BEFORE THE HEARINGS PANEL

IN THE MATTER of hearings on submissions concerning the Proposed One Plan notified by the Manawatu-Wanganui Regional Council

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SECTION 42A REPORT OF MR ALLAN DAVID COOK
(RE: RIVER AND DRAINAGE SCHEMES)
ON BEHALF OF HORIZONS REGIONAL COUNCIL

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1. INTRODUCTION

My qualifications/experience

1. My name is Allan David Cook. I am the Group Manager - Operations for Horizons Regional Council (HRC). I am responsible for managing Horizons' river and drainage engineering functions.

2. I hold a New Zealand Certificate in Engineering (Civil) and a Diploma in Business Studies (Local Government Management). I am a Registered Engineering Associate.

3. I have more than 35 years experience in river engineering throughout Horizons' Region at a practical, technical and managerial level.

4. I have carried out many investigations of river behaviour, have designed and supervised the construction of river engineering works, have managed many river scheme capital works and maintenance programmes, and have participated in the development and review of many river management plans. I have developed and led the public consultation programmes for a number of significant flood protection projects throughout the Region.

2. SCOPE OF EVIDENCE

5. My evidence will relate to my involvement in the management of river and drainage schemes. I will explain what schemes are, the statutory mandate for their establishment, how they function, and why they are critical to the safety and prosperity of the Region's various communities.

6. I will explain the dynamic nature of river behaviour and the need to be able to respond promptly to changed circumstances, in order to maintain the integrity of schemes.

7. Finally, I will explain the potential effects of the activities of others on the effective operation of schemes and therefore on the safety and prosperity of our communities.

Structure of river and drainage management activity

8. The Operations Group performs the river control and drainage functions of Horizons in terms of its powers and responsibilities under the Soil Conservation and Rivers Control

Act 1941 (the 1941 Act), the Local Government Act 1974 (LGA), the Land Drainage Act 1908, and the Resource Management Act 1991 (RMA).

9. Under the 1941 Act, it is specifically Horizons' function to *'minimise and prevent damage within the district by floods and erosion'.* The Act conveys very significant powers, rights and privileges on the Council in order that it may carry out its functions. Section 126(2) provides as follows:

> *Each Board shall have all such powers, rights, and privileges as may reasonably be necessary or expedient to enable it to carry out its functions, and in particular each Board shall have power to construct, reconstruct, alter, repair, and maintain all such works and do and execute all such other acts and deeds including the breaching of any stopbank as may in the opinion of the Board be necessary or expedient for -*
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> *(a) Controlling or regulating the flow of water towards and into watercourses.*
> *(b) Controlling or regulating the flow of water in and from watercourses.*
> *(c) Preventing or lessening any likelihood of the overflow or breaking of the banks of any watercourse.*
> *(d) Preventing or lessening any damage which may be occasioned by any such overflow or breaking of the banks.*
> *(e) Preventing or lessening erosion or the likelihood of erosion.*
> *(f) Promoting soil conservation.*

10. Further very specific powers are conferred on the Council in sections 133 and 135 of the 1941 Act, to enable the maintenance and improvement of watercourses and defences against water.

11. Under Section 37SA of the Local Government Act, Council has the functions, duties and powers of a Land Drainage Board under the Land Drainage Act 1908, in relation to those drainage districts that were scheduled in the Local Government (Manawatu-Wanganui Region) Reorganisation Order 1989. Under Section 504 of the LGA, the Council is able to establish new land drainage areas.

12. Section 30 of the RMA confers functions on the Council which include controlling the use of land for the purpose of the avoidance of natural hazards. The definition of natural hazards includes the occurrences of erosion, sedimentation and flooding, where those occurrences may adversely affect human life, property, or other aspects of the environment.

13. So Horizons clearly has the statutory mandate to undertake river control and drainage activities to ensure the safety and economic wellbeing of its various communities.

River and drainage schemes

14. The means by which those activities have traditionally been undertaken is within a 'scheme' framework. That framework originates from the 1941 Act, which provided, in Part V, for the classification of land for rating purposes of those areas that would benefit from proposed flood or erosion mitigation works. Earlier works, in particular those that were progressed under the 1941 Act, tended to be large and provided widespread community benefits. Accordingly, 'schemes' were developed to encompass the organised design, planning and classification processes necessary to ensure achievement of the desired long-term benefits. A scheme can be described as a legally established entity that provides flood or erosion protection benefits to a defined community. Schemes facilitate a coordinated approach where protection work undertaken by individuals would not necessarily be sufficiently comprehensive to deliver desired benefits.

15. Schemes are funded by way of targeted rates differentiated according to degree of benefit; they are able to spread the cost of capital improvements that provide longer term benefits across future generations through borrowing; and they provide certainty of funding through the Council's ability to strike rates and therefore give assurance of long-term maintenance and renewal of protection assets. The rating provisions of the 1941 Act have now been repealed and scheme classifications are developed in accordance with the Local Government (Rating) Act 2002 and the Local Government Act 2002.

16. Horizons currently manages 20 river control schemes, with flood and/or erosion control benefits, and 12 drainage schemes, with land drainage and flood protection benefits. The largest scheme, the Lower Manawatu Scheme (LMS), provides direct flood protection benefits to 280 sq km of highly productive land and to the urban populations of Palmerston North, Feilding and Foxton Beach. By contrast, the Haunui Drainage Scheme is one of the smaller schemes and provides land drainage benefits to 340 ha of rural land in the lower Whangaehu Valley.

17. The total budgeted cost of services for the scheme activity in the 2008-09 financial year was $19.7 million.

18. Each scheme employs infrastructural assets of various classes to provide an agreed scope and level of service to stakeholders. Across all the schemes it manages, Horizons employs assets with a replacement value as at July 2008 of $291 million. The most common assets are stopbanks, flood detention dams, drainage channels and rock rip-rap erosion protection linings. These assets are owned by Horizons on behalf of scheme ratepayers, who have the very reasonable expectation that the assets will be effectively managed and maintained to a high standard for the benefit of present and future generations.

19. A number of documents are central to the effective management and operation of each scheme. These comprise the scheme foundation or review document, which defines the scheme objectives and engineering philosophy; the Environmental Code of Practice for River Works, which specifies how river and drainage activities will occur; numerous resource consents granted in respect of specific scheme works activities, which also specify how activities will occur in order to avoid, remedy or mitigate environmental effects; the Asset Management Plan, which defines the agreed level of service; the Annual Plan and Works Programme, which specify what will be done, when it will be done and what it will cost; and the Annual Scheme Report, which records actual physical and financial performance. Further discussion on the relevance of resource consents and the Environmental Code of Practice for River Works is contained in my separate s42A report that addresses those matters.

20. Each scheme is based on a foundation scheme document that describes the nature and extent of problems to be addressed and therefore the benefits to be provided, and sets out the broader management philosophy, methodologies and management practices. The documents are prepared in close collaboration with key stakeholders and are subjected to a robust non-statutory consultation process. Scheme documents are then reviewed at appropriate intervals to ensure that they continue to reflect the service level expectations of stakeholders in an affordable and environmentally sustainable manner. Almost all of the 32 schemes currently managed by Horizons have either been comprehensively reviewed or have been newly established within the past 18 years.

21. The Environmental Code of Practice for River Works sets out environmental standards of good practice that will apply to all river and drainage engineering works within schemes, regardless of whether or not resource consents are required. By agreeing through the Code to meet defined standards for good practice that avoid, or minimise or mitigate adverse environmental impacts with respect to 19 specific river and drainage engineering activities, scheme managers achieve streamlined regulatory requirements,

improved efficiency in service delivery and better environmental outcomes. I will elaborate on this matter in my separate s42A report on the value of the Environmental Code of Practice for River Works.

22. Resource consents have been obtained in respect of those river and drainage scheme activities that are not permitted under the Regional Plan for Beds of Rivers and Lakes (BRL). The Operations Group currently holds 155 active consents. A significant proportion of those relate to finite construction activities and only remain active in respect of maintenance requirements. Twenty-eight consents can be described as 'global' in that they provide for ongoing scheme-wide river management activities.

23. Horizons is required to prepare Asset Management Plans (AMPs) for each scheme that employs infrastructural assets, and to review those plans at three-yearly intervals. The AMPs are subject to formal audit along with Council's Long-term Council Community Plan (LTCCP). The primary objectives of the AMPs are to define the desired level of service as determined in consultation with the affected community; to set out the management and operational processes that are in place to deliver that level of service, in particular the processes for maintaining the assets in perpetuity without loss of service potential; and to ensure that the assets are being managed in the most cost-effective way over their lifecycle.

24. While Asset Management Plans set out the agreed service levels, performance targets and measures to be applied for the three-year term in respect of assets employed, the Council's Annual Plan and individual scheme works programmes set out in some detail the nature, extent, location and estimated cost of proposed capital and maintenance works to meet those performance targets.

25. The Annual Scheme Report records all completed works and costs, and documents a variety of information including hydrology, environmental performance and key scheme issues. In accordance with the Code of Practice, the Annual Scheme Report is made available to nominated stakeholders.

26. Scheme managers report regularly to Scheme Liaison Committees in regard to physical and financial performance, and report to all ratepayers at annual public scheme meetings.

27. Horizons delivers a very substantial part of its core business through its 32 river and drainage schemes. An estimated 67% of the Region's ratepayers depend directly on

schemes for their safety and/or economic wellbeing. A further substantial proportion receive indirect benefits. The expectation for sustained performance around the agreed levels of service is extremely high. That is not surprising, given that the Region's economy is largely based on agriculture and that the best agricultural land is located on flood plains. Furthermore, approximately 33% of the population of the Region's largest urban area, Palmerston North, is located in a flood risk area. The experience gained during the February 2004 storm event accentuated the Region's exposure to flood and erosion hazards, and raised community expectations for a high standard of protection.

28. There is also a legal incentive for Horizons to ensure that scheme works are maintained to an agreed standard on an ongoing basis. Because the 1941 Act does not include any express provision for discontinuance of either entire schemes or works within those schemes, there is a risk that the Council will have continuing legal obligations and responsibilities in relation to those schemes. A decision to discontinue a scheme and, in doing so, abandon protection works, could be challenged by way of judicial review or private law action for damages, even if a reasonable process for disestablishment had been followed.

29. The effective management of schemes is therefore a critical success factor for Horizons. It is imperative that efficient and effective planning, engineering, financial, stakeholder consultation and environmental approval processes are in place to facilitate that effective management.

30. The potential damage, either to scheme assets themselves, or to land and assets protected, in the event of asset failure or lack of channel maintenance, could be very substantial. For example, in a variety of damage scenarios undertaken in respect of the flood protection for Palmerston North, direct damage costs ran into hundreds of millions of dollars, and floodable houses numbered in the thousands. Furthermore, the risk to human life in the event of the failure of a flood protection work cannot be discounted. In particular, the population density in floodable areas of Palmerston North, Wanganui, Taumarunui and Feilding is such that a stopbank breach during a major flood in any of those areas would present a very significant probability of loss of life.

31. Accordingly, it is imperative that Horizons is able to undertake flood and erosion control, and land drainage works, of a nature, extent, and at a frequency necessary to maintain, and in some circumstances enhance, current levels of hazard control. It is also imperative that the Council has the ability in all respects to respond quickly to changing

circumstances. The Environmental Code of Practice for River Works is designed to enhance Horizons' ability to meet stakeholders' high expectations in that regard.

Impact of activities of others on scheme management

32. Wherever possible, rivers within schemes are managed in accordance with a design channel alignment and cross-section. Design channels that fit the natural dominant flow meander form for the river concerned are drawn up and channel management and lateral erosion control works are planned and executed in a manner that either maintains or encourages the river to assume that alignment.

33. Activities undertaken within the river bed by people other than river engineers/scheme managers have the potential to seriously compromise the achievement of that design alignment and thereby destabilise the river channel. Furthermore, uncontrolled activities of others have the potential to compromise the integrity of structural flood or erosion control works.

34. Examples of activities undertaken by others within scheme areas:
    i. Construction and/or maintenance of bridges, culverts and fords.
    ii. Trenching and laying of services including pipelines and cables.
    iii. Construction and/or maintenance of water intake structures.
    iv. Extraction of gravel.

35. Examples of adverse effects arising from the activities of others:
    i. Construction of a bridge or culvert with an inadequate waterway area or with inappropriate foundation location within the active channel could significantly raise the upstream water level and thereby increase flood risk, or alternatively it could concentrate flows with lateral erosion consequences.
    ii. Excavation of a services trench through a flood protection structure, and inadequate attention to backfilling and compaction, could present a substantial risk of seepage development and ultimately a piping failure of the structure concerned. During the 2004 flood in the Manawatu River, a serious seepage problem developed around an irrigation pipe laid without approval through a scheme stopbank at Opiki. Emergency measures succeeded in containing seepage flows; however, had they been unsuccessful, then 4000 hectares of land, 90 houses and 8 km of road in the Opiki Basin could have been flooded. This situation was able to be managed because the problem was discovered in time; however, given that the Operations Group is responsible for more than 400 km of

stopbank, the risk of a seepage problem developing around an improperly installed conduit, and not being discovered in time, is significant.

iii. Mechanical disturbance of riverbank erosion protection works during construction or maintenance of non-scheme assets could compromise the integrity of the overall protection, and potentially contribute to its failure during a subsequent flood event. Erosion protection works are very often an essential component of a flood protection system, so a failure could have severe flooding consequences.

iv. Excavation of a trench or larger excavation in close proximity to a stopbank could shorten the seepage path under the structure and lead to a dramatic piping failure.

v. Excavation of gravel from a river channel in an inappropriate location or manner could encourage the development of undesired channel alignment and could ultimately result in failure of adjoining erosion protection works.

vi. Execution of works on non-scheme assets within a scheme area, for example on a bridge abutment, often requires access to be formed across a stopbank or through erosion protection structures. There have been many instances where access tracks have been cut into stopbank batters and where the integrity of the structure has been compromised accordingly. That behaviour simply demonstrates a lack of understanding of the design features of river engineering structures and the potential failure mechanisms.

36. Accordingly, there are high risks associated with activities being undertaken within river schemes by those who either do not have responsibility for the effective performance of those schemes or who do not have a thorough understanding of river engineering processes.

37. While the Environmental Code of Practice for River Works sets out good practice standards for the activities undertaken within schemes, that Code is written for river engineering practitioners. I have little confidence that other engineers, operators or contractors who may be engaged in the design or construction of works within the river environment could be relied on to properly interpret or operate under the Code.

38. Scheme managers must retain a high degree of control over all activities undertaken within scheme areas. If other individuals or agencies are to undertake works within Horizons' scheme areas, then we need to know and we need to be able to specify conditions and to monitor compliance in respect of any potential impacts on our assets. The best means of achieving that necessary degree of control is through the consents process.

39. The Operations Group is highly accountable to the community for the effective operation of the various schemes. It is my contention that the Group's ability to perform against that accountability will be compromised if others, who do not share that accountability, are able to operate within scheme areas under the Code.

Allan Cook
GROUP MANAGER OPERATIONS
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