomes

Issue	Mitigation	Expected Outcomes
Effects on Water Quality and Aquatic Ecology of Estuary		
Organic enrichment Toxic contaminants (metals and ammonia) Microbiological organisms Colour and clarity Aquatic species presence and density	■ High quality effluent discharged from upgraded BSTP ■ Removal of Opawa River discharge ■ Ebb tide discharge in Estuary with narrow effluent plume that remains below the surface (Cawthron,2007) ■ High flushing flows in Estuary ■ Initial dilutions available after reasonable mixing sufficient to meet Regional Plan and appropriate guideline values (e.g. ANZECC, 2000) for key contaminants under existing and likely future effluent flows ■ Extended guide bank at Wairau Bar entrance will promote efficient transport of plume to coast	■ Improvement in water quality of Lower Opawa River ■ No significant effects on estuarine water quality or aquatic ecology from existing or likely future effluent flows
Effects on Public Health		
Contact recreation (e.g. swimming) And shellfish gathering	■ Quantitative Microbial Risk Assessment using *Rotavirus* as model for all pathogens was carried out for key sites in Estuary and Cloudy (see Figure 6.1 in Appendix A) ■ Extreme viral case risks are likely to be over-estimated because shellfish are only intermittently exposed to contaminants (i.e. ebb tide only) ■ Long retention time in ponds will allow sufficient time for Health authorities to initiate restrictions on shellfish gathering	■ Risk (assessed against WHO, 2003 Guidelines) for recreational users almost absent under normal virus concentrations in effluent. Risk not exceeded under extreme virus concentrations at sites used for contact recreation ■ Under normal viral loads only edge of mixing zone in Estuary fails to meet guidelines for shellfish gathering (where shellfish gathering is not feasible) ■ Elevated risks for shellfish gathering at some sites under extreme viral loads (noting that the extreme virus case would be a very unusual event in Blenheim)
Recreational Values		
Boating, fishing, surfing	■ Improvement in water quality of Opawa River and Estuary	■ Improved water quality in Opawa River with no significant effects on estuarine water quality or aquatic ecology from existing or likely future effluent flows ■ Low risks for contact

Issue	Mitigation	Expected Outcomes
		recreation in Estuary and shellfish gathering in Cloudy Bay under all but extreme viral load situations

6.2.5 Other Effects of Operation of Upgraded BSTP

The other environmental issues from the operation of the upgraded BSTP, the proposed mitigation and the expected outcomes, after mitigation, are summarised in Table 6.4.

Table 6.4

Other Environmental Issues, Proposed Mitigation and Expected Outcomes From Operation of Upgraded BSTP

Issue	Mitigation	Expected Outcomes
Effects of Noise	■ Minimal noise from mechanical aerators and irrigators ■ Compliance with requirements of Regional Plan	■ No significant noise nuisance at nearby residences
Effects on Public Access	■ MDC propose closure of exiting paper roads and construct new walkway from carpark off Hardings Road to Opawa River and Estuary (see Drawing 6513042-C-626 in Appendix A)	■ Provision of new public access to Opawa River and Estuary
Visual Effects New structures Wetlands Irrigators	■ New structures at BSTP such as lime silo and utility building may be higher than existing structures but will meet District Plan requirements ■ Wetland will be low (~0.5 m) and planted along margins which will provide enhancement of habitat values ■ Spray irrigators (e.g. centre pivot or travelling type) are common sights in rural areas. They may be visible at a distance from neighbouring residences.	■ No significant visual effects of new structures from neighbouring residences ■ Spray irrigators visible but not out of keeping in rural area
Biting Insects Mosquitoes and midges	■ Properly managed existing ponds do not have insect problem (eg Blenheim, Oamaru, Geraldine) ■ Appropriate pond and wetland design and management includes low organic loading, maintenance of aerobic conditions, avoidance of gently sloping banks	■ No significant increase in mosquito or midge nuisance at neighbouring residences

6.2.6 Cultural Values

The Cultural Impact Assessment acknowledges that "*there is a pragmatic acceptance by iwi of the need for a properly functioning treatment plant to meet present and future needs. However, there is an equally strong desire to ensure that the operation of such a plant is culturally acceptable and environmentally sustainable*".

The preferred iwi option is for the restoration of the mauri of the project area through the elimination of the estuarine discharge and the construction of an ocean outfall. This is based on the premise that fish passage through the estuary would be restored without the need to contact the effluent plume. It is stated that an ocean outfall would allow a continuous discharge with greater capacity for assimilation of contaminants.

There has been little work carried out on the feasibility of constructing an ocean outfall and the costs of consenting, design and construction would be high. These high costs to the local community (preliminary estimate of about $25 million) are unlikely to be justified at present, in terms of the environmental effects of the existing discharge on the estuary. A discharge through a long outfall would also need to be pumped and have significant annual power costs. While the upgrade strategy of maximising land disposal, in conjunction with the wetland and estuarine discharge would be economically sustainable for the community, there would be little economic benefit for the overall community in constructing an ocean outfall. There would be less incentive to maximise land disposal because of the high capital cost of the outfall and the need to continuously discharge (to avoid sediment build-up in the pipeline). There is a strong iwi preference for land discharge of effluent and the upgrade strategy is considered the most appropriate means of minimising discharges to water.

7 Conclusions

The construction of the upgraded BSTP will be managed by MDC so that there will be no significant effects on neighbours or the public. The upgrading of the BSTP will reduce the loading of contaminants discharged to water by improving effluent quality, maximising land discharge and decommissioning the existing Opawa River outfall. There is unlikely to be any significant adverse effects on public health as a result of the proposed discharges to land or water. Existing recreational, cultural and landscape values will not be significantly altered.

Consent conditions including monitoring have been proposed so that any potential effects can be effectively avoided, remedied or mitigated.

8 References

- ANZECC, (2000); Australian and New Zealand Guidelines for Fresh and Marine Water Quality
- Buddy Mikaere and Associates Ltd (2007); Blenheim Wastewater Treatment Plant Upgrade and Resource Consent Project-Cultural Impact Assessment
- Cawthron, (2007); Ecological Investigations into Discharge Options to Water for the Blenheim Sewage Treatment Plant

- CH2MBeca, (2007) Report on Issues and Options for Upgrading of Blenheim Sewage Treatment Plant
- Department of Conservation (1993); Wairau Lagoons, Issues and Options Report (Nelson/Marlborough Conservancy)
- Pattle Delamore Partners, (2007) Concept Design of Wastewater Discharge to Land from Blenheim Sewage Treatment Plant

Appendix A

Existing Resource Consents

Drawing Plotted: 23 Nov 2007 09:25

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RESOURCE CONSENT
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
0	FOR RESOURCE CONSENT	KWJ			22.11.07

Client: MARLBOROUGH DISTRICT COUNCIL

Project: BLENHEIM SEWAGE TREATMENT PLANT RESOURCE CONSENTS

Design		
Drawn	HTC	05.08.08
Dsg Verifier		
Dwg Check		

CH2M Beca www.ch2mbeca.com

Title: BLENHEIM SEWAGE TREATMENT PLANT LOCALITY PLAN

Approved for Construction *
Date:
* Refer to Revision 1 for Original Signatures

Scale as drawn (A4) 1:50,000

Discipline: CIVIL

Drawing No. 6513042-C-621

Rev. 0

Document No. 6513042-C-621.dwg

DO NOT SCALE

IF IN DOUBT ASK.

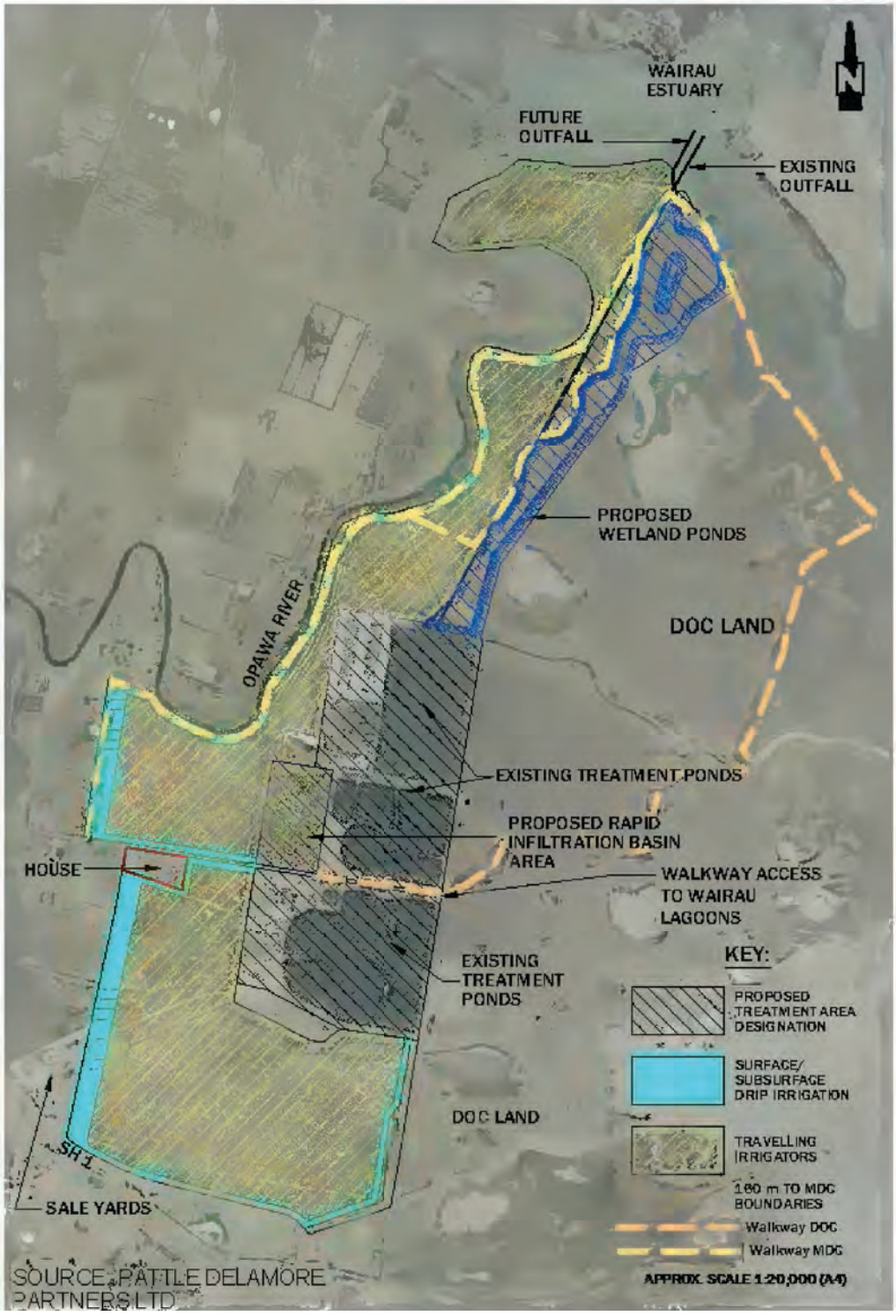

Figure 1.2: Location of Proposed Irrigation Areas, Rapid Infiltration Basins, New Wetland and Outfall

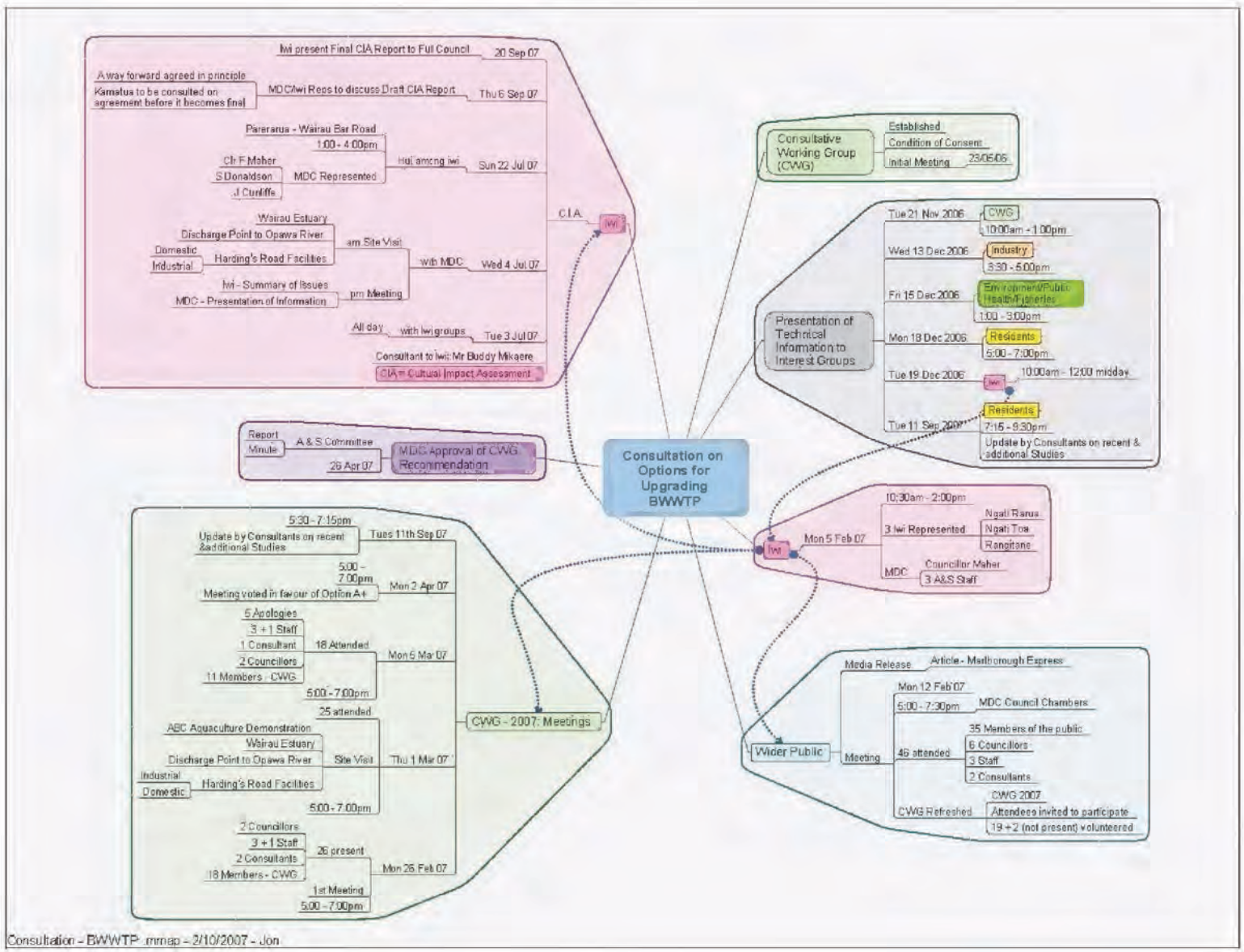

Figure 4.1 - Consultation Process