

1. CHRISTCHURCH WASTEWATER TREATMENT PLANT DISCHARGE CONSENT

RR 8261

Officer responsible Waste Manager	Author Walter Lewthwaite
Corporate Plan Output: Liquid Waste	

The purpose of this report is to:

- Inform the Council of progress towards a new discharge consent for the Christchurch Wastewater Treatment Plant (CWTP), and
- Seek endorsement of the consensus view of the community Wastewater Working Party.

1. PRESENT DISCHARGE CONSENT

Under the Resource Management Act the present CWTP discharge consent expires in October 2001 and the City Council must apply for a new consent at least six months prior to that date.

The present treatment plant opened in 1962. The wastewater discharges to the Avon-Heathcote Estuary after passing through sedimentation tanks, a two-stage biological treatment process consisting of bacterial decomposition in two trickling filters and polishing in six oxidation ponds.

The present discharge conforms to the existing consent and has been at the leading edge of New Zealand's wastewater treatment plants. However it is accepted that it contributes to a number of undesirable effects in the estuary and nearby ocean beaches (eg pathogen levels exceed guidelines at times and the nutrients contribute to the occurrence of a sea lettuce nuisance) and it would be unable to obtain a new consent under the RMA or meet growing community expectations for clean water.

2. RESOURCE MANAGEMENT ACT AND THE NEW CONSENT

The process and criteria for obtaining a new consent are stipulated in the Resource Management Act (1991). There are two main requirements in the RMA, firstly a need to consider alternative locations and methods of discharge, including disposal to land, and secondly a need to consult the public widely and with an open mind. The report describes how these requirements are being fulfilled.

Four further matters also follow from the RMA:

1. A court hearing has concluded that the Avon-Heathcote Estuary is part of the ocean. The main impact of this is that although an application will be processed initially by the Regional Council, it may be required to pass it on to the Minister of Conservation for a decision.

2. The RMA enables regional authorities to establish Coastal Management Plans as frameworks for activities in the coastal area. The Canterbury Regional Council now has a Proposed Regional Coastal Environment Plan which states standards for water quality in coastal and estuarine waters. All the potential solutions investigated seriously, as described in this report would, we believe, conform to the Proposed Plan.
3. The Act allows a non-complying mixing zone adjacent to a discharge. No limits are stated for such a mixing zone and there has been much legal debate over this issue. It is conceivable that a mixing zone could legally be as large as the whole estuary, if that was the chosen outfall location.
4. The Department of Conservation's New Zealand Coastal Policy Statement expresses a preference for discharge to land for human sewage. It requires anyone who is seeking to discharge sewage to investigate seriously a discharge to land and to be able to show a good reason for using an alternative if an alternative is chosen.

3. INVOLVEMENT OF CITY COUNCIL SO FAR

- In August 1996 the Council approved a process of action towards applying for consent, including nominating Councillors Evans, O'Rourke and Wright to attend community consultation meetings on behalf of the Council. The process involved the following key elements: public consultation, an issues-and-options study, a feasibility study, and finally implementation. As described below, most work has been on the consultation and issues-and-options study and it is considered that now is the appropriate time to move on to a more focussed feasibility study. It is envisaged that an application could be lodged about the middle of 1999.
- In February 1997 the Council endorsed the role of the community consultation Working Party with the following resolution: "*The Christchurch City Council recognises the integrity, independence and important role of the Working Party in determining appropriate options for wastewater discharge from the Christchurch plant. The Council will give serious consideration without prejudice to the issues raised and to the adoption of recommendations of the Working Party*". The Working Party has understood all along that the Council is not bound to accept its recommendations.
- In June 1997 the Council approved a brief for an Issues-and-Options study and later a Council subcommittee approved the letting of a contract for the Issues and Options study to a team of consultants led by Woodward-Clyde Ltd. This study is now effectively complete and both the full report and an abbreviated version aimed for the wider public should be available shortly.

- In May 1998 the City Services Committee held a seminar to receive a progress report on the issues-and-options study, and invited all Councillors to attend. A further seminar for all Councillors was held in July 1998 and a programme of meetings has been set up to enable the Council to make an informed decision in August 1998 on how to progress towards a consent.

4. **PRESENT UPGRADE OF TREATMENT PLANT**

In May 1996 the Council approved a \$30 million programme to upgrade the CWTP, following a study by consultants Beca Steven. This was required as the plant was nearing its capacity limit and would be vulnerable to overload if the wrong combination of conditions occurred. The planned work consisted of improving the efficiency of airflow through the trickling filters, installing fine screens on the plant inlet, building circular clarifiers for improved sedimentation, building secondary sludge thickeners, reconfiguring the oxidation ponds to reduce short circuiting of effluent, and modifying the discharge pipes at the estuary. So far just over \$3 million has been spent and design work is under way for construction of the circular clarifiers and thickeners. The programme should be completed in 2005/06 according to a modified timetable approved by the Council in October 1997.

Although this was planned as a capacity upgrade it was expected there would be improvements in the quality of effluent, particularly a reduction in pathogens.

It was stated at the time of approval that the \$30 million budget was:

- The minimum that might be considered necessary to obtain a consent, and that
- The Council should be aware that further work could be needed (two specific ideas stated were a disinfection plant and a nutrient removal plant).

This point has been made repeatedly in all subsequent discussions with the Council. The \$30 million includes allowance of \$1.7 million for work required to obtain a consent.

Further work in the Issues and Options study has confirmed initial concerns that the present upgrade is unlikely to achieve contact recreation standards consistently in the estuary, due mainly to pollution from birds, and is unlikely to lead in the long-term to a major reduction in the recurring sea lettuce nuisance. In response to this the Council has put \$15 million in an initial budget allowance spread over years 2003/04 and 2004/05 as part of the funds required for further upgrading for resource consent purposes.

5. **COMMUNITY CONSULTATION**

Advice was sought initially from a public relations consultant in Auckland, then from Gay Pavelka, an independent facilitator from Christchurch. Following a widely advertised public meeting in November 1996, a Working Party was selected, with initially 12 members (plus the three Councillors and two Council staff) representing all groups who expressed an interest at that time. In May 1998 three new members joined the group after an ocean outfall had become a serious option and ocean interests had begun to respond to requests from the Council for their input. (Working Party members are listed in an appendix.) The Working Party has developed considerable expertise over this time and has provided in-depth advice to Council staff, helping formulate a vision of desired outcomes, a list of issues of concern and possible options for addressing those, and a brief for a consultant to examine issues and options. It has also given evaluations and recommendations to the consultant on short-listed options, before settling now on the present single-option recommendation to the Council.

In addition there have been three rounds of public meetings aimed at different interest groups, plus 4 newsletters with a circulation of about 120, a series of articles in newspapers and City Scene, and presentations on request to a variety of community groups, technical groups and Community Boards.

In October 1996 the Council approached Tangata Whenua to discuss how they would like to be consulted and the outcome has been a separate but parallel process. So far this has included four hui on maraes, where issues of concern and preferred outcomes have been expressed. (See list of concerns in an appendix, with initial responses given by Council staff.)

Community consultation needs to continue and it would be most helpful to continue to involve the Working Party because of the experience and expertise it has developed.

6. ISSUES-AND-OPTIONS STUDY

A brief for this study was authorised by the Council after development by staff and the Working Party. A contract was let to a team headed by Woodward-Clyde Ltd, and included input from NIWA, Lincoln Environmental, Taylor Baines and Associates, and two overseas experts on ocean pipelines and Biological Nutrient Removal plants. A team of three experts was engaged as external peer reviewers, led by Beca Steven Ltd.

The study initially expanded the lists of issues and options and then in consultation with the Working Party it narrowed these down to six feasible options, ie three treatment technologies and three outfall locations, for more in-depth examination. This produced nine potential solutions, all of which answered in a fair degree the concerns expressed in the study brief. These nine discharge solutions consisted of three direct to the ocean, four to the estuary and two to land. A summary of the characteristics and impacts of these nine solutions is given in the appendix, copied from the consultants' draft Issues and Options report. Following that the Working Party selected one solution to recommend to Council, with a set of qualifiers.

7. WORKING PARTY CONSENSUS

The Working Party produced the following recommendation at a meeting in June 1998:

1. The Working Party prefers an ocean outfall, provided shellfish standards can be achieved at the beach.
2. Both ocean and estuary outfalls need more investigation to increase confidence about:
 - Standards that will be achieved from the present upgrade and future proposals.
 - Details of the impacts of currents in Pegasus Bay and the Estuary.
3. The Working Party strongly recommends the Christchurch City Council does not make a final decision until it receives the information above.

4. The Christchurch City Council could work towards the ocean outfall in stages as long as:
 - A timeline is included in the consent for reviewing the outcome of staged improvements.
 - Proposed conditions on the consent are checked with the Working Party prior to the application being lodged.
 - The end target of an ocean outfall is clearly stated so there is certainty about the end of the process.

(Note: The ocean outfall would be by way of a diffuser 2 to 3km offshore at the end of an underground pipeline. The treatment and a 2km pipeline are estimated to cost \$48 to \$57 million, depending on the methods chosen for disinfection.)

The final step of this recommendation – the ocean outfall – is seen as the minimum cost option that will ensure shellfish standards are maintained on the ocean beaches:

- Give the maximum feasible reduction of sea lettuce in the estuary.
- Lead to confidence that contact recreation standards will be maintained consistently throughout the estuary.

8. OTHER POTENTIAL SOLUTIONS

Land based solutions have been clearly rejected as they would:

- Create an undesirable risk to drinking water supplies in the underground aquifers.
- Cost an excessive amount.
- Be almost impossible to implement as it would be difficult to obtain enough suitable land.

The cheaper estuary options, including the present \$30 million upgrade, have been rejected as long-term solutions as they:

- Do not adequately address the sea lettuce nuisance.
- Do not give confidence that recreation standards will be achieved consistently throughout the estuary.

The nutrient removal options for the estuary have been rejected as they:

- Cost significantly more than the ocean outfall.
- Do not address the sea lettuce nuisance as effectively as the ocean outfall would.
- Leave doubt over the consistency with which recreation standards would be achieved throughout the estuary.

9. FURTHER WORK ON RECOMMENDED SOLUTION

The main concerns over the ocean outfall have been:

1. Is it necessary – will the present \$30 million upgrade produce a satisfactory effluent?
2. Will it cause deterioration in the quality of the ocean beaches?

Question 1 has been addressed above, but there is some doubt over **when** the full outfall might become needed. The present upgrade will lead to a reduction in nutrients until population increases cause the capacity to be more fully used. With some further developments to the planned work on the oxidation ponds it will also reduce human-originated pathogens to lower levels. Disinfection (either with UV or intensive new wetlands) would further control human-originated pathogens. As a result of this the Working Party recommends further investigation of the standards expected from the present upgrade, and recommends a stepwise implementation of the final solution with trigger points specified beforehand. These trigger points could, for example, be in terms of dates, population growth, quality of effluent or measured environmental impacts.

However it is clear that all estuary outfall options will leave the estuary vulnerable to excessive pathogens, if only those originating from birds on the oxidation ponds and Estuary and pollution from the Avon and Heathcote Rivers. (Decommissioning the ponds has been considered, but this is not favoured because of the value placed on the ponds by the people of Christchurch and because of their flow-balancing role.) Hence none of the estuary options is seen as an acceptable long-term solution. (Note there is a possibility that an estuary outfall could be legally consentable under the RMA because the Act allows non-compliance in a “mixing zone”. This mixing zone could be extensive – potentially covering the whole estuary – but this does not fit the current use of the estuary and cannot be promoted as a responsible answer to community usage or wishes.)

Regarding the possible impact on ocean beaches, it is recommended that hydrodynamic modelling and risk analysis be done before details of a decision are confirmed. This work will:

- Evaluate the frequency with which the treated plume will contact different beaches, and how much will recirculate into the estuary.

- Quantify the relative effects of the various estuary and ocean outfall solutions studied enable more confident predictions of the impacts of each of the solutions on sea lettuce.

10. **APPROPRIATENESS OF TIMING OF PRESENT RECOMMENDATION**

Despite the lack of quantified information on some outcomes it is appropriate to tentatively commit the ocean outfall now bearing in mind the following:

1. There is not a lot of dilution of the discharge at present in the estuary and the effluent circulates near the shore now, depositing decayed sea lettuce and pathogens onto ocean beaches.
2. The quality of effluent discharged to sea will be very much higher than what is discharged to the estuary now.
3. Preliminary analysis shows that with the proposed outfall, recreation standards will generally be achieved in the ocean immediately above the outfall diffuser, and even in the worst-case scenarios shellfish standards will be achieved on all the beaches.

The proposed modelling will give more confidence in quantifying the impacts, especially the relative impacts of all the solutions, including a comparison between the present situation and that proposed. The modelling will also enable a rational decision to be made on the length of outfall pipe needed to satisfy community wishes.

A further question to be settled is over the best details of disinfection technology. The cheapest and a robust option is for a combination of a modest UV plant plus pond enhancement. Other options are full UV and disposing of the ponds, or no UV and intensive and enlarged ponds. Decommissioning the ponds is not favoured because of the cost of running a full UV plant, their use in balancing flows, and because of the value the community places on the ponds. The “no-UV” option has appeal as a more natural system but its performance is less predictable and there could be damage to important winter feeding grounds on the Council farm for desired birds. To balance this there could be an opportunity to combine a wetlands development with other city objectives in the area such as the “Green Edge” ecological and recreational reserve. These details will be studied more during the next phase of work and a final decision is best left until 1999.

11. STAGING

The Working Party recommended that the Council could work towards the ocean outfall in stages, and this would be desirable fiscally. The present upgrade programme costing \$30 million is programmed for completion in 2005/06. More information is needed before the subsequent stages and their trigger points can be specified, but the following scenario is possible:

Stage	Timing	Cost
1. Install disinfection and/or upgrade ponds	2003/04 to 04/05	\$6 to \$15 million ¹
2. Construct ocean outfall	Year 5 to 10 of the Council's programme	\$42 million

Staging might also be desirable ecologically as it would bring change at a pace that the ecosystem might adjust to more readily.

The stages would be stipulated in a consent and could be tied to specified triggers. It would be desirable for the Council to propose triggers when lodging an application, and these can be developed during the AEE process.

¹ \$6 million for slightly modified ponds plus modest disinfection, or \$15 million for significantly modified ponds with new wetlands.

12. FINANCIAL IMPLICATIONS

Planning is under way to ascertain the best way to finance this work within the overall Council fiscal programme, while minimising the impact on rates and the Council's financial policy limits. Note that about \$3 million of work programmed in the present \$30 million upgrade is complementary to the proposed treatment for the ocean outfall and is effectively available as a saving against that estimate.

The table below compares the capital costs for Christchurch's wastewater with costs occurring over a similar time frame in the other main centres in New Zealand. These costs are required to bring urban centres into line with the requirements of the RMA. Christchurch's costs per head are the cheapest in New Zealand, largely because we are starting from a good base with relatively high quality treatment from the existing plant.

City	Total capital cost (approximate)	Capital cost per head
North Shore	\$100M	\$600
Auckland	\$350M	\$450
Hamilton	\$60M?	\$550
Porirua	\$25M?	\$300
Hutt Valley	\$60M	\$600
Wellington	\$130M	\$1,100
Christchurch	\$80M²	\$250
Dunedin	\$80M	\$800

Table 1: Comparison of costs for new wastewater treatment and disposal for New Zealand's main urban centres. For most centres these costs are committed but for some decisions have yet to be confirmed.

13. AGREEMENT ON WORKING PARTY RECOMMENDATION

The Working Party recommendations were a consensus view. However two new members of the group have expressed reservations and they and the interests they represent (surfboard riding and surf clubs) will need to be convinced that an ocean outfall will not cause water quality to deteriorate in the ocean. The proposed hydrodynamic model and risk analysis will need to address their concerns, and they will be involved in formulating a monitoring programme.

² This figure is the combined total of the estimated cost of the present upgrade (\$30 million) and the additional works in the proposed solution (say \$50 million).

The rest of the Working Party and special interest group meetings showed a strong preference for an ocean outfall as the long-term aim, including meetings of manufacturers, neighbours of the estuary and treatment plant, and ecologists and recreationists. Numbers attending meetings have often been low – as low as four – despite extensive advertising, and ocean interests took no part in consultation until December 1997. However it is considered that the issues of concern have been fully canvassed for the Issues-and-Options study and addressed sufficiently for the Working Party to realistically make its recommendation to the Council.

The wider community has been offered an opportunity for participation through news media advertisements but there has been little general interest so far. However feedback from the Council's 1997 consultation on levels of service showed wastewater was the only area of Council infrastructural assets with any community support for spending more to achieve a higher standard of service. A significant minority - 24% of respondents - supported the "premium" service option, estimated at that time to add \$197 per year to people's rates. (The present proposal is far less expensive than that.)

14. SUMMARY OF REASONS FOR ADOPTING WORKING PARTY RECOMMENDATION

Environmentally the recommendation fits best with the aspirations of the people of Christchurch for water that is clean and safe for recreation and minimises adverse impacts of the city on its environment.

It is fiscally responsible in that it encourages a staged implementation so that costs are spread over a number of years and there might be little impact on rates or the Council's financial policy limits.

It allows time before a decision is confirmed for further study of impacts so details of the consent application will be well considered.

It is probably the most consentable solution in terms of the requirements of the RMA.

15. PROCESS FROM HERE TO A CONSENT

The following key steps are recommended.

Step	Date
Council decides response to Working Party recommendations	July – August 1998
Council commissions hydrodynamic modelling of estuary and Pegasus Bay, and an Assessment of Environmental Effects	September 1998 – April 1999
Community consultation	On-going
Working Party reviews outcome of research and details proposed in AEE	May 1999
Council decides on consent details and lodges application	June 1999
Regional Council Minister of Conservation consider application and grant consent	July – September 1999
Consent open to appeal	October 1999

16. SUMMARY

- The present wastewater discharge consent expires in October 2001.
- The present \$30 million upgrade will provide capacity for growth in the city's population for another 20 to 30 years.
- An Issues and Options study has led to the conclusion that additional disinfection and then a long pipeline discharging to the sea will best meet the aspirations of Christchurch people and will be the most consentable solution. This would cost between \$48 and \$57 million in addition to the present upgrade.
- Further community consultation and study of the hydrodynamics of the estuary and Pegasus Bay needs to be done before consent details are finalised and an application lodged.
- The programme above indicates a consent application could be lodged in mid-1999.
- It is envisaged the full project will be implemented in stages over, perhaps, the next 10 years.

Recommendation: That the Council:

1. Notes the preference of the working party for an ocean outfall and carries out a full investigation of that option.
2. Makes a final decision on a consent option when the investigations on the ocean outfall option have been completed.
3. Authorises staff to commission a hydrodynamic model of the Estuary and nearshore parts of Pegasus Bay, and an Assessment of Environmental Effects (AEE) (both of these have already been budgeted).
4. Leaves further decisions on details of technology until the modelling results and AEE are completed.
5. Engages in on-going community consultation and education on the issues and the continuing findings from research and AEE preparation.
6. Retains the experience and expertise of the Working Party to help review the on-going research and AEE preparation, and develop appropriate conditions on a consent application.
7. Develops a co-ordinated plan for the western edge of the Estuary taking these objectives in account:
 - (a) The Wastewater Treatment Plant.
 - (b) The Lifelines project relating to the Ferrymead Bridge and its roading connections (with special reference to Humphries Drive), and the Heritage Cob Cottage.
 - (c) The Green Edge concept previously presented to the Council.
 - (d) Opportunities to enhance tourism, recreation and the protection and enhancement of wildlife in this area.

Note: Since the joint meeting of the City Services and Environmental Committees a letter has been received from Te Ngai Tuahuriri Runanga Resource Management Committee. This letter supports the recommendations of the working party but with two additions:

1. That the outfall be no less than 12.8 km out; and
2. That “Tangata Whenua, ie Te Ngai Tuahuriri Runanga Resource Management” be added to those who will be consulted in formulating proposed conditions on the consent.

Staff comments are:

1. The first request is considerably longer than what has been in mind but it will be discussed with Tangata Whenua including input to and results from the current modeling studies;
2. It was our intention also to continue to consult closely with Tangata Whenua at all stages in the development of details of the consent application.