

INDEPENDENT ASSESSMENT OF HORIZONTAL REBUILD WORK AND COSTS

April 2015



Christchurch
City Council 

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EXECUTIVE SUMMARY AND RECOMMENDATIONS

This report was prepared as a result of the commitments that are outlined in the Cost Sharing Agreement between the Crown and the Christchurch City Council. At the time of the execution of the Cost Sharing Agreement in 2013, only 40% of the assets had been assessed. This report establishes the total programme forecast for the parties to determine the subsequent cost allocation.

This review focusses on the unallocated programme i.e. projects that have not been committed to the construction phase by the Horizontal Infrastructure Governance Group but have been identified as potentially eligible to be considered under the Cost Sharing Agreement. It is based on financial and technical information provided by Christchurch City Council, CERA and New Zealand Transport Agency that has been verified by independent expert advisors. The unallocated work programme is deemed to be the programme of work currently being considered by Horizontal Infrastructure Governance Group to complete the Horizontal Infrastructure rebuild and comprises of SCIRT and non SCIRT projects.

Although the Cost Sharing Agreement identified that the independent assessment should take place by 1 December 2014, circumstances around validating the unallocated programme estimates and scope were such that this information was not made available until late February/early March 2015. Of particular note is the approach Christchurch City Council wishes to pursue in regards to the multi-decade Land Drainage Recovery Programme (of which only a small portion can currently be readily identified as being eligible for consideration under the Cost Sharing Agreement) and to aligning the rebuild programme with the 2016/ 2025 Draft Long Term Plan which was released in March.

Also in late April the New Zealand Transport Agency raised concerns about the potential eligibility of some of the Non SCIRT land transport projects. These will need resolving prior to commitment of funds against this asset class. For the purposes of this report, the non SCIRT land transport asset programme estimate currently being reported to the Horizontal Infrastructure Governance Group, (dated April 2015) has been used for assessing the “Costs to Come” and “Total Programme Forecast”.

It is pleasing to note the collaboration of the organisations in being able to work through the significant work programme and agree on the scope and cost allocation of most elements. The Memorandum of Understanding (dated 26 September 2013) sets out the governance and management of the horizontal infrastructure rebuild and also includes a resolution mechanism when parties cannot reach consensus. The Independent Assessor has not been advised of any issues that required the resolution procedure to be initiated.

Only one issue is unresolved in the unallocated work programme that has been submitted to the Horizontal Infrastructure Governance Group, which is to do with the remaining projects against the wastewater asset class. This is between the DG43B design guide and what the Christchurch Council will accept. The value of the difference (for the remaining 67 projects in this asset class) is estimated to be \$15m.

The following are the key findings and recommendations:-

1. Local Roading Infrastructure

- (i) Although the Posting Certificate provided for the Fitzgerald twin bridges requires ongoing inspections every 2 to 3 months, the decision to undertake minor repairs and New Zealand Transport Agency's commitment to provide 83% funding for any further work that may be required to achieve the Class 1 posting until the next posting assessment is carried out in 2 years (March 2017) is fair, meets the funding criteria of the Cost Sharing Agreement and will not impose any undue financial burden on Christchurch City Council.
- (ii) Costs for the second coat seals should not be included in the unallocated work programme as this is not eligible for funding against the Cost Sharing Agreement criteria.
- (iii) A number of land transport projects retaining walls have previously been identified by New Zealand Transport Agency are not eligible for funding against the Cost Sharing Agreement criteria is considered fair. In most cases, Christchurch City Council has made a submission to the Agency through the normal transport funding programme for financial assistance for these projects.
- (iv) The uncommitted Non SCIRT land transport asset estimate is currently reported at \$74.18m, however information has been received that the New Zealand Transport Agency considers only \$37.14m is potentially eligible for consideration under the Cost Sharing Agreement. It is recommended that further discussions take place to ensure that the programme does not include any projects that should be managed through the normal transport funding under the 2015 – 18 and subsequent National Land Transport Programmes.

2. Three Waters Asset Class (Water, Storm Water and Wastewater Assets)

Although Christchurch City Council has agreed to implement a network performance approach for the Levels of Service policy and will inherit a significant wealth of knowledge of the underground assets which allows them to be well placed for establishing a robust asset management system and accepted at the decision to implement DG43B, they still remain unconvinced it is the appropriate level of intervention.

- (i) The application of a network performance standard is reasonable taking into account that Christchurch City Council will inherit a substantial and valuable library of asset condition information which will assist them in putting in place comprehensive asset management plans for planning and operational purposes.
- (ii) It is prudent to apply DG43A1 to the uncommitted projects identified by Christchurch City Council and the costs be incorporated in the unallocated work programme estimate.
- (iii) Should DG43A1 not be incorporated, it is recommended the Crown consider guaranteeing Christchurch City Council for 60% of the costs (up to \$15m) for network failures where DG43B will be applied for a period of up to 5 years.

3. Land Drainage Recovery Programme (LDRP)

The total cost of the Land Drainage Recovery Programme is estimated to cost over \$1billion and is planned to be a multi-decade programme. The first tranche of projects addresses

immediate needs of the most vulnerable properties and is sufficiently defined to determine the eligibility for funding. However there is a need to do further engineering investigations as well as establish a business case to determine the funding arrangement for a substantial portion of the proposed programme.

- (i) The first tranche of the LDRP (years 1-3), which addresses the most urgent works, is relatively well defined as are the outlined scopes for further investigations. Aspects of this work can be considered as eligible for funding against the Cost Sharing Agreement criteria and be incorporated as part of the unallocated programme estimate.
- (ii) The remaining LDRP is not well defined and should be excluded from the unallocated work programme.
- (iii) It is recommended that the Crown and Christchurch City Council hold discussions on the development of a joint working group to investigate how best to progress the LDRP.

Unallocated Costs and Total Programme Cost (1 April 2015)

The total estimate for the unallocated costs is \$306,255m, comprising of infrastructure and indirect costs.

The following table summarises the total programme cost, (subject to the parties agreeing on costs to date and the non SCIRT uncommitted land transport asset estimate is confirmed) and provides a comparison with the position at the time the Cost Sharing Agreement was executed.

	Life to Date & Committed Programme \$000s	Uncommitted Programme \$000s	Total Gross Programme Cost \$000s	2013 Cost Share Agreement \$000s
Infrastructure (excl. of indirect costs)	1,403,451	260,440	1,663,891	1,883,059
Total Indirect Costs	603,050	45,815	648,865	765,405
Total Other Costs	50,769	-	50,769	51,014
Total Emergency & Response Costs	536,093	-	536,093	548,698
Total Gross Programme Cost	2,593,363	306,255	2,899,618	3,248,178

Acknowledgements

I wish to acknowledge the support and co-operation I have received from CERA, Christchurch City Council and New Zealand Transport Agency and in particular Mr James Stewart, Financial Manager, Horizontal Infrastructure CERA and Mr John Mackie, General Manager Infrastructure Rebuild, Christchurch City Council.

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SECTION 1 INTRODUCTION

1.1 BACKGROUND

In May 2011 the Minister of Finance put in place an Indemnity in favour of the four councils affected by the 4 September 2010 and 22 February 2011 Canterbury earthquakes. The Indemnity formalised the implicit guarantee set out in the Guide to the National Civil Defence Emergency Management Plan that the Government will reimburse local authorities, in whole or in part, for eligible response and recovery costs incurred as a result of the Canterbury earthquakes.

Cost Sharing Agreement

In mid-2013, the Crown and Christchurch City Council negotiated a Cost Sharing Agreement based on the October 2012 Horizontal Infrastructure Programme cost estimate and included that an independent assessor would be appointed to consider further information available in 2014 about the extent and likely repair costs to the horizontal infrastructure, (refer to Clause 4.4 of the Cost Sharing Agreement). The Cost Sharing Agreement also set out a new governance arrangement and the structure reflected the transition from “response” to “rebuild” and the new environment established by the agreed cost sharing arrangement.

The cost estimate at that time outlined a \$3,342m programme of works, apportioned \$2,039m to the Crown and \$1,303m to the Christchurch City Council, (including insurance and other contributions). The cost estimate was based on the Infrastructure Recovery Technical Standards Guidelines, (IRTSG) criteria as the basis for determining the work programme scope and standards for the three waters assets. Schedule One of the Agreement states that the maximum amount the Crown will contribute towards rebuild work of the horizontal infrastructure is \$1,800m and the maximum amount takes into account:

- the Crown will continue to fund 60% of all valid costs on the eligible three water infrastructure
- the Crown through NZTA will fund 83% of all valid costs on eligible roading infrastructure.

At that time, the Crown had received advice that reductions were possible from their contribution of \$2,039m through reviews of design guidelines, efficiencies within the delivery structure, procurement efficiencies and renewals policies (refer Clause 11 of the Memorandum of Understanding between the Canterbury Earthquake Recovery Authority and the Christchurch City Council dated 26 September 2013).

Prior to the Cost Sharing Agreement being executed clarifications were sought by Christchurch City Council. The Chief Executive of Christchurch City Council, Mr Tony Marryatt, who negotiated the Cost Sharing Agreement on behalf of the Council considered some of the wording to be ambiguous and therefore may give rise to disputes in the future. In particular, the interpretation of the Crown’s maximum contribution of \$1,800m. Two joint clarification letters were developed as an addendum to the Cost Sharing Agreement to provide a more detailed explanation of the meaning and/or intent of the wording in parts of the Agreement. The first joint clarification under Clause 6.5.1 of the Cost Sharing Agreement states among other things:

“The Crown has agreed to contribute \$1.8 billion towards the replacement of the horizontal infrastructure. This contribution is subject to an independent review of the current cost being undertaken by 1 December 2014.

The independent review will be the basis for the final infrastructure cost sharing split.

The final cost sharing split will be based on agreed subsidies of 83% for roading and 60% for the three waters infrastructure as per Schedule One.

It is acknowledged that as a result of the independent review the Crown contribution of the \$1.8 billion could be increased, reduced or stay the same.”

The Crown requested that the Christchurch City Council reduce its estimate of the Crown contribution in the 2013/16 Three Year Long Term Plan to \$1.8 billion (refer Christchurch City Council Paper 20 June 2013) and Christchurch City Council also reduced their contribution in the Plan pro-rate to \$1,143m, to reflect the cost sharing split. Including the insurance and other contributions, this left \$399.134m funding of the total programme forecast at risk and the funding parties agreed to actively pursue an optimisation/value engineering exercise in order to minimise this risk.

Horizontal Infrastructure Governance Group (HIGG)

In September 2013 a Memorandum of Understanding (MOU) was signed by New Zealand Transport Agency, CERA and Christchurch City Council which formalised the management and governance arrangements outlined in the Cost Sharing Agreement. The MOU identifies the key roles of HIGG and includes:

“developing and recommending to the Crown and Council options to achieve alignment between the rebuild programme and available funding which ensures the achievement of the purpose statement”

(Refer Memorandum of Understanding between the Canterbury Earthquake Recovery Authority, The New Zealand Transport Agency and Christchurch City Council for the Governance and Management of the Horizontal Infrastructure Rebuild within the City of Christchurch dated 26 September 2013). HIGG’s role also includes:

- identifying opportunities (or areas of concern) to ensure value for money is achieved
- approving projects and expenditure
- making amendments to the design guide, (IRTSG) and prioritisation methodology.

National Civil Defence Emergency Management (NCDEM) Plan

The National Civil Defence Emergency Management Plan outlines the Government’s general approach to Government financial assistance in response and recovery.

Section 26.5.1 of the “Guide to the National Civil Defence Emergency Management Plan (2006)” states that the following **may** be eligible for Government financial support in recovery:

- 1) Repair or recovery of essential infrastructure assets including:
 - water assets
 - storm water assets
 - wastewater assets
 - retaining walls
 - tunnels.

- 2) If these are assets:
 - on which essential services depend
 - are local authority assets
 - are not the property of trading utilities
 - do not receive a subsidy from any other source.

It is important to recognise the NCDEM Plan (which underpins the Cost Sharing Agreement) states the asset types that **may** be eligible for financial assistance.

New Zealand Transport Agency (NZTA) Programme and Funding Manual

The New Zealand Planning and Investment Knowledge Base defines emergency works and provides the basis of the eligibility of roading works under the Cost Sharing Agreement. Notwithstanding the significance of the earthquake events, this is a very mature policy and is being applied across New Zealand for all emergency works.

The policy addresses the Transport Agency’s approach to co-funding the response to any significant natural event; such responses usually are broken into two phases:

- Initial Response: Immediate response to reopen the road, make it safe or minimise further damage.

- Permanent Reinstatement: The restoration of the network to bring the asset back to a condition similar, but not better than before the emergency event.

The principle adopted by NZTA is to restore an asset to service, which may at times require full replacement, but in the vast majority of cases this is likely to be to restore service through targeted repair. Once an asset is restored to service (either through replacement or repair) all future treatment costs then become part of the local authorities day to day maintenance and renewals programme, and hence is eligible for NZTA funding through the relevant Activity Class.

1.2 OPTIMISATION PROCESS AND LEVELS OF SERVICE

Three Waters

After the 22 February earthquake it became apparent that the design guides being used up to that point did not address intervention points as it related to repair of earthquake damage, or have a simple way of incorporating improvements required as a result of earthquake damage observations. As a result the Infrastructure Recovery Technical Standards and Guidelines, (IRTSG) were developed that

defined earthquake intervention repair points. As asset assessment progressed across Christchurch it became clear that not all damage required immediate repair or replacement and a Level of Service, (LoS) approach to damage was adopted which saw the introduction of DG43. DG43 recognises the remaining asset life and is a less prescriptive approach to repair but assisted the designers in providing a consistent approach on how remaining asset life should be applied. The application of DG43 repair/renewal decisions required of the designers resulted in the assets being maintained at the pre-earthquake LoS but where renewal or repair was being carried out the work was done with modern material and standards.

In 2014, an optimisation process was carried out that recognised constraints on funding. The remaining works were prioritised (high, medium and low) with an acceptance of a greater range of defects.

CERA then proposed a new design guideline (DG43B) which was discussed and accepted by the joint governing body, the Horizontal Infrastructure Governance Group, (HIGG). DG43B allowed for critical defects in the network to remain if there was no impact on the performance of the asset, a SCIRT assessment that they would not fail within a five year period, the damage was not on a critical asset, in a critical location, incurring significant operational costs and there were no interdependencies with other work.

Although Christchurch City Council participated in the meetings where these decisions were made, at a governance level (refer HIGG meeting minutes dated 22 July 2014) and under the MOU (refer Clause 27) the role of HIGG includes agreeing on amendments to the IRSTG and prioritisation methodology, the Council engineering staff hold strong views that the application of DG43B leaves them with a high operational cost legacy, impacts on the remaining asset life and do not accept restricting repairs to failures within five years. However they do accept that areas of low grades and dips presented a lesser risk and proposed a refinement to DG43, (DG43A1). This is discussed further in Section 2.3.

Roading

The optimisation process, (DG36A), also included the review of the intervention hierarchy and the design criteria of the roading works and as a result there was a refinement of the scale and scope of the works to be completed, in particular the replacement/repair of several bridges and their relationship with the future land development plan for Christchurch, sealing work and the removal of low priority retaining walls. This is discussed further in Section 2.2.

1.3 LAND DRAINAGE RECOVERY PROGRAMME (LDRP)

The Canterbury earthquake significantly increased the flood risk in certain parts of the city by changing the topography and damaging the land drainage infrastructure. In 2012 the LDRP was established by Christchurch City Council to understand the consequences of the earthquake on the land drainage network within the city limits together with other known (i.e. non earthquake) effects such as potential impacts of climate change and engineering improvements to the land drainage system where the water table was known to be high. The 2012 project cost estimates had an allocation of funds associated with the earthquake damage to the “above ground” storm water assets but the severity of the problem to the overall land drainage system was not clearly highlighted until the March 2014 storm

event. In some areas it is still unclear what the most appropriate engineering solution is in order to respond to any future flood risk from network and land drainage, or from possible climate change impacts, to protect land and assets and their ongoing economic value.

1.4 SUMMARY TIMELINE

The following is a summary of the key events and timelines (relevant to the Independent Assessment), since the 4 September 2010 and 22 February 2011 earthquakes.

EVENT	DATE
Crown Indemnity issued in favour of four councils in the Christchurch region	May 2011
Development and application of IRTSG	2011
Total Programme forecast for the horizontal infrastructure relating to the earthquake event established	October 2012
Cost Sharing Agreement and two Joint Clarifications executed	June 2013
Capital Rationing process implemented and moving from asset replacement to a Level of Service, (LoS), approach - Introduction of DG43 - Refinement of the scope of roading works	October 2013
Precipitation corresponding to a 1:100 year storm event highlighted the land drainage issues resulting from the previous earthquakes	March 2014
Optimisation project carried out to identify rebuild programme scenarios and funding implications	2014
SCIRT develop a draft design guide (DG43A) to exclude repairs/renewals on assets <1.5m deep. It is never endorsed by the funders nor finalised	March 2014
Refinement of the design guide for the three waters from the accepted standard of DG43 to DG43B (approved by the HIGG on 22 July 2014)	July 2014
CCC develop a design guide (DG43A1) in response to DG43B with a 15 year failure period applied (as opposed to 5 years under DG43B)	July/August 2014
Scope of Land Drainage Recovery Programme for Christchurch City Council Long Term Plan 2016/18 prepared	February/March 2015

1.5 SCOPE OF THE INDEPENDENT ASSESSMENT REVIEW

The following is an excerpt from the Terms of Reference for the Independent Assessment of Horizontal Infrastructure Rebuild and Costs.

“Scope of the Review

Under the Cost Sharing Agreement (Agreement) the Crown and Council agreed that the independent assessor will:

- (a) consider the future information available in 2014 about the extent of the damage and likely repair costs to the horizontal infrastructure;*
- (b) ascertain the potential costs of the rebuild work and the work with the Crown and Council to test and refine the rebuild work and costs;*

- (c) *provide a report to the Crown and Council by 1 December 2014 identifying the finalised rebuild work and costs.*

Approach to be Taken

For the purpose of the Agreement (and this review), horizontal infrastructure means Council owned infrastructure assets relating to roading, wastewater, storm water and freshwater.

Within the Scope of the Review the independent assessor is to provide an independent quality assessment of the horizontal infrastructure rebuild programme by:

- (a) *defining the extent and scope of the work that has not been allocated, to meet the terms of the Agreement (“unallocated work”).*
- (b) *reviewing the costs estimates for the unallocated work, using the latest costs estimates for the SCIRT work programme and for the non-SCIRT capital and operating work programme , and the Morrison Low report on the Target Outturn Cost Process.*
- (c) *Together (a) and (b) will result in the Programme Cost to Come figure.*

The Programme Cost to Come figure will be added to the agreed historic costs and agreed committed costs programme incurred (comprised of the SCIRT direct/indirect costs incurred to date, SCIRT work in hand, non-SCIRT capital expenditure and non-SCIRT non capital expenditure costs) from September 2010, which will result in a Total Gross Programme Cost.”

The independent audit completed by Morrison Low in association with Evans and Peck in 2014, has provided sufficient assurance that the cost estimates of the SCIRT work are robust and represent fair market value.

This independent assessment has been based on an evidence based approach which has culminated in a series of meetings with key officials of Christchurch City Council, CERA and NZTA and two workshops (refer Appendix 1), together with engineering and other reports provided by the funding organisations. Wherever possible the work scope and costs of the unallocated work was jointly agreed. Where differences of views have been raised by the parties, the principles of the Cost Sharing Agreement and the two joint clarifications have taken precedence together with evidence from technical reports.

Although the independent assessor was commissioned at the end of December 2014, delays in the assessment occurred due to the unavailability of an accurate account of the scope and estimates of the unallocated work. It was also prudent to pause the assessment to allow time for Christchurch City Council and CERA officers to fully discuss the scope of the Land Drainage Recovery Programme and for the Council officers to align the information for all their rebuild programmes that was necessary for inclusion in their 2015-2025 draft Long Term Plan that was released in March 2015. During the intervening three month period the Horizontal Infrastructure Governance Group, (HIGG), approved construction of over \$200m of works which has substantially reduced the unallocated work programme remaining.

SECTION 2 STATUS OF THE UNALLOCATED INFRASTRUCTURE PROGRAMME

2.1 INTRODUCTION

This section describes the unallocated elements of the Horizontal Infrastructure based on the most recent project and costing information available prepared at the end of March 2015.

A joint workshop was held on 27 February 2015 which representatives of Christchurch City Council, CERA, and the New Zealand Transport Agency attended to discuss the scale and scope of unallocated projects and to identify areas which needed further investigation. A further joint meeting was held on 30 March to clarify the work scope for certain asset classes. It is pleasing to note that subsequent to the meeting, agreement was reached on the majority of outstanding aspects of the rebuild, including positive discussions on the approach and eligibility portions of the first tranche of the Land Drainage Recovery Programme (\$29m) which covers the first three years of the programme and addresses the highest priority works associated with protecting assets in the most vulnerable areas.

2.2 ROADING

Design guideline DG36A and DG36B have been applied in conjunction with the nationally accepted design guides for all roading works. It is acknowledged by New Zealand Transport Agency that some areas of Christchurch will have road surfaces that are a lesser quality in terms of geometry and smooth travel exposure than pre earthquake.

New Zealand Transport Agency's objective with the reinstatement of the roading network is to restore the roading network to a standard no better than existed before the damage occurred. This may include accepting a slightly reduced level of service for example increased road roughness, and is consistent with the principles set out in the NZTA Programme and Funding manual, (refer Second Joint Clarification Clause 6.5.1 of the Cost Sharing Agreement) and has been applied to all roading works approved by HIGG to date. Christchurch City Council's objective with the reinstatement of the roading network is to replace like for like with a focus on making the road network safe for the users by making repairs where appropriate and renewal as the second option when repair alone is not a viable or cost effective solution.

Notwithstanding their differing views, New Zealand Transport Agency and Christchurch City Council have jointly agreed to conduct independent modelling on the network level of performance indicators at the end of the rebuild period,(i.e. end of 2016) to ascertain the overall quality of the road network. The following is a summary of the key roading projects which have been accepted as being eligible for emergency funding at 83% and are included in the total programme forecasts.

- Sumner Road
- Sumner Corridor (City to Sumner)
- Street Lighting
- Bridges (notably to repair Fitzgerald Avenue bridges, Pages Rd, Gloucester St, Hereford St)
- Retaining Walls (identified as high priority).

Fitzgerald Avenue Bridges

In the case of the Fitzgerald Avenue twin bridges Christchurch City Council believes that the bridges must be reconstructed to provide an "unencumbered" Class 1 vehicle loading posting certificate in accordance with the Heavy Motor Vehicle Regulations 1974, as this is a significant link to the overall integrity and criticality of the roading network.

A revised Class 1 loading certificate was provided by Beca in March 2015 but with conditions that on-going inspections and monitoring of the abutment be carried out every three to four months. The Engineer made a further condition that the certificate be reviewed again in two years.

New Zealand Transport Agency is currently opting for a lesser cost option of minor repair works and this option has been accepted by HIGG and the repair works will proceed. However New Zealand Transport Agency has given an undertaking to Christchurch City Council that if there is any deterioration of the bridges' integrity that affects its ability to provide a level of service for Class 1 traffic for a life of at least ten years within a two year period, (i.e. up to March 2017), the remedial/reconstruction works required will fall under the Cost Sharing Agreement funding arrangement of 83% Crown contribution.

Second Coat Seals

The cost estimates developed in 2012 included estimated costs for second coat seals. Christchurch City Council has been advised as early as 2013 that second coat seals were not eligible for New Zealand Transport Agency's emergency works funding. This is consistent with the Transport Agency's emergency works funding policy. Christchurch City Council did challenge that the intent of the Cost Sharing Agreement did not require the work to meet the "emergency works funding policy", only that the work was "eligible", and wishes to further pursue this interpretation through their legal Counsel.

New Zealand Transport Agency's position is that Christchurch City Council can make an application for this work under the normal National Land Transport Programme (NLTP) process which attracts a subsidy rate of 48%. Christchurch City Council accepts this and this work has been removed from the unallocated work programme. Further, Christchurch City Council is concerned that the funding under the NLTP is not guaranteed and therefore there is a risk that the second coat seal programme, if deferred, will not be fully funded in the timeframes that are proposed. I have been advised that the New Zealand Transport Agency advised the Christchurch City Council on 15 April that it has approved a \$10m additional allocation in the 2015-2017 National Land Transport Planning Programme specifically for the second coat sealing work.

Retaining Walls and Other Related Land Transport Projects

Christchurch City Council officers have raised a number of projects which are currently not included in the unallocated work programme being considered by HIGG (refer memo dated 10 March 2015 to the Independent Assessor from Christchurch City Council). The majority were deemed as low priority at the time of the 2014 optimisation process and have subsequently been included in the Council's recent submission to the Land Transport Agency. They are as follows:

(i) **Low Priority Retaining Walls**

During the optimisation process which took place in 2014, agreement was reached on the prioritisation of the remedial works for retaining walls. The HIGG approved scenario included

a significant portion of retaining wall repair work as high priority and these have been included. The lower priority retaining walls have been excluded although Christchurch City Council believe these should be considered as emergency works. New Zealand Transport Agency has advised the Council it expects to fund the remaining non-critical retaining walls through the normal network planning process. The estimated costs for these works are \$8.4m.

(ii) Red Rock facing to the Red Rock Retaining Walls

The Independent Assessor has been advised by Christchurch City Council that it has a consent issued by Heritage New Zealand which has an obligation requiring the reinstatement the red rock facing to the red rock retaining walls at an estimated cost of \$3.1m. The assessor has no evidence that this matter has been raised and discussed by HIGG and recommends the Council provide a case to HIGG for its consideration. At this point there is no evidence that this can be considered as emergency work under the NZTA funding arrangements and is therefore not included in the work programme. (Note this matter was discussed at a Scope and Standards Committee on 19 December 2012 and New Zealand Transport Agency advised Christchurch City Council and at that time this work was considered betterment).

(iii) Low Priority AC Surfacing

High and medium priority AC work is considered eligible under the Cost Sharing Agreement. The low priority work has been removed (estimate cost of \$21.2m). The most appropriate funding vehicle is through the Land Transport programme mechanism where the roading network across the city can be considered in its entirety and after further joint investigations have been completed.

Assessor's Position:

- Although the Posting Certificate provided for the Fitzgerald twin bridges requires ongoing inspections every 2 to 3 months, New Zealand Transport Agency's commitment to provide 83% funding for any further work that may be required to achieve the Class 1 posting until the next posting assessment is carried out in 2 years (March 2017) is fair and will not impose any undue financial burden on Christchurch City Council
- Costs for the second coat seals should be removed from the unallocated work programme and the New Zealand Transport Agency has advised me that it has supported the recent application by Christchurch City Council through the 2015/18 NLTP process for this work in recognition that the network has been affected by the 2010 and 2011 earthquake events
- Costs of the low priority retaining walls should be excluded from the Cost Sharing Agreement and it is recommended that Christchurch City Council make an application to New Zealand Transport Agency for funding at an appropriate time
- The majority of the work for facing of the red rock retaining walls is excluded from the unallocated work programme as it is not considered emergency works in accordance to the NZTA Programme and Funding manual
- The most appropriate funding avenue for the low priority AC surfacing projects is through Land Transport Programme process and is excluded from the unallocated work programme

2.3 THREE WATERS

Wastewater/Storm Water/Water Networks

Shortly after the September 2010 earthquake event, Christchurch City Council established the Infrastructure Rebuild Management Office, (IRMO), for the purpose of repairing damage to the Council's networks. At that time the Christchurch City Council Infrastructure Rebuild Technical Standards and Guidelines (IRTSG) were developed and applied. After the February 2011 earthquake the intervention level of repair was refined and applied (in accordance with IRTSG), to approximately 30% of the network. In 2013, in recognition of the changing rebuild and repair requirements, a new design guide for three waters, was established:-DG43. This recognised that where renewal or repair was necessary, the work was done with modern materials, (e.g. application of lining failed pipeline) to modern standards. About 30% of the network has been built to this standard.

In 2014, an optimisation process was carried out that recognised constraints on funding. The remaining works were prioritised (high, medium and low) with an acceptance of a greater range of defects.

CERA then proposed a new design guideline (DG43B) which was discussed and accepted by the joint governing body, the Horizontal Infrastructure Governance Group, (HIGG). DG43B was applied to all remaining works (high, medium and low) and allowed for critical defects in the network to remain if there was no impact on the performance of the asset, a SCIRT assessment that they would not fail within a five year period, the damage was not on a critical asset, in a critical location, incurring significant operational costs and there were no interdependencies with other work.

Although Christchurch City Council participated in the meetings where these decisions were made at a governance level, (refer HIGG meeting minutes dated 22 July 2014) and under the MOU (refer Clause 27) the role of HIGG includes agreeing on amendments to the IRSTG and prioritisation methodology, they hold strong views that the application of DG43B leaves them with a high operational cost legacy, impacts on the remaining asset life and do not accept restricting repairs to failures within five years. However they do accept that areas of low grades and dips presented a lesser risk and proposed a refinement to DG43B, (DG43A1).

Although the technical recommendation was fully discussed and endorsed through the HIGG process, there is still a view held by Christchurch City Council that although they accept in principle a network performance approach, they consider not repairing defects that are likely to fail within a 15 year life change exposes them to legacy issues and are not convinced it is best for recovery. However the Council engineers do acknowledge the level of risk and impact of failure due as a result of blockages at low grades is less critical compared to a failure of the pipe integrity and would prefer that a modified version of DG43 be adopted (DG43A1). SCIRT engineers initially assess each project against both design guides and provide catchment maps showing the work scope for applying each of the design guides. A cost review on the remaining 67 projects has been conducted to establish the differential in applying DG43A1 and DG43B and this is estimated to be in the order of \$15m (\$140.6m compared to \$124.8m). DG43B includes a client review process where the merits of adding additional work scope as defined by DG43A1 are discussed. Any work scope in DG43A1 that can be justified by Christchurch City Council or SCIRT representatives and agreed by all parties are included in the final design.

A minute from a HIGG meeting of 22 July notes Christchurch City Council has the option of funding the difference between DG43B and A1 should they wish for the higher design guide to be applied. To date the Christchurch City Council has not elected to apply this principle to any projects or has initiated the HIGG resolution process if consensus is not reached.

Christchurch City Council commissioned Beca to provide an assessment of ongoing costs, (*Initial Evaluation of Christchurch City Council Future Three Waters OPEX Costs, July 2014 and updated January 2015*), which identified Opex levels post 2016, (i.e. after completion of the rebuild works) based on the application of DG43. The report indicated that these will be higher than escalated pre earthquake BAU costs. Several other studies based on a list of dipped pipe and flat grade lengths and structural defects that the optimisation process was considering leaving behind have been undertaken by SCIRT engineers. The studies provide an indication of the life remaining of various classes of pipes and the resultant economic loss the application of the optimisation process is likely to have on Opex. As a result of CCTV and other inspections Christchurch City Council will inherit a comprehensive library of asset information for most of its network and is in an excellent position to establish robust asset maintenance and operations plans to manage the overall network effectively.

The assessments made by the engineers to ascertain likely failures within a timeframe are based on judgement using the methodology of a decision tree in order to ensure networks are treated consistently. Statistically, defected pipes left in the ground will fail more frequently if the assessment period is reduced.

Recognising the criticality, serviceability performance and functionality of the network, the general principle of repairing defects should err on the side of caution and the application of DG43B is likely to increase the frequency of overall number of failures within the indicative five year window (but not in critical areas of the network as per the decision tree approach). The extent of the likely failures in applying DG43B to about 30% of the network is largely unknown, and this will only play out in time.

Assessor's Position:

- The application of a network performance standard, is reasonable taking into account that Christchurch City Council will inherit a substantial and valuable library of asset condition information which will assist them in putting in place comprehensive asset management plans for planning and operational purposes
- It is more prudent to apply DG43A1 to the projects identified by Christchurch City Council to potentially reduce disruption risks and costs in the short to medium term
- If assets are not built to DG43A1, it is recommended the Crown consider reimbursing Christchurch City Council for 60% of the costs for network failures where DG43B has been applied for a period of 5 years up to a limit of 60% of \$15m

2.4 LAND DRAINAGE RECOVERY PROGRAMME (LDRP)

The land drainage system in Christchurch consists of rivers, tributaries, lined and unlined drains, and storm water pipe networks. The overall system was severely damaged as a result of the successive earthquakes that has affected the overall topography and affected drainage. The NCDEM guide outlines which assets are eligible for Government financial support in recovery. Natural water courses, rivers or storm water assets not owned by the Council are ineligible for Government financial support

in recovery. At the time of the signing of the Cost Sharing Agreement in 2013, it was recognised that some of the eligible above ground storm water assets, will need to be rehabilitated and an estimate was allocated to this asset class, (\$167.3m).

In March 2014 certain areas of Christchurch experienced a 1:100 year storm event, (Tonkin and Taylor report dated 2014). The worst area that has been affected by the post-earthquake flooding is the Flockton Basin, an area long subject to flooding. It has seen the risk significantly increase as it comprises land that has been subject to earthquake related land settlement and outflows to the “red zone” in the south-east extent of the Dudley Creek catchment. In addition to the social and health impacts of flooding over and under habitable floors there are direct impacts to the likelihood of increased flooding risk in future years and the consequential economic effects on land use and building values.

Christchurch City Council has identified that the LDRP is a multi-decade programme which is likely to continue until at least 2045. The programmes objectives are:

- Repair damage to waterways and land drainage networks
- Reinststate pre-quake levels of flood risk.

Solutions may include a mixture of flood defences, (stop banks, tidal barriers), and land drainage improvements to natural waterways and drains. An opportunity exists to incorporate addressing pre-earthquake conditions, such as land drainage improvements to low lying areas. The solutions for addressing the damage in certain areas of the city will also need to take into account the overall future land use plans including the area deemed as part of the “red zone”.

The estimated cost of the 30 year LDRP is approximately \$1.2billion, and the projects which are associated with the very large programme of work will evolve over time and once further investigations are carried out. CERA and Christchurch City Council staff have held discussions on the eligibility of assets based on the criteria outlined in the NCDDEM Plan applied to the elements of the multi-decade programme and this has been outlined in a memo dated 9 March 2015 from the Christchurch City Council to the Independent Assessor. Table 1 below provides a summary of the outcome of the discussions on the eligibility of assets within the overall programme.

Table 1: LDRP Costs and Eligibility of Assets Against the Cost Sharing Agreement

Programme	Eligible Assets (\$000s)	Ineligible Assets (\$000s)	Total Cost (\$000s)
Years 1 - 3	26.5	129.9	156.4
Years 4 - 40	127.6	925.8	1,053.4
Total	154.1	1,055.7	1,209.8

The overall programme is summarised in the following sections.

First Three Year Programme

A programme (referred to as the first three year programme), has been identified to address the highest priority physical works which are well advanced in the planning and investigation stages and

which would benefit the most vulnerable properties where pre-earthquake flood risk levels would be restored (but not eliminated).

Remaining Programme (Years 4 - 30)

As previously outlined, the balance of the LDRP is not currently well defined. The assessment by CERA and Christchurch City Council staff agree that only a very small number of assets over the remaining programme as currently scoped are eligible under the NCDEM Plan (refer Christchurch City Council memo dated 9 March 2015 to the Independent Assessor).

It is recommended the Crown and Christchurch City Council; hold discussions to investigate how best to progress the remaining programme beyond the “First Three Year Programme”, with a potential option of developing a joint working group, and that this be excluded from the unallocated work programme. This option was discussed on a number of occasions at joint meetings between the Independent Assessor and the respective parties and agreed this to be an appropriate approach.

Assessor’s Position:

- The first tranche of the LDRP (years 1-3) which addresses the most urgent works is relatively well defined as are the outlined scopes for further investigations
- Agreement has been reached on the eligibility of assets for years 1-3 of the programme and this should be incorporated as part of the unallocated works
- The remaining LDRP is not well defined and should be excluded from the unallocated work programme
- It is recommended that the Crown and Christchurch City Council hold discussions to investigate how best to progress the LDRP

SECTION 3 TOTAL GROSS PROGRAMME COST

3.1 INTRODUCTION

The scope of the independent review includes reviewing the cost estimates for the unallocated work using the latest estimates, and for this to be added to the agreed historic and committed costs incurred in order to confirm the Total Programme Cost.

The process of estimating costs for the SCIRT work programme had been previously audited by Morrison Low in association with Evans and Peck and have been assumed for the purpose of this assessment as reliable.

At the beginning of 2015 a Financial Management Tool (FMT) was developed with the aim of consolidating all the elements relating to the Horizontal Infrastructure Programme and permits the interrogation of information on expenditure to date, committed work and uncommitted, (also referred to as unallocated) work costs. It also serves as the information bank for the apportionment of direct and indirect project costs according to eligibility criteria and agreed funding rules. Work is categorised as SCIRT or Non SCIRT projects and on their asset allocation type.

This section outlines the committed and unallocated costs based on the most recent information, (April 2015) as provided by the three funders to HIGG and a comparison of the total project cost with that at the time of the signing of the Cost Sharing Agreement. In late April the New Zealand Transport Agency raised concerns that the non SCIRT land transport asset project estimates may still contain ineligible projects. For the purpose of this report the Non SCIRT land transport programme as estimated at the beginning of April and received by HIGG is used. This is further discussed in Section 3.2 below. The assessment excludes project elements costs that are not shared and forecast costs are presented to allow a direct comparison with the 2013 estimates. For comparison purposes and consistency, the estimates are presented in the format adopted by Christchurch City Council and CERA for their financial reporting purposes. The detailed cost spreadsheet used for this analysis is attached to this report as Appendix 2.

3.2 UNALLOCATED WORK PROGRAMME

The direct costs within the unallocated work programme remaining is \$260.440m and comprises of components outlined in Table 2 below.

Table 2: Unallocated Work Programme Based On Asset Class

	Total Unallocated Programme \$000s
Infrastructure (excl. of indirect costs):	
Roading (excl. State Highways)	83,598
Sewer	106,283
Sewer Above Ground	-
Water	18,280
Storm Water Reticulation	10,772
Storm Water Above Ground (Stopbanks, lined drains)	-
Land Drainage LTP FY2016 – FY2018 (Eligible)	26,507
Design Guide Differences Estimate – DG 43A1/DG43B	15,000
Total	260,440

Roading

The cost of the repair works for the Fitzgerald Twin Bridges has been included in the allocated costs. It is unlikely that there will be any further refinements to the roading forecast costs as the majority of the works have now been designed and been through a value engineering process.

The non SCIRT uncommitted land transport asset estimate is currently reported at \$74.18m. However in late April the New Zealand Transport Agency advised it considers only \$37.14m may be potentially eligible for consideration under the Cost Sharing Agreement. It is recommended that further discussions take place to ensure that the programme does not include any projects that should be managed through the normal transport funding under the 2015 – 18 and subsequent National Land transport Programmes”.

Three Waters

More projects can be completed within the committed funding as a result of amending the criteria of the Levels of Service policy from one of a “damage approach” to a “network performance approach” where consideration is given to the performance, serviceability and functionality of the wider network as well as prioritisation of projects to ensure the highest priority projects are addressed in the first instance. The “network performance” guidelines have been through a number of design refinements and as outlined in Section 2.3 Christchurch City Council strongly believe they will be left with a legacy of maintenance issues resulting in high operational and community disruption costs. The additional costs for applying the higher standard (from DG43B to DG43A1) is \$15m and is included as part of the total unallocated programme, (or Total Programme Cost to Come).

Land Drainage Recovery Programme

As previously outlined in Section 2.4, Christchurch City Council is proposing a multi-year programme to address the land drainage issues across the city. The 30 year programme, including escalation, is estimated to be in the order of \$1.2billion. Some of the proposed programme can be demonstrated as directly related to damage to eligible horizontal infrastructure assets caused by the earthquake events, other elements of the programme have not been developed sufficiently to determine the cause and if the damage could be related to pre-existing conditions and to mitigating sea level rise. A series of workshops in February were held with Christchurch City Council and CERA officials and a way forward has been agreed. This is to separate the programme into two components, those that are eligible for a Crown contribution under the Cost Sharing Agreement and those that are not. This allows for the certain high priority works to proceed and to conduct early investigations and a needs assessment so a business case can be prepared for further consideration of Crown funding through other avenues.

It is proposed that the remaining programme for years 4 - 30 onwards for this assessment be set aside and Christchurch City Council discuss with the Crown other avenues for funding, as well as the potential option of establishing a joint working group to oversee the programme in its entirety.

The Crown has recognised that pre-existing flooding may have been exacerbated by the earthquakes and that they are willing to discuss ways of working with the Christchurch City Council on this. The Assessor has been advised that discussions has recently commenced.

For the purposes of this assessment, it is considered that the remaining programme for the outer years does not fall under the Crown Sharing Agreement and is therefore not included as part of the unallocated work programme.

\$26.507m has been included as part of the unallocated work programme (about 2.2% of the overall LDRP programme), and for the purposes of this assessment the rest of the programme is deemed ineligible. The programme and costs are consistent with the Council's published draft Long Term Plan.

Summary of Uncommitted Work Programme Costs

Table 3 below outlines the unallocated programme costs

Table 3: Summary of Unallocated Works*

	Uncommitted SCIRT \$000s	Uncommitted Non SCIRT \$000s	Total Uncommitted \$000s
Infrastructure (excl. of indirect costs)	142,648	117,792	260,440
Total Indirect Costs	45,815	0	45,815
Total Other Costs	0	0	0
Total Emergency & Response Costs	0	0	0
Total Unallocated Programme	188,463	117,792	306,255

*Includes Years 1 - 3 of the LDRP only and consistent with the Council's Draft Long term Plan

3.3 COMMITTED COSTS

The Independent Assessor's review excludes the review of previous decisions that have been made and which are included in the committed costs. CERA has recently completed a review of historic funding decisions and \$77.6m of committed projects have been identified as potentially ineligible for a Crown contribution as they represent BAU or betterment works. CERA believed a further \$16.9m of uncommitted projects fall into this category as well. This matter is being discussed with Christchurch City Council but for the purpose of determining the total gross programme forecast these costs have been included and form part of the Life to Date and Committed Costs.

3.4 TOTAL GROSS PROGRAMME COST

The Total Gross Programme Cost comprises the programme costs to come (i.e. unallocated or uncommitted costs), the agreed historic costs and agreed committed costs programme incurred from September 2010 (comprised of the SCIRT direct/indirect costs incurred to date, SCIRT work in hand, non-SCIRT capital expenditure and non-SCIRT non capital expenditure costs).

Table 4 summarises the total gross programme forecast based on this assessment and the financial information provided on the Life to Date and Committed Costs as at end of March 2015.

Table 4: Total Gross Programme Cost

	Life to Date & Committed Programme \$000s	Uncommitted Programme \$000s	Total Gross Programme Cost \$000s
Infrastructure (excl. of indirect costs)	1,403,451	260,440	1,663,891
Total Indirect Costs	603,050	45,815	648,865
Total Other Costs	50,769	0	50,769
Total Emergency & Response Costs	536,093	0	536,093
Total Gross Programme Cost	2,593,363	306,255	2,899,618

SECTION 4 CONCLUSIONS

- I. The Crown and Christchurch City Council entered into a Cost Sharing Agreement on June 2013 which included two joint clarifications. The first joint clarification specifically addresses the interpretation and intent of the independent review of the finalised rebuild work and costs, and acknowledges the Crown contribution of \$1.8billion could be increased, reduced or stay the same as a result of discussions following the review.
- II. The terms of reference of the Independent Assessment of the Horizontal Infrastructure rebuild work and cost are very specific and are focussed on the cost estimates for the unallocated work, using the latest cost estimates for the SCIRT and Non SCIRT programmes. Unallocated work is deemed to be the most recent work programme submitted and under consideration by HIGG.
- III. It has taken longer than expected to be provided with the unallocated work programme which in part was due to the unavailability of information on the estimates, the process Christchurch City Council required to align the programmes with the preparation of the draft 2016/25 Long Term Plan released in March, and engaging with CERA to evaluate the eligibility of funding against the Cost Sharing Agreement of the multi-year Land Drainage Recovery Programme.
- IV. Since the commencement of the independent assessment in early 2015 significant progress has been made in addressing outstanding work scope and cost issues between CERA and Christchurch City Council as well as progressing works through the governance approval process to the committed stage.
- V. The working relationship demonstrated in the intervening months is evidence that the objectives of cooperation outlined in the Cost Sharing Agreement are being practised and the governance structure in place has been effective.
- VI. The Land Drainage Recovery Programme (LDRP) is a multi-decade programme and currently only years 1 - 3 programme has a sufficiently defined scope to be considered for this assessment. The parties jointly agree this is a pragmatic approach to progress those works which are considered to be highest priority.
- VII. In view of the significance of the LDRP and the impact it will have on the overall development of Christchurch, it is recommended that a joint Crown/Christchurch City Council working group be established to ensure that the interests of all parties are considered as well as investigate funding opportunities.
- VIII. Only one matter brought to HIGG's attention pertaining to the unallocated work is outstanding. This is between the DG43B design guide and what the Christchurch City Council will accept. The value of the difference (for the remaining 67 projects in this asset class) is estimated to be \$15m.
- IX. It is prudent to apply DG43A1 to uncommitted the projects identified by Christchurch City Council and the costs be incorporated in the unallocated work programme estimate.

- X. Should DG43A1 not be incorporated, it is recommended the Crown consider guaranteeing Christchurch City Council for 60% of the costs (up to \$15m) for network failures where DG43B will be applied for a period of up to 5 years.
- XI. A number of low priority land transport projects that are currently not part of the unallocated work schedule being considered by HIGG were brought to the Independent Assessor's attention. It is considered the best avenue for funding these projects is through the normal land transport programme process.
- XII. There is some eligibility concerns held by NZTA that will need resolving prior to commitment of funds against this asset class. However, for the purposes of this report, the non SCIRT land transport asset programme estimate currently being reported to the Horizontal Infrastructure Governance Group has been used for assessing the "Costs to Come" and "Total Programme Cost". Further discussions are required to ensure that the programme does not include any projects that should be managed through the normal transport funding under the 2015 – 18 and subsequent National Land transport Programmes.
- XIII. Subject to confirming the non SCIRT land transport programme estimate, the programme cost to come is estimated to be \$306,255m.
- XIV. The total programme forecast at the time of the execution for the Cost Sharing Agreement in 2013 was \$3,248.178m.
- XV. As a result of the assessment and including the costs already committed, the total programme forecast (i.e. total gross programme costs subject to acceptance by the parties of the historic and committed costs) will be \$2,899,618m.

APPENDIX I OFFICIALS INTERVIEWED

NAME	POSITION	AFFILIATION
Baden EWART	Deputy Director, Implementation	CERA
Warwick ISAACS	Deputy Chief Executive Implementation / Director Christchurch Central Development Unit (CCDU)	CERA
Rob ROUSE	Asset Rebuild Manager, Horizontal Infrastructure	CERA
James STEWART	Financial Manager, Horizontal Infrastructure	CERA

NAME	POSITION	AFFILIATION
Dave ADAMSON	Director Facilities & Infrastructure Rebuild Facilities & Infrastructure Rebuild Group	CCC
Lianne DALZIEL	Christchurch City Mayor	CCC
Diane KEENAN	Manager, External Relations and Communications Unit	CCC
Peter LANGBEIN	Finance Manager, Capital Projects	CCC
John MACKIE	General Manager, Infrastructure Rebuild	CCC
Tony MARRYATT	CEO (until 2013)	CCC
Jane PARFITT	Chief Operating Officer (COO)	CCC
Steffan THOMAS	Transport Rebuild Unit Manager	CCC
Ian THOMSON	Council Solicitor	CCC

NAME	POSITION	AFFILIATION
Dave BRASH	Group Manager, Planning and Investment	NZTA

	NAME	AFFILIATION
Workshop Attendees 27 February	John MACKIE Peter LANGBEIN Dave ADAMSON (part time) James STEWART Rob ROUSE Mark YAXLEY	CCC CCC CCC CERA CERA NZTA
Roading Group Meeting	Richard TOPHAM (Manager, Transport and City Streets Unit) Chris GREGORY (Manager, Assets and Networks Unit) Michael JACOBSON (Asset Engineer - Roding, Assets and Networks Unit)	CCC CCC CCC
Workshop Attendees 30 March 2015	Dave ADAMSON Chris MACKENZIE James STEWART Mark YAXLEY	CCC CERA CERA NZTA