

**HUTT CITY COUNCIL**

File Ref: N/03/21/01

Date: 27 January 2010

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| The Chairperson and Members<br><b>WAIWHETU STREAM ADVISORY<br/>SUBCOMMITTEE</b> |
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**WAIWHETU STREAM FLOODPLAIN MANAGEMENT STUDY  
WAIWHETU CONTRACT 1268 COSTS UPDATE****Report No. WSAS2010/1/2****RECOMMENDATIONS:**

That the Subcommittee:

- (i) receives the report;
- (ii) notes the contents of the report;
- (iii) recommends that Hutt City Council provide additional funding of **\$1,174,373** to complete the clean up for the lower reaches of the Waiwhetu Stream; and
- (iv) recommends that Greater Wellington provide additional funding of **\$870,477** to complete the flood improvement works for the lower reaches of the Waiwhetu Stream.

**1. PURPOSE OF REPORT**

- 1.1 To update the Advisory Subcommittee on projected construction costs for works contract 1268, Waiwhetu Stream Flood Protection and Remediation Works.
- 1.2 To seek additional funding from each council to complete the clean up and flood improvement works for the lower reaches of the Waiwhetu Stream as a result of the discovery of more contaminated material.

**2. SIGNIFICANCE OF DECISION**

- 2.1 The decision sought does not reach any of the thresholds set out in the Local Government Act 2002.

**3. BACKGROUND**

- 3.1 Construction progress was last reported to the Subcommittee in report WSAS2009/6/1 on 10 November 2009.

- 3.2 Since then, the removal of contaminated material from cells A, B, C and D has been completed (refer to site map at Appendix 1). The excavation of contaminated material has proved to be more difficult than anticipated at the design stage, with greater than expected volumes. Revised estimates of quantities of contaminated material have been prepared which result in a different projected financial position to that reported in November. These issues were not apparent at the time of the November 2009 report.
- 3.3 The projected volume of contaminated material to be removed to Silverstream landfill is now 27,300 m<sup>3</sup> compared to the designed volume of 12,100 m<sup>3</sup>. The reasons for the increase in overall contaminated volume are explained in section 4.
- 3.4 The total cost to complete project construction is now projected to be \$20.4M compared to \$14.1M at start of construction. The majority of the increased costs are in the clean up part of the project. An explanation of the cost increase and the distribution of costs between each council is covered in section 5.

#### 4. REVISED CLEAN UP QUANTITIES

- 4.1 A presentation will be made to the Subcommittee by Jon Coakley (URS) and Rick Grobecker (CPG) explaining how the revised clean up quantities have been arrived at.

The total volume of material to be excavated, both cleanfill and contaminated material remains about the same as originally estimated, that is about 43,500 m<sup>3</sup>. The change is the split between the two materials, with an increased quantity of contaminated material and a corresponding decrease in clean material.

|                      | Design contaminated quantities | Revised contaminated quantities |
|----------------------|--------------------------------|---------------------------------|
| Cells A-H            | 10,000                         | 21,000                          |
| Urupa                | 1,000                          | 3,090                           |
| U Channel            | 0                              | 3,224                           |
| 10% design overcut   | 1,100                          |                                 |
| <b>Total</b>         | <b>12,100m<sup>3</sup></b>     | <b>27,314m<sup>3</sup></b>      |
| Density              | 1.5t/m <sup>3</sup>            | 2+t/m <sup>3</sup>              |
| <b>Total tonnage</b> | <b>18,150 T</b>                | <b>56,331 T</b>                 |

The explanation for these variations in each of the three works areas is as follows:

- 4.2 The **“U” channel area** of the works downstream of Seaview Road Bridge tested as “clear” of significant contaminants in previous studies undertaken prior to the start of works. The clean up works were sized up on this assumption. However, an estimated 200mm thin layer of contaminated material above chainage 200m (measured upstream from Port Road bridge) was discovered during the installation of precast panelling on the “U” channel walls. The contaminated layer is overlain by a thick layer of coarse sediments and shells, which must be treated as contaminated. Installation of precast panels above chainage 200m cannot proceed until the contaminated layers are removed. The estimated additional volume to remove is 3,224 m<sup>3</sup>, including the material from Waiu Street, which originated from the U channel section of the works.
- 4.3 Contamination in the **Urupa saltmarsh area** extends further laterally and deeper than originally anticipated. The portable XRF testing device has helped define the actual extent of contamination. This area was the original shoreline and so has been heavily modified with variable layers of fill and natural material. An additional 2,090m<sup>3</sup> of contaminated material from the urupa has been allowed for in the revised estimate.
- 4.4 The **main clean up area** is in cells A-H between Bell Road bridge and Seaview Road bridge. The revised quantity for this area is 21,000m<sup>3</sup>. The increased volume is mainly the result of:
- Historical filling on the Waiwhetu banks has created thin layers of contamination that extend back into the widened profile sections. Removed material above the thin layer must be treated as contaminated which has increased the volume.
  - In practice the 10% design overcut tolerance has not been achieved for ooze excavation. The tolerance for a thin ooze layer (for example 200mm) is only 20mm which is practically difficult to achieve with a digger. The 10% tolerance was derived on the basis that the interface between the contaminated ooze material and the underlying layers was visually apparent. This appeared to be the case in the trial. In reality XRF readings have identified that contaminated material extends beyond the ooze layer and penetrates into the clays and occasionally overlain gravel layers.
  - In many cases the extent of contamination is deeper than originally assumed as visual identification of contaminated ooze is not accurate. The portable XRF has been used to identify the extent of contamination as excavation is underway by digger, and we are able to do visual observations of the actual streambed conditions in the de-watered cells. The ooze layer in many cases is underlain by a “brown clay” layer that is difficult to separate from the black ooze layer.

Beneath the brown material is a gravelly layer. Contamination often extends below the black ooze layer into the brown and gravelly layers which results in the need for deeper excavation.

- The probe survey undertaken by GW in 2006, which measured the thickness of the soft black ooze layer did not and could not account for contamination beneath the soft layers into the gravelly layers. The assumption that the worst contaminants are concentrated in the ooze layers is correct but residual contamination into underlying layers was not identified by previous studies. It is also likely that the process of digging introduces some mixing of contaminated and non-contaminated material that cannot be avoided with large earthmoving equipment.
- The 30m trial section below Bell Road bridge, cleaned and validated in April 2008, was tested at the start of the remediation works and found to be recontaminated. This area and the area up to Bell Road bridge were cleaned up as part of Cell A. This additional volume of contaminated material was not part of the original design and done under the contingency for the contract. The working theory behind the recontamination of the trial area and up to Bell Road is the action of the stream and tide transporting material up and downstream.

#### 4.5 Other factors contributing to increased costs include:

- The density of the contaminated material assumed from the results of the trial and other information gathered during the preliminary investigations was 1.5t/m<sup>3</sup>. In practise the weight of material ex truck and over the weighbridge is about 2t/m<sup>3</sup>. This does not affect the volumes removed, or paid for under the construction contract, but has a significant effect on the landfill fees as they are charged by the tonne over the weighbridge.
- The as dug water content of the ooze is a critical factor as any "additional" water transported with the ooze to Silverstream landfill is charged at the full contaminated rate. Lessons learned in cells A and B with dewatering and excavation control have been applied to cells C and D. These have reduced the amount of free water taken to the landfill but not sufficient to compensate for the other increases.

## 5. OPTIONS TO PROCEED

### 5.1 Options to proceed with the project can be summarised as:

- Work within existing Budgets. Stop all work now at the current limit of funding approved.

- Complete clean up for cells A-H, defer clean up below Seaview Road Bridge. Stop the works at Seaview Road Bridge. Treat the Urupa and U channel section as a new project and seek additional funding and recommence works at a later date.
- Proceed to completion.

## 5.2 Work within existing Budgets.

Stopping all work now has the advantage of spending the least amount of money. The projected expenditure to “stop now” is approximately \$14.1M to the end of February. However the flood protection benefits would not be realised and there is the possibility of recontamination of cleaned sections from areas downstream. As the cleanup is not completed, the full MfE funding may be at risk and this would need to be explored with the Ministry. Contract exit costs would need to be negotiated with the contractor. The project may also be in breach of construction resource consents by not completing the clean up. This is the least preferred option.

## 5.3 Complete clean up for cells A-H, defer clean up below Seaview Road Bridge.

Stopping work at Seaview Road Bridge and treating the downstream sections as a new project would limit expenditure to about \$17.5M. This would allow a pause at a logical point in the project as the issues in the Urupa and the U channel are not straightforward and would possibly allow for an application for further funding from the MfE. However the risks are the same as “stop now” (flood protection benefits are partly achieved as the U channel has been widened) and there is no indication that the Ministry would entertain any further requests for funding. The costs to re-establish the work site and complete in the near future would likely be considerable. This is the second preferred option.

## 5.4 Complete Project.

Proceed to completion achieves all the flood protection and clean up goals of the project. It also requires additional funding of \$7.3M and the commitment of all parties to proceed. This is the preferred option and provides the least cost option to complete the work as originally intended.

It is recommended that each council provide additional funding required to complete the clean up and flood improvement works for the lower reaches of the Waiwhetu Stream.

## 6. PROJECT FUNDING AND COST DISTRIBUTION

6.1 The physical works are divided into 3 parts according to funding from each partner:

- Clean up
- Flood protection works; and
- HCC additional works e.g. sewer renewals and stormwater improvements.

GW has liability for the cost of the flood works and has provided a fixed \$500,000 contribution to the cost of the clean up.

The Ministry for the Environment (MfE) agreed a contribution of \$2,929,500 towards the cost of the clean up in 2008.

HCC has liability for the cost of the clean up above the contributions of the MfE and GW and for HCC additional works.

6.2 The funding splits reported for each of the partners at November 2008 were:

|             | Flood works | Clean Up    | HCC work     | Total               |
|-------------|-------------|-------------|--------------|---------------------|
| <b>GWRC</b> | \$7,062,000 | \$500,000   | 0            | <b>\$7,562,000</b>  |
| <b>HCC</b>  | 0           | \$3,001,000 | \$521,000    | <b>\$3,522,000</b>  |
| <b>MfE</b>  | 0           | \$2,929,500 | 0            | <b>\$2,929,500</b>  |
|             |             |             | <b>Total</b> | <b>\$14,014,000</b> |

Since the original agreement, an additional \$327,424 has been granted from the Contaminated Sites Remediation fund, towards the clean up. This amount, while welcome, does not cover the additional costs accruing to the project by imposition of the MfE Waste levy of \$10 per tonne, which was unbudgeted. The MfE's total contribution now stands at \$3,256,924.

6.3 The revised funding splits calculated for each of the partners is as below:

|              | Flood works | Clean Up    | HCC work  | Total               | Variance from 2008 |
|--------------|-------------|-------------|-----------|---------------------|--------------------|
| <b>GWRC</b>  | \$7,932,477 | \$500,000   | 0         | <b>\$8,432,477</b>  | \$870,477          |
| <b>HCC</b>   | 0           | \$8,575,124 | \$314,804 | <b>\$8,892,928</b>  | \$5,370,928        |
| <b>MfE</b>   | 0           | \$3,256,924 | 0         | <b>\$3,256,924</b>  | \$327,424          |
| <b>Total</b> |             |             |           | <b>\$20,582,330</b> |                    |

6.4 Increase in HCC costs.

The total costs of the clean up are now estimated to be \$20,582,330. The major variance is an additional \$4,752,355 in landfill fees, including \$563,310 as a result of the MfE Waste Levy. Although landfill fees have significantly increased, these will not have a rating impact to HCC in that they are offset by landfill revenues. The additional direct costs are the operating costs at the landfill which equate to around \$15 per tonne, or a total of \$586,800 on the additional volume now projected.

The additional costs to HCC are summarised:

- \$586,800 for direct operating costs at Silverstream landfill
- \$175,000 contingency, this is based on a \$500,000 contingency of which 75% of any additional costs are landfill fees, so only the balance is included for budgeting
- \$618,573 for increased contractor and supervision costs
- Less \$206,000 savings from infrastructure improvements
- Total increase in net cost to HCC is **\$1,174,373**

6.5 Increase in GW costs.

The total costs of the flood protection works are now estimated to be \$7,932,477. GW cost increases are made up of additional pumping station costs, increased areas of reno mattresses, relocation of additional services and the associated share of contractor and supervision costs.

The additional costs to GW are summarised:

- \$770,477 for increased contractor and supervision costs
- \$100,000 contingency

- Total increase in cost to GW is **\$870,477**
- 6.6 The project team are continuing to investigate options to reduce project costs. An update will be provided at the meeting.
- 6.7 Clean up projects by nature are highly complex with many uncertainties. While we are well through the project now and believe we have encountered most of the unexpected construction issues, there remains a possibility of unforeseen events arising in future that may have an impact on final costs.

## 7. LANDFILL ACCEPTANCE ISSUES

- 7.1 Silverstream landfill is being used to accept the contaminated waste from the clean up. The landfill provides secure containment of the contaminated material. It was originally envisaged that the landfill would receive up to 21,000 tonnes of waste, at a maximum rate of 500 tonnes per day. The material is being accepted as special waste which is the category that covers waste that requires special handling either because of its physical or chemical properties. The original estimate of waste identified that 14,000 tonnes was too wet to be handled by normal landfill operating equipment and needed disposal in specially constructed pits.
- 7.2 Since the original waste estimates were provided a number of changes have occurred in relation to the volume of material and its physical characteristics. The total estimate of waste for disposal at Silverstream is now approximately 88,000 tonnes consisting of approximately 32,000 tonnes of "clean fill" and approximately 56,000 tonnes of contaminated waste. Of the contaminated material nearly all of this requires the construction of disposal pits. The "clean fill" material is being accepted at the landfill on the basis it can be used as a cover material. Unfortunately some of this material has elevated moisture levels and cannot be used as a cover material, but requires special handling.
- 7.3 The original time frame for the works has expanded from February 2010 to June 2010.

The landfill has increased the daily amount of material it receives from 500 tonnes to 1,000 tonnes a day.

The landfill is in the process of closing down its current operating area Stage 1a and moving to a new area known as Stage 2. None of the Waiwhetu waste is suitable for disposal in the Stage 2 landfill until a cushioning layer of waste has been placed on the new base over the next 6 months.

7.4 The increased volume of material and the timing are of concern for the following reasons:

- There is a limit on the area available for the construction of pits to accept the waste
- The creation of pits to accept the contaminated material is a source of odour, and there has been an increase in the number of odour complaints since the landfill started to receive this material. GWRC consent management have taken an interest in these complaints. There will be an increase in operating cost to mitigate the odour, and in the worst scenario GWRC could seek the stoppage of the disposal of the waste.
- Once the move to the Stage 2 area has been completed over the next few months, the work on pits for receiving the contaminated will require mobilisation of equipment to different parts of the landfill (stages 1a and 2).
- Continued acceptance of the material until June 2010 will delay the final capping of the landfill.

HCC consultants and landfill operators are working closely with Waiwhetu project staff to manage these issues, and with the support of GW consents staff, expect to be able to do so. However the subcommittee should be aware that these factors raise concern about the ability to accept all the waste from the Waiwhetu project and the ability of the landfill to meet its resource consent conditions in regard to odour. There are likely to be as yet unidentified cost implications in finding ways to manage these issues, and contingency has been allowed for this.

## 8. POLICY CONSIDERATIONS

8.1 There are no policy considerations.

## 9. FINANCIAL CONSIDERATIONS

9.1 An application to the MfE's Contaminated Sites Remediation Fund for additional funding was approved for \$327,424 (50% of the requested funding) to be used for the disposal of additional contaminated materials, revised landfill disposal costs and the additional contractor costs identified since the original 2006 CSRF application.

Officers will approach the MfE to seek additional funding for the clean up.

9.2 Each council will need to consider the impacts of funding the project to completion in relation to other funding priorities in their respective LTCCP's.

GW would need to fund an additional **\$870,477** to meet its commitments. HCC would need to fund an additional **\$1,174,373** to meet its commitments.

**10. LEGAL CONSIDERATIONS**

10.1 There are no legal considerations.

**11. PUBLICITY CONSIDERATIONS**

11.1 The funding implications will be of major public interest. Press releases will be issued as appropriate.

**12. OTHER CONSIDERATIONS**

12.1 There are no other considerations.

**13. APPENDICES**

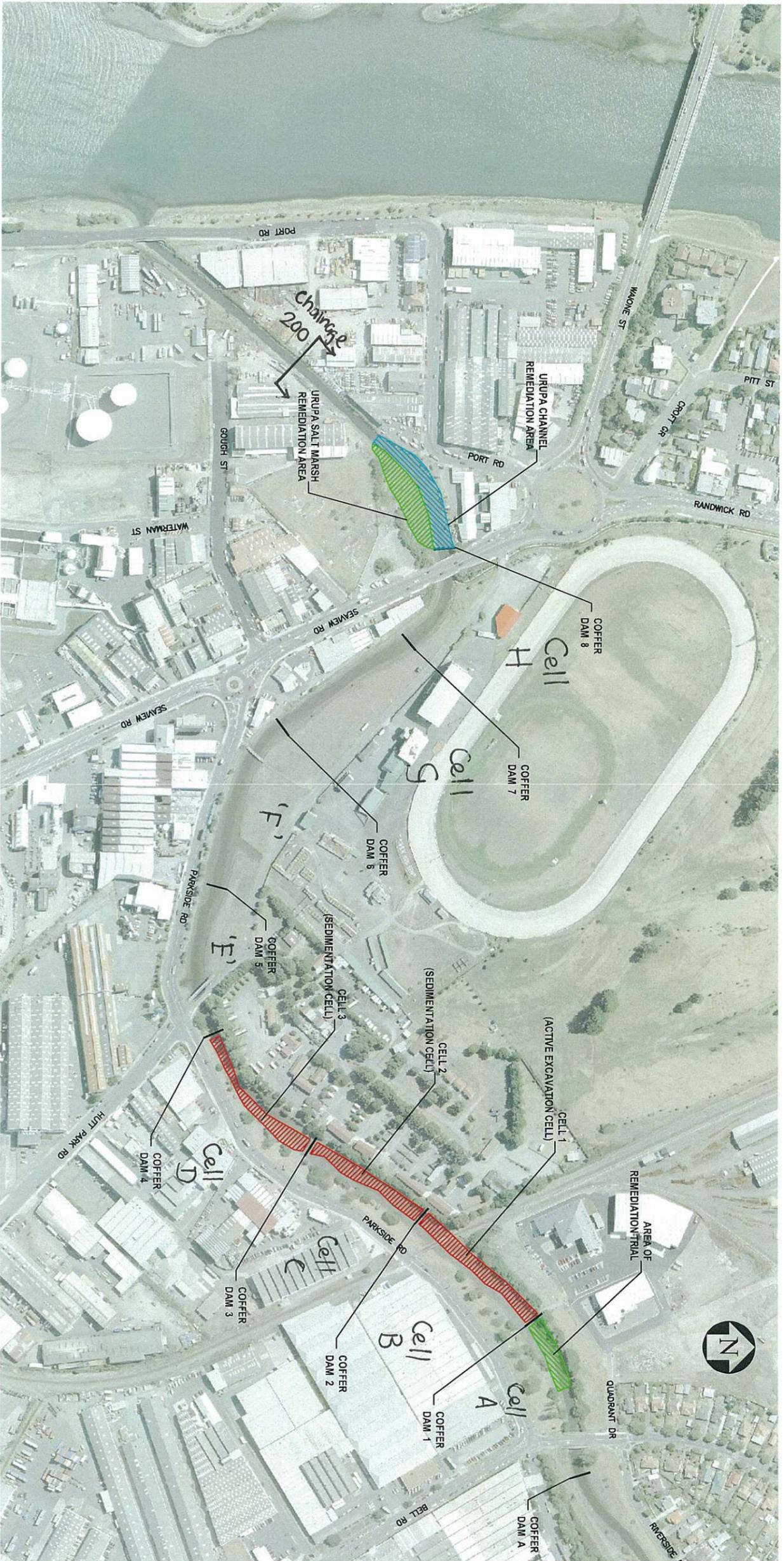
Appendix 1: Plan showing remediation areas.

Report prepared by:  
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**Catchment Management**

Approved by:  
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**City Infrastructure**



SHEET PILE COFFER DAM  
 LOCATIONS SHOWN ARE  
 APPROXIMATE ONLY.

| Rev | Description             | Design | Checked | Approved | Date       |
|-----|-------------------------|--------|---------|----------|------------|
| A   | TENDER                  | JC     | BG      | JC       | 27/11/2008 |
| B   | ISSUED FOR CONSTRUCTION | JC     | BG      | JC       | 18/6/2009  |

Tab REM-002  
 Scales 1:4000  
 Original Size A3

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GREATER WELLINGTON  
 REGIONAL COUNCIL

MAIWHETU STREAM PROJECT - CONTRACT SPECIFICATION  
 REMEDIATION MASTER PLAN

Status FOR CONSTRUCTION  
 Drawing Number REM-002  
 Revision B