Infrastructure, Transport and Environment Committee
AGENDA

Notice of Meeting:

An ordinary meeting of the Infrastructure, Transport and Environment Committee will be held on:

Date:	**Wednesday 12 April 2017**
Time:	**1pm**
Venue:	**Council Chambers, Civic Offices, 53 Hereford Street, Christchurch**

Membership

Chairperson	Councillor Pauline Cotter
Deputy Chairperson	Councillor Mike Davidson
Members	Councillor Vicki Buck
	Councillor Phil Clearwater
	Councillor Anne Galloway
	Councillor Aaron Keown
	Councillor Sara Templeton

7 April 2017

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INFRASTRUCTURE, TRANSPORT AND ENVIRONMENT COMMITTEE - TERMS OF REFERENCE

Chair	Councillor Cotter
Membership	Councillor Davidson (Deputy Chair), Councillor Buck, Councillor Clearwater, Councillor Galloway, Councillor Keown, Councillor Templeton
Quorum	Half of the members if the number of members (including vacancies) is even, or a majority of members if the number of members (including vacancies) is odd.
Meeting Cycle	Monthly
Reports To	Council

Responsibilities

The focus of the Infrastructure, Transport and Environment Committee is the governance of roading and transport, three waters, waste management, and natural hazards protection.

The Infrastructure, Transport and Environment Committee:

- Encourages opportunities for citizenship, community participation and community partnerships
- Works in partnerships with key agencies, groups and organisations
- Encourages innovative approaches and sustainable solutions

The Infrastructure, Transport and Environment Committtte considers and reports to Council on issues and activites relating to:

- Water supply, conservation and quality
- Stormwater drainage including the Land Drainage Recovery Programme
- Natural environment, including the waterways, aquifers, ecology and conservation of resources
- Natural hazards protection, including flood protection and river control
- Solid waste minimisation and disposals
- Sewage collection, treatment and disposal
- Roads, footpaths and streetscapes
- Transport including road operations, parking, public transport, cycle ways, harbours and marine structures consistent with Greater Christchurch Public Transport Joint Committee Terms of Reference.

Delegations

The Committee delegates to the following working group the responsibility to consider and report back to the Committee:

- Land Drainage Working Group matters relating to the Land Drainage Recovery Programme, including opportunities for betterment.

Major Cycleway Route (MCR) Programme

At the Council meeting of 9 March 2017:

It was **resolved** that the Council:

1. Delegates to the Infrastructure, Transport and Environment Committee the authority to make all decisions in connection with the Major Cycleway Routes (MCR) programme, including final route selections and anything precedent to the exercise by the Council of its power to acquire any property, subject to:

    a. The Infrastructure, Transport and Environment Committee and affected Community Boards being briefed prior to any public consultation commencing on any Major Cycleway Route project.

    b. The relevant Community Board Chair(s) will be invited by the Infrastructure, Transport and Environment Committee to participate in the relevant Major Cycleway Route item discussion and give their Board's feedback or recommendations.

2. Notes and reconfirms Councils previous decision to designate the MCR programme a metropolitan project, as set out in the Council's resolutions on 29 January 2015.

- 13.4 Agree to the Major Cycleway Route programme being declared a Metropolitan Programme and delegate to the Infrastructure, Transport and Environment Committee all decision making powers.

Part A Matters Requiring a Council Decision
Part B Reports for Information
Part C Decisions Under Delegation

TABLE OF CONTENTS

C 1. Apologies 5
B 2. Declarations of Interest 5
C 3. Confirmation of Previous Minutes 5
B 4. Deputations by Appointment 5
B 5. Presentation of Petitions 5

STAFF REPORTS

A 6. Storm Water Pump Station 205 Upgrade and Repair options 19
A 7. Disposal of land acquired under the Flood Intervention Policy 57
A 8. Proposed Bus Passenger Shelter Installation - 42 Hereford Street 65
B 9. ITE report 3 Waters and Waste - March 2017 73
C 10. Resolution to Exclude the Public 92

1. Apologies

At the close of the agenda no apologies had been received.

2. Declarations of Interest

Members are reminded of the need to be vigilant and to stand aside from decision making when a conflict arises between their role as an elected representative and any private or other external interest they might have.

3. Confirmation of Previous Minutes

That the minutes of the Infrastructure, Transport and Environment Committee meeting held on Wednesday, 8 March 2017 be confirmed (refer page 6).

That the minutes of the Infrastructure, Transport and Environment Committee meeting held on Thursday, 30 March 2017 be confirmed (refer page 14).

4. Deputations by Appointment

There were no deputations by appointment at the time the agenda was prepared.

5. Presentation of Petitions

There were no petitions received at the time the agenda was prepared.

Christchurch City Council

Christchurch City Council

Infrastructure, Transport and Environment Committee
OPEN MINUTES

Date: Wednesday 8 March 2017
Time: 1pm
Venue: Council Chambers, Civic Offices, 53 Hereford Street, Christchurch

Present

Chairperson	Councillor Pauline Cotter
Deputy Chairperson	Councillor Mike Davidson
Members	Councillor Phil Clearwater
	Councillor Aaron Keown
	Councillor Sara Templeton

13 March 2017

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Part A **Matters Requiring a Council Decision**

Part B **Reports for Information**

Part C **Decisions Under Delegation**

The agenda was dealt with in the following order.

1. Apologies

Part C

Apologies

Committee Resolved ITEC/2017/00009

It was resolved on the motion of Councillor Clearwater, seconded by Councillor Davidson that the apologies for lateness from Councillors Buck and Galloway be accepted.

Councillor Clearwater/Councillor Davidson **Carried**

2. Declarations of Interest

Part B
There were no declarations of interest recorded.

3. Deputations by Appointment

Part B
There were no deputations by appointment.

4. Presentation of Petitions

Part B
There was no presentation of petitions.

5. Land Drainage Working Group - Terms of Reference

Committee Comment

1. The Committee considered a report on the Land Drainage Working Group Terms of Reference.
2. The Committee resolved to adopt the Terms of Reference outlined in Attachment A of the report with further additions.

Staff Recommendations

That the Infrastructure, Transport and Environment Committee:

1. Receives the information in this report.
2. Adopts the Terms of Reference for the Land Drainage Working Group as set out in Attachment A.

3. Notes that Council staff will work with the Chair of the Land Drainage Working Group to carry out its responsibilities and activities as per the Terms of Reference.

Committee Resolved ITEC/2017/00010

Part C

That the Infrastructure, Transport and Environment Committee:

1. Receives the information in this report.
2. Adopts the Terms of Reference for the Land Drainage Working Group as set out in Attachment A and includes the following:
   a. *"The Land Drainage Working Group is also responsible for working with community representatives and civil defence staff to develop a framework, including purpose, objective and criteria, for a proposed Flood Response Fund, which it will recommend to the Committee."*
   b. Amending bullet point four under section one to read:
   "Improve the non-drainage values *(six values)* of our waterways through sensitive design of remediation works."
   c. A fourth bullet point added to section two to read:
   "Investigating water quality improvement opportunities."
3. Notes that Council staff will work with the Chair of the Land Drainage Working Group to carry out its responsibilities and activities as per the Terms of Reference.

Councillor Clearwater/Councillor Templeton **Carried**

6. An Accessible City: Hereford Street (Manchester - Madras)

Committee Comment

1. The Committee considered a report seeking its recommendation to the Council to approve the scheme design and resolutions relating to *An Accessible City*, Hereford Street (Manchester – Madras).
2. The Committee agreed on the staff recommendations and also requested that staff investigate an option for at least one disability park on this stretch of street and report back to the Council.

Staff Recommendations

That the Infrastructure, Transport and Environment Committee recommend that the Council approves the scheme design and resolutions relating to the following *An Accessible City* Phase 2 network transformation project as detailed in **Attachment 1**:

Existing Hereford Street – Madras Street to Manchester Street: Traffic Control

3.1. Approve that all traffic controls on both sides of Hereford Street from its intersection with Madras Street to its intersection with Manchester Street be revoked.

New Hereford Street – Madras Street to Manchester Street: Traffic Control

3.2. Approve the road marking changes, kerb alignment changes on both sides of Hereford Street from its intersection with Madras Street to its intersection with Manchester Street as detailed on **Attachment A.**

Existing Hereford Street – Madras Street to Latimer Square (West Side): Parking and Stopping Restrictions

3.3. Approve that all parking and stopping restrictions on both sides of Hereford Street from its intersection with Madras Street to its intersection with Manchester Street be revoked.

New Hereford Street – Madras Street to Latimer Square (West Side): Parking and Stopping Restrictions

3.4. Approve that the stopping of vehicles be prohibited at any time on the north side of Hereford Street, commencing at its intersection with Latimer Square (west side) and extending in an easterly direction to its intersection with Madras Street.

Existing Intersection – Hereford Street / Latimer Square (West Side)

3.5. Approve that all traffic controls at the intersection of Hereford Street and Latimer Square (west side) be revoked.

3.6. Approve that all parking and stopping restrictions on both sides of Latimer Square (west side) commencing at its intersection with Hereford Street and extending in a northerly direction for a distance of 18 metres be revoked.

New Intersection – Hereford Street / Latimer Square (West Side)

3.7. Approve that the stopping of vehicles be prohibited at any time on the west side of Latimer Square (west side) commencing at its intersection with Hereford Street and extending in a northerly direction for a distance of 17 metres.

3.8. Approve that the stopping of vehicles be prohibited at any time on the east side of Latimer Square (west side) commencing at its intersection with Hereford Street and extending in a northerly direction for a distance of 18 metres.

3.9. Approve that a Give Way control be placed against Latimer Square (west side) at its intersection with Hereford Street.

Existing Intersection – Hereford Street / Liverpool Street: Traffic Control

3.10. Approve that all traffic controls at the intersection of Hereford Street and Liverpool Street be revoked.

New Hereford Street- Latimer Square (West Side) to Manchester Street: Parking and Stopping Restrictions

3.11. Approve that the stopping of vehicles be prohibited at any time on the north side of Hereford Street, commencing at its intersection with Latimer Square (west side) and extending in a westerly direction for a distance of 14 metres.

3.12. Approve that the parking of vehicles be restricted to a maximum period of 60 minutes on the north side of Hereford Street commencing at a point 14 metres west of its intersection with Latimer Square (west side) and extending in a westerly direction for a distance of 6 metres.

3.13. Approve that a Bus Stop be created on the north side of Hereford Street commencing at a point 27 metres west of its intersection with Latimer Square (west side) and extending in a westerly direction for a distance of 14 metres.

3.14. Approve that the stopping of vehicles be prohibited at any time on the north side of Hereford Street, commencing at a point 41 metres west of its intersection with Latimer Square (west side) and extending in a westerly direction for a distance of 8 metres.

3.15. Approve that the parking of vehicles be restricted to a maximum period of 60 minutes on the north side of Hereford Street commencing at a point 50 metres west of its intersection with Latimer Square (west side) and extending in a westerly direction for a distance of 5 metres.

3.16. Approve that the stopping of vehicles be prohibited at any time on the north side of Hereford Street, commencing at a point 55 metres west of its intersection with Latimer Square (west side) and extending in a westerly direction to its intersection with Manchester Street.

3.17. Approve that the stopping of vehicles be prohibited at any time on the south side of Hereford Street, commencing at its intersection with Madras Street and extending in a westerly direction for a distance of 55 metres.

3.18. Approve that the parking of vehicles be restricted to a maximum period of 60 minutes on the south side of Hereford Street commencing at a point 55 metres west of its intersection with Madras Street and extending in a westerly direction for a distance of 17 metres.

3.19. Approve that the stopping of vehicles be prohibited at any time on the south side of Hereford Street, commencing at a point 72 metres west of its intersection with Madras Street and extending in a westerly direction for a distance of 10 metres.

3.20. Approve that a Bus Stop be created on the south side of Hereford Street commencing at a point 82 metres west of its intersection with Madras Street and extending in a westerly direction for a distance of 14 metres.

3.21. Approve that the stopping of vehicles be prohibited at any time on the south side of Hereford Street, commencing at a point 96 metres west of its intersection with Madras Street and extending in a westerly direction to its intersection with Manchester Street.

New Hereford Street- Manchester Street to Madras : Special vehicle lanes (Cycle Lanes)

3.22. Approve that a special vehicle lane (Cycle Lane) for east bound cyclists only, be installed on the north side of Hereford Street commencing at its intersection with Manchester Street and extending in an easterly direction to its intersection with Latimer Square (east side).

3.24. Approve that a special vehicle lane (Cycle Lane) for west bound cyclists only, be installed on the south side of Hereford Street commencing at its intersection with Madras Street and extending in a westerly direction to its intersection with Manchester Street.

3.25. Approve that a special vehicle lane (Cycle Lane) for west bound cyclists only, be installed on the south side of Hereford Street commencing at its intersection with Madras Street and extending in an easterly direction for a distance of 15 metres.

New Intersection – Hereford Street / Madras Street: Traffic Control

3.26. Approve that a Give Way control be placed against the Madras Street left turn slip lane into Hereford Street at its intersection with Hereford Street.

3.27. Approve that a pedestrian crossing (Zebra) be installed across the Madras Street left turn slip lane into Hereford Street at a point approximately 7 metres south of its intersection with Hereford Street.

Committee Decided ITEC/2017/00011

Part A

That the Infrastructure, Transport and Environment Committee recommends that the Council approves the scheme design and resolutions relating to the following *An Accessible City* Phase 2 network transformation project as detailed in **Attachment 1**:

Existing Hereford Street – Madras Street to Manchester Street: Traffic Control

1. Approve that all traffic controls on both sides of Hereford Street from its intersection with Madras Street to its intersection with Manchester Street be revoked.

New Hereford Street – Madras Street to Manchester Street: Traffic Control

2. Approve the road marking changes, kerb alignment changes on both sides of Hereford Street from its intersection with Madras Street to its intersection with Manchester Street as detailed on **Attachment A.**

Existing Hereford Street – Madras Street to Latimer Square (West Side): Parking and Stopping Restrictions

3. Approve that all parking and stopping restrictions on both sides of Hereford Street from its intersection with Madras Street to its intersection with Manchester Street be revoked.

New Hereford Street – Madras Street to Latimer Square (West Side): Parking and Stopping Restrictions

4. Approve that the stopping of vehicles be prohibited at any time on the north side of Hereford Street, commencing at its intersection with Latimer Square (west side) and extending in an easterly direction to its intersection with Madras Street.

Existing Intersection – Hereford Street / Latimer Square (West Side)

5. Approve that all traffic controls at the intersection of Hereford Street and Latimer Square (west side) be revoked.
6. Approve that all parking and stopping restrictions on both sides of Latimer Square (west side) commencing at its intersection with Hereford Street and extending in a northerly direction for a distance of 18 metres be revoked.

New Intersection – Hereford Street / Latimer Square (West Side)

7. Approve that the stopping of vehicles be prohibited at any time on the west side of Latimer Square (west side) commencing at its intersection with Hereford Street and extending in a northerly direction for a distance of 17 metres.
8. Approve that the stopping of vehicles be prohibited at any time on the east side of Latimer Square (west side) commencing at its intersection with Hereford Street and extending in a northerly direction for a distance of 18 metres.
9. Approve that a Give Way control be placed against Latimer Square (west side) at its intersection with Hereford Street.

Existing Intersection – Hereford Street / Liverpool Street: Traffic Control

10. Approve that all traffic controls at the intersection of Hereford Street and Liverpool Street be revoked.

New Hereford Street- Latimer Square (West Side) to Manchester Street: Parking and Stopping Restrictions

11. Approve that the stopping of vehicles be prohibited at any time on the north side of Hereford Street, commencing at its intersection with Latimer Square (west side) and extending in a westerly direction for a distance of 14 metres.

12. Approve that the parking of vehicles be restricted to a maximum period of 60 minutes on the north side of Hereford Street commencing at a point 14 metres west of its intersection with Latimer Square (west side) and extending in a westerly direction for a distance of 6 metres.

13. Approve that a Bus Stop be created on the north side of Hereford Street commencing at a point 27 metres west of its intersection with Latimer Square (west side) and extending in a westerly direction for a distance of 14 metres.

14. Approve that the stopping of vehicles be prohibited at any time on the north side of Hereford Street, commencing at a point 41 metres west of its intersection with Latimer Square (west side) and extending in a westerly direction for a distance of 8 metres.

15. Approve that the parking of vehicles be restricted to a maximum period of 60 minutes on the north side of Hereford Street commencing at a point 50 metres west of its intersection with Latimer Square (west side) and extending in a westerly direction for a distance of 5 metres.

16. Approve that the stopping of vehicles be prohibited at any time on the north side of Hereford Street, commencing at a point 55 metres west of its intersection with Latimer Square (west side) and extending in a westerly direction to its intersection with Manchester Street.

17. Approve that the stopping of vehicles be prohibited at any time on the south side of Hereford Street, commencing at its intersection with Madras Street and extending in a westerly direction for a distance of 55 metres.

18. Approve that the parking of vehicles be restricted to a maximum period of 60 minutes on the south side of Hereford Street commencing at a point 55 metres west of its intersection with Madras Street and extending in a westerly direction for a distance of 17 metres.

19. Approve that the stopping of vehicles be prohibited at any time on the south side of Hereford Street, commencing at a point 72 metres west of its intersection with Madras Street and extending in a westerly direction for a distance of 10 metres.

20. Approve that a Bus Stop be created on the south side of Hereford Street commencing at a point 82 metres west of its intersection with Madras Street and extending in a westerly direction for a distance of 14 metres.

21. Approve that the stopping of vehicles be prohibited at any time on the south side of Hereford Street, commencing at a point 96 metres west of its intersection with Madras Street and extending in a westerly direction to its intersection with Manchester Street.

New Hereford Street- Manchester Street to Madras : Special vehicle lanes (Cycle Lanes)

22. Approve that a special vehicle lane (Cycle Lane) for east bound cyclists only, be installed on the north side of Hereford Street commencing at its intersection with Manchester Street and extending in an easterly direction to its intersection with Latimer Square (east side).

23. Approve that a special vehicle lane (Cycle Lane) for west bound cyclists only, be installed on the south side of Hereford Street commencing at its intersection with Madras Street and extending in a westerly direction to its intersection with Manchester Street.

24. Approve that a special vehicle lane (Cycle Lane) for west bound cyclists only, be installed on the south side of Hereford Street commencing at its intersection with Madras Street and extending in an easterly direction for a distance of 15 metres.

New Intersection – Hereford Street / Madras Street: Traffic Control

25. Approve that a Give Way control be placed against the Madras Street left turn slip lane into Hereford Street at its intersection with Hereford Street.

26. Approve that a pedestrian crossing (Zebra) be installed across the Madras Street left turn slip lane into Hereford Street at a point approximately 7 metres south of its intersection with Hereford Street.

Disability Parks

27. Staff to investigate an option for at least one disability park on this stretch of street and report back to the Council.

Councillor Clearwater/Councillor Templeton **Carried**
Councillor Keown requested that his vote against the resolution be recorded.

7. Transport Unit - Bi-Monthly Report

Staff Recommendations

That the Infrastructure, Transport and Environment Committee:

1. Receive the information in the attached Transport Unit report.

Committee Resolved ITEC/2017/00012

Part B

That the Infrastructure, Transport and Environment Committee:

1. Receive the information in the attached Transport Unit report.

Councillor Davidson/Councillor Templeton **Carried**

Meeting concluded at 2.23pm.

CONFIRMED THIS 12TH DAY OF APRIL 2017

COUNCILLOR PAULINE COTTER
CHAIRPERSON

Christchurch City Council

Christchurch City Council

Infrastructure, Transport and Environment Committee
EXTRAORDINARY MINUTES

Date: Thursday 30 March 2017
Time: 9.02am
Venue: Council Chambers, Civic Offices, 53 Hereford Street, Christchurch

Present

Chairperson	Councillor Pauline Cotter
Deputy Chairperson	Councillor Mike Davidson
Members	Councillor Vicki Buck
	Councillor Phil Clearwater
	Councillor Anne Galloway
	Councillor Aaron Keown
	Councillor Sara Templeton

29 March 2017

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Part A **Matters Requiring a Council Decision**

Part B **Reports for Information**

Part C **Decisions Under Delegation**

The agenda was dealt with in the following order.

1. Apologies

Part C
There were no apologies.

2. Declarations of Interest

Part B
There were no declarations of interest recorded.

Councillor Buck arrived at 9.09am

3. Deputations by Appointment

Part B

3.1 The following presented deputations to the Committee on the Heathcote Expressway Major Cycleway Route and/or Rapanui Shag Rock Major Cycleway Route:

Heathcote Expressway:

1.1 Ray Edwards presented a deputation on behalf of himself and the following Ferry Road Property and Business Owners:

1.1.1 Dave Alexander

1.1.2 Brent Hodder

1.1.3 Craig Newberry

1.1.4 Tony Carey

1.1.5 Doug Pflaum

1.1.6 David Fleming

1.2 David McGregor on behalf of the Grace Vineyard Church

Heathcote Expressway and Rapanui Shag Rock:

1.3 Dirk De Lu on behalf of Spokes

1.4 Robert Fleming

1.5 Connie Christensen on behalf of Go Cycle Christchurch

1.6 Francesca Bradley on behalf of Generation Zero

Rapanui Shag Rock:

1.7 Bill Simpson on behalf of the Avon-Heathcote Estuary Trust 'The Trust'

4. Presentation of Petitions

Part B

There was no presentation of petitions.

5. Rapanui Shag Rock Section 2 and 3 Recommended Option Report

Committee Comment

1. Jake McKellan Deputy Chair of the Linwood-Central-Heathcote Community Board presented feedback from Community Board Members and joined the table for the discussion of this item.
2. The Committee considered the written submissions and deputations received on the Rapanui Shag Rock Section 2 and 3 Major Cycleway Rote.
3. The Committee resolved the staff recommendations with additional requests for staff.

Staff Recommendations

That the Infrastructure, Transport and Environment Committee:

1. Approve that the Rapanui Shag Rock Sections 2 and 3 proceed to detailed design and construction as shown in the attachment A - Rapanui Shag Rock Preferred Option Scheme Plans.
2. Approve the removal of the identified trees to allow the implementation of the proposed scheme.
3. Recommend that the detailed traffic resolutions required for the implementation of the route are brought back to the Infrastructure, Transport and Environment Committee for approval at the end of the detailed design phase prior to onsite construction.

Committee Resolved ITEC/2017/00013

Committee
Part C

That the Infrastructure, Transport and Environment Committee:

1. Approve that the Rapanui Shag Rock Sections 2 and 3 proceed to detailed design and construction as shown in the attachment A - Rapanui Shag Rock Preferred Option Scheme Plans.
2. Approve the removal of the identified trees to allow the implementation of the proposed scheme.
3. Recommend that the detailed traffic resolutions required for the implementation of the route are brought back to the Infrastructure, Transport and Environment Committee for approval at the end of the detailed design phase prior to onsite construction.
4. Recommend that staff investigate the feasibility of the reduction in speed on Humphreys Drive between Dyers Road and Tidal View.
5. Notes that the Humphreys Road section has significant ecological issues and that staff will keep the Committee informed on the progress, design and stakeholder discussions.

Councillor Templeton/Councillor Galloway **Carried**

The meeting adjourned at 11.16am.
The meeting reconvened at 11.31am.
Councillor Galloway arrived at 11.35am.

6. Heathcote Expressway Recommended Option Report

Committee Comment

1. The Committee considered the written submissions and deputations received on the Heathcote Expressway Major Cycleway Rote.
2. The Committee resolved the staff recommendations with additional requests for staff.

Staff Recommendations

That the Infrastructure, Transport and Environment Committee:

1. Approve the Heathcote Expressway Route alignment as shown in Attachment A – Heathcote Expressway Preferred Option Plans.
2. Approve that the Heathcote Expressway Route between Charles Street and Truscotts Road proceed to detailed design and construction as shown in Attachment A – Heathcote Expressway Preferred Option Plans.
3. Recommend that the decision relating to the Heathcote Expressway Cycle Route between the Ferry Road/Fitzgerald Intersection and Charles Street be bought back to the Infrastructure, Transport and Environment Committee at a future date.
4. Approve the removal of the identified trees to allow for the implementation of the proposed scheme.
5. Recommend that the detailed traffic resolutions required for the implementation of the route are brought back to the Infrastructure, Transport and Environment Committee for approval at the end of the detailed design phase prior to onsite construction.

Committee Resolved ITEC/2017/00014

Committee

Part C

That the Infrastructure, Transport and Environment Committee:

1. Approve the Heathcote Expressway Route alignment as shown in Attachment A – Heathcote Expressway Preferred Option Plans.
2. Approve that the Heathcote Expressway Route between Charles Street and Truscotts Road proceed to detailed design and construction as shown in Attachment A – Heathcote Expressway Preferred Option Plans.
3. Recommend that the decision relating to the Heathcote Expressway Cycle Route between the Ferry Road/Fitzgerald Intersection and Charles Street be bought back to the Infrastructure, Transport and Environment Committee at a future date.
4. Approve the removal of the identified trees to allow for the implementation of the proposed scheme.
5. Recommend that the detailed traffic resolutions required for the implementation of the route are brought back to the Infrastructure, Transport and Environment Committee for approval at the end of the detailed design phase prior to onsite construction.
6. Recommends that options for increasing the width of the cycleway on Cumnor Terrace are explored (including Cumnor Terrace being a one-way street).

7. Notes that the capital cost for the bridge replacement at Richardson Terrace/Clarendon Terrace is to be considered during the LTP process.

8. Asks for staff to prepare a report within the next six months to the Infrastructure, Transport and Environment Committee considering the need for secure cycle parking at trip generators and connections with public transport.

9. Requests staff extend the scope to Martindales Road, Truscotts Road and Station Road as part of the detailed design

10. Request staff feedback on communication strategy and "how to use" information at each ITE Committee meeting.

Councillor Clearwater/Councillor Templeton **Carried**

Councillor Keown and Davidson requested that their votes against this decision be recorded.

Meeting concluded at 12.35pm.

CONFIRMED THIS 12th DAY OF APRIL 2017

COUNCILLOR PAULINE COTTER
CHAIRPERSON

Christchurch City Council

6. Storm Water Pump Station 205 Upgrade and Repair options

Reference: 17/144473
Contact: Stephen Bensberg Stephen.bensberg@ccc.govt.nz 0272499328

1. Purpose and Origin of Report

Purpose of Report

1.1 The purpose of this report is to provide information to the Infrastructure, Transport and Environment Committee to enable a recommendation to the Council to approve an investment in storm water Pump Station 205 (PS205) to restore and increase the stations capacity which will simultaneously address a number of issues regarding the reliability and operation of the station.

Origin of Report

1.2 This report is staff generated to enable the Infrastructure, Transport and Environment Committee to make the recommendation described above. It follows from an LDRP- condition assessment of the pump station which identified loss of capacity due to the 2010/2011 earthquakes.

2. Significance

2.1 The decision in this report is of high significance in relation to the Christchurch City Council's Significance and Engagement Policy.

2.1.1 The level of significance was determined by an internal assessment of the effects of the proposed upgrade to the pump station. The level was determined as 'High' because the works involve a strategic Council Asset (it is the Council's largest storm water pump station) and controls flood risk for a wide community. Not carrying out these works could negatively impact on Council's reputation as the pump station is currently difficult to effectively operate and maintain, affecting its reliability to control flood risk.

2.1.2 No community engagement and consultation has been carried out to date to reflect the assessment.

3. Staff Recommendations

That the Infrastructure, Transport and Environment Committee:

1. Recommend to Council to progress the preferred PS205 option (option 1) to detailed design, consenting and construction as this option will:

   a. Extend the life of the Pump Station by 25 years, allowing for the effects of climate change (storm increase, sea level rise) over this lifetime.

   b. significantly increase the reliability of operating the pump station under current conditions

   c. Provided for an opportunity to enhance the Ecology value in the 6-Value framework by providing fish passage, in particular for Inanga spawning.

4. Key Points

4.1 This report supports the Council's Long Term Plan (2015 - 2025):

4.1.1 Activity: Flood Protection and Control Works

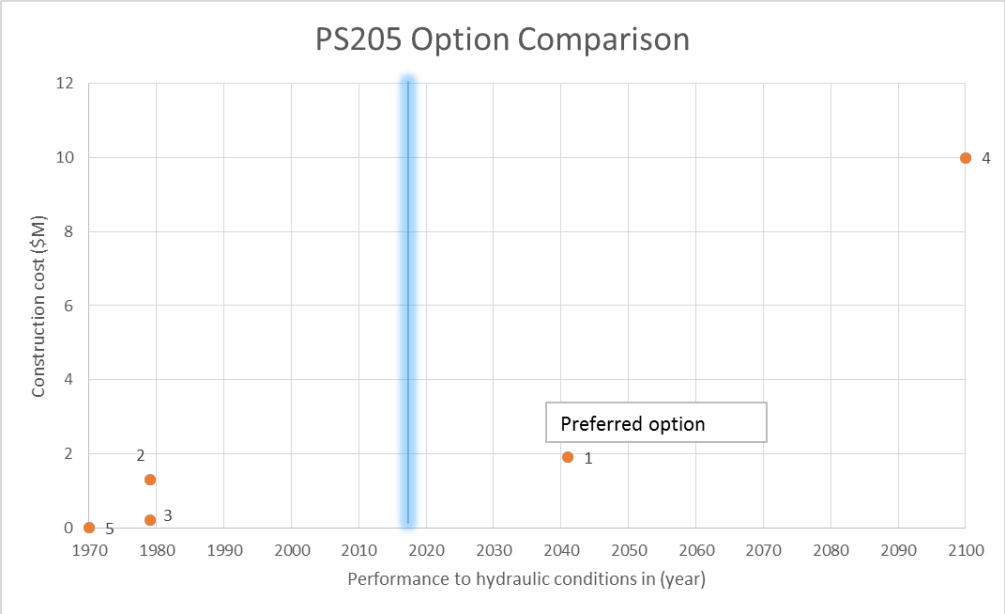
- Level of Service: 14.1.5 Implement Land Drainage Recovery Programme works to reduce flooding

4.2 The following feasible options have been considered:

- Option 1 – Maximise Station Life by extending Pump Station lift to maximum possible (0.6m) within the existing structure (preferred option)
- Option 2 – Improve Reliability and Extend Pump Station lift by 0.15m
- Option 3 - Earthquake Recovery Only (restore 0.15m of lift)
- Option 4 – Station Replacement
- Option 5 – Do Nothing

The following chart shows a comparison between the options described in this report. The graph compares the hydraulic performance provided by each option in terms of year, plotted against the cost of the option.

Chart One: Options Comparison



4.3 Option Summary - Advantages and Disadvantages (Preferred Option)

4.3.1 The advantages of this option include:

- Extends the station life to the maximum possible within the constraints of the existing structure, thus getting the highest return on past investment and proposed expenditure
- Improves the operational reliability of the station
- Provides the maximum lift and effective capacity
- Provides an extended life against future sea level rise (SLR) for 25 years
- Protects the most number of dwellings and properties
- Keeps long term options (incl. replacement) open pending plans for the regeneration of this area

4.3.2 The disadvantages of this option include:

- Highest Capital Cost (aside from option 4 – full station replacement)

5. Context/Background

A condition assessment of Horseshoe Lake and Pump Station 205 carried out in 2015 under the Land Drainage Recovery Programme identified:

5.1 Loss of pump capacity (lift level) due to settlement of the pump station in the 2010/2011 earthquake sequence. Pre-EQ discharge capacity needs to be restored by extending or moving flights on the 3 Archimedes screws. The capacity of the Archimedes screw design is more sensitive to SLR than other types of storm water pumping stations. As SLR eventuates the capacity of the station will progressively reduce.

5.2 Urgent health and safety issues (currently being addressed).

5.3 Reliability issues in operating the pump station due to age of equipment, unavailability of spare parts and accessibility to operate the station under storm condition (ie. flooding of the only access road to the station).

5.4 Fallen trees in HSL need to be removed to reinstate unimpeded flow to PS205 to effectively maintain Horseshoe Lake levels (currently being addressed).

5.5 Siltation in Pump Station inlet and tail water channels and culverts under New Brighton Road needs to be removed to optimize/reinstate discharge capacity of PS205 and effectively maintain Horseshoe Lake water levels (currently being addressed).

5.6 The station's operation includes five timber tide gates which allow storm flows to discharge via gravity during low tides. These gates have deteriorated and need replacement due to wood rot.

5.7 Improvements can be made to PS operations re data recording, compliance with (H&S)-regulations and building codes, reliability of equipment supply and optimisation of operation and maintenance of the PS.

5.8 The PS is sensitive to Sea Level Rise (SLR) and changes in the design flood level in the Avon. The council's 50yr flood level for the Avon has increased from RL10.8 in 1979 to RL11.2m in 2016. The change in design flood level is due to improvements in computer modelling, additional development in the Avon catchment, past Sea Level Rise and allowances for future SLR and Climate Changes in rainfall. The PS has therefore effectively 'lost' 0.4m of design lift since its construction in 1979.

5.9 Hydraulic modelling to date has estimated the number of at risk households that would experience overfloor flooding in a 1/50 year event, ranges 8 to 23, with additional properties experiencing surface flooding. This analysis is based on the existing flood storage within the RRZ adjacent to Horseshoe Lake being maintained.

5.10 Should the existing flood storage in the RRZ be lost due to future regeneration development in the RRZ, the flood levels within Horseshoe Lake would increase by at least 200mm with corresponding increases in flooding of the surrounding green zone residential land.

6. Option 1 – Maximise Station Life (preferred)

Option Description

6.1 Maximise Station Life by extending Pump Station lift to the maximum possible (0.6m) within the existing structure (preferred option).

This option will maximise the active life of the station before the station will need to be fully replaced. The current super structure limits the extent to which the station can be modified. The lift of 0.6m will restore the stations effective design capacity of 13m^3/s during the peak river levels that occur during a 50 year event (2%AEP) and allow for a SLR of 0.27m which will extends the station life to 2041.

Significance

6.2 The level of significance of this option is high; consistent with section 2 of this report.

6.3 Engagement requirements for this level of significance are nil as this option involves the continuation of an existing level of service and community consultation is not required. There will be no changes to the appearance on the outside of the station, with exception of replacing the tidal gates.

Impact on Mana Whenua

6.4 This option does not involve a significant decision in relation to ancestral land or a body of water or other elements of intrinsic value, therefore this decision does not specifically impact Ngāi Tahu, their culture and traditions. Providing a fish friendly passage will improve Inanga migration into Horseshoe Lake which is a site of ecological significance. Horseshoe Lake is culturally significant and is considered to be wāhi taonga (treasured area).

Community Views and Preferences

6.5 No community groups are specifically affected by this option as the upgrade will be within the pump station and consists of replacement of existing equipment. Visible changes to the outside of the station are limited to the replacement of the 5 wooden flap gates, which are to include fish friendly passage.

Alignment with Council Plans and Policies

6.6 This option is consistent with Council's Plans and Policies.

Financial Implications

6.7 Cost of Implementation - $1,900,000

6.8 Maintenance / Ongoing Costs – TBC. Currently, the yearly operational maintenance budget (approx. $10k/year) is insufficient to maintain the station for reliable operation. The proposed operational expenditure is to be confirmed but will need to be increased from its current level.

6.9 Funding source – This project will deliver increased flood protection beyond pre-earthquake flood levels, enhanced operation and reliability of the Pump Station. Funding for this project will be made available within the Land Drainage Recovery Programme. There is sufficient budget available within the Programme as proposed in the Annual Plan 2017-2018 in the next financial year (FY17/18) to deliver this project. Any savings identified at the end of the project will be returned to the Programme for application to other projects.

Legal Implications

6.10 This option is the continuation of the existing operational regime of the land drainage network. There are no legal implications from this option.

Risks and Mitigations

6.11 The extension of the PS lift seeks to restore and maintain the PS capacity at a 50 year capacity including an allowance for SLR to 2041. If the works are not undertaken the risk of flooding to adjacent land including RRZ & green zone will progressively increase.

6.12 No new risks result from the completion of these works. However the risk of flooding increases should the works not be undertaken. This will result in social disruption and costs to the community.

6.12.1 Treatment: Undertake the proposed works.

6.12.2 Residual risk rating: Following the completion of the works the rating of the residual risk is low.

Implementation

6.13 Implementation dependencies. The PS's existing drive chain cannot cope with a reinstated lift of more than 0.15m. In order to achieve the maximum lift proposed in this option the existing motors and drive equipment need to be replaced. The cost of these replacement drives and motors has been included in the total cost. Modelling and investigative work to date has proven that with the recommended equipment upgrades a 0.45m lift is achievable. It is anticipated that a maximum lift of 0.6m is hydraulically achievable, further modelling is underway to confirm this.

6.14 Implementation timeframe – 2017/2018 Financial year.

Option Summary - Advantages and Disadvantages

6.15 The advantages of this option include:

- Maximises the hydraulic lift and effective capacity of the station
- Maximises the effective lift of the station
- Provides time to plan for the station's eventual replacement

6.16 The disadvantages of this option include:

- The option has the second highest cost (after full replacement)

7. Option 2 - Improve Reliability and Extend Pump Station lift by 0.15m

Option Description

7.1 This option will only restore the lift capacity lost in the earthquakes and increase the reliability of the pump station through the replacement of obsolete equipment. This option will cost approx. $1.7M. This provides for a pump station that operates with new motors, drives and gearboxes. It does not provide the maximum lift extension possible but will restore the hydraulic performance of the station back to pre-EQ level. The pre-EQ performance level is equivalent to a 1979 flood level and below the current 2017, 50 year design level.

Significance

7.2 The level of significance of this option is high consistent with section 2 of this report.

7.3 Engagement requirements for this level of significance are nil. As this option involves the restoration of an earlier level of service, community consultation is not required.

Impact on Mana Whenua

7.4 This option does not involve a significant decision in relation to ancestral land or a body of water or other elements of intrinsic value, therefore this decision does not specifically impact Ngāi Tahu, their culture and traditions. Providing a fish friendly passage will improve Inanga migration into Horseshoe Lake which is a site of ecological significance. Horseshoe Lake is culturally significant and is considered to be wāhi taonga (treasured area).

Community Views and Preferences

7.5 No community groups are specifically affected by this option as the upgrade will be within the pump station and consists of replacement of existing equipment. Visible changes to the outside of the station are limited to the replacement of the 5 wooden flap gates, which are to include fish friendly passage.

Alignment with Council Plans and Policies

7.6 This option is consistent with Council's Plans and Policies

Financial Implications

7.7 Cost of Implementation - $1,700,000

7.8 Maintenance / Ongoing Costs – TBC. Currently, the yearly operational maintenance budget (approx. $10k/year) is insufficient to maintain the station for reliable operation. The proposed operational expenditure is to be confirmed but will need to be increased from its current level.

7.9 Funding source - Land Drainage Recovery Program

Legal Implications

7.10 This option is the continuation of the existing operational regime of the land drainage network. There are no legal implications from this option.

Risks and Mitigations

7.11 The extension of the PS lift seeks to restore the station capacity back to pre-earthquake levels. However the prequake level is below the 2017, 50 year capacity and does not include any allowance for future. The work also includes the replacement of obsolete parts to improves the station operational reliability. If the works are not undertaken, the risk of flooding to adjacent land including RRZ & green zone will progressively increase.

7.12 No new risks result from the completion of these works. However as the station lift is only being restored to prequake levels, the risk of flooding will progressively increase due to future SLR. Should the reliability works not be undertaken the station may not operate during a major storm

event potentially resulting in flooding. This will result in social disruption and costs to the community.

7.12.1 Treatment: Undertake the proposed works.

7.12.2 Residual risk rating: Following the completion of the works the rating of the residual risk is medium-low.

7.13 Implementation dependencies - None

7.14 Implementation timeframe - 2017/2018 Financial year.

Option Summary - Advantages and Disadvantages

7.15 The advantages of this option include:

- Improves the reliability of the pump station
- Restore the pre-earthquake capacity

7.16 The disadvantages of this option include:

- Does not fully restore the design capacity of the station
- Does not allow for future SLR
- Does not make optimal use of the opportunity to maximise benefits. For a marginal additional spend ($0.2M), maximum lift and service level can be obtained.

8. Option 3 – Restore lift capacity lost in the earthquakes

Option Description

8.1 Restore only the lift capacity lost in the earthquakes. This does not address issues with the reliability of operating the pump station. This option would involve relocating the flights on the lower end of the Archimedes screws to the top of the screws. This avoids replacement of the electrical and mechanical equipment inside the station. Cost estimate of restoring capacity lost in the EQ is approx. $0.2M

Significance

8.2 The level of significance of this option is high consistent with section 2 of this report.

8.3 Engagement requirements for this level of significance are nil as the work involves earthquake recovery within an existing council structure.

Impact on Mana Whenua

8.4 This option does not involve a significant decision in relation to ancestral land or changes to a body of water or other elements of intrinsic value, therefore this decision does not specifically impact Ngāi Tahu, their culture and traditions.

Community Views and Preferences

8.5 The local community is affected by this option due to the lower level of protection it provides. Their views have not yet been sought as this is not a preferred option.

8.6 Alignment with Council Plans and Policies

8.7 This option is inconsistent with Council's Plans and Policies

8.7.1 Inconsistency – Residential households will progressively be at a higher level of flood risk.

8.7.2 Reason for inconsistency – This option does not restore the station design capacity nor provides for future SLR making it difficult for the council to comply with existing levels of services.

Financial Implications

8.8 Cost of Implementation - $200,000

8.9 Maintenance / Ongoing Costs – TBC. Currently, the yearly operational maintenance budget (approx. $10k/year) is insufficient to maintain the station for reliable operation. The proposed operational expenditure is to be confirmed but will need to be increased from its current level.

8.10 Funding source – Land Drainage Recovery Program

Legal Implications

8.11 There are no legal implications from this option.

Risks and Mitigations

8.12 This option only restores the station's prequake lift capacity. However this capacity is equivalent to a 1979 flood level and below the current 2017, 50 year design level. The existing reliability issues remain and there is no allowance for future SLR.

8.13 The flood risk caused by the lack of adequate lift will result in increased flood risk to adjacent green zone properties and also the RRZ. Should the RRZ be filled as part of future the regenerate Christchurch plans the flood level in Horse Shoe Lake will rise further increasing the flood risk.

8.13.1 Treatment: Implement the recommended option (option 1)

8.13.2 Residual risk rating: the rating of the risk is high.

Implementation

8.14 Implementation dependencies - None

8.15 Implementation timeframe – 2017/18

Option Summary - Advantages and Disadvantages

8.16 The advantages of this option include:

- This option is the cheapest and can be delivered relatively quickly.
- The recommended reliability improvements can still be undertaken in the future.

8.17 The disadvantages of this option include:

- Does not fully restore the design capacity of the station
- There is no allowance for future SLR
- Pump station may not be able to start during a major flood due to inaccessibility or equipment failure, resulting in flooding of RRZ and green zone.

9. Option 4 – New Pump Station

Option Description

9.1 This option consists of the design and construction of a new pump station and abandonment of the existing pump station. A new pump station will be designed for hydraulic conditions, inclusive of the effects of climate change, for a design life of 100 years. The cost of a new pump station are expected to cost at least $10M to $20M.

Significance

9.2 The level of significance of this option is High consistent with section 2 of this report.

9.3 Engagement requirements for this level of significance are: consultation required with multiple stakeholders within and outside of Council, including but not limited to local residential community, Runanga, Regional Council and Regenerate Christchurch.

Impact on Mana Whenua

9.4 This option does involve a significant decision in relation to ancestral land or a body of water or other elements of intrinsic value, therefore this decision does specifically impact Ngāi Tahu, their culture and traditions. Their views have not yet been investigated at this stage as this is not a preferred option.

Community Views and Preferences

9.5 The community in the vicinity of the pump station are specifically affected by this option due to construction and operation of a new pump station with different characteristics compared to the current situation. Their views have not yet been investigated at this stage as this is not a preferred option.

Alignment with Council Plans and Policies

9.6 This option is consistent with Council's Plans and Policies

Financial Implications

9.7 Cost of Implementation – minimum of $10-20M

9.8 Maintenance / Ongoing Costs – TBC. Currently, the yearly operational maintenance budget (approx. $10k/year) is insufficient to maintain the station for reliable operation. The proposed operational expenditure is to be confirmed but will need to be increased from its current level.

9.9 Funding source – Land Drainage Recovery Programme

Legal Implications

9.10 There are currently no legal implications foreseen from this option.

Risks and Mitigations

9.11 This option will consider the long term impact of SLR on the design of the station including sea level rise and increased rainfall intensities expected with climate change. The required design life of the station would be 100 years.

9.12 This option effectively manages the flood risk for the HSL catchment.

9.12.1 Treatment: nil

9.12.2 Residual risk rating: the rating of the risk is low.

Implementation

9.13 Implementation dependencies - implementing a new pump station would need to involve wider consultation with a wide range of stakeholders, both within and outside of Christchurch City Council.

9.14 Implementation timeframe – implementation of a new pump station would take approximately 3 years.

Option Summary - Advantages and Disadvantages

9.15 The advantages of this option include:

- A new pump station will provide for a design life of 100 years
- It will allow use of the most modern technologies available
- It will provide high reliability of operation in comparison to options 3 & 5.

9.16 The disadvantages of this option include:

- Very high cost compared to the other options
- Uncertainty over the future use of the RRZ and ongoing research into the effects of climate change provide a level of uncertainty about long term hydraulic requirements and use of this option.

10. Option 5 – Do nothing

Option Description

10.1 Do not undertake any remedial activity at all.

Significance

10.2 The level of significance of this option is high consistent with section 2 of this report.

10.3 Engagement requirements for this level of significance are nil. However this option would represent a significant drop in the level of service provided and community consultation would need to be undertaken to re-set community expectations.

Impact on Mana Whenua

10.4 This option does not involve a significant decision in relation to ancestral land or a body of water or other elements of intrinsic value, therefore this decision does not specifically impact Ngāi Tahu, their culture and traditions.

Community Views and Preferences

10.5 The local community are affected by this option due to the lower level of protection provided and increased flood risk. Their views have not yet been sought as this is not a preferred option.

Alignment with Council Plans and Policies

10.6 This option is inconsistent with Council's Plans and Policies

10.6.1 Inconsistency – this option does not increase or restore flood protection but will allow flood risk to increase over time.

10.6.2 Reason for inconsistency – Council aims to restore flood risk to at least pre-earthquake levels. This will not be achieved by this option.

Financial Implications

10.7 Cost of Implementation - $0

10.8 Maintenance / Ongoing Costs – TBC. Currently, the yearly operational maintenance budget (approx. $10k/year) is insufficient to maintain the station for reliable operation. The proposed operational expenditure is to be confirmed but will need to be increased from its current level, even in the 'do nothing' option.

10.9 Funding source – Land Drainage Maintenance Budget

Legal Implications

10.10 There are no legal implications from this option. Council is able to set land drainage levels of service. However this option would represent a significant drop in the level of service provided and community consultation would need to be undertaken to re-set community expectations.

Risks and Mitigations

10.11 The current post quake flood risk is higher than that envisaged by the Council when the station was constructed. The flood risk to the community will progressively increase over time to sea level rise and climate change.

10.12 The flood risk caused by the lack of adequate lift will result in increased flood risk to adjacent green zone properties and also the RRZ. Should the RRZ be filled as part of future the Regenerate Christchurch plans the flood level in Horse Shoe Lake will rise further, increasing the flood risk.

10.12.1 Treatment: Undertake the recommended option.

10.12.2 Residual risk rating: the rating of the risk is very high.

Implementation

10.13 Implementation dependencies - N/A

10.14 Implementation timeframe – N/A

Option Summary - Advantages and Disadvantages

10.15 The advantages of this option include:

- No expenditure required

10.16 The disadvantages of this option include:

- The level of service provided by the pump station is lower than that provided when the station was built in 1979.
- The reliability issues are not resolved.
- The flood risk to the local community will remain higher than design level and progressively increase.

Attachments

No.	Title	Page
A ⇩	PS205 Options assessment and cost estimates 9 Dec 2016	32

Confirmation of Statutory Compliance

Compliance with Statutory Decision-making Requirements (ss 76 - 81 Local Government Act 2002).

(a) This report contains:

(i) sufficient information about all reasonably practicable options identified and assessed in terms of their advantages and disadvantages; and

(ii) adequate consideration of the views and preferences of affected and interested persons bearing in mind any proposed or previous community engagement.

(b) The information reflects the level of significance of the matters covered by the report, as determined in accordance with the Council's significance and engagement policy.

Signatories

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JACOBS

PS205 Discharge Lift Height Upgrade

Christchurch City Council

Options Assessment

| 1

09 December 2016

Options Assessment

PS205 Discharge Lift Height Upgrade

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Document history and status

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A	28SEP16	First draft for internal review	MBS	GM	
B	07OCT16	Final draft for internal review	MBS	GM	
C	11OCT16	Draft Final Report for Client comment	MBS	VPVB	VPVB
D	16NOV16	Revised Draft Final Report for Client comment	MBS	VPVB	VPVB
1	09DEC16	Final Issue incorporating additional Client comments	MBS	VPVB	GT

Contents

Executive Summary **1**
1. Introduction **3**
2. Scope of Assessment **4**
3. Assessment Method **5**
4. Assessment Approach **6**
4.1 Hydraulic Limits 6
4.2 Hydraulic Capacity 7
4.3 Torque Increase with Flight Extension 8
4.4 Capacity of Existing Drive Train Components 10
4.4.1 Gearbox 10
4.4.2 Belt Drive 11
4.4.3 Electric Motor for 3.3 m^3/s screw 11
4.4.4 Diesel drive units for 5.5 m^3/s screw 11
5. Assessment Outcomes **12**
6. Upgrade Options **14**
6.1 Increasing lift capacity 14
A. (1) Restore to pre-earthquake lift capacity – excluding reliability upgrade 14
A. (2) Restore to pre-earthquake lift capacity – including reliability upgrade 14
B. Restoring to the design intent of a 50-year high water level – including reliability upgrade 14
C. Increasing the lift capacity beyond the original design intent of a 50-year high water level – including reliability upgrade 14
6.2 General asset maintenance works 15
6.3 Cost estimates 15
6.4 Comparison of Options 16
6.4.1 Option A (1) – Return to pre-earthquake discharge height without reliability upgrading 16
6.4.2 Option A (2) – Return to pre-earthquake discharge height and undertake reliability upgrades 17
6.4.3 Option B – Restoring to the design intent of a 50-year high water level and undertake reliability upgrades 17
6.4.4 Option C - Increasing lift capacity beyond original design intent of a 50-year high water level and undertake reliability upgrades 17
6.4.5 Qualitative comparative assessment 17
7. Conclusions **18**

Appendix A. Cost Estimates

Executive Summary

Pump Station PS205 adjacent the Avon River at Horseshoe Lake settled approximately 150mm in the Christchurch earthquakes, retaining its discharge flow rate but at a reduced discharge height. This has reduced the ability of PS205 to discharge to the Avon River when it is in flood compared to Pre-Earthquake levels.

Christchurch City Council has engaged Jacobs to undertake a review to establish the feasibility of upgrading the discharge height of PS205 to pre-earthquake discharge levels or greater.

A range of assessments have been undertaken to determine the hydraulic limitations, capacity of existing drive train components, the increased capacity required for screw extensions and practical construction implications associated with extending the screws.

The principle outcomes of this assessment include:

- The current operational arrangement can no longer pump to the Avon River at its design capacity of 13 m3/s during a 50-year high water event.
- The existing diesel drive units and electrical MSB and instrumentation and controls are past their effective design life and pose significant reliability risk and it is recommended these are replaced
- Restoring to pre-earthquake discharge level is feasible without upgrading the existing drive train components, however this option requires removal of an equivalent length of screw from the base of the screw to avoid increasing loads. This is Option A (1) in the report.
- Restoring to pre-earthquake discharge level Option A (1) does not replace drive train components so does not resolve reliability issues. All other upgrade options require replacement of drive train and electrical components due to capacity issues and in doing so also resolve reliability issues
- Increasing screw extensions beyond restoration of pre-earthquake discharge level or not removing the lower screw flights requires replacement of gearboxes, diesel and electric drive units as well as electrical MSB and instrumentation and controls due to the increased loads
- Screw extensions of up to 0.9m, equivalent to a 0.45m lift above existing discharge height, has been demonstrated to be feasible and it is expected that an extension of 1.2m, equivalent to a increase in 0.60m lift, is achievable. A screw extension of this magnitude requires replacement of gearboxes, diesel and electric drive units as well as electrical MSB and instrumentation and controls to accommodate the increased loads and requires investigation of the shaft structural strength
- Works are required to provide dry and safe access, prevent overtopping of the backflow control structure, fix flap gates and general building maintenance and safety improvements

An evaluation of the cost of the various screw extension upgrade options has been undertaken which demonstrates that the cost of restoring pre-earthquake discharge level only (Option A (1)) is $0.2M. An additional approximate $1.5M is required to achieve the recommended reliability upgrades (Option A (2)), at a total cost of $1.7M.

Restoring performance to the design intent of a 50-year high water level and achieving reliability upgrade (Option B) can be achieved for a cost of $2.0M.

Increasing the lift height beyond the 50-year high water level and achieving reliability upgrade (Option C) is achievable at a cost of $2.3M.

Considerable additional flood risk mitigation is achieved by restoring to or above a 50-year high water level when compared against restoration of pre-earthquake levels.

Once a decision on the preferred screw extension approach is determined, a range of additional assessment and design activities are required to progress the preferred approach to implementation.

Important note about your report

This report is solely for the benefit of Christchurch City Council to assist it make decisions on the feasibility and preferred approach for upgrading the discharge height of Pump Station PS205.

In preparing this report the authors have relied upon the available information on existing pump station componentry and their performance which for some components is limited.

Computational analysis has been undertaken to determine the impacts of the upgrade options considered and limitations with regards to the accuracy of outputs is noted in the body of the report.

Extrapolation of computation outputs for the purpose of determining design loads requires use of efficiency factors and service factors, whose selection required engineering judgement. The values used and reasoning for their use is identified, however Christchurch City Council should review and confirm their acceptance of these values prior to undertaking detailed design of its preferred option.

Feasibility has been assessed and reported for the specific options considered, and recommendations are made with regards to further assessment required if an upgrade option is considered that increases the length of screw and therefore loading on the pump station.

This report is to be read in full with no excerpts to be representative of the findings.

The report has been prepared exclusively for Christchurch City Council and no liability is accepted for any use or reliance on the report by third parties.

1. Introduction

Christchurch City Council's (Council) storm water pump station PS205, located between Horse Shoe Lake and the Avon River, settled approximately 150mm in the Christchurch earthquakes, retaining its discharge capacity but reducing its lift and discharge height. The impact of this settlement is that the pump station is less effective than pre-earthquake with respect to its ability to discharge to the Avon River when it is in flood.

Advances in the Avon River flood modelling reliability plus physical changes and the onset of sea level rise since the pump station was designed in 1977 have resulted in the design Avon River water level for a 2% Annual Exceedance Probability (AEP) event at the pump station location increasing from RL10.81 to RL11.20.

Previous studies have been undertaken into the effects of earthquake damage on performance of PS205 and the catchments that drain into Horse Shoe Lake which have identified among other matters:

- There remains a need for PS205 or alternatively new pump stations on the fringe of Horse Shoe Lake if PS205 were decommissioned, to reduce flood risk in Residential Red Zone and upstream catchments
- PS205 is in a relatively poor state of repair and has difficulty starting diesel drives and aging electrical switchboard and controls, requiring maintenance and upgrade works to enable continued safe and reliable operation and dry access during storm events

Council commissioned this assessment to develop options, within the existing structure constraints, to achieve:

A. restore PS205 maximum tail water level to pre-earthquake pump station lift capacity (RL10.90)

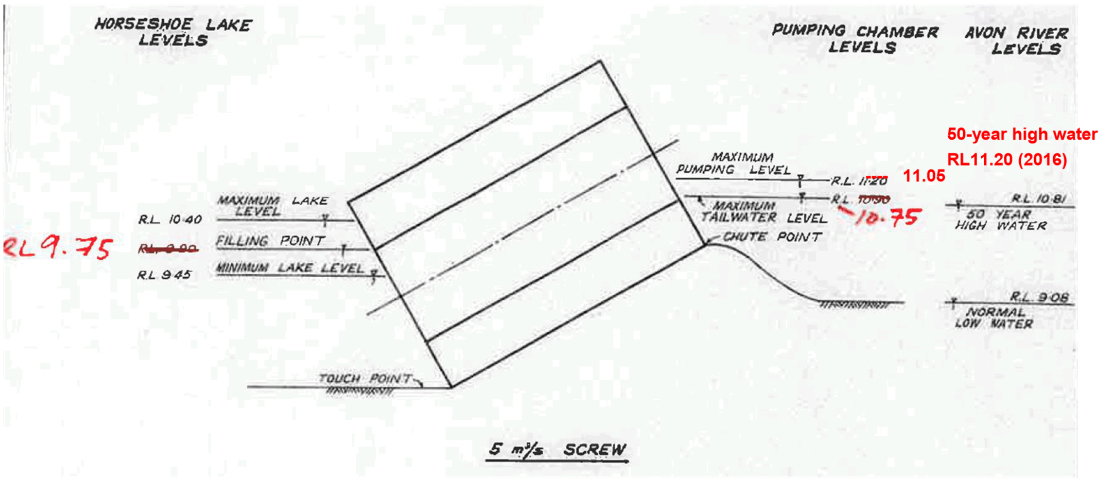
B. restore PS205 maximum tail water level to original design intent of a 50-year high water level (RL11.20)

C. increase PS205 maximum tail water level beyond original design intent of a 50-year high water level

Maximum tail water level is a function of the pump design and is the highest water level at which the pump station can pump at full capacity. Above this level the discharge capacity reduces until water reaches the **maximum pumping level** where discharge reduces to zero. Above this level water will overflow the screw.

A schematic showing the original design operational levels, with amendment in red to reflect the effect of settlement of the pump station, are presented in Figure 1.

Figure 1 : PS205 design water levels post earthquake settlement



2. Scope of Assessment

To advance the project the following specific assessments were undertaken:

1. Determine the length of screw and screw trough extension possible before the discharge of flow from the screw into the discharge structure becomes hydraulically limited

2. Determine the capacity of gearboxes, belt drives and diesel and electric drive units and supporting infrastructure including electrical supply, electrical switchboards, cooling system and fuel supply

3. Determine budget implementation costs for a range of options

It is noted that assessment was undertaken for one of the 5 m^3/s screws with a diesel drive motor, with the results extrapolated to make upgrade recommendations for the 3 m^3/s screw that has an electric drive motor.

Previous condition assessments of PS205 have reported that critical components including the diesel drives and electrical switchboard are in need of replacement to provide the reliability necessary of such an important asset, as well as general maintenance and site access improvements to enable safe access and operation of the facility. Due to the importance of addressing these matters, we have made cost allowance for reliability and general upgrade works and applied these similarly across the options presented to enable comparative assessment. The upgrade works considered are summarised in Section 6.2 and are identified in the preliminary cost estimates. We note that these works and cost allowances are indicative only and require further detailed consideration and development once a decision is made to progress them.

Sufficient assessment has been undertaken to demonstrate the hydraulic feasibility of an extension option that restores discharge levels to the original design intent of a 50-year high water level (0.9m extension or RL11.20), however additional assessment is required to optimise the final length of extension achievable, check the structural capacity of the screw shaft, size upgraded drive train components and determine Council preferences with respect to diesel drives or electric motors with a diesel backup generator.

The options assessment report will contribute to Council decision making on a preferred upgrade strategy. Thereafter the concept, preliminary and detailed design, with associated revised cost estimates, will be undertaken and procurement processes agreed and implemented.

We note that for the scenario of a screw extension greater than restoration to pre-earthquake conditions, we have not undertaken a structural assessment of the screw, determined the maximum potential screw extension achievable nor given consideration to the degree to which conservatism should be applied to equipment selection. These matters require consideration should Council choose to upgrade beyond restoration of pre-earthquake conditions, with the structural assessment of the screw to be undertaken as a priority to confirm feasibility prior to commitment to detailed design.

3. Assessment Method

Investigation and evaluation of the various study components were undertaken over a 2-month period, with three fortnightly meetings with Councils project team to update them on progress and developments and to gain the necessary input from Council. Progress reports were submitted to Council in advance of these meetings.

Activities undertaken included:

- Commission, input, review of inputs and outputs for CFD modelling
- Sourcing specifications and supplier information for gearboxes, diesel drives and electric motors, reviewing and determining capacity of existing components and efficiency factors and service factors for new drive train components
- Development of input loads for various shaft extensions and design loads for the drive train components
- Preliminary selection and pricing of drive train components to determine preliminary project cost
- Engagement with specialist mechanical contractor to validate screw extension methodology and cost

Investigations sought input from a range of external and independent sources including:

- Landustry Industries (Netherlands) - original designers of the screw pumps – to review CFD model outputs, undertake parallel flow and torque output assessment and to provide general industry experience
- Maud Kirk Limited – New Zealand agents of Hansen gearboxes – to assist with original gearbox information, to provide input to service factor setting and to size and price new gearboxes, belt drives and other equipment
- Gough CAT – suppliers of diesel drive units and generators – to size and price diesel drive units and generators
- Lyttelton Engineering – specialist industrial and mechanical engineering contractors – to review work method and provide pricing for extending screw flights
- Matrix Applied Computing – specialist computational fluid dynamics (CFD) analysts – to build and run a CFD model of a 5.5 m^3/s screw pump to enable assessment of maximum possible extension length and to derive predicted flow rates and drive torques
- City Care – Councils current maintenance and operations contractor – Discussions regarding the performance and reliability of the diesel drive units as well as PS205 operational experience in general

Preliminary outcomes in all areas of assessment were shared among the parties above as well as Jacobs technical reviewers to validate and agree on refinements to the assessment method. A key focus of these reviews was to establish ways to validate the outcomes and gain confidence in the computational fluid dynamics (CFD) modelling.

4. Assessment Approach

The assessment approach and outcomes for the various specific assessments undertaken are summarised in the following sections, with the outcomes presented in Section 5. Synthesis of these outcomes to draw overall conclusions is made in Section 7.

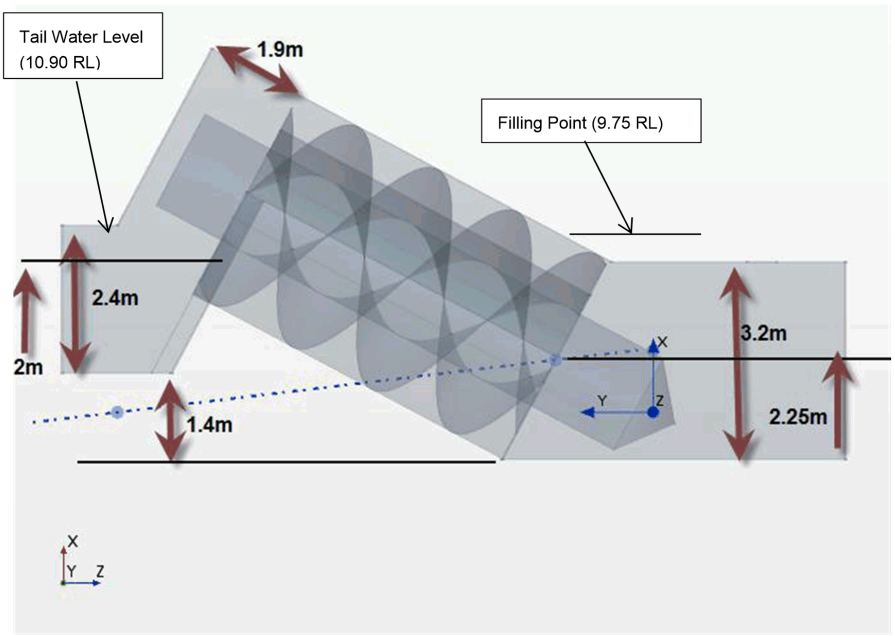
Key CFD modelling parameters that were adopted include:

- Screw rotational speed of 22 r.p.m. as this was the original design speed. Subsequent site checking of speeds demonstrated some minor variance from this value
- Inlet water level used is the "filling point" level for the screw for the current arrangement of RL 9.75, as this level gives the greatest load. When the water level is higher, there is less work as there is less lifting required. When the water level is lower, there is less work as there is less water in the screw
- Discharge water level used is the "maximum tail water" level for the screw for the original design arrangement of RL 10.90, as this level is highest level at which full pump capacity is achieved and that required to get back to pre-earthquake performance

4.1 Hydraulic Limits

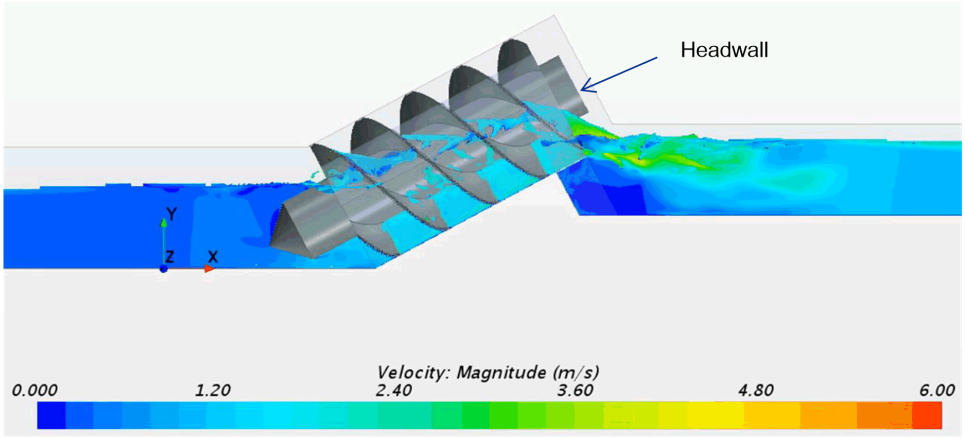
CFD analysis was undertaken for extension lengths of 0.3m then 0.9m (along the shaft direction) to progressively learn about the likely hydraulic limit for discharge of flows from the screw into the discharge structure. The 0.3m extension represents a 0.15m vertical lift and is sufficient to restore the discharge height to pre-earthquake levels. The general arrangement of the 5 m^3/s screw as modelled is presented in Figure 2.

Figure 2 : CFD model design water levels and general arrangement for the 5 m^3/s screw with 0.3m extension



The initial CFD run at 0.3m extension demonstrated that the "throw" of the water into the discharge structure under design conditions is easily accommodated. The second CFD run at 0.9m extension demonstrated that the "throw" of the water under design conditions is still easily accommodated within the discharge structure. A cross section of the CFD model output for the 0.9m extension is presented in Figure 3.

Figure 3 : Cross section of water profile during operation of the 5 m³/s screw with 0.9m extension



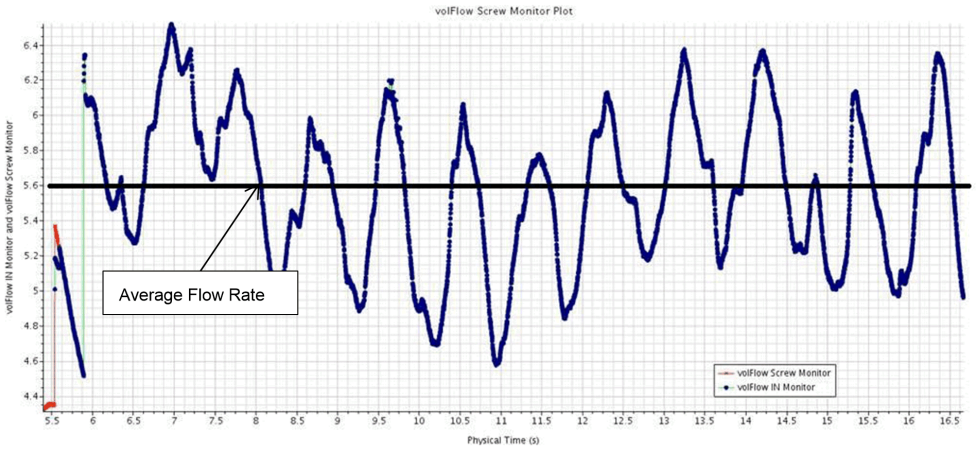
Visual assessment of the cross section presented in Figure 3 identifies that there is still space between the discharged flow and the concrete headwall, suggesting further extension is possible before a hydraulic constraint is incurred.

By agreement with Council, further optimisation of the maximum possible extension length has been deferred until if and when Council decides to proceed with an upgrade beyond restoration to pre-earthquake conditions. Based on work undertaken to date, it appears that an extension of 1.2m may be possible, equivalent to a 0.6m vertical lift to RL11.35, or 0.45m increase over pre-earthquake conditions and this value has been considered as the interim hydraulic limit as discussed in Section 5.

4.2 Hydraulic Capacity

CFD modelling of the screw physical arrangement demonstrated that the hydraulic capacity of the 5 m³/s screw is actually closer to 5.6 m³/s. In addition it demonstrated cyclic variability in the delivered flow rate, which is to be expected due to the discharge pulsing with passing of each of the three flights. The flow performance predicted by CFD modelling with 0.9m extension model is presented in Figure 4.

Figure 4 : Flow performance predicted by CFD modelling with 0.9m extension



In order to validate CFD model outputs, we requested Landustry to review pump performance using current design software for the current installation with proposed extensions for both the 5 m^3/s and 3 m^3/s screws. Landustry determined a revised capacity of 5.5 m^3/s and 3.3 m^3/s for these screws respectively. It is considered this strongly correlates with CFD modelling outputs.

Rotational speed checks were undertaken at the station to confirm design inputs, which demonstrated a slight variance from design speeds, with 22.6 rpm for the northernmost 5.5 m^3/s screw and 21.4 rpm for the southernmost 5.5 m^3/s screw. The small screw operated at 25.9 rpm. In reality therefore, actual performance will differ slightly from that as modelled by CFD.

Consideration of how the pump discharge capacity could be increased was beyond the scope of this assessment. However; we note that this could be achievable by increasing the screw rotational speed but that the increases achievable are likely to be limited due to increased inefficiencies resulting from boundary friction, turbulence, splash and spillage. Further stress would also be placed on the drive units and the screw itself. Further specific assessment would be required if an increase in discharge rate were to be pursued.

As an outcome of the work described above, it is recommended that 5.5 m^3/s and 3.3 m^3/s should be used for the screw capacities for any further hydraulic analysis until such time as a preferred screw upgrade arrangement is identified.

4.3 Torque Increase with Flight Extension

Due to the complexity of assessing the performance and input torque of a screw pump, a combination of approaches were used to derive likely shaft input torques for the various extension lengths considered.

The principle basis has been the use of CFD modelling for the 5.5 m^3/s screw with a 0.3m extension to establish predicted required shaft input torque. This was validated by seeking a parallel resign review by Landustry, which confirm predicted required shaft input torques approximately 13% lower than the peak shaft input torques derived by CFD modelling. Acknowledging that the Landustry design assumes a free outfall, the CFD results were used due to them being more representative of the design tail water conditions.

A first principles approach was then used to derive the work effort required to lift the designated flow the design lift, i.e.: for the 5.5 m^3/s pump, lifting 5.5 m^3 of water every second the height from the filling point to the maximum pumping point. An adjustment factor was then developed to calibrate with the CFD model outputs for the 0.3m extension. This factor takes account of uncertainties including inefficiencies at entry and exit of the screw, shear and friction.

The derived relationship including calibration factor was then used to assess the increasing torque requirements with increasing extension length. This approach was used for both the 5.5 m^3/s and 3.3 m^3/s screws.

The CFD shaft input torque plots for the 5.5 m^3/s and 3.3 m^3/s screws are presented in Figure 5 and Figure 6 respectively. The CFD derived shaft torque for the 0.3m extension used to calibrate the first principles design approach is shown in Figure 5 and the shaft torque determined using the first principles design approach for the 0.9m extension is shown in Figure 6.

It should be noted that the CFD modelling for the 0.3m extension assumes that the bottom 300mm of flights are left on the screw.

Figure 5 : Shaft input torque for 5.5 m³/s screw with 0.3m extension

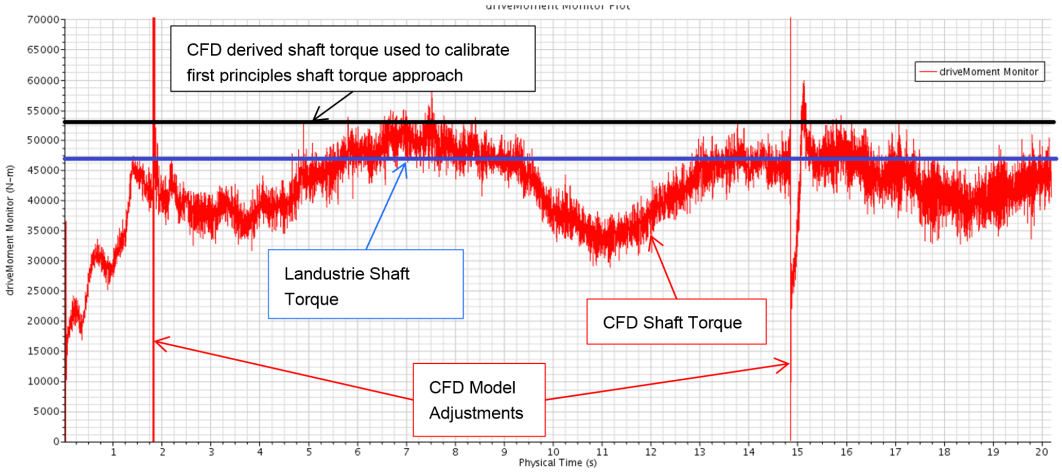
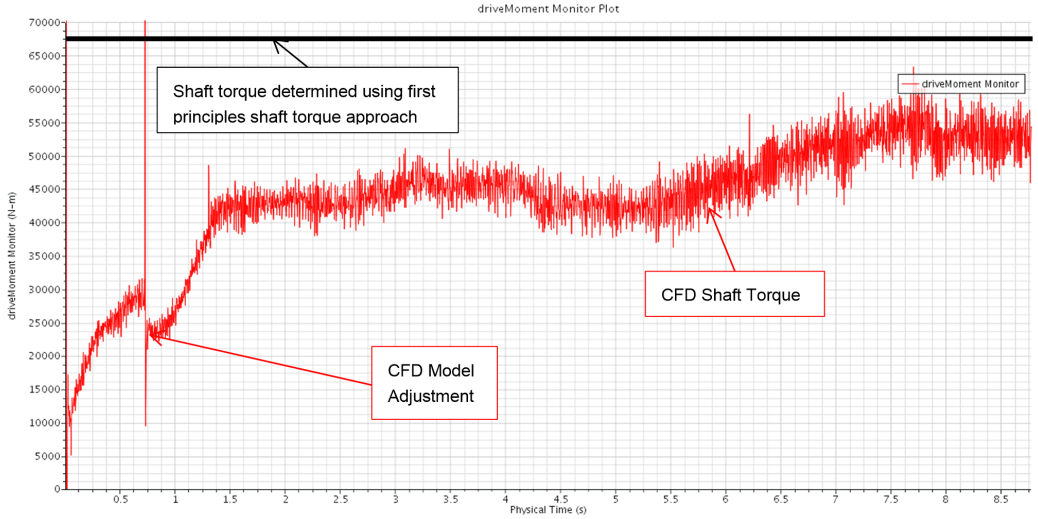


Figure 6 : Shaft input torque for 5.5 m³/s screw with 0.9m extension



To identify the required input torques or capacity for upstream mechanical components, conventional and typical mechanical engineering efficiency factors for the associated plant were applied, to account for the minor losses incurred through the gearbox, the belt drive and the fluid coupler (if adopted). Fluid coupler efficiencies have not been included at this stage since a clutch may be utilised as is currently the case on the 5.5 m^3/s diesel engines and no fluid coupler on the small screw as is currently the case on the 3.3 m^3/s electric motor.

Sizing and selection of appropriate gearbox and drive units then require application of a service factor to the design inputs, which apply a level of conservatism based upon the significance of the application, how dynamic the loading is and the ability of the drive train component to accommodate such loading. In this case, we have sourced and applied the original Hansen gearbox service factor recommendations assuming infrequent use, high reliability required and the screw is reasonably cyclic in its loading range.

The resulting preliminary design shaft input torques for both the 5.5 m^3/s screw and 3.3 m^3/s screw, drive train component efficiencies and recommended services factors are presented in Table 1.

Table 1 : Shaft torque inputs for gearbox, belt drive and drive unit for 5.5 m^3/s screw and 3.3 m^3/s screw

Power Requirements for 5.5 m3/s Screw

Option	Screw Shaft Power [2]	Gearbox Efficiency [3]	Gearbox Service Factor [4]	Gearbox Selection Power [5]	Belt/Clutch Drive Efficiency [6]	Engine Service Factor [7]	Engine Selection Power [8]
Existing , no change	111 kW	97%	1.2	138 kW	90%	1.1	140 kW
300mm extension	124 kW	97%	1.6	205 kW	90%	1.1	157 kW
900mm extension - Diesel [1]	149 kW	97%	1.6	246 kW	90%	1.1	188 kW
900mm extension - Electric [1]	149 kW	97%	1.25	192 kW	90%	1.1	188 kW
Method	a	b	c	d = a*c/b	e	f	g=a*f/b/e

Notes

[1] Assumes no removal of flights at base of screw
[2] Uses energy calculation on lift, calibrated using CFD outputs and Landustrie software
[3] Supplied by Sumitomo-Hansens
[4] 1.2 = existing SF, 1.25 = SF electric. 1.6 = SF for diesel. Numbers based off supplier recommendations for load type/frequency
[5] Selection power for gearbox, existing = 138kW nominal
[6] 95% efficiency typical, but have deep belts at high load, so higher losses
[7] Service factor to ensure motor has sufficient capacity long term
[8] Selection power for engine, existing diesel = 153kW nominal

Power Requirements for 3.3 m3/s Screw

Option	Screw Shaft Power [2]	Gearbox Efficiency [3]	Gearbox Service Factor [4]	Gearbox Selection Power [5]	Belt/Clutch Drive Efficiency [6]	Engine Service Factor [7]	Engine Selection Power [8]
Existing , no change	65 kW	97%	1.25	84 kW	90%	1.15	86 kW
300mm extension	73 kW	97%	1.25	94 kW	90%	1.15	96 kW
900mm extension - Diesel [1]	88 kW	97%	1.75	159 kW	90%	1.15	116 kW
900mm extension - Electric [1]	88 kW	97%	1.25	113 kW	90%	1.15	116 kW
Method	a	b	c	d = a*c/b	e	f	g=a*f/b/e

Notes

[1] Assumes no removal of flights at base of screw
[2] Uses energy calculation on lift, calibrated using CFD outputs and Landustrie software
[3] Supplied by Sumitomo-Hansens
[4] S.F. (existing) = 1.6, S.F. (diesel) = 1.75, S.F. (electric) = 1.25. Numbers based off supplier recommendations for load type/frequency
[5] Selection power for gearbox, existing = 84kW nominal
[6] 95% efficiency typical, but have deep belts at high load, so higher losses
[7] Service factor to ensure motor has sufficient capacity long term
[8] Selection power for motor, existing = 90kW nominal

With regards to Table 1 it is noted that for the 0.3m extension, the load increase can be counteracted by removal of 0.3m of flight from the lower end of the screw. This is because the overall work done by the screw on the lifted water remains identical to the pre-earthquake setting. Similarly, we can reduce the torque load on all extension options by removal of some of the flights from the lower end of the screw. The resulting torque loadings are presented for both scenarios in Section 5.

4.4 Capacity of Existing Drive Train Components

Assessment of the existing drive train components is required to determine the extent to which lift height upgrading is achievable before drive train components require upgrading. The method used to assess each component and outcomes are discussed below:

4.4.1 Gearbox

Technical specifications were tracked down for the current gearboxes, which coupled with stamped name plates enabled identification of the original design service factors and resulting rated capacity at that service factor. These are presented in Table 2.

Table 2 : Existing Gearbox Performance

Gearbox	Model	RPM Ratio	Nominal Capacity	Service Factor	Rated Capacity
Drive #1 5.5 m3/s	NK33-ARNY-31.5	700/22	138 kW	1.2	115kW
Drive #2 5.5 m3/s	NK33-ARNY-31.5	700/22	138 kW	1.2	115kW
Drive #3 3.3 m3/s	NG33-ANNY-35.5	970/26.7	84 kW	1.6	54 kW

We note that subsequent assessment of torque load of 65 kW for the current 3.3 m^3/s screw arrangement are considerably greater than the rated capacity of 54 kW, indicating the current service factor is closer to 1.30.

4.4.2 Belt Drive

No formal assessment of capacity was undertaken for the reason that belt drive selection is likely to have matched overall design approach, suggesting that if upgrading of gearbox or drive unit were required then the belt drive would also require upgrading.

4.4.3 Electric Motor for 3.3 m^3/s screw

The name plate on this motor provides motor capacity and additional information as summarised in Table 3.

Table 3 : 3.3 m^3/s screw electric motor characteristics

Electric motor	RPM (Nominal)	Poles	Nominal Capacity
3.3 m3/s screw	1000	6	90 kW

Previous condition reviews have identified that the electrical control and main switch board servicing the 3.3 m^3/s screw is at the end of its useful life and in need of replacement to enable reliable operation.

4.4.4 Diesel drive units for 5.5 m^3/s screw

The diesel drive units for the 5.5 m^3/s screws are approximately 70-years old and while they have stamped name plates, there is uncertainty on the output torque they are capable of reliably delivering due to their age. Information known is summarised in Table 4.

Table 4 : Diesel drive unit information

Diesel Motor	Rated RPM	Nominal Rated Capacity	Service Factor	Proposed Rated Capacity
5.5 m3/s Screw	680	153 kW	1.1	139 kW

We note that the service factor used in Table 4 has been applied based on judgement to account for the uncertainty of the output capacity of the old diesel units.

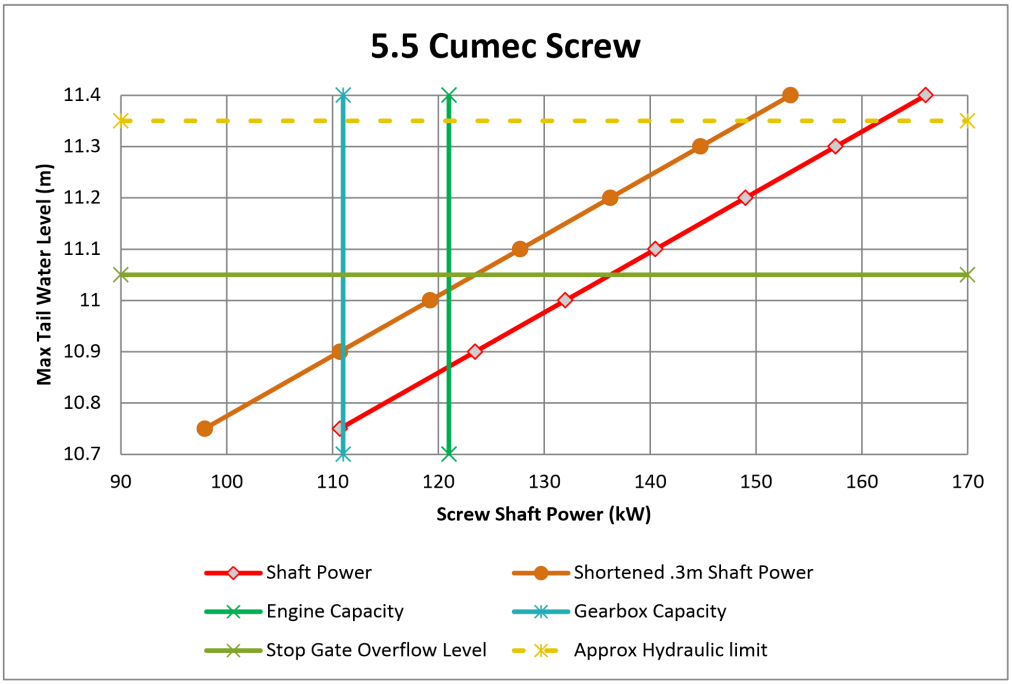
Discussion with City Care operations staff indicate that the diesel drive units are not reliable, with skilled staff required to start them. During one of our site visits one could not be started. Replacement of the diesel drive units and the current cooling system is considered necessary to enable reliable operation.

5. Assessment Outcomes

Synthesis of the rated capacity of the existing drive train components and the design torque required for the possible extensions considered has resulted in development of the pump lift height / torque load relationship as presented in Figure 7 for the 5.5 m^3/s screw and in Figure 8 for the 3.3 m^3/s screw.

The gearbox and engine capacities shown are the available power at the screw shaft, after taking into account their rated capacity and the efficiency of the drive train components between them and the screw.

Figure 7 : Pump lift height / torque load relationship for 5.5 m^3/s screw

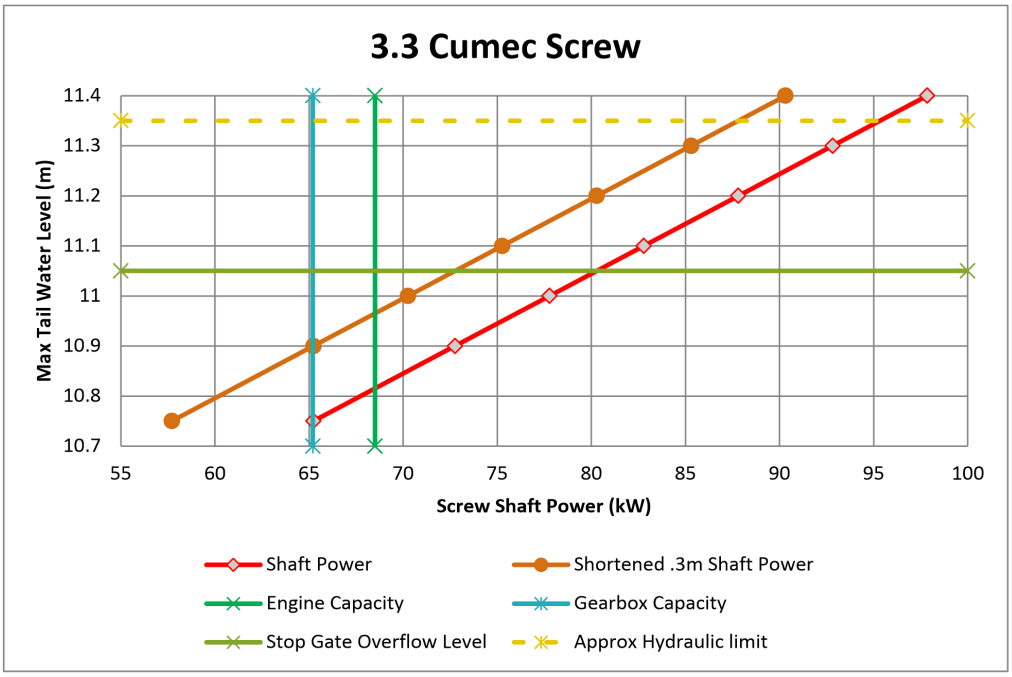


The hydraulic limit noted above is the maximum tail water level that would be achieved with a 1.2m screw extension, if that were confirmed feasible.

With regards to Figure 7 the following outcomes are highlighted:

- Restoring to pre-earthquake lift capacity to RL 10.90 is achievable with a 0.3m screw extension, without upgrading of gearbox, belt drive or diesel motor **if** the lower 0.3m of screw is removed. However due to the condition of the diesel drive units, their replacement would significantly increase reliability. If the lower 0.3m of screw is not removed then upgrading of gearbox, belt drive and diesel drive unit is required.
- Restoring to the design intent of a 50-year high water level, now RL 11.20, is achievable with a 0.9m screw extension and requires upgrading of gearbox, belt drive and diesel drive units plus an increase in the height of the back-flow gate structure to prevent overflow and short circuiting.
- Increasing the lift capacity beyond the original design intent of a 50-year high water level is expected to be achievable and requires upgrading of gearbox, belt drive and diesel drive units plus an increase in the height of the back-flow gate structure to prevent overflow and short circuiting.

Figure 8 : Pump lift height / torque load relationship for 3.3 m³/s screw



The hydraulic limit noted above is the maximum tail water level that would be achieved with a 1.2m screw extension, if that were confirmed feasible.

With regards to Figure 8 the following outcomes are highlighted:

- Restoring to pre-earthquake lift capacity to RL 10.90 is achievable with a 0.3m screw extension, without upgrading of gearbox, belt drive or electric motor if the lower 0.3m of screw is removed. However due to the age of the MSB, replacement would significantly increase reliability. If the lower 0.3m of screw is not removed then upgrading of the MSB, gearbox, belt drive and electric motor is required.
- Restoring to the design intent of a 50-year high water level, now RL 11.20, is achievable with a 0.9m screw extension requires upgrading of the MSB, gearbox, belt drive and electric motor plus an increase in the height of the back-flow gate structure to prevent overflow and short circuiting.
- Increasing the lift capacity beyond the original design intent of a 50-year high water level is expected to be achievable and requires upgrading of the MSB, gearbox, belt drive and electric drive units plus an increase in the height of the back-flow gate structure to prevent overflow and short circuiting.

6. Upgrade Options

6.1 Increasing lift capacity

A. (1) Restore to pre-earthquake lift capacity – excluding reliability upgrade

The minimum work required to achieve pre-earthquake lift capacity is a 0.15m lift to maximum tail water level of RL10.90 and includes:

- 0.3m screw and trough extension with 0.3m screw removal at base on all screws

A. (2) Restore to pre-earthquake lift capacity – including reliability upgrade

The additional works required to achieve pre-earthquake lift capacity **and** increase reliability to acceptable levels includes the following:

- For 5.5 m3/s screws - replacement diesel drive with new belt drive and/or 2:1 reduction gearbox to enable retention of existing gearbox
- For 3.3 m3/s screw – retain electric motor, belt drive and starter, replace MSB, instrumentation, controls

B. Restoring to the design intent of a 50-year high water level – including reliability upgrade

The minimum work required to achieve the design intent of a 50-year high water level is a 0.45m lift to maximum tail water level of RL11.20 includes the following:

- 0.9m screw and trough extension on all screws
- For 5.5 m3/s screws - replacement diesel drive, belt drive and gearbox
- For 3.3 m3/s screws – replacement electric motor, belt drive, gearbox, soft starter, MSB and instrumentation and controls

As existing drive train and electric components would all be replaced, reliability upgrading would be achieved.

If this option is to be progressed, the following additional assessment is required:

- assess torque loads for maximum tail water level of RL11.20 and a maximum pumping level of RL11.50
- review of drive train equipment capacity and selection
- structural assessment of the screw shaft undertaken using finite element analysis

C. Increasing the lift capacity beyond the original design intent of a 50-year high water level – including reliability upgrade

The minimum work required to achieve a lift capacity beyond the original design intent of a 50-year high water level is a lift greater than 0.45m lift and maximum tail water level of RL11.20. Replacement drive train and electric components would be required as for Option B, with increase in capacity dependent upon the scale of extension determined feasible. Reliability upgrading would be achieved as a result of these replacements.

An extension of 1.2m that would achieve a lift of 0.6m and maximum tail water level of RL 11.35 has been assessed as being potentially achievable and is recommended as the target extension if this option is to be progressed. If an extension of 1.2m is to be considered, the additional assessment required is the same as for Option B.

6.2 General asset maintenance works

General asset maintenance works are recommended irrespective of the lift capacity option adopted and whether or not reliability upgrades are undertaken. Works required include:

- Provide safe all-weather site access - requires raising bunds around both sides of the connecting waterway between the pump station and New Brighton Road to a minimum of RL 11.5m and potentially raising of site access road
- Avoid backflow and recirculation – requires raising the backflow gates structure sill level from the present sill level of RL 11.10m to RL 11.50m and maintenance of flap gates
- General building maintenance - maintenance and safety items on pump station building as identified during early investigations
- Periodic screw maintenance - Inspection and/or replacement of bottom bearings on the 5.5 m^3/s screws

6.3 Cost estimates

Cost estimates to implement lift capacity upgrade options as well as the common upgrade works required are summarised in Table 5 and presented in detail in Appendix A.

A cost estimate for the larger upgrade option using electric motors rather than diesel motors was prepared however this is significantly more expensive with little additional benefit. Operation and maintenance costs are likely to be similar as diesel as prime power requires 2 diesel engines and electric as prime power requires 1 large standby diesel generator. The diesel drive option is reported in Table 5 below.

It is noted that the cost estimate for option c with a 1.2m extension as evaluated and described above assumes a nominal 10% increase in capacity required and therefore costs of equipment, as no formal assessment of this option has been undertaken. Accordingly, the cost estimate for this option is indicative only and subject to further detailed assessment if option c is to be pursued.

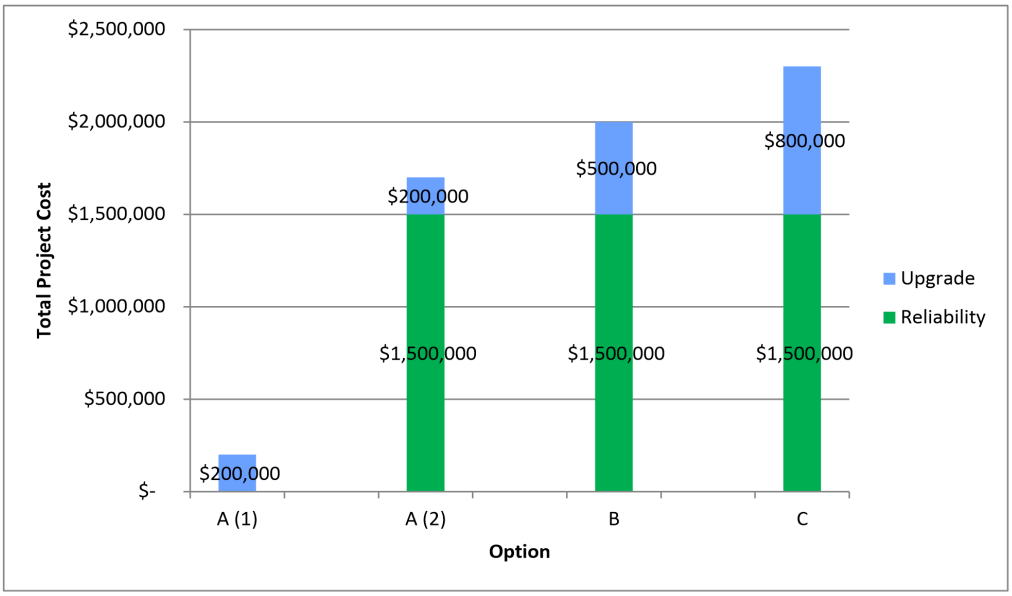
Table 5 : Upgrade cost estimates

Option	Description	Project Cost Estimate
A (1)	Restore to pre-earthquake lift capacity - 0.3m screw and trough extension	$0.2M
A (2)	Restore to pre-earthquake lift capacity plus reliability upgrades and general asset maintenance – 0.3m screw and trough extension – replace 2 diesel motors, electrical MSB, instrumentation and controls, ancillary building improvements and maintenance and external civil works	$1.7M
B	Restore to original design operational performance plus reliability upgrades and general asset maintenance – 0.9m extension – replace 2 diesel motors, electrical MSB, instrumentation and controls, ancillary building improvements and maintenance and external civil works	$2.0M
C	Increasing the lift capacity beyond original design operational performance plus reliability upgrades and general asset maintenance - 1.2m screw and trough extension - replace 2 diesel motors, electrical MSB, instrumentation and controls, ancillary building improvements and maintenance and external civil works	$2.3M

The above costs are exclusive of GST, but inclusive of construction cost contingencies, Contractors overhead and profit, design and construction management and escalation to September 2017. Refer detailed preliminary cost estimates attached in Appendix A.

These costs are also presented graphically in Figure 9, with the minimum reliability upgrade costs shown in blue to demonstrate the proportion of overall upgrade costs that associated with reliability upgrading.

Figure 9 : Upgrade costs for options showing reliability upgrade component



Note:

- Option A (1) has lift capacity to RL10.9
- Option A (1) has lift capacity to RL10.9 and includes reliability upgrading
- Option B has lift capacity to RL11.2
- Option C has lift capacity to RL11.35

6.4 Comparison of Options

6.4.1 Option A (1) – Return to pre-earthquake discharge height without reliability upgrading

This option is the simplest way to get the pump station back to the pre-earthquake discharge lift height. The cost to achieve this is not significant and relatively certain. It would also give an opportunity for some minor maintenance to occur at the same time while each screw is not operational.

However, the existing diesel engines are 70 years old, and have the expected issues associated with such age, including unreliability, difficulty in sourcing spare parts and shortage of trained operators. The existing MSB and instrumentation and controls are at the end of their life and need replacement. These asset upgrade items will still be required in the near future if not undertaken in conjunction with the screw upgrade project.

The adverse impact of this option is that it requires removal of the lower 0.3m of the screw flights, which reduces the level to which Horseshoe Lake can be lowered. This ability to lower the Lake further may become a useful attribute if additional storage was determined to be beneficial for catchment flood risk management.

6.4.2 Option A (2) – Return to pre-earthquake discharge height and undertake reliability upgrades

By extending the screw by 0.3m and replacing the existing diesel engines and electrical MSB, several issues are addressed. The unreliability of the diesel engines and the difficulty in starting them is eliminated, so the probability of the pump station not being operable during a flood event is greatly reduced. In addition, upgrading the electrical MSB and instrumentation and controls reduces the risk of failure of the smaller screw considerably.

Benefits include the cost efficiencies gained by combining the lift and asset upgrade works as well as that the lower portion of the screws are retained.

Adverse outcomes are that considerable expenditure is incurred with only limited lift height benefit gained.

6.4.3 Option B – Restoring to the design intent of a 50-year high water level and undertake reliability upgrades

This option will restore the pump station lift capacity to the original design intent, being a 50-year design flood event in the Avon River. Due to the increase in torque loads, all drive train components require replacement so reliability issues are resolved at the same time.

The key benefit is that the increased lift height is achieved for a relatively small marginal cost increase over the option of restoration of pre-earthquake lift height and minimum reliability upgrading.

6.4.4 Option C - Increasing lift capacity beyond original design intent of a 50-year high water level and undertake reliability upgrades

Assuming an extension of 1.2m is achievable, an extension of this amount will enable the pump station to continue discharging well beyond the original design intent of a 50-year high water level and provide considerable mitigation against the effects of sea level rise. As for Option B, upgrading of equipment due to increased loads also increases the reliability.

The key benefit is that the increased lift height and some defence against sea level rise is achieved for a relatively small marginal cost increase over the option of restoring to original design operational performance.

6.4.5 Qualitative comparative assessment

An assessment of the relative characteristics of the three upgrade options is provided in Table 6.

Table 6 : Upgrade Options Analysis

Objective	Option A (1) 0.3m extension RL 10.90 Without reliability upgrade	Option A (2) 0.3m extension RL 10.90 With reliability upgrade	Option B 0.9m extension RL 11.20	Option C 1.2m extension RL 11.35
Restore to pre-earthquake lift capacity	Yes	Yes	Yes	Yes
Restore to original design operational performance = 50-year high water	No	No	Yes	Yes
Accommodate > 50-year high water + some sea level rise	No	No	No	Yes
Asset reliability	Poor	Good	Good	Good
Cost	$0.2M	$1.7M	$2.0M	$2.3M

The following comments are made regarding Table 6:

- The extent to which option C provides accommodates flood events greater than a 50-year high water or sea level rise requires further assessment, however this option has potential to perform considerably better than others.
- The costs for options A (2), B and C are indicatively grouped as being of similar magnitude, however the relative value of options B and C are considerably greater given that they provide a considerable increase in defence against larger flood events and sea level rise than option A (2).

7. Conclusions

The assessment and evaluation of upgrade options and requirements presented above incorporates both land drainage recovery and routine asset upgrading, so that the real costs associated with both upgrading and maintaining the pump station in a fit-for-purpose state are recorded.

The technical analysis indicates that restoration to pre-earthquake discharge levels is readily achievable with only minor physical works and that a considerably greater upgrade in discharge height is feasible, subject to review of screw structural capacity which will be undertaken if the option of a more substantive upgrade is preferred.

The assessment has also highlighted the poor condition and low levels of reliability of the pump station, with replacement of the diesel drive units and the electrical MSB as major asset upgrade requirements.

If restoration only to pre-earthquake levels is determined appropriate and reliability and asset upgrading is not desired, then the lowest cost **Option A (1)** meets these requirements.

Implementation of **Option A (1)** requires the following:

a. Development of preliminary designs, materials specifications and supplier quotation documents to enable screw alterations to be undertaken

If the recommended reliability upgrades are considered essential then **Option C** is recommended as it provides a significant increase in pump station lift capacity and flood risk mitigation for a nominal $0.6M increase in cost over Option A (1).

If either **Option B** or **Option C** is implemented, then the following further assessment is required:

a. CFD model of agreed extension length (if longer than 0.9m) to confirm hydraulic feasibility and screw shaft torque loads
b. Undertake structural assessment of screws using finite element analysis to confirm adequacy
c. Discuss and agree with Council the additional safety factors that should be applied in sizing of drive train components, to provide increased reliability
d. Discuss and agree with Council their preferred drive units (diesel or electric), with the current nominal recommendation being diesel units for the 5.5 m^3/s screws and electric motor for the 3.3 m^3/s screw
e. Resize and selected appropriate drive train components
f. Develop preliminary design, detailed design, material specifications and tender documentation to enable market quotations to be gained

Appendix A. Cost Estimates

PS205 Lift Upgrade Options Cost Estimates

By Matt Sheppard
Date 1-Dec-16
Rev 11
Review James Channell

Notes
PS205 upgrade involves extending the screw flygts and underchannel, plus associated upgrades to drive trains and electrical components.
Cost estimates are prepared for two extension lengths, 300mm and 900mm.
Equipment selection is based upon derived loads incorporating industry accepted service factors, as detialed in the options assessment report.
Pricing has been sought for nominal equipment selections fromreputable industry suppliers, while installation and civil costs have been developed based anticipated work effort.
It is expected that the preferred option will be subsequently reviewed in detail to select specific equipment and cost estimates will be revised at that time.

Option A (1) - 300mm extension option - with 300mm removed from lower screw and no asset upgrade
Assume lower 300mm of flygt ***is*** *removed from screws*
Assume all drive components are unchanged
Asumme no asset upgrades are undertaken
Assume screw extension done in place.
Assume re-use of existing fuel storage and supply system.

Item	Description	Quantity	Unit cost	Total	Notes
Screw extensions					
	Replace Bottom Bearings	2	$5,000	$10,000	Estimate. 3.3 m3/s screw bearing done in recent times.
	Extend flights of 3 screws	3	$15,000	$45,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
	Extend 3 Troughs	3	$15,000	$45,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
	Temporary Works	1	$20,000	$20,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works

Construction Cost Subtotal				**$120,000**	
	Construction Works Contingency	20%		$24,000.00	
Construction Cost Total				**$144,000**	
	Preliminaries & General	10%		$14,400	
	Overheads & Profit (Builder's Margin)	8%		$11,520	
	Engineer's Design, Procurement and Construction Management	15%		$21,600	Complex works
	Cost Esclation til September 2017	6%		$8,640	
Project Cost Estimate				**$200,000**	

Option A (2)- 300mm extension option - 300mm not removed from lower screw and reliability and asset upgrade undertaken
Assume lower 300mm of flygt ***not*** *removed from screws*
Assume new gearbox for 5.5 m3/s screws and reuse of old gearbox for 3.3 m3/s screw
Assume new diesel drive for 5.5 m3/s screws due to reliability and new electric motor for 3.3 m3/s screws due to capacity
Assume replacement of MSB for 3.3 m3/s screw due to age
Assume screw extension done in place
Assume re-use of existing diesel drive units fuel storage and supply system

Item	Description	Quantity	Unit cost	Total	Notes
Mechanical and Electrical Supply Items					
	5.5 m^3/s screw gearbox - 200kW	2	$100,000	$200,000	Based on Maud Kirk quote of $80k, but depends on final selection and exchange rate
	Belt Drives	3	$5,000	$15,000	Based on Maud Kirk quote of $4k, but depends on final selection and exchange rate
	Fluid Coupler or Clutch	2	$15,000	$30,000	
	3.3 m^3/s switchboard incl. power factor correction	1	$80,000	$80,000	Estimate by Mike Swan
	Diesel engines (160kW) for 5.5 m3/s screw incl. speed controls	2	$40,000	$80,000	Gough CAT estimate $30K indicative
	Electric motor (95kW) for 3.3m^3/s screw	1	$10,000	$10,000	Based on ABB quote of $8.2k for 90kW motor, depends on final selection and exchange rate
Mechanical and Electrical Installation Items					
	Removal of old equipment	1	$20,000	$20,000	Estimate
	Demolish/form new equipment mounts/plinths	2	$10,000	$20,000	Estimate
	Instal gearbox and belt drive	2	$10,000	$20,000	Estimate
	Install new diesel engine	2	$10,000	$20,000	Estimate
	Install Diesel Cooling system	2	$15,000	$30,000	Estimate. Need to decide on approach (water cool vs air cool)
	Install electric motor for 3.3 m3/s screw	1	$10,000	$10,000	Estimate
	Install MSB for 3m3/s screw, incl. cabling	1	$50,000	$50,000	Estimate
	Replace level controls, PLC, radio network, wiring	1	$50,000	$50,000	Estimate
	Commissioning	1	$20,000	$20,000	Estimate
Screw extensions					
	Replace Bottom Bearings	2	$5,000	$10,000	Estimate. 3.3 m3/s screw bearing done in recent times.
	Extend flights of 3 screws	3	$15,000	$45,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
	Extend 3 Troughs	3	$15,000	$45,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
	Temporary Works	1	$15,000	$15,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
Building Works					
	Raise ground level for entry, around site, on north bank and to New Brighton Road	1	$50,000	$50,000	Rough estimate - further assessment required
	Reseal raised access	1	$50,000	$50,000	Rough estimate - further assessment required
	Raise backflow sill level	1	$50,000	$50,000	Rough estimate - further assessment required
	Maintenance and safety items on pump staiton building	1	$50,000	$50,000	Rough estimate - further assessment required
	Minor Upgrades to the building structure.	1	$50,000	$50,000	Estimate based on Mike Swan e-mail and on site photos only.
Construction Cost Subtotal				**$1,020,000**	
	Construction Works Contingency	20%		$204,000	
Construction Cost Total				**$1,224,000**	
	Preliminaries & General	10%		$122,400	
	Overheads & Profit (Builder's Margin)	8%		$97,920	
	Engineer's Design, Procurement and Construction Management	15%		$183,600	Complex with multiple work interfaces
	Consent and Approvals	3%		$36,720	Uncertaint of consents required
	Cost Esclation til September 2017	6%		$73,440	
Project Cost Estimate				**$1,700,000**	

Option B (1) - 900mm extension option - diesel drive for 5.5 m³/s screws and electric drive for 3.3 m³/s screw
Assume lower 300mm of flygt ***not*** *removed from screws*
Assume reuse of large gearbox for small screw.
Assume replacement of Diesel Engines for 5.5 m3/s screw due to unreliability.
Assume replacement of MSB for 3.3 m3/s screw due to age.
Assume replacement of electric motor on 3.3m3/s screw due to capacity.
Assume screw extension done in place.
Assume re-use of existing fuel storage and supply system.

Item	Description	Quantity	Unit cost	Total	Notes
Mechanical and Electrical Supply Items					
	5.5 m^3/s screw gearbox - 255kW	2	$120,000	$240,000	Based on Maud Kirk quote of $80k, but depends on final selection and exchange rate
	Belt Drives	3	$5,000	$15,000	Based on Maud Kirk quote of $4k, but depends on final selection and exchange rate
	Fluid Coupler or Clutch	2	$15,000	$30,000	
	3.3 m^3/s switchboard incl. power factor correction	1	$80,000	$80,000	Estimate by Mike Swan
	Diesel engines (190kW) for 5.5 m3/s screw incl. speed controls	2	$50,000	$100,000	Gough CAT estimate $30K indicative
	Electric motor (115kW) for 3.3m^3/s screw	1	$15,000	$15,000	Based on ABB quote of $8.2k for 90kW motor, depends on final selection and exchange rate
	Soft starter for 3.3m3/s screw	1	$15,000	$15,000	
Mechanical and Electrical Installation Items					
	Removal of old equipment	1	$10,000	$10,000	Estimate
	Demolish/form new equipment mounts/plinths	3	$10,000	$30,000	Estimate
	Instal gearbox and belt drive	3	$10,000	$30,000	Estimate
	Install new diesel engine	2	$10,000	$20,000	Estimate
	install Diesel Cooling system	2	$15,000	$30,000	Estimate. Need to decide on approach (water cool vs air cool)
	Install electric motor for 3.3 m3/s screw	1	$5,000	$5,000	Estimate
	Install MSB for 3m3/s screw, incl. cabling, testing, precommisioning, co	1	$50,000	$50,000	Estimate
	Replace level controls, PLC/RTU, radio network, UPS	1	$50,000	$50,000	Estimate
	Commissioning	1	$30,000	$30,000	Estimate
Screw Extensions					
	Replace Bottom Bearings	2	$5,000	$10,000	Estimate. 3.3 m3/s screw bearing done in recent times.
	Replace Top Coupler to Gearbox	3	$5,000	$15,000	Estimate
	Extend flights of 3 screws	3	$25,000	$75,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
	Extend 3 Troughs	3	$25,000	$75,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
	Temporary Works	1	$20,000	$20,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
Building Works					
	Raise ground level for entry, around site, on north bank and to New Brighton Road	1	$50,000	$50,000	Rough estimate - further assessment required
	Reseal raised access	1	$50,000	$50,000	Rough estimate - further assessment required
	Raise backflow sill level	1	$50,000	$50,000	Rough estimate - further assessment required
	Maintenance and safety items on pump station building	1	$50,000	$50,000	Rough estimate - further assessment required
	Minor Upgrades to the building structure.	1	$50,000	$50,000	Estimate based on Mike Swan e-mail and on site photos only.
Construction Cost Subtotal				**$1,195,000**	
	Construction Works Contingency	20%		$239,000	
Construction Cost Total				**$1,434,000**	
	Preliminaries & General	10%		$143,400	
	Overheads & Profit (Builder's Margin)	8%		$114,720	
	Engineer's Design, Procurement and Construction Management	15%		$215,100	Complex with multiple work interfaces
	Consent and Approvals	3%		$43,020	Uncertaint of consents required
	Cost Esclation til September 2017	6%		$86,040	
Project Cost Estimate				**$2,000,000**	

Option B (2) - 900mm extension option - electrive drive for 5.5 m³/s screws and electric drive for 3.3 m³/s screw
Assume lower 300mm of flygt ***not*** *removed from screws*
Assume reuse of large gearbox for small screw
Assume replacement of MSB for 3.3 m3/s screw due to age, but incoporatde into new MSB for all eletric motors
Assume replacement of electric motor on 3.3m3/s screw due to capacity
Assume replacement of Diesel Engines with Electric Motors for 5.5 m3/s screws.
Assume screw extension done in place
Assume re-use of existing fuel storage and supply system
Acoustically treated building not required for standby generator due to separation from residential houses

Item	Description	Quantity	Unit cost	Total	Notes
Mechanical and Electrical Supply Items					
	5.5 m^3/s screw gearbox - 255kW	2	$120,000	$240,000	Based on Maud Kirk quote of $80k, but depends on final selection and exchange rate
	Belt Drives	3	$5,000	$15,000	Based on Maud Kirk quote of $4k, but depends on final selection and exchange rate
	Fluid Coupler or Clutch	2	$15,000	$30,000	
	MSB for all electric motors	1	$120,000	$120,000	Estimate
	Electric motors (190kW) for 5.5m3/s screw	3	$35,000	$105,000	Carry spare as 6-pole motors are not stock items. Based on ABB quote of $13.5k for 150kW motor, depends on final selection and exchange rate. Maud Kirk quoted $35k for 185kW. Extra for spare.
	Electric motor (115kW) for 3.3m^3/s screw	1	$15,000	$15,000	Based on ABB quote of $8.2k for 90kW motor, depends on final selection and exchange rate
	VSD - 150kW	2	$30,000	$60,000	Based on Maud Kirk quote of $32k for 200kW
	VSD - 100kW	1	$25,000	$25,000	Based on Maud Kirk quote of $32k for 200kW
	Harmonic filters due to VSDs	1	$50,000	$50,000	Estimate
	Diesel standby generator - 750kW in weatherproof housing	1	$200,000	$200,000	Gough CAT estimate $130K indicative and without canopy
Mechanical and Electrical Installation Items					
	Removal of old equipment	1	$10,000	$10,000	Estimate
	Demolish/form new equipment mounts/plinths	3	$10,000	$30,000	Estimate
	Instal gearbox and belt drive	3	$10,000	$30,000	Estimate
	Install standby diesel generator	1	$20,000	$20,000	Estimate
	Install electric motor for 3.3 m3/s screw	1	$5,000	$5,000	Estimate
	Install MSB , incl. cabling, testing, precommisioning, commissioning, cab	1	$100,000	$100,000	Estimate
	HVAC to electrical room	1	$25,000	$25,000	Estimate
	Replace level controls, PLC, radio network, wiring	1	$50,000	$50,000	Estimate
	Install new distribution transformer (750kW)	1	$40,000	$40,000	Price from Etel $33K supply)
	Commissioning	1	$30,000	$30,000	Estimate
Screw extensions					
	Replace Bottom Bearings	2	$5,000	$10,000	Estimate. 3.3 m3/s screw bearing done in recent times.
	Replace Top Coupler to Gearbox	3	$5,000	$15,000	Estimate
	Extend flights of 3 screws	3	$25,000	$75,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
	Extend 3 Troughs	3	$25,000	$75,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
	Temporary Works	1	$20,000	$20,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
Building Works					
	Raise ground level for entry, around site, on north bank and to New Brighton Road	1	$50,000	$50,000	Rough estimate - further assessment required
	Reseal raised access	1	$50,000	$50,000	Rough estimate - further assessment required
	Raise backflow sill level	1	$50,000	$50,000	Rough estimate - further assessment required
	Maintenance and safety items on pump staiton building	1	$50,000	$50,000	Rough estimate - further assessment required
	Minor Upgrades to the building structure.	1	$50,000	$50,000	Estimate based on Mike Swan e-mail and on site photos only.
Construction Cost Subtotal				**$1,645,000**	
	Construction Works Contingency	20%		$329,000	
Construction Cost Total				**$1,974,000**	
	Preliminaries & General	10%		$197,400	
	Overheads & Profit (Builder's Margin)	8%		$157,920	
	Engineer's Design, Procurement and Construction Management	15%		$296,100	Complex with multiple work interfaces
	Consent and Approvals	3%		$59,220	Uncertaint of consents required
	Cost Esclation til September 2017	6%		$118,440	
Project Cost Estimate				**$2,800,000**	

Option C - 1200mm extension option - diesel drive for 5.5 m^3/s screws and electric drive for 3.3 m^3/s screw
Assume nominal 10% increase in capacites and costs as NO technical assessment has been undertaken at this stage
Contingency increased from 20% to 25% to account for increased uncertainty on scope of works rquired at this stage
*Assume lower 300mm of flygt **not** removed from screws*
Assume reuse of large gearbox for small screw.
Assume replacement of Diesel Engines for 5.5 m3/s screw due to unreliability.
Assume replacement of MSB for 3.3 m3/s screw due to age.
Assume replacement of electric motor on 3.3m3/s screw due to capacity.
Assume screw extension done in place.
Assume re-use of existing fuel storage and supply system.

Item	Description	Quantity	Unit cost	Total	Notes
Mechanical and Electrical Supply Items					
	5.5 m^3/s screw gearbox - 280kW	2	$130,000	$260,000	Based on Maud Kirk quote of $80k, but depends on final selection and exchange rate
	Belt Drives	3	$7,500	$22,500	Based on Maud Kirk quote of $4k, but depends on final selection and exchange rate
	Fluid Coupler or Clutch	2	$15,000	$30,000	
	3.3 m^3/s switchboard incl. power factor correction	1	$80,000	$80,000	Estimate by Mike Swan
	Diesel engines (210kW) for 5.5 m3/s screw incl. speed controls	2	$60,000	$120,000	Gough CAT estimate $30K indicative
	Electric motor (130kW) for 3.3m^3/s screw	1	$20,000	$20,000	Based on ABB quote of $8.2k for 90kW motor, depends on final selection and exchange rate
	Soft starter for 3.3m3/s screw	1	$20,000	$20,000	
Mechanical and Electrical Installation Items					
	Removal of old equipment	1	$10,000	$10,000	Estimate
	Demolish/form new equipment mounts/plinths	3	$10,000	$30,000	Estimate
	Instal gearbox and belt drive	3	$10,000	$30,000	Estimate
	Install new diesel engine	2	$10,000	$20,000	Estimate
	install Diesel Cooling system	2	$15,000	$30,000	Estimate. Need to decide on approach (water cool vs air cool)
	Install electric motor for 3.3 m3/s screw	1	$5,000	$5,000	Estimate
	Install MSB for 3m3/s screw, incl. cabling, testing, precommisioning, co	1	$50,000	$50,000	Estimate
	Replace level controls, PLC/RTU, radio network, UPS	1	$50,000	$50,000	Estimate
	Commissioning	1	$30,000	$30,000	Estimate
Screw Extensions					
	Replace Bottom Bearings	2	$5,000	$10,000	Estimate. 3.3 m3/s screw bearing done in recent times.
	Replace Top Coupler to Gearbox	3	$5,000	$15,000	Estimate
	Extend flights of 3 screws	3	$30,000	$90,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
	Extend 3 Troughs	3	$30,000	$90,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
	Temporary Works	1	$30,000	$30,000	Lyttleton Engineering estimate $80K for 0.3m extn to screw and trough excluding temporary works
Building Works					
	Raise ground level for entry, around site, on north bank and to New Brighton Road	1	$50,000	$50,000	Rough estimate - further assessment required
	Reseal raised access	1	$50,000	$50,000	Rough estimate - further assessment required
	Raise backflow sill level	1	$50,000	$50,000	Rough estimate - further assessment required
	Maintenance and safety items on pump station building	1	$50,000	$50,000	Rough estimate - further assessment required
	Minor Upgrades to the building structure.	1	$50,000	$50,000	Estimate based on Mike Swan e-mail and on site photos only.
Construction Cost Subtotal				**$1,292,500**	
	Construction Works Contingency	25%		$323,125	
Construction Cost Total				**$1,615,625**	
	Preliminaries & General	10%		$161,563	
	Overheads & Profit (Builder's Margin)	8%		$129,250	
	Engineer's Design, Procurement and Construction Management	15%		$242,344	Complex with multiple work interfaces
	Consent and Approvals	3%		$48,469	Uncertaint of consents required
	Cost Esclation til September 2017	6%		$96,938	
Project Cost Estimate				**$2,300,000**	

Christchurch City Council

7. Disposal of land acquired under the Flood Intervention Policy

Reference: 17/107957
Contact: Justin Sims Justin.sims@ccc.govt.nz 941 6424

1. Purpose and Origin of Report

Purpose of Report

1.1 The purpose of this report is:

1.1.1 For the Infrastructure, Transport and Environment Committee to recommend to Council to remove the dwellings on any land acquired under the Flood Intervention Policy (the Policy), declare them surplus and sell the vacant sections on the open market.

Origin of Report

1.2 This report is staff generated.

2. Significance

2.1 The decision in this report is of low significance in relation to the Christchurch City Council's Significance and Engagement Policy.

2.1.1 The level of significance was determined by utilising the significance assessment worksheet.

2.1.2 The community engagement and consultation outlined in this report reflect the assessment.

2.2 The decisions made in this report will be applied to all future purchases made to enact the flood intervention policy and extends beyond the seven properties described in this report.

3. Staff Recommendations

That the Infrastructure, Transport and Environment Committee recommend that the Council:

1. Approve the removal of the dwellings on the properties acquired or to be acquired under the Policy.
2. Delegate to the Manager Property Consultancy authority to consider retaining non-habitable structures such as garages on the property if these are considered to enhance re-sale value.
3. Declare the properties acquired under the Policy surplus and delegate to the Manager Property Consultancy authority to initiate a process to dispose of the land at open market value, entering into such agreements and to take such steps considered expedient or necessary to effect the sale.

4. Key Points

4.1 This report supports the Council's Long Term Plan (2015 - 2025):

4.1.1 Activity: Flood Protection and Control Works

- Level of Service: 14.1.5 Implement Land Drainage Recovery Programme works to reduce flooding

4.2 The following feasible options have been considered:

- Option 1 – Remove the dwellings and sell the properties (preferred option)

- Option 2 – Remove the dwellings and retain the properties

4.3 Option Summary - Advantages and Disadvantages (Preferred Option)

4.3.1 The advantages of this option include:

- Removal of the dwellings fulfils the purpose of the Policy.
- Removal of the dwelling and selling the properties will reduce ongoing maintenance and holding costs.
- Sale of the vacant sections would return developable land to the market.
- Sale of the vacant sections would recoup some costs of the original purchase.

4.3.2 The disadvantages of this option include:

- none

5. Context/Background

Background

5.1 At the Council meeting of 10th December 2015, the Council resolved to adopt a policy to intervene where habitable floor levels are at risk of frequent flooding (in a 10 year average recurrence interval event) and there has been exacerbation of flooding due to the Canterbury earthquake sequence. (The Council's resolution can be found at attachment A.)

5.2 In accordance with the resolution, staff:

5.2.1 Have acquired 4 of the 7 properties;

5.2.2 Are negotiating with the owners to purchase two of the remaining properties;

5.2.3 Have had one offer rejected by the property owner.

5.3 As the properties have been acquired in accordance with the Policy for welfare reasons, Council does not need to retain them for another use. If it did so, the stock of developable land in Christchurch would be reduced. Additionally holding land with an indeterminate purpose or reason is not prudent and may put the Council at operational risk. It also comes at a cost in terms of operating / holding, foregone capital, potential social, poor community outcomes.

5.4 The Policy envisages a subsequent sale of the properties to recoup some of the purchase costs.

5.5 The dwellings need to be removed to fulfil the purpose of the Policy. Once removed, any new building would need to meet the floor level requirements of the District Plan which means the new dwelling would have a habitable floor level above the flood level.

5.6 Some of the properties benefit from detached garages and/or ancillary buildings which may enhance re-sale value if left in-situ. Demolition of ancillary building should be decided on a case by case basis following consultation with the appointed real estate agent.

6. Option 1 - Remove the dwellings and sell the properties (preferred)

Option Description

6.1 Remove (demolish or relocate as appropriate on a case by case basis) the dwellings on the properties acquired and any other improvements if they do not enhance re-sale value, then sell the sections on the open market through a disposal process.

Significance

6.2 The level of significance of this option is low consistent with section 2 of this report.

6.3 Engagement is not required for this level of significance.

Impact on Mana Whenua

6.4 This option does not involve a significant decision in relation to ancestral land or a body of water or other elements of intrinsic value, therefore this decision does not specifically impact Ngāi Tahu, their culture and traditions.

Community Views and Preferences

6.5 No one is specifically adversely affected by this option due to the property being acquired from a willing private seller. Any owner who rejects the offer of assistance will be able to sell on the open market as they see fit.

Alignment with Council Plans and Policies

6.6 This option is consistent with Council's Plans and Policies.

Financial Implications

6.7 Cost of Implementation – agents and legal fees will be incurred in the sale but the sale proceeds will offset these. Additional legal and administrative fees may be incurred in documenting any cross lease co-owners consent to the demolition.

6.8 Maintenance / Ongoing Costs – none.

6.9 Funding source – LDRP budget.

Legal Implications

6.10 Some of the properties are held on a cross lease and therefore the co-owners consent is required prior to demolition.

6.11 A sale and purchase agreement will be entered into with any prospective purchaser.

Risks and Mitigations

6.12 There is a risk the vacant sections may not sell on the open market due to a lack of demand. This will result in the properties being retained by Council in the short term.

6.12.1 Treatment: use a reputable real estate agent to ensure marketing reaches as many people as possible.

6.12.2 Residual risk rating: the rating of the risk is low.

Implementation

6.13 Implementation dependencies - removal of the dwellings.

6.14 Implementation timeframe – as soon as they can be arranged following Councils resolution.

Option Summary - Advantages and Disadvantages

6.15 The advantages of this option include:

- Removal of the dwellings fulfils the purpose of the Policy.

- Removal of the dwellings and selling the properties will reduce ongoing maintenance and holding costs.
- Sale of the vacant sections would return developable land to the market.
- Sale of the vacant sections would recoup some costs of the original purchase.

6.16 The disadvantages of this option include:

- None.

7. Option 2 - Demolish the dwellings and retain the properties

Option Description

7.1 Remove the dwellings but do not sell the sections.

Significance

7.2 The level of significance of this option is low consistent with section 2 of this report

7.3 Engagement requirements for this level of significance are not required.

Impact on Mana Whenua

7.4 This option does not involve a significant decision in relation to ancestral land or a body of water or other elements of intrinsic value, therefore this decision does not specifically impact Ngāi Tahu, their culture and traditions.

Community Views and Preferences

7.5 No one is specifically affected by this option due to the property being acquired from a willing private seller.

Alignment with Council Plans and Policies

7.6 This option is inconsistent with Council's Plans and Policies

7.6.1 Inconsistency – not selling the property

7.6.2 Reason for inconsistency – the Policy envisaged the properties would be sold to recoup some of the purchase cost.

7.6.3 Amendment necessary – none this would be a one off exception

Financial Implications

7.7 Cost of Implementation –legal and administrative fees may be incurred in documenting any cross lease co-owners consent to the demolition.

7.8 Maintenance / Ongoing Costs – rates, insurance and ongoing landscape maintenance.

7.9 Funding source – operational budget.

Legal Implications

7.10 None

Risks and Mitigations

7.11 There is a risk the vacant sections may be unlawfully occupied and would therefore require security inspections.

Implementation

7.12 Implementation dependencies - N/A

7.13 Implementation timeframe – N/A

Option Summary - Advantages and Disadvantages

7.14 The advantages of this option include:

- none

7.15 The disadvantages of this option include:

- Retaining land for no purpose.
- Ongoing maintenance and holding costs.
- No costs of the purchase would be recouped.

- Retaining the properties removes developable lots from the market.
- Increased security issues and potential squatters on the land.

Attachments

No.	Title	Page
A ⇩	Council 10 December 2015 - Minutes	63

Confirmation of Statutory Compliance

Compliance with Statutory Decision-making Requirements (ss 76 - 81 Local Government Act 2002).
(a) This report contains:
  (i) sufficient information about all reasonably practicable options identified and assessed in terms of their advantages and disadvantages; and
  (ii) adequate consideration of the views and preferences of affected and interested persons bearing in mind any proposed or previous community engagement.
(b) The information reflects the level of significance of the matters covered by the report, as determined in accordance with the Council's significance and engagement policy.

Signatories

Authors	Justin Sims - Property Consultant Thomas Parsons - Surface Water Engineering Consultant
Approved By	Angus Smith - Manager Property Consultancy Bruce Rendall - Head of Facilities, Property and Planning Keith Davison - Manager Land Drainage David Adamson - General Manager City Services

Council Resolved CNCL/2015/00098

That the Council:

1. Adopt a policy to intervene where habitable floor levels are at risk of frequent flooding (in a 10 year ARI event) and there has been exacerbation of flooding due to the Canterbury earthquake sequence.
    a. The policy would be rolled on a catchment by catchment basis to complement the investigation of engineering options to mitigate the flood risk as part of the Land Drainage Recovery Programme. The policy only applies to those properties that do not benefit from timely and effective catchment engineering works.
    b. Intervention options include local drainage works, house raising and an offer to purchase the property. The Council will decide the most cost effective intervention option for an eligible property on a case by case basis.
    c. The financial assistance for local drainage works and/or house raising would be reduced by the amount of any EQC Increase Flooding Vulnerability payment that has been received for the property or is due to the property owner.
    d. At Council's discretion, the voluntary purchase offer would be based on either
        i. the 2007 capital valuation less any EQC payments and with assignment of insurance claims – as for the Port Hills red zone option 1; or
        ii. The current market valuation of the property, which will be obtained by the Council from an independent valuer, at the date of the Council's offer, without assignment of the insurance and/or EQC payments.
    e. The voluntary purchase offer would be capped at $600,000 per property for an individual household and *$400,000 per unit* where the property comprises strata titles or cross lease titles.
    f. The proposed eligibility for intervention is as follows:
        i. Residential properties within Christchurch city urban area; and
        ii. The habitable floor (excludes garages, laundries, detached sleep outs and utility areas) is at risk in the 10 year ARI event – as confirmed by Council modelling and a survey of the floor level; and
        iii. There has been earthquake exacerbation of the flood risk – assessed by eligibility for Increased Flooding Vulnerability (IFV) and/or by Council flood modelling.
    g. The exceptions are:
        i. Houses where catchment works eliminate the risk of flooding to habitable floors in a 10 year ARI event; or
        ii. Houses which are to be rebuilt or will undergo a foundation repair such that the floor level will be raised to comply with the Building Code.
2. Include this option in the Land Drainage Recovery Programme scope and allocate $3,500,000 from the related budget for this policy, and provide regular reports to the Land Drainage Recovery Programme Working Group.
3. Approach the owners of the seven eligible properties in the Flockton catchment to assess the opportunity to undertake local drainage works, provide financial assistance for house raising and/or make a voluntary purchase offer.

4. Delegates the Chief Financial Officer to enter into the funding agreements and/or purchase offers on behalf of Council with the property owners in accordance with this resolution. Should there be exceptional circumstances outside those described in the resolution, the matter can be referred back to Council for a decision.

Councillor Cotter/Councillor Jones **Carried**

Deputy Mayor Buck requested her vote against this resolution be recorded.

Christchurch City Council

8. Proposed Bus Passenger Shelter Installation - 42 Hereford Street

Reference: 17/266976

Contact: Brenda O'Donoghue | CityStreetsTrafficEngineers@ccc.govt.nz | 941 8999

1. Purpose and Origin of Report

Purpose of Report

1.1 The purpose of this report is for the Infrastructure, Transport and Environment Committee to recommend to the Council, to approve the installation of a bus passenger shelter at an existing bus stop located at 42 Hereford Street (located adjacent to the King Edward Barracks KEB).

Origin of Report

1.2 This report is staff generated. Where no objection (either by approval or no feedback) to the shelter has been presented by the owner or occupier of an affected property, the relevant community board or committee for that area has the delegated authority to approve the installation of the proposed shelter.

2. Significance

2.1 The decision(s) in this report is of low significance in relation to the Christchurch City Council's Significance and Engagement Policy.

2.1.1 The level of significance was determined by comparing factors relating to this decision against the criteria set out in the Councils Significance and Engagement Policy.

2.1.2 The community engagement and consultation outlined in this report reflect the assessment.

3. Staff Recommendations

That the Infrastructure, Transport and Environment Committee recommend that the Council:

a. Approve the installation of a bus shelter at 42 Hereford Street.

4. Key Points

4.1 This report supports the Council's Long Term Plan (2015 - 2025):

4.1.1 Activity: Public Transport Infrastructure

- Level of Service: 10.4.4 Ensure user satisfaction with the number and quality of bus shelters

4.2 The following feasible options have been considered:

- Option 1 - The preferred option, install a bus passenger shelter at an existing bus stop located at 42 Hereford Street.
- Option 2 - Do nothing.

4.3 Option Summary - Advantages and Disadvantages

4.3.1 The advantages of this option include:

- Protection from weather.
- Seating provided within the shelter.

- Increase the visibility and legibility of public transport.
- Increased revenue earning capacity for the council as the shelter type will incorporate advertising.
- Cost of purchasing the shelter and the shelter installation will be covered by Adshel NZ, not council.
- Maintenance cost of the shelter will be covered by Adshel NZ, and not council.

4.3.2 The disadvantages of this option include:

- Shelters can be a target for vandalism. Where a shelter is located in a busy location, where there is good passive surveillance, such as 42 Hereford Street, vandalism incidents are less likely to occur than in areas of poor passive surveillance. If vandalism does occur to the shelter, for example a side panel is broken, once notified of the event, it is the responsibility of Adshel NZ to tidy and make safe the site, and repair the broken component of the shelter.

4.4 Consultation has been undertaken with Ngai Tahu Property Ltd, who own the adjacent KEB site that the proposed shelter is located adjacent to. Ngai Tahu Property Ltd have agreed to the proposed shelter installation, and are aware of what the proposed shelter (with advertising) will look like.

5. Context/Background

5.1 A bus passenger shelter, that includes an advertising panel, is proposed to be installed at an existing bus stop located adjacent to 42 Hereford Street. This existing bus stop is located adjacent to the currently undeveloped section of the KEB site. The location of the bus stop is indicated in Attachment A.

5.2 The bus stop located adjacent to 42 Hereford Street is serviced by the number 17 bus line that connects Huntsbury to Bryndwr, via the city centre. An average of about 20 passengers per weekday use this bus stop to travel by public transport.

5.3 Under s339 of the Local Government Act (1974), the Council may erect on the footpath of any road a shelter for use by intending public-transport passengers or taxi passengers provided that no such shelter may be erected so as to unreasonably prevent access to any land having a frontage to the road. The Council is required to give notice in writing to the occupier and owner of property likely to be injuriously affected by the erection of the shelter, and shall not proceed with the erection of the shelter until after the expiration of the time for objecting against the proposal or, in the event of an objection, until after the objection has been determined.

5.4 Staff confirm the shelter will not prevent vehicular or pedestrian access to the existing developed, as well as undeveloped sections of KEB, as a result of the proposed shelter installation.

5.5 Due to the correspondence that has occurred with staff representing the interests of Ngai Tahu Property Ltd, staff can confirm that the shelter will not, or is highly unlikely to prevent vehicular or pedestrian access to the future development of the currently undeveloped section of the KEB site.

5.6 Consultation has been carried out with the affected party, Ngai Tahu Property Ltd. The consultation with Ngai Tahu Property Ltd covered a period of late January 2017 to late February 2017. Ngai Tahu Property Ltd have agreed to the proposed shelter installation, and are aware of what the proposed shelter with advertising will look like.

5.7 The proposed shelter will be provided by Adshel NZ. The shelter will include an advertising panel that incorporates digital advertising on one side, and regular 'poster' advertising on the other side of the panel.

5.8 As a consequence of the digital advertising component, Adshel NZ have to undertake a resource application, for the activity to be permitted under the newly operative Christchurch District Plan rules. Irrespective of the digital advertising component, Adshel are also required to seek approval to install the shelter and advertising panel under the council's relevant bylaw and policies concerning structures on street and advertising on bus passenger shelters.

5.9 The applications for resource consent, bylaw and policies are a separate process to that of approval of the shelter under section 339 of the Local Government Act, to which this report relates. All approvals have to be granted before Adshel can commit to installing the shelter.

5.10 Subject to all approvals being granted, Adshel NZ will cover the co cost of the shelter purchase, installation, maintenance and repairs.

6. Option 1 - Proposed Bus Passenger Shelter Installation

Option Description

6.1 Install a bus passenger shelter at an existing bus stop located at 42 Hereford Street (located adjacent to the King Edward Barracks (KEB).

6.2 The proposed location of the shelter is shown in Attachment A. The type of shelter, inclusive of the digital advertising panel is shown below:

Type of bus passenger shelter (with advertising) proposed

Significance

6.3 The level of significance of this option is low, consistent with section 2 of this report. Engagement requirements for this level of significance includes the consultation with occupier and owner of property likely to be injuriously affected by the erection of the shelter. The owner of the adjacent property (KEB), is Ngai Tahu Property Ltd, who have been consulted with. A summary of the consultation is provided in section 6.5 – 6.7.

Impact on Mana Whenua

6.4 This option does not involve a significant decision in relation to ancestral land or a body of water or other elements of intrinsic value, therefore this decision does not specifically impact Ngāi Tahu, their culture and traditions.

Community Views and Preferences

6.5 Consultation has been carried out with the affected party, Ngai Tahu Property Ltd. Consultation with Ngai Tahu Property Ltd covered a period of late January 2017 to late February 2017. Ngai Tahu Property Ltd have agreed to the proposed shelter installation, and are aware of what the proposed shelter with advertising will look like.

6.6 During consultation, plans for the undeveloped section of the KEB site were discussed. The proposed location of the shelter reflects the outcome of these discussions, in that the shelter is unlikely to obstruct the future locations of vehicle or pedestrian access points.

6.7 Also discussed during the consultation period was the likely inclusion of a pedestrian priority crossing on Hereford Street. As a consequence of the pedestrian crossing, the location of the bus stop will be amended. The future amendment to bus stop will mean the shelter will be closer to the front of the bus stop, which is a better outcome for bus passengers. Plans associated with the pedestrian crossing are at a design stage, but will be presented to the Council for approval in due course.

Alignment with Council Plans and Policies

6.8 This option is consistent with Council's Plans and Policies.

Financial Implications

6.9 Cost of Implementation – No implementation cost to council. Adshel NZ pay for the cost of implementation.

6.10 Maintenance/Ongoing Costs – No maintenance or ongoing costs. Adshel NZ pay for maintenance and ongoing costs.

6.11 Funding source – Not applicable.

Legal Implications

6.12 Where no objection to the shelter has been presented by the owner or occupier of an affected property, the relevant community board or committee for that area has the delegated authority to approve the installation of the proposed shelter.

Risks and Mitigations

6.13 The shelter is not installed, leading to a poor level of service for passengers waiting for a bus.

6.14 If the shelter is vandalised, for example a side panel is broken, once notified of the event, it is the responsibility of Adshel NZ to tidy and make safe the site, and repair the broken component of the shelter.

Implementation

6.15 Implementation dependencies:

- Recommendation by the Infrastructure, Transport and Environment Committee to the Council, and subsequent approval by the Council to approve the shelter installation relevant to section 339 of the Local Government Act, as outlined in this report.
- Separate to this report, approval of the resource consent application approval.
- Separate to this report, approval of the relevant bylaw and policies application.

6.16 Implementation timeframe – Adshel NZ anticipate to have the shelter installed by the end of May 2017.

Option Summary - Advantages and Disadvantages

6.17 The advantages of this option include:

- Protection from weather.
- Seating provided within the shelter.
- Increase the visibility and legibility of public transport.
- Increased revenue earning capacity for the council as the shelter type will incorporate advertising.
- Cost of purchasing the shelter and the shelter installation will be covered by Adshel NZ, not council.
- Maintenance cost of the shelter will be covered by Adshel NZ, and not council.

6.18 The disadvantages of this option include:

- Shelters can be a target for vandalism. Where a shelter is located in a busy location, where there is good passive surveillance, such as 42 Hereford Street, vandalism incidents are less likely to occur than in areas of poor passive surveillance. If vandalism does occur to the

shelter, for example a side panel is broken, once notified of the event, it is the responsibility of Adshel NZ to tidy and make safe the site, and repair the broken component of the shelter.

7. Option 2 - Do Nothing

Option Description

7.1 No bus passenger shelter is installed at the location identified in section 3 of this report.

Significance

7.2 As there is no bus passenger shelter proposed, no consultation is required.

Impact on Mana Whenua

7.3 This option does not involve a significant decision in relation to ancestral land or a body of water or other elements of intrinsic value, therefore this decision does not specifically impact Ngāi Tahu, their culture and traditions.

Community Views and Preferences

7.4 Not applicable.

Alignment with Council Plans and Policies

7.5 This option is inconsistent with Council's Plans and Policies

7.5.1 Inconsistency - It does not ensure user satisfaction with the number and quality of bus shelters

7.5.2 Reason for inconsistency - Bus passengers will not be provided shelter to wait for a bus

7.5.3 Amendment necessary - No amendment needed to the Council's Plans and Policies.

Financial Implications

7.6 Cost of Implementation - not applicable.

7.7 Maintenance/Ongoing Costs - not applicable.

7.8 Funding source - not applicable.

Legal Implications

7.9 Not applicable

Risks and Mitigations

7.10 The existing passenger waiting facilities remain, leading to no improvement to the level of service for passengers waiting for a bus.

Implementation

7.11 Implementation dependencies - not applicable

7.12 Implementation timeframe - not applicable.

Option Summary - Advantages and Disadvantages

7.13 The advantages of this option include:

- No advantages to this option.

7.14 The disadvantages of this option include:

- It is inconsistent with Council's Plans and Policies.
- It would undermine the approval of the adjacent property owners who have indicated approval to the installation of the bus passenger shelter.
- Does not take advantage of increased revenue earning potential for the council.

- Does not take advantage of infrastructure, maintenance and on-going costs that are provided for and undertaken by an external party, at the expense of the external party.

Attachments

No.	Title	Page
A ⇩	Bus Shelter Plan for Approval: 42 Hereford Street	72

Confirmation of Statutory Compliance

Compliance with Statutory Decision-making Requirements (ss 76 - 81 Local Government Act 2002).
(a) This report contains:
  (i) sufficient information about all reasonably practicable options identified and assessed in terms of their advantages and disadvantages; and
  (ii) adequate consideration of the views and preferences of affected and interested persons bearing in mind any proposed or previous community engagement.
(b) The information reflects the level of significance of the matters covered by the report, as determined in accordance with the Council's significance and engagement policy.

Signatories

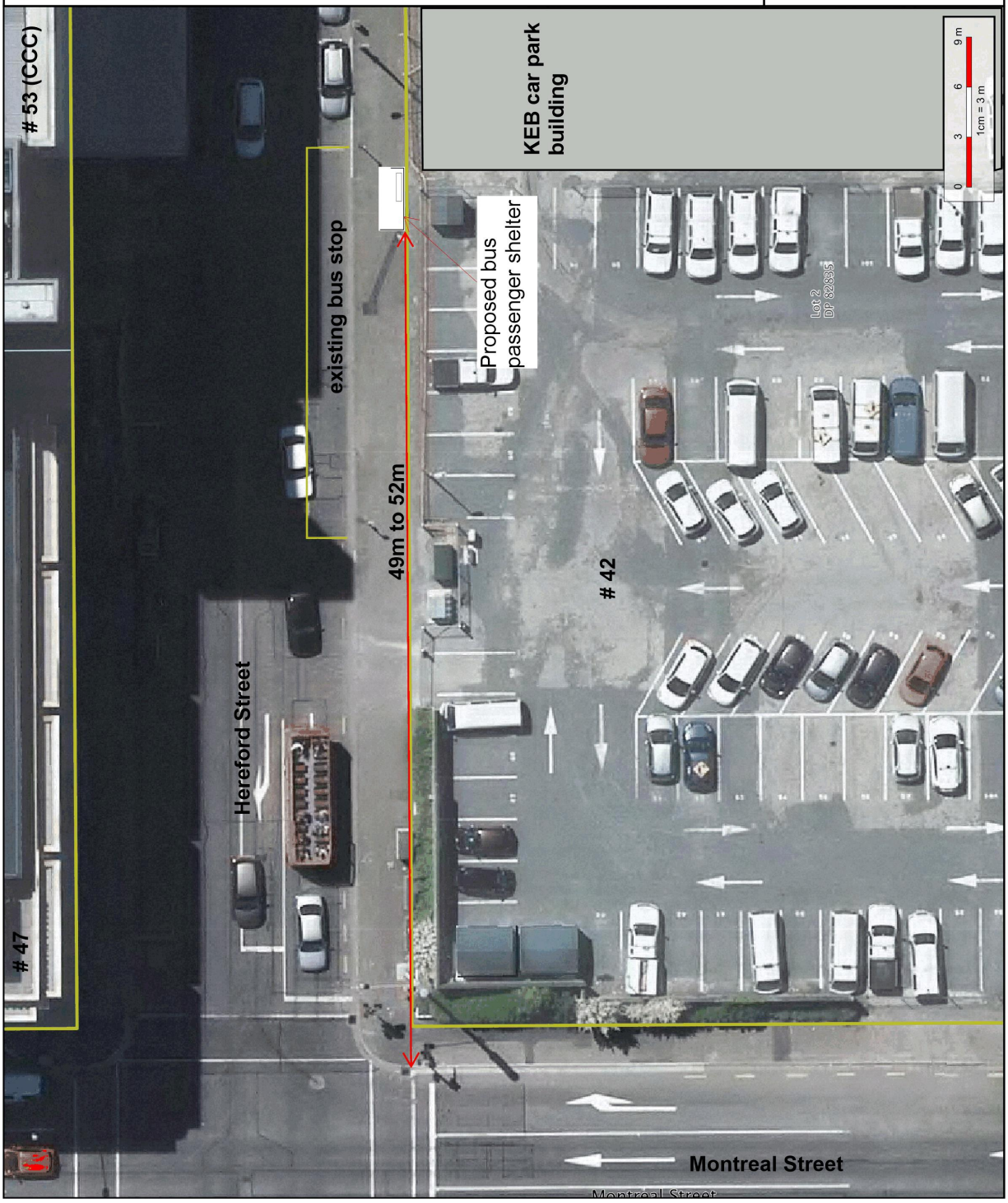
Author	Brenda ODonoghue - Passenger Transport Engineer
Approved By	Ryan Rolston - Team Leader Traffic Operations Aaron Haymes - Manager Operations (Transport) David Adamson - General Manager City Services

Christchurch City Council

42 Hereford Street

Bus shelter plan for approval.

Attachment A



Attachment A Item 8

Christchurch City Council

9. ITE report 3 Waters and Waste - March 2017

Reference: 17/313742
Contact: John Mackie John.mackie@ccc.govt.nz 6548

1. Purpose and Origin of Report

Purpose of Report

1.1 The purpose of this report is for the Infrastructure, Transport and Environment Committee to inform of the activities undertaken by the 3 Waters and Waste Unit, who are responsible for the planning, asset management, operations, maintenance and capital project delivery for all 3 waters and waste infrastructure. This includes drinking water, wastewater, stormwater, land drainage and solid waste services within the city.

Origin of Report

1.2 This report is staff generated at the request of the Infrastructure, Transport and Environment Committee to keep them up to date with the current status of the Three Water activities in Christchurch.

2. Significance

2.1 There are no decision(s) sought in this report and therefore the significance is low in relation to the Christchurch City Council's Significance and Engagement Policy.

3. Staff Recommendations

That the Infrastructure, Transport and Environment Committee:

1. Receive the information in the 3 waters and waste February 2017 report attached.

4. Key Points

4.1 SCIRT are in the final stages of completing the horizontal infrastructure rebuild and preparing for the transition of SCIRT back in to Council.

Attachments

No.	Title	Page
A ⇩	ITE report 3 Waters and Waste - March 2017	75

Confirmation of Statutory Compliance

Compliance with Statutory Decision-making Requirements (ss 76 - 81 Local Government Act 2002).

(a) This report contains:
  (i) sufficient information about all reasonably practicable options identified and assessed in terms of their advantages and disadvantages; and
  (ii) adequate consideration of the views and preferences of affected and interested persons bearing in mind any proposed or previous community engagement.

(b) The information reflects the level of significance of the matters covered by the report, as determined in accordance with the Council's significance and engagement policy.

Signatories

Author	John Mackie - Head of Three Waters and Waste
Approved By	Peter Ryan - Head of Performance Management Peter Langbein - Finance Business Partner David Adamson - General Manager City Services

Christchurch City Council

3 Waters and Waste

FEBRUARY 2017 REPORT

Christchurch City Council | March 27, 2017

Table of Contents

Overview 2
Consents and Compliance 3
Customer Service Level of Service 3
Better Service Delivery 3
Finance 4
Manage to budget 4
Health and Safety 6
3 Waters Projects 6
SCIRT 6
Service Delivery 6
SCIRT 6
Planning and Delivery 7
Levels of Service 7
Project Management - Major Projects 7
Project Management - Small Projects 8
Water and Wastewater Planning 9
Asset Management Team 9
Solid Waste Team 10
Levels of Service 10
Landfill Aftercare 10
Organics Processing Plant (OPP) 10
EcoDrop (Transfer Stations) 11
EcoSort (Materials Recovery Facility - MRF) 11
Kerbside Collection 11
Education and Audit 12
Stormwater and Land Drainage Teams 13
Levels of Service 13
Land Drainage Planning 13
Land Drainage Recovery Programme (LDRP) 14
Wastewater Treatment Plant 15
Appendix 1 - Health and Safety Statistics 16

Overview

This report is intended to inform the Committee of the current progress against the planned activities in the 3 Waters and Waste unit as at 28 February 2017.

As well as progress against operational and capital delivery targets, it also summarises the progress of the SCIRT Alliance who undertake rebuild works for transport assets and greenspace assets as well as three waters infrastructure. Some unfinished projects are being transitioned back into the business to complete together with the current non-SCIRT programme.

Details of existing roads and pipes projects currently in construction can be found on the Council website at https://ccc.govt.nz/the-rebuild/roads-and-pipes.

While still reviewing the impacts of the Kaikoura earthquakes in November 2016, our core activities were again impacted in February 2017 with the response to the Port Hills fire in which 3 Waters and Waste personnel were seconded to undertake key roles in this Civil Defence emergency.

Consents and Compliance

There are currently no outstanding enforcement actions or significant non-compliance grades with resource consents in the 3 waters and waste section.

The Environment Canterbury infringement notice alleging an offensive and objectionable odor from the Organics Processing Plant (Metro Place) on 14th June 2016 has been withdrawn by Environment Canterbury and the site no longer has a significant non-compliant grading.

Customer Service Level of Service

BETTER SERVICE DELIVERY

Category 1 - Level of service requests where activation/recovery time for delivery is critical within the 24 hours of an event:

95.6% achieved against a target of **≥90%**

Category 2 - Level of service requests where activation/recovery time for delivery is critical within the 72 hours of an event:

100% achieved against a target of **≥85%.**

Category 3 and 4 – Level of service requests where activation/recovery time for delivery is critical within either 5 days for Cat 3 or 10 days for Cat 4,

87.5% achieved against the target of **≥80%.**

Further Levels of service LOS are on page 7 below.

Finance

MANAGE TO BUDGET

Operating costs – variance year to date is $2.865m favourable with the major contributor being land drainage maintenance. This is offset by high unfavourable variances in Collecting Wastewater from Properties due to the high number of EQ damaged sewer laterals being replaced, higher costs at the treatment plant for midge control, transport of biosolids and higher than expected electricity costs.

Year to Date $000's			Operations Split	Year End $000's			
Actual	Budget	Variance		Forecast	Budget	Variance	%
3,307	3,786	479	Recyclable Materials Kerbside Collection	5,395	5,879	484	8%
3,446	3,428	(18)	Residual Waste Kerbside Collection	5,398	5,355	(44)	-1%
5,772	5,242	(530)	Organics Kerbside Collection	8,635	8,178	(457)	-6%
12,119	9,073	(3,046)	Collecting Wastewater from Properties	16,253	12,561	(3,692)	-29%
5,353	3,866	(1,487)	Treat & Dispose of Wastewater Collected	6,934	6,090	(844)	-14%
7,502	7,206	(297)	Supply Potable Water	10,100	9,665	(435)	-5%
5,523	5,220	(303)	Residual Waste Disposal & Transport	8,441	8,177	(264)	-3%
125	226	101	Landfill Gas Capture & Treatment	222	340	118	35%
(364)	(415)	(51)	Refuse Transfer Stations	(692)	(758)	(66)	-9%
(1,718)	(612)	1,106	Operation & Care of Closed Landfills	(2,147)	(902)	1,245	138%
2,420	2,803	383	Organics Processing incl Compost Plant	3,703	4,092	389	9%
7	163	156	Laboratory Services - Wastewater	64	252	188	75%
799	680	(119)	EQ - Water Supply	473	1,020	547	54%
1,192	1,806	615	EQ - Wastewater Collection	2,112	2,709	598	22%
-	24	24	EQ - Wastewater Treatment and Disposal	()	35	35	100%
1,103	1,435	332	Three Waters Asset Management	1,498	2,154	657	30%
2,636	2,330	(306)	Three Waters Planning	4,260	3,659	(601)	-16%
10,203	16,246	6,044	Land Drainage Operations	20,581	24,821	4,240	17%
(2,635)	(2,851)	(216)	Cost Centre Balances	(5,607)	(4,173)	1,434	34%
56,791	59,657	2,865	**Unit Summary**	85,622	89,155	3,533	

Capital Costs – By the end of February 2017, 46% of the 3 Waters capital programme (excluding SCIRT) was completed to the value of $62.43m. This leaves an ambitious target over the remaining 4 months to achieve the budget of $134.68m. The higher EAC forecast of $141.4m is a stretch target largely relating to land drainage projects where the target was deliberately set high as history shows that events occur which will impair the delivery of projects for unforeseen reasons. Most 3WW capital programme projects are under budget, the exceptions are Project management SW & land drainage (51%), Solid waste (53%) and Technical Services (80%). This does not imply that any unbudgeted expenditure will be incurred and formal change processes will be followed if further budget allocation required.

Capital Expenditure Delivery Team	Budget	EAC Current Forecast	Forecast Variance	Actuals YTD	% of Budget Spent
Area Supervisors	143,914	87,000	56,914	0	0%
Asset Management CWW	2,649,364	2,571,070	78,294	962,797	36%
Asset Planning CWW	8,167,333	8,453,726	-286,393	3,132,463	38%
Programme Management Office	0	455	-455	1,841	0%
Project Management CWW	70,513,926	67,300,290	3,213,636	30,552,026	43%
Project Management SW & Land Drainage	49,969,950	59,609,913	-9,639,963	25,679,683	51%
Solid Waste	1,507,708	1,398,942	108,766	798,811	53%
Technical Services	1,632,370	1,881,772	-249,402	1,297,911	80%
Water & Waste Asset Management	95,000	95,000	0	4,384	5%
Grand Total	**134,679,565**	**141,398,168**	**-6,718,603**	**62,429,917**	**46%**

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Current Forecast FY17	4,158	5,694	11,853	13,206	12,967	9,167	8,634	7,185	11,145	16,250	17,693	24,970
Actuals FY17	817	5,510	9,007	7,095	8,108	10,664	5,848	7,179				
Initial Forecast FY17	4,158	5,694	11,853	14,995	13,389	13,867	9,581	11,698	11,826	12,104	11,585	14,525

Health and Safety

3 WATERS PROJECTS

There were over 123,500 hours worked in February with 2 lost time injuries resulting in 6 lost working days. One related to a pre-existing condition with a sub-contractor employee (engaged in meter reading) and the other at the Eco Sort plant. Please see appendix 1 for the detailed statistics and the measures of LTIFR (lost time injury frequency rate) and TRIFR (total recordable injury frequency rate).

SCIRT

There were no lost time, medical treatment or first aid injuries recorded during February. SCIRT TRIFR has reduced to 5.9 but reduced work hours have caused the LTIFR to rise to 0.5. It is now 16 months since the last notice was received from WorkSafe. There was one strike on a marked 11kV high voltage service in February and the current focus is to ensure that SCIRT processes and standards are strictly maintained as works ramp down.

Service Delivery

SCIRT

SCIRT have completed over 99% of their allocated work programme as at the end of February 2017 to a forecast value of $2,212,675,145. Some projects will still require construction completion and final commissioning. Around 11 projects will achieve construction completion in April with one project (pump station 15) continuing into May. Final handover work will continue until the end of June 2017, after which there will be a 12 month period of defects liability.

Planning and Delivery

LEVELS OF SERVICE

LOS 13.17.20 Horizontal Infrastructure – Both SCIRT and Non-SCIRT

- Forecast is expected to achieve 82.2% of horizontal infrastructure projects against a target of 85%.
- 100% of contracts comply with procurement Policy.
- All programmes have milestones identified in CPMS.
- Milestone will not be achieved on City Outfall drain due to a considerable underestimate of costs by consultant, requiring the design solution to be revisited. Bells Creek pump station construction delayed by 6 months to incorporate addition of a separate stormwater filter.

LOS 13.17.21 – Day to Day Infrastructure

- 100% of contracts comply with procurement Policy.
- All programmes have milestones identified in CPMS.
- Milestone achievement at 82.2% against a target of 85%.
- Percentage of programmes/projects completed to approved budget 85% (horizontal infrastructure) is forecast to miss with 59.8% of projects on or under budget by year end. Budgets are being managed by bring backs from future years or within the overall programme.

PROJECT MANAGEMENT - MAJOR PROJECTS

Watch list projects: 4 out of 5 watch list projects are forecasted to miss the original milestones and remedial actions are underway mainly extending the construction period.

Riccarton Road Trunk Main WW & WS – Stage 1 of the works is now complete (from Deans Ave to Darvel Street), which includes all WW and WS elements. This is approximately 25% of the project. Work is about to begin on Stage 2 on the WW Trunk Main continuing on from Darvel Street. Another work front will also open up at the same time to complete the trenchless installation of the WW Trunk Main underneath the railway line. The project is on track for completion in November 2017.

Lower Riccarton Interceptor WW – This project was awarded to City Care which involves the construction of a new pump station, a pressure waste water line and a gravity line.

Good progress is being made on the project now with multiple work fronts open on the pressure main section of work. This work includes horizontal directional drilling (HDD) with the installation of sheet piles for the entry and exit pits.

Demolition of the old suction tank is underway for the new pump station site in Paeroa Reserve. Once this is completed, sheet piling will begin for the pump station. The project is on track for completion in November 2017.

SE Halswell Waste Water and Water Supply – The purpose of this project is to provide a new trunk sewer infrastructure to service the South East Halswell. The area is designed to provide new capacity for 4400 new households as well as reduced reliance on existing, aging, infrastructure. A secondary objective of the project is to extend potable water mains capacity in the Sutherland Road area to support housing growth.

The project is approximately 16% complete and on track for commissioning in November 2017.

Lyttelton Waste Water Pipeline Scheme – The Lyttelton waste water scheme is now moving through several phases with the involvement of NZTA and their tunnel upgrade which will house a section of the waste water line and a new potable water supply pipeline. The section of the new waste water line that passes through the tunnel will be completed in November 2017, this will be carried out through the preferred contractor selected by NZTA. The council has had an observer sit on the evaluation process of the tunnel upgrade to assist on any technical issues regarding the water and waste water pipelines.

An expression of interest (EOI) has been placed on the GETS web site for the remainder of the project, and the evaluation of the EOI will take place early April.

Bexley pump station suffered major damage so a new station is planned to be built near Wainoni Park. Investigation work is in progress. Construction is planned to start in July 2017 and project will be completed late 2019.

Northwest Bores - Work has been substantially completed on the new bores in the North-west water catchments of the city with all operational wells now having secure groundwater status.

PROJECT MANAGEMENT - SMALL PROJECTS

Water Supply and Waste Water Renewals Programme – The water supply renewal for mains and sub-mains is 76% complete for 2017, the remaining projects are in Fendalton and Christchurch East

The waste water renewals are continuing with work progressing in Akaroa, Christchurch East and Fendalton. All work will be completed by June 2017.

WW Worsleys Road – This is a SCIRT legacy project for a proposed pipe-bridge crossing for a 1 in 50 year flood level.

Procurement is now being addressed, though there is a reasonable risk that completion will not be achieved this FY.

Waste Water Planned Lateral Replacements – This work has been conducted mostly in the New Brighton targeted area to St Albans, and overall is around 20% complete [from 3250 properties to be reviewed].

Around 22% of inspected laterals require repair, with a further 19% requiring renewal, so a high proportion of laterals have been earthquake damaged.

The repair/renewal crews are approximately 11% complete, and costs are essentially to the benchmark rates, despite several tricky jobs in New Brighton due to high ground water and running sand.

WATER AND WASTEWATER PLANNING

Akaroa Wastewater Upgrade – The Akaroa Treated Wastewater Reuse Options Working Party has completed its work and is finalising its joint statement. The working party made a valuable contribution to the project and as a result non-potable reuse in Akaroa (e.g. for irrigating public parks and flushing public toilets) as a partial solution has been added to the options being considered. Public consultation on reuse and disposal options will be between 3 and 30 April, and the Council needs to make a decision on which option to pursue and report back to the Environment Court by 30 June.

Vacuum Sewer System Monitoring – A project is underway to consider options for monitoring the vacuum sewer systems in Aranui, Shirley and Prestons. The aim of the monitoring system is to make it much easier for the maintenance contractors to find and fix faults, and for long term growth planning within the vacuum sewer catchments.

Pressure Sewer System Construction Inspections – A joint project with the Building Consents and Building Inspections teams has been undertaken to develop a robust process for making sure that new pressure sewer pump system installations are in accordance with both Council infrastructure and Building Code requirements, so that they are built to an acceptable standard to be vested in Council. It is planned to roll this out in April, including staff training and external communications.

ASSET MANAGEMENT TEAM

Renewal Programmes – The focus for the team at present is work to identify the draft renewal programmes for 3 Waters & Waste before the 1st April. Individual programmes will then be geospatially mapped and compared with other activities such as transport renewals, growth, improvement and developer programmes and to identify dependencies and opportunities for improved delivery.

Solid Waste Team

LEVELS OF SERVICE

8.0.4 Proportion of incoming recyclable materials that are contaminated and sent to landfill (PCat4) – where the target is less than or equal to 10%, and the actual is currently running at 10.3%.

The contamination occurs during processing where small pieces of metal, plastics and paper contaminate the glass. EcoSort are working on reducing this cross-contamination by further processing this cross-contaminated material to divert from landfill. An amendment to the measure next year will provide a more definitive measure of processing contamination and will be able to be addressed through improvements in the recovery process as well as education. This is included in the draft Annual Plan.

LANDFILL AFTERCARE

- 10 New LFG wells have been commissioned and performing well.
- Resource consents for Site B landfill operations have been filed with ECan but a mini hearing with Commissioner is required to progress the consents.
- BRRP landfilling operations in Cell A is nearly complete.
- Consent compliance monitoring sampling to be completed by Tonkin and Taylor at Burwood Landfill.
- Meeting held with Burwood Pegasus Community Board received positive feedback from elected members.
- BRRP landfilling operations in Cell A extended 28,063 tonnes for July.

ORGANICS PROCESSING PLANT (OPP)

- ECan liaison regarding odours assessment and monitoring in Bromley. No current or pending transgressions.
- Liaison with events team ahead of organics trial for 'Sustainable events'
- Organics Processing Plant Open Day Saturday 18th March - Comms & facilitation ahead of event.
- Engagement with Fire Service regarding collaborative message on 'Managing Ash Waste & Arsenic contamination'.
- OPP Community Liaison Group meeting Tuesday evening 21st February. New Chair under formal contract to demonstrate independence of role.

ECODROP (TRANSFER STATIONS)

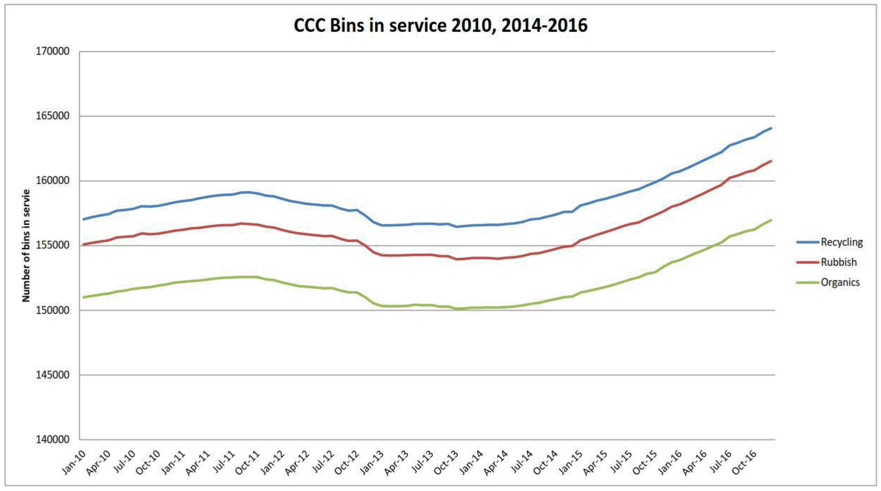
- 2016/17 CAPEX maintenance programme discussed and agreed upon with ECL.
- Working with ECL Management and Board in an effort to improve process and reduce operating costs. Options to be considered in the next LTP.

ECOSORT (MATERIALS RECOVERY FACILITY - MRF)

- Review of Health and Safety undertaken and determination that ECL are meeting all requirements.

KERBSIDE COLLECTION

- The stock take is progressing well 75,000 bins have now been tagged and 1500 additional bins removed from circulation
- Currently working with Cycle ways Project Management Team and Waste Management to ensure collection will continue safely along the new cycle ways being implemented throughout the city.
- WM have raised safety concerns in collecting on some of the streets of Banks Peninsula – parked cars are blocking access on these narrow streets. This will be ongoing and currently working closely with the Traffic Operations Team to consider possible solutions.
- Number of Wheelie bins in Service showing steady increase (graph below).



EDUCATION AND AUDIT

- Working with the Business Improvement Team to update and improve our processes.
- Engaged with MY COUNCIL to also looking to improve processes and customer experience.

Involved in the 'Our City Education Programme' which is a chance for High School students to gain an understanding in the role of council in the community and possibility career opportunities within council.

Stormwater and Land Drainage Teams

LEVELS OF SERVICE

Targets for stormwater level of service measures are on track to be met with the following exceptions:

- LOS 14.0.3 Customer satisfaction with Stormwater Drainage Management (PCat4) has a target of ≥70% and is flagged amber (at risk) until the resident's survey is completed. Previous years' results (45% in 2015 and 50% in 2016) have required the business to look at remedial actions to raise the forecasted survey results.
- 14.0.12 Number of complaints received by CCC about the performance of the stormwater system (PCat1) has a target of 8.5 per 1,000 connected properties. As actuals are approaching the target, this measure is marked amber (at risk). The recently appointed Drainage Operations Manager is expected to significantly improve this measure by introducing targeted condition monitoring and optimising scheduled maintenance programmes.

LAND DRAINAGE PLANNING

The Spreydon Lodge Infrastructure – Provision Agreement has been signed and activated.

Port Hills Fire Response – The Stormwater Planning Team have been providing stormwater planning support to the CCC response to the Port Hills fires, in coordination with the Recovery Manager, Council Operations, Parks and geotechnical staff.

Sutherlands Basin (Welshs) Stormwater Facility – Safety Review has required some design amendments which have been completed. Issued to tender 29th March. Construction start expected mid-May.

Worsleys Spur Stormwater Pipe – Detailed Design has been updated based on CCC review. Land and design have been affected by the Port Hills fire - this is now resolved but has caused a delay. Tender documents are complete, will be issued to tender 27th March. Construction start expected by end of April.

Sparks Road Wetland – Detailed Geotechnical Investigation underway. Final report due 28th April.

Curletts Wetland – Proposal for Geotechnical Investigation received. Consultant engaged by end of March.

Bullers Stream Naturalisation and Stormwater Treatment Project – Earthworks for stream naturalisation are complete, including features to enhance aquatic habitat. Vegetation establishment and construction of wetland to follow.

LAND DRAINAGE RECOVERY PROGRAMME (LDRP)

There are a total of 40 LDRP investigation projects currently live or scheduled to commence within the first half of the calendar year. All but 19 of these are scheduled to be completed by the end of the financial year, however, the completion of the City Wide Modelling project is anticipated to identify some new areas for investigation in FY18.

There are 20 currently live capital projects. The following are highlights of this capital programme:

- **Bells Creek** – original project milestones are at risk and completion dates have been extended from December 2017 to February 2018. Construction is underway, with some good media coverage in The Press. Process ongoing with MoE over land purchase for next phase of works.
- **Bells Creek Stormwater Filter** – the supplier and construction contracts have now been awarded.
- **City Wide Flood Model** – the first stage of model delivery is due in April.
- **Cranford Basin** – the Tay Street Drain package has been awarded and works will commence on site on 10 April.
- **Dudley Creek** – construction of bypass has reached 50 percent completion and widening of Stapletons Road is progressing well.
- **Estuary Drain** – tender for construction to go out in April.
- **Knights Drain** – Phase 1 pump station and rising main nearing completion by SCIRT with handover scheduled for April. The design of Phase 2 is being progressed.
- **Matuku Waterway** – Stage 1 works almost complete, Stage 2 works out for tender.
- **Mid Heathcote Bank Stabilisation** – contract for preliminary and detailed design was awarded in February, with construction to start later this calendar year.
- **No. 1 Drain** – detailed design almost complete.
- **Pump Station 205** – Investigations completed and a preferred option has been identified. This has been progressed for approval at the next ITE meeting.
- **Residual House Remediation - Flockton Area** –Three offers have been accepted and a further is under negotiation.
- **Temporary Stop Bank Management** – contract has been awarded for strengthening sections of the stopbanks.

- **Upper Heathcote Storage** – Cashmere/Worsley flood detention scheme – preliminary design draft completed and awaiting finalisation of a dam break assessment.
- **Wigram East Retention Basin** – construction has commenced on this fast tracked project, which is aligned for delivery in conjunction with Nga Puna Wai.

Wastewater Treatment Plant

Capital work in progress at the treatment plant includes the following;

- Improvements to grit tanks 4 and 5 are underway as part of grit improvement project, and the channel repairs are down in conjunction to minimise downtime.
- Re-assembly of belt press 1. Temporary polymer system will be used for 6 months to accelerate timeframe for belt press 2 refurbishment.
- Building 1 (Network Operations) construction commenced. Carpark undergoing modifications. This is a series of EQ repairs for the office/admin buildings on site.
- A number of H&S risk assessments and initiatives have been implemented on site resulting in review of PPE measures and raising the Zero Harm messaging in line with partner industries, in order to meet our commitment to keeping staff and public safe and well.
- The plant has been operating within consent conditions, and there has been no exceedances in February. There have been no odour complaints.
- The problem with midges persists despite the significant investment in control measures
- A member of the CWTP team has completed his National Diploma of Wastewater Treatment.

Appendix 1 - Health and Safety Statistics

3 Waters Waste and Transport (Incorporating all SCIRT Activity)

Health and Safety Statistics - Month of February 2017	Totals	Land Drainage	Water Waste	Solid Waste	Transport	SCIRT
Near Misses	14	2	2	9	1	0
First aid injuries (FAI)	19	2	5	11	1	0
Medical Treatment Injuries (MTI)	1	0	1	0	0	0
Lost Time Injuries (LTI)	3	0	1	1	1	0
No. of days lost to LTIs	7	0	5	1	1	0
No. of hours worked	123,773	8,016	17,004	13,856	10,403	74,494
LTIFR	24.2	0.0	58.8	72.2	96.1	0.0
MTIFR	32.3	0.0	117.6	72.2	96.1	0.0
TRIFR (LTI + MTI)	56.6	0.0	176.4	144.3	192.3	0.0
Health and Safety Statistics - Year to Date July - February 2017	**Totals**	**Land Drainage**	**Water Waste**	**Solid Waste**	**Transport**	**SCIRT**
Near Misses	229	38	22	158	11	0
First aid injuries (FAI)	130	11	17	70	1	31
Medical Treatment Injuries (MTI)	26	7	7	4	0	8
Lost Time Injuries (LTI)	7	0	1	5	1	0
No. of days lost to LTIs	15	0	5	9	1	0
No. of hours worked	1,732,154	127,533	166,578	104,156	104,364	1,229,524
LTIFR (SCIRT is a 12 month average)	4.0	0.0	6.0	48.0	9.6	0.4
MTIFR (SCIRT is LTD)	19.1	54.9	48.0	86.4	9.6	6.4
TRIFR (LTI + MTI) (SCIRT is LTD)	23.1	54.9	54.0	134.4	19.2	6.9

Year to Date July 2016 - July 2017

10. Resolution to Exclude the Public

Section 48, Local Government Official Information and Meetings Act 1987.

I move that the public be excluded from the following parts of the proceedings of this meeting, namely items listed overleaf.

Reason for passing this resolution: good reason to withhold exists under section 7.
Specific grounds under section 48(1) for the passing of this resolution: Section 48(1)(a)

Note

Section 48(4) of the Local Government Official Information and Meetings Act 1987 provides as follows:

"(4) Every resolution to exclude the public shall be put at a time when the meeting is open to the public, and the text of that resolution (or copies thereof):

(a) Shall be available to any member of the public who is present; and
(b) Shall form part of the minutes of the local authority."

This resolution is made in reliance on Section 48(1)(a) of the Local Government Official Information and Meetings Act 1987 and the particular interest or interests protected by Section 6 or Section 7 of that Act which would be prejudiced by the holding of the whole or relevant part of the proceedings of the meeting in public are as follows:

ITEM NO.	GENERAL SUBJECT OF EACH MATTER TO BE CONSIDERED	SECTION	SUBCLAUSE AND REASON UNDER THE ACT	PLAIN ENGLISH REASON	WHEN REPORTS CAN BE RELEASED
11	SCIRT DEFECTS LIABILITY MANAGEMENT	S7(2)(H)	COMMERCIAL ACTIVITIES	RELATING TO A COMMERICAL TRANSACTION WITH SCIRT CONTRACTORS	30 June 2018
12	DISPOSAL OF LAND PURCHASED FOR QUARRYMAN'S CYCLE TRAIL	S7(2)(H), S7(2)(I)	COMMERCIAL ACTIVITIES, CONDUCT NEGOTIATIONS	PURCHASE OF THE PROPERTY TO BE DEMOLISHED HAS NOT SETTLED YET.	After settlement of the purchase of the property
13	CONTRACT VARIATION	S7(2)(H)	COMMERCIAL ACTIVITIES	THE REPORT CONTAINS COMMERCIALLY SENSITIVE INFORMATION	Once the Council has made a decision on the contract