CHAPMAN TRIPP

18 June 2019

Resource Consents Unit
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LYTTELTON PORT COMPANY LIMITED - APPLICATION FOR LAND USE CONSENTS IN RELATION TO A CONTAINER TERMINAL AT TE AWAPARAHI BAY

1 We act for Lyttelton Port Company Limited (*LPC*).

2 Please find enclosed:

2.1 An application for land use consents in relation to a container terminal at Te Awaparahi Bay;

2.2 A cheque for the application fee (being the publicly notified land use consent application fee of $15,000);

2.3 An Assessment of Environmental Effects (*AEE*); and

2.4 Appendices containing the reports referred to in the AEE.

Background

3 The Canterbury earthquakes of 2010 and 2011 devastated the Port. The severity of the damage caused to the Port was recognised by the Minister for Canterbury Earthquake Recovery (*Minister*), who directed Environment Canterbury (*ECan*) to develop a Lyttelton Port Recovery Plan (*LPRP*). After an extensive public consultation and hearing process the LPRP was gazetted by the Minister in November 2015.

4 The LPRP recognised the Port's essential role in the recovery and economic productivity of greater Christchurch and the wider region. It provides planning certainty that a series of interrelated projects can occur, through the application of an enabling set of rules (at both District and Regional level) applying specifically to the Port.

5 In 2011 and 2018, LPC gained approvals from ECan to reclaim land and build wharves that cover a total area of 34 hectares at Te Awaparahi Bay, Lyttelton.[1]

6 LPC now seeks two land use consents for the establishment and use of a container terminal and other port activities on the two reclamation areas (the *Container Terminal*).

[1] See CRC175507, CRC175508, CRC175509, CRC175510, and CRC176030.

Activity status and matters to have regard to

7 Applications for consents to establish activities on land that is to be reclaimed are provided for in section 89(2) of the Resource Management Act 1991 (*RMA*), which provides:

> ***89 Applications to territorial authorities for resource consents where land is in coastal marine area***
>
> *[...]*
>
> *(2) Where—*
>
> *(a) an application is made to a territorial authority for a resource consent for an activity which an applicant intends to undertake within the district of that authority once the proposed location of the activity has been reclaimed; and*
>
> *(b) on the date the application is made the proposed location of the activity is still within the coastal marine area,—*
>
> *then the authority may hear and decide the application as if the application related to an activity within its district, and the provisions of this Act shall apply accordingly.*

8 Section 89(2) is silent on the status of the application. The Environment Court[2] has previously concluded that land which is in the process of being reclaimed is effectively "unzoned" in terms of the District Plan and therefore any future land use activity should be classified as a **discretionary activity**.[3]

9 Section 104B RMA sets out how a resource consent application for a discretionary activity is determined:

> ***104B Determination of applications for discretionary or non-complying activities***
>
> *After considering an application for a resource consent for a discretionary activity or non-complying activity, a consent authority—*
>
> *(a) may grant or refuse the application; and*
>
> *(b) if it grants the application, may impose conditions under section 108.*

10 Section 104 RMA sets out the matters to which a consent authority must have regard to when considering applications for resource consents. Section 104(2)

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[2] *Tairua Marine Limited v Waikato Regional Council* (A108/05)

[3] As per section 87B(1) RMA.

provides that regard must be had to "*any other matter the consent authority considers relevant and reasonably necessary to determine the application.*"

11 The LPRP is relevant and reasonably necessary to have regard to in order to determine the application. There is also specific provision in the Greater Christchurch Regeneration Act 2016 (*GCRA*) relating to the LPRP. Section 60(2)(a) of the GCRA provides:

> ***60 Councils, etc, not to act inconsistently with Plan***
>
> *[...]*
>
> *(2) Any person exercising powers or performing functions under the Resource Management Act 1991 must not make a decision or recommendation relating to all or part of greater Christchurch that is inconsistent with the Plan on any of the following matters under the Resource Management Act 1991:*
>
> *(a) an application for a resource consent for a restricted discretionary, discretionary, or non-complying activity (whether or not the application was first lodged after the Plan was gazetted):*

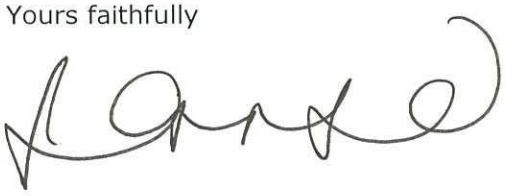
12 Therefore any conditions attaching to the Container Terminal must not frustrate its operation. To do so would be inconsistent with the LPRP (of which the Container Terminal is a key component), and would therefore not meet section 60(2) GCRA. Should the Council, or LPC, consider that this has occurred, they may request the Minister to rule upon the matter or appeal to the Environment Court.[4]

13 In this respect, the application is not a typical discretionary activity application.

Public notification

14 Due to the nature of the application, LPC seeks that this application be publicly notified.

Yours faithfully



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PARTNER

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[4] As per sections 60(3) and (4) GCRA.

Christchurch City Council

Resource Consents Unit

Application for a Resource Consent: Land Use

Resource Management Act 1991 – Form 9

Submit this form online at: onlineservices.ccc.govt.nz; or
Email to: resourceconsentapplications@ccc.govt.nz; or
Deliver to: Resource Consents Unit, Christchurch City Council, 53 Hereford Street, Christchurch; or
Send to: Resource Consents Unit, Christchurch City Council, PO Box 73013, Christchurch Mail Centre, Christchurch, 8154

For enquiries phone: (03) 941 8999 or email DutyPlanner@ccc.govt.nz

About this form

This form is to be used for an application for land use consent under Section 88 of the Resource Management Act 1991 (RMA). It must be accompanied by plans, a Certificate of Title and other supporting information.

A deposit (minimum application fee) is required to be paid before processing will commence (refer Resource Management Fee Schedule). An invoice will be issued when the application has been received.

Applications are checked for completeness prior to acceptance. Please ensure that you have compiled your documents carefully to avoid delays accepting your application. A checklist is included at the end of this form.

Please also refer to the important information for applicants contained in Sections 15 and 16 of this form.

1. Pre-application discussions

Have you had a pre-application meeting or discussions with any Council staff about this proposal?	☒ Yes	☐ No
If yes, what was the name of the planner or other staff member(s)?	*Kent Wilson*	
Date of pre-application meeting (if applicable):	-	
Meeting reference number:	-	

2. Controlled activity application

Is this a land use consent application for a **controlled activity** only, under the District Plan? (defined as a fast-track application under section 87AAC of the RMA)	☐ Yes	☒ No
If **Yes**, do you wish to opt out of the fast-track process?	☐ Yes	☐ No

Please note:

- *If the application involves any activities other than controlled land use activities under the District Plan, it is not a fast-track application.*
- *An application ceases to be fast-track if it is publicly notified or limited notified, or a hearing is to be held.*
- *An electronic address for service must be provided for an application to be a fast-track application.*

3. Application site

Street address:	*Lyttelton Port, Lyttelton*
Legal description:	*N/A*

☐ I have provided a Certificate of Title (Computer Register) less than 3 months old, including a copy of any consent notice, covenant or other encumbrance to which the Council is a party. Note: These can be obtained from Land Information New Zealand: https://apps.linz.govt.nz/survey-titles/order-copy/

OR

☐ I request that the Council obtain a copy of the Certificate of Title (Computer Register) and any relevant encumbrances from Land Information New Zealand and on-charge the cost to me.

4. Applicant details

*Please note that the **applicant** is responsible for the fees associated with this application, unless specified otherwise in Section 6. Where there is an agent, it is the Council's practice to communicate with both the agent and the applicant.*

Full name (including middle name):			
OR			
Registered Company / Trust / Organisation name:	*Lyttelton Port Company*		
Contact person / Trustee names:	*Jared Pettersson*		
Landline:	*03 328 8198*	Mobile :	*021 679 838*
Email:	*Jared.Pettersson@lpc.co.nz*		
Postal Address:	*Waterfront House, 37 – 39 Gladstone Quay, Lyttelton 8082*		

The applicant is the: ☐ Owner ☒ Occupier ☐ Lessee ☐ Prospective purchaser of the application site

☒ Other (please specify): Click here to enter text.

5. Agent details

Name of Agent:	*Jo Appleyard*		
Name of firm:	*Chapman Tripp*		
Landline:	*03 353 0022*	Mobile :	*027 444 7641*
Email:	*jo.appleyard@chapmantripp.com*		
Postal Address:	*Level 5, PWC Building, 60 Cashel Street, Christchurch 8013*		

6. Invoicing details

All consent-related invoices are to be made out to:

☒ Applicant ☐ Agent

☐ Existing 'on-account' customer State name of PMO:

☐ Other (specify below)

Name:	
Email:	
Postal Address:	

Note: Any refunds will be paid to the receipted name unless written authorisation has been received from the receipted person or company.

7. Owners and occupiers of the application site

The full name and postal address of each owner and occupier of the application site (if different to the applicant):

N/A

8. Description of proposal

Describe the proposed activity to be carried out on the site (e.g. to build a new dwelling with attached garage):

To establish a container terminal and other port activities on reclaimed land.

9. Areas of non-compliance

List all of the areas of non-compliance with the rules in the Christchurch District Plan and any relevant National Environmental Standard (*use additional pages if necessary*).

There are no areas of non-compliance.

10. Assessment of Effects

Assessment of any effects on the environment in accordance with Schedule 4 of the Resource Management Act 1991, including reference to the assessment matters in the District Plan where relevant. *This section MUST be completed to a level of detail that corresponds with the scale and significance of the effects that the proposed activity may have on the environment (Use additional pages if necessary).*

See attached AEE.

11. National Environment Standard (NES)

This section relates to the National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil to Protect Human Health. www.mfe.govt.nz/laws/standards/contaminants-in-soil

The NES includes regulations controlling **soil disturbance, change of use, subdivision and removal/replacement of fuel storage systems** on properties which have been used either now or in the past for a hazardous activity or industry (known as HAIL) that may have resulted in contamination of the soil.

Please answer the following questions to determine whether the NES applies to your proposal.

Is the application site listed on Environment Canterbury's Listed Land Use Register (LLUR)? www.llur.ecan.govt.nz. If YES, please include a copy of the LLUR statement with your application.	☐ Yes	☒ No
If the site is not listed on the LLUR, is an activity described on the Hazardous Substances and Industries List (HAIL) currently being undertaken on the piece of land to which this application relates, or is it more likely than not to have ever been undertaken on the land? The HAIL list is available at: http://www.mfe.govt.nz/land/hazardous-activities-and-industries-list-hail	☐ Yes	☒ No
Type of HAIL activity:		

If the answer to either of the above questions is YES, then the NES may apply, depending on the proposed activity. Please identify whether the application involves any of the activities below.
(If the answer to both of the above questions is NO, you do not need to answer the remaining questions in this section).

Will the proposed activity involve disturbance of more than 25m³ of soil (per 500m² of disturbed area)?	☐ Yes	☐ No
Volume of soil disturbance:		
Will the proposed activity involve removal of more than 5m³ of soil (per 500m² of disturbed area) from the site?	☐ Yes	☐ No
Volume of soil removal:		
Does the application involve changing the use of the land to one which, because the land has been subject to a HAIL activity, is reasonably likely to harm human health? (e.g. service station to office, orchard to residential)	☐ Yes	☐ No
Does the application involve removing or replacing a fuel storage system or parts of it?	☐ Yes	☐ No
Does the application involve subdivision of the land?	☐ Yes	☐ No

If the answer to any of the above activity questions is also YES, then the NES will apply.

- Soil disturbance or removal exceeding the specified volumes requires resource consent.
- Changing the land use or subdividing the land will require resource consent if the permitted activity requirements of the NES are not complied with. These include provision of a Preliminary Site Investigation carried out by a suitably qualified and experienced practitioner.
- Removal or replacement of a fuel storage system will require consent if the permitted activity requirements of the NES are not complied with.

Does the proposed activity require resource consent under the NES?	☐ Yes	☒ No

If the answer is YES, an assessment of the application under the NES must be provided as part of your Assessment of Effects on the Environment (refer Section 10 above). A Detailed Site Investigation may be required.

12. Other Applications

Have you applied for, or are you required to apply for, any other **resource consents** for this project, either from the Christchurch City Council or Environment Canterbury, and if so, what type?

		Has been applied for:	Is required to be applied for:	Has been obtained:	Reference no. (if applicable):
Christchurch City Council	Subdivision Consent	☐	☐	☐	
	Other Land Use Consent	☐	☐	☐	
Environment Canterbury	Water Permit	☐	☐	☐	
	Discharge Permit	☐	☐	☐	
	Coastal Permit	☐	☐	☒	*CRC175507; CRC175508; CRC175509; CRC175510; CRC176030*

OR

☐ No additional resource consents are needed for the proposed activity.

Have you applied for a **Project Information Memorandum (PIM)** or a **building consent** for this project?	☐ Yes	☒ No
If yes, what is the project number (BCN number)?		

13. Development Contributions

The following information is required for assessment of levies under the Development Contributions Policy.

Residential development

The use of land or buildings for living accommodation purposes including residential units such as dwellings, serviced apartments and until/strata development but excluding retirement villages and travellers accommodation such as hotels, motels and hostels.

Existing:		**New Total** *(Existing plus proposed)*:	
Number of residential units:		Number of residential units:	

Has a residential unit been demolished/removed from the site? ☐ Yes Date:

The following section applies when there will be more than one residential unit on the site:

Gross floor area (all buildings): m^2 Gross floor area of each unit: m^2
(*Attach separate page if necessary*)

The following section applies where there will be two or more **attached** residential units are on the site:

Impervious surface area m^2 Impervious surface area: m^2

**Impervious Surface Area includes the area of roofs, paving and gravel.*

Non-residential Development

The use of land or buildings for commercial premises/offices, shopping centres, supermarkets, service stations, market, bulk goods/home improvement stores, retail facilities, manufacturing industries, restaurants, drive-in fast food restaurants, warehouse/storage, retirement villages and commercial accommodation.

Existing:				**New total** (*Existing plus proposed*):			
Impervious surface area:*	m^2			Impervious surface area:*	m^2		
Landscaping area (lawn/garden):	m^2			Landscaping area (lawn/garden):	m^2		
Gross floor area for each land use activity:				Gross floor area for each land use activity:			
Gross floor area:	m^2	Land Use:	m^2	Gross floor area:	m^2	Land Use:	m^2

Gross floor area:	m^2	Land Use:	m^2	Gross floor area:	m^2	Land Use:	m^2
Gross floor area:	m^2	Land Use:	m^2	Gross floor area:	m^2	Land Use:	m^2
Total gross floor area:	m^2			Total gross floor area:	m^2		

*Impervious Surface Area includes the area of roofs, paving and gravel.

Special Assessment

If the development is one that is not recognised as a residential or non-residential land use (as above), please provide the following information for a special assessment of development levies.

Existing:		**New total** (*Existing plus proposed*)	
Impervious surface area:*	m^2	Impervious surface area:*	m^2
Traffic movements per day:		Traffic movements per day:	
Litres of water usage per day:		Litres of water usage per day:	

*Impervious Surface Area includes the area of roofs, paving and gravel.

Note: *For mixed use developments please complete all relevant sections above.*

Connections to Council Infrastructure

Does this development require connection/s to the following:

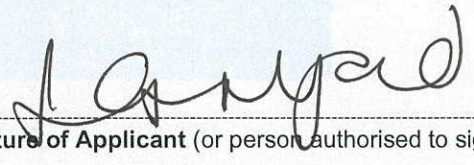
Water supply	☐ Yes	☒ No
Stormwater	☐ Yes	☒ No
Wastewater	☐ Yes	☒ No

14. Declaration

I have completed all relevant sections of this form (including the checksheet in Section 16), and I understand that my application may be returned as incomplete if it does not include all of the relevant information.

I understand that the fees paid on lodgement **are a deposit only**, and that the Council will invoice all costs actually and reasonably incurred in processing this application.

All of the information provided with this application is, to the best of my knowledge, true and correct. I understand that all information submitted as part of an application is required to be kept available for public record, therefore the public (including business organisations, media and other units of the Council) may view this application, once submitted. It may also be made available to the public on the Council's website. If there is commercially sensitive information in your application please let us know. If you would like to request access to, or correction of, your details, please contact the Council.



Signature of Applicant (or person authorised to sign on behalf of applicant):

Date	*18 June 2019*	Print name	*Jo Appleyard*

If you are signing this application on behalf of a company/trust/other entity (the applicant), you are declaring that you are duly authorised to sign on behalf of the applicant to make such an application.

15. Fee information

The required deposit (Minimum Application Fee) must be paid before processing of the application will start. A further invoice will be issued when the processing of this application has been completed if the cost of processing it exceeds the deposit paid. If the cost of processing the application is less than the deposit a refund will be issued to the **person who paid the fee**.

Where the application fee is to be charged to an **account holder** no deposit is required. Instead the actual fees will be invoiced on completion of processing.

Interim invoices may be issued on a monthly basis for all applications, including where the applicant is an account holder.

The Resource Management Fees Schedule can be viewed at: https://ccc.govt.nz/consents-and-licences/resource-consents/resource-management-fees/

DEBT RECOVERY – Where an invoiced amount has not been paid by the stated due date, the Council may commence debt recovery action. The Council reserves the right to charge interest, payable from the date the debt became due, and recover costs incurred in pursuing recovery to the debt.

MONITORING FEES – Please note that if this application is approved you will be required to meet the costs of monitoring any conditions applying to the consent, pursuant to Section 35 of the Resource Management Act 1991.

DEVELOPMENT CONTRIBUTIONS – Your development, if granted, may also incur development contributions under the Local Government Act 2002 in accordance with the Council's Development Contributions Policy. Any development contributions payable will be invoiced to the applicant.

16. Additional notes for the applicant

1. This application is for resource consent under the Resource Management Act 1991. In processing the application the Council can only consider relevant matters under the Resource Management Act. Please be aware that there may be a range of other matters which could affect your ability to carry out the proposed development or activity, and it is your responsibility to investigate these.
2. If your proposal involves building work or change of use of a building you may also require a building consent under the Building Act 2004. This must be applied for separately. Dependant on the nature of the proposal, other consents or licences may also be required under such legislation as the Health Act 1956 and the Sale of Liquor Act 1989.
3. You may apply for two or more resource consents that are needed for the same activity on the same form.
4. The written approval of persons the Council considers may be adversely affected by the proposal may be required as part of the application, if it is to be processed on a non-notified basis. This will be determined after the application has been lodged and assessed, and a site visit carried out.
5. Consultation with neighbours and other affected persons is at the discretion of and is the responsibility of the applicant.
6. The costs incurred in receiving and checking incomplete applications are invoiced to the applicant. To avoid delays and cost please ensure that you submit a complete application.
7. If further information is required after your application is accepted, you will be advised as soon as possible and processing of the application will be suspended until the information is received.
8. All applicants are asked to check the accuracy of the information supplied. Inaccuracies in information supplied can cause difficulties at a later date, such as additional costs, delays and legal proceedings initiated by the Council and/or by other persons.
9. If resource consent is granted the applicant has a legal obligation to comply with any conditions of the consent.

17. Checklist

This checklist has been produced to assist you in the preparation and lodgement of your application. The provision of correct and accurate information will ensure that delays are kept to a minimum. Please complete all sections using **Y** where the information is provided, or **N** where the information is not required.

[ ] **a. Application Form P-001 (1 copy)**

[ ] Completed and **signed** application form, including a full description of the proposal, a list of the ways in which it does not comply with the Christchurch District Plan and/or NES, and an assessment of effects on the environment

[ ] **b. Location of Application Site**

[ ] Copy of current Certificate of Title (Computer Register) less than 3 months old, including any consent notices, covenants or other encumbrances to which the Council is a party.
(Note: The Council can obtain this from Land Information New Zealand on your behalf)

[ ] **c. Application Fee / Deposit**

[ ] Fees payable and internet banking details are set out in the Resource Management Fee Schedule.

[ ] **d. Site Plan (1:200) showing (where relevant)**

[ ] Location and use of all existing and proposed buildings in relation to legal and internal boundaries;

[ ] Location of any waterway and dimensions from its banks to any new buildings and/or earthworks (see also g. below);

[ ] Vehicle access, manoeuvring, parking spaces and driveway gradients;

[ ] Outdoor living, service and storage space;

[ ] Landscape plan showing location, species and height of all existing and proposed plants;

[ ] Location of protected trees on the site or adjoining sites;

[ ] Location of street trees on road reserve adjoining the application site;

[ ] Areas of proposed filing or excavation, retaining walls and existing and proposed ground levels;

[ ] Building coverage (proposed and existing) in square meters; and

[ ] Surveyed ground and floor levels (especially at critical points to show District Plan compliance).

[ ] **e. Floor Plans (1:100 / 1:50) showing (where relevant)**

[ ] Proposed uses;

[ ] Gross floor areas for each use;

[ ] Location of all/any kitchen facilities;

[ ] Doors and windows; and

[ ] Overall dimensions of all buildings.

[ ] **f. Elevations (1:100 / 1:50) showing (where relevant)**

[ ] Recession planes from accurate levels;

[ ] Maximum height; and

[ ] Doors and windows.

[ ] **g. Water body setback intrusions (in addition to other information on this checksheet)**

[ ] The location of the required water body setback, measured in accordance with Appendix 6.11.5.2 and 6.11.5.3 of the District Plan;

[ ] The amount of building intrusion within the setback (in m^2), including any proposed decking;

[ ] Volume and location of proposed excavation and filling within the water body setback;

[ ] An assessment of the effects of the intrusion on the water body environment; covering the matters in Rule 6.6.7 of the District Plan;

[ ] For water bodies defined as Nga Wai in Appendix 9.5.6.4, an assessment of the proposal against the matters in Rule 9.5.5.3 of the District Plan (also refer to the Mahaanui Iwi Management Plan at www.mkt.co.nz)

[ ]		Details of any bank maintenance and/or enhancement works; and
[ ]		An assessment of the effects of the activity where the water body is identified as a Site of Ecological Significance in Schedule A of Appendix 9.1.6.1.
[ ]	**h.**	**HAIL (land contamination) information**
[ ]		Details of any known areas of contamination, or potential contamination identified on Environment Canterbury's Listed Land Use Register (www.llur.ecan.govt.nz) and/or in a contamination investigation report.
[ ]		A copy of the LLUR statement if the site is listed on the Register.
[ ]		If the land is contaminated or potentially contaminated (refer Section 8 of this form) a report from a suitably qualified and experienced practitioner (e.g. consultant experienced in investigating and managing contaminated land) outlining how the works will be managed to avoid potential effects on the health of neighbours and people living and working on the site, and on the environment. A Preliminary Site Investigation or Detailed Site Investigation may be required.
[ ]	**i.**	**Assessment of Environmental Effects**
[ ]		An assessment of effects on the environment in accordance with Schedule 4 of the RMA, at a level of detail that corresponds with the scale and significance of the effects that the proposed activity may have on the environment. This assessment may require technical specialist reports on matters such as traffic, heritage, noise, protected trees, contaminated land, geotechnical assessment, landscape and urban design.

***Note**: This is a preliminary checksheet only. It is general in nature and does not cover all rules in the District Plan, nor is all of the information relevant to all types of application. Please check with a planner at the Council if you are unsure of the information requirements for your particular application. Please also note that the detailed technical review of your application may reveal the need for you to supply further information, in which case you will be advised as soon as possible.*

LAND USE CONSENT APPLICATION

TE AWAPARAHI BAY

CONTAINER TERMINAL

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LAND USE CONSENT APPLICATION

TE AWAPARAHI BAY CONTAINER TERMINAL

Lyttelton Port Company

1 INTRODUCTION

Proposal to carry out port activities on reclaimed land

1.1 Lyttelton Port Company ('LPC') is seeking two land use consents from the Christchurch City Council to enable the establishment and operation of port activities on reclaimed land at Te Awaparahi Bay, at the eastern end of Lyttelton Port.

1.2 The particular port activities proposed to be carried out on the reclaimed land will be a container terminal and other port activities. For ease of reference, these applications will be referred to as "the Container Terminal", to describe the proposed port activities for which consents are sought.

1.3 LPC has previously gained approvals from Environment Canterbury to reclaim land and build wharves that cover a total 34 hectares ('ha') in Te Awaparahi Bay (Refer **Appendix 1**).

1.4 LPC also holds an existing landuse consent granted in 2011 to use 10 ha of the total 34 ha for port activities (Refer **Appendix 1**).

1.5 The reclaiming of the land, which commenced in 2011, is being carried out in two distinct parts, as shown on **Figure 1.1**:

- Reclamation A (comprising Phases 1 and 2); and
- Reclamation B.

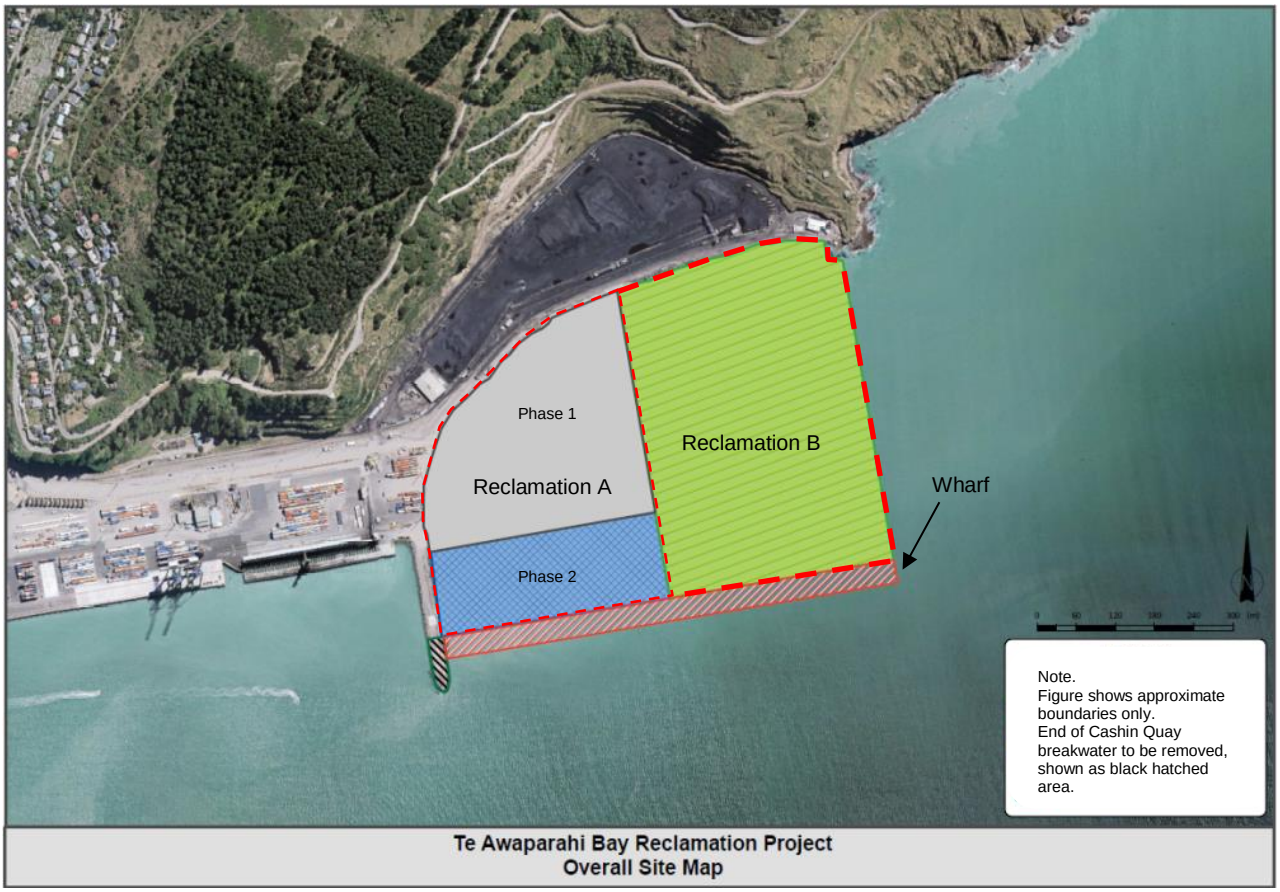

Figure 1.1: Plan showing the location of Reclamation A and B and the associated wharf.

1.6 The construction of Reclamation A (Phase 1) has recently been completed. The Phase 1 land reclamation is 10 ha. It is currently being used for the transitory storage of cargo, such as cars and logs, as well as providing access to the Phase 2 reclamation area, shown in **Figure 1.1** above.

1.7 The construction of Reclamation A (Phase 2) has commenced and is anticipated to be completed, along with a wharf, between 2024 and 2026. The Phase 2 land reclamation will be a maximum of 6 ha in size. Reclamation A (Phase 1 and 2) will therefore be a combined total maximum area of 16 ha.

1.8 The construction of Reclamation B, including the associated wharf, is not anticipated to be completed until some 15 years after completion of Reclamation A. Reclamation B, together with the wharf, will be approximately 18 ha. Therefore, the full extent of the Container Terminal is unlikely to be realised until the late 2030's.

1.9 Further details on the project description can be found in **Chapter 2** of this Assessment of Environmental Effects ('AEE').

1.10 LPC is therefore seeking two land use consents from the Christchurch City Council. The first land use consent will enable the establishment and operation of the Container Terminal on Reclamation A and associated wharf. Once the land use consent for Reclamation A commences, the land use consent referred to in paragraph 1.4 above, the existing consent granted in 2011, can be surrendered.

1.11 The second land use consent will enable the establishment and operation of the Container Terminal on Reclamation B.

1.12 The land use consents are classified as **discretionary activities**. Further details of the consenting requirements, including the why two separate land use consents are considered necessary, are found in **Chapter 8** of the AEE.

Background

1.13 Lyttelton Port of Christchurch is the primary international gateway for the South Island, with Christchurch being the major distribution centre for inbound goods. Cargo being exported from the Port originates from across the South Island. Export customers include a wide variety of dairy, meat, forestry, horticultural, mineral extraction and manufacturing businesses.

1.14 Lyttelton Port is the most significant port in the South Island in terms of total tonnage of cargo and containers handled and the value of imports received, as well as in the value of certain exports.

1.15 In 2011, during the immediate aftermath of the 2010 and 2011 sequence of earthquakes, the then Minister for Canterbury Earthquake Recovery (Hon Gerry Brownlee) enabled LPC to apply to Environment Canterbury and Christchurch City Council via Order in Council for resource consents as controlled activities to construct a reclamation at Te Awaparahi Bay. The purpose of this reclamation was to receive demolition rubble from the CBD, and to use the reclaimed land for port activities.

1.16 In June 2011, LPC obtained the necessary consents to reclaim up to 10 ha of land and to

use the reclaimed land for port activities[1].

1.17 The sequence of earthquakes also significantly damaged the Port. Consequently, the Minister for Canterbury Earthquake Recovery directed Environment Canterbury to develop a Lyttelton Port Recovery Plan ('Recovery Plan'). The purpose of the Recovery Plan was to enable the complex repair, rebuild and reconfiguration of the Port, and its operations, to be completed in an expeditious and efficient manner. In November 2015, the Minister gazetted the Recovery Plan after a lengthy process involving submissions and a public hearing.

1.18 A key element of the Recovery Plan is the the 34 ha reclamation at Te Awaparahi Bay, which will service the Container Terminal and associated berths. The Recovery Plan recognises that a lack of flat land is a significant constraint to handling the increasing freight volumes arriving at the Port in an efficient manner, and thereby causing flow-on costs to exporters and importers. The Port's lack of capacity to service increasing freight volumes has been further exacerbated by damage caused by the earthquakes.

1.19 The Recovery Plan directed that the Regional Coastal Environment Plan contain provisions to make a future reclamation, including wharf structures, in Te Awaparahi Bay a controlled activity. Because the reclaimed land did not exist in the District at the time of the Recovery Plan process, it was not possible to seek changes to the activity status in the District Plan relating to these applications for land use consents.

1.20 The Recovery Plan has special significance in relation to these land use applications, because Section 60(2) the Greater Christchurch Regeneration Act 2016 ('Regeneration Act') provides that any person deciding a resource consent application "*must not make a decision or recommendation….that is inconsistent with the Plan…*".

1.21 In addition to the existing consents relating to the 10 ha reclamation referred to in paragraph 1.4 above, LPC has also obtained the necessary resource consents to construct an additional 24 ha of reclamation and wharf.[2] The construction of the additional 24 ha reclamation is to be carried out in two stages, i.e.:

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[1] The consent granted by Christchurch City Council is RMA92018173 (Refer **Appendix 1**).

[2] CRC75507 (Refer **Appendix 1**).

a. Stage 1 creates approximately 6 ha of land and a wharf approximately 350m long and 40m wide; and

b. Stage 2 creates approximately 18 ha of land and a wharf approximately 400m long and 40m wide.

1.22 The entire 34 ha reclamation and wharf envelope (including the 10 ha already completed under the consents referred to in paragraphs 1.3 and 1.4) is shown in **Figure 1.1**.

1.23 Consistent with the staged construction of the reclamation envelope, the establishment of the Container Terminal on the reclaimed land as discussed above is also proposed to be completed in two distinct time periods, hence the reference to Reclamation A (Phase 1 and Phase 2) and Reclamation B in this application, and why two separate land use consents are sought for Reclamation A and Reclamation B**.**

Purpose and Content of AEE

1.24 The purpose of this AEE document is to assess the actual or potential effects associated with the establishment of the Container Terminal on Reclamation A and Reclamation B, and describe the proposed measures to mitigate adverse effects on the environment, where appropriate.

1.25 The AEE contains proposed mitigation measures for building height, lighting and noise, which is detailed further in **Chapter 6**. Such measures are expected to form the basis of conditions of consent.

1.26 The land, once built, will eventually be subsumed into the Specific Purpose (Lyttelton Port) Zone ('Port Zone') in future plan change processes and the conditions on building height, lighting and on noise are expected to be converted into standards for this part of the Zone.

1.27 Any conditions on the consents must not frustrate the operation of the Container Terminal. To do so would be inconsistent with the Recovery Plan; of which this development is a key component as described above and would therefore not meet Section 60(2) of the Regeneration Act.

1.28 The AEE is set out as follows:

a. Site location and description (above);

b. A description of the proposed activity (**Chapter 2**);

c. A description of the existing environment **(Chapter 3)**;

d. An assessment of effects on the environment **(Chapter 4)**;

e. A description of the mitigation measures (**Chapter 5)**;

f. A description of consultation **(Chapter 6)**; and

g. An assessment of the relevant statutory provisions **(Chapter 7)**.

1.29 The technical assessment reports supporting the AEE are listed in **Table 1.1**.

Topic	Company	Appendix Number
Economics	Brown Copeland and Co	2
Lighting and Glare	Opus	3
Visual Simulations	Virtual View	4
Visual/Landscape	Andrew Craig Landscape Architecture	5
Noise	Hegley Acoustic Consultants	6
Traffic	Stantec	7
Power	Pedersen Reid	8

Table 1.1: Supporting technical reports appended to the AEE.

2 PROJECT DESCRIPTION

Introduction

2.1 The establishment and operation of the Container Terminal is proposed on Reclamation A (Phases 1 and 2) and Reclamation B, consistent with the staged-construction of the reclamation outlined in **Chapter 1**.

2.2 Reclamation A will see the ongoing development of port activities on the recently completed 10 ha reclamation (Phase 1), which was consented in 2011 together with construction of an additional 6 ha reclamation/wharf (Phase 2). In summary, the sequence of development on the Reclamation A land with indicative timelines is as follows:

Reclamation A: 2019 - 2020

a. Increasing use of containers and associated establishment of infrastructure to serve the containers on the Phase 1 reclamation;

b. Continuing storage of cars and logs on the Phase 1 reclamation; and

c. Continuing stockpiling at the south-eastern end of the Phase 1 reclamation, as a means to pre-load the surface and further consolidate the reclaimed land.

Reclamation A: 2020 – 2024/2026:

d. Continuing development of container facilities on the Phase 1 reclamation;

e. Completion of construction of the 6 ha, Phase 2 reclamation and the use of the land for cars and logs as the land settles after construction; and

f. Constructing the Reclamation A (Phases 1 and 2) container terminal and associated wharf, with quayside cranes to load and unload vessels.

2.3 The construction of the Reclamation B bund is likely to commence prior to the completion of the Container Terminal on Reclamation A. However, the establishment of the final container terminal is unlikely to be realised for 15 years after the completion of Reclamation A, or potentially longer, due to the amount of time required for the construction methodology being used for Reclamation B.

2.4 The project description below provides further details of each development sequence. However, it is emphasised that the layouts and the timelines are indicative only and could change as LPC refines its design to reflect changes in cargo volumes, demand forecasts and land availability.

2.5 While the Container Terminal is being developed on the reclaimed land, vessels with other types of cargo may use the berths in Te Awaparahi Bay or other cargo may be stored in the area. To operate efficiently, LPC needs to be able to shift vessels and cargo to different parts of the Port in response to changes in the volume or type of cargo coming through the Port, or in response to the need to maintain or repair other parts of the Port. Therefore, consent is sought for "port activities" to be established on the reclaimed land as defined in the District Plan (see **Chapter 7**) noting the land will likely be rezoned for port activities during the next review of the District Plan, in any event.

2019 - 2020: Existing Use and Indicative Development of Reclamation A (Phase 1)

2.6 As shown in **Figure 2.1**, the completed 10 ha Reclamation A (Phase 1) is currently being used to store both full and empty containers adjacent to Cashin Quay. The blue 'Terminal' area mostly houses full containers that are stacked three-high (approx. 8.5m) while the Empty Container Yard ('ECY') houses empty containers that are stacked five-high (approximately 14.5m). Cars and logs are stored to the east and north while the eastern-end of the reclamation is being used as a construction zone. Surcharge material has been deposited in the stockpile area in order to pre-load the surface, as a means to further consolidate the reclaimed land until settlement rates reach an acceptable level. This activity is authorised by the existing 2011 consent, referred to in paragraph 1.4 above, as well as the consents granted by Environment Canterbury (Refer **Appendix 1**).

Figure 2.1: Completed 10 ha Reclamation A (Phase 1) showing port activities being carried out, being mostly full containers in the blue 'terminal' area, with an adjoining ECY. Car and log storage areas are located on the northern and eastern sides of the circulation road, with construction/stockpile areas located at the far eastern end. Cashin Quay is to the left.

2.7 The next two years will see Reclamation A (Phase 1) continue to be developed as shown in **Figure 2.2**. The road will be re-aligned, including a direct link being provided to Cashin Quay. Electricity will be installed so that refrigerated ('reefer') containers can be stored in the area. The reefer containers are to be stacked four-high and need to connect to three-storey steel lattice frames, called reefer towers. The height of the containers and towers will be approximately 12m. The reefer towers are designed to enable safe electrical connection to the reefer containers, without the use of ladders.

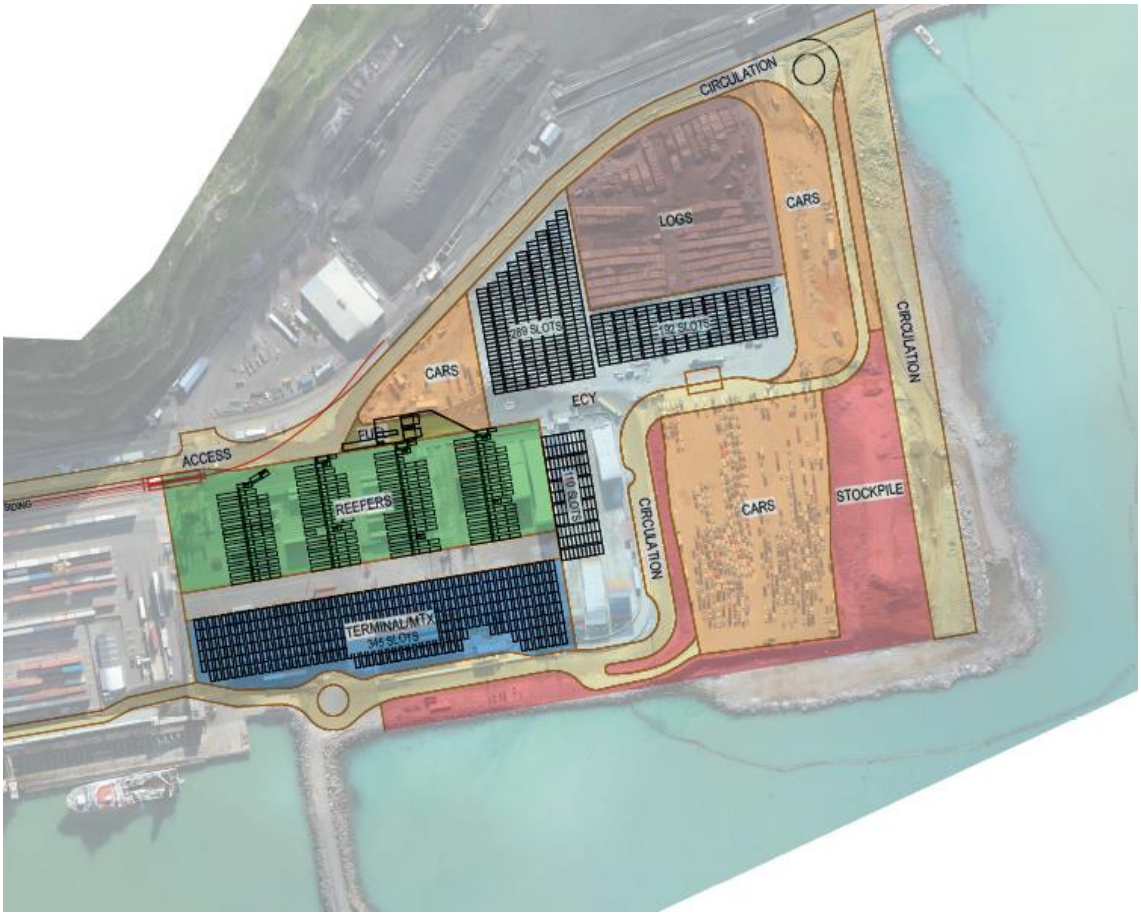

Figure 2.2: Indicative future development of 10 ha Reclamation A (Phase 1) showing full containers in the blue 'terminal' area, reefer containers in the green 'reefer' area, the adjoining 'ECY' in light blue area, car and the log storage area and stockpile (surcharge) areas with the haul road serving the 6 ha Reclamation A (Phase 2).

2.8 Full containers are intended to be located on the seaward side of the reefers, while empty containers would be stored in the ECY, with cars and logs stored to the east and north respectively. The far eastern end of the reclamation is to be used as a haul road to carry rock from the Gollans Bay quarry. The rock will be used as seawall protection and fill material for the 6 ha Reclamation A (Phase 2).

2.9 **Figure 2.3** shows Reclamation A (Phase 2) at the completion of construction. Cars and logs are likely to be stored on the reclaimed land while the land consolidates. Phase 1 will continue to undergo development for container storage, with expansion of the terminal and reefer areas, which again are to be stacked three and four-high respectively. The MTX area shown in yellow is an empty container handling transition area, to allow a change in container handling equipment (straddles to reach stackers). Empty containers could be stacked up to

nine-high (approximately 25m) in this area. The area in pink will be the park up for the straddle carries (see **Figure 2.4**) and to house the Ministry of Primary Industries ('*MPI*').

Figure 2.3: Indicative future development Reclamation A (Phase 1) showing full containers (Terminal) in blue, reefer container area in green, MTX area in yellow, the ECY to the north, as well as car/log/ stockpile areas. The red area is to house the straddle carries and MPI.

Figure 2.4: Example of a straddle carrier

2020 – 2024/2026: Completion and Use of the Phase 2

2.10 Once the 6 ha Reclamation A (Phase 2) has settled to acceptable levels, the first portion of the wharf (approximately 350m long) will be built. The wharf is expected to take about 18 months to construct, with a programmed completion date in 2024/2026.

2.11 With the wharf complete, ship-to-shore cranes (up to 4) would be put in place to unload and load container vessels. Full containers are unlikely to be stored on the Phase 2 land until land settlement is fully complete, with straddle carriers taking the containers to the 10ha Reclamation A (Phase 1) area shown on **Figure 2.3** or to Cashin Quay. Empty containers could be stored in the Reclamation A (Phase 2) reclamation area.

2.12 A programme to establish the container terminal infrastructure would then commence, which will consist of paving and installing container handling equipment, permanent lighting and other services.

2.13 As shown on **Figure 2.5**, the intention is for the Reclamation A container terminal to operate stacking cranes in the long term, although the new terminal will initially run a straddle operation. Straddle carriers will continue on the existing Cashin Quay container terminal.

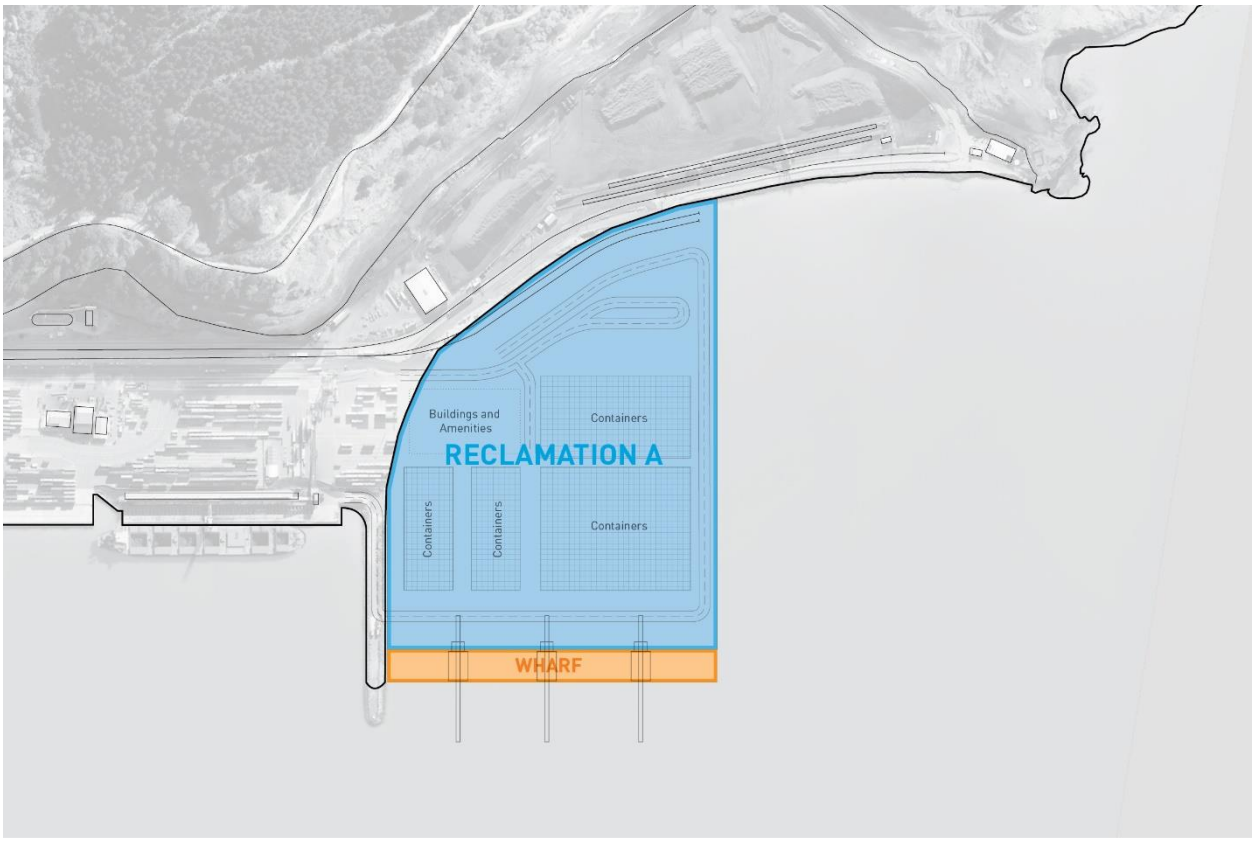

Figure 2.5: Indicative future development of 16 ha Reclamation A and wharf.

2.14 Stacking cranes enable the establishment of dense container blocks with a minimal gap between containers. An example of stacking cranes and associated blocks in operation is shown on **Figure 2.6**. The containers would be stacked seven-high and eight wide and each block about 180m long. Each block, including the stacking cranes, would be a height of approximately 20m.

Figure 2.6: Example of stacking crane blocks, noting these are only stacked five high

2.15 A container exchange area for trucks is to be located at the rear of the terminal, adjacent to the stacking container blocks. Empty container blocks, up to nine containers high (approx 23m) would be located on the reclamation, likely on the western-edge and north-eastern corner.

2.16 A rail line and associated loading/unloading infrastructure is proposed to run along the northern-edge of the reclamation, roughly parallel to the existing coal yard.

2024 to 2026 onwards

2.17 The construction of the Reclamation B bund is likely to commence between 2020 and 2024 to 2026. As shown in **Figure 2.5**, a perimeter bund would be constructed first, followed by the infilling of the reclamation paddock with quarry material, imported fill, demolition rubble and/or dredge spoil.

2.18 When the southern edge of Reclamation B becomes sufficiently stable, the second part of the wharf would be constructed and up to four or more ship-to-shore container cranes installed.

2.19 Once the settlement rate of the Reclamation B has reduced to acceptable levels, the terminal infrastructure will be installed. As noted earlier, it is likely to take some 15 years for the reclaimed land to sufficiently settle to allow further construction. As shown on **Figure 2.7**, the development of the Container Terminal on Reclamation B involves the eastward extension of the stacking container blocks and the rail and truck exchange to the rear, which may be staged depending on freight volumes and construction decisions made at the time.

Figure 2.7: Indicative future development of full 34ha Reclamation A, Reclamation B and wharf.

3 EXISTING ENVIRONMENT

Physical Setting of Lyttelton Harbour/Whakaraupō

3.1 Lyttelton Harbour/Whakaraupō is a 15km long, rock-walled inlet with an average width of approximately 2 km. As shown below in **Figure 3.1**, the upper harbour widens to form Governor's Bay, Charteris Bay and the head of the Harbour, separated by peninsulas and Quail Island. The harbour has a low-tide area of approximately 43 km^2 and a central, long axis oriented in an ENE-WSW direction.

Figure 3.1: Lyttelton Harbour/Whakaraupō. Source: satellite mosaic from Google Earth, 15 Feb 2011

3.2 The wider area of Banks Peninsula comprises two large Miocene (11 to 8 million years old) volcanoes, the central areas of which have collapsed and been eroded. Subsequent drowning by the sea has formed the Lyttelton and Akaroa inlets. The underlying volcanic rocks of the peninsula are commonly mantled by deposits of loess, up to 20 m thick and blown from the Canterbury Plains during the glacial period from approximately 2.6 million until 11.7 thousand years ago, and also loess colluvium (volcanic detritus). This fine sediment is readily eroded from the hill slopes and transported to the sea.

3.3 Previous drilling work has shown that the Harbour has in-filled over 100m in places. As a result of this accretion and the high rates of resuspension, the seabed of the Harbour is

unusually flat in profile with rocks exposed at only two locations: Parsons Rock, north of Ripapa Island, and Shag Reef, north-east of Quail Island.

3.4 Ocean swells and winds from Pegasus Bay penetrate the Harbour up to the Port. These swells and waves have the ability to suspend the fine benthic sediments particularly in the shallower bays of the outer Harbour. There is only limited penetration of swell waves past the Port and into the upper Harbour, where the wave climate is instead dominated by wind waves generated locally across moderate water fetches. However, the extensive shallows of the upper Harbour flats mean that these short period waves also maintain high levels of sediment suspension. Lyttelton Harbour is therefore a turbid environment much of the time.

3.5 Although there is some variation, the overriding feature in Lyttelton Harbour is a benthic community that is inherently tolerant of these turbid conditions: they are adapted to periods of very high suspended sediments resulting from persistent wave re-suspension of fine sediments.

3.6 Although a wide variety of fish species have been anecdotally reported (23 species) the Harbour is not known for its fishing generally. In terms of mammals, Hector's dolphin/upokohue (*Cephalorhynchus hectori*) is regularly sighted in the Harbour, peaking in the summer months, and the New Zealand fur seal/kekeno (*Arctocephalus forsteri*) is found at the Heads.

Physical Setting of Te Awaparahi Bay

3.7 The coastline from Magazine Bay east to Battery Point has been heavily modified by the Port, with flat land, linear shorelines and breakwaters that enclose the inner Harbour and protect Cashin Quay. The existing coal stockyard, along with the recent completion of the 10 ha reclamation approved in 2011 (Reclamation A, Phase 1) and the commencement of the approximately 6 ha Reclamation A (Phase 2) in Te Awaparahi Bay typify the reclamation and modification that has occurred throughout the Port area. The Port environment is one of continual activity and noise, with ships, trains, cargo, stockpiled material, and other port infrastructure.

3.8 The old Sumner Road, which runs to the Gollans Bay Quarry, is located on the slopes above the coal stockyard. Above that again is Sumner Road, which traverses the western slopes of Gollans Bay under the high rock bluffs and meets the ridge top at the Evans Pass summit.

Sumner Road is now open for public use after remediation works being carried for several years following the earthquake sequence.

3.9 Residential areas of Diamond Harbour and Charteris Bay headland lie across the other side of the harbour from Te Awaparahi Bay, approximately 3 to 4.5 km to the south, and some parts of these communities would have a line of view to the site. Most of the Lyttelton residences are separated from the site by a high ridge.

3.10 An identified 'historic area', below old Sumner Road behind the coal yard, encompasses 20 historic sites. The sites relate to military defence activity and structures from the 1880's and World War II. Seventeen of the sites are on Battery Point with the remaining three, in the inner bay, to the west.

3.11 The coal stockyard and the land on the slopes above Te Awaparahi Bay and Gollans Bay is owned by LPC, except for old Sumner Road and a now disused landfill, which is located on land owned by the Christchurch City Council.

Reclamations are part of the existing environment at Te Awaparahi Bay

3.12 As discussed in **Chapter 1**, LPC has previously gained approvals from Environment Canterbury to reclaim land and build wharves that cover a 34 ha envelope in Te Awaparahi Bay. Legally, this means that the reclamation, whether constructed as of today or into the future, is considered to be part of the existing environment.

3.13 Likewise, LPC has previously gained land use consent from the Christchurch City Council to establish and operate port activities on 10 ha of land already reclaimed since the earthquakes i.e. Reclamation A (Phase 1). Again, this means a full range of port activities, subject to the conditions, can establish on this portion of Reclamation A and this, therefore, is also considered to be part of the existing environment.

3.14 Therefore, this AEE and the technical reports supporting the AEE are on the basis that the reclamation and port activities discussed above form part of the existing environment in Te Awaparahi Bay when assessing the actual or potential effects associated with the applications.

Social and Cultural Context

3.15 There is a long and rich history of Māori settlement in Banks Peninsula, including Whakaraupō. Te Hapū o Ngāti Wheke holds mana whenua and mana moana (traditional authority) over Whakaraupō and its catchment. Lyttelton Port is also located within the takiwā (traditional territory) of Te Hapū o Ngāti Wheke (Rāpaki). The value of Whakaraupō as a provider of mahinga kai is emphasised in the Mahaanui Iwi Management Plan (see pages 246 and 249).

3.16 Rāpaki traditionally fished for a range of species in Whakaraupō, including pātiki (flounder), hoka, (red cod), aua (herring), hokarari (ling) koiro (conga eel) and the delicacy pīoke (rig). However, fishing stocks today are insufficient to provide a regular food source for those living at Rāpaki.

3.17 The Ngāi Tahu Claims Settlement Act 1998 ('NTCSA') recognises the importance of the coastal marine area to Ngāi Tahu via the identification of the Te Tai o Mahaanui Statutory Acknowledgement ('SA') area. A statutory acknowledgement is an acknowledgement by the Crown of the particular cultural, spiritual, historical and traditional association of Ngāi Tahu with those areas.[3]

3.18 A Mātaitai was gazetted in 2017 for the for the upper half of the Harbour, as shown in **Figure 3.2.** This Mātaitai excludes the immediate Port area.

[3] Note, however, that the statutory acknowledgement does not affect, and is not to be taken into account in, the exercise of any power, duty, or function by any person or entity under any statute, regulation, or bylaws except as expressly provided for in sections 208 to 211, 213 and 215 of the NTCSA.

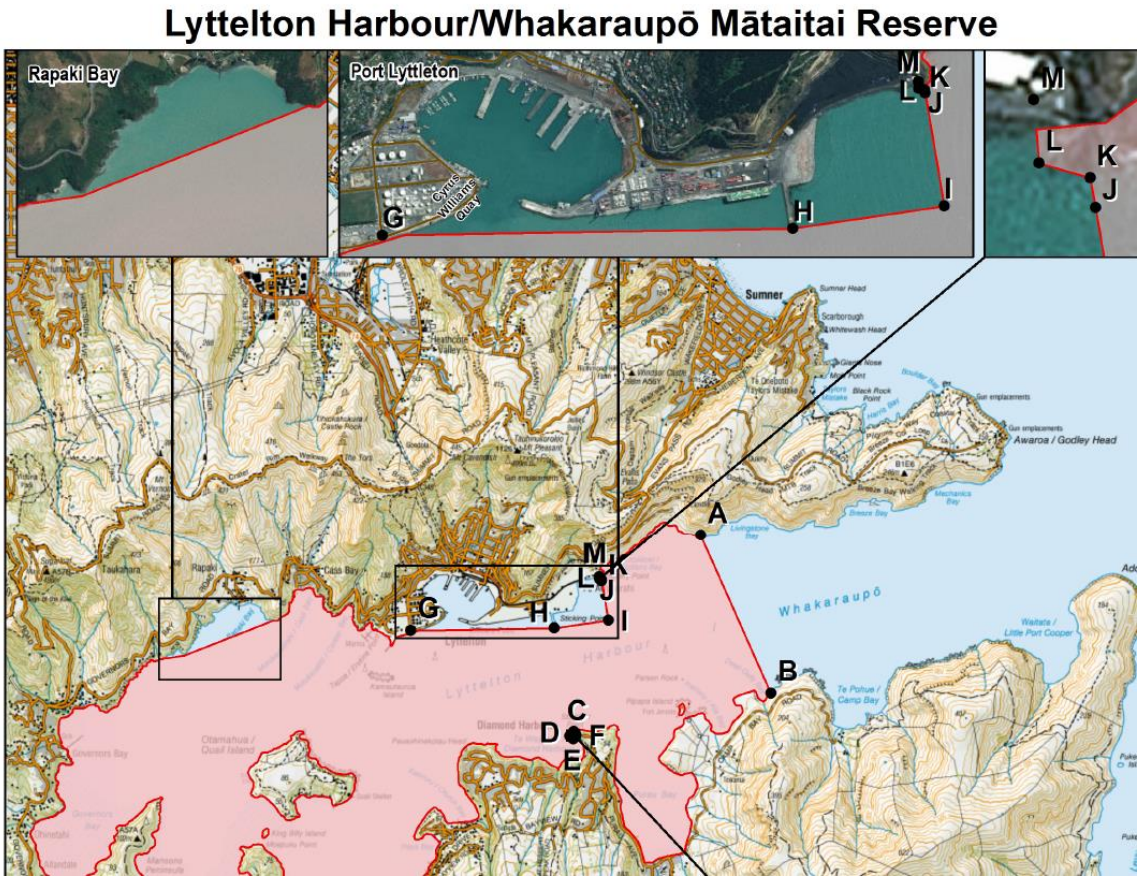

Figure 3.2: Whakaraupō Mātaitai Reserve. (A Mātaitai reserve has been previously gazetted for Rāpaki Bay). Source: Ministry of Primary industries.

3.19 So far as is known, the first European to actually visit the district was Captain Chase in the *Pegasus* in 1809. From the early 1840s a period of 'squatting' began, which prefigured formal settlement.

3.20 The idea of Lyttelton Township and the port were conceived in 1847 by Edward Gibbon Wakefield and John Robert Godley, who formed the Canterbury Association as part of their planned programme of systematic colonisation. In 1849 Lyttelton was gazetted as a port of entry. Cavendish Bay beach was modified with a seawall, culverts and a 45 metre long by 4.5 metre wide jetty, and from this time on Lyttelton Port has become an integral part of the Harbour environment.

3.21 The township soon had over 200 inhabitants and grew from there. The rail tunnel between Lyttelton and Christchurch was opened in 1867. The port has continued to develop over the years, with the building of the moles to protect shipping from harbour winds, the reclaiming

of land to provide flat cargo handling areas, and, with the advent of containerisation, the establishment of Lyttelton as a container port in the mid-1970s.

3.22 The coal stockyard is located on land that was reclaimed in the 1960s as part of Cashin Quay development and, as noted earlier, land is currently being reclaimed for the proposed container terminal and other port activities associated with this application east of the Cashin Quay breakwater.

3.23 The wider Harbour consists of small settlements, with holiday and permanent residential homes. East of Diamond Harbour and Lyttelton Township, there are few settlements except for rural dwellings on the southern side of the harbour and small settlements at Purau and Camp Bays. The outer Harbour is more exposed to coastal weather. It has a history of military defence with remnant gun emplacements, tunnels, and other structures on headlands and vantage points.

3.24 Lyttelton Harbour/Whakaraupō is an important destination for recreationalists both on and off the water. There are two yacht clubs located in the harbour: the Naval Point club at Lyttelton and the Charteris Bay yacht club. In addition, wind surfers and sea kayakers frequent the harbour, as do motorised craft. There are a number of designated swing mooring areas and boatshed areas, as well as jetties in various bays throughout the harbour.[9] Swimmers also visit various bays and Port Levy. A number of Lyttelton-based commercial recreation companies also operate in the Harbour.

4 ASSESSMENT OF ENVIRONMENTAL EFFECTS

4.1 **Chapter 4** is set out in two parts. **Part A** describes the benefits of the project to the Canterbury community. **Part B** assesses the actual or potential effects from the Container Terminal.

PART A: BENEFITS OF THE PROPOSED CONTAINER TERMINAL

4.2 The benefits of the Container Terminal being established and operated on Reclamation A and B were thoroughly examined during the preparation of the Recovery Plan. The Panel hearing submissions on the Recovery Plan, and subsequently the Minister for Canterbury Earthquake Recovery, determined that reclaiming land to serve a container terminal was a key component of port recovery. The grant of these land use consents are a critical step in realising the outcomes sought by the Recovery Plan. Further discussion on the Recovery Plan can be found in **Chapter 7**.

4.3 LPC has engaged Brown Copeland & Co Ltd to assess the economic effects of the proposal. That report is attached in **Appendix 2** (the *Economic Report*). In summary, that report observes that:

a. New Zealand is reliant on overseas trade and sea transport, which is highlighted by the total volume of containers handled across all New Zealand ports representing almost 1% of annual global container throughput, compared with only 0.06% of the world's population.

b. In 2018, 99.7% of New Zealand's exports and imports of goods by volume and 80.5% by value was transported by sea, which highlights the significant role played by New Zealand sea ports.

c. New Zealand remains heavily dependent upon the agricultural sector and the export of agricultural commodities, making up 43% of the value of New Zealand's commodity export trade, most of which go through the sea ports.

d. Lyttelton Port is the largest port in the South Island, and is the third largest container port in New Zealand (behind Tauranga and Auckland).

e. Lyttelton Port is New Zealand's second largest export port (behind Tauranga) and the most significant port in the South Island in terms of total tonnages of cargo, number of containers handled, the value of exports and the value of imports.

f. As at 30 June 2018, LPC had $391.1 million dollars' worth of property, plant and equipment. The company collected $122.2 million in revenue, provided over 550 jobs and paid $56.7 million in salaries and wages. It spent $28.1 million on goods and services, much of this going to local Christchurch City suppliers.

4.4 The Economic Report notes that the Port has experienced a more than 10-fold increase in the number of containers handled in the past 30 years. Trade through Lyttelton Port has grown considerably across both containerised and general cargo. The volume of containerised and general cargo through the Port has increased by 17.8% over the period 2010 to 2018, and forecasts of the number of twenty-foot equivalent container units ('TEUs') handled by the port's container terminal are predicted to grow to well over 1 million TEUs by 2041.

4.5 The Economic Report also states that a trend towards Lyttelton Port being used as a hub for all regions in the South Island is likely to intensify in the future, making the Port an integral part of economic activity throughout the South Island.

4.6 The Economic Report then discusses the direct benefits of the Container Terminal and comments as follows:

a. The Container Terminal will increase flexibility for LPC's Lyttelton Port operations, enabling more efficient ship-side activities and therefore reduce overall costs of container storage and handling.

b. Lyttelton Port is a significant employer, with over 550 staff across its various operations. The Container Terminal will assist in the retention and expansion of these staff numbers, their incomes and expenditure with local businesses.

c. The efficient movement of increasing volumes of exports and imports through the port will help maintain and expand employment in agriculture, manufacturing and other sectors dependent upon the port within Christchurch City, the Canterbury Region and elsewhere within the South Island.

d. The Container Terminal will be served by two deep draft capable berths with associated big ship capable infrastructure, enabling LPC to more efficiently cater for big ships. Without the expansion of the ship-side area to handle containers, the Port will be limited in its ability to handle the larger container vessels expected on New Zealand's trade routes in the future, and will result in higher costs for local importers and exporters.

e. Without the provision of additional ship-side land for handling containers at Lyttelton Port, it is likely that greater use of more flexible road transport to and from the port will be required to meet the peak loading and unloading requirements of container vessels arriving at the Port. The Container Terminal includes an expansion of the existing rail facilities at the Port, enabling the increased use of rail for container freight to and from the inland Midland Port and elsewhere throughout the South Island. This will not only be more efficient for shippers, but will also reduce road congestion, emissions and the risk of road accidents.

4.7 The Economic Report concludes that the Container Terminal and other port activities on the Te Awaparahi Bay reclamations will:

a. enable the residents and businesses of Christchurch City, the Canterbury region and elsewhere in the South Island *"to provide for their … economic ... well being*"; and

b. be consistent with *"the efficient use and development of natural and physical resources"*.

PART B: EFFECTS OF THE PROPOSED CONTAINTER TERMINAL

Section 1: Effects of Lighting

4.8 LPC engaged WSP/Opus to prepare an assessment of effects from artificial lighting and this is attached as **Appendix 3** (Lighting Report). This report was considered necessary on the basis that the Container Terminal will operate continuously (24/7). The Lighting Report firstly discusses how artificial lighting is categorised into three types of direct effects on the environment and how they are measured. The three categories are summarised below.

Light Spill

4.9 Light Spill is density of light (called illuminance) which is measured in 'Lux' at a property boundary. Typical Lux values measuring illuminance are as follows:

a. Moonlight 0.5 – 1.0 Lux

b. Typical Office interior 300 – 500 Lux

c. Daylight >10,000 Lux

4.10 Because of the relative ease to measure Lux values, the Christchurch District Plan contains rules that apply on adjoining property or zone boundaries. Rule 13.8.4.2.4 in the Port Zone states that no operation or activity shall be conducted so that direct illumination exceeds 10 Lux (lumens per square metre) at the boundary of any site in a Residential Zone or Commercial Banks Peninsula Zone. The Lighting Report concludes that this rule can easily be complied with, as the site of the Container Terminal is well away from these zone boundaries.

Glare

4.11 Glare is visual disability or discomfort caused by the direct view of a high intensity light source, usually against a dark background. A common example is the sensation of approaching car headlights.

4.12 Glare is considered difficult to measure and quantify. As a consequence, district plan compliance is typically based around objectives and standard practices rather than numerical standards. There is no rule relating to glare that applies to the Port Zone, although the Christchurch District Plan has a general rule that includes a permitted activity standard relating to glare (see Rule 6.3.4.1). That rule seeks that exterior lighting as far as practicable, be aimed, adjusted and/or screened to direct lighting away from the windows of habitable spaces of sensitive activities such as dwellings so that the obtrusive effects of glare on occupants are minimised. Reference is made to Appendix 6.11.13, which provides relevant guidance on acceptable lighting practice. The design features proposed for the Container Terminal are consistent with this guidance.

Sky Glow

4.13 Sky Glow is the artificially increased luminance of the night sky, from the combined effect of direct and indirect lighting, which is scattered by the atmosphere. It reduces the quality of view to the night sky. The degree of impact is influenced by moonlight and weather conditions. Although assessment methods exist, the cumulative nature of sky glow is such

that it is only addressed in subjective terms. No rules are contained in the Christchurch District Plan on this matter.

4.14 The above effects from lighting collectively influence the visual amenity of an area at night. Visual amenity is assessed in the context of the surrounding environment, and is part of a landscape assessment. This matter is also addressed in Landscape Report attached in **Appendix 5**.

Lighting Technology

4.15 The Lighting Report discusses the rapid changes in lighting technology. The existing Cashin Quay container terminal is flood-lit, with high-pressure sodium vapour luminaries[4] lamps ('HPS'), which have the distinctive golden colour appearance as shown on photographs contained in the Visual Simulations attached as **Appendix 4**. The golden colour, typical of the incandescent light bulbs, has a colour temperature of 2100°K.

4.16 The luminaries sit on poles that are up to 30m high. The spacing between the poles together with HPS luminaires require an aiming tilt which ranges between 20° and 50°. The upper end of that range is constrained by both glare and shadowing effects.

4.17 The HPS technology is being taken over by Light Emitting Diode ('LED'), which is becoming dominant in most aspects of lighting. A characteristic of high output LED's is a very cool white appearance, however the lighting report notes this is likely to change with further development, as is already evident with lower output LED's. LED lighting uses far less electricity, and some overseas ports already have LED installations for container terminals.

4.18 Light Emitting Plasma ('LEP') lamps are also suited to high output applications such as floodlighting, although the technology is not advancing to the same degree as LED technology. However, it cannot be discounted that LEP technology could improve over time and become a preferred option. Regardless of whether LED or LEP lighting is used for the Container Terminal, the distribution characteristics, colour appearance, and associated environmental effects are expected to be similar.

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[4] Luminaire is the standard international term for an assembly which incorporates a light source, and provides photometric control of the output distribution. Other comparable terms are light fitting or light fixture.

Anticipated Design Features

4.19 Given the rapidly evolving technology, it is difficult to predict the lighting design that will be used even for the Container Terminal on Reclamation A, which is due to completed between 2024 and 2026. However, on the basis of current trends, the Lighting Report anticipates that the:

a. luminaires are likely to be of the flat glass type, with LED or LEP lamp technology, and a high degree of upward cut-off;

b. spectral characteristics of the lighting would be a neutral white to cool white appearance, with correlated colour temperature of 3000 - 4000°K;

c. blue light would be reduced where practical;

d. luminaire tilt be limited to within low angles above horizontal, in order to assist the mitigation of obtrusive effects; and

e. mounting heights stay the same or increase within a practical limit in the order of 40m above ground.

4.20 The spacing between lighting poles is expected to remain similar to that in the existing container terminal. The beam cut-off of characteristics of the luminaires and their low tilt orientation is likely to constrain increased spacing, which could otherwise result from higher mounting.

Effects of Lighting

4.21 The Lighting Report has assessed the effects of light spill, glare and of sky glow based on the anticipated lighting design described above and also within the context of the existing lighting environment at the Port.

4.22 The Lighting Report notes that the Container Terminal will provide similar functional lighting levels to the existing container terminal, but with more refined beam control and increased efficiency of distribution.

4.23 With respect to light spill, the report concludes that proposed lighting would result in less light spill, and hence less reflected light spill from the harbour waters. This is shown in the photo-simulations attached in the Visual Simulations attached as **Appendix 4**.

4.24 The Lighting Report assesses the impact of glare and sky glow from Diamond Harbour, Purau and Governors Bay respectively. The impacts are greatest at Diamond Harbour, due to its relative proximity and viewing position.

4.25 The Lighting Report concludes that, while the Container Terminal is likely to be illuminated to a similar level to Cashin Quay, the associated glare is expected to be considerably less, due to predominantly downward orientated luminaires and, as a consequence, reduced direct views of the light source. This is again shown on the Visual Simulations attached as **Appendix 4**.

4.26 The Lighting Report comments that if the existing container terminal lighting is replaced over time, due to end-of-life reasons associated with the HPS lights, there should be an overall reduction in glare from the viewing points described above.

4.27 Sky glow is expected to remain similar. While there is likely to be a decrease in sky glow through the improved luminaire function and beam control, on the other hand, sky glow is likely to increase due to:

a. a stronger illumination causing increased upward reflection from pavement and containers etc; and

b. the white spectrum lighting associated with LED or LEP lights causing more atmospheric scatter than the existing HPS lighting (see further discussion below).

4.28 The report also examines the visual amenity in the context of the existing lighting environment at the Port. While there will be an increase in the prominence of lighting to the east, and there will be marked transition in the colour of lighting between Cashin Quay and the new Container Terminal (at least for while[5]), the effects on visual amenity from the lighting is likely to be seen as a refinement to the existing Port lighting environment, and not out of keeping from what can be expected at a port.

4.29 The Lighting Report comments that the LED lights commonly have strong output in the blue part of the colour spectrum (i.e. 424 – 500nm). High levels of blue light exposure has been associated with adverse health effects. However, the Report notes exposure to blue light

[5] The Lighting Report indicates that the Cashin Quay container terminal is likely to undergo a transition to LED over time due to the efficiency gains with LED but ultimately that will be decision for LPC.

from outdoor lighting is significantly less; and, further, the incident blue-rich light would be negligible at all viewing locations to the Container Terminal. Blue rich light also produces higher levels of scatter, the contribution to sky brightness from blue-rich white LED lights can be up to 3 times that of comparable HPS lights.

4.30 Finally, the Lighting Report observes that there may be some effects on plants and animals from enriched blue light, although the research on this topic is in early stages. The prudent response at this time is to adopt current good practice in terms of lighting design and application, which typically involves the general minimisation of environmental lighting effects and moderating blue light spectral content where practical.

Section 2: Landscape Effects

4.31 LPC has engaged Andrew Craig Landscape Architect Ltd to assess the visual effects, including the effects on amenity from artificial lighting ('Landscape Report'), for the applications. The Landscape Report outlines the existing landscape and the effects from the Container Terminal on the existing environment. The Landscape Report is attached in **Appendix 5**.

4.32 The Landscape Report firstly examines the visual effects of the Container Terminal from three different viewing areas:

a. vessels using the harbour;

b. publicly accessible vantage points on land such as roads and parks; and

c. residential areas located in Lyttelton township, Diamond Harbour and Governors Bay.

4.33 The Landscape Report also examines the changes to the landscape from the Container Terminal, irrespective of whether they are visible. The Report addresses whether the changes to landscape character are in keeping with what might be reasonably expected to occur in the receiving environment. The type and magnitude of change is an important consideration in this regard, which is informed by the existing environment.[6]

[6] As discussed in **Chapter 3**, the existing environment includes land yet to be reclaimed and a full range of port activities on the 10 ha Reclamation A (Phase 1) as well as activities on the yet to be constructed wharf.

4.34 The Landscape Report relies on a series of photo-simulations, which are attached in **Appendix 4.** For night-time assessments, the Report relies on the Lighting Report discussed above and contained in **Appendix 3**.

4.35 In carrying out the assessment, the Landscape Report first describes the visibility of the Container Terminal generally:

a. The Container Terminal is an extension of what currently occurs on the reclaimed land to the west, which adjoins the application site.

b. Container operations are dynamic, with cargo transiting through the terminal meaning the extent or volume of cargo continually vary,

c. Cranes and lighting towers are the main permanent structures that are at height; although containers can be stacked to heights with empty containers possibly reaching 26m, in some locations.

d. The heights of these structures mean that the lower 30m of hillside backdrop will be obscured, or partially so, when viewed across from the harbour and at various vantage points around it. This will particularly be the case for those living directly opposite the Port at Diamond Harbour.

Visual effects from the water

4.36 The views of the Container Terminal from water borne activities are assessed as being highly variable, with the visual impacts ranging from low to moderately high, depending on factors such as distance to the Container Terminal, weather conditions and the direction of travel.

4.37 As a craft, for example, moves perpendicular towards the Container Terminal, the hillside backdrop will become increasingly obscured by the Container Terminal. However, the Landscape Report notes that the visual impacts to water borne activities are transient and therefore temporary.

Visual effects from Lyttelton Township

4.38 The Landscape Report observes that most of the Container Terminal will be obscured from Lyttelton township by the prominent ridgeline that separates Lyttelton and Te Awaparahi Bay, and so the visual effects of the Container Terminal from most of the township will be very low to non-existent.

4.39 However, there will be visual effects for those residents located west of Simeon Quay. This is because the view of the harbour entrance would appear more cluttered with the Container Terminal, and there would also be partial loss of views of the eastern harbour and Adderley Head in the background. The impacts are reduced because the Container Terminal is located within an existing port setting. The Landscape Report considers these residents will experience moderate visual effects.

Visual effects from Diamond Harbour environs

4.40 Many residents in Diamond Harbour will have clear views of the Container Terminal, as is the case with the Port presently. As a consequence, existing views to the lower 30m of the hillslope backdrop will be obscured and the quality of the view impacted due to the industrial nature of the Container Terminal. However, the Landscape Report states that the lower slopes have already been extensively modified to accommodate the existing haul road and historic benching, and therefore cannot be considered a high value landscape feature whose views merit protection.

4.41 The Landscape Report also observes that the views of the upper slopes of the Port Hills, which have a high natural character, will be unaffected. These slopes present the greater portion of the view for residents.

4.42 The Landscape Report also states that the Container Terminal would be highly visible because of the high level of contrast between the Port and the Port Hills hill backdrop, and also the contrast with harbour foreground. However, the degree of visibility is reduced because of the existing coal stockyard, with its lighting towers that extend the full length of Te Awaparahi Bay as viewed from Diamond Harbour.

4.43 Overall, the Landscape Report concludes the adverse visual effects from Diamond Harbour are considered to be moderate. The impacts from the Container Terminal are mitigated to an extent by the Port Hills backdrop, which is much greater in proportion (scale) to the extent of the Container Terminal, as well as the 2km separation distance between the Container Terminal and residences at Diamond Harbour.

Visual effects from Western Bays (Governors Bay environs)

4.44 Although approaching a 7km separation distance from the application site, the views of the Container Terminal will be readily apparent from the Governors Bay environs. The views

from the southern parts of Governors Bay will be less affected than from those to the north, because the Container Terminal will merge into the backdrop of the Port Hills. From the north-end of Governors Bay, views of the harbour entrance will be interrupted and compromised to a reasonably significant extent by the Container Terminal, particularly by the taller structures such as gantry cranes, flood lights poles, stacked containers and indeed the transient presence of ships.

4.45 The Landscape Report notes that the impacts are unavoidable, but reduced to an extent, due to the distance of the Port from Governors Bay. As a consequence, the hills that enclose the Port and Container Terminal remain dominant landscape features.

Visual effects from the Port Hills summit ridgeline

4.46 Because the Container Terminal would be 'tucked' into the shoreline at the base of steep high hills, views of it from most the of the Port Hills summits are limited by intervening land forms. Somewhat contrary to expectation, from many vantage points, but not all, the site becomes less visible the closer one is to it. The terminal would not be visible from the nearby Gondola building or considerable stretches of the Crater Rim track, for example.

4.47 On some other parts of the track, views to the application site are more or less unimpeded. This is the case, for example, from that part of the track skirting Livingstone Bay. From this vantage point walkers will experience clear views of the terminal. Some of the taller structures, such as gantry cranes, will intrude background views of Quail Island and the upper harbour from this vantage point.

4.48 Further afield, views do become more widely apparent, and this is particularly the case from the hills at the head of the harbour. In the opposite direction, however, at Godley Head, views are obscured by intervening landform.

4.49 As for most vantage points around the Lyttelton Harbour basin, views from the hills are variable depending on the presence or otherwise of intervening features such as landform and vegetation. Nevertheless, there are numerous vantage points that include the Summit Road and various walking / cycle tracks, which provide views of the Container Terminal, although most are distant views.

4.50 Overall adverse visual effects from the hill tops are considered moderately low. This is because, for the most part, views of the application site are generally moderated by distance. Close up views from formed roads, walking and cycle tracks are not attainable.

Effects on visual amenity from lighting

4.51 The Landscape Report examines the impact of the Container Terminal's lighting on visual amenity. The Report acknowledges that the additional lighting from the Port would be adverse to those people whose preference would be for less light from the Port as a starting point. Nevertheless, the Report also states that the additional lighting:

a. would not result in unacceptably excessive glare or light spill;[7]

b. would be contiguous with the existing port and the township; and, following on,

c. the lighting would not be unexpected and in this regard entirely in keeping with existing port setting.

Landscape effects

4.52 The Container Terminal will introduce a significant change to the landscape, although of a nature not entirely foreign to the wider setting. Given the construction timeframes involved, however, the Landscape Report notes people will have more time to accustom to the change.

4.53 A further characteristic of the site is that activity is concentrated or clustered. That is, the Container Terminal is not isolated or a stand-alone location, rather it will read as an extension to the existing Port, and as a whole will appear visually coherent.

4.54 As mentioned regarding views from the Port Hills ridgeline and upper elevations, the Container Terminal is in keeping with existing development patterns around Lyttelton Harbour basin. The Landscape Report reiterates that development in the basin is generally confined to the lower slopes and the Container Terminal will be consistent with this. Nor will it have any discernible effect on the proportion of rural to urban activity.

[7] Relying on the Lighting Report attached in **Appendix 3** and the night time visual simulations attached **Appendix 4**.

Associative effects

4.55 The Landscape Report also examined the associative effects from the Container Terminal. Associative effects relate to the matter of whether activities in the landscape are expected to normally occur.

4.56 The Landscape Report considers the Container Terminal is entirely in keeping with public expectations, informed by the location and extent of the existing Port. The Container Terminal and other port activities are inextricably linked to the township and is the reason for its existence – Lyttelton is a port town.

4.57 The other factor signalling acceptable associative effects is what the District Plan expects; which, as discussed in **Chapter 7**, is for the Port to grow eastwards, with the reclaimed land and the Container Terminal being a key component. The resulting change in landscape character is therefore deemed acceptable.

4.58 Overall, the Landscape Report concludes that it should not be surprising to anyone to find that the Container Terminal and other port activities are to be located within the landscape setting of Te Awaparahi Bay. Further, it is operationally logical that this can only occur at the point where the land meets the sea. For these reasons, and the mitigation outlined below, the Landscape Report concludes there will be negligible, if any, adverse associative landscape effects.

Section 4: Noise Effects

4.59 LPC engaged Hegley Acoustic Consultants to prepare an assessment on the effects of noise from the Container Terminal ('Noise Report'). The Noise Report is attached in **Appendix 6**.

4.60 The assessment of noise is carried out within the context of the requirements of the Christchurch District Plan. The District Plan requires LPC to prepare a Port Noise Management Plan and a Port Noise Mitigation Plan.[8] In essence, LPC is required to introduce measures to reduce port noise, but where noise is still high then it shall offer acoustic treatment to affected residents. A 'Port Noise Contour Map' has been prepared and, where port noise exceeds the specified threshold value (called the 65 dB $_{Ldn}$ contour

[8] Rule 13.8.4.2.7.

line) within a residential property, the owners of properties in the identified area are eligible for the treatment.[9]

4.61 The Noise Report therefore compares the port noise generated from existing port activities (contours already mapped) with the additional noise predicted noise from the Container Terminal to assess the effect on residents in Lyttelton township and Diamond Harbour.

4.62 The operations at the Port that generate noise include:

a. rail noise inside port-owned land;

b. coal handling equipment;

c. trucks transporting containers to and from the container terminal;

d. reefers;

e. container handling equipment;

f. container cranes; and

g. ships at berth.

4.63 The progressive phased movement east of the Port with the Container Terminal will inevitably change the mix of port activities elsewhere. Therefore, the predicted noise contours, incorporating the Container Terminal, include other likely changes elsewhere at the Port, such as the ceasing of activities at the No 7 Wharf and the Low-Level Breastwork berth.

4.64 The noise is predicted using a computer software package that identifies noise generating operations at various locations. The package incorporates the local topography. In essence, a grid varying between 10m and 50m has been used to calculate the noise. The noise from the Port operations is calculated at each grid point, and noise contours can be drawn based on the noise levels at the different grid locations.

[9] For further detail refer to Appendix 13.8.6.7 of the District Plan.

4.65 The results of the Noise Report show no new properties are expected to fall within the 65dBA L_{dn} contour. Two properties at the eastern end of Lyttelton however will experience some additional noise and are expected to fall within the previous 60dBA L_{dn} contour. On the other hand, a reduction in some types of Port operations in the western area of the Port means a number of properties in Lyttelton would experience less exposure to noise.

4.66 Turning to Diamond Harbour, the predicted port noise levels have been calculated at 53dBA L_{dn}, which is similar to the level currently experienced from port operations. The Noise Report notes that this level of noise is well within a reasonable level for the residents.

Section 5: Effects from Traffic

4.67 An Integrated Transport Assessment ('ITA') was prepared in November 2014 to support the Recovery Plan. The ITA examined the growth freight at the Port, and the development at Dampier Bay and various cruise berth options and the predicted effects on the local Lyttelton road network as well as the wider strategic road network.

4.68 LPC engaged Stantec to provide a traffic assessment ('Traffic Report'), which focused on how local intersections within Lyttelton have been performing since the 2014 ITA, and to determine any constraints and/or issues relating to traffic considerations that may arise from the Container Terminal. The Traffic Report is attached in **Appendix 7**.

4.69 The Traffic Report firstly examined the traffic count information held by the New Zealand Transport Authority, as well carrying out traffic counts at the intersections along Norwich Quay between the tunnel and Gladstone Quay. The results show that Norwich Quay presently carries approximately 7,850 vehicles per day on average, with 18% being heavy vehicles. The traffic patterns show that there are approximately 120 heavy vehicle movements per hour. This compares to Lyttelton Tunnel, with 12,000 vehicles per day and 15% being heavy vehicles. Approximately 160 heavy vehicle movements per hour were counted at the tunnel entrance. In other words, approximately 4,150 vehicles per day turn right at the tunnel round about.

4.70 An analysis of the how the intersections within Lyttelton are operating was carried out, and the Traffic Report concludes that there is a good level of service throughout the day. Road safety records do not highlight any specific issues with the normal operation of Norwich Quay within Lyttelton.

4.71 The Traffic Report then carried out an analysis of intersection performance, which allows for growth of traffic using the Port and township through to 2041. A key component is the growth of container-related traffic associated with the Container Terminal. The forecast assumes there will be an increased use of rail as a mode for transport to and from the Port, and that peak traffic demand will be spread either over a slightly longer day, such as is occurring with a vehicle booking system recently implemented at the Port's main entrance gate.

4.72 The Traffic Report also factors in the new cruise berth and the traffic generated for the largest cruise ship visiting the berth (approximately 120 vehicle movements per hour as passengers depart and arrive back from day trips).

4.73 The Traffic Report shows that intersections on Norwich Quay will continue to provide acceptable levels of service at 2026. Intersections at the western end of Norwich Quay will have slightly higher delays for those turning right out of the local road (i.e. Dublin Street and Canterbury Street) because of higher passing traffic volumes than intersections at the eastern end. However, the delays will remain within acceptable levels.

4.74 In the long term, there is a potential for the intersections at the western end of Norwich Quay to have reduced performance and high delay times turning right into Norwich Quay. Typical traffic management responses such as traffic signals would be needed to address any delay issues. The Traffic Report notes this is a matter for road controlling authorities to continue to monitor over the longer term, rather than requiring any specific changes as a result of the Container Terminal consent process.

4.75 The overall conclusion of the Traffic Report is that the predictions from previous ITA carried out by during the Recovery Plan process were correct, and any treatments to the local intersections, such as signals, will not be required for many years.

Section 6: Provision of electricity and utilities

4.76 LPC engaged Pedersen Reid Consulting to examine the likely electricity (power) needed to operate the Container Terminal and whether needed the power supply to the Port needs to be upgraded. The assessment of power supply ('Power Supply Report') is attached as **Appendix 8**.

4.77 Orion, the local network provider, supplies power to Lyttelton using two 11,000 volt (11kV) overhead cables. The cables have a rated capacity of 7MVA (megavolt ampere) each. Orion essentially supplies 7MVA to Lyttelton, with the second cable being used as a backup circuit if a fault occurs in the other cable. Of that, 3.75MVA is available for the Port to use.

4.78 The Power Supply Report notes that an upgrade of the Lyttelton supply has commenced. Another 11kV cable is being installed in the road tunnel. This will double the capacity to 14MVA.

4.79 The Report estimates that the Port, along with the new Container Terminal, is likely to generate a peak electrical demand of approximately 10MVA, which would be sometime in the late 2030's. Therefore, a secure supply of power will be available. However, the Power Supply Report notes that demand will need to be monitored so that steps can be taken to carry out any further upgrades in the event more power is used than currently predicted.

4.80 The Container Terminal would not generate any significant increase in the demand for water or generate a significant increase in the volume of wastewater. Wastewater from the Port is pumped to the Lyttelton wastewater treatment plant, located immediately to the north of the existing container terminal. Recent discussions with the Christchurch City Council did not raise any concerns around capacity at the treatment plant for additional discharges.

Section 7: Stormwater

4.81 LPC is already managing stormwater from the recently developed container handling area on Phase 1 of Reclamation A. The stormwater will be managed in a similar manner for the rest of the Container Terminal development.

4.82 All areas are to be paved and the pavement is to be constructed so that all stormwater running off containers and the pavement is collected in slot drains, which will generally run along the internal roadways within the Container Terminal area. This collected stormwater is then discharged to the sea via a stormwater treatment device.

4.83 A number of different treatment devices are installed at the Port, but they typically take the form of flow based 'vortex' systems. As shown in **Figure 4.1**, these systems have chambers and baffles to settle out suspended solids, trap floating hydrocarbons and remove gross

pollutants. Given the size of the Container Terminal, a number of such devices would be needed.

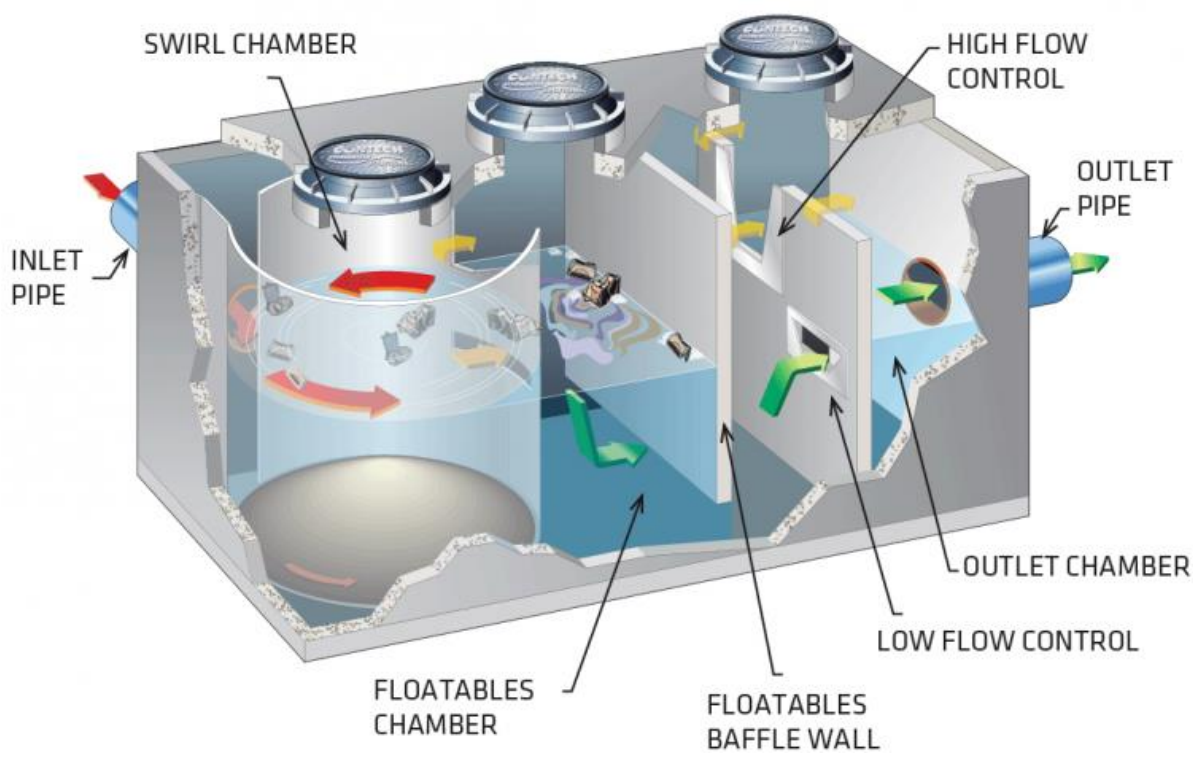

Figure 4.1: Example of vortex based treatment system

4.84 Container terminals are generally low risk in terms of stormwater contamination, with the primary risk coming from leaks or spills from container handling machinery. Some risk is posed by breaching or damage to a container that contains hazardous goods. Container handling staff are trained in responding to incidents, with spill kits in place about the terminal. However, if there are higher risk areas, such refuelling facilities, oil water separators or similar can be used. These have emergency shut off valves that can be employed before the stormwater enters the general network.

5 MITIGATION AND MONITORING

5.1 Measures to mitigate the effects of the Container Terminal have already been incorporated into the design of the reclamation during the submission process and hearing on the Recovery Plan, as well as during the process leading to the regional resource consents[10] to construct Reclamation A and B and wharf:

a. the reclamation/wharf envelope was reduced by total of 3 ha so that the southern-edge did not protrude out into the harbour beyond Sticking Point Breakwater;

b. the reclamation edge was required to be set back from Battery Point;

c. armour rip-rap material on the eastern seaward reclamation edge was to be limited to volcanic rock sourced from Lyttelton or visually similar volcanic rock;

d. a planting strip is required to be established along the eastern edge of the reclamation; and

e. a programme of planting on the above hillside be will prepared and implemented.

5.2 It is proposed that the following additional mitigation measures on building height, lighting and noise are introduced as well:

a. restrictions on building height of 30m;

b. restriction floodlight poles and luminaires to a height of 40m;

c. the use of LED or LEP lighting only;

d. a maximum lighting temperature of 4000°K;

e. luminaires designed and orientated to minimise glare and skyglow as far as practical;

f. a ‘Port Noise Management Plan’ that sets up the framework for monitoring, measuring and reporting on port noise;

[10] CRC75507 (Refer **Appendix 1**).

g. a ‘Port Noise Liaison Committee’ that provides an overview on how LPC is managing port noise; and

h. a ‘Construction Noise Management Plan’ that provides the framework for monitoring, measuring and reporting on noise during the construction of the container terminal, with the Liaison Committee having an overview role.

5.3 The above measures are expected to be included in the standards for a Port Zone once the area has been available for zoning in the review of the District Plan.

5.4 LPC has already prepared and implemented a Port Noise Management Plan and a Construction Noise Management Plan across its port operations. It is anticipated these plans will be amended to apply to the new Container Terminal area. For completeness, the existing Port Noise Mitigation Plan, which is already prepared under the District Plan, will also be amended to apply to Reclamation A and B, in the event that any residence becomes subjected to levels of noise such that it is eligible for an offer of acoustic treatment.

5.5 The monitoring of port noise will be detailed in the port noise and the construction noise management plans respectively. No other monitoring is considered necessary.

6 CONSULTATION

6.1 Consultation on the proposed reclamations, including the establishment and operation of the Container Terminal, was carried out during the preparation of the Recovery Plan. The consultation carried out during the Recovery Plan was extensive, involving public and stakeholder consultation and engagement. An assessment of effects associated with components of the Recovery Plan was a key part of the LPC information package and provided a basis for the consultation, which included:

a. mail outs to over 100 key stakeholders and distributed at public outlets;

b. numerous 'Port Talk' events;

c. a number of workshops;

d. key stakeholder meetings; and

e. regular statutory partner meetings.

6.2 The full consultation report (including consultation on reclamation matters) prepared as part of the Recovery Plan process can be found on the LPC's website.[11]

6.3 The Recovery Plan was notified in draft and was subject to a public submission process and public hearing before an Independent Hearings Panel.

6.4 Following the completion of the Recovery Plan, LPC sought the necessary consents to construct the reclamation from Environment Canterbury. This process included further consultation on the reclamation and its effects, but not specifically on the use of the reclaimed land, which was clearly signalled at that time as being part of future applications to Christchurch City Council. Those consents were granted in December 2017 following public notification and a hearing.

6.5 Throughout 2017 to 2019, LPC kept mana whenua informed of the need for separate land use consents and the process for seeking those consents. This has mainly been via updates

[11] http://www.lpc.co.nz/wp-content/uploads/2015/09/Appendix-3-Consultation-Report.pdf.

at the Manawhenua Advisory Group ('MAG') meetings. The purpose of the MAG is to provide a forum for LPC and Te Hapū o Ngāti Wheke to work together on harbour issues.

6.6 The consultation resulted in Te Hapū o Ngāti Wheke advising LPC that a Cultural Impact Assessment ('CIA') was not required to accompany these land use consent applications. LPC has provided Te Hapū o Ngāti Wheke with a draft copy of these applications prior to submission to CCC.

6.7 Port Talk is open every Friday from 11.00am to 1.00pm to allow members of the public to discuss port recovery projects with an LPC staff member. In addition, a specific Saturday Port Talk was held on the proposed land use consents on 25 May 2019. The Port Talk event was advertised in the Bay Harbour News, on LPCs Facebook page, local Lyttelton community Facebook pages and emailed out to LPC's stakeholder list, which includes local community groups and residents associations. No person attending this Port Talk had any specific concerns on to the project.

Outcomes of the consultation

6.8 During the process of developing the Recovery Plan, a number of changes relevant to the land use activities on the reclamations were made as a consequence of consultation and submissions. These are summarised below:

a. Battery Point exclusion zone was offered by LPC during the Recovery Plan hearing process. This was in response to Manawhenua values associated with the Battery Point area. As a result, Battery Point remains as a landscape feature and provides a visual bookend to the eastern extent of the reclamation.

b. The southern extent of the reclamation was reduced by 50m to ensure that the reclamation and wharf did not protrude further out into the harbour than the existing Cashin Quay breakwater. This reduced intrusion into the harbour and associated degree of visual impact.

c. LED lighting was introduced to reduce potential effects of light spill, glare and sky glow.

6.9 LPC intends to hold a further dedicated Port Talk Event after the applications are publicly notified to enable people to discuss the proposal further.

7 STATUTORY CONSIDERATIONS

7.1 This chapter sets out the relevant statutory provisions and an assessment of those provisions against this proposal.

Status of the Application

7.2 The Resource Management Act 1991 ('RMA') provides the statutory framework under which this land use consent application is processed. Section 89(2) of the RMA enables an applicant to obtain consent to establish activities on land that is to be reclaimed:

> *"Where –*
>
> *(a) an application is made to a territorial authority for a resource consent for an activity which an applicant intends to undertake within the district of that authority once the proposed location of the activity has been reclaimed; and*
>
> *(b) on the date the application is made the proposed location of the activity is still within the coastal marine area, –*
>
> *then the authority may hear and decide the application as if the application related to an activity within its district, and the provisions of this Act shall apply accordingly."*

7.3 The land being reclaimed is located in the Christchurch District and therefore the Christchurch City Council is the relevant consent authority.

7.4 Section 89(2) is silent on the status of an application. The Environment Court[12] has previously concluded that land which is in the process of being reclaimed is effectively "unzoned" in terms of the District Plan, and therefore any future land use activity should be classified as a **discretionary activity**.

7.5 Pursuant to section 87A(4), the consent authority may decline or grant a consent with or without conditions.

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[12] *Tairua Marine Limited v Waikato Regional Council* (A108/05)

Need for two land use consents

7.6 S116(2) provides that a land use consent to which section 89(2) applies shall not commence until the land has been reclaimed and a certificate has been issued under section 245(5).

7.7 This means LPC can only commence the establishment and operation of Container Terminal on reclaimed land once the construction of the reclamation is finished and a survey plan of the reclamation has been prepared by LPC and approved by the Canterbury Regional Council (see sections 89 (3), 116 (2) and 245 respectively).

7.8 As set out previously in this AEE, construction of the reclamation is being carried out in two distinct stages (resulting in the two reclamations - Reclamation A and B as shown in **Chapter 1**, **Figure 1.1**), with different construction methodologies and completion dates. Therefore, two land use consents are required so that the land use consent for the area of land which is Reclamation A can commence under s116(2) as soon as it has been constructed and surveyed.

7.9 If only one land use consent was granted, then the entire land use consent could not commence until construction of the full reclamation envelope was completed and a survey plan prepared and approved, sometime in the late 2030s.

7.10 The first land use consent enables the Container Terminal to establish after Reclamation A is completed, and the second land use consent enables the Container Terminal to establish on Reclamation B at a later date.

7.11 The following steps to construct the reclamations and commence the establishment and operation of the Container Terminal on the reclaimed land are proposed:

a. construct Reclamation A;

b. survey Reclamation A which includes both Phase 1 and Phase 2 and deposit the survey plan;

c. establish and commence operating the Container Terminal on Reclamation A;

d. construct Reclamation B (may commence prior to Reclamation A (Phase 2) being completed);

e. survey Reclamation B and deposit survey plan; and

f. establish and commence operating the Container Terminal on Reclamation B.

Existing land use consent for Reclamation A (Phase 1)

7.12 As discussed in **Chapter 1**, LPC already holds a land use consent for a 10 ha Reclamation A (Phase 1) - see RMA92018173 attached in **Appendix 1**.[13] The land use consent authorises port activities[14] on the reclaimed land, subject to a number of conditions relating to building height, noise and lighting. Port activities on Reclamation A (Phase 1) are therefore legally part of the receiving environment and will continue to be developed under that consent.

7.13 The land use consents applied for as part of these applications will authorise land use activities on the entire Reclamation A (Phase 1 and Phase 2 areas). Once the land use consent in relation to Reclamation A commences in 2022, or thereabouts, land use consent RMA92018173 (for Reclamation A Phase 1) can be surrendered.

No other consents required

7.14 No other resource consents are required. The discharge of stormwater from the container handling facility and the wharf are permitted under Rule 10.27 of the Regional Coastal Environment Plan ('*Coastal Plan*'), subject to conditions. This includes a requirement on LPC to install hydrocarbon interceptors and/or gross pollutant interceptors during construction of the stormwater network for the reclaimed land and wharf. LPC factors in these requirements as a matter of practice and will continue to do so during design of the Container Terminal. The discharges are expected to comply with the Coastal Plan conditions under Rule 10.27 and will be a permitted activity.

7.15 Likewise, the discharge of contaminants to air associated with the operation of the container terminal is expected to be a permitted activity under the Canterbury Air Regional Plan.[15] Rule 7.3 permits the discharge of odour, dust or smoke into air that is not managed by any other

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[13] As described in **Chapter 1**, this consent was issued under an "Order in Council" approval process

[14] Other than the handling or storage of coal

[15] Noting that the discharge of dust to air associated with the construction of the reclamation has been authorised subject to conditions (see Discharge Permit CRC177510)

rule in the Plan, provided the discharge does not cause or is not likely to cause an adverse effect beyond the boundary of the property of origin. No adverse effects beyond the boundary are anticipated because containers are not dust generating and the container handling facility will be sealed and regularly swept.

Decision-Making

7.16 Section 104B sets out how a resource consent application for a discretionary activity is determined:

> *"After considering an application for a resource consent for a discretionary activity or non-complying activity, a consent authority—*
>
> *(a) may grant or refuse the application; and*
>
> *(b) if it grants the application, may impose conditions under section 108."*

7.17 Section 104 sets out the matters to which a consent authority must have regard to when considering applications for resource consents. In particular, section 104(1) provides:

> *"(1) When considering an application for a resource consent and any submissions received, the consent authority must, subject to Part 2, have regard to –*
>
> *(a) any actual and potential effects on the environment of allowing the activity; and*
>
> *(b) any relevant provisions of –*
>
> *(i) a national policy statement:*
>
> *(ii) a New Zealand coastal policy statement:*
>
> *(iii) a regional policy statement or proposed regional policy statement:*
>
> *(iv) a plan or proposed plan; and*
>
> *(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application."*

7.18 With respect to section 104(1)(c), the Recovery Plan is relevant and reasonably necessary to determine the application. As discussed below, there are also specific provisions under

the Greater Christchurch Regeneration Act 2016 that mean the determination of these resource consent application "*must not be inconsistent*" with the Recovery Plan.

7.19 The matters set out in section 104 are subject to Part 2 (Purpose and Principles) of the RMA. There are four sections in Part 2. The first is section 5, which states the purpose of the Act and sets out a definition of "sustainable management." Section 6 sets out matters of national importance which are to be recognised and provided for by all persons exercising functions and powers under the Act. Section 7 sets out another list of matters to which persons exercising functions and powers are to have "particular regard". Finally, section 8 requires functionaries under the Act to take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

Lyttelton Port Recovery Plan (Recovery Plan)

7.20 The Recovery Plan was prepared so that the Port could:

a. be repaired and restored to meet current and future trade requirements;

b. assist in the Christchurch rebuild process and the recovery of the Greater Christchurch economy; and

c. meet the growing demands that will be placed on the Port as a consequence of projected growth in cargo volumes over time.

7.21 The vision of the Recovery Plan is:

> "*The rebuilt Lyttelton Port is resilient and efficient, and contributes positively to the social, economic, cultural and environmental wellbeing of Lyttelton township, harbour-side communities and greater Christchurch.*"

7.22 The vision is supported by eight goals which are further elaborated in Chapter 3 of the Recovery Plan. The first key consideration recognises and provides for the establishment of a container handling facility on reclaimed land at Te Awaparahi Bay (page 13) and is set out below:

> "***3.1. LIMITED FLAT LAND AVAILABLE FOR PORT ACTIVITIES***
>
> *Lyttelton Port is operating beyond capacity and freight volumes are increasing. Without the ability to handle larger ships and freight volumes, there is a risk that greater Christchurch will only be serviced*

by less efficient container ship fleets in the future. The flow-on effects to importers and exporters would be at a cost to the region. Lyttelton Port is seeking an additional 24-hectare reclamation in Te Awaparahi Bay. This is in addition to the 10 hectares of reclamation that was provided for by way of an Order in Council made under the Canterbury Earthquake Recovery Act 2011 on 26 May 2011."

7.23 The Independent Hearings Panel that heard the submissions on the Recovery Plan made the following comments in relation to the proposed reclamation for a container terminal on page 14:

"5.14 The Panel accepts that such long term freight projections are necessarily best estimates. It may well be that unforeseen changes will occur and skew the container demand upon Port Lyttelton. But a wait and see approach is not, in our view, an available option. The recovery plan has been under development for twelve months and adequate time remains for a draft plan to be publically notified, and approved, if accepted by the Minister.

5.15 The reclamation is the key component of that plan. It effects an eastward movement of a major part of LPC's operation. This, in the longer term, will free up space and facilitate much needed redevelopment of the inner harbour to the benefit of the Lyttelton, and wider, communities. The plan has been developed as a coherent whole. To remove the key component at this point would not be workable. Assurance must exist in relation to LPC's ability to develop the reclamation or the plan will falter."

7.24 Chapter 4 of the Recovery Plan sets out the statutory directions and summarises the changes needed to the relevant provisions of the various statutory instruments. The progressive, phased movement east of port operations is a policy feature in the District Plan and the Coastal Plan, consistent with the above discussion.[16] These policies are discussed further below.

7.25 The third key consideration in the Recovery Plan states the following:

"***3.3 DEEPER AND LONGER SHIPPING CHANNEL AND TURNING BASIN NEEDED***

[16] Noting the re-development of Dampier Bay with a new marina together with enhanced public access has been completed.

To accommodate larger ships, Lyttelton Port requires deeper and longer shipping channels. If Lyttelton Port is only serviced by relatively small, old and costly ships, it could disadvantage Christchurch and Canterbury in terms of economic efficiency and growth.

Lyttelton Port Company Limited is seeking to deepen and widen the main navigational channel and to create and deepen ship-turning basins adjacent to Te Awaparahi and Cashin Quay reclamations."

7.26 The dredging consents have been secured after a lengthy consenting process and the first stage of channel-deepening completed. As noted above, the deepening of the navigation channel is to enable larger container ships to visit Lyttelton. In turn, the new container terminal at Te Awaparahi Bay is fundamental to servicing these larger ships efficiently, which again demonstrates the inter-relatedness of these projects as part of port recovery.

7.27 While the Recovery Plan has directed changes to the objectives, policies and rules of the various RMA statutory instruments, the Plan also has special significance in a resource consent application context by virtue of a provision in the Greater Christchurch Regeneration Act 2016.[17] Section 60(2) of this Act provides that any person deciding a resource consent application "*must not make a decision or recommendation ….that is inconsistent with the Plan…*" Should a council, or LPC, consider that this has occurred, they may request the Minister to rule upon the matter or appeal to the Environment Court (section 60(3) and (4), respectively).

7.28 To conclude, the Recovery Plan recognises Lyttelton Port needs to have the ability to handle larger ships and freight volumes. Consequently, reclamation at Te Awaparahi Bay and the use of the reclaimed land for a Container Terminal is a key element of Port Recovery.

Assessment of the Relevant Statutory Documents listed under Section 104

District Plan

7.29 As discussed above, it is envisaged that the reclaimed land, once constructed, will eventually be subject to Specific Purpose (Lyttelton Port) Zoning. For this reason, the conditions of consent sought should be broadly consistent with that zoning.

[17] This Act replaced the Canterbury Earthquake Recovery Act 2011 upon its expiry date.

7.30 The landward side of the reclamation envelope is zoned “Specific Purpose (Lyttelton Port) Zone” (‘Port Zone’). As shown in **Figure 7.1**, the Port Zone covers all LPC-owned land and is divided into three management areas which includes the hill-slopes up to Sumner Road and the port-owned quarry above Gollans Bay.

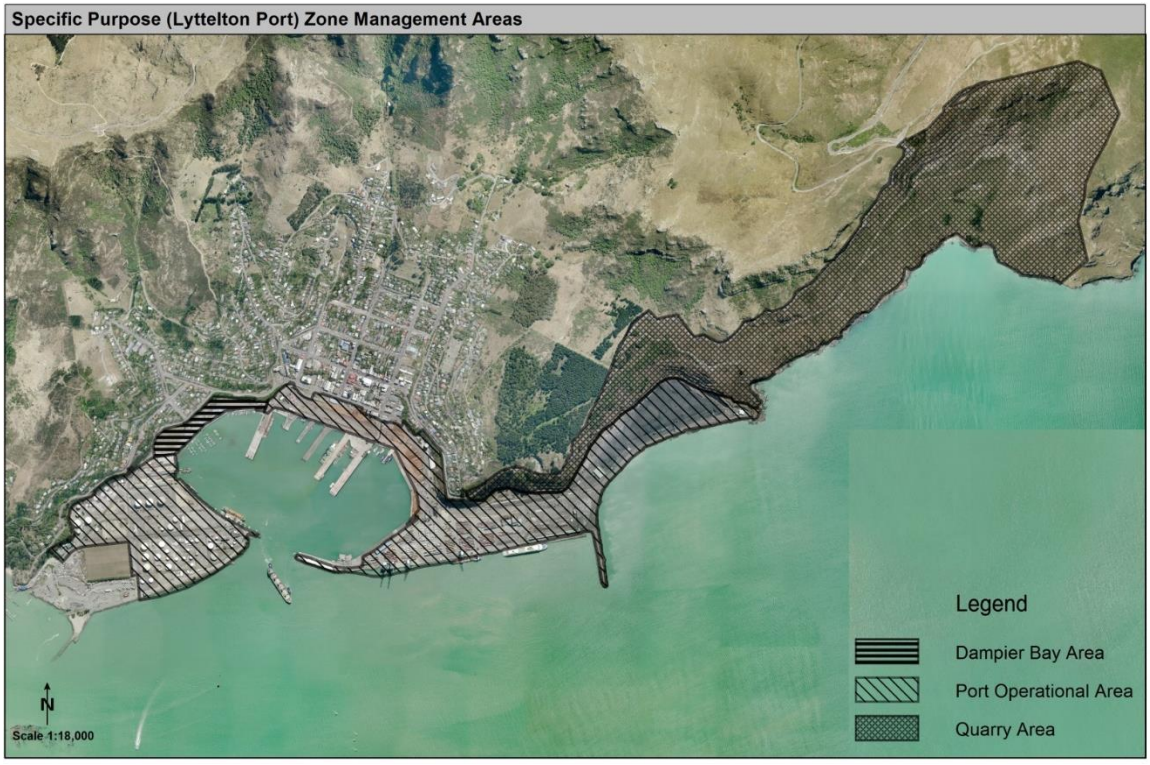

Figure 7.1 Specific Purpose (Lyttelton Port) Zone Management Areas.

7.31 Port activities are a permitted activity on the flat land in the Port Zone, all of which has been historically reclaimed. “Port activities” are defined as follows:

> *Port Activities means the use of land, buildings and structures for:*
>
> *a. cargo handling, including the loading, unloading, storage, processing and transit of cargo;*
>
> *b. passenger handling, including the loading, unloading and transit of passengers, and passenger or cruise ship terminals;*
>
> *c. maintenance and repair activities, including the maintenance and repair of vessels;*
>
> *d. port administration;*

e. marine-related trade and industry training facilities;

f. marine-related industrial activities, including ship and boat building;

g. warehousing in support of (a)–(f), (h) and (i), and distribution activities, including bulk fuel storage and ancillary pipeline networks;

h. facilities for recreational boating, including yachting;

i. activities associated with the surface navigation, berthing, manoeuvring, refuelling, storage, servicing and providoring of vessels;

j. ancillary transport infrastructure, buildings, structures, signs, utilities, parking areas, landscaping, hazardous facilities, offices and other facilities, and earthworks; and

k. ancillary food and beverage outlets in support of the above.

7.32 Port activities are subject to seven built form standards. However, given the subject area is well away from residential areas there are only two of the standards that are relevant; those on building height[18], and noise[19].

7.33 In the Port Zone, there are no height limits on container cranes, lighting towers and container storage[20] while other buildings are permitted up to a height of 15m. With respect to noise including construction noise, there are no limits, although noise management plans and, where relevant, mitigation plans need to be prepared[21].

7.34 High trip generating traffic to and from the Port Zone from existing access to the state highway and from new or existing access to local roads is a permitted activity[22]. The Port Zone has been excluded from transport standards contained in the Chapter 7 of the District Plan.

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[18] Rule 13.8.4.2.1 – noting that containers that are transiting through the port appear to be excluded from the definition of a building in any event i.e. clause (c) refers to containers being used on site as a residential unit or place of business or storage.

[19] Rule 18.8.4.2.6.

[20] Except for an area adjacent to Norwich Quay.

[21] Rules 13.8.4.2.7 and 13.8.4.2.8.

[22] Rule 13.8.4.2.9 (a) and (b).

7.35 The storage and handling of hazardous substances is permitted in the Port Zone up to certain thresholds. The thresholds do not apply when hazardous substances are in transit or stored temporarily as part of cargo for up to 72 hours.[23] However, these types of threshold limits in the Port Zone have since been removed from the rest of the District Plan, and it is expected that the Port Zone thresholds in due course will also be removed.

7.36 The coastline at Te Awaparahi Bay is not identified as an area of high natural character in the coastal environment ('HNC'), nor is any part of the Port Zone identified as an Outstanding Natural Landscape ('ONL'). The land further east is identified as HNC and ONL, and the upper slopes around the harbour are generally identified as ONL.

7.37 Lyttelton Port is identified as strategic infrastructure in the District Plan, which is defined as *"….. those necessary infrastructure facilities, services and installations which are of greater than local importance. It includes infrastructure that is nationally significant."* Lyttelton Port of Christchurch is then listed in the definition as an example of strategic infrastructure.

7.38 Chapter 3 (Strategic Directions) set outs the overarching direction for the District Plan. This chapter has primacy and guides the subsequent implementation and interpretation of the Plan generally. Objective 3.3.12(a) states that the social, economic, environmental and cultural benefits of infrastructure, including strategic infrastructure, are recognised and provided for, and its safe, efficient and effective development, upgrade, maintenance and operation is enabled. The remaining part of the objective seeks to protect strategic infrastructure, including specifically Lyttelton Port, from incompatible development and activities by avoiding adverse effects from them, including reverse sensitivity effects. Objective 3.3.12(c) acknowledges there may be adverse effects of infrastructure on the surrounding environment but that these are to be managed, having regard to the economic benefits and technical and operation needs of infrastructure.

7.39 Chapter 13.8 sets out the objectives and policies for the Port Zone. The first objective deals with the recovery and growth of Lyttelton Port:

"13.8.2.1 Objective – Recovery and growth of Lyttelton Port

[23] Rule 13.8.4.1.1 (P10) and Appendix 13.8.6.10.

a. The recovery of the Lyttelton Port is enabled in a timely manner:

i. to restore its efficient and effective operation, and enable growth and development to support its role as strategic infrastructure in the recovery of greater Christchurch; and

ii. to recognise its significance in the recovery of greater Christchurch, including economic growth within the township of Lyttelton, Christchurch District and the wider region."

7.40 Policy 13.8.2.1.1 details the elements of recovery consistent with the direction of the Recovery Plan:

"a. Recognise that the repair, rebuild and reconfiguration of Lyttelton Port entails the progressive phased movement east of port operations resulting in:

i. operational port activities being established on reclaimed land in Te Awaparahi Bay; and

ii. the shifting of some general cargo from the Inner Harbour to Cashin Quay; and

iii. redevelopment of land in Dampier Bay in a staged manner to provide for a commercial marina and associated land-side activities, including limited commercial activity, with enhanced public access and connectivity between the Lyttelton township, surrounding residential area and other parts of Naval Point."

7.41 The proposal to establish and operate the Container Terminal on the reclaimed land is fundamental to port recovery and is directly supported by this policy. Similarly, Policy 13.8.2.1.3 enables the efficient operation, use and development of Lyttelton Port by "*iv providing for expansion of the Port operational area onto reclaimed land in Te Awaparahi Bay*."

7.42 Policy 13.8.2.1.2 the addresses the three management areas shown on **Figure 7.1**. Clause (i) provides for a range of port and ancillary activities in the 'port operational area' while Clause (ii) provides for quarrying and roads to facilitate Port maintenance and development including reclamation in the 'port quarry area.'

7.43 Consistent with the above policy direction, the proposed consent will enable port activities to establish on land that is being reclaimed for port purposes.

7.44 Policy 13.8.2.1.4 states:

"a. Ensure that access and movement networks provide for:

i. efficient, safe and effective access along Norwich Quay to the Lyttelton Port, to meet the needs of the Port as a strategic transport and freight hub; and

ii. safe, direct and accessible provision for all transport modes between the Lyttelton Town Centre and surrounds to the ferry, cruise ships, marina and publicly accessible areas of Naval Point and the Dampier Bay/Inner Harbour waterfront.

7.45 The policy recognises that Norwich Quay needs to meet the needs of the port as a strategic transport and freight hub. The traffic report attached in **Appendix 6** states that Norwich Quay will continue to have the capacity to service trucks using the Container Terminal. The assessment indicates that in the longer-term traffic signals might need to be introduced at one of the intersections along Norwich Quay although this is a matter for longer-term monitoring and forward planning by the road controlling authorities.

7.46 Objective 18.8.22 addresses the effects from the recovery and operation of the Port, i.e.

a. The recovery of Lyttelton Port, including its operation, is managed to:

i. reduce the potential for adverse effects on the amenity of the wider Lyttelton township during recovery and repair, while recognising the inherent nature of adverse effects associated with large scale construction projects;

ii. mitigate adverse effects on the wider Lyttelton township and environment generated from ongoing port operations;

iii. minimise adverse effects of development on mana whenua cultural values; and

iv. avoid significant adverse effects of commercial activities in the Specific Purpose (Lyttelton Port) Zone on the recovery and function of the Lyttelton Town Centre and on the operational efficiency and safety of port activities

7.47 Clauses (i) and (ii) are concerned with reducing effects on the amenity of the wider Lyttelton township during port recovery and to mitigate adverse effects on the township during on-going port operations.

7.48 Clause (iii) needs to ensure all development mitigates adverse effects on mana whenua cultural values. With respect to clause (iii), LPC regularly consults with Te Hapū o Ngāti Wheke over progress of port recovery and discuss any issues that may arise. All Construction and Environmental Management Plans ('CEMP') prepared for construction activities have a section dealing with archaeology and what to do in the event of accidental discovery.

7.49 Objective 18.8.22 is complementary to Policy 13.8.2.1.1, described earlier, because the phased movement east of Port operations is designed to free up space and facilitate redevelopment of the inner harbour to the benefit of Lyttelton township. This has begun with Stage 1 of the marina and the public promenade, which have been completed, and have resulted in improved amenity for Lyttelton township generally.

7.50 To achieve the objective, Policy 13.8.2.2.1 seeks to ensure that activities within the Port Zone are designed to reduce existing and minimise new adverse effects generated within the Port operational area while Policy 18.8.2.2.4 more specifically addresses the form, scale and height of buildings within the Port Zone located in Dampier Bay and Norwich Quay as a means to ensure that the visual connections between the township and residential areas and the harbour are retained.

7.51 The development of the Container Terminal at Te Awaparahi Bay is therefore consistent with Objective 18.8.22 and the associated policies. As noted in the Landscape Report attached in **Appendix 3**, the Container Terminal will be located in the least sensitive area in terms of amenity values generally because the terminal does not directly adjoin the township or residences and is located to minimise visual intrusion.

7.52 Chapter 9.6 (Coastal Environment) states[24] that the Recovery Plan inserted the Specific Purpose (Lyttelton Port) Zone into the District Plan, and was developed to give effect to the New Zealand Coastal Policy Statement 2010. Therefore, the coastal environment objectives, policies or matters of discretion do not apply to the Specific Purpose (Lyttelton Port) Zone.

7.53 Therefore, no weight should be given to the objective and policies in Chapter 9.6 because the application involves the establishment of port activities on land that is authorised to be

[24] Clause 9.6.1 (h).

reclaimed for port purposes, adjoins the existing Port Zone; and is likely to be rezoned Port Zone during future reviews of the District Plan.

7.54 Chapter 9.5 addresses Ngāi Tahu values and the natural environment. Table 3 of Schedule 9.5.6.4 identifies the coastal waters within Lyttelton Harbour/Whakaraupō as Ngā Wai (ID 96), that is, these waters form part of Te Tai o Mahaanui, which is identified in the Ngāi Tahu Claims Settlement Act (NTCSA) 1998 as a Statutory Acknowledgement site.

7.55 Clause 9.5.3 (p) in Chapter 9.5 states that the chapter applies to any discretionary or non-complying activities within the Port Zone. Therefore, it is reasonable to assume that the objectives and policies in Chapter 9.5 are relevant, given this application is for a discretionary activity.

7.56 Objective 9.5.2.1.3 states that the cultural significance of Te Tai o Mahaanui is recognised and Ngāi Tahu is able to exercise kaitiakitanga and undertake customary uses in accordance with tikanga within the coastal environment. Policy 9.5.2.2.3 recognises the cultural significance of those parts of the coastal environment identified as Ngā Wai and to manage the effects of land uses on the surface water, including, most relevant, to ensure new land uses do not create additional demand to be able to discharge sewage or stormwater directly into Ngā Wai.

7.57 The Mahaanui Iwi Management Plan ('MIMP') also provides further policy guidance. The MIMP is a mana whenua planning document, reflecting the collective efforts of six Papatipu Rūnanga that represent the hapū who hold mana whenua rights over lands and waters within the takiwā from the Hurunui River to the Hakatere River and inland to Kā Tiritiri o Te Moana (page 17).

7.58 The takiwā of Te Hapū o Ngāti Wheke (Rāpaki) incorporates Whakaraupō and surrounding catchments, and therefore Rāpaki hold mana whenua rights, and are responsible for protecting their hapū and tribal rights, values and interests.

7.59 The first Ngā Paetae objective for Rāpaki is the restoration of the cultural health of Whakaraupō, including elimination of wastewater discharges, reducing sedimentation and achieving a water quality standard consistent with the Harbour as mahinga kai. There are also policies on the relationship between Rāpaki and LPC. Policy WH2.4 (page 253) states the following:

"WH2.4 To require that LPC recognise and provide for the relationship of Ngāi Tahu to Whakaraupō, and aspirations to manage the harbour as mahinga kai,by:

(a) Ensuring that port activities avoid contributing to pollution in the outer harbour;

(b) Ensuring that port activities at all times seek to avoid or minimise pollution in the innerharbour; and

(c) Providing appropriate mitigation and/or compensation where cultural and environmental effects cannot be avoided, including but not limited to:

(i) Funds for restoration projects."

7.60 The outcome of consultation with Te Hapū o Ngāti Wheke during the preparation of the Recovery Plan was to insert the conditions requiring LPC to install appropriately designed hydrocarbon and/or gross pollutant inceptors, as discussed earlier. **Chapter 4** of the AEE details the installation of these devices. In terms of clause (c), LPC has set aside funds for restoration projects as part of Recovery Plan process, the approvals to deepen the navigation channel and the approvals for the construction of the reclamation.

7.61 As discussed in **Chapter 6**, Te Hapū o Ngāti Wheke has confirmed that no Cultural Impact Assessment is required in relation to these consents, although the Rūnanga may yet to choose to submit if there are any consenting issues that may arise.

Coastal Plan

7.62 The Coastal Plan has less relevance to this proposal given consent to construct the reclamation has been issued by Environment Canterbury. Nevertheless, the objectives and policies reinforce those of the District Plan. Chapter 10 of the Coastal Plan is concerned with the recovery of the Lyttelton Port and the objectives and policies and rules in that chapter implement not only the specific recovery objectives for the Lyttelton Port but also prevail over the objectives and policies of the other chapters on the same subject matter [25].

7.63 Objective 10.1 recognises that the expedited recovery of Lyttelton Port, including its repair, rebuild and reconfiguration, is provided for as a matter of priority, while recognising the

[25] The Canterbury Air Regional Plan and Canterbury Land and Water Regional Plan also contain a policy providing for the recovery of Lyttelton Port by expediting activities while managing effects on the environment.

relationship with and managing any adverse effects of recovery activities on the ecological, recreational, heritage, amenity and cultural values of Lyttelton Harbour/Whakaraupō.

7.64 Policy 10.1.1 (Elements of recovery) recognises that an expedited recovery of the Lyttelton Port includes the progressive phased movement east of port operations, including establishing the Container Terminal on a maximum of 34 ha of reclaimed land in Te Awaparahi Bay.

7.65 Allied to the above is Policy 10.1.2, which **r**ecognises that Lyttelton Port is essential to the regional economy and that its continued operation is essential for the recovery of greater Christchurch.

7.66 Policy 10.1.11 specifically concerns the Container Terminal in Te Awaparahi Bay and states:

"Enable the development of a container terminal within Area A in Te Awaparahi Bay, as shown on Planning Map 5.10, which includes reclaimed land and wharf structures, while ensuring that:

1) The construction is carried out in a manner to minimise the propagation of sediment plumes and the risk of biosecurity incursions; and

2) Methods are employed to minimise effects on marine ecology; and

3) Measures are taken to achieve a net gain in mahinga kai; and

4) Methods are employed, such as the design and treatment of the reclamation edge, to reduce visual changes associated with the reclamation; and

5) The reclamation of land to protect berthing facilities does not extend beyond the 34 hectare area shown as Area A on Planning Map 5.10.

6) An exclusion zone around Battery Point is established to protect mahinga kai values."

7.67 The matters contained in Clauses (1) – (6) were addressed and satisfied during the consenting process for the construction of the reclamation.

7.68 Clause (4) of Policy 10.1.3 (Occupation and access) recognises that public access to all areas within the Operational Area of Lyttelton Port is to be managed by the owner or operator of Lyttelton Port to ensure public safety, and the security of cargo and port operations is maintained. Access to the proposed reclamation was addressed during the consent for the reclamation and it was accepted that public access to this area is impractical for safety and

security reasons. However, the establishment of a marina at Dampier Bay and the associated public promenade, as part of phased expansion to the east, enables the public to gain access to an area of the port and the Harbour that was previously inaccessible.

7.69 In summary, the proposed reclamation for a container terminal is clearly provided for in, and consistent with, the above policies.

New Zealand Coastal Policy Statement and the Regional Policy Statement

7.70 The higher-order documents (NZCPS and RPS) should have limited weight in this application because more specific objectives and policies have been introduced under the Recovery Plan, as described above, as the means to recognise and provide for operational port activities on the reclaimed land at Te Awaparahi Bay. These higher order documents pre-date the objectives, policies and rules inserted to the District Plan and the Regional Plans by the Recovery Plan. As noted earlier, Chapter 9.6 (Coastal Environment) states that the Recovery Plan inserted the Specific Purpose (Lyttelton Port) Zone into the District Plan, and was developed to give effect to the New Zealand Coastal Policy Statement 2010.

7.71 Nevertheless, for completeness, discussion of these documents is provided below.

NZCPS

7.72 Objective 2 of the NZCPS seeks:

"*To preserve the natural character of the coastal environment and protect natural features and landscape values through:*

- *recognising the characteristics and qualities that contribute to natural character, natural features and landscape values and their location and distribution;*
- *identifying those areas where various forms of subdivision, use, and development would be inappropriate and protecting them from such activities; and*
- *encouraging restoration of the coastal environment."*

7.73 As discussed in **Chapter 4**, the existing coastline from Magazine Bay east to Battery Point has been heavily modified by the port, with flat land, linear shorelines and breakwaters that enclose the inner Harbour and protect Cashin Quay. The existing coal stockyard along with the recent completion Reclamation A (Phase 1) and the commencement of Reclamation A

(Phase 2) typify the reclamation and modification that has occurred throughout the port area. The Port environment is one of continual activity and noise, with ships, trains, cargo, stockpiled material, and other port infrastructure and the coastal marine area currently being reclaimed is located within the port operational area (Planning Map 10.1 of the Coastal Plan).

7.74 Following on, Objective 6 states relevantly:

"To enable people and communities to provide for their social, economic, and cultural wellbeing and their health and safety, through subdivision, use, and development, recognising that:

- *the protection of the values of the coastal environment does not preclude use and development in appropriate places and forms, and within appropriate limits;*
- *some uses and developments which depend upon the use of natural and physical resources in the coastal environment are important to the social, economic and cultural wellbeing of people and communities;*
- *functionally some uses and developments can only be located on the coast or in the coastal marine area;*

……"

7.75 The proposal depends on natural and physical resources in the coastal environment and functionally can only be located in the coastal environment. The proposal is important to the social and economic well-being of the wider community, and the lower-order statutory documents have determined that the location is appropriate for a container terminal and port activities.

7.76 Policy 6 addresses activities in the coastal environment generally. Clause (a) recognises that the provision of infrastructure amongst other things is important to the social, economic and cultural well-being of people and communities as discussed above while clause (c) seeks the consolidation of existing urban areas. The proposed container terminal is consistent with these clauses.

7.77 Clause (h) addresses visual effects, which are discussed in the Landscape Report set out in **Appendix 3**. That report recognises that the site of the container terminal avoids the headlands and prominent ridgelines although the terminal will intrude into some of views to Godley Head from Governors Bay. This visual impact cannot be avoided, accepting that the

other policies recognise and provide for a container terminal at this location as a fundamental part of Port Recovery.

7.78 Policy 9 (b) of the NZCPS concerns ports:

"Recognise that a sustainable national transport system requires an efficient national network of safe ports, servicing national and international shipping, with efficient connections with other transport modes, including by:

(a) ensuring that development in the coastal environment does not adversely affect the efficient and safe operation of these ports, or their connections with other transport modes; and

(b) considering where, how and when to provide in regional policy statements and in plans for the efficient and safe operation of these ports, the development of their capacity for shipping, and their connections with other transport modes".

7.79 The District Plan, Coastal Plan and the RPS (see below) recognise that reclamation for a container terminal and port activities are appropriate in terms of Policy 9 (b).

7.80 Policy 13 addresses the preservation of natural character in further detail. Clause (a) seeks to avoid adverse effects in areas identified as having outstanding natural character and Clause (b) seeks to avoid significant adverse effects and avoid, remedy or mitigate other adverse effects on natural character in the coastal environment generally. Policy 15 concerning natural features and natural landscapes takes the same approach.

7.81 The Landscape Report (**Appendix 3**) notes that adjoining Port Zone is outside any overlays identifying natural and landscape overlays (see also paragraph 7.18 earlier), but the proposed container terminal will again intrude into some views onto areas subject to landscape overlays. Any change in the character in the vicinity of Te Awaparahi Bay has been recognised and anticipated by the other objectives and policies described earlier and the change in natural character was also assessed as part of the approval process for the construction of the reclamation for port purposes. As noted previously, this visual impact cannot be avoided, accepting that the other policies recognise and provide for a container terminal at this location as a fundamental part of Port Recovery.

7.82 Policy 19 promotes public access along the coast as a general principal, although clause (3)(e) recognises that restrictions on public walking access are necessary to protect public health and safety. A similar policy (8.3.6) exists in the RPS, with the explanation of that policy

stating that there is a need to control public access to commercial ports for safety and security, including compliance with the International Code for the Security of Ships and of Port Facilities under the Maritime Security Act 2004.

7.83 Policy 23(5)(a) requires port operators to take all practicable steps to avoid contamination of coastal waters, substrate, ecosystems and habitats that is more than minor. The design of the proposed hydrocarbon and gross pollutant traps are discussed in **Chapter 4** of the AEE.

7.84 Objective 3 and Policy 2 addresses the treaty of Waitangi and the role of tangata whenua as kaitiaki. **Chapter 3** describes the between Te Rūnanga o Ngāti Wheke (Rāpaki) and Whakaraupō and this chapter sets out the most relevant provisions of the MIMP.

RPS

7.85 The definition of "Strategic Infrastructure" (page 204 of the RPS) means: *"those necessary facilities, services and installations which are of greater than local importance, and can include infrastructure that is nationally significant*." The Port of Lyttelton is explicitly recognised in the definition as an example of strategic infrastructure.

7.86 The RPS's glossary (page 198) defines regionally significant infrastructure. The Port is captured by Clause 15 which includes "*Infrastructure defined as 'strategic infrastructure' in this regional policy statement*" as regionally significant infrastructure.

7.87 The Port also falls within the definitions of *"Strategic Transport Network"* which means: "*transport networks and operations of national or regional significance. These include the strategic road network including State Highway and major arterial roads as defined in district plans and the rail network, along with the region's core public passenger transport operations and significant regional transport hubs such as Christchurch International Airport and the Port of Lyttelton.*"

7.88 The Port also falls within the definitions of "*essential infrastructure*" and "*critical infrastructure*". However, those definitions apply in limited specific contexts relevant to activities in the beds of the rivers and lakes and natural hazards.

7.89 Objective 8.2.3.3 states that "Subdivision, use or development in the coastal environment does not adversely affect the efficient development and use of regionally significant infrastructure and other commercial maritime activities".

7.90 The objective recognises that the efficient development and use of regionally significant infrastructure is important for wider social and economic reasons. The explanation to the objective states that ports will need to be developed in response to future growth of population and economic activity in the region. Providing for the Container Terminal is consistent with the objective.

7.91 Policy 8.3.6 states the following:

"In relation to regionally significant infrastructure in the coastal environment:

(1) provide for its efficient and effective development, operation, maintenance and upgrade;

(2) provide for a range of associated activities that have an operational requirement to be located in that environment;

(3) recognise the potential of renewable resources in the coastal environment, such as energy from wind, waves, current and tides;

(4) avoid development that may result in reverse sensitivity effects that constrain the ability of the infrastructure to be developed and used (because of the imposition of time or other operational constraints); and

(5) provide for the expedited recovery of the Lyttelton Port, including its repair, rebuild and reconfiguration.

Such provisions should avoid, remedy or mitigate the adverse effects on that environment and take into account:

(a) the integrated management of Whakaraupō/Lyttelton Harbour in the recovery and further development of the Lyttelton Port, including provision for the many ecological, cultural, recreational and amenity values and uses of that area.

(b) that the ports of Lyttelton and Timaru need to dredge and deposit spoil in the coastal marine area outside the port areas to remain operational.

(c) that the recovery of the Lyttelton Port includes a container terminal being established in Te Awaparahi Bay on up to 34 hectares of reclaimed land;

(d) that regionally significant infrastructure may need to be further developed in response to commercial opportunities and community needs.

(e) that the operators of regionally significant infrastructure need to have their own controls over access to operational areas, and that public access to such areas is not always appropriate.

(f) national port noise standards.

(g) the effects of coastal erosion, climate change and sea level rise.

7.92 The location and extent of the Container Terminal is specifically recognised under Clauses (5) and (c) accepting there is a general requirement to avoid, remedy or mitigate adverse effects within this context.

7.93 Finally, more generally, Policy 6.3.5 (3) directs that the efficient and effective functioning of infrastructure is maintained, and the ability to maintain and upgrade that infrastructure is retained through the integrating land use development with infrastructure in order to assist the recovery of Greater Christchurch providing for a Container Terminal on the reclaimed land is consistent with this Policy and will maintain the efficient functioning of the Port.

Part 2 RMA

7.94 The Independent Hearings Panel appointed to hear and decide the Recovery Plan determined that a reclamation to establish the Container Terminal satisfied the essential purpose of the RMA (sustainable management) and therefore recommended controlled activity status for the construction of the reclamation. Their recommendations were accepted by the Minister and consequently the District Plan, Coastal Plan and RPS were amended and now all variously anticipate and support the establishment and operation of a Container Terminal on the land being reclaimed at Te Awaparahi Bay.

7.95 At the same time, there is a need to avoid, remedy or mitigate adverse effects on the receiving environment under section 5.2(c) of the RMA. The AEE includes an assessment of the actual and potential effects on the environment and proposed methods of mitigation which are similar scope to standards contained in the adjoining Port Zone.

7.96 As discussed earlier, the coastal marine area is known as Te Tai o Mahaanui and is identified in the Ngāi Tahu Claims Settlement Act (NTCSA) 1998 as a Statutory Acknowledgement site. Therefore 6(e) and Section 7(a) and (b) are relevant to the proposal.

7.97 LPC regularly consults with mana whenua on a wide range of matters, including these applications for the Container Terminal as described in **Chapter 6**. No CIA has been sought by the Te Hapū o Ngāti Wheke in this instance.

7.98 Section 6(a) and (c) matters were addressed during the consent hearing relating to the construction of the reclamation and are not relevant to this application.

7.99 In terms of Section 7(c) and 7(f), the Landscape and Lighting Reports attached to this AEE conclude that the visual effects and the effects of lighting from container terminal are not significant, but will nevertheless result in moderate visual impact to residences in and around Diamond Harbour and, to a lesser extent, in and around parts of Governors Bay.

7.100 Noise from the Container Terminal will be more noticeable when heard from Diamond Harbour, but will be within the noise levels anticipated in the District Plan. However, such changes have been contemplated through the Recovery Plan. Without the reclamation for the Container Terminal the recovery of the Port would not occur and Recovery Plan would be undermined.

7.101 With respect to the statutory planning framework that applies to these applications, it is concluded that the development of the Container Terminal in the manner proposed will, for the most part, align with the overall management outcomes specified in the relevant national, regional and district planning documents. Most of these planning documents also recognise the importance of the Port, and the continued operation and expansion of the Port will positively contribute to achieving those important planning outcomes.

LAND USE CONSENT APPLICATION

TE AWAPARAHI BAY

CONTAINER TERMINAL

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	Lyttelton Port Company			
8	Lyttelton Port Company – Reclamation Land Use Consent – Assessment of Electrical Power Supply Infrastructure	Power	Pederson Reid	5 June 2019

APPENDIX 1

EXISTING CONSENTS

Environment Canterbury Regional Council approvals to reclaim land and build wharves that cover a total of 34 hectares at Te Awaparahi Bay

Consent number	Consent description	Commencement date	Expiry date	Link to consent
CRC175507	Coastal permit to reclaim seabed and construct a wharf, and associated disturbance of the seabed, and deposition onto or into the seabed in the Coastal Marine Area.	23 Jan 2018	08 Dec 2052	https://www.ecan.govt.nz/data/consent-search/consentdetails/CRC175507/CRC176030
CRC175508	To discharge water and contaminants into water or into or onto land, and associated deposition in the coastal marine area.	23 Jan 2018	08 Dec 2052	https://www.ecan.govt.nz/data/consent-search/consentdetails/CRC175508/CRC176030
CRC175509	To discharge construction phase stormwater into water, or onto or into land, in the coastal marine area.	23 Jan 2018	08 Dec 2052	https://www.ecan.govt.nz/data/consent-search/consentdetails/CRC175509/CRC176030
CRC175510	To discharge dust into air	23 Jan 2018	08 Dec 2052	https://www.ecan.govt.nz/data/consent-search/consentdetails/CRC175510/CRC176030
CRC176030	To discharge sediment associated with the reclamation of the seabed and construction of a wharf	23 Jan 2018	08 Dec 2052	https://www.ecan.govt.nz/data/consent-search/consentdetails/CRC176030/CRC176030

Canterbury Earthquake (Resource Management Act Port of Lyttelton Recovery) Order 2011

Christchurch City Council

Report/Decision on a Resource Consent application for a Controlled Activity

Application Number: **RMA92018173**
Applicant: Lyttelton Port Company
Site address: 28 Cashin Quay & 231 Old Sumner Road – Lyttelton Road
Legal Description: A legal description of the sites is noted on pages 1 and 2 of the application.

Activity Status: Controlled activity pursuant to Clause 11 of the Canterbury Earthquake (Resource Management Act Port of Lyttelton Recovery) Order 2011

Description of Application:

- *To reclaim up to 10 hectares of land at the north-eastern corner of Te Awaparahi Bay, Lyttelton Port as identified on the plans submitted with the application attached as Annexure A.*
- *To undertake 'reclamation works' as necessary to carry out the reclamation including quarrying activities at the LPC Quarry at Gollans Bay, widening of the existing haul road (Old Sumner Road) and construction of the new haul road.*
- *To use the 'reclamation land' for 'port activities' including the construction of lighting towers up to 30 metres in height but excluding the use of the 'reclamation land' for the handling or storage of coal.*

Introduction

The purpose of this report is to make a recommendation to an Independent Commissioner on the land use consent application by Lyttelton Port Company to allow the above activity under the Canterbury Earthquake (Resource Management Act Port of Lyttelton Recovery) Order 2011 and to recommend any conditions to be imposed on the consent when granted.

The Canterbury Earthquake Recovery Act 2011

The Canterbury Earthquake Recovery Act 2011 was passed following a 6.3 magnitude earthquake on 22 February 2011 that caused severe damage to buildings, land and infrastructure, as well as significant loss of life. An earlier 7.1 magnitude earthquake struck the region on 4 September 2010. The purpose of the Act is to ensure that Christchurch recovers from the earthquakes in a focussed, timely and expedient manner and to restore the social, economic, cultural and environmental well-being of the greater Christchurch community.

Subsequent to the February 2011 earthquake the Port of Lyttelton made a request to the Ministry for the Environment for an Order in Council in recognition that the Port of Lyttelton has sustained significant damage from the earthquakes of September 2010 and February 2011 and requires additional flat land to carry out normal port operations. It was also recognised that the Central Business District (CBD) of Christchurch has suffered significant damage with many buildings requiring demolition creating millions of tonnes of demolition rubble.

The Canterbury Earthquake (Resource Management Act Port of Lyttelton Recovery) Order 2011

The purpose of this order is to permit the reclamation and port activities necessary for the recovery of the Port of Lyttelton to proceed without being unduly impeded by certain processes of the Resource Management Act 1991. The order came into force on 27 May 2011 and expires on the expiry of the Canterbury Earthquake Recovery Act 2011, being 18 April 2016. The Order enables the Lyttelton Port Company ("LPC") to apply to both territorial authorities, being Environment Canterbury and Christchurch City Council, for resource consent for a controlled activity to construct a reclamation at Te Awaparahi Bay for the future use of the land for Port Activities; and to carry out quarry operations at Gollans Bay including upgrading the associated haul road

access between the quarry and reclamation. The Order facilitates the rubble from the CBD to be transported to the Port for use in the reclamation.

The Order specifically identifies the meaning of "reclamation works" and the location of the Gollans Bay quarry (Clause 4). It also identifies the meaning of "Port Activities" (Clause 5) and the location and extent of the reclamation land (Clause 6), as well as the location and extent of the haul road (Clause 7). The definition of "port activities" specifically excludes the use of the reclaimed land for the handling or storage of coal.

Clause 8 of the Order sets out the applications that may be made under the Order and identifies a number of parties the applicant must consult with before lodging an application. It also requires an application to include a summary of the consultation undertaken and of the views (if any) of the persons or bodies consulted, the response of the applicant to those views, and any conditions that the applicant proposes be imposed on the resource consents applied for. I note that the applicant has included in Appendix 6 of their application a summary of the consultation undertaken.

Clause 11 of the Order sets out how applications are to proceed. It identifies that a reclamation work or port activity for which an application is made under Clause 8 is a controlled activity within the meaning of section 87A(2) of the Act. It also identifies, for the purpose of imposing conditions on a resource consent granted under the Order for any reclamation works or port activities, matters over which control is reserved. In brief, it groups the activities required for the reclamation into four categories:

a) Before reclamation works commence;
b) Reclamation works, including quarrying and haul road construction;
c) Rehabilitation and stabilisation of the quarry and road batters; and
d) Port activities on reclaimed land.

It should be noted that the Order at Clause 12 states that applications under the Order are to be determined on a non-notified basis. Applications must not be publicly notified or given limited notification.

Clause 14 states that a consent authority must give notice of its decision on an application not later than 5 working days after the date that the application was lodged with the consent authority. As the application was lodged on 30 May 2011, a decision is required to be given no later than Tuesday 7 June 2011.

The proposal and background

The proposed reclamation works and port activities are described in detail in the assessment of effects included in the application.

The current proposal is not dissimilar to that put forward in the direct referral application RMA92015151 which is currently before the Environment Court (on hold at the applicant's request). The Lyttelton Port Company on the 9th November 2009 lodged resource consent applications to the Christchurch City Council (RMA92015151) and Environment Canterbury to carry out quarry operations at Gollans Bay including the upgrade of the associated haul road access, stockpiling, screening and crushing and any other ancillary activities; and reclamation in Te Awaparahi Bay for use for stockpiling of coal and Port activities. That application was publicly notified and attracted a number of submissions in opposition.

Following the close of submissions, LPC requested that the applications made to both Environment Canterbury and Christchurch City Council be directly referred to the Environment Court. Both Councils were preparing reports for the Environment Court when the Canterbury Earthquake of September 4th 2010 struck. Reports were finalised following a delay by the applicant to assess damage to the Port. Reports pursuant to section 87F of the Resource Management Act 1991 were released by the consent authorities on the 24th November 2010. and following this the applicant was granted an extension of time until 31 January 2011 to decide whether to proceed with the applications in light of the damage suffered to the Port infrastructure, and to file a Notice of Motion with the Environment Court. The applicant filed a Notice of Motion on the 31st January 2011 advising they wished to proceed with the application for direct referral. The subsequent period for parties to lodge as s.274 parties was due to close on the 25 February 2011. I am only aware of the New Zealand Historic Places Trust has requested to be party to the appeal proceedings.

Canterbury then suffered a further 6.3 magnitude earthquake on 22 February 2011 which caused further damage to the Port. The application with the Environment Court was placed on hold at the request of the applicant so they could review the additional damage. Since that time the Canterbury Earthquake (Resource Management Act Port of Lyttelton Recovery) Order 2011 has come into force as stated earlier in this report .

The main difference between the controlled activity application (RMA92018173) under the Order in Council and the direct referral application (RMA92015151) is the positioning and shape of the reclamation, the construction methodology, the use of earthquake demolition rubble to construct the reclamation, and the specific exclusion of the use of the reclaimed land for the handling or storage of coal.

The current assessment of effects lodged with the controlled activity application draws on the information prepared for the direct referral application and addresses in turn those matters identified in the Order under Clause 11 over which control can be exercised and conditions imposed. This is discussed further below.

I note that the applicant has also applied to Environment Canterbury (ECan) for eight different consents under the Order in Council, related to the haul road construction, the quarry operations and the reclamation within the coastal marine area. These are listed on page 3 of the application.

Planning framework

The site is included in the Lyttelton Port Zone and the Rural Zone and is covered by the Port Environs Overlay Area under the Proposed Banks Peninsula District Plan. This proposal would normally be assessed as a discretionary activity under the District Plan. However the Canterbury Earthquake (Resource Management Act Port of Lyttelton Recovery) Order 2011 overrides the requirements of the Proposed Banks Peninsula District Plan and the Resource Management Act 1991 allowing the current proposal to proceed as a controlled activity.

Clause 11 of the Order applies to reclamation works and port activities as controlled activities and essentially sets out the planning framework for this application. For the purpose of imposing conditions on a resource consent granted under the Order for any reclamation works or port activities, the work or activity is a controlled activity, but only in respect of the following matters:

(a) before any reclamation works are commenced,—
- (i) the location (within the general area described in clause 6) and shape and size of the area of the reclamation land; and
- (ii) the materials used in and for any reclamation work; and
- (iii) the design and construction methods, including the armouring of the reclamation; and
- (iv) the management of the effects of those activities on—
  - (A) heritage, cultural, and archaeological values; and
  - (B) landscape, natural character, and visual amenity; and
  - (C) coastal processes; and

(b) while any reclamation works are being carried out,—
- (i) the management of construction work, stormwater, marine biosecurity, hazardous substances, coastal water quality, spills, artificial lighting, dust, noise, and vibration; and
- (ii) the management of the effects of the construction works on—
  - (A) heritage, cultural, and archaeological values; and
  - (B) landscape, natural character, and visual amenity; and

(c) following completion of reclamation works, the subsequent rehabilitation and stabilisation of the quarry and haul road batters; and

(d) in relation to port activities, the management of the height of structures, artificial lighting, and noise.

I note that Clause 11(3) states that the declaration in subclause (1) of Clause 11, that reclamation works and port activities are controlled activities in respect of the matters specified in subclause (2) of Clause 11, is not limited by the provisions of:
- (a) any other enactment; or
- (b) the district plan or any regional plan, to the extent that they apply to the reclamation land, or any reclamation works or port activities carried out on that land; or
- (c) the relevant regional coastal plan.

"Reclamation works" and "port activities" are defined in the Order, as are the location and extent of reclamation land and the haul road, the "existing road", and "Gollans Bay Quarry".

The existing environment

The application site is located at 28 Cashin Quay & 231 Old Sumner Road – Lyttelton Road, Lyttelton. The applicant has comprehensively described the existing environment of the site and surrounding area on pages 28 to 45 of the direct referral application including: the topography, geology, meteorology, marine receiving environment, air quality, road access to Lyttelton Port and coal stockyard, landscape, natural character and visual amenity, Battery Point historical values, and cultural values.

The application site encompasses the existing coal stockyard operation, the Lyttelton Port area, the Gollans Bay Quarry, associated haul road and parts of the surrounding hillside and coastal marine area. The topography of the area is dominated by the harbour and the Port Hills. The terrain rises steeply from the harbour to a height of approximately 500 metres. The Lyttelton area, including the proposed reclamation site occupies the steep, south facing, inner flanks of the extinct Lyttelton volcano crater that is part of the Port Hills. The crater rim and its upper slopes are lined with steep bluffs and large rock outcrops, that together create a distinctive landform and skyline. The slopes east of Lyttelton remain largely undeveloped and primarily in semi-improved grasslands with areas of regenerating native shrub and scrublands. There is a pine forest on the Urumau Reserve which separates Te Awaparahi Bay from Lyttelton.

Te Awaparahi Bay is located on the northern side of the Lyttelton Harbour, to the east of Lyttelton Township. Gollans Bay Quarry occupies the slopes below the summit of Sumner Road (Evans Pass). The land subject to this application is owned by LPC with the exception of the Old Sumner Road that runs through it.

Te Awaparahi Bay and the coal stockyard are highly modified, mostly occupying earlier reclaimed land, and the entire area is now used for coal stockpiling and coal handling infrastructure. The toe of the slopes behind the coal storage area has also been modified with terracing from previous excavations for reclamation work. The existing coal stockyard occupies an area of approximately 10.2 ha of which approximately 4.4 ha is for coal stockpiling itself with the balance for conveyors, roading, rail tracks, parking for mobile plant and other equipment.

Much of the land to the north, northwest and northeast of the coal stockyard is owned by LPC and is zoned rural. To the south and south east of the coal stockyard is Lyttelton Harbour. The nearest houses are located on a spur which rises to a height of approximately 240 metres above sea level and which separates the township from Te Awaparahi Bay and the coal stockyard. The nearest house in Lyttelton Township is approximately 450 metres to the west of the coal stockyard.

The coastline in the Port of Lyttelton and east to Battery Point has been heavily modified by port industry, creating flat land, linear shorelines, and breakwaters that enclose the harbour. Te Awaparahi Bay coal stockyard and shoreline typify the reclamation and modification that has occurred throughout the Port.

Gollans Bay, beyond Battery Point is a broad and shallowly indented bay with steep uniform slopes and bluffs towering above it. The quarried terraces below Evans Pass are a notable feature of the backdrop. Battery Point headland defines the eastern extent of Te Awaparahi Bay and the coal stockyard. The headland also marks the eastern extent of the highly modified Lyttelton Port area with Gollans Bay beyond retaining its original shoreline alignment.

The Gollans Bay quarry area is visible from many locations within this part of the harbour and from parts of Sumner Road. Excavation of the roads and the quarry has left visible scars in the landscape, and human modification along the upper slopes has reduced the natural character and landscape values of the Evans Pass summit area. Overall the natural character and landscape value of the mid-slopes of the bay, including the previous quarried faces, quarry floor, landfill, and access roads, is modified in comparison to the natural rocky bluffs above the quarry.

I note also that since the Canterbury Earthquakes of September 4th 2010 and February 22nd 2011, the landscape of Evans Pass above Sumner Road has been modified due to land slips caused by the quake which have blocked the Sumner Road. Christchurch City Council is currently involved in emergency clearing of the road by transferring much of the rock fall into the Gollans Bay quarry on the LPC land and safety excavations of Windy Point. This was evident on a recent site visit of 27 May 2011..

Te Awaparahi Bay coal stockyard is visually secluded from many local land based locations, including Lyttelton, and much of Sumner Road itself. The Windy Rock Point lookout above the coal stockyard provides views into the coal stockyard, not otherwise possible from Sumner Road, but is not currently accessible.

Tunnel Road, Norwich Quay, and Gladstone Quay form part of State Highway 74 (SH74) and provide access to the Port area at the eastern end of Lyttelton. Old Sumner Road is located within the Rural Zone and vehicular access is restricted with a Council locked gate adjacent to Sumner Road at the western end. The road has a gravel carriageway with a width of approximately 7m and is well maintained.

Battery Point has a number of archaeological values which exist in close proximity to the coal stockyard. Battery Point supported a number of military installations dating from the 1880's, WWI and WWII. The Battery Point historic grounds and the boundaries of the Battery Point Battery Historic Area are recorded as an archaeological site; most of the structures date from WWII. The site of the barracks dating from the 1880s is located high on the slopes of Te Awaparahi Bay above the coal stockyard. A sentry post is located near the barracks on the Old Sumner Road and was part of a large chamber cut into the slope and with an arched masonry roof. A short distance east, on the Old Sumner Road, is the Battery Point spur. An 1880's store and magazine is located in the slope for about 10m with two side rooms partitioned off by brickwork; nearby is a terrace cut into the slope which may have supported a shed for the District Gunner.

Also part of this upper complex is a battery observation point which consists of a chamber with masonry walls and a concrete pillar. A large 'L' shaped room, with four smaller rooms, is located further down the spur. Below this structure is a mid-slope complex with three WWII buildings grouped together. The first is the magazine built of concrete into the slope which has a permanently shut steel door. Next to it is a free standing concrete building which is the war shelter or troop ready room. Below this mid-slope group are the two WWII gun emplacements. An 1880 magazine is located on the lower slopes. Remnants of searchlight systems and a latrine are located inside the Port security fence.

There is also a long history of Maori settlement in Banks Peninsula. The applicant has described in section 5.9 of the direct referral AEE the cultural values of the Banks Peninsula area. A Cultural Impact Assessment was not submitted as part of the direct referral application, however subsequent consultation has been undertaken with local runanga as required under the Order in Council.

Notification

It should be noted that Clause 12(1) of the Canterbury Earthquake (Resource Management Act Port of Lyttelton Recovery) Order 2011 states that applications under the Order are to be determined on a non-notified basis. Applications must not be publicly notified or given limited notification but must be determined in accordance with Part 6 of the Act, unless otherwise specified by the order. Clause 12(2) states that sub-clause (1) applies instead of sections 95 to 103A of the Resource Management Act 1991 (which relate to notification, submissions, pre-hearing, and hearing matters).

Consultation

As noted earlier in this report, Clause 8 of the Order sets out the applications that may be made under the Order and identifies a number of parties the applicant must consult with before lodging an application. It also requires an application to include a summary of the consultation undertaken and of the views (if any) of the persons or bodies consulted, the response of the applicant to those views, and any conditions that the applicant proposes be imposed on the resource consents applied for.

I note that the applicant has included in Appendix 6 of their application a summary of the consultation undertaken. Consultation was undertaken with all required parties, namely Te Rūnanga o Ngāi Tahu, the Department of Conservation, the New Zealand Historic Places Trust, Maritime New Zealand, the Lyttelton-Mount Herbert Community Board, the Lyttelton Community Association Incorporated, and the Diamond Harbour Community Association Incorporated.

I have reviewed the summary of the consultation with the relevant stakeholders identified above and am satisfied that the conditions of the CCC consent will address the concerns raised by each of the stakeholder groups.

I note one issue which is beyond the matters for control under the Order is the issue of the increased traffic movements between the CBD of Christchurch and the Port of Lyttelton to transport the demolition rubble. This issue was raised by the Lyttelton-Mt Herbert Community Board in consultation and warrants further consideration as there is the potential for adverse effect.

LPC has advised that the increased truck movements through the Lyttelton tunnel associated with the reclamation are anticipated to be in the order of approximately 200 extra truck movements per day. In the course of a 10 hour work day this equates to approximately 20 extra truck movements per hour or one every 3 minutes. I do not consider this will have any more than a minor adverse effect on the amenity of the Lyttelton Township or other land along the transport route from the CBD given their temporary duration.

LPC have offered a number of initiatives to monitor and reduce impacts of the increased traffic from the CBD to the Port and will consult with the community to address any concerns. I consider this is adequate in the circumstances.

Assessment of the effects on the environment

The applicant in their assessment of effects has addressed in turn each of the matters over which control is reserved pursuant to Clause 11 of the Order and placed these in to four categories, being:

a) Before reclamation works commence;
b) Reclamation works, including quarrying and haul road construction;
c) Rehabilitation and stabilisation of the quarry and road batters; and
d) Port activities on reclaimed land.

For each of these categories the applicant has summarised the actual or potential effects on the environment, and proposed mitigation and relevant conditions to address these effects. I do not intend to repeat the assessment of the applicant in this regard, but instead summarise the key points raised in the AEE under each of the proposed headings and note the conditions Council wishes to see imposed on the consent to avoid, remedy and mitigate adverse effects of the proposed activities upon the environment. Extensive pre-application work has been undertaken between Christchurch City Council, Environment Canterbury, the Department of Conservation, Lyttelton Port Company and those stakeholders identified in the Order in preparing the AEE and the conditions to be imposed on consent.

Before reclamation works commence

The location of the 10ha recovery reclamation is such that it is an extension of the existing Cashin Quay reclamation and will allow the Port to expand its cargo storage area and provide an alternative space for Port activities. This does not pose any concerns from a land use perspective with respect to the CCC consents.

With respect to the location and size of the quarry and the haul road alignment, the applicant has submitted with the direct referral application a landscape assessment of the area upon which the quarry and haul road will expand. It is noted that the quarry has existing use rights to expand over time, and the current proposal will accelerate this expansion with much greater immediate effect than if it were undertaken at slower rate. The applicant has advised that the quarry will be expanded in stages moving west to east along the footprint as shown on the plans for the expansion. LPC plans to also lower the floor of the quarry however this is likely to be less than what was previously planned due to a lower estimate of the amount of available armour rock in the quarry floor.

The Old Sumner Road is to be used as the haul road between the quarry and the reclamation and is to be widened in sections to allow large trucks two way access along the haul road. This haul road will also be extended from the Old Sumner Road where it reaches Battery Point. A hair pin bend is to be constructed which will extend the haul road down to the existing coal stockyard at Te Awaparahi Bay. The applicant has discussed the widening and gradients of the haul road construction in detail on pages 5 and 6 of the AEE.

The widening of the haul road and the expansion of the Gollans Bay quarry are both integral to the construction of the reclamation. Andrew Craig, Landscape Architect on behalf of the Council, considered the effects of the widened haul road and the expansion of the quarry for the direct referral application and concluded the adverse effects on the environment would be no more than minor, subject to conditions. The recommended conditions include the requirement for the quarry expansion to proceed as per the proposed footprint on the plans included with the application, for a site management plan to be prepared and submitted to Council to set out the measures required to stabilise the slopes during and after earthworks, and for a landscape and ecology rehabilitation/enhancement plan to be prepared for the quarry and haul road upgrade.

With respect to the materials to be used in and for any reclamation work, these include armour rock from the Gollans Bay quarry, and demolition rubble from the Christchurch CBD, estimated at approximately 2.2 million tonnes. Large rock from the quarry is estimated at around 70,000 tonnes to construct the breakwalls for the reclamation. The materials to be used for the reclamation are addressed in the Regional Council applications. I note that concern has been raised by the Lyttelton - Mount Herbert Community Board and the Diamond Harvour Community Association over the type of materials being dumped in the sea to construct the reclamation. The applicant has advised at page 6 of the AEE that material will be sorted on site and only suitable material will be used in the reclamation. I have visited the site recently and note that sorting of material is already occurring on site.

On pages 7 to 11 of the AEE the applicant has addressed the design and construction methods to be used for the reclamation and advises that it is estimated to take up to 2 years to complete, dependent on the supply of rubble. I do not have concerns with the methods of construction as this is a Regional Council issue and will be covered by their assessment and conditions. The only issue which has been raised by the applicant is the future use of the reclamation for Port Activities which is discussed later in this report. The applicant has requested a 10 year lapse period for the use of the reclamation for Port Activities. This is to address any future issues which may arise with settlement of the reclamation and its suitability for future use, hence the extended lapse period for the future use aspect of the consent. I do not oppose the extended lapse period as it gives the Port flexibility over the use of the land should the reclamation and associated settling take longer than expected. I note that amendments to the District Plan are likely to negate the requirement for the extended lapse period as the land will in the future be incorporated into the Lyttelton Port Zone under the District Plan however this is not certain to happen within the next 5 years, hence the longer lapse period for the use of the reclaimed land. I do not anticipate that the environment surrounding the reclamation is likely to change significantly in the next 10 years which would raise concern with the extended lapse period to enact the use on the reclaimed land. I further note the only persons affected by the extended lapse period are the Port. I consider the extended lapse period to 10 years for the use of the reclaimed land to be appropriate.

At pages 11 and 12 of the AEE the applicant has addressed the design and construction of the haul road and the quarry expansion. The applicant has undertaken geo-technical investigations of the quarry and haul road locations and this has influenced the design and construction methods. The quarry and haul road will be benched and a safety berm constructed along the edge of the haul road. This will involve at the quarry, planned and controlled blasting, drilling and excavation. Environmental Health expert, Russell Malthus on behalf of the Council has considered the effects of the haul road and quarry expansion and the design and construction methods proposed and concludes the adverse effects will be no more than minor, subject to conditions. These include the preparation of a site management plan and conditions related to blasting and vibration and effects on the Battery Point Historic Area structures.

In terms of the heritage, cultural and archaeological values of the area, it is not anticipated that the adverse effects of these pre-reclamation activities will be any more than minor. The applicant has agreed to an accidental discovery protocol condition. In terms of cultural effects these are mostly confined to the coastal marine area and consultation has been on-going with Te Rūnanga o Ngāi Tahu and relevant Papatipu Rūnanga identified by Te Rūnanga o Ngāi Tahu, and this is reflected in the summary of consultation at Appendix 6 of the AEE. It is not anticipated that the heritage structures at Battery Point will be adversely affected by the construction of the haul road or the expansion of the quarry, however the applicant has agreed to conditions to ensure the adverse effects on these heritage structures are avoided or mitigated. With respect to the effects of the activities on the landscape, natural character and visual amenity of the area, as discussed previously Andrew Craig, Landscape Architect, has reviewed the proposal and concluded the adverse effects of the proposal will be no more than minor, subject to conditions. Andrew has advised that the landscape is highly modified in the region of the proposed reclamation and the proposed haul road and quarry expansion areas and supports the landscape assessment undertaken by Boffa Miskell.

Reclamation works, including quarrying and haul road construction

With respect to the haul road construction and the quarry expansion, while the reclamation is being constructed there is potential for adverse effects to occur related to stormwater runoff, hazardous substances use/storage/spills, artificial lighting, dust, noise, and vibration, and for these effects to adversely impact upon the heritage, cultural, and archaeological values of the area as well as the landscape, natural character, and visual amenity of this part of Banks Peninsula. I note stormwater runoff is addressed in the ECan consents so I do not intend to discuss this issue further. I further note that a site management plan (SMP) is to be prepared to provide an overview of the proposed excavation methods on the road batter slopes, including a geotechnical report into slope stability and stabilisation techniques required, and the staging of the quarry excavation methods and battering of slopes.

With respect to hazardous substances, the applicant advises that there will not be any storage of hazardous substances at the quarry or anywhere along the haul road. Any fuel for machinery will be stored at the Port and taken by a portable fuel tanker to the quarry on an as needed basis. Should there be any spills during refuelling of machinery this can easily be addressed through the use of spill kits or the fuel spill can be scooped up by machinery used on site and disposed of correctly. Any hazardous substances used in blasting at the quarry will also be stored at the Port and taken to the quarry on an as needed basis. I do not anticipate there being any adverse effects arising from the use and handling of hazardous substances on either the quarry or haul road. ECan is also addressing any effects of hazardous substances and stormwater runoff in their consent conditions.

With respect to artificial lighting the applicant has discussed this issue at page 20 of the AEE. The potential adverse effects arising from artificial lighting are glare, light spill, sky glow and visual amenity. The main viewpoint for lighting of the haul road and quarry areas will be from Diamond Harbour. The applicant anticipates insignificant adverse effects associated with the artificial lighting at the quarry and along the haul road. I agree with the applicant's assessment at page 20 of the AEE and consider this issue can be managed through appropriate conditions on consent. These are noted below in the recommended conditions.

With respect to dust from the loading and unloading of material used in the reclamation, the haul road construction and use, and the expansion of the quarry, this issue has been addressed through conditions to mitigate the adverse effects of fugitive dust. I agree with the applicant's assessment on page 21 of the AEE that dust emissions can be managed through the use of water carts along the haul road and through the staged expansion and rehabilitation of the quarry surfaces. This issue is covered in the ECan consents through appropriate conditions of consent.

With respect to noise, the applicant anticipates the predominant adverse noise effects to arise from the use of equipment such as haul trucks, excavators, loaders and bulldozers at the reclamation, along the haul road and at the quarry. The applicant predicts any noise emissions to be well below the construction noise standards contained in NZS6803 and have proposed conditions for this consent to cover address any potential noise issues. A construction noise management plans is proposed to address noise form the construction of the haul road and the expansion of the quarry. Any blasting at the quarry is not anticipated to generate high levels of noise given its remote location. The applicant has also advised that any noise complaints will be forwarded to the Port Liaison Committee which has already been established to examine issues of Port noise and noise mitigation that may be required. I am comfortable that noise from the proposed activities can be managed through appropriate conditions.

With respect to vibration I do not consider the vibration effects from the blasting at the quarry or the use of the haul road will be any more than minor. Blasting will be limited to between 9am and 4pm each day and is not anticipated to generate any adverse effects at the closet residential property in Lyttelton. Some concern has been raised regarding the historical Battery Point gun emplacements and any adverse vibration effects which may occur to these structures. The applicant has proposed conditions to monitor any vibration effects on these structures and to address any concerns that may occur. I am comfortable that vibration effects can be monitored and managed to ensure the on-going viability of these structures and to ensure there no nuisance effects from vibration to residents in Lyttelton. I note that vibration from aftershocks associated with the earthquakes is also still occurring in the Banks Peninsula area and is likely to have more of an adverse effect on residents in Lyttelton and upon the heritage structures at Battery Point than the anticipated vibration from blasting at the quarry or the use of the haul road.

Overall I agree with the applicant's assessment on pages 23 to 27 of the AEE with respect to the management of the effects of the reclamation works on the heritage, cultural and archaeological values of the area and the management of the effects of the quarrying and haul road construction upon the landscape, natural character and visual amenity of this area of Banks Peninsula. The Proposed Banks Peninsula District Plan anticipates the expansion of the quarry and the use of the haul road to facilitate reclamation for the expansion of the Port. These activities are for the most part anticipated in the Lyttelton Port zone. The Rural zone anticipates earthworks associated with the haul road upgrade and the widening of the haul road is for the most parrt permitted under Chapter 35 of the Plan in relation to access, parking and loading.

As stated previously, Andrew Craig has undertaken an assessment of the Boffa Miskell landscape assessment and is satisfied any adverse effects associated with the widening of the haul road and the expansion of the quarry can be mitigated through appropriate conditions. Russell Malthus, Environmental Health expert has also undertaken an assessment of the noise, dust, lighting and vibration effects and is satisfied that these effects can be managed through appropriate conditions. I am satisfied the adverse effects from the proposed activities can be mitigated through appropriate conditions and agree with the applicants assessment of the effects.

Rehabilitation and stabilisation of the quarry and road batters

The applicant is proposing a Landscape and Ecology Rehabilitation/Enhancement Plan (LEREP) to address any adverse landscape effects from the proposed haul road widening and the expansion of the quarry. This contains conditions relating to the planting of the haul road batters, planting of the quarry benches, gully enhancement plans and general weed control of these areas. It also contains conditions around the LEREP preparation times and future amendments where necessary. Council's Botanist, Trevor Partridge, has provided technical input into these conditions as has Andrew Craig in addressing the landscape, natural character and visual amenity effects. Both are comfortable with the conditions to be attached to the consent to address rehabilitation and stabilisation of the quarry and haul road batters. I consider the LEREP conditions will facilitate

the future rehabilitation of the batter slopes and gullies associated with the haul road construction and the quarry expansion areas.

Port activities on reclaimed land

The applicant has discussed the future Port activities on the reclaimed land at page 29 of the AEE. They have noted that the conditions which are to apply to the CCC consent for the future use will effectively replicate the requirements of the Lyttelton Port Zone in anticipation that the reclaimed land will be incorporated into the Lyttelton Port Zone at the next District Plan review.

I note that the Resource Management Act 1991 (RMA) defines "district" in relation to a territorial authority as meaning the district of the territorial authority as defined in the Local Government Act, and as including any area in the coastal marine area for the purposes of s89 of the RMA. Section 89 of the RMA provides that where an application is made to a territorial authority for a resource consent "for an activity which an applicant intends to undertake within the district of that authority once the proposed location of the activity has been reclaimed, and on the date that the application is made the location is still within the coastal marine area, then the territorial authority "may hear and decide the application as if the application related to an activity within its district".

Essentially the Port wishes to be able to undertake the proposed Port Activities on the reclaimed land until such time that the land is incorporated into the Lyttelton Port Zone, hence the requirement for conditions around the use of the reclaimed land. The Order identified the management of the height of structures, artificial lighting, and noise as the matters over which control should be reserved in relation to the future Port Activities. The applicant has suggested conditions in relation to these matters. These conditions include a restriction on the types of activities to occur, and specifically excludes the handling and storage of coal. As discussed earlier there is an extended lapse period to give effect to the Port Activities occurring on the site given the potential for issues associated with settlement of the reclaimed land which may take longer than 5 years, hence a 10 year period for the use is requested. I consider this appropriate. The height of structures is also conditioned and reflects the requirements for the height of structures in the Lyttelton Port Zone as they apply to lighting structures, buildings, and quayside and container cranes. Construction noise limits and a noise management plan conditions are also proposed as are conditions relating to flood lighting and permanent lighting of the reclaimed land. A review condition is also recommended to address any unanticipated adverse effects on the environment which may arise form the use of the reclaimed land in the future. I consider the conditions proposed are adequate to mitigate any adverse effects from the future use of the reclaimed land and will ensure that the Port Activities and the effects of these are consistent with the activities and effects anticipated in the Lyttelton Port Zone.

Conclusion

The Canterbury Earthquake (Resource Management Act Port of Lyttelton Recovery) Order 2011 provides for the reuse of approximately 2.2 million tonnes of demolition rubble which would otherwise have ended up in the landfill, and is required to be removed from the CBD as quickly as possible. This is a significant cost saving to the wider community in the order of $200 million and expedites the rebuild of Christchurch, while also assisting with the recovery of the Port of Lyttelton. In my opinion the consultation undertaken by the applicant is adequate and the assessment of effects has addressed the issues raised in consultation. I consider the conditions which are recommended below adequately address the potential adverse effects associated with the future use of the reclaimed land at Te Awaparahi Bay, the proposed widening and extension of the haul road, and the expansion of the quarry at Gollans Bay. As a controlled activity, consent must be granted to this application and in my opinion it is appropriate this is subject to the conditions set out later in this report.

How do any relevant objectives, policies, rules or other provisions of the District Plan relate to the proposal?

The relevant objective and policies of the Banks Peninsula District Plan seek to preserve the natural character and amenity values of the coastal environment of the District including the coastal natural character landscape and to protect it from the adverse effects of inappropriate use and development. The Plan notes it is important to ensure that the use and development of physical resources does not adversely affect the integrity of important elements of the cultural heritage of the District and to identify and secure the protection of structures, buildings, places, sites and areas which have cultural heritage value.

Further, the Plan seeks to maintain the landscape values, natural character and amenity values of each of the Landscape Categories identified within the Rural Zone and to maintain and enhance the prominent rocky outcrops of the rural environment and seeks the ability to sustainably provide for the evolving nature of land

based activities and to identify, protect and enhance significant habitats of indigenous fauna wetlands and ecosystems; and encourage the retention and enhancement of indigenous vegetation and habitats of indigenous fauna

Objective 9 of the Rural Zone particularly seeks to enable the efficient operation, use and development of the Port of Lyttelton as a major sea link for New Zealand and the related policy seeks to ensure that the efficient operation, use and development of Lyttelton Port is maintained or enhanced by avoiding reverse sensitivity effects arising from adjoining land use activities.

The Lyttelton Port Zone objectives seek to enable the efficient operation, use and development of Lyttelton Port, as a major sea link for New Zealand. Related policies seeks to enable the efficient operation, use and development of the Lyttelton Port by: providing for port activities within the Lyttelton Port Zone; ensuring that any reverse sensitivity effects arising from any noise sensitive activities located in the adjoining zones are avoided or minimised; avoiding encroachment of the urban boundary towards and around Lyttelton Port where such encroachment may result in reverse sensitivity effects; ensuring, as far as practicable, that areas which can be used to buffer Lyttelton Port from activities that may result in reverse effects on the port are utilised; and providing the opportunity for the future expansion of Lyttelton Port through the establishment of a Port Environs Overlay Area and by recognising the potential need for reclamation.

Further, the Lyttelton Port Zone aims to ensure the use or development of Lyttelton Port is managed so that the environmental effects on neighbouring activities in Lyttelton Township are avoided, remedied or mitigated in order to reduce the potential for conflict. Relevant Policy 2A seeks to set standards on the height of structures and buildings in order to avoid or mitigate adverse effects, and in particular having regard to visual effects as viewed from the adjoining zones in Lyttelton Township. Relevant Policy 2C seeks to set standards on lighting in order to avoid or mitigate adverse effects, and in particular the effects of light spill on sites in adjoining Residential, residential Conservation, and Town Centre Zones.

Also of relevance is Objective 3 of the Lyttelton Port Zone which aims to ensure that the expansion of the Port's activities can occur in a sustainable manner which minimise conflict. Relevant Policy 3A seeks to identify an area beyond the Port Zone for the sustainable expansion of Port activities.

I consider that the proposed expansion of the Gollans Bay quarry, the widening of the haul road, and the expansion of the coal stockyard onto the reclaimed land at Te Awaparahi Bay will have no more than minor adverse effects on the landscape, natural character and visual amenity of the site and surrounding area of Banks Peninsula and Lyttelton harbour. The natural character and amenity of the coastline will be preserved with the exception of the reclaimed land at Te Awaparahi Bay, however this expansion is anticipated for the future expansion of port activities between Gollans Bay and Te Awaparahi Bay. The works will be undertaken in a manner that sees the landscape rehabilitated over time and the effects on the landscape amenity of the area minimised. In my opinion, and subject to conditions relating to landscape management, the adverse effects on the landscape will be adequately mitigated and ecological values of the area will be maintained.

I consider the amenity of the area will be protected from the additional activities associated with the reclamation. The road network has the capacity to cater for the additional truck movements associated with the reclamation at Te Awaparahi Bay and transporting the material from the CBD with only a minor effect on the amenity of residents in Lyttelton Township. Stormwater associated with the haul road and the expanded quarry will be treated in an appropriate manner before being discharged into Lyttelton Harbour. The proposal seeks to expand the Port with minimal impact on the Lyttelton Township in terms of noise and traffic. Given there is the large spur of land which separates the Township from the Port, and the Port is sufficiently remote from the Township, it is unlikely that reverse sensitivity effects will arise as a result of activities establishing in the Township which would be sensitive to any effects the Port may generate which could potentially cause the Port to curtail its operations. The reclamation will allow for the expansion of the Port in a sustainable manner with minimal conflict between uses. The reclamation is necessary to ensure the Port recovers from the damage sustained during the recent earthquakes.

I consider the noise levels proposed are acceptable, reasonable and appropriate in the context of the environment and will not result in undue adverse effects, including cumulative effects. There will be on-going community consultation regarding noise effects as a requirement of the Construction Noise Management Plan and conditions of consent should it be granted.

After considering the relevant objectives and policies of the Proposed Banks Peninsula District Plan, it is my opinion that the proposal is not contrary to the objectives and policies as they relate to the conservation of heritage, the coastal environment, cultural heritage, the rural zone, the Lyttelton Port zone, noise and transport.

Are there any relevant provisions of a National Environmental Standard, National Policy Statement, Regional Plan, Regional Policy Statement or Coastal Policy Statement?

Canterbury Regional Policy Statement (RPS)

The Canterbury Resource Policy Statement 1998 sets the framework for resource management in Canterbury. It provides an overview of the significant resource management issues facing the region, and sets out objectives, policies and methods to address the region's resource management issues. Its goal is the integrated management of the region's natural and physical resources. The operative 1998 Canterbury Regional Policy Statement has now been reviewed. This document will set the framework for resource management in Canterbury for the next 10 to 15 years. Public input was sought from 25 September until 3 December 2010.

The Draft Canterbury Regional Policy Statement 2010 follows four years of development, including extensive consultation with Canterbury local authorities, Ngāi Tahu, and key stakeholders. It substantially updates, and will eventually replace, the operative 1998 policy statement. The invitation for public input in the draft is an informal step in the development of the new policy statement for the region, ahead of notification in 2011.

Proposed Change 1 (PC1)

Proposed Change 1 to the Regional Policy Statement addresses land use and urban growth management in Greater Christchurch for the next 35 years and provides statutory backing for the Greater Christchurch Urban Development Strategy. It is not operative and has not been reviewed. It was notified in 2007 and decisions were released in 2009. Appeals are underway in the Environment Court. The outcomes will be incorporated into the Canterbury Regional Policy Statement as Chapter 5 – Development of Greater Christchurch.

The objective of Proposed Change 1 (PC1) to the Canterbury Regional Policy Statement (RPS) is to bring the strategic vision for the growth of Canterbury into a resource management planning framework. PC1 was developed by Environment Canterbury with Christchurch City, Selwyn and Waimakariri District Councils, and the NZ Transport Agency as a method of implementing the Urban Development Strategy (UDS), which covers an area known as the Greater Christchurch sub-region. The UDS was developed by the partners under the Local Government Act and included significant consultation with the community.

PC1 is now well advanced with the release of the decisions on submissions and further submissions in December 2009 by Environment Canterbury, following a recommendation by independent commissioners. The appeal period has now closed and the hearing of the appeals will begin in 2011.

Strategic infrastructure is recognised as having national, regional and sub-regional significance. Strategic infrastructure may be existing or developed, and is defined as "*those necessary facilities, services and installations which are of greater than local importance, and can include infrastructure that is nationally significant*". The Port of Lyttelton is recognised as strategic infrastructure of regional significance in the RPS and PC1 to the RPS. In my opinion the proposal will provide for the future expansion of the Port to recover from the immediate damage resulting from the devastating earthquakes of September 2010 and February 2011 and will ensure the Port remains as an important transportation gateway. The Port is considered essential for the economic functioning and well being of the region.

There are also policies in the RPS which seek to preserve the natural character at the coast and maintain or enhance the quality of the coastal waters. I consider that the proposed expansion of the Gollans Bay quarry, the widening and extension of the haul road will not compromise the landscape, natural character or visual amenity of the site and surrounding area of Banks Peninsula and Lyttelton harbour. The natural character and amenity of the coastline will be preserved with the exception of the reclaimed land at Te Awaparahi Bay, however this expansion is anticipated for the future expansion of port activities between Gollans Bay and Te Awaparahi Bay. Expansion of the Gollans Bay quarry and the haul road will be undertaken in a manner that sees the landscape rehabilitated over time and the effects on the landscape amenity of the area minimised. Overall I consider the proposal is consistent with the objective and policies of the RPS as they relate to the protection of the natural features and landscapes of Banks Peninsula.

Also of relevance to this proposal is Chapter 8, Objective 4, Policy 5 of the RPS which seeks the protection or enhancement of the historical and cultural heritage sites, buildings, places and areas, including their cultural, recreational and amenity values, that contribute to Canterbury's distinctive character and sense of identity. I consider the potential effects upon the heritage and cultural values of the area from the proposed expansion of the Port can be managed through appropriate conditions of consent.

With respect to other relevant statutory documents such as the *New Zealand Coastal Policy Statement,* the *Regional Coastal Environment Plan* (*RCEP),* the *Natural Resources Regional Plan* and the *Land and Vegetation Management Regional Plan: Part II: Earthworks and Vegetation Clearance, Port Hills,* these are considered in the reports presented by Environment Canterbury.

Overall I consider the proposal is consistent with the Regional Policy Statement and Proposed Change 1.

Are there any provisions of any relevant non-statutory documents?

No

Is the application consistent with Part II of the Act, and are there any other matters which are relevant and reasonably necessary to determine the application?

Achievement of Part II, the purpose and principles of the Resource Management Act, must be considered when reviewing an application for resource consent.

The purpose of the Act is to promote the sustainable management of natural and physical resources. Section 5 imposes a duty on consent authorities to promote sustainable management while avoiding, remedying or mitigating adverse effects of activities on the environment.

Section 6(e) requires the Council to as a matter of national importance recognise and provide for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga; and Section 6(f) requires the Council to recognise and provide for the protection of historic heritage from inappropriate subdivision, use and development.

Section 7 lists various matters to which regard shall be had in achieving the purpose of the Act. The matters of particular relevance to this application are:

a) Kaitiakitanga
b) The ethic of stewardship
c) The efficient use and development of natural and physical resources;
d) The maintenance and enhancement of amenity values;
e) Maintenance and enhancement of the quality of the environment.

Section 8 requires that the Council take into account the principles of the Treaty of Waitangi.

This proposal in my opinion represents efficient use of significant volumes of demolition rubble from the Christchurch CBD and will avoid needing to put it in landfill. This is a sustainable use of resources and will assist with the recovery of the CBD area, and the Port, without compromising the amenity values or quality of the coastal environment, nor the surrounding settlements. The Port is an important transportation gateway to the Canterbury Region and this recovery is essential to the economic wellbeing within the region. I note that significant consultation has been undertaken with local runanga and interested community groups and their comments and concerns have been taken on board by the applicant and addressed in the recommended conditions of consent. The Historic Places Trust has also been consulted with respect to the Battery Point Historic area and their views and comments have been taken into consideration.

Overall I am satisfied that the proposal achieves in an overall sense the purpose and principles outlined in Part II of the Resource Management Act 1991.

Recommendations

RECOMMENDATION A: PORT ACTIVITIES

That for the above reasons the application by Lyttelton Port Company for land use consent to a controlled activity pursuant to the Canterbury Earthquake (Resource Management Act Port of Lyttelton Recovery) Order 2011 to establish and operate Port Activities on reclaimed land at Te Awaparahi Bay, Lyttelton Harbour **be granted** subject to the following conditions:

Definitions

Pursuant to Clause 5 of the Canterbury Earthquake (Resource Management Act Port of Lyttelton Recovery) Order 2011 for the purpose of this consent "**Port Activities"**:

"(a) means the use of the reclamation land and of the plant, equipment, buildings, and other port facilities and structures on that land for the following activities:

- (i) the reception of ships' passengers:
- (ii) the handling of cargo:
- (iii) port administration:
- (iv) maintenance and repair activities:
- (v) ship and boat-building activities:
- (vi) warehouse and storage facilities:
- (vii) car-parking facilities:
- (viii) movement and other activities associated with the berthing and departure of ships:
- (ix) activities ancillary to any of those activities; but

(b) does not include the use of any area of the reclamation land or facilities of any kind on the reclamation land for the handling or storage of coal."

Conditions of Consent:

Lapsing of Consent

1. Pursuant to Section 125(1) of the Resource Management Act 1991 this resource consent shall lapse 10 years after the commencement of the consent.

Location

2. The Port Activities may occur on reclaimed land located in the area shown on Drawing No C-A4-6679 prepared by the Lyttelton Port of Christchurch and dated 6 May 2011, contained in the application (copy attached). This drawing is entered into Council records as RMA92018173/2.

Height of Structures

3. The following heights shall not be exceeded:

   a) Lighting structures: 30 metres.
   b) Buildings 15 metres.

   There shall be no height limit for quayside and container cranes.

Construction Noise Limits

4. The land reclamation at Te Awaparahi Bay, including works within the Coastal Marine Area, shall comply with the following limits at any affected residential dwelling, when measured and assessed in accordance with NZS 6803:1999 Acoustics – Construction noise.

Time of week	***Time period*** *(hours)*		
		Leq	***Lmax***
Weekdays	*0630-0730*	*55*	*75*
	0730-1800	*70*	*85*
	1800-2000	*65*	*80*
	2000-0630	*45*	*75*
Saturdays	*0630-0730*	*45*	*75*
	0730-1800	*70*	*85*
	1800-2000	*45*	*75*
	2000-0630	*45*	*75*
Sundays and public holidays	*0630-0730*	*45*	*75*
	0730-1800	*55*	*85*
	1800-2000	*45*	*75*
	2000-0630	*45*	*75*

Construction Noise Management Plan (CNMP)

5. Prior to any construction work commencing, the Consent Holder shall submit a Construction Noise Management Plan (CNMP) to the Resource Consents Manager, Christchurch City Council. The purpose of the CNMP is to set out the measures to ensure compliance with the construction noise limits in Condition 4 of this consent. The CNMP shall be prepared by a suitably qualified and experienced acoustics expert in consultation with the Christchurch City Council and shall include but not be limited to:

   a) A description of the activities which generate construction noise.

   b) A description of persons responsible for implementing construction noise mitigation procedures and measures.

   c) A description of vehicle or plant specifications and maintenance to avoid or mitigate construction noise production and any other methods to ensure compliance with Condition 4.

   d) A description of the training of operators and contractors in noise mitigation techniques.

   e) Details of any monitoring sites and monitoring procedures to be carried out by acoustical experts.

   f) Procedures to be followed in responding to any construction noise complaints, including the forwarding of noise related complaints and other noise related issues to the Port Liaison Group which has been established under Method 2.0 of Chapter 33 (Noise) in the Proposed Banks Peninsula District Plan.

6. The CNMP may be amended at any time. Any amendments shall achieve the purpose of the CNMP and shall be submitted in writing for the acceptance by the Resource Consents Manager, Christchurch City Council.

Noise from Port Activities

7. Noise from Port Activities undertaken on the reclaimed land shall be incorporated into the Port Noise Contour Map included as part of the "*Port Noise Management Plan – Lyttelton Port of Christchurch*", in accordance with the relevant provisions of Rule 2.1 in Chapter 33 (Noise) of the Proposed Banks Peninsula District Plan.

Lighting

8. All flood lighting luminaires shall be fitted with shields and, as far as is practicable, orientated so that the principal output is directed away from the opposite side of the harbour.

9. Temporary flood lighting luminaires required for the construction of the reclamation area at Te Awaparahi Bay shall be located and controlled to ensure that direct illumination does not exceed 10 lux (lumens per square metre) within the boundary of any site within the Residential Zone, Residential Conservation Zone or Town Centre Zone.

10. Permanent lighting required for Port Activities shall be designed by an suitably qualified and experienced lighting engineer and installed to ensure that direct illumination does not exceed 10 lux (lumens per square metre) within the boundary of any site within the Residential Zone, Residential Conservation Zone or Town Centre Zone.

    For the purpose of this condition, light shall be measured by a person experienced in the measurement and assessment of outdoor lighting.

Review

11. Pursuant to Section 128(1) of the Act, the Christchurch City Council may, during the last 5 working days of May or November in each year, serve notice of its intention to review the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent. Such a review may be undertaken jointly with the Canterbury Regional Council, where appropriate.

Advice notes

- The Council will require payment of its administrative charges in relation to monitoring, as authorised by the provisions of section 36 of the Resource Management Act 1991. At present the monitoring charges include:

  (i) A monitoring fee of $132.90 to cover the cost of setting up a monitoring programme and carrying out two site inspections to ensure compliance with the conditions of this consent; and
  (ii) Time charged at an hourly rate where additional monitoring is required.

RECOMMENDATION B: RECLAMATION WORKS

That for the above reasons, the application by Lyttelton Port Company for land use consent to a controlled activity pursuant to the Canterbury Earthquake (Resource Management Act Port of Lyttelton Recovery) Order 2011 to undertake "reclamation works" as defined in the Order, including:

a) the extraction of minerals and overburden by mechanical means, including blasting, from an open quarry;
b) the stacking, depositing and storage of quarry material;
c) the transporting of quarry material, including the upgrading and realignment of a haul road;
d) any other activities and buildings ancillary to the above activities

be granted subject to the following conditions:

General

1. The Consent Holder shall inform the Resource Consents Manager, Christchurch City Council in writing of the date on which this consent is first exercised. Such notice shall be given prior to or on the date of exercise of the consent.

Location of the Quarry

2. The quarrying associated with this consent shall not exceed the footprint as shown on Drawing No C-A4-6679 prepared by the Lyttelton Port of Christchurch and dated 6 May 2011, contained in the application (copy attached). This drawing is entered into Council records as RMA92018173/2.

Site Management Plans (SMP's)

3. Prior to scheduled commencement of the earthworks associated with the haul road upgrade or realignment, the Consent Holder shall provide a Site Management Plan (SMP) to the Resource Consents Manager, Christchurch City Council.

   The SMP shall be prepared by a suitably qualified person(s) in consultation with the Christchurch City Council and its purpose shall be to set out the measures required to stabilise slopes during or after earthworks.

   To achieve the purpose of the SMP, it shall include but not be limited to the following:

   a) An overview of the proposed excavation methods on road batter slopes.
   b) A geotechnical report in the slope stability of any haul road batter slopes, where relevant.
   c) Stabilisation techniques used (including batter design consistent with a geotechnical assessment) and where practicable the application of aggregate, geotextile, mulch, hydroseeding or other methods to establish vegetation on overburden.

4. Prior to scheduled commencement of the extraction of mineral and overburden quarry material, the Consent Holder shall provide a SMP to the Resource Consents Manager, Christchurch City Council.

   The SMP shall be prepared by a suitably qualified person(s) in consultation with the Christchurch City Council and its purpose shall be to set out the measures required to stabilise slopes during or after earthworks.

To achieve the purpose of the SMP, it shall include but not be limited to the following:

a) An overview of the proposed quarry excavation methods;
b) Details on the proposed staging of quarrying;
c) A geotechnical report in the slope stability for each stage area of quarrying; and
d) Stabilisation techniques used (including final bench design consistent with a geotechnical assessment) and where practicable the application of aggregate, geotextile, mulch, hydroseeding or other methods to establish vegetation on overburden.

5. The SMPs may be amended at any time. Any amendments shall achieve the purpose of the SMP and shall be submitted in writing for the acceptance by the Resource Consents Manager, Christchurch City Council.

6. A copy of the SMPs required by Conditions (3) and (4) or amended in accordance with Condition (5) shall be kept on site at all times.

Landscape and Ecology Rehabilitation/Enhancement Plan

7. The Consent Holder shall provide to the the Resource Consents Manager, Christchurch City Council, a Landscape and Ecology Rehabilitation/Enhancement Plan (LEREP). The LEREP shall be prepared in consultation with the Christchurch City Council and its purpose shall be to set out the proposed rehabilitation and enhancement works for the quarry and haul road upgrade. To achieve the purpose of the LEREP it shall include but not be limited to the provision of information on the following:

a) **Planting of haul road batter slopes**
   i. Identification of the staging of the haul road upgrade works, and the batter slopes, including any benching of batter slopes, that will become available for planting.
   ii. A planting plan for the batter slope plantings that includes:
      - The location, spacing and identification of indigenous species suited to the batter slope conditions.
      - A typical cross section showing the species type and the conditions of the batter slope or bench.
      - A description of maintenance methods including weed and pest control, replacement planting and protection of plantings from grazing animals where relevant and practicable.

b) **Planting of quarry benches**
   i. Identification of the estimated staging of the quarry extraction works, including the construction of any batter slopes above the quarry benches.
   ii. A planting plan for areas of the quarry that become available, including:
      - The location, spacing and identification of indigenous species suited to the batter slope conditions.
      - A typical cross section showing the species type and the conditions of the batter slope above the quarry benches.
      - A description of maintenance methods including weed and pest control, replacement planting and protection of plantings from grazing animals where relevant and practicable.

c) **Gully Enhancement Plantings**
   i. Identification of the four gullies that are to be subject to enhancement plantings. Three gullies are located in Te Awaparahi Bay above the Old Sumner Road and below Sumner Road and the fourth gully which drains the quarry stormwater in Gollans Bay.
   ii. A planting plan for the gully plantings that includes:
      - The location, spacing and identification of indigenous species suited to the batter slope conditions.
      - A typical cross section that shows the species type and the conditions of a gully.
      - A description of maintenance methods including weed and pest control, replacement planting and protection of plantings from grazing animals where relevant and practicable.
      - A timetable identifying when planting is to commence for each gully.

d) **General Weed Control**

i. A weed control strategy that applies to the site in general, but in particular to those areas that contain indigenous vegetation that have been identified to be of particular value will form part of the LEREP.

ii. The weed control strategy shall include the species of invasive weeds that require control as well as the frequency of control and associated monitoring.

8. The LEREP may be submitted to the Council in stages, provided that:

i. those matters outlined in Condition 7a) shall be provided prior to the commencement of the haul road upgrade and realignment.

ii. those matters outlined in Condition 7(b) shall be provided prior to the commencement of the extraction of quarry material.

iii. those matters outlined in Condition 7(c) and (d) shall be provided within six months of the date on which this consent is first exercised.

9. The LEREP may be amended at any time. Any amendments shall achieve the purpose of the LEREP and shall be submitted in writing for the acceptance by the Resource Consents Manager, Christchurch City Council.

10. A copy of the LEREP and any subsequent amendments shall be forwarded to Te Hapū o Ngāti Wheke (Rapaki) and to Te Rūnanga o Koukourārata (Port Levy).

Construction Noise Limits

11. All construction work associated with the upgrading of the haul road shall comply with the following limits at any affected residential dwelling, when measured and assessed in accordance with NZS 6803:1999 Acoustics – Construction noise.

Time of week	***Time period*** *(hours)*		
		Leq	***Lmax***
Weekdays	*0630-0730*	*55*	*75*
	0730-1800	*70*	*85*
	1800-2000	*65*	*80*
	2000-0630	*45*	*75*
Saturdays	*0630-0730*	*45*	*75*
	0730-1800	*70*	*85*
	1800-2000	*45*	*75*
	2000-0630	*45*	*75*
Sundays and public holidays	*0630-0730*	*45*	*75*
	0730-1800	*55*	*85*
	1800-2000	*45*	*75*
	2000-0630	*45*	*75*

Construction Noise Management Plan (CNMP)

12. Prior to any construction work commencing, the Consent Holder shall submit a Construction Noise Management Plan (CNMP) to the Resource Consents Manager, Christchurch City Council. The purpose of the CNMP is to set out the measures to ensure compliance with the construction noise limits in Condition 11 of this consent. The CNMP shall be prepared by a suitably qualified and experienced acoustics expert in consultation with the Christchurch City Council and shall include but not be limited to:

a) A description of the activities which generate construction noise.

b) A description of persons responsible for implementing construction noise mitigation procedures and measures.

c) A description of vehicle or plant specifications and maintenance to avoid or mitigate construction noise production and any other methods to ensure compliance with Condition 4.

d) A description of the training of operators and contractors in noise mitigation techniques.

e) Details of any monitoring sites and monitoring procedures to be carried out by acoustical experts.

f) Procedures to be followed in responding to any construction noise complaints, including the forwarding of noise related complaints and other noise related issues to the Port Liaison Group which has been established under Method 2.0 of Chapter 33 (Noise) in the Proposed Banks Peninsula District Plan.

13. The CNMP may be amended at any time. Any amendments shall achieve the purpose of the CNMP and shall be submitted in writing for the acceptance by the Resource Consents Manager, Christchurch City Council.

Quarry Noise Limits

14. Noise from quarrying and associated activities in the Gollans Bay Quarry shall not exceed the following noise limits at any point within the notional boundary of any dwelling, when measured in accordance with NZS 6801:1991 'Measurement of Sound' and assessed in accordance with NZS 6802:1991, 'Assessment of Environmental Sound':

Monday to Saturday 0700 – 2200	50dB L_{10}
At all other times	40dB L_{10}
On any day, between 2200 and the following 0700	70 L_{max}

Hours of Extraction

15. The extraction of quarry material shall be limited to the hours of daylight.

Note: The stockpiling, loading or unloading, or transportation of material or other ancillary activities, carried out on the quarry floor, is not captured by this condition but refer to Conditions 23 and 24.

Blasting and Vibration

16. Blasting shall be limited to between the hours of 0900 and 1600 each day.

17. Blasting shall not exceed a peak particle velocity of 5 mm/sec within the notional boundary of any dwelling, provided that this level may be exceeded on up to 5% of the total number of blasts over a period of 12 months. The level shall not exceed 120dB (L_{in} peak) at any time.

18. Blast monitoring shall be conducted by a person experienced in measuring vibration and over pressure noise, and using appropriate equipment which is within current calibration, to verify that blasting at Gollans Bay Quarry complies with the noise limits described in Condition 17:

a) The first five blasts at the Gollans Bay Quarry shall be measured within the notional boundary of the dwelling in Lyttelton closest to the blasting. The results are to be provided to the Resource Consents Manager, Christchurch City Council within one week of undertaking the measurements.

b) At any other time reasonably requested by the Resource Consents Manager, Christchurch City Council, at least three blast measurements shall be conducted at a location or locations to be determined by the Council. The results are to be provided to the Christchurch City Council's Resource Consents Manager within one week of undertaking the measurements.

c) In the event of any non-compliance the Consent Holder shall advise the Resource Consents Manager, Christchurch City Council, on the next weekday, of the steps to be implemented to achieve compliance and the time it is expected to take to resolve the matter. Additional measurements shall be undertaken and reported once the activity has been modified, as set out in Conditions 18 (a) and (b).

Vibration and Battery Point Historic Area Structures

19. When the haul road is being used for the transport of quarry material associated with this consent, it shall be maintained by regular grading so that the development of any potholes is minimised.

20. Prior to the commencement of the haul road upgrade works, a suitably qualified structural engineer, in consultation with the Department of Conservation, shall examine the Battery Point structures and prepare a report that summarises the condition of the features and in particular any cracks that already exist.

21. The expert referred to in Condition 20 shall monitor the structures at least every month during upgrade works to ensure that there is no change to the features.

22. In the event that any new visible cracks appear on the features, or any other damage in the view of the structural engineer is clearly attributable to the haul road upgrade works, the Consent Holder shall immediately cease construction work and the Consent Authority shall be immediately informed. The Consent Holder shall require the structural engineer to prepare a report that that sets out the reasons why it is considered that the damage is clearly attributable to the haul road upgrade works and recommendations to the change in construction methodology to avoid any further damage. This report shall be forwarded to the Consent Authority and to the Department of Conservation. Any recommencement of construction work on the haul road upgrade is subject to approval being given by the Consent Authority and monitoring of the features in accordance with Condition 21 shall recommence once construction resumes.

Lighting

23. The use of flood lights shall only be for stockpiling or transportation purposes.

24. All flood lighting luminaires shall be fitted with shields and, as far as is practicable, orientated so that the principal output is directed away from the opposite side of the harbour.

Te Hapu o Ngati Wheke (Rapaki) Accidental Discovery Protocol

25. If koiwi (human skeletal remains), wähi taoka (resources of importance), wähi tapu (places or features of special significance) or artefact material are discovered, the consent holder shall;

    a) Stop work immediately;

    b) Immediately advise the affected Papatipu Rünanga, Te Hapu o Ngati Wheke (Rapaki) or their representatives of the disturbance;

    c) Allow a site inspection by Te Hapu o Ngati Wheke (Rapaki) and their advisors, who shall determine whether the discovery is likely to be extensive and whether a thorough site investigation is required; and

    d) Material discovered shall be handled and removed by tribal elders responsible for the tikanga (custom) appropriate to their removal or preservation.

Investigation of disturbed landfill

26. In the event that waste material which has previously been deposited at the Christchurch City Council's closed landfill is disturbed during quarry operations, the Consent Holder shall carry out the following:

    a) Notify the Resource Consents Manager, Christchurch City Council, immediately;
    b) Engage a suitably qualified expert in hazardous waste management to examine the disturbed waste and as soon as practicable prepare a report which includes recommendations on an appropriate disposal option for the material that is authorised by the Resource Consents Manager, Christchurch City Council;
    c) The Consent Holder, at its cost, shall dispose of the material in accordance with the recommendations, contained in the report prepared under clause (b); and

d) The Consent Holder shall forward the report prepared under clause (b) to the Resource Consents Manager, Christchurch City Council and confirmation that the waste material has been disposed of in accordance with the recommendations.

27. Records and reports of any such investigations and disposals shall be held by Lyttelton Port Company and made available to any investigation officer of the Christchurch City Council or Environment Canterbury.

Review

28. Pursuant to Section 128(1) of the Act, the Christchurch City Council may, during the last 5 working days of May or November in any year, serve notice of its intention to review the conditions of this consent for the purposes of dealing with any adverse effect on the environment which may arise from the exercise of the consent. Such a review may be undertaken jointly with the Canterbury Regional Council, where appropriate.

Advice notes

- The Council will require payment of its administrative charges in relation to monitoring, as authorised by the provisions of section 36 of the Resource Management Act 1991. At present the monitoring charges include:
  (i) A monitoring fee of $132.90 to cover the cost of setting up a monitoring programme and carrying out two site inspections to ensure compliance with the conditions of this consent; and
  (ii) Time charged at an hourly rate where additional monitoring is required.

- Ian Hill from the Department of Conservation is the current contact person for Condition 20.

Reported and Recommended by: Jesse Burgess, Senior Planner
Date: 2 June 2011

Reviewed by: Catherine Elvidge, Planning Team Leader
Date: 2 June 2011

Decision

That the above recommendation be adopted for the reasons outlined in the report.

Commissioner:

Name: Ken Lawn

Signature:

Date: 3 June 2011

APPENDIX 2

ECONOMICS

LYTTELTON PORTCOMPANY'S LAND USE CONSENTS' APPLICATION FOR ESTABLISHING PORT ACTIVITIES ON RECLAIMED LAND AT TE AWAPARAHI BAY

ASSESSMENT OF ECONOMIC EFFECTS

Prepared for

Lyttelton Port Company Limited

Brown, Copeland & Co Ltd

13 June, 2019

INTRODUCTION

Background

1. LPC has previously gained approvals from Environment Canterbury to reclaim land and build wharves with a total area of 34 hectares in Te Awaparahi Bay, at the eastern end of Lyttelton Port.

2. The reclaiming of the land, which commenced in 2011, is being carried out in two distinct parts as shown on Figure1.1 below:

    a. Reclamation A (comprising Phases 1 and 2); and

    b. Reclamation B

3. The construction of Reclamation A (Phase 1) has just been completed. Phase 1 land reclamation is 10hectares in size.

4. The construction of Reclamation A (Phase 2) has commenced and is anticipated to be completed along with a wharf in 2024/26. Phase 2 land reclamation will be up to 6 hectares in size.

5. Reclamation B, including the associated wharf, is not anticipated to be completed until some 15 years after completion of Reclamation A. Reclamation B will be approximately 18 hectares in size. Therefore, the full and final container terminal is unlikely to be realised until the 2030's.

6. Further details on the project description can be found in Chapter 2 of the Assessment of Environmental Effects ('AEE').

7. LPC is seeking two land use consents from the Christchurch City Council. The first land use consent will enable the establishment and operation of a container terminal and other port activities on Reclamation A and associated wharf.

8. The second land use consent will enable the establishment and operation of a container terminal and other port activities on Reclamation B.

9. The land use consents are classified as discretionary activities. Further details of the consenting requirements, including the reasons why two land use consents are needed, are found in Chapter 8 of the AEE.

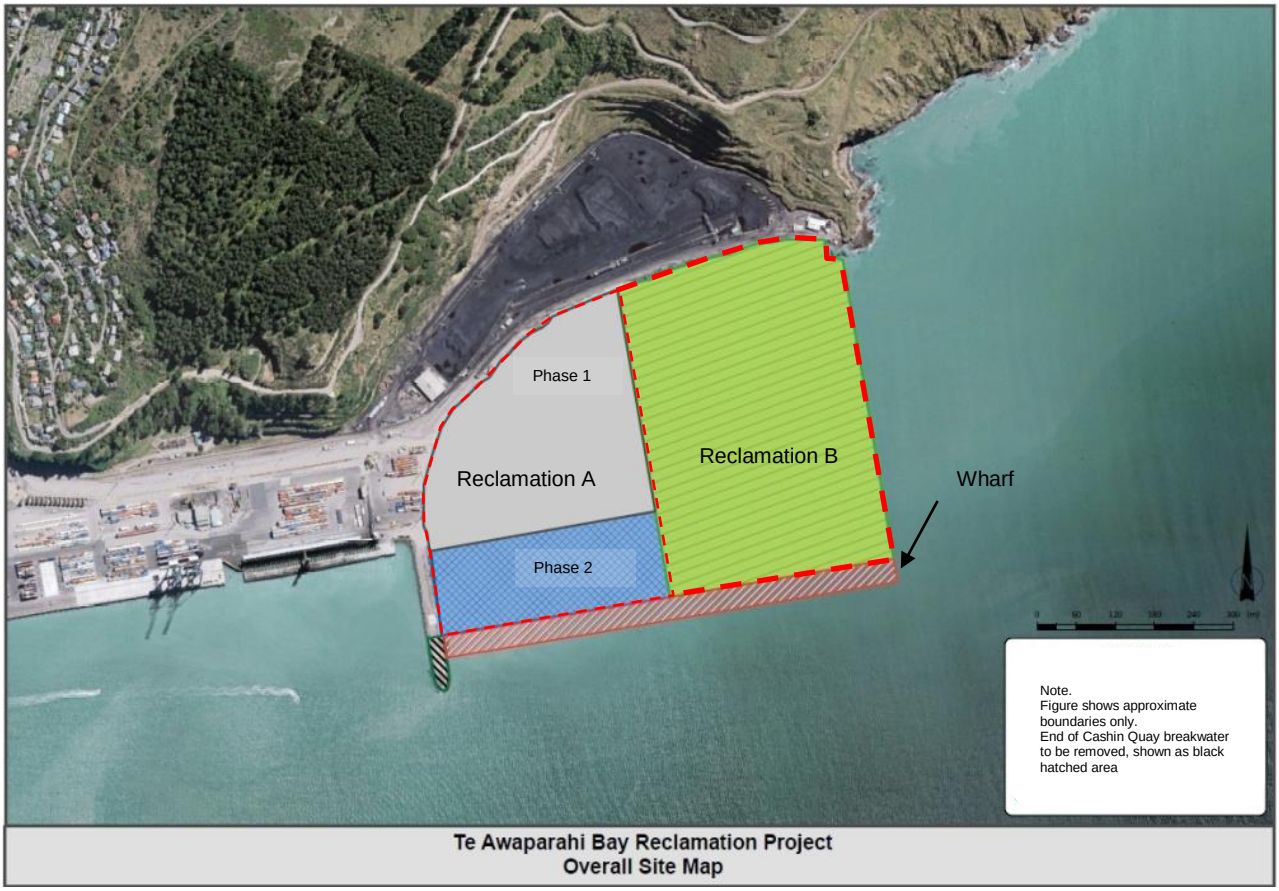

Figure 1.1: Plan showing the location of Reclamation A and B and the associated wharf.

Report Purpose

10. The purpose of this report is to undertake an assessment of the economic effects for Lyttelton, Christchurch City, the Canterbury region and New Zealand from the proposed container terminal and other port activities on the reclamations (the *Proposed Container Terminal*). The report will form one of the technical appendices to the Assessment of Environmental Effects accompanying the Consent Application.

Report Format

11. The remainder of this report is in nine parts and covers:

    a. The relevance of economic concepts under the Resource Management Act 1991 (RMA);

    b. The economic significance of merchandise trade to the New Zealand economy;

    c. The economic significance of Lyttelton Port;

    d. Background to the Christchurch City and Canterbury regional economies;

    e. The implications of the introduction of bigger container ships on New Zealand's trade routes;

    f. LPC's port recovery plan;

g. The economic benefits from land use consents being granted for the Proposed Container Terminal on the reclaimed land;

h. The potential economic costs from land use consents being granted for the Proposed Container Terminal on the reclaimed land; and

i. The report's conclusions.

RELEVANCE OF ECONOMIC CONCEPTS UNDER THE RMA

Community Economic Wellbeing

12. Economic considerations are intertwined with the concept of the sustainable management of natural and physical resources, which is embodied in the RMA. In particular, Part 2 section 5(2) refers to enabling "*people and communities to provide for their social, economic and cultural well-being and for their health and safety*" as part of the meaning of "*sustainable management*", the promotion of which is the purpose of the RMA.

13. As well as indicating the relevance of economic effects in considerations under the RMA, section 5 also refers to *"people and communities"*, which highlights that, in assessing the impacts of the Proposed Container Terminal, it is the impacts on the community and not just LPC or particular individuals or organisations that must be taken into account. This is underpinned by the definition of *"environment"* which also extends to include people and communities.

14. The Proposed Container Terminal on the reclamations will enable the residents and businesses of Lyttelton, Christchurch City and the wider Canterbury region to better provide for their economic and social well-being. These benefits are discussed later in this report.

Economic Efficiency

15. Part 2 section 7(b) of the RMA directs that, in achieving the purpose of the Act, all persons *"shall have particular regard to ... the efficient use and development of natural and physical resources"* which includes the concept of economic efficiency.[1] Economic efficiency can be defined as:

    "The effectiveness of resource allocation in the economy as a whole such that outputs of goods and services fully reflect consumer preferences for these goods and services as well as individual goods and services being produced at minimum cost through appropriate mixes of factor inputs".[2]

16. More generally, economic efficiency can be considered in terms of:

    a. Maximising the value of outputs divided by the cost of inputs;

    b. Maximising the value of outputs for a given cost of inputs;

    c. Minimising the cost of inputs for a given value of outputs; and

    d. Minimising waste.

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[1] See, for example, in *Marlborough Ridge Ltd v Marlborough District Council* [1998] NZRMA 73 at [86], the Court noted that all aspects of efficiency are "*economic*" by definition because economics is about the use of resources generally.

[2] Pass, Christopher and Lowes, Bryan, 1993, *Collins Dictionary of Economics* (2nd edition), Harper Collins, page 148.

17. The Proposed Container Terminal will bring economic efficiency benefits to the residents and businesses of Lyttelton, Christchurch and the wider Canterbury region and therefore is consistent with this part of the RMA. These efficiency benefits are discussed later in this report.

Economic Growth and Employment

18. Section 32(2)(a) of the RMA requires reports prepared under the Act to:

    "Identify and assess the benefits and costs of the environmental, economic, social and cultural effects that are anticipated from the implementation of the provision, including the opportunities for:

    Economic growth that are anticipated to be provided or reduced; and

    Employment that are anticipated to be provided or reduced."

19. Although this section of the RMA relates to plan change requests rather than land use consent applications and is therefore not directly relevant here, it again highlights that economic costs and benefits and economic growth and employment effects are relevant under the RMA. As explained later in this report the Proposed Container Terminalwill contribute to increased economic growth and employment for Lyttelton, Christchurch City the Canterbury region and other South Island regions.

Viewpoint for Economic Assessment

20. An essential first step in carrying out an assessment of the economic effects of the Proposed Container Terminalis to define the appropriate viewpoint that is to be adopted. This helps to define which economic effects are relevant to the analysis. Typically a city (district) or wider regional viewpoint is adopted and sometimes a nationwide viewpoint might be considered appropriate.

21. In the case of the reclamations and the Proposed Container Terminal, there are economic effects for Lyttelton, Christchurch City, the Canterbury region and other regions of the South Island to be assessed. Therefore, all of these viewpoints are relevant.

Intangible Effects

22. In economics, 'intangible' costs and benefits are defined as those which cannot be quantified in monetary terms. For any project, such effects may include amenity effects, landscape effects, ecological effects, Māori cultural and relationship effects and recreational effects. Such effects may be positive or negative – i.e. a benefit or a cost for a particular community of interest.

23. Sometimes attempts can be made to estimate monetary values for so called 'intangibles' using techniques such as willingness to pay surveys or inferring values on the basis of differences in property values. However, these techniques are frequently subject to uncertainty and criticism.

24. It is generally better to not attempt to estimate monetary values for these effects but to leave them to be part of the consideration under section 5 of the RMA. This also avoids the danger of 'double-counting' – i.e. including them within a quantified measure of efficiency and treating them as a separate matter in the overall judgement under section 5. The noise, visual, traffic and lighting effects of the Proposed Container Terminal are covered in other technical reports appended to the AEE.

THE IMPORTANCE OF MERCHANDISE TRADE TO NEW ZEALAND

25. Merchandise trade (also known as commodity trade)[3] is extremely important to the economic wellbeing of New Zealanders because the relatively small size of our population, labour force and economy limits the range of commodities that can be efficiently produced in New Zealand. In addition we are reliant on imports of commodities which can be produced more efficiently overseas. Lower cost imports help maintain the competitiveness of New Zealand producers as well as providing cost savings to consumers.

26. Merchandise trade enables New Zealand to specialise in the production of certain products in which New Zealand has a comparative advantage enabling production surplus to domestic consumption to be exported. These exports in turn provide the foreign exchange to enable New Zealand to finance the purchase of competitively priced imported goods and services.

27. The alternative model of "fortress New Zealand"[4] would see higher priced goods and services, reduced choice in the range of goods and services available in New Zealand and a less efficient use of our physical and natural resources. This would result in lower incomes and a lower standard of living for New Zealanders.

28. New Zealand's reliance on overseas trade and sea transport is highlighted by the total volume of containers handled across all New Zealand ports representing almost 1% of annual global container throughput.[5] New Zealand's population of 4.9 million people is only 0.06% of the world's population.

29. Although the New Zealand economy has diversified with growth in non-agricultural industries, it remains heavily dependent upon the agricultural sector and the export of agricultural commodities. In the year ending 31 March 2019, dairy products, meat, fruit, wool and raw hides, skins and leather made up 47% of the value of New Zealand's commodity export trade. Mineral fuels, vehicles, parts and accessories, mechanical machinery and equipment, textiles, plastics and electrical machinery and equipment are the most important import commodities making up 56% of the value of New Zealand's commodity import trade in the year ending 31 March 2019.[6]

30. In 2018, 99.7% of New Zealand's exports and imports of goods by volume and 80.5% by value was transported by sea.[7] This highlights the significant role played by New Zealand sea ports.

THE ECONOMIC SIGNIFICANCE OF LYTTELTON PORT

31. Lyttelton Port is recognised as a "lifeline utility"[8] and "significant infrastructure" at the local and national level.[9] It, together with LPC's City Depot in Woolston and Midland

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[3] A distinction is made between "commodity trade" (or "merchandise trade") and total trade. Commodity trade relates to the exporting and importing of goods only, whereas total trade includes the exporting and importing of both goods and services.

[4] I.e. where New Zealand does not engage in international trade.

[5] Source: The Question of Bigger Ships. Securing New Zealand's International Supply Chain. New Zealand Shippers' Council; August 2010.

[6] Source: Statistics NZ; Overseas Merchandise Trade, March, 2019.

[7] Source: Statistics New Zealand.

[8] See Civil Defence Emergency Management Act 2002, s 60.

[9] See New Zealand Government's 2011 National Infrastructure Plan, Christchurch City Council's Christchurch Transport Plan 2012-42, and the Civil Defence Emergency Management Act 2002, Schedule 1.

Port at Rolleston play a significant role in the current and future economic (and social) well-being of Greater Christchurch and the Canterbury region in that:

a. They are key contributors to the economic drivers of the Canterbury (and South Island) regional economy, which in turn underpins much of the economic activity within Greater Christchurch; and

b. They contribute to the Greater Christchurch rebuild process.

32. As at 30 June 2018, LPC had $391.1 million dollars worth of property, plant and equipment.[10]During the year ended 30 June 2018, the company collected $122.2 million in revenue, provided over 550 jobs and paid $56.7 million in salaries and wages.[11] It spent $28.1 million on goods and services, much of this going to local Christchurch City suppliers.[12]

33. In terms of total tonnage, Lyttelton Port is the largest port in the South Island and is third largest container port in New Zealand (behind Tauranga and Auckland). It is New Zealand's second largest export port by tonnage (behind Tauranga). The port is by far the most significant port in the South Island in terms of total tonnages of cargo, number of containers handled, the value of exports and the value of imports. By volume, the Port accounts for 30.7% of South Island seaports' overseas exports and 45.1% of overseas imports.[13] By value the Port handles 35.9% of the South Island's seaports' exports and 70.5% of the South Island's seaports' imports.[14]Due to the exclusion of coal export values, however, these percentages are understated.

34. The main export trades by value through Lyttelton Port in 2018 were[15]:

a. dairy products ($1,823 million and 12.5% of the total dairy exports for New Zealand);

b. meat ($592 million and 8.0% of the total meat exports for New Zealand);

c. wool ($298 million and 51.0% of the total wool exports for New Zealand);

d. wood and wood products ($218 million and 4.2% of the total wood exports for New Zealand); and

e. fish ($175 million and 10.7% of the total fish exports for New Zealand).

35. The main import trades by value through Lyttelton Port in 2017 were[16]:

a. fuels ($1,150 million and 14.8% of the total fuel imports for New Zealand);

b. vehicles ($629 million and 7.0% of the total vehicle imports for New Zealand);

c. plastics and plastic articles ($208 million and 8.9% of the total plastic imports for New Zealand);

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[10]Source: Data Lyttelton Port Company 2018 Annual Report.

[11]Source: Data from LPC and Lyttelton Port Company 2018 Annual Report.

[12]Source: Data from Lyttelton Port Company 2018 Annual Report.

[13]For the year ending 31 June, 2018. Statistics New Zealand. Infoshare, Overseas Cargo Statistics (www.archive.stats.govt.nz/infoshare)

[14]For the year ending 31 December, 2018. Source: Statistics New Zealand NZStat Imports and Exports Tables.

[15]Source: For the year ending 31 December, 2018. Statistics New Zealand NZStat Imports and Exports Tables.

[16]Source: For the year ending 31 December, 2018. Statistics New Zealand NZStat Imports and Exports Tables.

d. iron and steel and iron and steel articles ($211 million and 12.2% of the total iron and steel imports for New Zealand);

e. fertilizers ($124 million and 15.8%of the total fertilizer imports for New Zealand); and

f. electrical machinery ($142 million and 2.8% of the total electrical machinery imports for New Zealand).

36. The Port has experienced a more than 10 fold increase in the number of containers handled in the past 30 years. Trade through Lyttelton Port has grown considerably across both containerised and general cargo. The volume of containerised and general cargo through the port has increased by 17.8% over the period 2010 to 2018.[17] In the year to 30 June 2015, the port handled 370,000 twenty-foot equivalent units (TEUs) and forecast the number of TEUs handled by the port's container terminal would grow to well over 1 million TEUs by 2041.[18] In the year to 30 June 2018, the port handled 424,560 TEUs, up 5.7% from 401,711 TEUs in the year to 30 June 2017.[19] Non-containerised volumes of export and import trades are expected to continue growing but not as fast as containerised cargo.

37. The Port is a significant piece of infrastructure underpinning two of the three economic drivers of the Canterbury regional economy – agriculture and manufacturing (including agricultural product processing). The Port also plays a role, albeit less significant, in relation to the third economic driver, tourism. The economic (and social) well-being of Greater Christchurch is largely dependent on the economic activity generated by the wider Canterbury region, as set out below. Therefore Greater Christchurch's earthquake recovery and future economic prosperity is also significantly influenced by the current and future performance of Lyttelton Port.

38. The trend towards Lyttelton Port being used as a hub for all regions in the South Island is likely to intensify in the future making the Port an integral part of economic activity throughout the South Island.

39. LPC's Inland Midland Port at Rolleston and City Depot in Woolston have been developed to enable containerised cargo for export to be aggregated before transport by rail or road to Lyttelton Port. Also they are used for containerised imported freight to be disaggregated and redistributed at locations relatively close to, and within the main South Island domestic market of Christchurch.

40. They help to mitigate operational constraints at Lyttelton Port because of ship-side land limitations. These operational constraints will be exacerbated in future as a result of:

a. Expected future growth in container volumes through the port; and

b. LPC continuing various construction projects as part of its Port Recovery Plan following the Christchurch earthquakes. This includes the new cruise ship terminal.

41. Because Lyttelton Port, the City Depot and the Midland Port are connected by rail, the Midland Port and City depot help to divert containerised import and export cargo from road to rail through Christchurch City and elsewhere throughout the South Island. This

[17] For years ending 30 June. Source: Statistics New Zealand Infoshare, Overseas Cargo Statistics (www.archive.stats.govt.nz/infoshare)

[18] Source: LPC Annual Review. 2015. (page 18).

[19] Source: LPC Annual Review. 2018. (page 3).

not only reduces transport costs but also reduces road transport externality costs such as vehicle emissions, road accidents and road congestion. The Greater Christchurch Freight Study,[20] completed prior to the establishment of Midland Port, identified that inefficiencies in the movement of freight particularly congestion issues relating to road, rail and port access, would add to the costs for individual businesses and negatively impact on overall productivity for the Canterbury region's economy.

42. Therefore one of the Study's recommended actions was the development of an inland port and associated freight precinct at Rolleston to improve Lyttelton Port's overall capacity.[21] The benefits the study identified from such an inland port located at Rolleston included freed up capacity in and around Lyttelton Port, shorter road trips leading to better fleet utilisation, greater off-peak movement of freight and co-location of complementary businesses. By significantly reducing the freight related traffic entering Christchurch (especially traffic between Lyttelton Port and other parts of the South Island), an inland port at Rolleston was expected to lessen the impact of increasing freight volumes on Christchurch's road network and prevent the deterioration of the amenity of Christchurch itself.

43. LPC's Midland Port development is fulfilling the inland port role envisaged by the Greater Christchurch Freight Study. So far only part of the site's 27 hectares has been developed with future development planned to meet expected future growth in demand. However Midland Port will be best used in conjunction with, not instead of, increased container handling capacity at the port itself. The Proposed Container Terminal on the reclamations includes expansion of the existing rail facilities at the port.

THE CHRISTCHURCH CITY AND CANTERBURY REGIONAL ECONOMIES

Christchurch City Economy

44. Statistics New Zealand's June 2018 population estimate for Christchurch City is 388,500 or 62.2% of Canterbury's population and 8.0% of New Zealand's total population. In 2006 the population in Christchurch City was 361,800 persons, which represented 67.0% of Canterbury's population. Christchurch City population over the period 2006 to 2018 has grown by 7.4%, as compared to growth of 15.6% for the Canterbury region and 16.7% for New Zealand as whole. This reflects the impacts of the 2010 and 2011 earthquakes and the significant population growth in Auckland City compared to the rest of New Zealand.

45. Statistics New Zealand's 'medium' population projections[22] have Christchurch City's population increasing to 459,100 by 2043 at an average rate of 0.7% per annum over the period 2017-43, as compared to an average rate of growth for the Canterbury region of 0.8%. For New Zealand as a whole population growth of 0.8% per annum is also forecast.

46. Employment data highlights the dependence of the Christchurch City economy on manufacturing and the services sector. In 2018, 23,000 jobs (10.7%) of the City's 215,900 jobs were in the manufacturing sector with the main sub-sectors being food product manufacturing (4,200 jobs), machinery and equipment manufacturing (4,000 jobs), fabricated metal products manufacturing (3,500) and transport equipment

[20] Greater Christchurch Freight Study Freight Management Directions Statement; Aurecon; 22 December, 2014.

[21] Greater Christchurch Freight Study Freight Management Directions Statement; Aurecon; 22 December, 2014. page 20.

[22] Statistics New Zealand prepares three sets of projections – high, medium and low – according to natural population change (i.e. the net effect of birth and death rate assumptions) and net migration assumptions. These projections do not explicitly incorporate assumptions about different rates of economic development.

manufacturing (2,550 jobs). Other important sectors are health care and social assistance (27,200 jobs or 12.6% of total jobs), retail trade (22,100 jobs or 10.2% of total jobs), construction (22,000 jobs or 10.2% of total jobs), professional, scientific and technical services (19,500 jobs or 9.0% of total jobs) education and training (16,000 jobs or 7.4% of total jobs) and accommodation and food services (14,500 jobs or 6.7% of total jobs).

47. Apart from construction activities associated with the Christchurch rebuild, the key economic drivers for Christchurch City are manufacturing, tourism (which accounts for some but not all[23] of the jobs created in the retail trade and accommodation and food services sectors) and services provided to the agriculture and agricultural product processing activity within the wider Canterbury region. Employment in other sectors within the City is to a large extent driven by the demand for goods and services by these industries and their employees with the so called "multiplier" effects[24] creating additional jobs for the City's economy.

Canterbury Regional Economy

48. Statistics New Zealand's June 2018 population estimate for the Canterbury region is 624,200 or 12.8% of New Zealand's total population. It is the second largest region in New Zealand in terms of population. The Canterbury region's population is estimated to have declined between June 2010 and June 2012 by 6,900 (1.2%) due to Christchurch City's population falling by 13,600 (3.6%) after the earthquakes and only some of the consequent out-migration relocating to neighbouring districts within the Canterbury region.

49. Statistics New Zealand estimates total employment in the Canterbury region in February 2018 at 302,000 which represents 13.5% of the total persons employed in New Zealand. The agriculture, forestry and fishing industry group employed 16,300 persons (5.4% of total jobs) of which most (14,364) were engaged in agriculture[25]. Other significant sectors are manufacturing employing 36,000 or 11.9% of total jobs (of which the most significant subsectors are food products manufacturing (12,300 jobs), machinery and equipment manufacturing (5,400 jobs), fabricated metal products manufacturing (3,900 jobs) and transport equipment manufacturing (2,900 jobs)), health care and social assistance (33,300 jobs or 11.0% of total jobs), construction (30,400 jobs or 10.1% of total jobs),retail trade (30,400 jobs or 10.1% of total jobs), professional, scientific and technical services (23,000 jobs or 7.6% of total jobs), education and training (22,800 jobs or 7.5% of total jobs) and accommodation and food services (20,900 jobs or 6.9% of total jobs).

50. The key drivers of the Canterbury economy remain largely agriculture, manufacturing and tourism, the last of which includes parts of the retail trade, accommodation and food services and education and training sectors. Employment in other sectors is to a large extent driven by the demand for goods and services by these industries and their employees with the so called "multiplier" effects creating additional jobs for the region's economy.

51. Future employment growth and associated social and economic wellbeing for the Canterbury region is also likely to be largely associated with the three key economic

[23] Employment in tourism is difficult to identify from official statistics since the relevant sectors such as retail trade and accommodation and food services for which data is collected meet the needs of domestic and international visitors, business travellers and local residents and businesses.

[24] These are discussed in greater detail in the next section of this report.

[25] Including agriculture's proportionate share of agriculture, forestry and fishing support services.

drivers of agriculture, manufacturing (including agricultural product processing) and tourism.

52. The agriculture, forestry and fishing industries and the manufacturing industry together generate an estimated 52,300 jobs or 17% of total employment in the Canterbury region and underpin much of the economic activity of Greater Christchurch and the wider Canterbury region. These two industry groups are highly dependent upon Lyttelton Port for exporting their finished products and importing goods required as inputs to their production activities.

53. There are important linkages between the performance of the Canterbury regional economy (which is heavily dependent upon agriculture and agricultural product processing) and the Greater Christchurch economy. Apart from construction activities associated with the Christchurch rebuild, and tourism which accounts for some but not all[26] of the jobs created in the retail trade and accommodation and food services sectors, the key economic drivers for Greater Christchurch are manufacturing and services provided to the agriculture and agricultural product processing activity within the wider Canterbury region.

54. Employment in other sectors is to a large extent driven by the demand for goods and services by these key industries and their employees with the so called "multiplier" effects creating additional jobs for the region's economy.

55. Multipliers for a region such as Canterbury are typically in excess of 2.0[27] – in other words for each job created in an industry such as tourism, agriculture or manufacturing there is at least one additional job created in other industries providing goods and services required by that industry or the personal requirements of that industry's employees and dependants.

56. Conservatively assuming a Canterbury regional multiplier of only 2.0, the agriculture, forestry and fishing and manufacturing industry groups alone generate 104,600 jobs or 35% of the total employment in the Canterbury region. These two industry groups are highly dependent upon LPC's facilities for exporting their finished products and importing goods required as inputs to their production activities.

57. To a lesser extent tourism, the third key driver of the Canterbury regional economy is also dependent for some inputs upon the Lyttelton Port – for example, imports of vehicles, fuel, and other goods used within the tourism industry. Also LPC's new cruise berth will facilitate visits to Christchurch by cruise ship passengers.

58. Future employment growth and associated economic well being for the Canterbury region is also likely to be largely associated with the three key economic drivers of agriculture, manufacturing and tourism, although disruptions due to the 2010 and particularly 2011 earthquakes have impeded tourism activity within Greater Christchurch.

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[26] Employment in tourism is difficult to identify from official statistics since the relevant sectors such as retail trade and accommodation and food services for which data is collected meet the needs of domestic and international visitors, business travellers and local residents and businesses. However, tourism is an important economic driver for the Canterbury regional economy as it is for the national economy.

[27] See for example, Appendix 8 of evidence in chief of Geoffrey Vernon Butcher for Christchurch City Council and Canterbury Regional Council in relation to the former Proposed Change 1 to the Canterbury Regional Policy Statement.

THE IMPLICATIONS OF BIGGER SHIPS ON NEW ZEALAND'S TRADE ROUTES

59. At present the average sized container ship calling at New Zealand ports has a capacity of approximately 4,500 TEUs. The largest sized ship calling at New Zealand ports regularly has a capacity of approximately 10,000 TEUs. It is expected in future more ships with capacities in the range of 8,000 to 12,000 TEUs will be used on New Zealand trade routes as even larger vessels are used on the more significant international trade routes.

60. The Ministry of Transport commissioned a report by Deloitte entitled Future Freight Scenarios Study.[28] The study examined the impacts that larger ships would have on the New Zealand freight system across a range of scenarios assuming different ports and different numbers of ports in each of the North and South Islands became big ship capable.[29] It concluded that combining together the benefits from cheaper international freight costs (assuming these are passed on to New Zealand shippers of cargo) with the additional costs associated with hubbing – i.e. the additional land transport and coastal shipping costs and capital costs for port, rail and road infrastructure improvements – the net effects overall would be substantially negative. The study concludes:

    "The economic cost benefit analysis indicates that the projected BCR [Benefit Cost Ratio]*for all scenarios is less than 1 and eight of the scenarios have a projected BCR less than zero. This means that the increase in broader economic costs associated with port hubbing, as well as operating costs and capital investments, outweigh the economic benefits (incremental to the Status Quo – Scenario 1) under the port hubbing."*

61. However, in interpreting the results of the Future Freight Scenarios Study it is important to appreciate that:

    a. New Zealand will not get a choice as to whether larger ships will be used on New Zealand's overseas trade routes – i.e. in the future the status quo is not an option. It is necessary therefore to seek the cheapest option for New Zealand shippers of overseas cargo; and

    b. From the perspective of Canterbury (and West Coast) shippers of overseas cargo, the Future Freight Scenarios Study shows that the least cost options involve Lyttelton Port becoming big ship capable. Of the various scenarios considered in the study, those options which involve Lyttelton becoming big ship capable result in savings in total freight costs of greater than 10% for Canterbury and West Coast shippers of overseas cargo.[30] For those scenarios not involving Lyttelton becoming big ship capable, freight costs are estimated to increase by between 11 and 50% for Canterbury shippers of overseas cargo and between 50 and 100% for West Coast shippers of overseas cargo. These cost penalties will negatively impact on business profitability and competitiveness and increase costs for consumers. Enabling the Proposed Container Terminal at Lyttelton Port will better enable the Port to more efficiently service larger vessels and will provide benefits to the businesses and residents of Canterbury (and the West Coast).

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[28] November, 2014.

[29] Of the 10 scenarios considered in the study (including the status quo), 6 included Lyttelton Port being a big ship capable hub.

[30] Under another scenario of only limited consolidation of port visits (Scenario 2), the Future Freight Scenarios Study estimates no material change in freight costs because there is an insufficient reduction in port visits to generate sufficient cost savings to offset the additional infrastructure costs.

62. If Wellington's CentrePort does not become big ship capable, the Tasman, Nelson and Marlborough regions will become increasingly dependent upon Lyttelton Port.

63. **LPC'S PORT RECOVERY PLAN**

64. In 2014 and 2015 LPC assisted Environment Canterbury to prepare the Lyttelton Port Recovery Plan (LPRP), which was subject to community consultation and approved by the Minister for Canterbury Earthquake Recovery in November 2015. The LPRP provided for infrastructure repairs, rebuild and development in the aftermath of the damage caused by the 2010 and 2011 Christchurch earthquakes and required a number of inter-related investment projects at the Port to be formulated, sequenced and implemented to:

    a. Repair and reinstate the damaged and destroyed assets with reasonable despatch;

    b. Restore the capability of the Port's infrastructure together with LPC's other facilities to meet LPC customers' current and future requirements;

    c. Expedite the Christchurch rebuild process and the recovery of the Greater Christchurch economy; and

    d. Meet the growing demands that will be placed on the Port as a consequence of projected growth in cargo volumes through the Port.

65. The Proposed Container Terminal will facilitate the implementation of the LPRP and help restore LPC's capabilities to meet the current and future requirements of the Greater Christchurch and the Canterbury regional economies. Consistent with the Christchurch Earthquake Recovery Act (CERA) and the CERA Recovery Strategy, the LPRP does not simply reinstate the Lyttelton Port's before-earthquakes capabilities but incorporates development components enhancing those capabilities to match expected future requirements as efficiently as possible.

ECONOMIC BENEFITS FROM LAND USE CONSENTS BEING GRANTED

Efficiency Benefits from Increased Land Adjacent to Container Ship Berths for Container Storage and Logistics

66. The Proposed Container Terminal will increase flexibility for LPC's Lyttelton Port operations enabling more efficient ship-side activities and therefore reduce overall costs of container storage and handling. Without consents being granted for these port activities on the reclaimed land container operations at LPC would reach capacity and additional freight would have to be diverted away from LPC, increasing container logistics costs.

Retention and Increase in Employment, Incomes and Expenditure for Christchurch City, Canterbury Region and South Island Economies

67. Lyttelton Port is an important employer within Christchurch City (and to a lesser extent Selwyn District) employing over 550 staff across its various operations. The Proposed Container Terminal will assist in the retention and expansion of these staff numbers, their incomes and expenditure with local businesses. They will also assist in maintaining and expanding employment, incomes and expenditure with local businesses within Lyttelton.

68. In addition by enabling the efficient movement of increasing volumes of exports and imports through the port, the Proposed Container Terminal will help maintain and expand employment in the agriculture, manufacturing and other sectors dependent upon the port within Christchurch City, the Canterbury Region and elsewhere within the South Island.

69. In addition to these "direct" economic impacts, there are also "indirect" (or "multiplier") impacts as a consequence of these businesses requiring a range of goods and services as inputs to their operations and from their employees demanding goods and services from local businesses. Enabling the efficient expansion of container handling facilities at Lyttelton Port therefore helps to maintain and expand employment, incomes and expenditure across the Christchurch City, Canterbury Region and South Island economies.

70. As indicators of levels of economic activity, economic impacts in terms of increased expenditure, incomes and employment are not in themselves measures of improvements in economic welfare or economic wellbeing. However, there are economic welfare enhancing benefits associated with increased levels of economic activity. These relate to one or more of:

    a. Increased economies of scale: Businesses and public sector agencies are able to provide increased amounts of outputs with lower unit costs, hence increasing profitability or lowering prices;

    b. Increased competition: Increases in the demand for goods and services allow a greater number of providers of goods and services in markets and there are efficiency benefits from increased levels of competition;

    c. Reduced unemployment and underemployment[31] of resources: To the extent resources (including labour) would be otherwise unemployed or underemployed, higher levels of economic activity can bring efficiency benefits when there is a reduction in unemployment and underemployment. The extent of such gains is of course a function of the extent of underutilized resources within the local economy at the time and the match of resource requirements and those resources unemployed or underemployed within the local economy; and

    d. Increased quality of local and central government provided services: Sometimes the quality of services provided by location and central government such as education and health care are a function of population levels and the breadth and quality of such services in a community is higher with higher levels of economic activity, particularly to the extent they lead to or maintain higher levels of population.

71. The additional expenditure, employment and incomes generated by the Proposed Container Terminal will give Lyttelton and Christchurch City especially greater critical mass and as a consequence local residents and businesses will benefit from economies of scale, greater competition, increased resource utilisation and possibly better provision of public services.

Enabling Lyttelton Port to Become Big Ship Capable

31 Underemployment differs from unemployment in that resources are employed but not at their maximum worth; e.g. in the case of labour, it can be employed at a higher skill and/or productivity level, reflected in higher wage rates.

72. The Proposed Container Terminal will provide two deep draft capable berths with associated big ship capable infrastructure enabling LPC to more efficiently cater for big ships. Without the expansion of the ship-side area to handle containers, the port will be limited in its ability to handle the larger container vessels expected on New Zealand's trade routes in the future and will result in higher costs for local importers and exporters.

Facilitating LPC's Port Recovery Plan

73. As discussed above, the Proposed Container Terminal will facilitate the implementation of the LPRP, helping restore LPC's capabilities to meet the current and future requirements of the Greater Christchurch and the Canterbury regional economies.

Enabling Greater Use of Rail Transportation of Containers to and from the Port

74. Without the provision of additional ship-side land for handling containers at Lyttelton Port, it is likely that greater use of more flexible road transport to and from the port will be required to meet the peak loading and unloading requirements of container vessels arriving at the port. The Proposed Container Terminal includes expansion of the existing rail facilities at the port, enabling the increased use of rail for container freight to and from the inland Midland Port and elsewhere throughout the South Island. This will not only be more efficient for shippers but will also reduce road congestion, emissions and the risk of road accidents.

Increased Port Efficiency

75. The Proposed Container Terminal will enable a fully modern purpose built container terminal to be built at Lyttelton Port. This will enable the port to be more cost effective and more price competitive.

Improved Amenity Value for Lyttelton

76. The development of container handling facilities on the reclaimed land will allow some port activities to be relocated out of the inner harbour, lessening port effects on local residents and businesses and possibly allow for an expansion of marina activities and recreational boating. To the extent this makes Lyttelton a more attractive place to live and visit there will be economic benefits for local businesses and residents.

POTENTIAL ECONOMIC COSTS FROM LAND USE CONSENTS BEING GRANTED

Utilities

77. Sometimes economic costs for business and residential ratepayers can arise, where a developer does not meet the full costs of Council provided services. However the expansion of port operations onto the reclaimed land will not require the cross-subsidization of LPC by other Christchurch City ratepayers. Water supply, wastewater disposal and other services provided by the Council will be paid for via user charges and rates, whilst vehicles travelling to and from the port will meet road operation and maintenance costs via road user charges and petrol taxes.

CONCLUSIONS

78. Social and economic wellbeing, the efficient use and development of natural and physical resources and opportunities for economic growth and employment are relevant considerations under the RMA.

79. Merchandise trade, international cargo shipping and seaports are extremely important to the economic wellbeing of New Zealanders because the relatively small size of our population, labour force and economy limits the range of commodities that can be efficiently produced in New Zealand. In addition we are reliant on imports of commodities which can be produced more efficiently overseas.

80. Lyttelton Port is by far the most significant port in the South Island in terms of total tonnages of cargo and containers, the value of exports and the value of imports. Lyttelton Port has been growing in relative importance and is expected to continue to do so in the future as a result of:

    a. Growth in Canterbury and South Island exports and imports;

    b. Greater use of Lyttelton Port instead of other South Island ports as shipping companies have reduced services to some ports; and

    c. In the short to medium term, the Port handling increased quantities of building materials and machinery for the greater Christchurch rebuild.

81. LPC forecasts ongoing growth for its container terminal to reach well over one million twenty-foot equivalent units (*TEUs*) by 2041. Non-containerised volumes of export and import trades are expected to continue growing but not as fast as containerised cargo.

82. The agriculture, forestry and fishing industries and the manufacturing industry together generate an estimated 104,600 jobs or 35% percentage of the total employment in the Canterbury region and underpin much of the economic activity of Greater Christchurch and the wider Canterbury region. These two industry groups are highly dependent upon Lyttelton Port exporting their finished products and importing goods required as inputs to their production activities.

83. International container trade shipping services are trending towards larger vessels and fewer port calls to reduce international shipping costs. Lyttelton Port has obtained consents for, and is in the process of implementing, it's Capital Dredging Programme that will enable it to become big ship capable.

84. The Proposed Container Terminal on the Te Awaparahi Bay reclamations will contribute to the following economic benefits:

    a. Efficiency benefits from having a larger area of land adjacent to container ship berths for container storage and logistics;

    b. The retention of, and increase in employment, incomes and expenditure for Christchurch City, Canterbury Region and South Island economies;

    c. Enabling Lyttelton Port to more efficiently cater for the larger container ships expected to become increasingly prevalent on New Zealand's international trade routes;

    d. Facilitating the implementation of the LPRP and thereby helping to restore the port's capabilities to meet the current and future requirements of the Greater Christchurch and the Canterbury regional economies;

    e. Enabling greater use of rail transportation of containers to and from the Port;

    f. Enabling Lyttelton Port to be more efficient and price competitive; and

g. Improving the amenity values of Lyttelton, making it a more attractive place to live and visit.

85. The Proposed Container Terminal on the reclaimed land will not require cross-subsidization of LPC by other Christchurch City ratepayers.

86. The Proposed Container Terminal on the Te Awaparahi Bay reclamations:

a. Enable the residents and businesses of Christchurch City, the Canterbury region and elsewhere in the South Island *"to provide for their … economic ... well being*"; and

b. Are consistent with *"the efficient use and development of natural and physical resources"*.

APPENDIX 3

LIGHTING

Lyttelton Port
Reclamation Land Use
Resource Consent Application

Assessment of Environmental Effects – Lighting

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1 Introduction

1.1 General

LPC has previously gained approvals from Environment Canterbury to reclaim land and build wharves with a total area of 34 hectares in Te Awaparahi Bay, at the eastern end of Lyttelton Port.

The reclaiming of the land, which commenced in 2011, is being carried out in two distinct parts as shown on **Figure 1** below:

(a) Reclamation A (comprising Phases 1 and 2); and
(b) Reclamation B

The construction of Reclamation A (Phase 1) has just been completed. Phase 1 land reclamation is 10 hectares in size. Phase 1 is already being used for port activities under a previous land use consent.

The construction of Reclamation A (Phase 2) has commenced and is anticipated to be completed along with a wharf in 2024/26. Phase 2 land reclamation will be up to 6 hectares in size.

Reclamation B, including the associated wharf, is not anticipated to be completed until some 15 years after completion of Reclamation A. Reclamation B will be approximately 16 hectares in size. Therefore, the full and final container terminal is unlikely to be realised until the 2030's.

Further details on the project description can be found in **Chapter 2** of the Assessment of Environmental Effects (*AEE*).

LPC is seeking two land use consents from the Christchurch City Council. The first land use consent will enable the establishment and operation of a container terminal and other port activities on Reclamation A and associated wharf. This will replace Reclamation A, Phase 1's land use consent which will subsequently be surrendered.

The second land use consent will enable the establishment and operation of a container terminal and other port activities on Reclamation B.

The land use consents are classified as discretionary activities. Further details of the consenting requirements, including the reasons why two land use consents are needed, are found in **Chapter 8** of the AEE.

The purpose of this report it to undertake an assessment of lighting effects from the proposed container terminal and other port activities on the reclamations (the *Proposed Container Terminal*). The report will form one of the technical appendices to the AEE accompanying the consent application.

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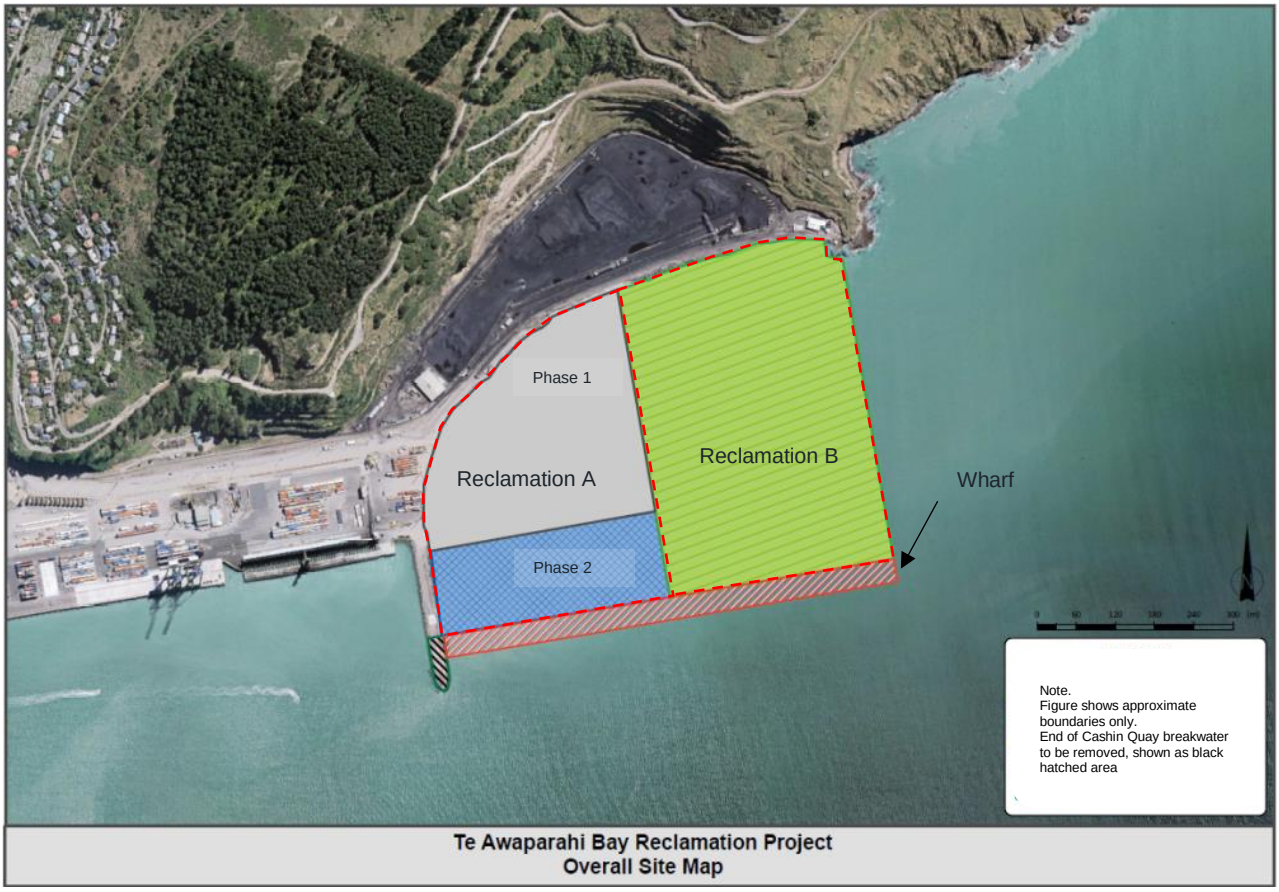

Fig. 1 - Overall Site Map

1.2 Lighting Effects

The impact of artificial lighting on the night environment is characterised by several distinct effects. The following summary is provided to define and differentiate those effects, in order to assist the understanding of the subsequent sections of this report.

1.2.1 Light Spill

Light spill is illuminance[1] distributed beyond an application area, typically a property boundary. It is also referred to as 'light trespass'. The illuminance can be simply measured in terms of *Lux*, and district plans commonly apply light spill limits at property boundaries.

1.2.2 Glare

Glare is visual disability or discomfort, resulting from the luminance, size, background contrast, and view perspective of a light source. It is usually associated with the direct view of a high intensity light source against a dark background, and assessment is somewhat subjective. A common example is the sensation of approaching car headlights.

[1] Illuminance is the characteristic of light density. Refer to the Glossary section for definition and further explanation.

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Glare can be measured and quantified. However, because of the complexity of perspectives, contributing factors, and sensitivity, regulatory compliance is typically based around objectives, concepts, and standard practices, rather than numerical standards.

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1.2.3 *Sky Glow*

Sky glow is the artificially increased luminance of the night sky, from the combined effect of direct and indirect lighting, which is scattered by atmospheric molecules and particles. It reduces luminance contrast, and the quality of view to the night sky, which detracts from visual amenity. The effect is cumulative, and perception is influenced by moonlight and weather conditions.

Although assessment methods exist, the cumulative nature of sky glow is such that it is only addressed in subjective terms, and particularly as an aspect of visual amenity.

1.2.4 *Visual Amenity*

The influence of lighting on visual amenity incorporates the combination of the other lighting effects, and includes aesthetic factors such as colour, form, and relativity. It is assessed in the context of the surrounding environment, and integral to overall landscape amenity assessment.

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2 Planning

2.1 Christchurch District Plan

2.1.1 Rules and Standards

The Proposed Container Terminal site is currently within the Coastal Marine Area (*CMA*) and therefore a resource consent is required for the reasons discussed in **Chapter 7** of the AEE. The site adjoins land that is specifically zoned for port purposes under the Christchurch District Plan[2]. The plan rules relating to the adjoining land provide guidance for an acceptable lighting environment.

There are no light spill standards in the Christchurch District Plan that apply to the adjoining CMA.

It is important to highlight that activities within the Specific Purpose (Lyttelton Port) Zone are exempt from the general rules and provisions relating to outdoor lighting and glare contained in Chapter 6 of the district plan[3]. Instead, port activities are subject to the following specific light spill standard:

> ***13.8.4.2.4 Light spill***
>
> *No operation or activity shall be conducted so that direct illumination exceeds 10 lux (lumens per square metre) at the boundary of any site in a residential zone or Commercial Banks Peninsula Zone.*

Since the Proposed Container Terminal is substantially isolated from any residential or commercial zones, compliance with this standard is assured.

Notwithstanding the general rule's exemption, the activity standard in Rule 6.3.4.1 and associated Appendix 6.11.13 provide relevant guidance on acceptable lighting practice.

The only other Specific Purpose (Lyttelton Port) Zone standard relevant to lighting, is Rule 13.8.4.2.1 relating to maximum building height, which specifies that there is no limit to the height of lighting towers.

2.1.2 Policy

Apart from the guidance provided by the rules and standards outlined above, the following outdoor lighting policy is relevant;

> **6.3.2.1.1 Policy - Enabling night-time activity while managing the adverse effects of artificial outdoor lighting**
>
> Recognise and provide for artificial outdoor lighting for night-time activities and safety while managing its scale, timing, duration, design and direction in a way that:
>
> *(i) avoids, remedies or mitigates adverse effects on the rest or relaxation of residents; or any areas of natural, historic or cultural significance;*
> *(ii) does not interfere with the safe operation of the transport network or aircraft;*
> *(iii) minimises unnecessary light spill into the night sky.*

[2] Refer Specific Purpose (Lyttelton Port) Zone of the Christchurch District Plan
[3] Refer Christchurch District Plan clause 13.8.3(c)

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The following zone policy relating to the Lyttelton Port recovery objective is also relevant to lighting effects;

> **13.8.2.2.1 Policy - Recovery opportunities to reduce adverse effects**
>
> Ensure activities undertaken within the Specific Purpose (Lyttelton Port) Zone, including to enhance and reconfigure Lyttelton Port infrastructure and operations, are designed to reduce existing and minimise new adverse effects generated within the Port operational areas.

2.2 Canterbury Regional Council (ECan)

The Canterbury Regional Council (ECan) administers the Coastal Marine Area (CMA) through the Canterbury Regional Policy Statement *(CRPS),* and the associated policies have relevance to outdoor lighting which is incident on that area. In particular policies **8.3.3 Management of activities in the coastal environment** and **8.3.6 Regionally significant infrastructure**, relate to the avoidance, remedy or mitigation of adverse effect on the environment.

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3 Methodology

3.1 Assessment

3.1.1 General

This assessment focusses on the lighting effects from the Proposed Container Terminal and associated port activities within the context of the existing receiving environment, which includes the Cashin Quay and Te Awaparahi Bay areas of Lyttelton Port.

The assessment methodology is based upon observation, comparison, and experience-based interpretation. The existing lighting infrastructure and its effects are established for reference, then the anticipated lighting development for the Proposed Container Terminal is outlined. Then the ensuing effects are assessed, with particular focus on comparison with the existing conditions.

The report is set out as follows:

(a) The existing lighting infrastructure is set out in Section 4;
(b) An assessment of effects from the existing lighting infrastructure is set out in Section 5;
(c) The anticipated form of the lighting infrastructure for the Proposed Container Terminal on Reclamation A and B is set out in Section 6;
(d) The associated mitigation features are set out in Section 7; and
(e) The assessment of effects is provided in Section 8.
(f) The conclusion to this assessment is set out in Section 9.
(g) A Glossary of lighting terms is set out in Section 10.

Photographs of the existing lighting are provided for reference. Photo simulations, including the anticipated future lighting developments, have also been provided to supplement the description of assessed effects.

3.1.2 Light Spill

Light spill is a localised effect, relating to adjoining site boundaries, and regulated according to planning zone rules. Since the Proposed Container Terminal boundaries are only to other port areas and the waterfront, there are no applicable Christchurch District Plan rules. However, the ECan policy relating to the avoidance of adverse effects remains relevant in respect of the Coastal Marine Area.

Since the quantitative measurement of boundary light spill is not relevant, the assessment of this effect is limited to observation and perspective. Particularly that relating to the associated water reflection and the influence on visual amenity.

3.1.3 Glare

Glare is influenced by both direction and proximity, and closely related to visual amenity. In this case it is also significant that there are no external boundaries to other planning zones, and an absence of objective compliance requirements.

This assessment of glare has been based on observation, comparison and experience-based interpretation, and the area most exposed to the effects of glare is the Diamond harbour headland, directly opposite the port.

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3.1.4 *Sky Glow*

Sky Glow is a cumulative wide area effect, but the view direction and associated background is significant when relating the effect to a local area. In that respect, the view from the assessment locations for visual amenity effect were also considered to be suitably representative of the sky glow effect.

Sky glow can be measured and defined using several different methods, but the metrics are uncommon, and mostly associated with astronomy. In any case, the evaluation of obtrusive effect is largely subjective. For that reason, and the ease of interpretation, a comparative approach has been adopted.

3.1.5 *Visual Amenity*

The influence of lighting on visual amenity relates to the combination of lighting effects, in relation to the aesthetic appearance of the night time surroundings. That influence is considered in the context of overall landscape amenity which is addressed further in the Landscape Assessment prepared by Mr Andrew Craig.

The intent of this assessment is to describe the collective form of the contributing lighting effects, to complement the Landscape Assessment. Considering the subjective nature of those effects, this aspect of lighting assessment is also based on observation and perspective.

3.2 Assessment Locations

The port is located on the northern side of the Lyttelton Harbour inlet, which is mostly surrounded by steeply sloping hills. The Proposed Container Terminal will be located on Reclamation A and B in Te Awaparahi Bay.

Lyttelton Township is the major residential settlement in the greater harbour area, but views from the town to the Proposed Container Terminal on Reclamation A and Reclamation B are mostly shielded by the projecting hill spur on the east side. Elsewhere in the harbour area residential settlement is relatively sparse, and clustered in bays and headland areas. For the purpose of this effects assessment, the view perspectives were rationalised to Diamond Harbour, Purau, and Governors Bay. These locations are considered to be representative of the most significant lighting effects from the port, for the following reasons:

(a) Diamond harbour is directly across the harbour from Cashin Quay, the existing container terminal, and the Proposed Container Terminal, at a distance of approximately 2 km to the nearest residence. The view to the port is mostly unobstructed, and it is therefore exposed to the full extent of any lighting effects from the Proposed Container Terminal.

(b) Purau is at the head of Purau Bay, to the east of Diamond Harbour headland, and more distant. The view to the port is limited to Te Awaparahi Bay and the coal stockyard area, but will eventually include most of Reclamation A and B, with the associated change to lighting effects.

(c) Governors Bay is at the western end of the harbour, and at a distance in the order of 6km from the nearest residence at the north side to the Proposed Container Terminal. The prominence of the container terminal areas (i.e. new & proposed) in the narrow view to the outer harbour entrance is of most significance from this perspective.

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There are also many transient view perspectives to the port, throughout the greater harbour area. These are from roadways, walking tracks, and water vessels, and have widely differing orientations. However, considering the day-time nature of these perspectives, and their intermittent nature, they are considered secondary to the view from residential settlements. Furthermore the selected residential perspectives are representative of the most significant effects that would be experienced from transient view.

3.3 Blue Light

Consideration has been given to the following effects associated with the blue-rich characteristic of LED[4] lights which are likely to be utilised for the prospective lighting development. The associated perspectives are taken into account in the assessment of the environmental lighting effects, where applicable.

3.3.1 Biological Effect

The new lighting technologies which are likely to be associated with the Proposed Container Terminal, have a white colour appearance. In particular, LED lights also commonly have strong output in the blue part of the colour spectrum (i.e. 424 – 500nm). That wavelength range can have biological effects, such as circadian disruption and associated health disorders, particularly with high levels of exposure, and indoor conditions. However there is no established increase in health risk associated with blue wavelength light exposure at night[5]. Furthermore, the low levels of exposure associated with outdoor lighting would be less significant than from indoor conditions.

In any case, the dissipation from the prospective LED lighting would be such that incident blue-rich light to any relevant view location is negligible.

3.3.2 Atmospheric Effect

The atmospheric scatter from all forms of outdoor lighting contributes to the artificial brightening of the night sky, known as 'sky glow', which pollutes visual amenity and astronomical observation. Furthermore, the refraction from blue-rich light sources produces higher levels of scatter than others with less blue emphasis. For example, the contribution to sky brightness from blue-rich white LED lights can be up to 3 times that of comparable high pressure sodium vapour lights[6].

The evolving standard practices for mitigating sky glow include, efficient utilisation of distribution, the elimination of unnecessary intensity or operation, and the use of sources with reduced blue wavelength output. Preferably those of a warm colour appearance, which relates to a correlated colour temperature of 3000°K or less[7].

It is anticipated that the lighting development for the Proposed Container Terminal, and the anticipated eventual upgrading of the existing container terminal lighting, will adopt such practices within the limitations of technology development and application suitability.

[4] LED – Light Emitting Diode
[5] Impacts of artificial blue light on health and the environment – Royal Society Te Aparangi (November 2018)
[6] Ibid
[7] Ibid

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3.4 Ecology

Whilst this assessment is focussed on a human perspective, it is also acknowledged that lighting can affect the ecology of plants and animals. That is particularly relevant to the blue part of the light colour spectrum.

This is a developing area of awareness and knowledge, which is complicated by the diversity and taxa specific nature of the relationships. There is also very little research with direct local relevance.

Considering the nature of this issue, and the practical limitations, the prudent response is to adopt current good practice in terms of lighting design and application. That typically involves the general minimisation of environmental lighting effects, and moderating blue light spectral content where possible.

In relation to this assessment, the practices referred above have been incorporated into the form of the anticipated lighting development, and the associated mitigation.

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4 Existing Lighting

This section describes the existing lighting which forms the context and existing environment for the assessment of lighting effects from the Proposed Container Terminal on Reclamation A and B.

The Proposed Container Terminal area is located at the eastern extremity of the port. To the west, the existing container terminal extends for approximately 1km along Cashin Quay. To the north, the coal stockyard occupies the area immediately behind the two reclamations, over a length of approximately 700m.

Reclamation A Phase 1 is in a period of ground consolidation, and currently supports general access and low intensity storage use, authorised under its existing land use consent.

Fig. 2 illustrates the general location and extent of the areas which relate to lighting installations described in this section.

Fig. 2 - Lighting Areas - Locations & Extent

4.1 Existing Container Terminal

4.1.1 Area lighting

The existing general area lighting in the container terminal consists of high mast floodlighting, with mounting heights of up to 30m above ground level at the waterfront. The luminaires are typically of the asymmetric reflector type, in pole top groups, with radial configuration, and tilted aim.

Pole spacing is commonly at the upper end of practicality, to maintain suitable conditions, but minimise obstructions. The combination of spacing and luminaire type necessitates aiming tilt which ranges between 20° and 50°. The upper end of that range, is constrained by both glare and shadowing effects.

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The lamps are of the high-pressure sodium (HPS) vapour type, with a distinctive golden colour appearance, which has a correlated colour temperature of 2100°K. An associated characteristic is the low quality of colour rendition for incident surfaces.

The lighting levels are based on standard compliance and industry practice, for the complex loading, unloading, and manoeuvring activities involved. The average illuminance, is in the order of 50 Lux[8], which is substantially higher than would be common for general circulation and access only.

Commonly this lighting is operated continuously through darkness hours, consistent with the Port's 24/7 operations.

4.1.2 Cranes & Coal Ship Loader

The relocatable waterfront container cranes and coal ship loader incorporate lighting for access to the operator cabins, and task related floodlighting for the activity below. Typically this lighting is localised, differs in colour appearance, and is of low intensity from an external view perspective. It is also associated with the intermittent loading and unloading operations, so is normally only viewed in combination with lighting on the vessels.

4.1.3 Ships

Port operations involve regular shipping movements, with vessels ranging considerably in size and type. At the existing container terminal wharves the vessels are of large scale and incorporate a range of lighting including: low intensity access lighting, activity-based floodlighting, internally illuminated windows, and navigation lights. The lighting is intermittent and variable, and characteristic of the port environment.

4.1.4 Equipment & vehicles

The headlights of mobile plant and vehicles are evident intermittently. Inherently such lighting is mobile, low powered and at low level. It is also, variable, and infrequent. The tall straddle carriers, used for container handling, also incorporate task lighting, which is downward aimed, localised, and mobile.

All such lighting is of minor significance compared with the high mast area lighting.

4.1.5 Roadway

The main roadway adjacent to the existing container terminal, and the adjacent rail siding, has pole mounted lighting, similar to that in the container terminal. As a result the lighting function effectively merges.

4.1.6 Buildings & Structures

Within the existing container terminal there are various distributed buildings and structures with exposed exterior lighting. The most significant being the straddle carrier workshop complex, and the elevated coal conveyor facilities. Others include small isolated office, amenity, and utility buildings.

Commonly the lighting associated with these facilities is sparse, of low output, and insignificant in relation to the encompassing general area lighting.

[8] Illuminance measured on the horizontal plane at ground level.

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4.2 Coal stockyard Lighting

The coal stockyard lighting features are similar to the existing container terminal, but with lower illuminance, intermittent operation, and generally wider pole spacing.

4.3 Interim Reclamation Lighting

The initial reclamation area (Reclamation A Phase 1) has general lighting for access, circulation and storage activities. The lighting is of the pole mounted floodlighting type, with 'cut-off' type flat glass LED luminaires, configured in small pole top groups, in a radial arrangement. The mounting height is mid-range (approximately 20m), with correspondingly reduced spacing compared the container terminal area. The associated illuminance level relates to general purpose application which is less than for the existing container terminal.

A notable feature of the LED luminaires is a cool white colour appearance, with correlated colour temperature of 4000°K, which contrasts with the surrounding HPS lighting to the north and west.

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5 Existing Lighting Environment

The following section provides an assessment of existing lighting effects, in accordance with the methodology defined in section 3.

5.1 Waterfront – Light Spill

The existing container terminal wharf areas have relatively high levels of area lighting to support load handling activities, in close proximity to the waterfront. In addition to task lighting beneath the booms of container cranes and from ships at berth, there is inevitable light spill to the immediate seaward area.

At the waterfront of the coal stockyard the effect is only evident to a very minor degree, because of the comparatively sparse lighting installation, lower intensity, and more pronounced inward aim.

The light spill is variable with the location of ships and associated operations, and to a lesser extent sea and tidal conditions. It can be observed from a distance in the form of reflection, particularly from the Diamond Harbour area, directly opposite. As such it influences visual amenity which is discussed by Andrew Craig in the Landscape Assessment included with this application.

Because of the water reflection, the light spill effect is clearly evident. However it is a long established visual feature, and consistent with the nature of the port operations. The magnitude of the light spill appears to be consistent with the installation era in terms of; standard practice, distribution utilisation, and the type and orientation of luminaires.

5.2 Diamond Harbour

5.2.1 Glare

The location and proximity of the Diamond Harbour headland, on the opposite side of the harbour, is such that the area is most exposed to glare from lighting at the port.

At the distance involved, the only light sources with strong luminance in the direction of view are the pole mounted area lights. Particularly those associated with the existing container terminal. In contrast with a dark background that results in a low level of glare, which is less than would be associated with visual discomfort or disability.

As for light spill, this effect is a long-established aspect of the port operations. The magnitude also appears to be consistent with the installation type and era.

5.2.2 Sky glow

From the Diamond Harbour area the appearance of the sky above the port, and the hillside behind, is significantly altered by artificial lighting. Above the direct brightness of the existing luminaire groups, the sky has a low intensity glow with a light golden colour appearance. The background sky glow from Christchurch City, on the other side of the Port Hills, is also superimposed on the local area effect.

The overall density of effect varies according to atmospheric particle content, and conditions such as fog which affect visibility.

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In simple terms the combined effect on the appearance of the night sky in this direction could be described as mid-range between a fully natural state and inner city conditions, when referenced to the subjective Bortle Scale. Clouds and surroundings are clearly visible and there is a noticeable loss of astronomical definition, but the effect is limited to a particular field of view.

The sky glow effect is pronounced when compared to the conditions further east, towards the outer harbour. The degree of the effect is consistent with the dated existing lighting installations, but more substantive than would result from modern lamp and luminaire technologies.

Refer to ***Fig. 3*** *Light Pollution Map Extract* which shows affected areas and relevant intensity from satellite radiometer imaging. The image also illustrates that the sky glow effect is specific to the view towards the port and Christchurch city.

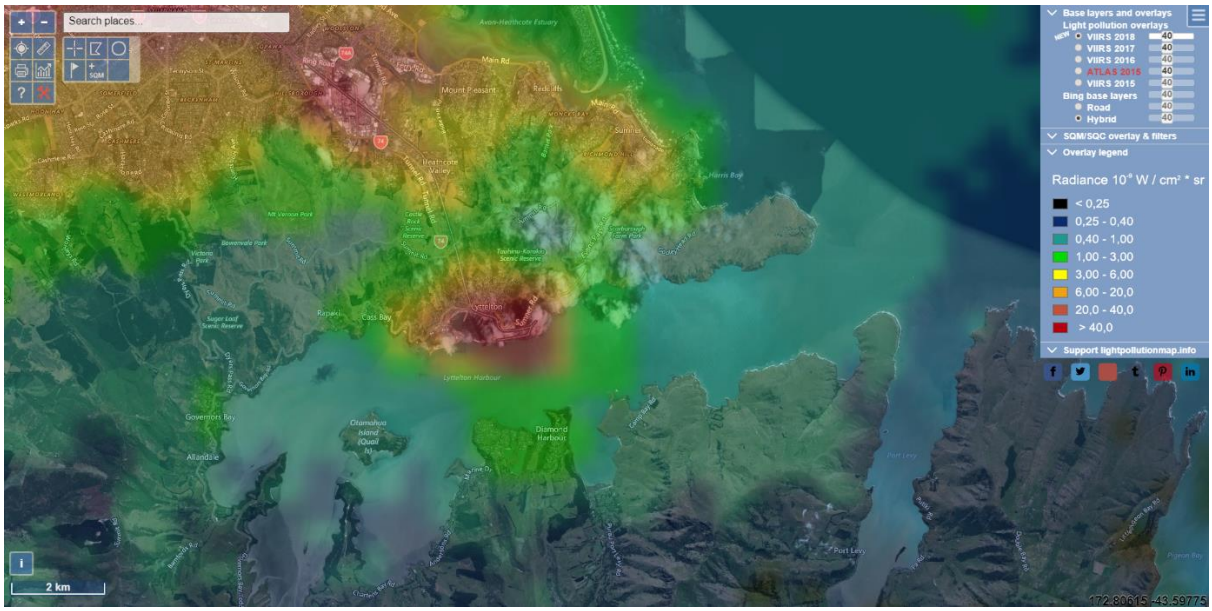

Fig 3. - Light Pollution Map Extract[9]

5.2.3 Visual Amenity

The visual amenity effect of the existing lighting is the combination of the other lighting effects, in relation to the aesthetic appearance of the night time surroundings. The effect integrally relates to overall landscape amenity, which is addressed in the separate landscape assessment.

The assessment of visual amenity is very subjective. The dominance of lighting over the night time appearance of a natural background, is often considered to be a negative feature. Especially by those in a rural setting. However, it is also possible that such lighting could also be considered a positive feature, in a similar manner to the nightscape of a city or harbour.

[9] The Light Pollution Map extract is obtained from Jurij Stare at www.lightpollutionmap.info

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In this case the combined lighting effects have a pronounced influence on the night environment. However, the form of the lighting, and the effects, are consistent with what would be expected at a major port. The lighting is also a long-established feature of the night environment in the area, and there is some visual interest associated with the port operations.

Refer to ***Fig. 4*** *View from Diamond Harbour*, for illustration of the existing lighting effects and their collective influence on visual amenity.

Fig. 4 - View from Diamond Harbour[10]

5.3 Purau

The views to the port from Purau are almost completely limited to the coal stockyard area. As a result, reflected light spill and glare effects are insignificant.

Since sky glow is a wide area effect, it is evident from Purau, to a similar extent as from Diamond Harbour. However the absence of direct view to the existing container terminal lighting de-emphasises the effect.

The view from Purau to the Port, is that of a hill side landscape altered by artificial lighting, in a shallow band above the waterfront. However the magnitude of the visual amenity effect is relatively soft, because of the low levels of the contributing lighting effects from this perspective, and the more limited operation of that lighting.

5.4 Governors Bay

The distance from Governors Bay to the existing container terminal area is in the order of 6km, and therefore light spill effect, and its reflected presentation, are not present from this perspective.

The prominent brightness of the existing container terminal lighting, covers a relatively small sector of view and is moderated by the distance. However it is in marked contrast to the subdued lighting of adjacent Lyttelton Township, and the relatively dark surroundings. The combined effect being a very low order of glare effect, which is insignificant in terms visual discomfort or disability.

Sky glow effect is less pronounced than in the view from Diamond harbour, because of the absence of background contribution from Christchurch City. However clouds and surroundings remain clearly apparent, and the loss of astronomical definition is noticeable, but relatively narrow in field, and at low elevation.

[10] Photograph provided by Virtual View

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As per the description above, the existing container terminal lighting is a relatively small but prominent influence on visual amenity in the view from Governors Bay. An accentuating feature may be that the lighting is coincident with the view to the outer harbour entrance, although that is of less significance at night.

In any case the lighting is a long standing feature, and consistent with the proximity to such a facility.

Refer to ***Fig. 5*** *View from Governors Bay*, for illustration of the existing lighting effects and their collective influence on visual amenity.

Fig. 5 - View from Governors Bay[11]

[11] Photograph provided by Virtual View

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6 Lighting Development

6.1 General

In order to assess the effects of lighting on the receiving environment, from the Proposed Container Terminal on Reclamation A & B, it is first necessary to anticipate the form that such lighting would take. Considering the staged and long term of nature of the Proposed Container Terminal, it is inevitable that lighting practices and technology will evolve over that time.

Nevertheless it is possible to reasonably predict the design features of prospective lighting from reference to existing installations (as done in Sections 4 and 5) both at the Port and elsewhere, and from current understanding of technological development on technology development and associated environmental effects.

It is also relevant that emphasis on the efficiency of utilisation and the minimisation of environmental effects is increasingly prominent in lighting design and technology. Therefore it is reasonable to anticipate that the trend will be beneficial in terms of the environmental outcomes from future installations.

The following sections discuss the relevant lighting technology, and define the anticipated lighting design features which formed the basis of this assessment.

6.2 Technology

The anticipated form of area floodlighting for new areas (and the anticipated future replacement of existing floodlighting) will respond to evolving lighting technologies, and the associated environmental knowledge base. In particular LED[12] technology is rapidly developing, and becoming dominant in most aspects of lighting application.

LED lighting has many performance advantages over the existing HPS[13] lamp technology (which is currently used for the existing container terminal). The available output of LED lighting has been steadily increasing, and as a result it is becoming more suitable for high mast applications. Some overseas ports already have LED installations for container terminals.

A characteristic of high output LED's is a very cool white appearance. However that is likely to be moderated through further development, as is already evident with lower output LED's.

LEP[14] is also a relevant technology. It is based upon an established principle, and well suited to high output applications such as high mast floodlighting. It also offers a balanced lighting colour spectrum, with a neutral white appearance. However it has some application complexity, narrow application, and minor uptake at present.

Regardless of whether LED or LEP prevails for the Proposed Container Terminal, the distribution characteristics, colour appearance, and associated environmental effects, are expected to be similar.

[12] LED – Light Emitting Diode
[13] HPS – High Pressure Sodium Vapour
[14] LEP – Light Emitting Plasma

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6.3 Anticipated Design Features

Essentially the lighting within the Proposed Container Terminal is likely to be of similar form and function to that previously outlined for the existing container terminal. However it is expected that some design features of the high mast installations will differ, as follows;

(a) Luminaires are likely to be of the flat glass type, with LED or LEP lamp technology, and a high degree of upward cut-off.
(b) The anticipated spectral characteristics of the lighting include a neutral white to cool white appearance, with correlated colour temperature of 3000 - 4000°K, and moderated blue range emission where practical.
(c) Luminaire tilt is expected to be limited to within low angles above horizontal, in order to assist the mitigation of obtrusive effects.
(d) Mounting height may increase, within a practical limit in the order of 40m above ground.

The spacing between lighting poles is expected to remain similar to that in the existing container terminal. The beam cut-off of characteristics of the luminaires, and their low tilt orientation, is likely to constrain increased spacing, which could otherwise result from higher mounting.

The lighting is expected to reflect the dynamic and evolving nature of port operations. That would be evident through staged development, interim installations, and varied layout arrangements over time. An example being the replacement of the interim reclamation area lighting with a high mast installation, consistent with the existing container terminal.

6.4 Existing Container Terminal

The existing container terminal lighting is necessarily associated with the assessment of effects from the Proposed Container Terminal on Reclamation A & B. The existing lighting, outlined in section 4.1.1, utilises aging lamp technology and luminaire types. As such, the associated depreciation, performance, and maintenance issues will eventually necessitate replacement.

It is anticipated that the eventual replacement of the existing container terminal lighting will utilise similar lamp technology and luminaires to the installations for the container terminals on Reclamation A & B. This premise is referenced in the assessment of effects, particularly in relation to the long term nature of the development, and evolving overall lighting appearance and uniformity.

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7 Mitigation

The mitigation of environmental lighting effects can be achieved by either source control or containment from screening or shielding. Owing to the exposed nature of the Proposed Container Terminal site, and the height of the dominant lighting features, the only practical mitigation in this case relates to the design and utilisation of the lighting. The objective being to control glare, light spill, sky glow, and the influence on visual amenity, through the appropriate specification and application of luminaires. It is therefore anticipated that the prospective lighting installations will be designed accordingly.

It is also significant that key aspects of lighting design relating to effects mitigation are also integral to performance efficiency, which provides additional incentive.

7.1 Design

A summary of applicable mitigation design features which are anticipated as integral to the prospective lighting installations is as follows;

(a) Professional design, utilising industry standard software modelling such as AGI[15].
(b) Guidance from relevant standards where practical, including the design objectives and guidelines in Appendix A of AS/NZS 4282:2019.
(c) Luminaires with a high degree of photometric control and upward cut-off, such as the 'flat glass' type.
(d) Minimised luminaire tilt, for downwards concentration of the output and minimised remote view of the light source.
(e) Luminaire location, orientation, and photometric specification (i.e. beam shape) to optimise the concentration of the lighting inwards to the site.
(f) Light source with a correlated colour temperature not exceeding 4000°K, and moderated blue range emission where practical.

Note that the above features reflect the guidance provided by Rule **6.3.4.1** and Appendix **6.11.13** of the Christchurch District Plan.

The anticipated mitigation features are consistent with Christchurch District Plan policies **6.3.2.1.1** & **13.8.2.2.1** relating to the minimisation of adverse environmental effects. They are also consistent with ECAN Canterbury Regional Policy Statement policies, **8.3.3 Management of activities in the coastal environment,** and **8.3.6 Regionally significant infrastructure**, which relate to the avoidance, remedy or mitigation of adverse effect on the coastal environment.

[15] AGI Software is a common and credible design tool for exterior lighting

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7.2 Control

A benefit of the prospective new lighting technologies, and related controls and communications developments, is the opportunity for refined functionality. In particular, features such as quick start-up and output dimming enable lighting function to be closely attuned to operational requirements. That can optimise efficiency and moderate the level and/or presence of environmental effects.

It is anticipated that, such control features would be integrated with the lighting design for future installations where possible. The environmental effects may therefore be reduced or eliminated at times. However it should be noted that such opportunity would directly relate to operations requirements, which are likely to be variable.

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8 Assessment of Effects

This section provides an assessment of the lighting effects from the Proposed Container Terminal, in terms of modification to the existing environment. The associated methodology is outlined in section 3, and anticipated lighting design features and mitigation are outlined in sections 6 and 6.4 respectively.

8.1 Light Spill - General

The anticipated lighting design and luminaires for the Proposed Container Terminal will provide similar functional lighting levels to the existing container terminal, but with more refined beam control and increased efficiency of distribution. The result will be a substantially lower presentation of reflected light spill, than for the existing container terminal.

The separation distance to any relevant neighbouring zones is such that light spill will be insignificant in terms of compliance. Furthermore the anticipated mitigation features are consistent with policies **6.3.2.1.1** and **13.8.2.2.1** of the Christchurch District Plan, and policies **8.3.3** and **8.3.6** of the ECan Coastal regional Policy Statement, in relation to the control of adverse effects.

8.2 Diamond Harbour

8.2.1 Photo Simulation

In order to assist the interpretation of anticipated lighting effects a photographic simulation has been developed, on the basis of the prospective design features, and an indicative layout. Refer to ***Fig. 6*** *Simulation view from Diamond Harbour*.

The simulation illustrates a state of most contrast, where the full extent of the Proposed Container Terminal is operational, and the existing container terminal lighting remains unchanged. However, the actual transition is likely to evolve through stages of development and replacement, with less pronounced contrast.

Fig. 6 - Simulation view from Diamond Harbour[16].

[16] Photographic simulation provided by Virtual View.

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8.2.2 Glare

Although the Proposed Container Terminal is likely to be illuminated to a similar level as the existing container terminal, the associated glare effect is expected to be considerably less. That is because of the mitigation provided by the anticipated type and orientation of luminaires, with predominantly downward output and a substantially reduced direct view of the light source.

In conjunction with the eventual and similar replacement of the existing container terminal lighting, the anticipated mitigation features will result in a low order of glare in the view from Diamond harbour, which is the most significant viewpoint. The effect will be substantially less than at present, and continue to be insignificant in terms of discomfort or disability.

8.2.3 Sky Glow

The perception of sky glow will be less influenced by direct source visibility than at present. The effect will also be mitigated through improved luminaire beam control and distribution utilisation. Particularly when the lighting of the existing container terminal area is eventually replaced.

However, the increased area of strong illumination, and the associated upward reflection from pavement and containers etc. will offset that benefit to some extent. In addition, the white spectrum lighting (i.e. LED or LEP) will have more atmospheric scatter than the existing high pressure sodium vapour lighting.

Collectively the perception of sky glow effect from the larger facility is likely to remain of a similar order to that existing, from the Diamond harbour perspective.

8.2.4 Visual Amenity

The influence of the Proposed Container Terminal lighting on visual amenity is a combination of the contributing lighting effects.

The horizontal extent of the landscape altered by lighting will be similar to that existing, with the coal stockyard included. However, the presence of the Proposed Container Terminal lighting will be more pronounced than that of the coal stockyard. The overall impression will therefore be of an increased horizontal area of lighting prominence.

The most significant view perspective in relation to visual amenity will be from Diamond Harbour, because of the relatively close and direct view.

The anticipated lighting characteristics, including those associated with the eventual existing container terminal lighting replacement, will significantly moderate the level of the combined existing effects. However, the lighting will remain a pronounced influence on the night environment, and the associated visual amenity.

A consequential feature of the anticipated lighting development, is that the white colour appearance will differ markedly from that of the existing container terminal, which will result in a contrasting appearance during the development transition.

The outcome will appear as a refinement iteration of the established condition. It will also remain consistent with the appearance of a major port.

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8.3 Purau

8.3.1 Glare

As for the perspective from Diamond Harbour, the direct view of luminaires will be substantially mitigated, and the white colour appearance of the lighting will be distinctive. The greater separation distance to Purau will also further diminish any glare effect.

8.3.2 Sky Glow

Port lighting will become more evident than at present. However sky glow is expected to remain of a similar order when viewed from Purau, because of the design features previously outlined, and the wide area nature of the effect. The limited direct visibility of light sources will also minimise the associated influence on sky glow perception.

8.3.3 Visual Amenity

As for Diamond Harbour, the influence of the anticipated lighting on visual amenity is the combination of the lighting effects.

The extent of the landscape altered by the Port lighting will be a distant shallow band, of up to 10° of horizontal angle, which is effectively unchanged from the existing condition. The lighting function will appear more substantial, but no more extensive. It will also remain consistent with the appearance of a major port.

Another significant factor is that the residential lighting on the west side of Purau Bay moderates night time contrast in the view to the Port.

Whilst the contributing lighting effects will be of a low order, and the affected area unchanged, the combination will remain a conspicuous influence on the night environment.

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8.4 Governors Bay

8.4.1 Photo Simulation

The photographic simulation in **Fig. 7** below has also been developed for the Governors Bay view perspective, on the same basis as that for Diamond Harbour.

Fig. 7 - Simulation view from Governors Bay[17]

8.4.2 Glare

As for other view perspectives, the anticipated form of the Proposed Container Terminal lighting, will effectively eliminate glare from a distant view. That form, and the white colour of the lighting, will contrast with the existing container terminal lighting until the eventual replacement of the later results in a more uniform appearance.

8.4.3 Sky Glow

The increased extent of Port lighting, in combination with the anticipated design features, is expected to result in similar conditions to that existing. The reduced exposure to the direct view of light sources will also reduce influence on the perception of sky glow.

8.4.4 Visual Amenity

The contributing effects from the anticipated lighting will remain of a similarly low order to that existing. Although the width of landscape affected by lighting will increase slightly in the focal view to the outer harbour entrance, that factor is not significant during darkness hours.

Since the lighting at the port is a long-standing landscape feature, and the anticipated lighting will be less visually prominent, the nett effect is not expected to significantly different. The appearance will also remain consistent with that of a major port.

[17] Photographic simulation provided by Virtual View.

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9 Conclusion

The geography of the harbour basin, separation distance from susceptible locations, and anticipated mitigation, are such that the anticipated primary lighting effects from the enlarged port area, will remain comparable to that existing.

Specifically, the increased photometric control provided by modern lighting technologies, in conjunction with minimal tilt design, will have dual benefit. It will substantially reduce the direct view of light sources, and increase the utilisation efficiency of the lighting within the application area. It is anticipated that the eventual replacement of the existing container terminal lighting will also be beneficial to the lighting environment. .

The influence of lighting on visual amenity results from the combination of the other lighting effects, and also includes aesthetic factors such as colour, form, and relativity. It is assessed in the context of the surrounding environment, and is an integral aspect of overall landscape amenity. That context includes the long established presence of the port as a feature of the harbour basin landscape, and the consistency of the associated lighting with such a facility.

The white colour appearance of modern lighting technologies will be a notable feature of the anticipated lighting development. Initially that is likely to contrast with the colour of existing lighting. But eventually the modernisation of existing container terminal lighting will result in a uniform appearance.

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10 Glossary

10.1 Lighting Terms

10.1.1 Illuminance

Illuminance is the density of light, or luminous flux, incident in a specific plane of measurement, typically vertical or horizontal. Illuminance quantification of lighting conditions is common in both design and regulation, and measurement is routine. The unit of magnitude is Lux, and some reference examples of typical values are as follows:

- Moonlight 0.5 – 1.0 Lux
- Typical Office interior 300 – 500 Lux
- Daylight >10,000 Lux

10.1.2 Luminance

Luminance is the photometric term related to the perception of brightness, which is a function of source area and intensity in the direction of view, measured in Candela/m^2 (Cd/m^2). Luminance quantification is uncommon for general exterior lighting practice, and not utilised in relevant planning regulation. Measurement is possible, but rare in practice.

10.1.3 Luminaire

Luminaire is the standard international term for an assembly which incorporates a light source, and provides photometric control of the output distribution. Other comparable terms are light fitting, or light fixture.

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11 Appendix A

Photographs and simulations

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Appendix A

The images in this appendix are provided by Virtual View.

Figure 1. Existing view from Diamond Harbour

Figure 2. Simulation view from Diamond Harbour

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Figure 3. Existing view from Governors Bay

Figure 4. Simulation view from Governors Bay

© WSP Opus | May 2019

APPENDIX 4

VISUAL SIMULATIONS

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 01 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 01 - 50mm Lens - Proposed Final Year

lpc Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 01

Cnr Cressy Tce and Wilsons Rd, Lyttelton

Easting (Mt Pleasant 2000):	**398352.63**
Northing (Mt Pleasant 2000):	**798247.75**
Elevation :	**81.24m**
Height of Camera :	**1.5**
Orientation of View :	**SE**
Date of Photography :	**05 Mar 2019**
Time of Photography :	**12:28pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Jason Blair with a 50mm lens.

Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 02 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 02 - 50mm Lens - Proposed Final Year

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 02

Summit Road above Governors Bay

Easting (Mt Pleasant 2000):	**392875.08**
Northing (Mt Pleasant 2000):	**797481.17**
Elevation :	**405.82m**
Height of Camera :	**1.5**
Orientation of View :	**E**
Date of Photography :	**05 Mar 2019**
Time of Photography :	**1:03pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Jason Blair with a 50mm lens.

Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 03 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 03 - 50mm Lens - Proposed Final Year

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 03

13 Ranui Street, Diamond Harbour

Easting (Mt Pleasant 2000):	**400122.57**
Northing (Mt Pleasant 2000):	**795951.65**
Elevation :	**68.84m**
Height of Camera :	**1.5**
Orientation of View :	**N**
Date of Photography :	**05 Mar 2019**
Time of Photography :	**1:50pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Jason Blair with a 50mm lens.

Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 03 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 03 - 50mm Lens - Proposed Final Year - No Ships Docked

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 03

13 Ranui Street, Diamond Harbour

Easting (Mt Pleasant 2000):	**400122.57**
Northing (Mt Pleasant 2000):	**795951.65**
Elevation :	**68.84m**
Height of Camera :	**1.5**
Orientation of View :	**N**
Date of Photography :	**05 Mar 2019**
Time of Photography :	**1:50pm**

NOTES :

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Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 03 - 50mm Lens - Existing Night

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 03 - 50mm Lens - Proposed Final Year Night

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 03

13 Ranui Street, Diamond Harbour

Easting (Mt Pleasant 2000):	**400122.57**
Northing (Mt Pleasant 2000):	**795951.65**
Elevation :	**68.84m**
Height of Camera :	**1.5**
Orientation of View :	**N**
Date of Photography :	**15 April 2019**
Time of Photography :	**6:56pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Jason Blair with a 50mm lens.

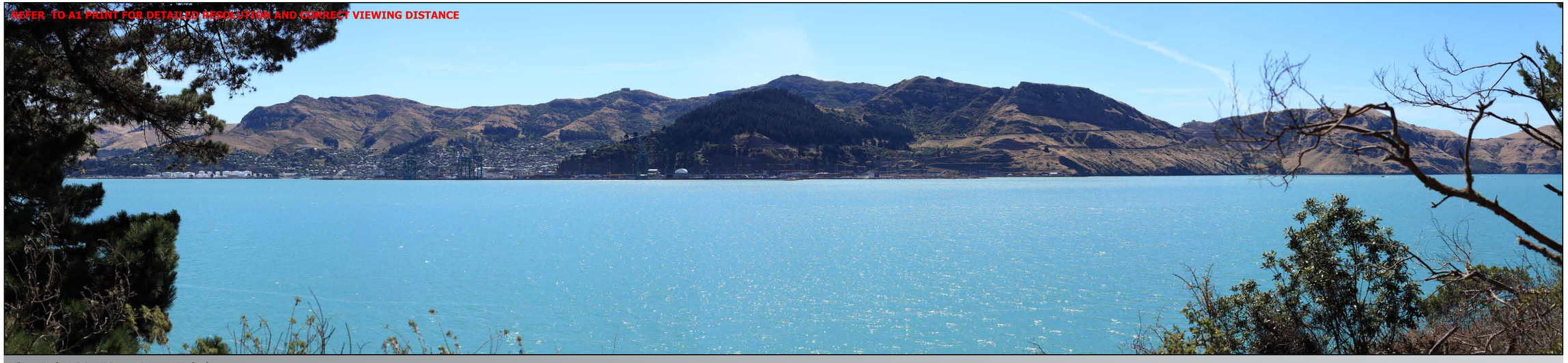
Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE



View Point 04 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 04 - 50mm Lens - Proposed Final Year

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 04

Waipapa Ave , Diamond Harbour

Easting (Mt Pleasant 2000):	**400835.76**
Northing (Mt Pleasant 2000):	**796420.59**
Elevation :	**17.71m**
Height of Camera :	**1.5**
Orientation of View :	**N**
Date of Photography :	**05 Mar 2019**
Time of Photography :	**2:11pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Jason Blair with a 50mm lens.

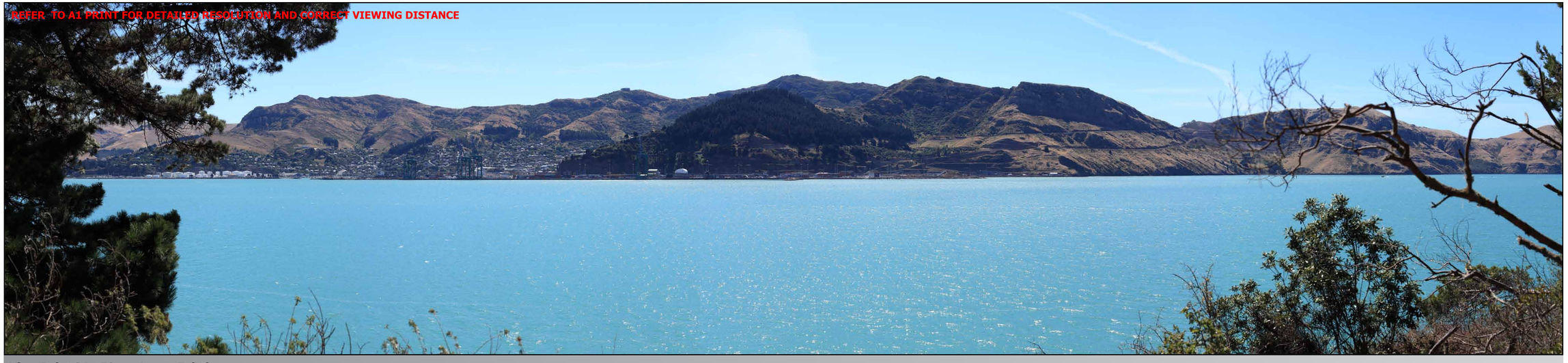
Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE



View Point 04 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 04 - 50mm Lens - Proposed Final Year - No Ships Docked

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 04

Waipapa Ave , Diamond Harbour

Easting (Mt Pleasant 2000):	**400835.76**
Northing (Mt Pleasant 2000):	**796420.59**
Elevation :	**17.71m**
Height of Camera :	**1.5**
Orientation of View :	**N**
Date of Photography :	**05 Mar 2019**
Time of Photography :	**2:11pm**

NOTES :

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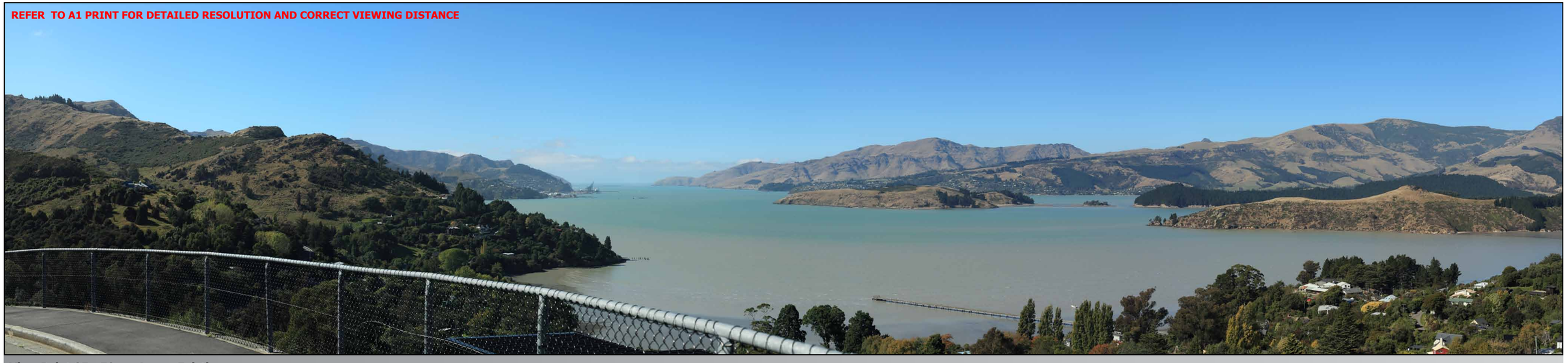
VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

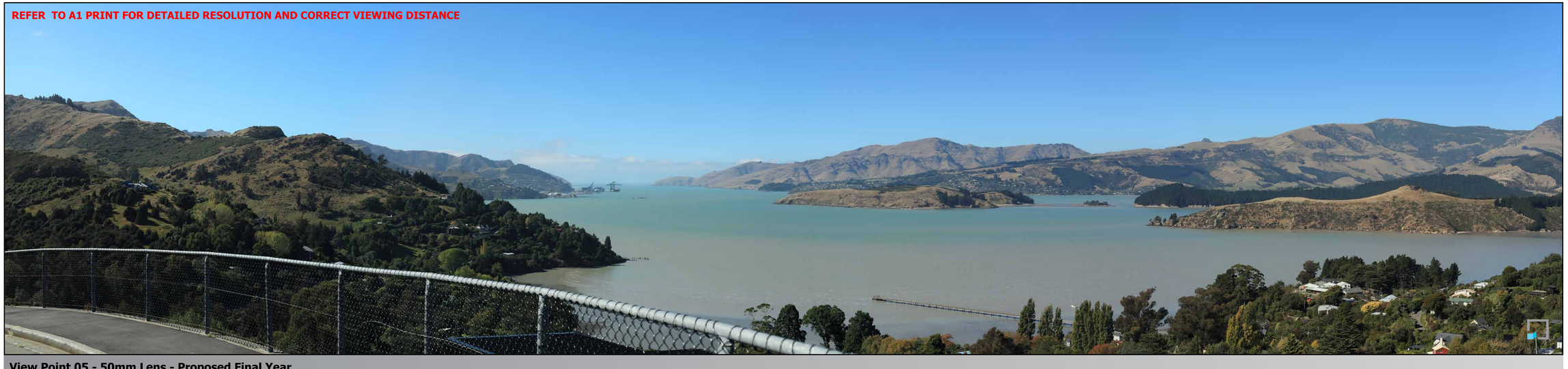
Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE



View Point 05 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE



View Point 05 - 50mm Lens - Proposed Final Year

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 05

The Terrace , Governors Bay

Easting (Mt Pleasant 2000):	**393495.96**
Northing (Mt Pleasant 2000):	**796486.8**
Elevation :	**112.95m**
Height of Camera :	**1.5**
Orientation of View :	**E**
Date of Photography :	**09 April 2019**
Time of Photography :	**12:36pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Emma Pollard with a 50mm lens.

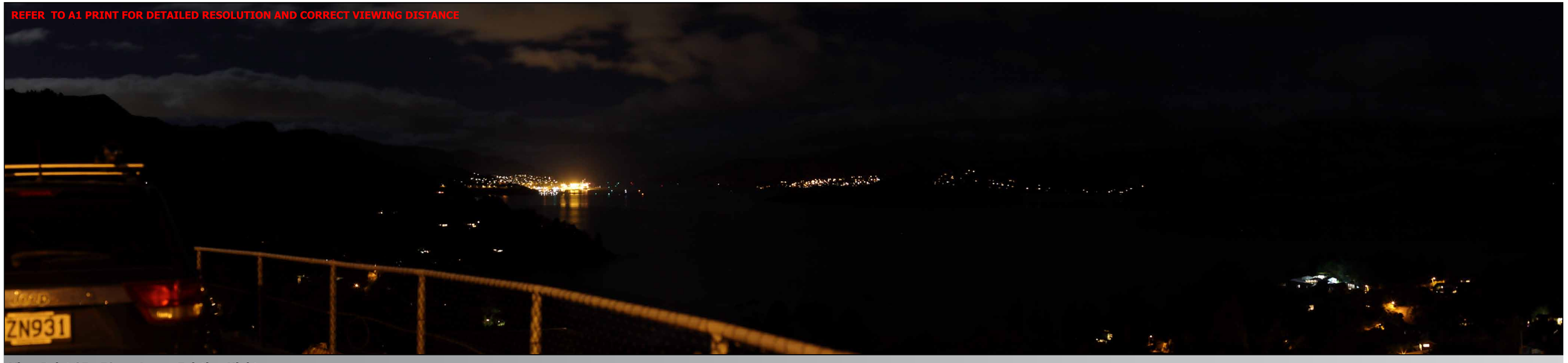
Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

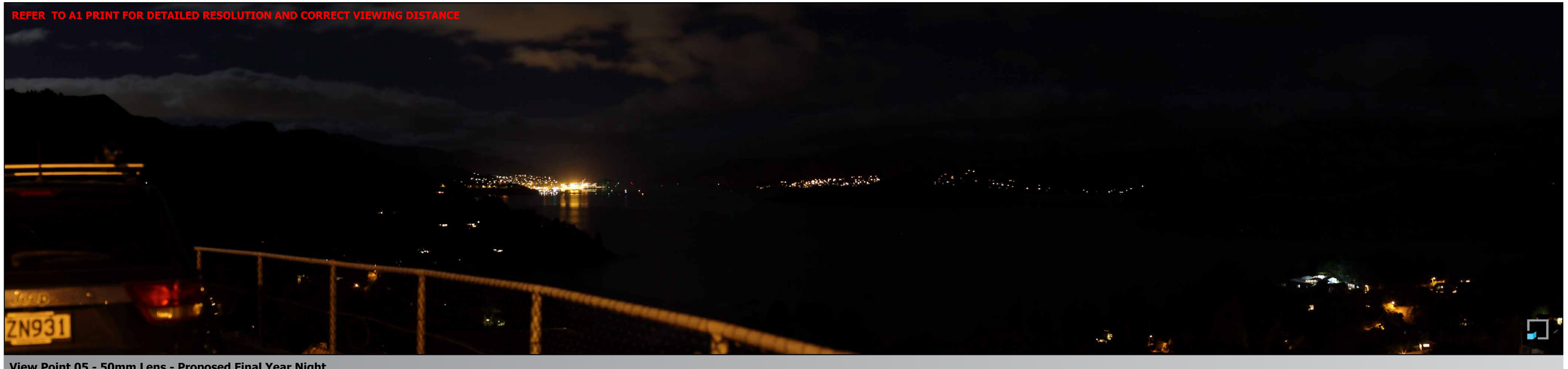
Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE



View Point 05 - 50mm Lens - Existing Night

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE



View Point 05 - 50mm Lens - Proposed Final Year Night

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 05

The Terrace , Governors Bay

Easting (Mt Pleasant 2000):	**393495.96**
Northing (Mt Pleasant 2000):	**796486.8**
Elevation :	**112.95m**
Height of Camera :	**1.5**
Orientation of View :	**E**
Date of Photography :	**15 April 2019**
Time of Photography :	**7:30pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Emma Pollard with a 50mm lens.

Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

APPENDIX 4

VISUAL SIMULATIONS

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 01 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 01 - 50mm Lens - Proposed Final Year

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 01

Cnr Cressy Tce and Wilsons Rd, Lyttelton

Easting (Mt Pleasant 2000):	**398352.63**
Northing (Mt Pleasant 2000):	**798247.75**
Elevation :	**81.24m**
Height of Camera :	**1.5**
Orientation of View :	**SE**
Date of Photography :	**05 Mar 2019**
Time of Photography :	**12:28pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Jason Blair with a 50mm lens.

Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 02 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 02 - 50mm Lens - Proposed Final Year

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 02

Summit Road above Governors Bay

Easting (Mt Pleasant 2000):	**392875.08**
Northing (Mt Pleasant 2000):	**797481.17**
Elevation :	**405.82m**
Height of Camera :	**1.5**
Orientation of View :	**E**
Date of Photography :	**05 Mar 2019**
Time of Photography :	**1:03pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Jason Blair with a 50mm lens.

Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 03 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 03 - 50mm Lens - Proposed Final Year

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 03

13 Ranui Street, Diamond Harbour

Easting (Mt Pleasant 2000):	**400122.57**
Northing (Mt Pleasant 2000):	**795951.65**
Elevation :	**68.84m**
Height of Camera :	**1.5**
Orientation of View :	**N**
Date of Photography :	**05 Mar 2019**
Time of Photography :	**1:50pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Jason Blair with a 50mm lens.

Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 03 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 03 - 50mm Lens - Proposed Final Year - No Ships Docked

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 03

13 Ranui Street, Diamond Harbour

Easting (Mt Pleasant 2000):	**400122.57**
Northing (Mt Pleasant 2000):	**795951.65**
Elevation :	**68.84m**
Height of Camera :	**1.5**
Orientation of View :	**N**
Date of Photography :	**05 Mar 2019**
Time of Photography :	**1:50pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

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Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 03 - 50mm Lens - Existing Night

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 03 - 50mm Lens - Proposed Final Year Night

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 03

13 Ranui Street, Diamond Harbour

Easting (Mt Pleasant 2000):	**400122.57**
Northing (Mt Pleasant 2000):	**795951.65**
Elevation :	**68.84m**
Height of Camera :	**1.5**
Orientation of View :	**N**
Date of Photography :	**15 April 2019**
Time of Photography :	**6:56pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Jason Blair with a 50mm lens.

Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 04 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 04 - 50mm Lens - Proposed Final Year

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 04

Waipapa Ave , Diamond Harbour

Easting (Mt Pleasant 2000):	**400835.76**
Northing (Mt Pleasant 2000):	**796420.59**
Elevation :	**17.71m**
Height of Camera :	**1.5**
Orientation of View :	**N**
Date of Photography :	**05 Mar 2019**
Time of Photography :	**2:11pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Jason Blair with a 50mm lens.

Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 04 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 04 - 50mm Lens - Proposed Final Year - No Ships Docked

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 04

Waipapa Ave , Diamond Harbour

Easting (Mt Pleasant 2000):	**400835.76**
Northing (Mt Pleasant 2000):	**796420.59**
Elevation :	**17.71m**
Height of Camera :	**1.5**
Orientation of View :	**N**
Date of Photography :	**05 Mar 2019**
Time of Photography :	**2:11pm**

NOTES :

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All photos were taken by Jason Blair with a 50mm lens.

Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 05 - 50mm Lens - Existing

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

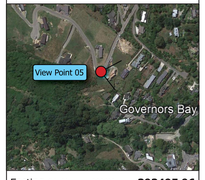
View Point 05 - 50mm Lens - Proposed Final Year

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 05

The Terrace , Governors Bay



Easting (Mt Pleasant 2000):	**393495.96**
Northing (Mt Pleasant 2000):	**796486.8**
Elevation :	**112.95m**
Height of Camera :	**1.5**
Orientation of View :	**E**
Date of Photography :	**09 April 2019**
Time of Photography :	**12:36pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Emma Pollard with a 50mm lens.

Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

View Point 05 - 50mm Lens - Existing Night

REFER TO A1 PRINT FOR DETAILED RESOLUTION AND CORRECT VIEWING DISTANCE

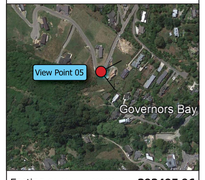
View Point 05 - 50mm Lens - Proposed Final Year Night

Lyttelton Port Company

Lyttelton Port Company
Te Awaparahi Bay Reclamation

View point 05

The Terrace , Governors Bay



Easting (Mt Pleasant 2000):	**393495.96**
Northing (Mt Pleasant 2000):	**796486.8**
Elevation :	**112.95m**
Height of Camera :	**1.5**
Orientation of View :	**E**
Date of Photography :	**15 April 2019**
Time of Photography :	**7:30pm**

NOTES :

The proposed is a 3D survey accurate photo simulation.

All photos were taken by Emma Pollard with a 50mm lens.

Photo positions and reference points surveyed Patterson Pitts Ltd.

VIRTUALVIEW
3D VISUALISATION SPECIALISTS

Version info : 0002

Date Printed : 16 - 05 - 2019

APPENDIX 5

VISUAL LANDSCAPE

Assessment of Environmental Effects

Landscape

Land use resource consent application at:

Lyttelton Port, Christchurch

Report prepared by: Andrew Craig
Landscape Architect

For: Lyttelton Port Company Limited
Applicant

Dated: June 2019

ANDREW CRAIG
LANDSCAPE ARCHITECT LTD

Poynton House I 68 Oxford Terrace I PO Box 109 I Christchurch 8140 **p** 03 377 0157 **m** 021 146 1092 **e** andrew@acla.co.nz

1 INTRODUCTION

This landscape assessment has been prepared in response to proposed land use activities on reclaimed land at Te Awaparahi Bay, Lyttelton Port. More specifically it concerns port activities to establish on recent and future (consented) reclamation. The location and extent of this is shown on the plans accompanying the application.

LPC has previously gained approvals from Environment Canterbury to reclaim land and build wharves with a total area of 34 hectares in Te Awaparahi Bay, at the eastern end of Lyttelton Port.

The reclaiming of the land, which commenced in 2011, is being carried out in two distinct parts as shown on **Figure 1.1** below:

a. Reclamation A (comprising Phases 1 and 2); and

b. Reclamation B

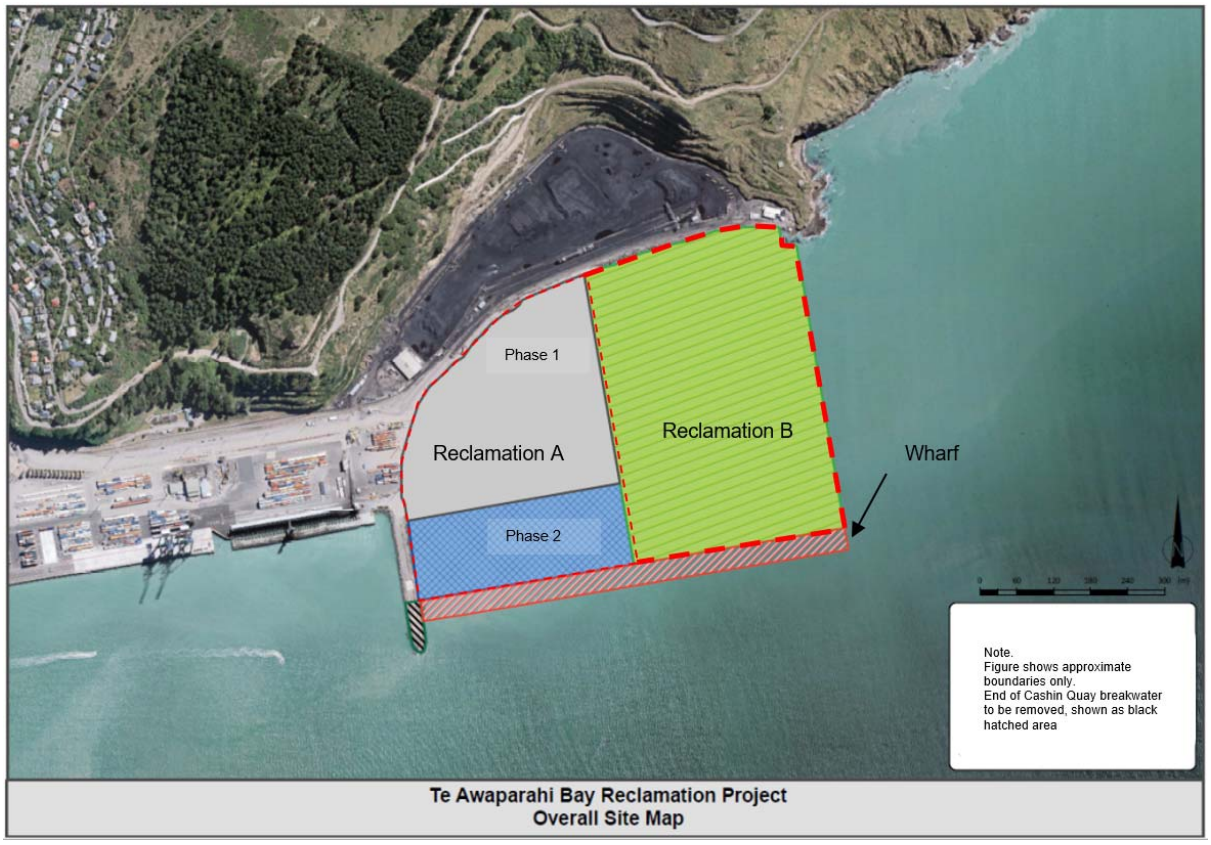


Figure 1.1: Plan showing the location of Reclamation A and B and the associated wharf.

The construction of Reclamation A (Phase 1) has just been completed. Phase 1 land reclamation is 10 hectares in size.

The construction of Reclamation A (Phase 2) has commenced and is anticipated to be completed along with a wharf in 2024/2026. Phase 2 land reclamation will be up to 6 hectares in size.

Reclamation B, including the associated wharf, is not anticipated to be completed until some 10-15 years after completion of Reclamation A. Reclamation B will be approximately 16 hectares in size. Therefore, the full and final container terminal is unlikely to be realised until the 2030's.

Further details on the project description can be found in **Chapter 2** of the Assessment of Environmental Effects ('AEE').

LPC is seeking two landuse consents from the Christchurch City Council. The first landuse consent will enable the establishment and operation of a container terminal and other port activities on Reclamation A and associated wharf.

The second landuse consent will enable the establishment and operation of a container terminal and other port activities on Reclamation B.

The landuse consents are classified as discretionary activities. Further details of the consenting requirements, including the reasons why two landuse consents are needed, are found in **Chapter 8** of the AEE.

A detailed description of the proposed activity is also included in the application. In summary and for the purposes of this landscape assessment, it is understood the activity will include the transitory storage of:

- Motor vehicles
- Logs
- Shipping containers
- General cargo

It is not anticipated that coal will be stored on the reclamation. Nor will a cruise passenger terminal be located on the reclamation, although cruise vessels may berth at the wharf from time-to-time. None of these activities occur on recently reclaimed

land and is therefore not subject to this application and subsequent landscape assessment.

Key landscape issues

When assessing the potential and actual effects of a proposed activity The Resource Management Act 1991 (RMA) requires consideration of landscape and visual effects.[1] RMA s7(c) also asks that we have particular regard for the maintenance and enhancement of amenity values – namely those attributes which make the environment pleasant. Allied to this is RMA s7(f) regarding the maintenance and enhancement of the quality of the environment. Environment includes consideration of aesthetic effects[2] as does Schedule 4 (cited in footnote[1]).

Landscape effects are those arising from changes to the landscape irrespective of whether they are visible. In this case, the changes will arise from proposed activity within the reclamation area, namely the establishment of a container terminal and other port activities. The issue is whether these changes to landscape character are in keeping with what might be reasonably expected to occur in the receiving environment, or whether they are alien to it. The type and magnitude of change is an important consideration in this regard which is informed by the existing environment.[3]

Visual effects are those that are visible from potentially affected residential areas and publically accessible vantage points such as roads and parks. The issue here is to what extent views are intruded by the proposed activity. And secondly, the effects of it on view quality. To assist in this regard a series of photo-simulations have been prepared. These give accurate impressions of the fully implemented container terminal from various vantage points around Lyttelton Harbour Basin.

The final issue concerns associative effects. These effects relate to peoples' expectations of what might reasonably occur in the landscape, or otherwise.

[1] Clause 7(1)(b), Schedule 4 of the RMA provides for the assessment of *"any physical effect on the locality, including any landscape and visual effects* and *(d) any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural, or other special value for present or future generations"* (emphasis added).

[2] Under section 2 of the RMA 'environment' includes amenity values (c) and aesthetic considerations (d).

[3] Existing environment comprising the environment as of the moment, and that potentially able to occur resulting from a non-fanciful implementation of permitted and consented activity.

Relevant planning provisions

A number of planning documents include provisions affecting landscape outcomes. These are identified as follows which will be discussed in further detail later.

With reference to the Christchurch District Plan[4] it is understood that because the proposal is located on reclaimed land, it is therefore currently outside the Specific Purpose (Lyttelton Port) zone (Port Zone). As a consequence, the applied for activity attracts Discretionary Activity status.[5] On that basis the actual or potential effects of the proposal on the environment are considered, including potential positive effects. In determining this, regard is had to those District Plan objectives and policies relevant to landscape outcomes. So too are those in other relevant statutory documents which are the:

- Christchurch District Plan;
- Canterbury Regional Policy Statement (CRPS) and the Regional Coastal Environment Plan (RCEP);
- New Zealand Coastal Policy Statement; and
- Mahaanui Iwi Management Plan (MIMP).

In this assessment the following landscape matters are addressed:

- A description of the existing environment;
- Evaluation of the proposed activity with regard to its visual and landscape effects;[6]
- Arising from the preceding point, identification of any potential adverse effects and practicable measures taken to avoid, remedy or mitigate them;

[4] Now operative with consideration to the matters relevant to this application.

[5] Section 87B of the RMA.

[6] Clause 7(1)(b), Schedule 4 of the RMA provides for the assessment of *"any physical effect on the locality, including any landscape and visual effects* and *(d) any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural, or other special value for present or future generations"* (emphasis added).

Landscape effects are those arising from changes to the landscape irrespective of whether they are visible. Visual effects are those that are visible from neighbours and publically accessible vantage points such as roads and parks.

- Identification of positive effects; and

  Consideration of statutory documents where they concern landscape outcomes.

To assist this assessment, a series of four photo–simulations have been prepared.[7] They accurately portray visual effects as seen from selected vantage points within sight of the proposed activity. The vantage points were chosen on the basis of 'worst case scenario' - that is, where the visual effects are anticipated to be greatest from the point of view of potentially affected parties. From this an assumption is made where effects from all other vantage points, of which there are many, will be less than those portrayed in the photo–simulations.

2 EXISTING ENVIRONMENT – LANDSCAPE DESCRIPTION

The existing environment comprises:

- The environment of the application site and its immediate setting as of the moment;

- Any consented activity not yet implemented, which in this case includes the consented reclamation and associated wharf;

- What can occur non-fancifully as of right (permitted activity) noting that the land in question is not yet zoned, but is at some future point likely to be Specific Purpose – Lyttelton Port which includes Port Activities as denoted by District Plan zoning ; and

- Port and other activities on a wharf because they are not expressively regulated under the Regional Coastal Environment Plan.

Here the landscape character and amenity of the application site and its receiving environment is described. The location and extent of these is shown in **Graphic Attachment Figure 1**.

[7] Photo-simulations prepared by Virtual View Limited. Accompanying the simulations is an explanation of methodology.

The application site

This comprises the 34 ha reclamation area as shown on the **Graphic Attachment Figure 1** aerial map and those maps accompanying the application. Essentially the 34 hectare area consists of:

- Existing reclaimed area – 10 ha
- Reclamation A – 6 ha
- Reclamation B – 18 ha

Included in these areas is the proposed wharf.

Construction of the up to 6 ha Reclamation A is underway and Reclamation B is expected to commence prior to the completion of Reclamation A and the container terminal. However, the full container terminal on Reclamation A and B is unlikely to be realised for some 18 - 22 years.

Both Reclamations, however, have been consented and therefore form part of the existing environment – that is; land. Nonetheless, as of the moment the application site is in a state of transition from sea to land. Consequently the site is characteristically dynamic or in a continuous state of change.

On that part of the site already reclaimed, the transitory storage of logs, containers and imported vehicles occurs. A large linear stockpile of loess soil is also present along the eastern edge as a means to speed up consolidation of the reclaimed land. Throughout are various vehicle routes. Apart from light poles there are no permanent structures such as buildings or fixed machinery.

Apart from the presence of the sea, there are no natural features of any kind, including vegetation, within the application site. The entire site, once reclaimed incorporating the proposed land use activity will be entirely artificial - that is, 100% the product of human agency. This includes a planting strip whose appearance will be comparatively natural, which is to be implemented along the eastern edge of Reclamation B as a condition of consent. What this currently looks like is shown in **Graphic Attachment Photograph 1**.

Topographically the reclaimed site upon which the proposed activity is located is essentially flat, and without the aforementioned stored goods, it is featureless. At the

seaward side landform descends to the shoreline at an even uniform gradient. The latter comprises locally sourced rock rip rap extracted from nearby Gollans Quarry and Lyttelton / Sumner road remediation.

The overall shape of site is geometric where the eastern and southern shorelines are perpendicular to each other. Landward the form follows the curving embayment, itself established reclamation. The latter incorporates the coal handling facility. Such geometry contributes significant artificiality to the site.

Due to existing and future activity, amenity is generally low. It is and will be entirely industrial in nature whose sole purpose is to facilitate the import and export of goods. Within the application site, no activity contributes amenity such as green open space, natural and cultural features. Nevertheless the site is located in a wider setting where such features do exist. This is described next.

The wider application site setting

The application site in its wider setting is demonstrated in **Graphic Attachment Figure 2**.

Because the site is so evidently of human construction it contrasts with the predominantly natural character of its immediate setting to the north, south and east. This has a complementary effect in that the opposite qualities of each environment highlights the inherent character of both the application site and its surrounds.

Westward the site adjoins existing port activity areas, primarily incorporating container handling and storage. Buildings also exist in this area. The proposal will result in an area of similar character and generally low amenity. That is; more of the same.

Further west the existing port extends into the port environment of the inner harbour. This area includes wharves, a marina, log stockpiles, rail all of which is bookended by the petroleum tank farm. North is Lyttelton township comprising a mix of commercial, retail and residential activity. Overall, the environment west of the application site is largely modified given to human activity of one sort or another. Amenity however improves the closer ones gets to Lyttelton township due to the presence of the aforementioned activities.

The sea bordering the site to its south and east is entirely natural in character as it is, apart from some navigation aids, largely devoid of artificial structures such as jettys, buoys and the like. Beyond the reclamation area the shoreline exhibits a far more natural character, and is largely unmodified. Close to the shore however are the historic WWII gun emplacements and bunkers located on Battery Point which marks the easternmost extent Reclamation B. Nonetheless the Point is predominantly natural in character and as such will contrast with the adjoining reclamation and the activity it supports.

The steep slopes north of the application site are predominately natural in character, although they accommodate modification mainly in the form of roading. This includes the publically accessible Lyttelton Sumner road. Other roads comprise the old Lyttelton Sumner Road and haul road linking the application site to Gollans Bay quarry. All of this modification occurs on the lower slopes – essentially below the Lyttelton Sumner road. This pattern of development on the lower slopes generally persists throughout Lyttelton Harbour basin.

Above the application site and Lyttelton Sumner Road the landscape is rural. Apart from a small area of plantation forest which is understood to be publically owned, the upper slope land is not generally given to any form of rural production. Instead it comprises Buckleys Bay and Tauhinu – Korokio Reserves where the vegetation cover mostly consists of regenerating native vegetation. The location and extent of this in relation to the application site is shown on **Graphic Attachment Figure 3**. Most of this land is zoned *'Open Space Natural'* overlaid ONL.[8] The combination of this with its reserve status means that it will never likely be developed. As a result, the land above Lyttelton Sumner Road is highly natural and given the prescribed land use this state will be enduring.

Because of this high natural character, the amenity derived from it is very high. The presence of the ocean nearby contributes to this effect overall.

Overall, as the wider setting is greater than the application site, it is as a consequence much more diverse in its character. At a more general level, the environment comprises both urban and rural landscapes. The application site within its coastal setting sits at the interface between these two environments. The transition between them is generally abrupt and as a result there exists significant

[8] ONL - Outstanding Natural Landscape subject to section 6(b) RMA matters.

land use contrast – see **Graphic Attachment Photograph 2**. One of the landscape issues is whether this contrast will be maintained following implementation of the applied for activity.

Within this setting the extent of existing Port activity occupies most of the shoreline – see again **Graphic Attachment Figure 1** and **Photograph 2**. In terms of elevation – that is, height above sea level – the activity occurs, for the most part, well within 20 metres. As it extends horizontally for 3km, the Port appears to be very elongated where it stretches along the shoreline. That is, the Port appears as a very narrow strip of activity at the point where the land meets the sea. This effect is shown in **Graphic Attachment Figure 4**.

Activity within the Port area overall is generally dynamic, which also informs its character. Contributing to this dynamism is the coming and going of ships, land based transport servicing them, the rise and fall of container stacks, log and coal stockpiles. The transitory presence of imported motor vehicles adds to this too. Further contributing to apparent activity is night lighting and sound emanating from day to day Port activity. This activity occurs 24 hours a day, all year round.

So it is not a static environment, and never has been since human occupation began. It is very clearly a working environment dedicated to the transportation of goods. This contrasts to the relatively static residential and commercial areas of Lyttelton Township and its rural backdrop.

A landscape issue in terms of character and amenity is whether the proposed activity will deviate from the existing pattern, and if so will this generate unacceptable adverse effects? This is addressed next.

3 THE PROPOSAL AND ITS EFFECTS

Fundamentally the proposed activity is an extension of what currently occurs on the reclaimed land to the west which adjoins the application site. The project description and accompanying site plans illustrate what is proposed. As mentioned, essentially this includes container handling, and storage (albeit the proposed activity will be significantly more intense compared to what currently occurs). There may also be other port activities such as log and car storage. Also as mentioned, the nature of this activity is dynamic. Further the volume of goods stored on the application site is transitory, particularly with regard to its extent. That is, there will always be stored goods, but their apparent extent or volume will continually vary.

As described in the preceding discussion, the location of the proposed activity, including light poles and gantry cranes will occur (regarding elevation) within a relatively narrow band less than 80m above m.s.l.[9] with most activities <45m above m.s.l. In fact, it will occupy that area shown in **Graphic Attachment Figure 4**, as this includes the existing coal handling facility which adjoins and is located directly landward of the application site.

For the existing Port Zone a 3D envelope exists in which all existing and future port activity will occur. The Christchurch District Plan standards dictate this via its extent in combination with the height standards. The Port Zone has no limit set for the height of container cranes, lighting towers and container storage.[10] Buildings however are limited to 15m.[11] Telecommunication utility structures are permitted up to 25m.[12] There are no other standards of relevance to the Port Zone that control bulk and location of port activity. This includes recession planes which only apply to activity adjoining residential areas,[13] which the application site does not. As mentioned however, the application site is not yet zoned. But as it is likely to be zoned for Port Activity, the existing standards provide a useful guide as to what future permitted effects might be.

A combined workshop and administration building is proposed, likely within Reclamation A, where it is understood that a portion of the structure may be up to 30m high. It is understood the reason for this height is to accommodate the servicing of straddle carriers. The proposed building will be located to the rear of the reclamation and so will appear less prominent. The reason is that it will be foregrounded by the gantry cranes and container stacks. Their height and visual complexity will effectively screen or obscure most of the building when viewed from the harbour and surrounding residential areas. The building location will not be readily visible from Lyttelton Township either.

The rest of the application site will be solely devoted to container storage and handling with some interim, log and vehicle storage. Empty containers will be stacked

[9] M.S.L - Mean Sea Level.

[10] Rule 13.8.4.2.1(a) of the Christchurch District Plan.

[11] Rule 13.8.4.2.1(d).

[12] Rule 13.8.4.2.1(h).

[13] Rule 13.8.4.2.2(a).

up to nine high in some locations – reaching a total height approaching 26m.[14] Cranes and lighting towers will effectively be the only permanent vertical structures.

What these heights mean is that the lower 30m of hillside backdrop will be obscured, or partially so, when viewed from the harbour and various vantage points around it. This will particularly be the case for those living directly opposite at Diamond Harbour – see View Points 03 and 04 of the Visual Simulations attached at **Appendix 4** to the application. The potentially visually affected land will be below the Lyttelton / Sumner Road. As the simulations show, the land above the road will remain unaffected.

View effects from the water

As there are an infinite number of vantage points from the water, views of proposed Port activity are going to be highly variable. Nonetheless, there are factors that will affect views depending on vantage point location. These include:

- Distance or proximity to the application site;
- The presence or otherwise of intervening features such as headlands;
- Weather conditions;
- Direction of travel; and
- The height above sea level of the vantage point – for example views from cruise ships are substantially elevated compared to those from small domestic boats.

As water borne activities are by their very nature, transient, the effects on parties are going to be, in any case, transitory.

Because the harbour affords unimpeded access to the application site, the potential exists for the closest views of port activity. From the water, as one moves perpendicular toward the port activity, the hill side backdrop will become increasingly obscured, due to the effect illustrated in **Graphic Attachment Figure 5**. As mentioned these are transient and therefore temporary effects, and therefore not enduring unlike those from dwellings.

[14] A standard ISO shipping container is 2.59m high.

Overall, adverse visual effects are going to be highly variable in correspondence with the infinite number of vantage points. Consequently the effects are going to range from low to moderately high. As noted, the latter is due to the ability of water borne users to get very close to the site – so much so that it dominates the visual field. Being transient they do so by choice where the effects are transitory.

View effects from Lyttelton Township

View effects from Lyttelton Township occur in two distinct areas. In one area comprising most of the Township north and east of Simeon Quay, there will be no discernible visual effect. The other area encompasses residential areas south and west of Simeon Quay.

For these residents, and as View Point 01 of the Visual Simulations attached at **Appendix 4** to the application shows, views of the outer harbour will be intruded by cranes and containers in addition to those currently present. From lower elevations within Lyttelton township and vicinity, these structures intrude the skyline toward Adderley Head – see **Graphic Attachment Photograph 3**. This effect will be compounded by the presence of increased port activity. From these very low vantage points therefore, views of Adderley Head and the harbour entrance will potentially be fully obscured, particularly when containers are stacked at their highest 24m. The lowest dwellings in the vicinity of **Graphic Attachment Photograph 3** (Brittan Tce / Park Tce) sit at around 50 above m.s.l, and so views of the coast from these will overtop the containers.

In that area of Lyttelton Township North and east of Simeon Quay, views of the proposed activity area will be obscured by the prominent intervening ridgeline that contains Lyttelton to the North east – see **Graphic Attachment Photographs 4, 5, 6, and Figure 6**. The presence of pine plantation on the intervening ridge adds to this effect. But even if the pines were absent, the ridge is of sufficient height to obscure views. It is this part of Lyttelton that is physically closest to the application site, but will not be visible from it.

Overall, adverse view effects from most of Lyttelton township and immediate environs will be very low – essentially non-existent. To reiterate, the majority of residents in the township, that is north and east of Simeon Quay will not be able to see the proposed activity.

Views will however change for those residing West of Simeon Quay, as shown in View Point 01 of the Visual Simulations attached at **Appendix 4** to the application. As this shows, views toward the harbour entrance will appear more cluttered resulting from the presence of the proposed activity. Also evident is the loss of views of the eastern harbour and Adderley Head in the background. Further diminished view quality will result, where the apparent naturalness of the backdrop, relative to the current situation, will be adversely affected.

Those residing in that part of Lyttelton with views will experience moderate effects. To a certain extent, the visual effects similar to those arising from the proposal currently exist. Consequently the effects from port activity will intensify, but will not be foreign.

View effects from Diamond Harbour environs

Because of its relative proximity to the application site and perpendicular view of it, visual effects from this vantage point will be greatest. Generally there are no view impediments such as intervening vegetation or landforms. Consequently many residents in Diamond Harbour will have clear views of the proposed port activity, as is the case presently of the existing activity.

What Diamond Harbour residents will see is shown in View Points 03 and 04 of the Visual Simulations attached at **Appendix 4** to the application. Visible to them will be the complex arrangement of aforementioned structures and elements comprising port activity. As discussed, most of this, excluding cranes, will occur in a band less than 45m above m.s.l. The resulting effect will be obscured views of the lower hill slope backdrop and diminished view quality due to the evidently industrial nature of the proposed activity. It should be noted that this lower slope is not entirely natural, as it has been extensively modified to accommodate the existing haul road. Historic benching is also evident – see again **Graphic Attachment Photograph 4**. It cannot therefore be considered a high value landscape feature whose views merit protection.

While views from Diamond Harbour will vary depending on vantage point location and elevation, none will result in skyline intrusion. That is, the proposed port activity (as is the case now with the existing activity) will be entirely back dropped by land form. The high natural character of the Port Hills upper slopes - above the Lyttelton / Sumner Road – will be unaffected. Further, they will still present the greater portion

of the view, as is evident in View Points 03 and 04 of the Visual Simulations attached at **Appendix 4** to the application.

Because of the nature of port activity involving movement, lighting, brightly coloured elements and overall geometric artifice, there is (and will be) a high level of contrast between the port and hill backdrop. The same applies to the harbour foreground. As a result the proposed port activity along with that existing will be highly visible. To a lesser extent this already exists. The coal handling facility with its lighting towers extend the full length of the application site as viewed from Diamond Harbour. So to a certain degree visual effects arising from port activity exist, and those proposed are will not be entirely alien. The proposed activity will nonetheless intensify these effects.

Overall, adverse view effects from Diamond Harbour will be moderate. Countering view effects will be the landform backdrop which is much greater in proportion (scale) to the extent of the proposed activity. Also contributing moderation is the 2km distance between the application site and residences at Diamond Harbour. This means that the site occupies a relatively small portion of the field of view as is evident in View Points 03 and 04 of the Visual Simulations attached at **Appendix 4** to the application.

View effects from Western Bays (Governors Bay environs)

Although approaching 7km distance from the application site, views of the proposed activity will be readily apparent from the Governors Bay environs. Currently views to the outer harbour are generally unimpeded, although this depends on the vantage point. The further south the vantage point is within Governors Bay the less intruded the harbour entrance will be. Conversely points further north will result in greater intrusion of the harbour entrance as shown in View Point 05 of the Visual Simulations attached at **Appendix 4** to the application and **Graphic Attachment Photograph 8**. This effect is also shown on the **Graphic Attachment Figure 7** map.

As a matter of principle, views are also affected by the elevation of the vantage point. At lower elevations it is more likely that objects will intrude horizons. This is the case here, where views of the harbour entrance from lower elevations will be partially intruded by the proposed activity. Conversely from higher vantage points the horizon is not intruded – see View Point 02 of the Visual Simulations attached at **Appendix 4** to the application.

What this means is that for those residing to the south the view backdrop will comprise for the most part landform – that is, of Godley Head – see **Graphic Attachment Photograph 9**. Because of this, the view effects will be less intrusive than for those living toward the north. That is, the landform backdrop will better absorb Port activity compared to effects arising from view intrusion of the harbour entrance.

View intrusion will however affect those residing toward the north end of Governors Bay. From vantage points here, many of which are elevated, views of the harbour entrance will be interrupted by the proposed activity, particularly by tall structures such as gantry cranes, lights, stacked containers and indeed the transient presence of ships. As View Point 05 of the Visual Simulations attached at **Appendix 4** to the application shows, view quality of the harbour entrance will be compromised to a reasonably significant extent. But as the photo-simulation shows, views of the harbour entrance will not be entirely obscured or lost. Nevertheless, there is no landscape method or intervention which can satisfactorily mitigate such effects.

While existing and future activity will affect views, a mitigating circumstance is the considerable distance of the Port from Governors Bay. Consequently, while Port activity is prominent by way of contrast between it and its wider setting, it is by no means dominant. View Points 02 and 05 of the Visual Simulations attached at **Appendix 4** to the application indicate that the harbour basin generally and the hills that enclose it remain dominant landscape features.

View effects from the Port Hills summit ridgeline

Because the application site is 'tucked' into the shoreline at the base of steep high hills views of it from most of the Port Hills summits are curtailed by intervening land forms. Somewhat contrary to expectation, from many vantage points, but not all, the site becomes less visible the closer one is to it – see **Graphic Attachment Photograph 7**. It is not visible from the nearby Gondola building or considerable stretches of the Crater Rim track for example - see **Graphic Attachment Photograph 11**. This photograph illustrates the view from the Crater Rim walkway at one point where it passes very close to the application site. Here the presence of an intervening ridge however precludes views from the track. If walkers deviate from the track however, to the edge of the bluffs overlooking the application site, they will have a very good bird's eye view of it – see **Graphic Attachment Photograph 12**.

On some other parts of the track views to the application site are more or less unimpeded. This is the case for example, from that part of the track skirting Livingstone Bay – see **Graphic Attachment Photograph 13**. From this vantage point walkers will experience clear views of the entire site. Some of the taller structures such as gantry cranes will intrude background views of Quail Island and the upper harbour from this vantage point. Similarly, some of the easternmost gantry cranes will be visible from Evans Pass – see **Graphic Attachment Photograph 10**.

Further afield views do become more widely apparent, and this is particularly the case from those hills at the head of the harbour. This is what View Point 05 of the Visual Simulations attached at **Appendix 4** to the application illustrates. In the opposite direction however, at Godley Head, views are obscured by intervening landform.

As for most vantage points around the Lyttelton Harbour basin, views from the hills are variable depending on the presence or otherwise of intervening features such as landform and vegetation. Nevertheless, there are numerous vantage points that include the summit road and various walking / cycle tracks which provide views of the application site.

As noted and with some exceptions, most of these views are distant rather than close to the application site. Consequently the extent of the application site is quite diminutive relative to the expanse of its wider harbour setting - see again View Point 02 of the Visual Simulations attached at **Appendix 4** to the application. Because elevated views are so extensive, the full variety of activity occurring in the Harbour Basin will be evident. In terms of visible landscape extent most of this by far is rural, with a relatively small portion devoted to urban activity – namely in the form of settlements. The latter generally occur on the lower hill slopes, and so the location of the proposed activity will be evidently in keeping with this pattern. In any event, the proportion of rural to urban will essentially remain unchanged. This will be particularly evident from the higher vantage points.

The backdrop for these high views is going to be the sea, although for those to the south including from Mounts Herbert and Bradley the Port Hills backdrop will also be evident. From all high viewpoints people will appreciate the full extent of the activity as they are looking down on it. Additionally they will appreciate this where all existing port activity will be readily apparent. In other words, the visual effects will be collective, and with those arising from the proposal these will appear co-located.

Overall adverse visual effects from the hill tops are considered moderately low. This is because for the most part views of the application site are generally moderated by distance. Close up views from formed roads, walking and cycle tracks are not attainable. It is acknowledged however, that people can deviate from these vantage points, and in limited places will attain closer views of the application site. A final point to note, is that potentially affected parties are transient rather than permanent residents.

Landscape effects

Landscape effects are those arising from changes to the landscape, irrespective of whether they are visible. Allied to this matter is whether the effects are enduring or permanent.

As described, the proposed activity will introduce a significant change, although of a nature not entirely foreign to the wider setting. In summary these changes will include:

a) Diversity arising from a wide range of permanent and transient structures and elements such as cranes, light towers, vehicles, containers, logs, wharves, ships, roads and buildings;

b) Prominence due to the elements and structures just described in combination with their dimensions; and in particular the vertical dimension;

c) Overall heavy industrial character of the site;

d) Dynamism arising from 24 hour activity involving the loading and unloading of ships;

e) Increased lighting (the visual amenity effects of which are addressed later and technical lighting effects by other expert reports contained in this application);

f) Contrast with the largely natural rural backdrop of the Port Hills and coastal environment east of the application site; and

g) The absence of natural features, apart from proposed planting along the eastern edge of the reclaimed land.

It is anticipated that development of port activity will be staged, possibly culminating in the late 2030s to early 2040s. Change therefore will not be radical; instead being incremental. This will allow people more time to get accustomed to change.

A further characteristic of the site is that activity is concentrated or clustered. That is, the proposed activity is not isolated or stand alone. Instead it will read as an extension of existing like for like activity. All of this is confined to a continuous narrow band spread along the Lyttelton shoreline – see again **Graphic Attachment Figure 4**. Consequently any sporadic effects are avoided. As a result port activity as a whole will appear visually coherent.

As mentioned regarding views from the Port Hills ridgeline and upper elevations, the proposed activity is in keeping with existing development patterns around Lyttelton Harbour basin. To reiterate, development is generally confined to the lower slopes and the proposed activity will be consistent with this. Nor will it have any discernible effect on the proportion of rural to urban activity.

The visual amenity effects of lighting

In considering the potential visual amenity effects arising from proposed lighting I have relied on; firstly, the lighting assessment prepared on behalf of LPC by Mr Mike Dent; and secondly, on the night time photo-simulations which accompany the application.

Regarding adverse effects on visual amenity there are three key matters to consider. One is glare or the brightness of light which can affect peoples' viewing comfort when looking toward the light source. The second concerns excess illumination of any particular vantage point so that it affects night time amenity. Over illumination of a bedroom for example, might affect sleep. The third potential adverse effect relates to congruity – that is; is the light source in an area which is expected to generate such effects? This latter consideration concerns 'associative effects' which will be discussed in more detail later.

The two night time photo-simulations (from Diamond Harbour and Governors Bay) enable before and after assessment of lighting effects. From these, it is evident that extent of lighting will increase eastwards from present activity. This is especially apparent in the Photo-simulation 03 from Diamond Harbour where lighting effects are expected to be greatest with regard to potentially affected parties. It should be noted

however that lighting already occurs within the coal handling facility which in its extent corresponds with that proposed.

Both Photo-simulations show however, that glare and illumination or light spill is significantly less than that for the existing Port. In his report Mr Dent explains the technical reasons and overall outcome for this[15]. So while there will be an overall increase in the extent of lighting which is evident in the Photo-simulations, it is evident that this will not result in unacceptably excessive illumination and glare. It is understood from Mr Dent's report that such effects will diminish with distance. Nonetheless it is acknowledged that an increase in the extent of lighting will constitute an adverse effect where the preference of potentially affected parties, it is assumed, is for less. Regarding this however, the context of proposed activity is a critical consideration determining whether lighting effects are acceptable.

The final key consideration is congruity predicated on the question of whether such lighting effects out of keeping with their setting. As discussed, existing port activity informs landscape character and amenity of the receiving environment, as does the existing environment which includes the consented reclamation. As for the day time, the night time lighting effects will appear contiguous with existing port activity, and indeed that of Lyttelton Township. The lighting effects are not isolated or alien to the setting and therefore out of keeping with it. Consequently the presence of the lighting is not unexpected and in this regard is entirely in keeping with the setting.

Associative effects

Associative effects relate whether activities in the landscape are expected to normally occur – or otherwise.

The key question concerning associative effects is; would people be surprised to encounter such an activity as that proposed in this particular setting? Or to put it another way; is the proposed activity out of keeping with its setting?

The simple answer to this is that the proposed port activity is entirely in keeping with public expectations. The latter are informed by the location and extent of existing port activity – so much so that the whole of Lyttelton is regarded as a working port

[15] In section *8.2.2 Glare*

environment. This activity is inextricably linked to the township and indeed is the reason for its existence – Lyttelton is a port town.

Secondly, the activity is historically embedded, having been established as such by early European settlers in the early / mid 1800s. Port activity has been continuous since then. Consequently there is a long and strong association of the activity with that part of the harbour in which it occurs.

The other factor signalling acceptable associative effects is what the District Plan expects, particularly with regard to policy outcomes – which will, along with other relevant statutory documents, be addressed in more detail later. Essentially, the operative Plan expects the port to grow eastwards on reclaimed land with a view to accommodating port activity expansion (see Objective 13.8.2.1 and supporting Policy 13.8.2.1.1). The resulting change in landscape character is therefore deemed acceptable. In terms of its location and extent, consequent port activity is therefore in keeping with this expectation.

Overall, it should not be surprising to anyone to find port activity, such as that proposed, in the location of the application site landscape setting. Further, it is operationally logical that this can only occur at the point where the land meets the sea.

For the preceding reasons it is concluded that there will be negligible, if any, adverse associative landscape effects.

4 STATUTORY LANDSCAPE MATTERS

In this section the following statutory documents (identified earlier) are considered in particular where they concern landscape outcomes:

- Christchurch District Plan;
- CRPS and RCEP;
- New Zealand Coastal Policy Statement; and
- MIMP.

The focus is on the Christchurch District Plan as it is the operative plan that must give effect to the others listed above (which pertain to more national and regional matters).

Christchurch District Plan

The provisions of most relevance are those listed in Chapter 13.8 concerning the Special Purpose (Lyttelton Port) Zone. As mentioned, the application site is not currently zoned, and so the Plan Standards that apply to the Port Zone do not yet apply to what is proposed. Nevertheless, the Standards do provide a useful guide as to what effects may non-fancifully occur within the application site assuming it likely to be included in the Port Zone at some point in the future. The Objectives and Policies however, (including those in the other statutory documents addressed) do provide more concrete direction as what effects are expected to occur within the area generally. The following discussion addresses those of relevance to landscape outcomes.

13.8.2.1 Objective - Recovery and growth of Lyttelton Port

a. The recovery of the Lyttelton Port is enabled in a timely manner:

i to restore its efficient and effective operation, and enable growth and development to support its role as strategic infrastructure in the recovery of greater Christchurch;

The objective clearly recognises the prospect of growth at the Port. It follows therefore that landscape character will change as a result. Or to put it another way, the Objective does require that the location and extent of Port operations remain static or is maintained in its current state. Supporting Policy 13.8.2.1.1 to follow specifically indicates the direction of growth.

13.8.2.1.1 Policy - Elements of recovery

a. Recognise that the repair, rebuild and reconfiguration of Lyttelton Port entails the progressive phased movement east of port operations resulting in:

i operational port activities being established on reclaimed land in Te Awaparahi Bay;

This policy unequivocally expects growth to occur east into Te Awaparahi Bay and that this shall occur on reclaimed land. It is understood that reclaimed land includes all of that consented irrespective of whether it has yet been implemented.

The policy therefore specifically identifies the direction, extent and location of growth and consequently where landscape change will take place. The nature of that change will involve reclamation and the port activity it supports. The proposal and its landscape effects will be entirely consistent with the expectations signalled by this policy.

13.8.2.1.3 Policy - Port operation, use and development

a. iii avoiding the creation of esplanade reserves or esplanade strips within the Specific Purpose (Lyttelton Port) Zone;

iv providing for expansion of the Port operational area onto reclaimed land in Te Awaparahi Bay;

The avoidance of esplanade strips or reserves means that the public will not have land based access to the application site. As a result they will not be able to experience its landscape setting, nor the close up effects on it arising from the proposed activity. Such an outcome is reinforced by *13.8.2.3.2 Policy - Access and connectivity* which seeks to restrict public access to operation areas, while providing for it in recreational areas such as at Dampier Bay and potentially the Inner Harbour.

Policy 13.8.2.1.3(iv) simply reiterates the aspirations of Policy 13.8.2.1.1(a)(i) involving the expansion or port activities eastwards.

Overall, the preceding policies give a very clear indication that firstly, it is expected that the port will expand, and secondly that this will occur east onto reclaimed land at Te Awaparahi Bay. In giving this direction, the policies infer changes to landscape character in favour of port activity. As the policies are operative and known to the public, these landscape changes and visual effects arising from them can only be acceptable.

Nevertheless, the following objective seeks to manage effects, which are now discussed.

13.8.2.2 Objective - Effects of Lyttelton Port recovery and operation

a. The recovery of Lyttelton Port, including its operation, is managed to:

i reduce the potential for adverse effects on the amenity of the wider Lyttelton township during recovery and repair, while recognising the

inherent nature of adverse effects associated with large scale construction projects;

ii mitigate adverse effects on the wider Lyttelton township and environment generated from on-going port operations;

iii minimise adverse effects of development on mana whenua cultural values;

13.8.2.2.1 Policy - Recovery opportunities to reduce adverse effects

a. Ensure activities undertaken within the Specific Purpose (Lyttelton Port) Zone, including to enhance and reconfigure Lyttelton Port infrastructure and operations, are designed to reduce existing and minimise new adverse effects generated within the Port operational areas.

To achieve this objective, following policies and the relevant Plan standards recognise that amenity effects arising from port activity vary depending on where it occurs. This is particularly so where activity occurs alongside Lyttelton township and recreational area at Dampier Bay (see 13.8.2.3.1 Policy - Dampier Bay development).

In such situations the amenity effects of port activity is more intensively managed in these areas. Outside of these areas, the management of amenity effects is less important. This is reflected in more permissive standards for port activity which includes activity within the application site. Essentially therefore, the application site and activity within is recognised as being in the least sensitive area regarding effects on amenity. Largely this is because the site does not directly adjoin the township or any residences, and is located so as to minimise visual intrusion.

The Objective also mentions effects on mana whenua cultural values. This will be discussed in more detail with reference to the MIMP where they concern landscape outcomes.

13.8.2.2.1 Policy cited above seeks to '…*reduce existing and minimise new adverse effects generated within the Port operational areas.'* While it is not practical for operational reasons to mitigate effects via usual methods of landscaping, other means of minimizing them are employed. This largely comes about through avoidance, the chief means being location. Regarding this the application site is located in such a way that renders it least visible from sensitive vantage points such as nearby residential areas. As described it will be visible from certain such areas, but there is nothing practical that can be done to lessen effects further. In other

words, the minimisation of effects is maximised. Regarding visual effects, there is no better site than that accommodating the proposed port activity.

Turning to the reduction of existing adverse effects, it is clear from the District Plan that it is intended to enhance the Inner Harbour and Dampier Bay areas for recreational and general amenity purposes. It is understood that the proposed activity contribute to implementation of this enhancement where existing Port activities are transferred to the application site.

In summary it is clear that the objectives and policies acknowledge expansion of Port activities eastward into Te Awaparahi Bay. But they do so with the proviso that adverse amenity effects, among others, are minimised. As discussed, the reclamation and proposed activity will be located in such a way to lessen adverse effects as much as is practical. Further, the policies recognise there is an amenity hierarchy whose apex centres on Dampier Bay. The application site is located at the opposite end of the spectrum – that is, in the area exhibiting least amenity.

Overall, it is concluded that the proposed activity is not contrary to those objectives and policies relevant to landscape amenity outcomes for the application site and its immediate surrounds.

Canterbury Regional Policy Statement (CRPS)

The CRPS includes policies that specifically recognise the functioning of Lyttelton Port. Of particular relevance is Policy *8.3.6 Regionally significant infrastructure.* It firstly sets out to:

1. *provide for the expedited recovery of the Lyttelton Port, including its repair, rebuild and reconfiguration.*

This particular provision signals change – that the Port will be repaired, rebuilt and reconfigured. As a result, the landscape character of the Port is not going to be static or remain as it is. This can be taken as the overarching principle where it concerns the Ports' character.

The policy then becomes more specific as to where this change will occur. Of relevance it states:

2. *provide for a range of associated activities that have an operational requirement to be located in that environment;*

and then more specifically…

> *that the recovery of the Lyttelton Port includes a container terminal being established in Te Awaparahi Bay on up to 34 hectares of reclaimed land.*

So the extent and location of the proposed activity is identified. The proposed activity and the subsequent landscape changes are consistent with this. These provisions further intimate that there are no better alternative sites able to accommodate such change. So a clear picture emerges of where this landscape change and its effects on amenity will occur. As part of that though, further policy provisions seek:

a. *the integrated management of Whakaraupō / Lyttelton Harbour in the recovery and future development of the Lyttelton Port, including provision for the many ecological, cultural, recreational and amenity values and uses of that area.*

This points to the positive effects to emerge from the proposal – namely amenity enhancement of Dampier Bay and the Inner Harbour. In other words, the proposed activity will enable this to occur and so better integrate the Port with the Lyttelton Township.

While Policy 8.3.6 focusses (among other matters) on the Port, the preceding Policy 8.3.3 seeks:

Management of activities in the coastal environment
Within the coastal marine area provide a framework for:

1. *the use and occupation of coastal space;*
2. *the use and development of the natural and physical resources of the coastal marine area;*
3. *the extraction of sand, shingle, shell, or other natural materials;*
4. *the emission of noise;*
5. *activities on the water and on the foreshore and seabed;*
6. *protecting the values of the coastal environment*

while avoiding, or where this is not practicable, remedying or mitigating adverse effects within the coastal environment on:

a. *the life-supporting capacity and/or mauri of coastal ecosystems and the natural processes that sustain them;*
b. *indigenous species, areas of significant indigenous vegetation and significant habitats of indigenous fauna;*
c. *natural character (including associated natural processes), outstanding natural features and outstanding natural landscapes;*
d. *amenity, cultural and recreational values;*
e. *coastal areas of cultural significance identified in consultation with Ngāi Tahu as tāngata whenua;*

f. the health and safety of people;
g. historic heritage values, including historic heritage and historic cultural landscapes;
h. surf breaks of national significance;
i. *the efficient and effective operation, maintenance and development of regionally significant infrastructure or other commercial maritime facilities.*

While not all of the matters flagged in the Policy are landscape related, they are included for completeness. Among matters of relevance are the following:

b. natural character (including associated natural processes), outstanding natural features and outstanding natural landscapes;

d. amenity, cultural and recreational values

g historic heritage values, including historic heritage and historic cultural landscapes;

As discussed earlier, the proposed activity will have no effect on outstanding natural features and landscapes (ONF and ONL). While the hills above the application site outside of the Special Purpose (Lyttelton Port) Zone are ONL, they are sufficiently high enough to avoid being affected by the proposed activity.

The effects on amenity have been discussed.

On the matter of historic cultural landscapes, the application site does adjoin the WWI and WWII Battery Point defence structures (gun and searchlight emplacements, observation posts, magazine and so on) – see again **Graphic Attachment Photograph 1** . None of these historic features and their immediate setting will be physically affected by the proposal. Eastward views to them however, particularly from the water, will be obscured by cranes and stored containers. This will not be the case from other quarters however.

Overall, like the District Plan, the CRPS gives unequivocal clear direction as to where it expects Port activity to occur and to its extent. Implicit in the provisions is acceptance of effects including those on amenity and the landscape. The proposed activity is therefore consistent with these anticipated outcomes, including the landscape changes that result.

Regional Coastal Environment Plan (RCEP)

Referred to in the discussion to follow is Chapter 10 amended as directed in the Lyttelton Port Recovery Plan (2015)[16]. In a number of its provisions is a requirement to consider the potential effects of activity on amenity. These are addressed as follows.

Objective 10.1 – Recovery of Lyttelton Port states:

> *The expedited recovery of Lyttelton Port, including its repair, rebuild and reconfiguration ,is provided for as a matter of priority, while recognising the relationship with and managing any adverse effects of recovery activities on the ecological, recreational, heritage, amenity and cultural values of Whakaraupō / Lyttelton Harbour.*

Some of the policies that set out to achieve the above Objective signal landscape effects while taking into account those on amenity. As a reminder, landscape effects are those that result in changes to the landscape irrespective of whether they are visible.

Regarding landscape effects, *Policy 10.1.1. – Elements of recovery* flags, as it states:

> *1) The progressive phased movement east of port operations including:*
>
> *a) Establishing a container terminal on a maximum of 34 hectares of reclaimed land in Te Awaparahi Bay; and…*

Clearly this part of the Policy anticipates change to the landscape east of existing activity as an environmental outcome. Further it expects such change will involve the expansion of port activity onto the reclaimed land. Thus the policy describes expected landscape effects to be of a certain nature, as opposed to those arising from any other particular land use. The proposed activity and its effects on the landscape will be consistent with this outcome. Similarly *Policy 10.1.3 – Occupation and access* also anticipates occupation of the Coastal Marine Area (CMA) and structures (the reclamation areas) by port activities. The unequivocal outcome is that the ultimate landscape of the CMA and subsequent reclaimed land will be that informed by future port activity.

No mention is made of visual amenity effects in these particular policies, although reference is made regarding enhanced amenity at Dampier Bay arising from its

[16] Section 4.2

redevelopment[17]. It is understood that future development within the reclamation will enable this.

Policy 10.1.4 – Lyttelton Harbour Relationships states*:*

> *Recognise that the recovery of Lyttelton Port, including reconfiguration, will result in some adverse effects on the environment that cannot in all circumstances be avoided or mitigated, but that the owner or operator of Lyttelton Port will undertake recovery activities while ensuring that:*

To this end the policy goes on to state:

> *Any adverse effects on the ecological, recreational, heritage, amenity and cultural values of Whakaraupo / Lyttelton Harbour are minimised as far as practicable; and…*

In much the same vein, *Policy 10.1.6 – Structures and activities* sets out to:

> *Enable the erection, placement, reconstruction, alteration, demolition and removal of structures, provided the adverse effects on the environment are avoided, remedied or mitigated, where practicable.*

As discussed, with regard to landscape and visual effects there is little scope for remediation or mitigation. This is because the scale, location and extent of proposed activity are dictated by operational requirements and the anticipated demand for port activity. At best, the location of the application site is such that it contributes minimisation of visual effects for the reasons addressed earlier. Realistically and practically however, not a lot can be done landscape wise to lessen adverse visual effects further.

In summary, like the District Plan the RCEP specifically anticipate expansion of Port activities into Te Awaparahi Bay with the proviso that landscape amenity effects are given regard to and appropriately managed and that any of those that are potentially adverse are minimised. As part of this, integrated management of the entire Port environment is encouraged. As discussed, the proposed expansion will better enable this, particularly with regard to enhanced integration of the Inner Harbour area with Lyttelton township.

New Zealand Coastal Policy Statement

While given effect by the CRPS and the Christchurch District Plan, there are a number of landscape related policies that are relevant to the proposed activity. Of

[17] Policy 10.1.1.(1) (c)

particular relevance is Policy 6 concerning *'Activities in the coastal environment.'* Regarding landscape matters are the following clauses:

(h) consider how adverse visual impacts of development can be avoided in areas sensitive to such effects, such as headlands and prominent ridgelines, and as far as practicable and reasonable apply controls or conditions to avoid those effects;

(i) set back development from the coastal marine area and other water bodies, where practicable and reasonable, to protect the natural character, open space, public access and amenity values of the coastal environment; and

As discussed the location of the application site avoids headlands or prominent ridgelines. Nonetheless its presence will have some visual effect on Godley Head when viewed from certain points at Governors Bay – see again **Graphic Attachment Photograph 8.** As mentioned, little can be done to mitigate this for those parties, namely residents, who will be affected. Apart from water borne parties, no one else will be visually affected in this regard.

Regarding setback of activity, it is understood that this is not operationally possible. This is because Port activity involves the transfer of goods from ship to shore which can only occur at the land / sea interface. The natural character and amenity of the shoreline is in any case absent due to the reclamation and activity it supports.

Policy 13 concerns '*Preservation of natural character'.* Of relevance to the application site are the following clauses:

1. To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use, and development:

a. avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character; and

b. avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment; including by:

c. assessing the natural character of the coastal environment of the region or district, by mapping or otherwise identifying at least areas of high natural character; and

d. ensuring that regional policy statements, and plans, identify areas where preserving natural character requires objectives, policies and rules, and include those provisions.

Closely allied to Policy 13 is Policy 15 which addresses '*Natural features and natural landscapes'.*

a. *avoid adverse effects of activities on outstanding natural features and outstanding natural landscapes in the coastal environment; and*

The Lyttelton Port Zone adjoins a range of landscape overlays which include:

- Rural Amenity Landscape (RAL);
- Natural Character in the Coastal Environment (NCCE);
- Area of at least High Natural Character in the Coastal Environment (HNC); and
- Outstanding Natural Landscape (ONL).

The underlying zoning is Open Space Natural (ON).

As these areas have been identified, assessed and incorporated into the District Plan, Policy 13 clause 1 (b) (c) (d) and the equivalent Policy 15 clauses have been implemented and therefore given effect to. Consequently the Lyttelton Port Zone and the application site lies outside of these landscape overlay areas. As a result none of the proposed activity will have a direct effect on these.

But from certain vantage points the proposed activity will to a point, intrude on views of these landscape overlay areas. As a result there will be some loss of their appreciation which cannot be mitigated. This is notwithstanding the fact that much of the immediate backdrop has been significantly modified due to roading and associated benching of the hill side immediately alongside the application site. Otherwise, to a degree the avoidance of effects is achieved where proposed activity is effectively clustered or co-located with existing Port activity. This concentration of activity therefore avoids the intermittent dispersal of effects.

While it is not practically possible to mitigate effects on view intrusion, the Port Company has and will continue to re-vegetate certain areas of the backdrop landscape. This will result in enhancement of natural character that will to some extent counter diminished view quality.

Mahaanui Iwi Management Plan

In Section 6.6 *Whakaraupo* of the Mahaanui Iwi Management Plan Issue WH2 specifically addresses Lyttelton Port Company activities. One of the issues concerns *(a) Inner harbour activities, and expansion of these activities.*

It appears the focus of this provision is a desire for tangata whenua to work closely with LPC, particularly with regard to the effects of activity within the water body of the harbour itself. Of particular policy concern are the cultural effects of pollution and sedimentation (WH24 and WH25). No specific landscape issues appear to be identified, particularly with regard to land based activities such as those proposed. If they are of concern to tangata whenua, then these will be addressed when responding to submissions.

CONCLUSION

As is the case with virtually all activity potentially affecting the landscape, context is key to determining whether effects are acceptable or otherwise. Context is always predicated by the character of the existing environment and the statutory environment.

In this case it is clear that the latter recognises expansion of Port activities east into Te Awaparahi Bay. And that the extent of this is also identified, since it is fixed as part of the existing environment by the consented reclamation. So in effect, the changes to the landscape and amenity of the application site and its immediate setting are expected.

In the grander scheme of things, this will have little effect on the proportion of apparent differing land uses – namely rural and urban - within Lyttelton Harbour basin. Nor will relationships between land uses and their landscape expression change. The application site remains integrated with Lyttelton township, although it is sufficiently removed to minimise adverse amenity effects. Further, because the proposed activity will maintain continuity with existing activity, the overall effect is one of visual coherence. That is, all activity will appear as one rather than as unrelated disparate nodes spread along the shoreline.

The effects on natural character, especially that of the shoreline and hill side backdrop, will be neglible. This is mainly because these areas are already affected by existing reclamation and the Port activity it accommodates.

As the photo-simulations show, the proposed activity will, to varying degrees, result in appreciable visual effects, as the structures and elements both permanent and transient are collectively substantial. They will for all intents and purposes be an extension of existing effects – that is, more of the same spread along the shoreline. As intimated however, the extent of these effects will vary depending on the position of vantage points relative to the application site. Further variation will result on the nature of the backdrop – whether it is landform or the sea.

Regarding this, it is evident that for certain residential areas – namely Diamond Harbour and western Lyttelton (Governors Bay) - will experience some loss of view quality. Within the envelope set by the District Plan bulk and location standards however, and assuming the application site will be incorporated into the Port Zone at some point in the future, there is little that can practically be done to avoid, remedy and mitigate such effects. As discussed, this is because the location and extent of effects are dictated by operational needs – refer to the earlier discussion concerning Regional Coastal Environment Plan policies 10.1.4 and 10.1.6.

Concerning visual effects however, there really is no better location for the proposed activity. That is, the location contributes significantly to the avoidance of effects, but for operational reasons it cannot eliminate them. In other words, the visual and landscape effects are minimised as much as is practically possible. It is worth noting too that as development is staged these effects are going to be incremental, which will enable people to become accustomed to them over time.

For the above reasons it is therefore concluded that the proposed activity will result in less than minor landscape and visual effects when the application site setting and statutory context is taken into account.

Dated: 17 July 2019

Andrew Craig – *Landscape Architect*

Graphic Attachment - Landscape

Prepared for: Lyttelton Port Company
Christchurch

Prepared by: Andrew Craig
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Date: June 2019

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Map source: ECAN Canterbury Maps

Figure 1 *The location and extent of the application site within the context of its immediate setting.*

Map source: Google Earth

Figure 2 *The application site in its wider setting*

Photo – points denoted

Photograph 1 *The current character of the application site. The dotted line indicates the ultimate extent of the consented reclamation.*

Source: Christchurch City Council; *Walking on the Port Hills*. 2014

Figure 3 *The application site in relation to nearby reserves. The land immediately adjoining the site belongs to the Lyttelton Port Company.*

Photograph 2 *The application site setting showing the pattern of development on the lower slopes of the Port Hills and high natural character of the land above and east of the application site.*

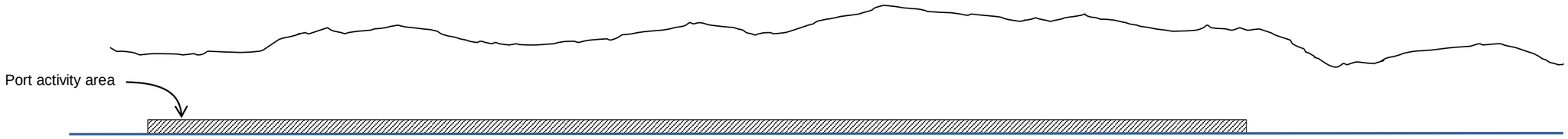


Figure 4 *The proportionate extent of Port activity showing its very elongated horizontal form. This diagram is based on what can be seen in Photograph 2. It should be noted that gantry cranes and light poles will intrude above the Port activity shown above. See also Photo-simulations 03 and 04.*

Photograph 3 *Existing container cranes intrude the ridgeline at Adderley Head as viewed from Governors Bay Road above Naval Point*

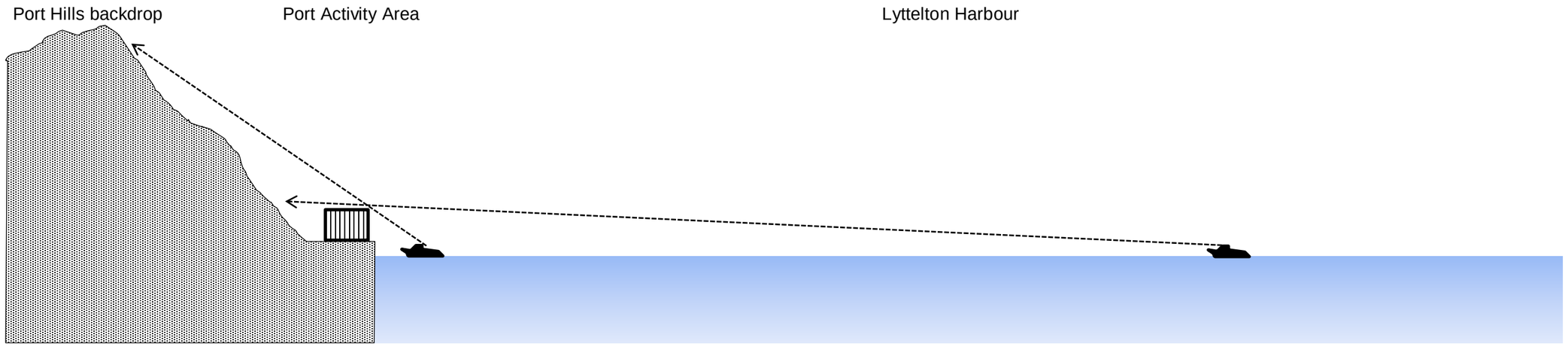
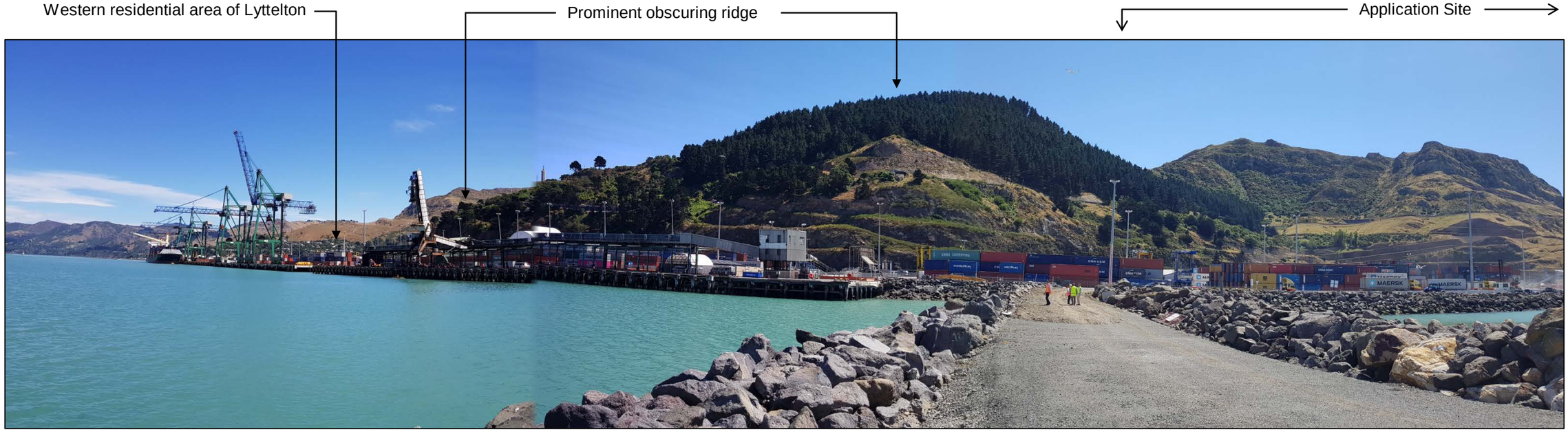


Figure 5 *Schematic cross section (nts) showing how views will vary from water borne vantage points depending on proximity in relation to the port activity area. Generally, the closer the vantage point is to the activity area the more obscured the backdrop becomes.*



Photograph 4 *The prominent pine covered ridge will obscure the proposed activity area from most of Lyttelton township, except from its western most quarter. Also see photograph 5.*

Photograph 5 *From the vicinity of Bridle Path / Harmans Road the ridge will completely obscure the application site for those residing west of this vantage point.*

Photograph 6

The application site virtually disappears behind the intervening ridge for those residents west of this point

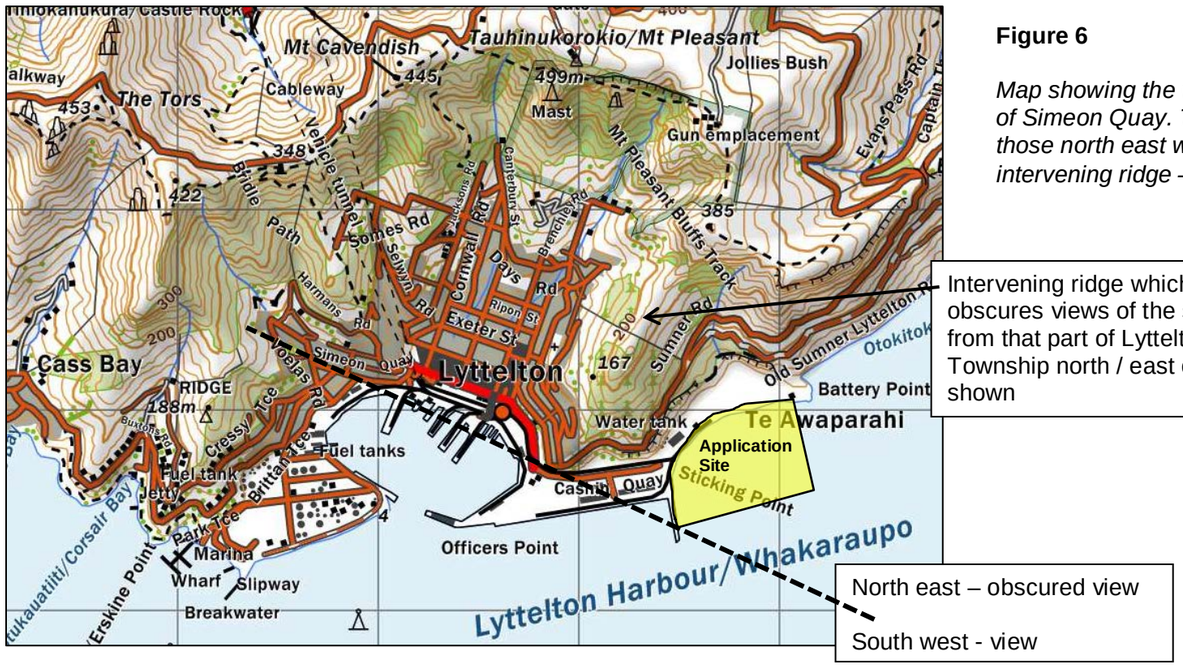


Figure 6

Map showing the view boundary for those living north east and south west of Simeon Quay. Those living south west will see the application site, while those north east will not. The reason for this is the presence of an intervening ridge – shown on the map.

Photograph 7 *The prominent pine covered ridge will obscure much of the proposed activity area from* those *publically accessible vantage points on the Port Hills summit that are relatively close to the site. The tops of gantry cranes and lights may be visible to the left of those visible in the photograh.*

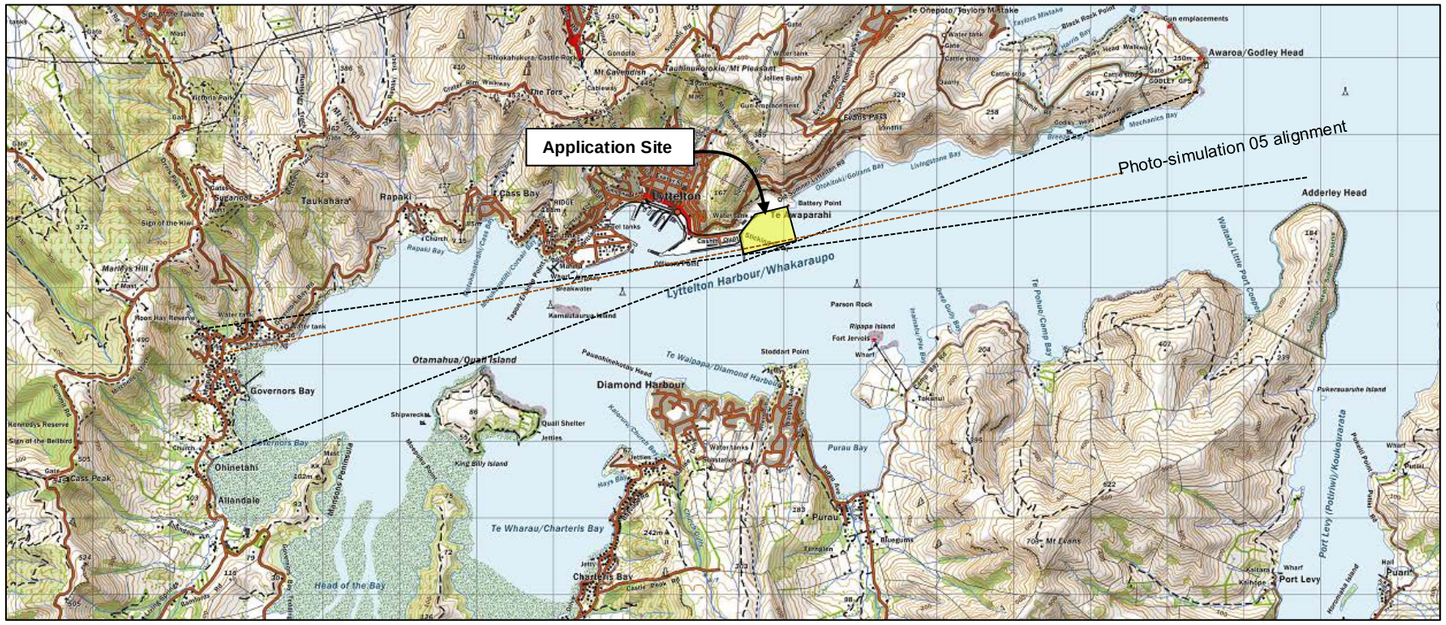
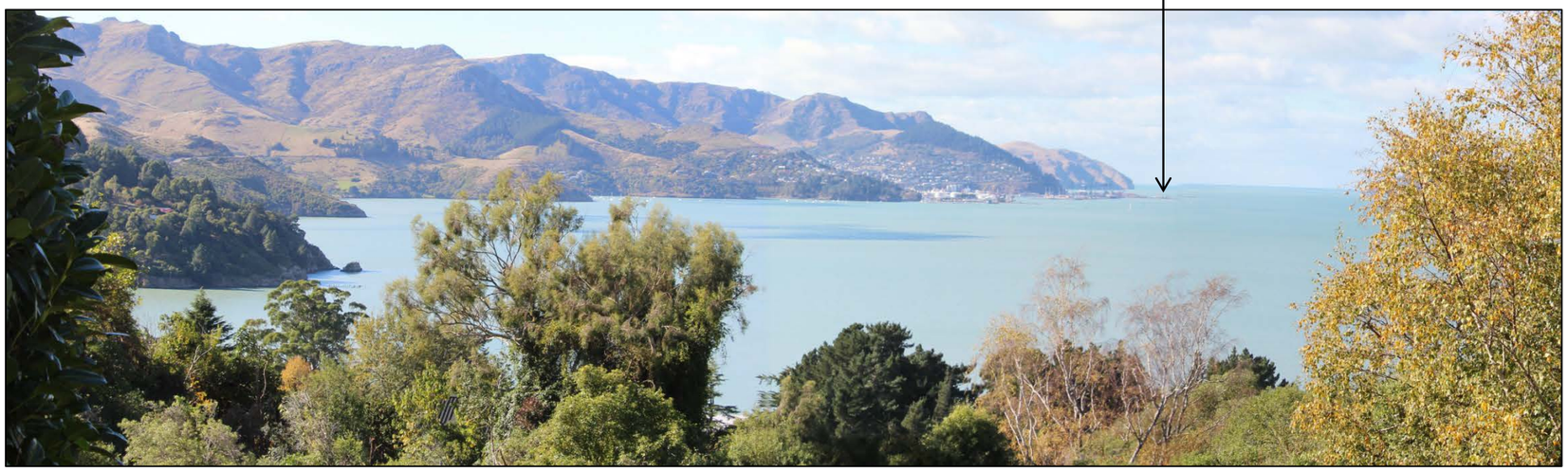


Figure 7

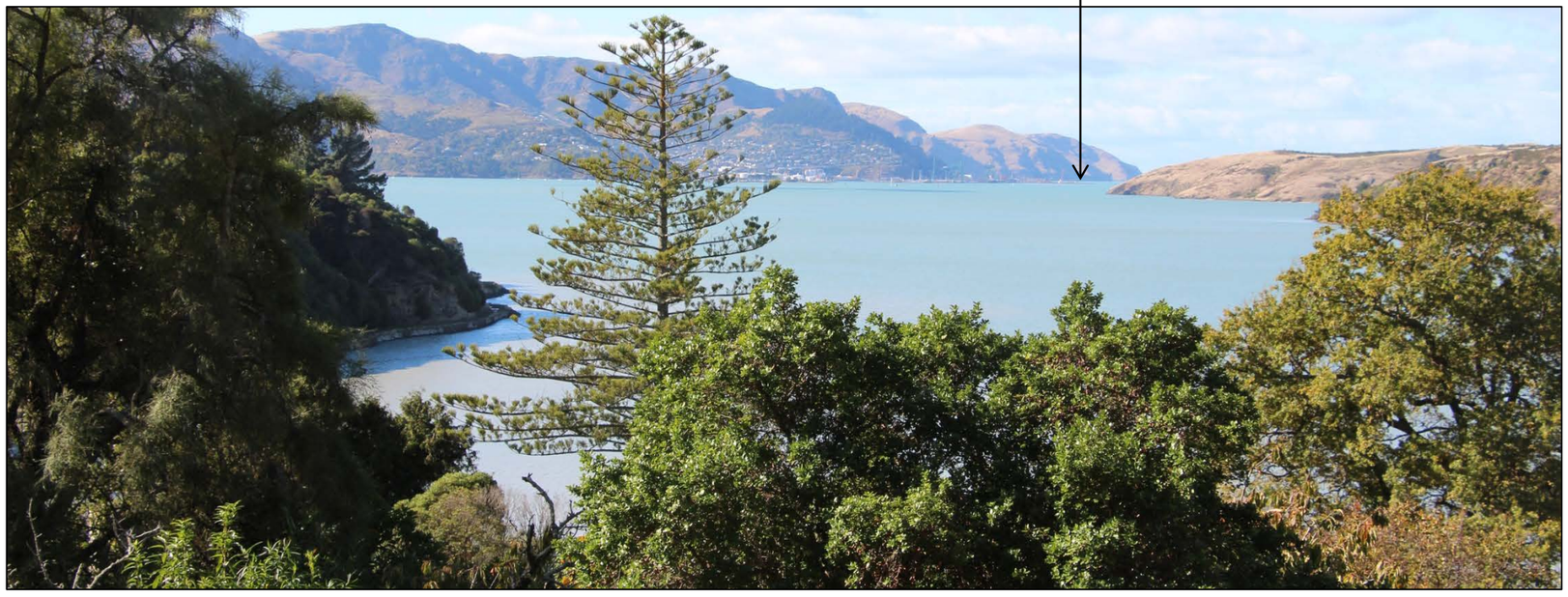
Showing the range of view intrusion from the northern and southern parts of Governors Bay. The red line represents the alignment of Photo-simulation 05.

Application site at its southernmost extent into the harbour



Photograph 8 *The view from roughly the mid- point of Governors Bay showing the Godley Head landform backdrop. All proposed activity will occur left of the arrow where the horizon will be intruded by taller structures such as gantry cranes and light poles.*

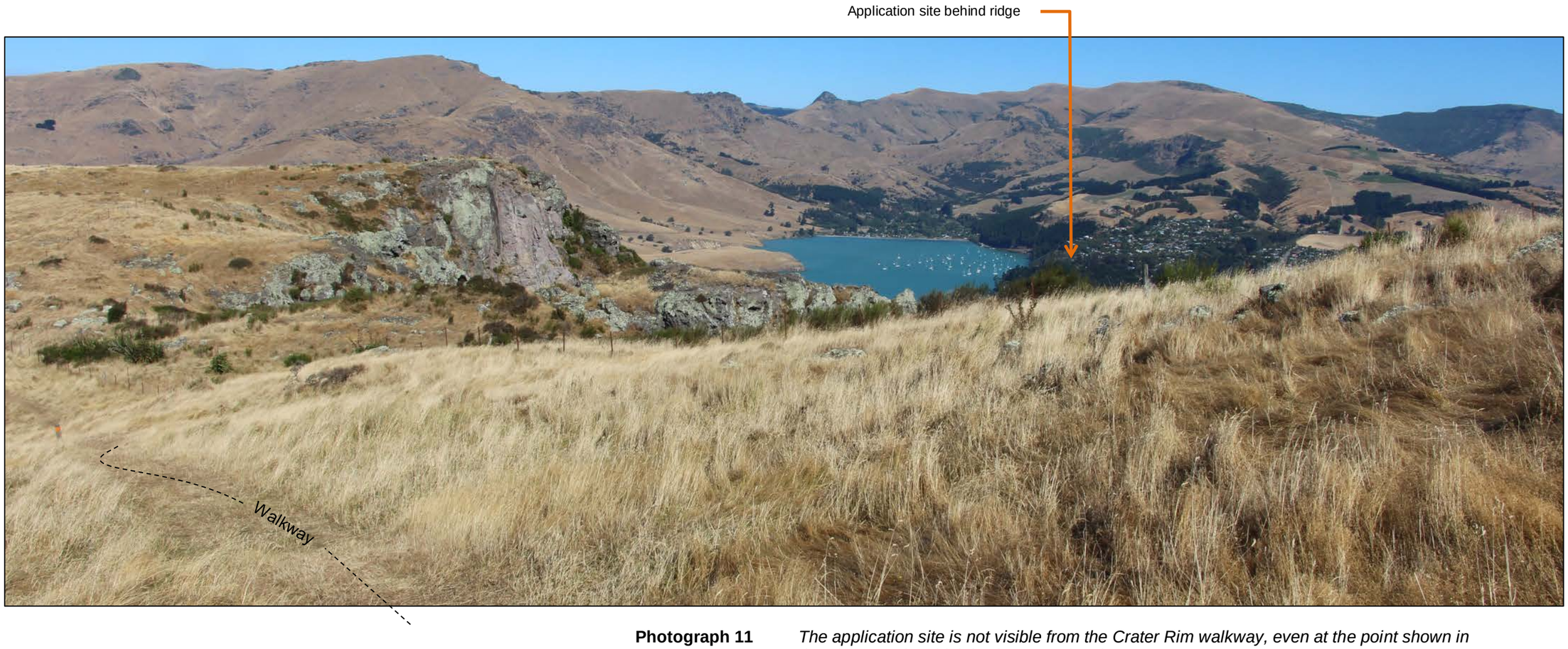
Application site at its southernmost extent into the harbour



Photograph 9 *The view from the southernmost part of Governors Bay (above Ohinetahi) showing the Godley Head landform backdrop. All proposed activity will occur left of the arrow.*

Seaward extent of proposed Port activity

Photograph 10 *It is anticipated that the tops of the easternmost gantry cranes will be visible from Evans Pass just above the road – that is, right of the arrow.*



Photograph 11 *The application site is not visible from the Crater Rim walkway, even at the point shown in the photograph, which is closest to the site.*

Photograph 12 *A clear view is attained from atop the bluffs overlooking the application site. The application site is represented by the dashed line.*

Photograph 13 *A clear view of the application site is attained from the Crater Rim walkway above Livingstone Bay. The seaward extent of the application site is represented by the dashed line.*

APPENDIX 6

NOISE

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LYTTELTON PORT OF CHRISTCHURCH

TE AWAPARAHI BAY PROJECT

ASSESSMENT OF NOISE EFFECTS

Report No 19102

Prepared for:

Lyttelton Port of Christchurch
Lyttelton
12 June 2019

Prepared by: .....

Nevil Hegley

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1. INTRODUCTION

This report assesses the noise effects of the proposed operation of a new container terminal on the Te Awaparahi Bay Reclamation A and B on Lyttelton Township and Diamond Harbour. The area of the proposed development is shown on Figure 1.

Figure 1. Te Awaparahi Bay Reclamation

The report addresses the cumulative noise effects from the operation of all existing port activities currently occurring plus those associated with the operation of a container terminal and other port activities on Reclamation A and B.

2. DESIGN CRITERIA

Rule 13.8 of the Christchurch City District Plan zones the Lyttelton Port of Christchurch as a Specific Purpose (Lyttelton Port) Zone. Appendix 13.8.6.7(c) Port Noise Management Plan requires the owners and operators of the Port of Lyttelton in conjunction with the Port Liaison Committee to:

i. *Prepare and implement the Port Noise Management Plan and the Plan for Acoustic Treatment and Purchase of Dwellings.*

ii. *Develop noise modelling, monitoring and measurement procedures that follow the concepts in NZS 6809: 1999 Acoustics – Port Noise management and land use planning, for the purpose of preparing a Port Noise Contour Map that shows contour lines in 1dB increments from 55dB L_{dn} to 70dB L_{dn} inland of the Specific Purpose (Lyttelton Port) Zone. This Port Noise Contour Map is to be attached to the Port Noise Management Plan and is to be regularly updated as required by the Port Liaison Committee and at the expense of the owners and operators of the Port of Lyttelton. The model for the Port Noise Contour Map shall be reviewed at least once every two years to determine whether it needs to be updated.*

iii. *Develop methods to monitor port noise, in order to verify the port noise contour lines.*

iv. *In developing the Port Noise Contour Map, recognise that noise from water and grit blasting at the dry dock facilities is excluded and instead noise from the water and grit blasting operation is managed by controlling the hours of operation.*

The following sets out the noise effects of the proposed development on the existing noise contours. It is noted the noise contours, as set out in Appendix 13.8.6.7(c) (ii) above, are due to be reviewed to determine if they need to be updated.

3. PREDICTED NOISE LEVEL

Noise from all existing activities has been included in the modelling with the addition of the work associated with the operation of a container terminal and other port activities on Reclamation A and B as shown on Figure 1.

The noise predictions have assumed the modified existing port activities, such as no activities at No 7 Wharf or at the Low Level Breastwork although there is a ship at the Oil Berth. In addition to the existing facilities the proposed additional facilities that will be operating in the reclamation area include:

- Ship noise;
- Cruise ship
- Rail noise from the end of the existing rail designation into the coal yard;
- Coal conveyor;
- Bulldozer and loaders in the coal yard;
- Trucks transporting containers to and from the container terminal;
- Reefers;
- Mobile container handling; and
- Container cranes

The noise from the Lyttelton Port and proposed extension has been predicted using the Brüel & Kjær Predictor programme v2019.02. This is a powerful environmental noise calculation software package that uses a digital terrain model using a 2m ground contour with each of the noise sources modelled at their various locations. Calculations have been undertaken in accordance with the requirements of ISO 9613-1/2 Acoustics – Attenuation of Sound during Propagation Outdoors. For this project a grid varying between 10m – 50m has been adopted to calculate the noise contours. The noise from the port operating is calculated at each grid point and the noise contours have been drawn based on these levels. All calculations have been undertaken assuming a slightly positive meteorological effect at the receiver position as required by NZS 6802:2008 Acoustics - Environmental Noise, ground absorption of 0.7 on land and 0.05 across the water with a receiver height of 1.5m.

Figure 2 shows the predicted 60dBA and 65dBA L_{dn} noise contours when including the above additional port activity. Also included on Figure 2 are the noise contours that are currently adopted in the Port Noise Management Plan.

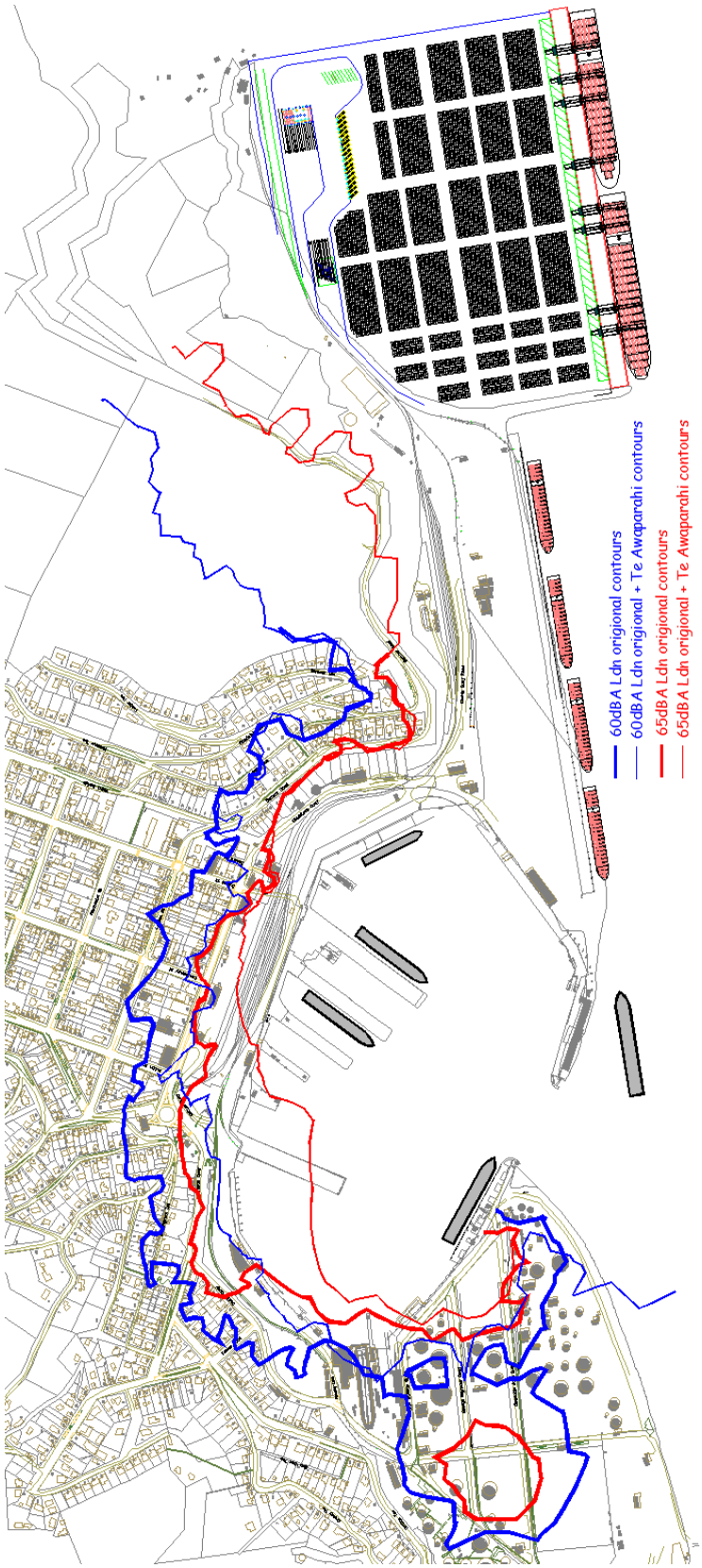


Figure 2. Predicted noise contours - dBA L_{dn}

Inspection of Figure 2 shows no new properties fall within the 65dBA L_{dn} contour. However, two new properties (14 and 16 Reserve Terrace) now fall within the 60dBA L_{dn} contour as a result of the cumulative noise from the current port operations plus the effects of the proposed port activities in the Te Awaparahi Bay Reclamation A and B areas. As a result of the reduced activities in the western area of the Port there are also a number of properties where the noise exposure has reduced. However, as set out in Appendix 13.8.6.7(c)(iv) of the Port Noise Management Plan, the noise from water and grit blasting in the dry dock facilities has been excluded from the port noise contouring. Noise from this work will remain similar to the level currently experienced.

4. DIAMOND HARBOUR

In addition to the noise effects in Lyttelton the noise across the water in Diamond Harbour has been calculated at 53dBA L_{dn}, which is similar to the level currently experienced from Lyttelton Port.

As set out in NZS 6809:1999 Acoustics - Port Noise Management and Land Use Planning, noise levels that are below 55dBA L_{dn} are considered to be to be within a reasonable level for the residents. Taking into account it takes a doubling of the noise sources to increase the noise level by 3dBA L_{dn} a level of 53dBA L_{dn} is considered to be well within a reasonable level and will not have any adverse noise effects on the residents in Diamond Harbour.

5. CONCLUSIONS

As a result of a change in the way the port has been operated since the earthquake, the noise from the port will be reduced for residents in the Godley Quay area

The noise from the addition of port activities at the Te Awaparahi Bay Reclamation A and B areas will add two dwellings in Reserve Terrace to within the 60dBA L_{dn} noise contour as shown in Figure 2, otherwise there will be a small reduction to the same level for all other residents.

The cumulative effect to the existing port noise and noise from the Te Awaparahi Bay Reclamation A and B areas will be well within a reasonable level for resident in Diamond Harbour.

APPENDIX 7

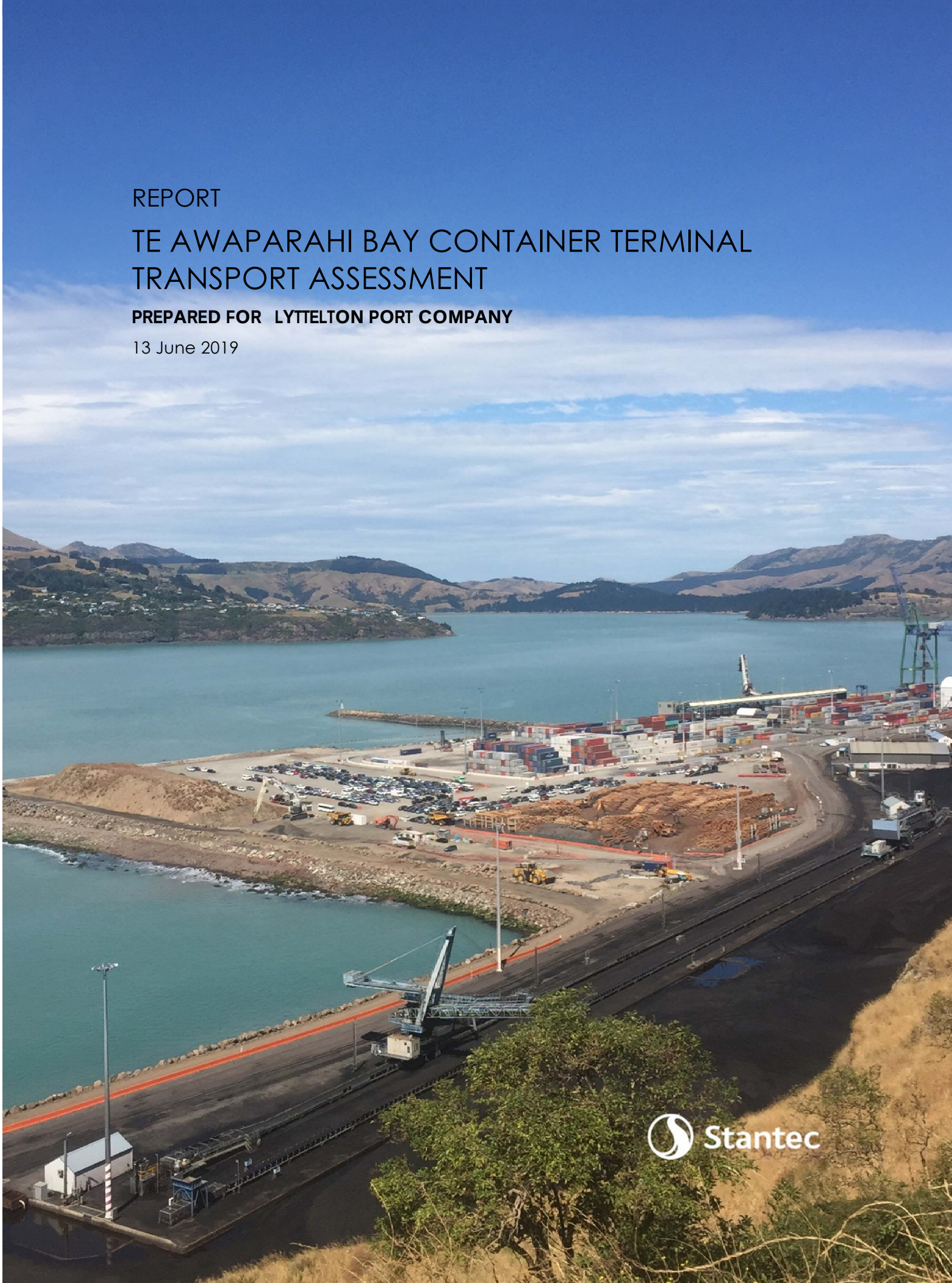
TRAFFIC

REPORT

TE AWAPARAHI BAY CONTAINER TERMINAL TRANSPORT ASSESSMENT

PREPARED FOR LYTTELTON PORT COMPANY

13 June 2019



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Executive Summary

Introduction

Lyttelton Port Company (LPC) is seeking landuse consents for use of existing and future reclamation areas at the eastern end of Lyttelton Port of Christchurch (the Port), at Te Awaparahi Bay. This will allow the Port operations to be reconfigured so that the existing container terminal can be expanded and set up more efficiently.

The Christchurch District Plan includes policy direction around development of the area, and transport related rules specifically exclude traffic generating activities in the Port area from the normal assessment of traffic related effects. The Port forms part of the Strategic Transport Network, and comprehensive assessment has previously been undertaken as part of the Lyttelton Port Recovery Plan (LPRP) process to establish anticpated transport related effects of Port expansion.

Even though the traffic generation is otherwise permitted, in this case the Proposed Container Terminal is a Discretionary Activity and a Transportation Assessment has been prepared to describe the transport environment, and potential effects of future development. Given the extent of assessment provided with the LPRP, this Transport Assessment is more focused on consideration of how local intersections within Lyttelton are performing, to determine whether there is any short term improvements requiring further investigation at this stage.

Existing Transport Environment

Lyttelton Port is connected to the wider road network via Norwich Quay through Lyttelton. Norwich Quay is classified as part of State Highway 74, and is also a Major Arterial, in recognition of its strategic importance. Lyttelton township also connects onto Norwich Quay with sign controlled local road intersections. The Norwich Quay streetscape facilitates through movement by high volumes of heavy vehicles, whilst also needing to provide for the local access and use requirements associated with the Lyttelton township activity, including the local road intersections, car parking and bus stops.

Norwich Quay carries approximately 7,850 vehicles per day on average, with 18% heavy vehicles. The traffic patterns show that there are approximately 120 heavy vehicle movements per hour. This compares to Lyttelton Tunnel with 12,000 vehicles per day and 15% heavy vehicles, and approximately 160 heavy vehicle movements per hour.

Intersection analysis shows that intersections within Lyttelton are operating with a good level of service throughout the day. Road safety records do not highlight any specific issues with the normal operation of Norwich Quay within Lyttelton.

Planned Transport Infrastructure

A review of recent on-going road improvements indicates focus has been on motorway and arterial connections into and around Christchurch. Of importance in those projects is facilitating efficient movement of freight, including to and from the Port. The Sumner Road has recently reopened improving resilience of access to Lyttelton and the Port.

Christchurch City Council has some roading funding allocated for capital projects associated with the implementation of the Lyttelton Suburban masterplan. The masterplan was developed in 2012 to guide recovery in the township and included a range of goals and actions. It included provision for street amenity and access improvements. The CCC website shows that a range of actions have already been completed, and from a transport perspective that included the pedestrian crossing treatment and bus stop on Norwich Quay, and reopening the Sumner Road.

Proposed Container Terminal

The existing 10ha reclamation (being Reclamation A (Phase 1)) is currently being used for the transitory storage of cargo. Construction of Reclamation A (Phase 2) has commenced and is anticipated to be completed along with the wharf in 2024/26. The construction of Reclamation B, included associated wharf, is not anticipated to be completed until some 15 years after completion of Reclamation A. Therefore, the full and final 31ha container terminal is unlikely to be realised until the late 2030's. Land use consents for a container terminal and other port activities are required for use of the reclamations (the Proposed Container Terminal).

The Proposed Container Terminal will allow for the ongoing growth of the existing container terminal. LPC have advised that the container volumes are forecast to increase by approximately 44% over the next eight years (to 2026), and then double between 2026 and 2041. This growth will only be achievable if the reclamation proceeds and the landuse consents for the Proposed Container Terminal are obtained to allow reconfiguration of the existing container terminal and address existing Port operating constraints. In addition, other bulk freight is expected to increase over time, at a lower rate.

Traffic Generation Changes

An assessment of the change in traffic generation of the Port has been undertaken, over a medium and long term forecast. A summary of daily and peak hour heavy vehicle movements is shown in Table 1-1 below.

Table 1-1: Port Related Truck Movements on Norwich Quay

Year	Daily Traffic Movements (vpd)				Peak Hourly Traffic Movements (vph)		
	Container	Bulk	Hazardous (via Simeon and Sumner)	Total	Hazardous (via Simeon and Sumner)	Container and Bulk	Total
2018/19	1,154	612	-	1,766	-	116	123
2025/26	1,396	737	130	2,263	9	149	149
2040/41	2,600	989	237	3,825	16	236	251

The forecasts allow for increased use of rail as a mode for transport to and from the Port. As a means to manage this predicted increase in Port related traffic, it is understood that LPC has recently implemented a vehicle booking system to redistribute traffic into off-peak periods. The hours of operation at the Port have also increased to allow freight to be moved efficiently and will help spread the traffic increases to minimise the change in traffic volumes on the road network.

Light vehicle movements will also potentially increase, as a result of increased Port activity. The assessment allows for a scenario of 10% growth through to 2026, and 50% growth (compared to 2019) through to 2041.

The Port will include a cruise ship berth in the future, and traffic generation for the largest ship would be approximately 120 vehicle movements per hour as passengers depart and arrive back from day trips.

Traffic Network Performance

The performance of the transport network has been assessed with the increase in traffic volume generated by the Proposed Container Terminal over time, which is facilitated by the reclamation.

The assessment shows that intersections on Norwich Quay will continue to provide acceptable levels of service in the assessment year of 2026. Intersections at the western end of Norwich Quay will have slightly higher delays for those turning right out of the local road, due to higher passing traffic volumes than intersections at the eastern end. However, the delays remain within acceptable levels.

In the long term, there is the potential for the intersections at the western end of Norwich Quay to have reduced performance and high delays most likely requiring some modifications to improve access from the local road network. Typical traffic management responses such as traffic signals would address any delay issues. It is considered this is a matter for road controlling authorities to continue to monitor over the longer term, rather than requiring any specific changes as a result of the landuse consent process. It has been noted that changes in the timing of traffic generation at the Port, such as by spreading traffic over a longer part of the day, or including longer hours in the weekend will also reduce any changes in performance.

Conclusion

It is considered the traffic related effects of the Proposed Container Terminal have largely been anticipated by previous studies and planning processes, and updated assessment at local intersections suggests similar longer term timeframes will continue to apply for any necessary improvements to intersections within Lyttelton.

Further development traffic generation facilitated by the expansion and improvements to the strategic transport hub can be supported from a transportation effects perspective.

Abbreviations

AADT	Annual Average Daily Traffic Volume
CERA	Canterbury Earthquake Recovery Authority
ha	Hectare
HCV	Heavy Commercial Vehicle
ITA	Integrated Transport Assessment
LOS	Level of Service
LPC	Lyttelton Port Company
LPRP	Lyttelton Port Recovery Plan
MCV	Medium Commercial vehicle
NZTA	New Zealand Transport Agency
p.a.	Per Annum
s/veh	Seconds Per Vehicle
TEU	Twenty Foot Equivalent Unit

Lyttelton Port Company

Te Awaparahi Bay Container terminal Transport Assessment

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1. Introduction

1.1 Proposal

Lyttelton Port Company (LPC) is seeking two landuse consents to enable the establishment and operation of a container terminal and other port activities on the reclamations (the Proposed Container Terminal) at the eastern end of the Lyttelton Port of Christchurch (the Port), at Te Awaparahi Bay. This will allow the Port operations to be reconfigured so that the existing container terminal operations can be expanded and set up more efficiently. The reclamation areas are shown at the eastern end of the Port in Figure 1.1 below.

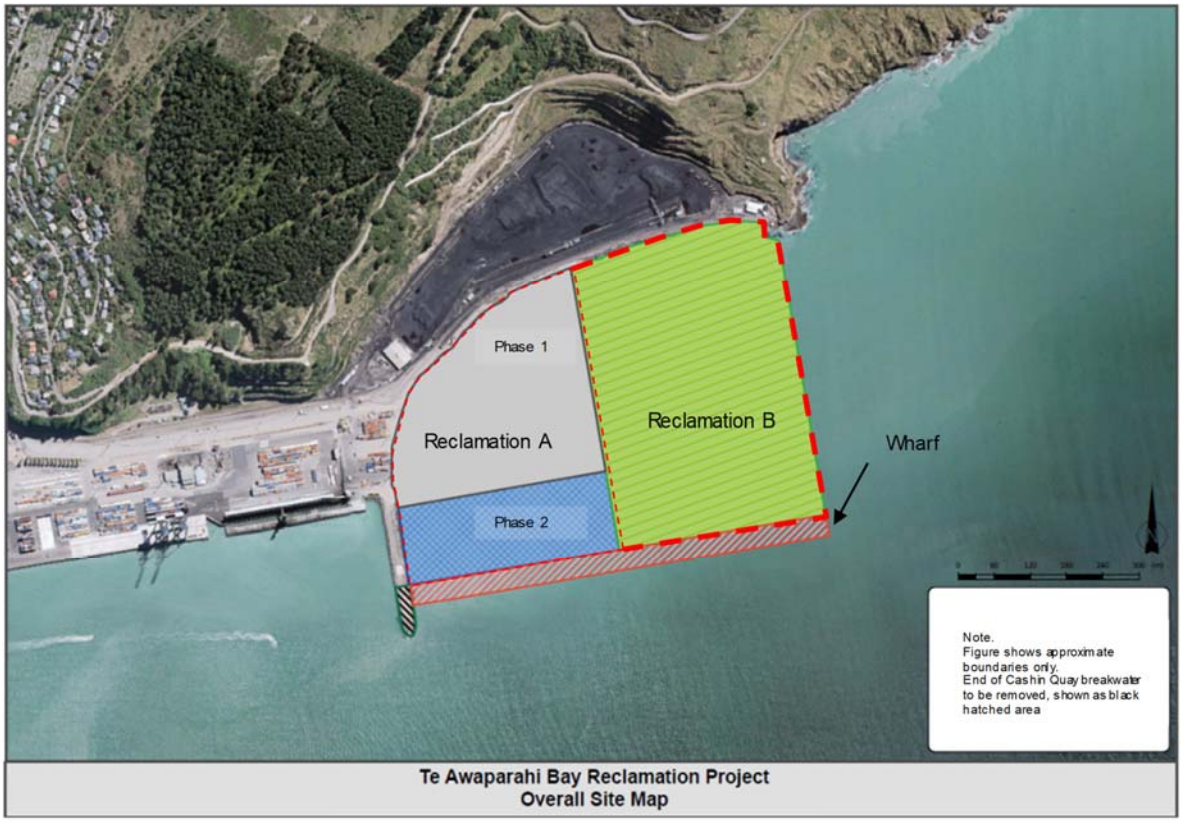


Figure 1-1: Port Reclamation Maps

The reclaiming of the land, which commenced in 2011, is being carried out in two distinct parts as shown on Figure 1.1:

a. Reclamation A (comprising Phases 1 and 2); and

b. Reclamation B

The construction of Reclamation A (Phase 1) has just been completed. Phase 1 land reclamation is 10 hectares in size. The construction of Reclamation A (Phase 2) has commenced and is anticipated to be completed along with a wharf in 2024/26. Phase 2 land reclamation will be up to 6 hectares in size.

Reclamation B, including the associated wharf, is not anticipated to be completed until some 15 years after completion of Reclamation A. Reclamation B will be approximately 18 hectares in size. Therefore, the full and final Proposed Container Terminal is unlikely to be realised until the 2030's.

The Proposed Container Terminal is a Discretionary Activity in the Christchurch District Plan (District Plan). As the Proposed Container Terminal will facilitate Port expansion, which will in turn result in changes to traffic patterns, a Transportation Assessment has been prepared to describe the transport environment, and potential effects of development.

At the outset, it is noted that the activity associated with the Proposed Container Terminal has been anticipated through previous processes that established the planning framework in the District Plan. For

example, the District Plan includes policy direction around development of the area, and transport related rules specifically exclude traffic generating activities in the Port area from the normal assessment of traffic related effects. This is largely because of the strategic significance of the Port from a transport perspective, and also because a comprehensive Integrated Transport Assessment (ITA) was prepared by LPC as an information package to support the development of the Lyttelton Port Recovery Plan (LPRP).

This Transport Assessment is assembled in five parts:

- Part A provides narrative on the current transport conditions;
- Part B highlights planned changes to transport infrastructure;
- Part C focuses on the Container Port planning requirements;
- Part D summarises analysis of the transport effects; and
- Part E concludes the findings of the report.

As a full assessment of wider network effects has previously been prepared and accepted for the LPRP, the focus is on the transport network in Lyttelton.

1.2 Background

The ITA prepared as part of the process to develop the LPRP assessed the effects of longer term traffic generation on the external transport network. The key findings with respect to access to the Port were that:

- Norwich Quay would continue to be the primary access route to the Port for the foreseeable future;
- Some intersections along Norwich Quay in Lyttelton would become more difficult to turn out of in peak periods as traffic volumes increase, potentially requiring modifications by road controlling authorities;
- Increasing pedestrian demand across Norwich Quay associated with the Te Ana marina development at Dampier Bay would need to be catered for to improve access with the increasing traffic volumes;
- The performance of the Chapmans Road / Port Hills Road intersection would also need to be monitored, as it supports Port activity; and
- improvements to the local and wider strategic transport network would be subject to normal infrastructure planning and funding processes, requiring a partnership approach between LPC, road controlling authorities (New Zealand Transport Agency and Christchurch City Council), and Environment Canterbury (who manage public transport services at Lyttelton).

The outcome of the ITA was that the anticipated increase in traffic generation associated with Port recovery, including reconfiguration associated with the reclamations and Proposed Container Terminal, would be acceptable. Directions from the Minister of Earthquake Recovery then directed provisions to be input to the Christchurch District Plan that supported the activity from a transportation perspective. Effectively, traffic generated by Port operations is listed as a permitted activity in the Special Purposes (Lyttelton Port) Zone, and traffic using the Port is not subject to the District Plan Transport Chapter rules.

As the ITA for the LPRP was looking at a long term scenario that is largely the same as currently forecast and was considered through a public consultation and decision making process, it is considered significant weight can still be applied to its findings and recommendations. In that respect, this Transport Assessment is more focused on consideration of how local intersections within Lyttelton are performing, to determine any constraints and/or issues relating to traffic considerations that may arise from the Container Terminal.

PART A: EXISTING TRANSPORT ENVIRONMENT

2. Transport Network

2.1 Road Network

The main route to the Lyttelton Port through Lyttelton is Norwich Quay running into Gladstone Quay on the east end, and meeting Tunnel Road and Simeon Quay via a roundabout intersection at the west end.

As indicated by Figure 2-1, Tunnel Road, Norwich Quay and Gladstone Quay make up part of SH74 and are classified as Major Arterial Roads in the CCC District Plan. Simeon Quay to the west of Lyttelton, and part of Oxford Street and Sumner Road to the east are classified as Minor Arterial Roads. The remaining roads in the vicinity are classified as Local Roads.

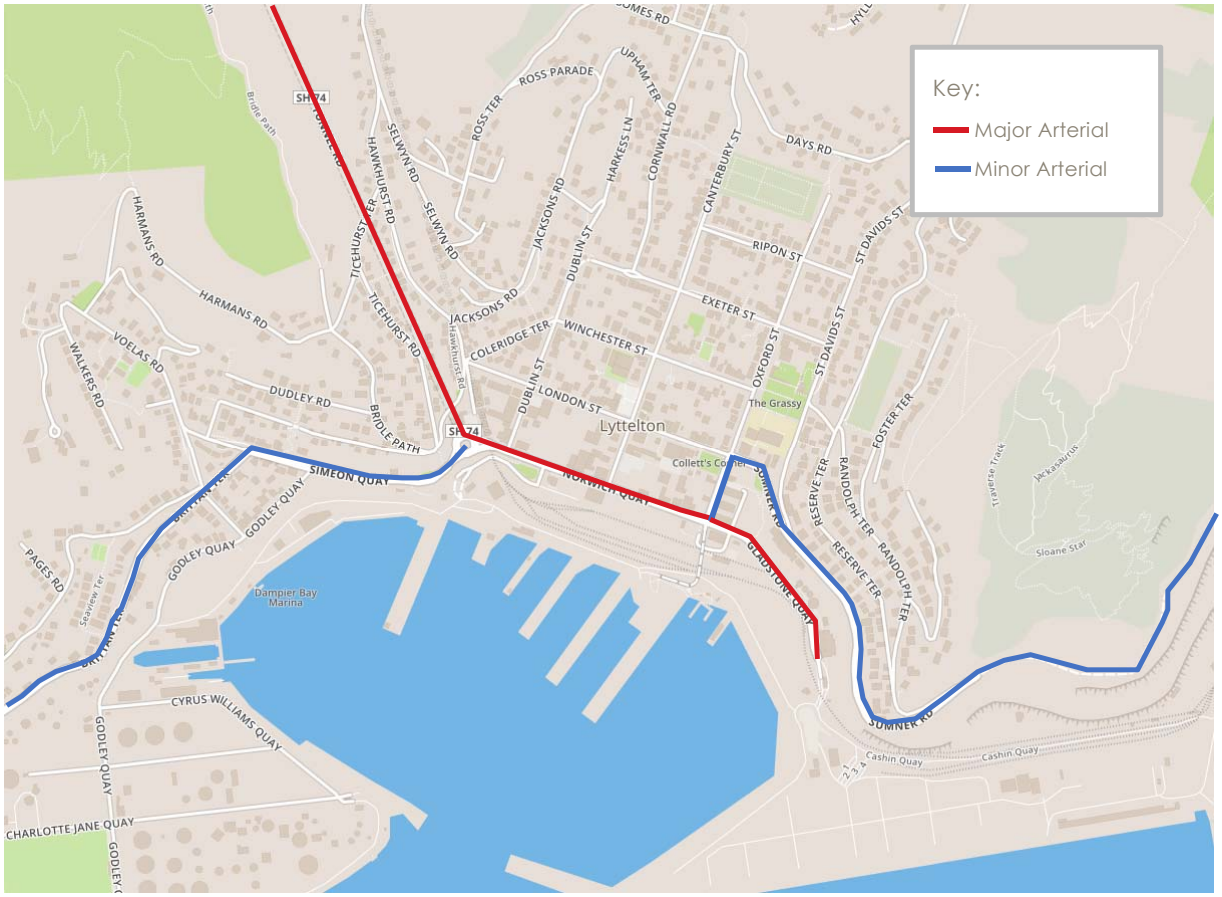


Figure 2-1: Lyttelton Road Hierarchy (Base Map Source: LINZ)

Figure 2-2 shows an aerial photo view of Norwich Quay (prior to installation of pedestrian traffic signals west of Canterbury Street). From west to east, the following local roads connect onto Norwich Quay:

- Dublin Street (stop controlled tee intersection, access to Lyttelton township on north side);
- Sutton Quay (stop controlled tee intersection, access to Port on south side);
- Canterbury Street (stop controlled tee intersection, access to Lyttelton township on north side);
- Oxford Street (stop controlled crossroad intersection, access to Lyttelton township on north side, Port and public transport on south side).

Norwich Quay has a flush painted median at its western end, and a standard wide two-lane cross-section at its eastern end. The traffic lanes readily accommodate the heavy vehicles that use the road. These layouts are largely unchanged since the time of assessment associated with the LPRP, although a

signalised pedestrian crossing has been installed between Sutton Quay and Canterbury Street to improve pedestrian connectivity.

Gladstone Quay forms part of SH74 and continues as LPC-owned Cashin Quay from approximately 250m southeast of Oxford Street. Part of Gladstone Quay allows on-street parking.

2.2 Rail Network

The Port railway line connects directly into the Lyttelton Port via a railway tunnel through the Port Hills. Currently, the length of sidings limits container train wagon numbers to 24 wagons. The frequency of trains (entering, then exiting) the Port is 3 to 5 container trains per day, and 3 coal trains per day.

No changes to rail facilities have been made since the time of assessment associated with the LPRP.

2.3 Bus Network

The number 28 bus runs between Northwood and Lyttelton at a frequency of every half hour and more often during peak periods. Figure 2-3 shows the full route of the bus line and Figure 2-4 shows the locations of the bus stops in Lyttelton and the route the bus takes locally.

The bus route ends most of the time at the Lyttelton Wharf, however the route extends through to Rapaki three times in the evening peak Monday to Friday in the southbound direction, and three times in the morning peak Monday to Friday in the northbound direction.

Public transport facilities are largely unchanged since the time of assessment associated with the LPRP. A new LPC car park has been installed on Jetty 2 just past the bus stops at the bottom of Oxford Street. This involves controlled access, with the location shown in Figure 2-5.

Figure 2-2: Aerial Photo View of Norwich Quay (Source Canterbury Maps)

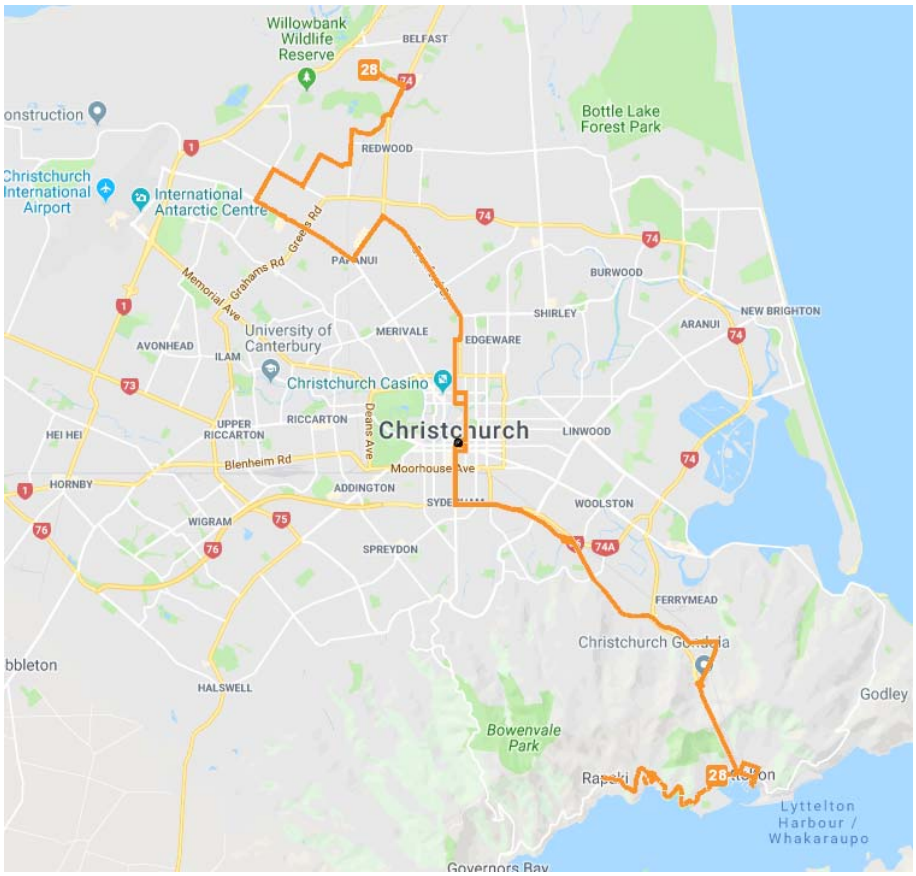


Figure 2-3: Number 28 Bus Route (Source: CHCH Metro)

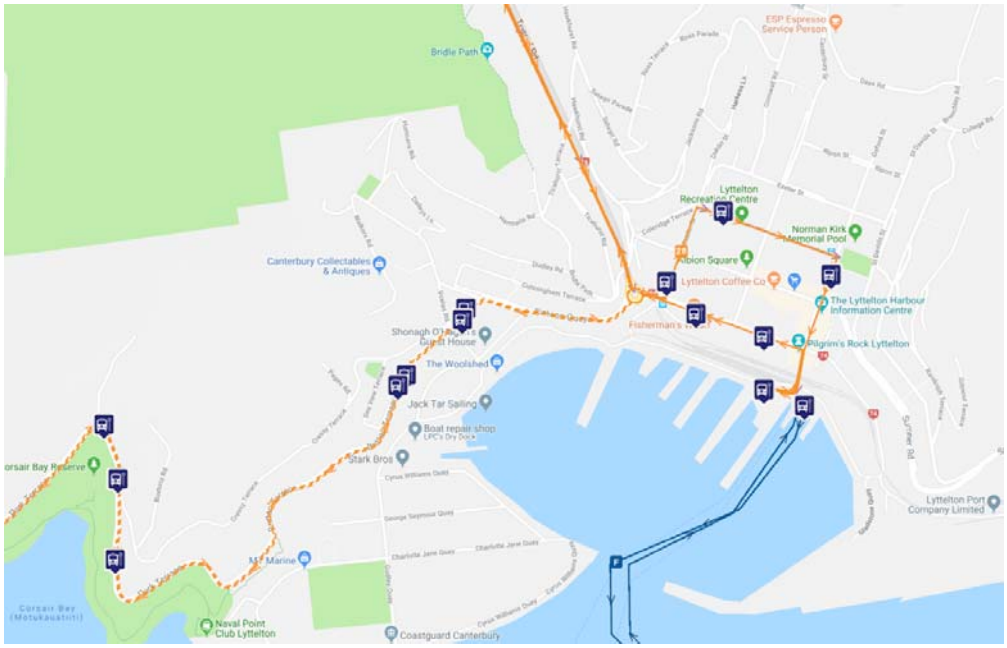


Figure 2-4: Public Transport Stops in Lyttelton (Source: CHCH Metro)

Figure 2-5: Oxford Street Overbridge and LPC Car Park (Source Google Earth)

2.4 Ferry Network

The Diamond Harbour Ferry travels between Lyttelton Wharf (accessed via Oxford Street rail overbridge) and Diamond Harbour and runs every hour and more frequently during the peak periods. Its route and jetty locations are shown in Figure 2-6 below. The Ferry connects with the bus service, and otherwise requires pedestrians to walk from the township to the Ferry.

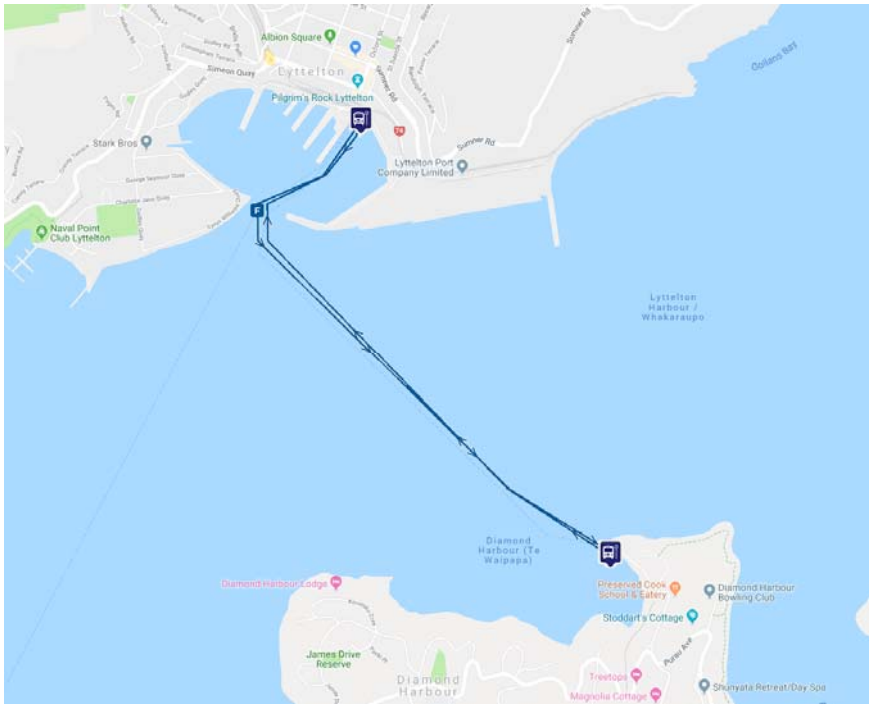


Figure 2-6: Lyttelton to Diamond Harbour Ferry Route (Source: CHCH Metro)

2.5 Pedestrian and Cycle Routes

Within Lyttelton there are no specific cycling facilities on the key roads. Cyclists are not permitted to travel through the Lyttelton Tunnel, although bus services carry bikes allowing cyclists to transfer through the tunnel for onward travel by bicycle. Lyttelton also forms part of a popular recreational route for cyclists via the harbourside Governors Bay Road, and incorporating the road passes to Christchurch. Part of the route via Sumner Road and Evans Pass has only recently reopened, at the end of March 2019.

3. Daily Traffic Volumes

3.1 Daily Volumes

NZTA has count sites in two locations close to the Port: at Lyttelton Tunnel, and on Norwich Quay approximately 30m west of Canterbury Street. The year 2018 annual average daily traffic (AADT) volumes in vehicles per day are summarised in Table 3-1 below with associated percentage of heavy vehicles.

Table 3-1: 7-Day Daily Traffic Volumes (Source: NZTA)

Road	Average Daily Traffic Volume (vpd)	%HV
SH74 Lyttelton Tunnel	12,120	14%
SH74 Norwich Quay	8,218	16%

It can be seen that Norwich Quay carries only part of the traffic volume passing through the tunnel.

3.2 Lyttelton Tunnel Seasonal Patterns

An analysis has been undertaken of the SH74 Lyttelton Tunnel continuous traffic count by NZTA, showing the 7-day average traffic volume by week across the year in 2018. It can be seen that heavy (HCV) and medium (MCV) class vehicles have a relatively flat profile week to week, with some increased light vehicle activity through the start and end of year.

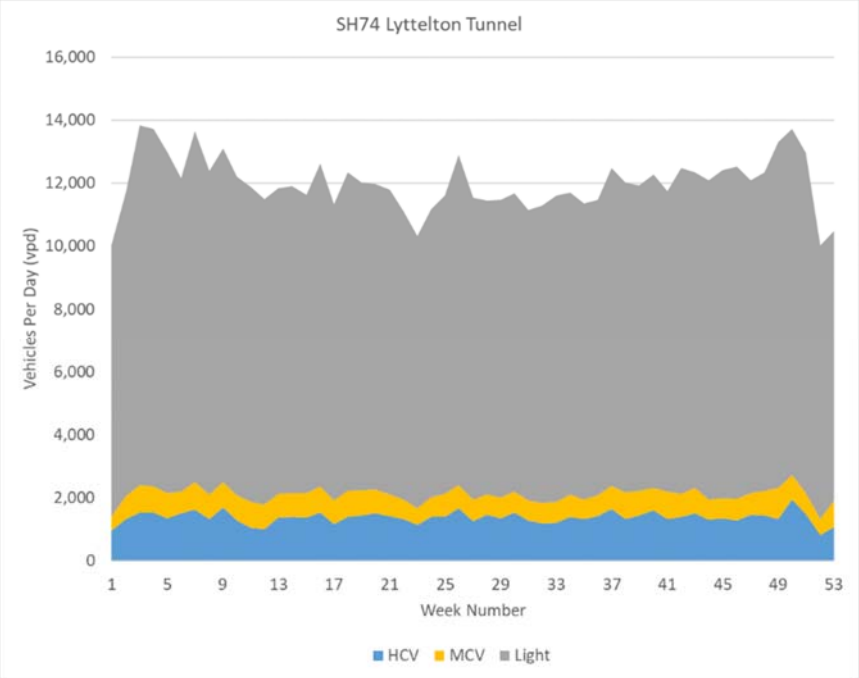


Figure 3-1: Seasonal Pattern of SH74 at NZTA Lyttelton Tunnel Site

3.3 Traffic Growth

Recent traffic data has also been summarised on an annual basis to identify growth trends at the count sites. The graph below shows that traffic growth has been at a relatively low rate in the last 5 years, at between 1.9% per annum at the Lyttelton Tunnel, and a reduction of 0.4% per annum on Norwich Quay.

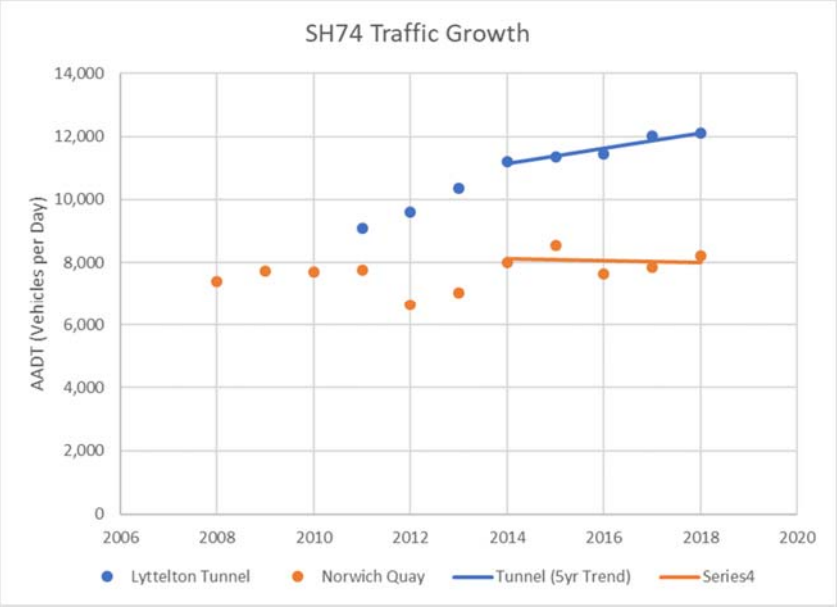


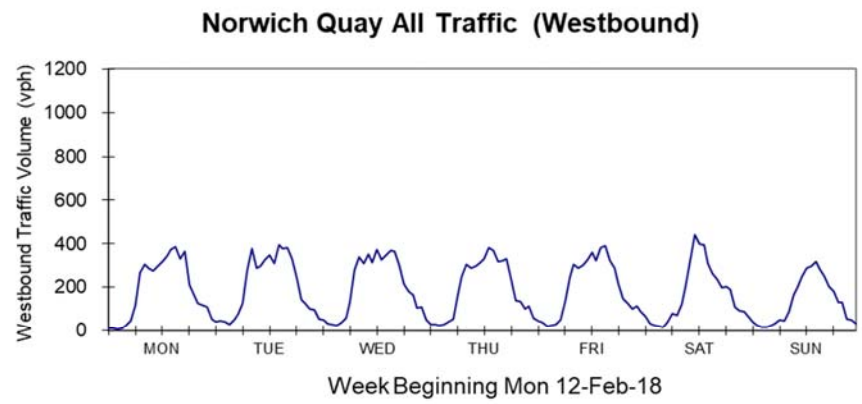
Figure 3-2: Traffic Growth on SH74

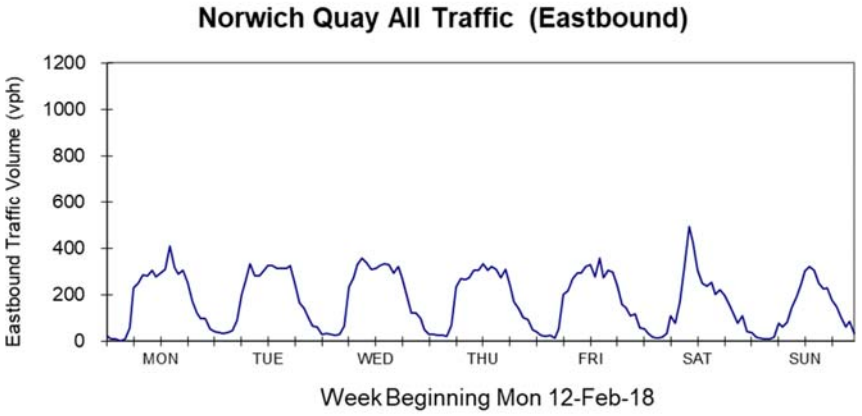
It is possible that the dip in traffic volumes on Norwich Quay in 2012-13 relates to post Christchurch earthquake effects, where external access routes were impacted.

3.4 Hourly Patterns

3.4.1 Norwich Quay Hourly Patterns – All Traffic

Hourly profiles for traffic volumes on Norwich Quay are shown for all traffic in Figure 3-3 for a week in February which is 6% higher than the reported AADT for 2018. The two directions are very similar in traffic volume and there is a relatively flat profile. Traffic volumes are between 600vph and 700vph throughout the day from the morning through to evening peak periods. The weekday daily average volume is approximately 9,350vpd during the week analysed (12-18 February 2018), indicating the peak hour carries approximately 6.5% to 7.5% of the weekday daily traffic volume. Saturday has a slightly higher and shorter peak of approximately 900vph due to weekend visitor activity.





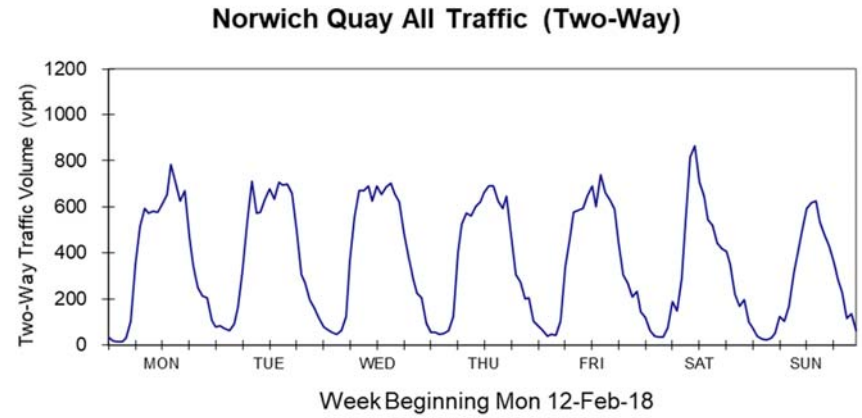


Figure 3-3: Hourly Traffic Profile (All Traffic) on Norwich Quay (west of Canterbury Street)

3.4.2 Norwich Quay Hourly Patterns – Heavy Vehicle Traffic Only

Figure 3-4 shows the hour by hour two-way heavy vehicle traffic profile, again showing a flat profile with approximately 120vph recorded throughout the typical weekday from 7am to 4pm. Heavy vehicle traffic in the weekend is significantly lower. Evening heavy traffic sits between approximately 30vph and 40vph. The weekday daily heavy volume average is approximately 1,730vpd. The peak hourly movements are therefore approximately 7% of the weekday daily heavy traffic volume.

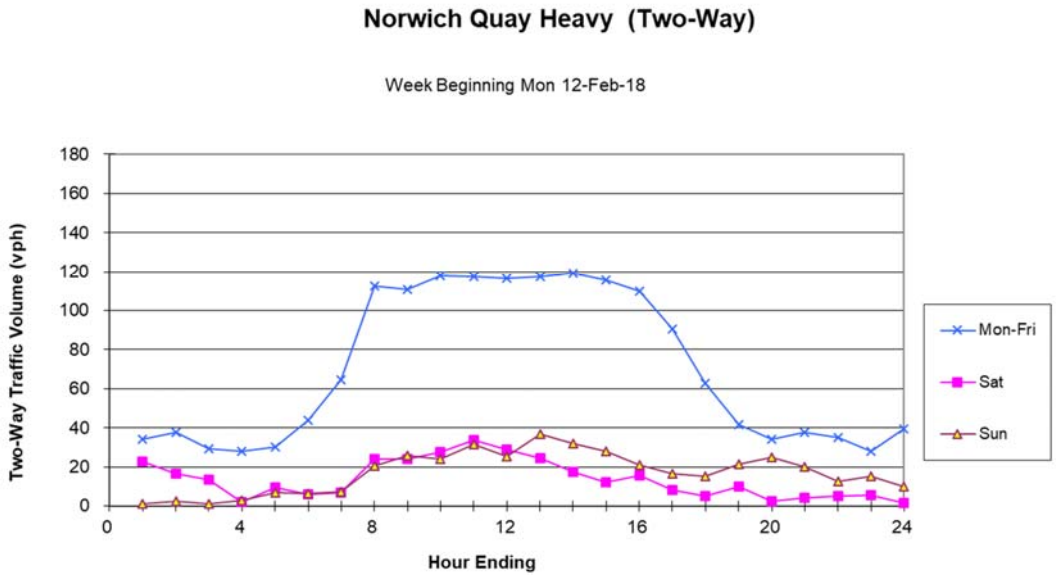
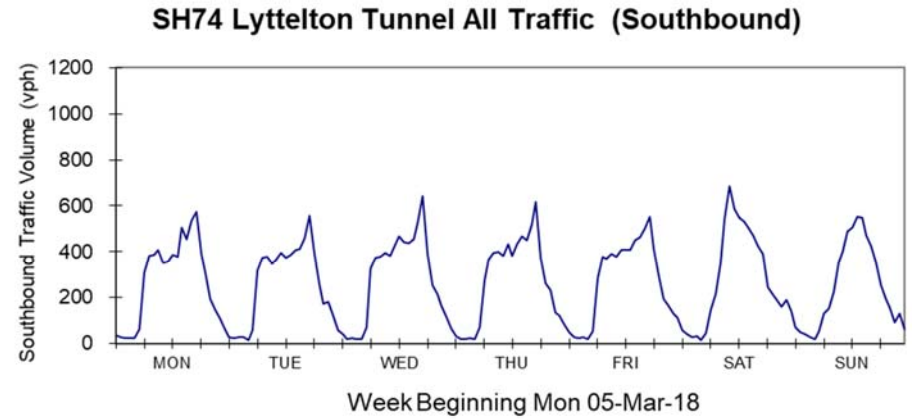


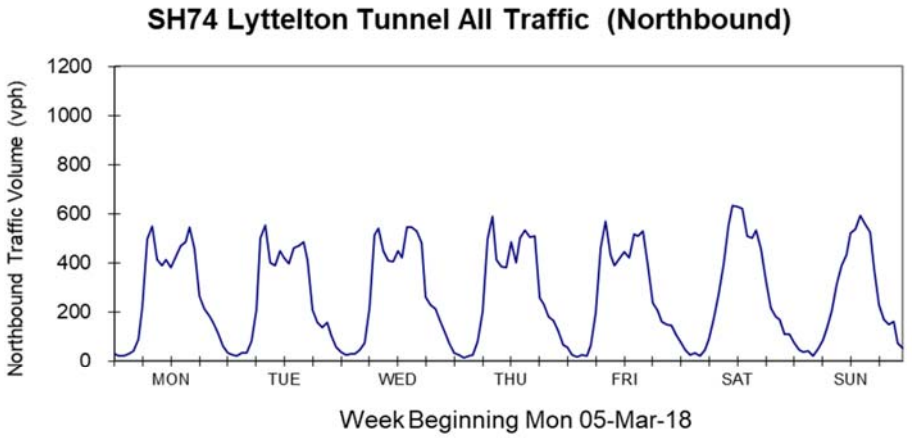
Figure 3-4: Hourly Profile for Heavy Traffic on Norwich Quay

LPC recently implemented a vehicle booking system at the existing container terminal to improve efficiency at the terminal and this has resulted in spreading of movements at the existing container terminal. The day period 6am to 6pm accommodated 68% of daily container movements prior to the vehicle booking system, and this has reduced to 59% after implementation of the vehicle booking system in March 2019.

3.4.3 Lyttelton Tunnel Hourly Patterns – All Traffic

A similar analysis to that described above was done for Lyttelton Tunnel and shows that there is slightly more commuter traffic, and higher volumes overall in the Lyttelton Tunnel compared with Norwich Quay. The morning peak period carries 940vph, dropping to 760vph late morning, before increasing to an evening peak of 1,060vph. The weekday daily average volume is approximately 12,965vpd during the week analysed (5-11 March 2018), indicating the peak hour carries approximately 7.3% to 8.2% of the weekday daily traffic volume.





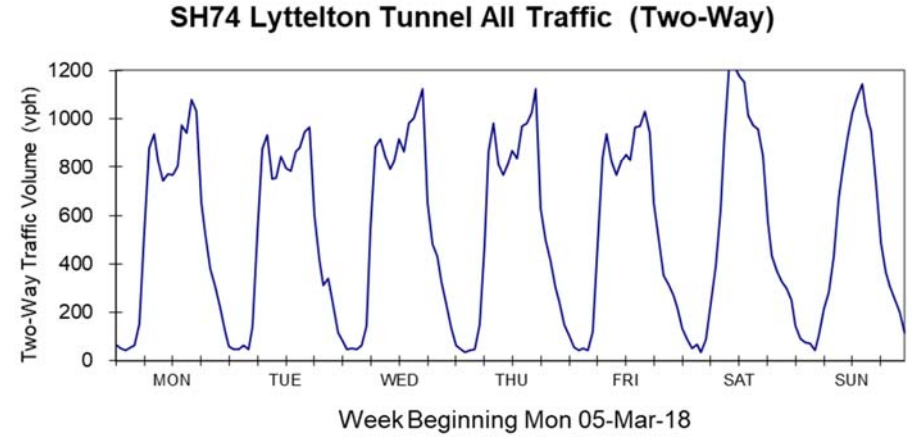


Figure 3-5: Hourly Traffic Patterns Lyttelton Tunnel

3.4.4 Lyttelton Tunnel Hourly Patterns – Heavy Vehicle Traffic Only

Heavy vehicle patterns in Lyttelton Tunnel exhibit a similar flat profile to Norwich Quay, with a slightly higher heavy traffic volume of 140-160 heavy vehicles per day on a weekday, between 7am and 5pm. The weekday daily heavy volume average is approximately 2,200vpd.

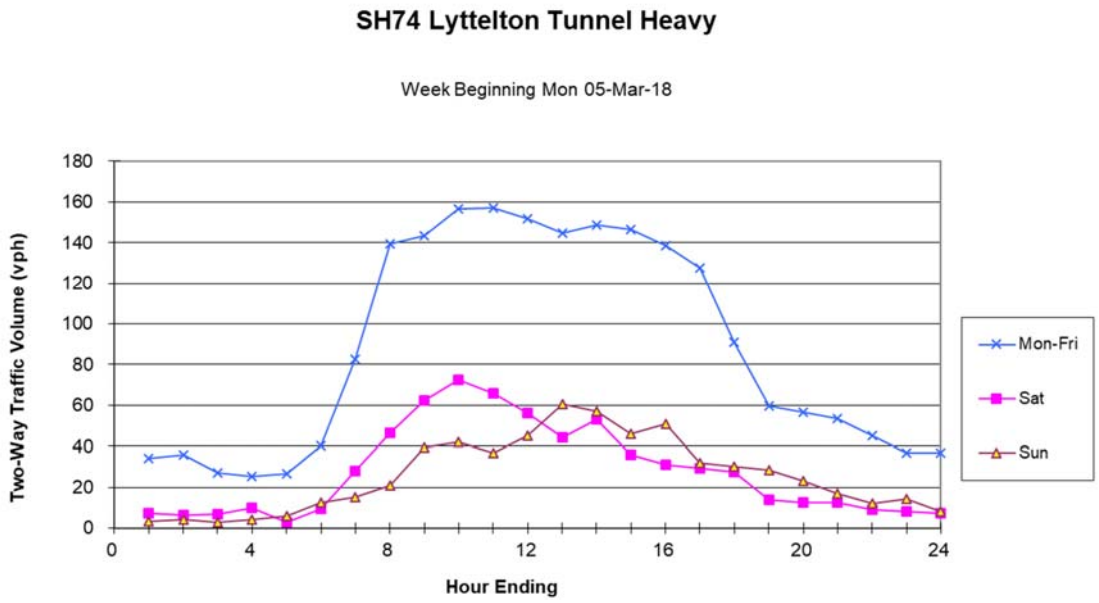


Figure 3-6: SH74 Lyttelton Tunnel Traffic Patterns

3.5 Lyttelton Intersection Counts

Traffic counts were undertaken at intersections in Lyttelton to assess the current traffic patterns and performance of intersections along the Norwich Quay corridor. The surveys were undertaken using video recording, and covered the following time periods, with the peak hour also shown where applicable:

- 7-9am, Thursday 7th March 2019, peak hour 7.30-8.30am;
- 1-2pm, Wednesday 6th March 2019, referred to as the "inter peak" period;
- 4-6pm, Wednesday 6th March 2019, 4.45pm – 5.45pm.

Hourly summaries are shown in Figures 3-7 to 3-9 showing the turning volumes for light and heavy traffic at each if the intersections. The traffic surveys were conducted at a time when the Sumner Road was still closed (it opened on the 29 March 2019). Historical traffic counts for Evans Pass Road (the continuation of Sumner Road on the northern side of the Summit Road) showed that it carried weekday volumes of approximately 1,000vpd. It is considered that while some changes in intersection turning volumes may be expected following reopening, they will be small in the context of the recorded turning movements.

From the "all traffic" diagrams, it is apparent that the dominant movement from the Lyttelton township side roads are right turns, and these are relatively evenly distributed across each of the intersections (Dublin Street, Canterbury street, and Oxford Street), in each of the peak periods. The maximum right turn volume is in the morning peak, with 139vph from Oxford Street (north) onto Norwich Quay. Traffic movements to and from the southern side intersections (Sutton Quay and Oxford Street) are much lower.

From the data, it is calculated that Port related traffic from Gladstone Quay comprises approximately 20-25% of the traffic on the western end of Norwich Quay in the morning and evening peak periods, and a higher 30-35% in the interpeak period. Of the heavy traffic on Norwich Quay at its western end, it is calculated that approximately 80-90% utilises Gladstone Quay across the periods counted. Peak heavy traffic via the Gladstone Quay gate is approximately 107 heavy vehicles per hour, and via Sutton Quay approximately 6 heavy vehicles in the same hour. Trucks using Simeon Quay account for approximately 17 vehicle movements per hour.

Cycle counts showed only 1-2 cyclists per hour in the peak hours using Norwich Quay.

Data from the intersection traffic counts (which did not cover the traffic signal crossing) show that the highest level of pedestrian activity occurs at the Oxford Street / Norwich Quay intersection which has zebra pedestrian crossings. In the inter peak survey, just over 50 pedestrians crossed each of the Oxford Street south approach and Norwich Quay west approaches, 20 crossed the Norwich Quay east approach, and 15 crossed the Oxford Street north approach. Other locations with higher pedestrian numbers are at the Sutton Quay crossing which recorded 25 pedestrians in the interpeak hour, and 36 in the morning peak hour.

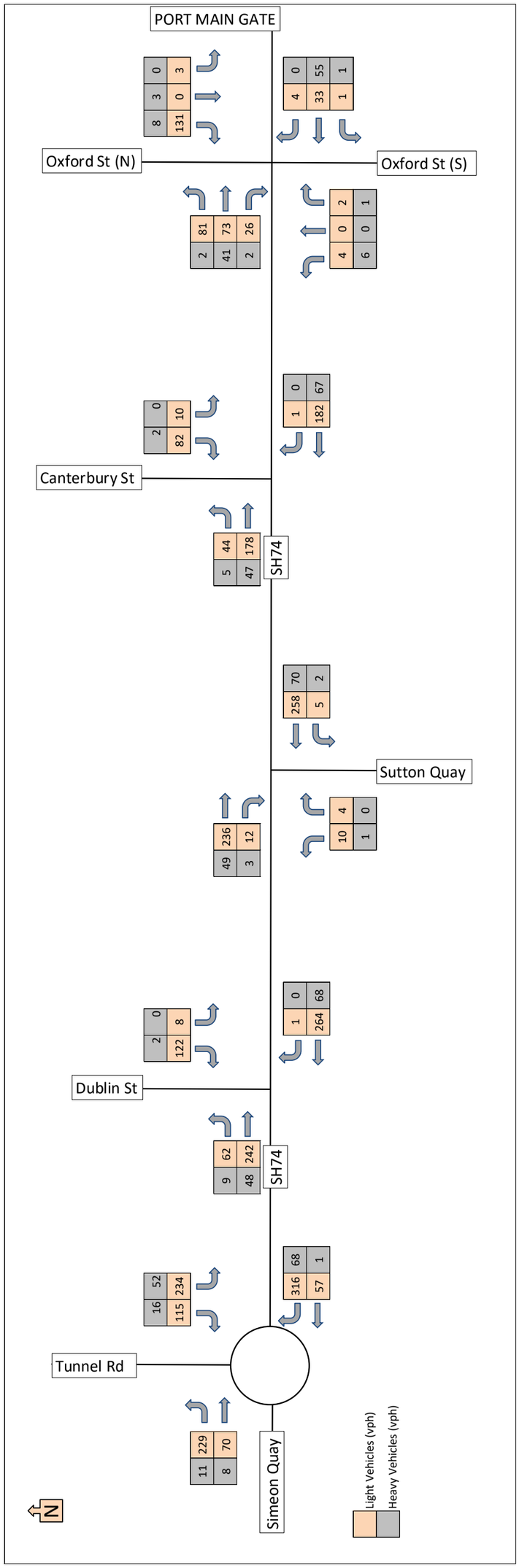


Figure 3-7: AM Peak Hour Intersection Counts

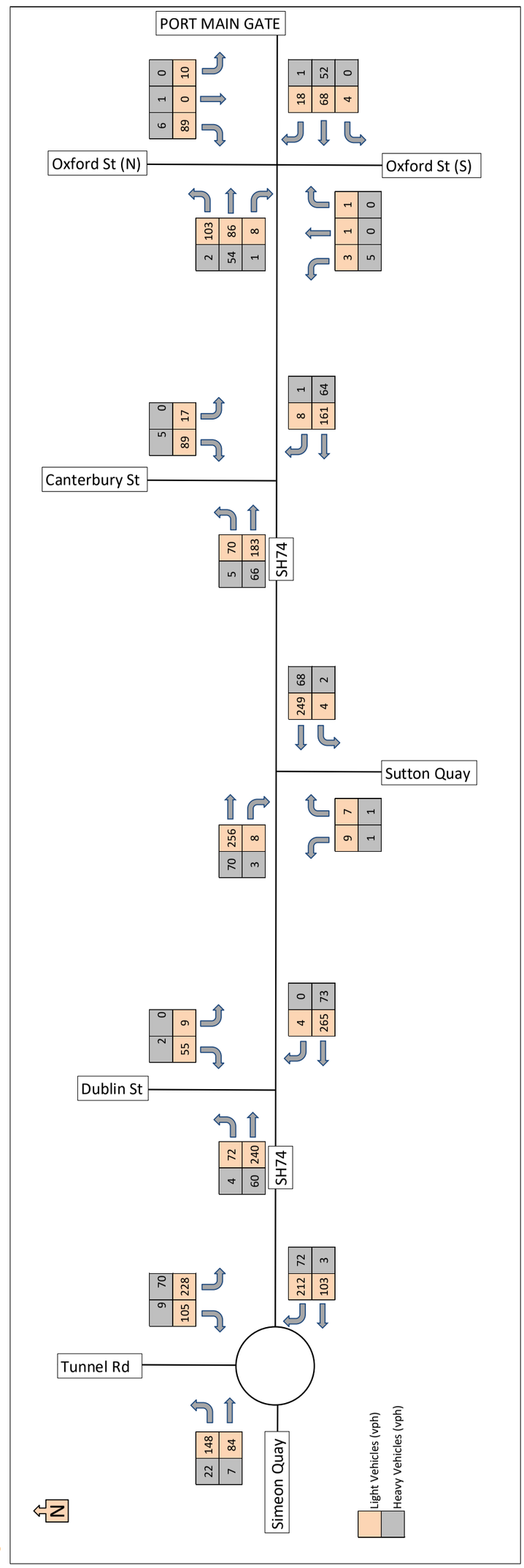


Figure 3-8: Inter Peak Intersection Counts

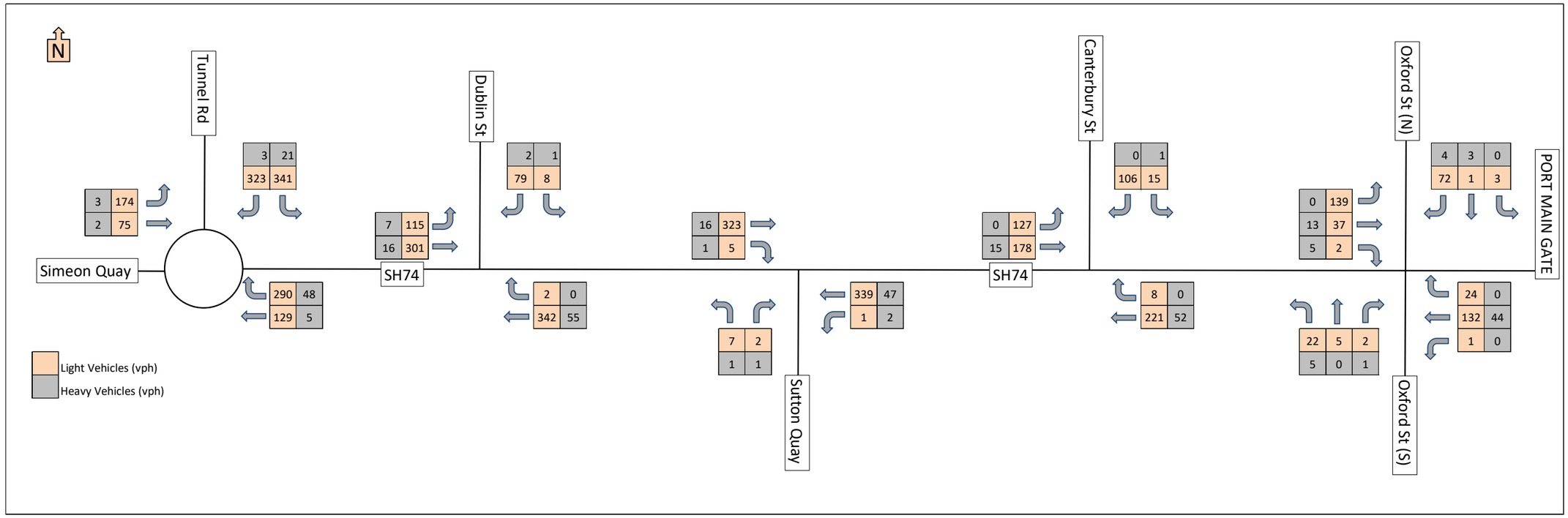


Figure 3-9: PM Peak Hour Intersection Counts

Data from the pedestrian signals has been analysed for the week that the traffic surveys were undertaken and is summarised in Figure 3-10. It shows that they were generally not called overnight (i.e. a pedestrian activates the wait button) at all between 9pm and 7am. On weekdays between 7am and 6pm, the number of times the signals were activated was typically no more than 5 times per hour, with a peak number being 5 times per hour. The busiest time during the week was Saturday late morning, with 19 activations which will correspond with the Lyttelton farmers market.

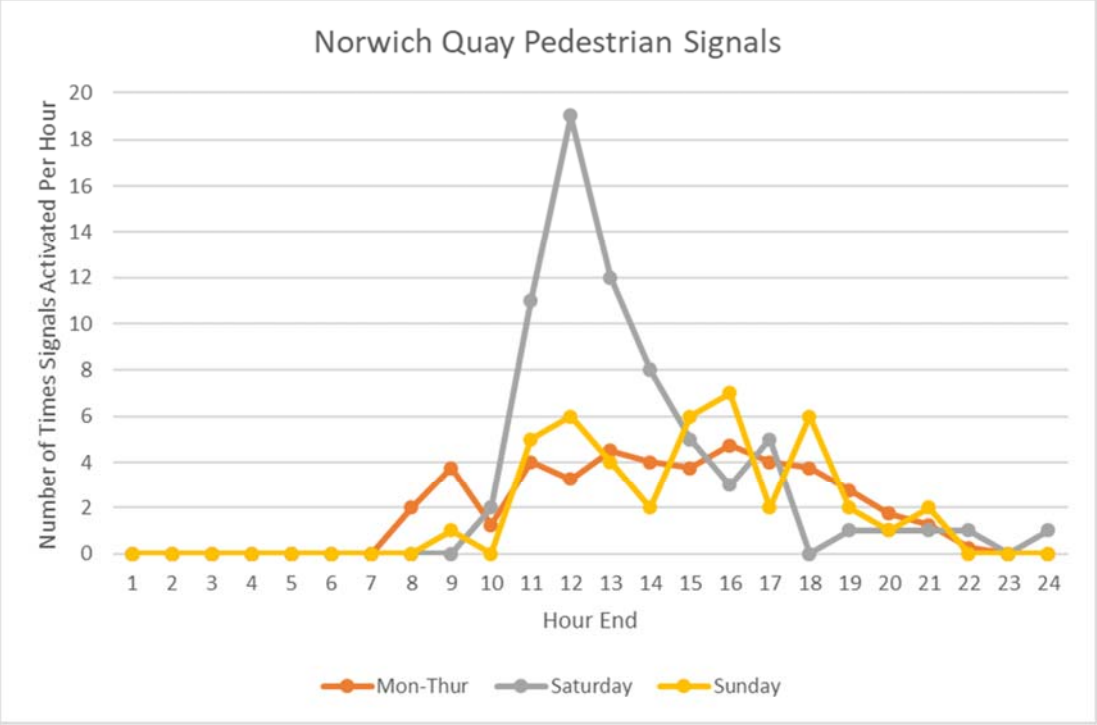


Figure 3-10: Pedestrian Signal Activation Week Starting 6 March 2019

4. Intersection Performance Assessment

SIDRA Intersection 8 has been used to assess the current performance of the intersections on Norwich Quay. The assessment with a focus on worst movement turning delay has been summarised in Tables 4-1 to 4-3 below. Level of service (LOS) is also included, which is a qualitative measure describing operational conditions and their perception by motorists. For intersections, level of service is linked to average delay. The level of service range is from LOS A which represents very low delays, through to LOS F which represents high delays indicative of intersection capacity issues. LOS A through to LOS D is considered acceptable for side road access, and LOS E would suggest further investigation of performance is necessary.

Table 4-1: Existing Norwich Quay Intersection Performance – AM Peak

Intersection	Critical Movement	Volume (vph)	Average Delay (s/veh)	Level of Service
Tunnel / Norwich / Simeon	Intersection	1,177	5	LOS A
Norwich / Dublin	Dublin – Right	124	19	LOS C
Norwich / Sutton	Sutton – Right	4	16	LOS C
Norwich / Canterbury	Canterbury Right	84	12	LOS B
Norwich / Oxford	Oxford (N) Right	139	12	LOS B

Table 4-2: Existing Norwich Quay Intersection Performance – Inter Peak

Intersection	Critical Movement	Volume (vph)	Average Delay (s/veh)	Level of Service
Tunnel / Norwich / Simeon	Intersection	1,063	5	LOS A
Norwich / Dublin	Dublin – Right	57	24	LOS C
Norwich / Sutton	Sutton – Right	8	21	LOS C
Norwich / Canterbury	Canterbury Right	94	13	LOS B
Norwich / Oxford	Oxford (N) Right	95	12	LOS B

Table 4-3: Existing Norwich Quay Intersection Performance – PM Peak

Intersection	Critical Movement	Volume (vph)	Average Delay (s/veh)	Level of Service
Tunnel / Norwich / Simeon	Intersection	1,414	6	LOS A
Norwich / Dublin	Dublin – Right	81	27	LOS D
Norwich / Sutton	Sutton – Right	3	30	LOS D
Norwich / Canterbury	Canterbury Right	106	12	LOS B
Norwich / Oxford	Oxford (N) Right	76	11	LOS B

It can be seen that all of the intersections are operating satisfactorily with LOS A to LOS D on the critical turning movement. Those intersections at the western end of Norwich Quay where opposing through traffic volumes are higher, exhibit higher levels of delay than those to the east. The highest delays occur in the PM peak hour, where the combination of turning movements and through traffic volumes is the highest.

5. Road Safety

The NZTA Crash Analysis System has been used to investigate reported crashes on SH74 between Tunnel Road and the Lyttelton Port access gate in the five-year period 2014-2018 and any crashes from 2019 (at May 2019). Figure 5-1 shows the location of all reported crashes.

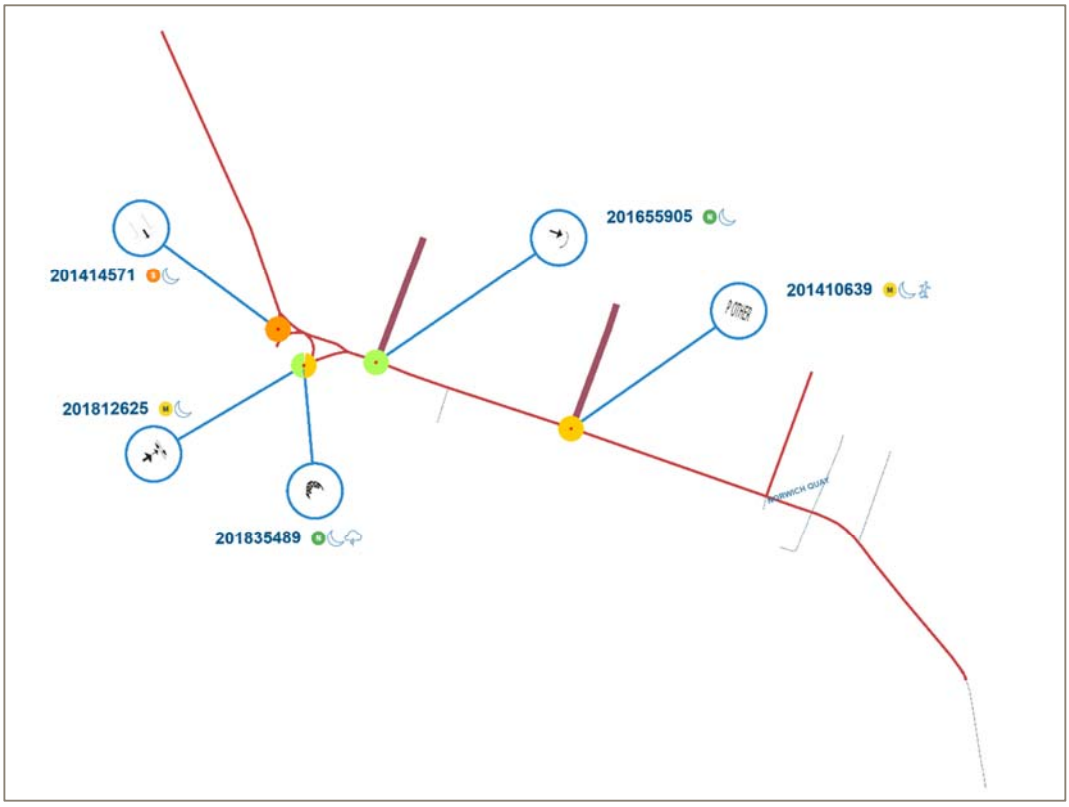


Figure 5-1: Location of Crashes on Norwich Quay 2014 – 2019 (Source: NZTA CAS system)

There have been five crashes in the last five years including one serious and two minor injury crashes. All occurred at night, between 9.30pm and 1.00am.

The serious crash occurred due to a vehicle travelling southbound through the tunnel and colliding with the roundabout traffic island, with speed and alcohol likely factors. Another two crashes occurred at the roundabout, one minor injury where alcohol was involved and the inexperienced driver hit the rear end of a car giving way to other traffic at the roundabout, and one non-injury crash where the driver lost control turning at the roundabout with speed and alcohol factors.

The other minor injury crash occurred at the intersection of Norwich Quay and Canterbury Street and involved a skateboarder losing control and not being able to stop being struck by a vehicle when turning left onto Norwich Quay. A non-injury crash involved a truck hitting a vehicle u-turning west of Sutton Quay, after the vehicle driver misjudged the distance – time available for the u-turn manoeuvre.

No collisions associated with the Lyttelton Port access have occurred during the search period. The crash reports do not highlight any specific issues with the normal operation of Norwich Quay within Lyttelton.

PART B: PLANNED TRANSPORT INFRASTRUCTURE

6. State Highway Network

6.1 NZTA National Land Transport Programme 2018-2021

During the three year period of the 2018-2021 National land Transport Programme (NLTP) transport investment in Greater Christchurch will be focused on completing construction of the Christchurch Southern Motorway and the Northern Arterial thus providing better access from the south and north of the city for both commuters and freight.

Stage two of the southern motorway – four-laning of SH1 from Rolleston through to Christchurch – is expected to be completed in early 2020. The Northern Corridor connecting the Waimakariri River through to QE11 Drive and Cranford Street is on schedule to be completed in 2019/20.

As shown in Figure 6-1 below, these corridors provide better access for freight to and from the Christchurch International Airport, the Lyttelton Port of Christchurch and also to and from freight hubs in the southwest of the city, supporting economic growth of not only Canterbury but the wider South Island.

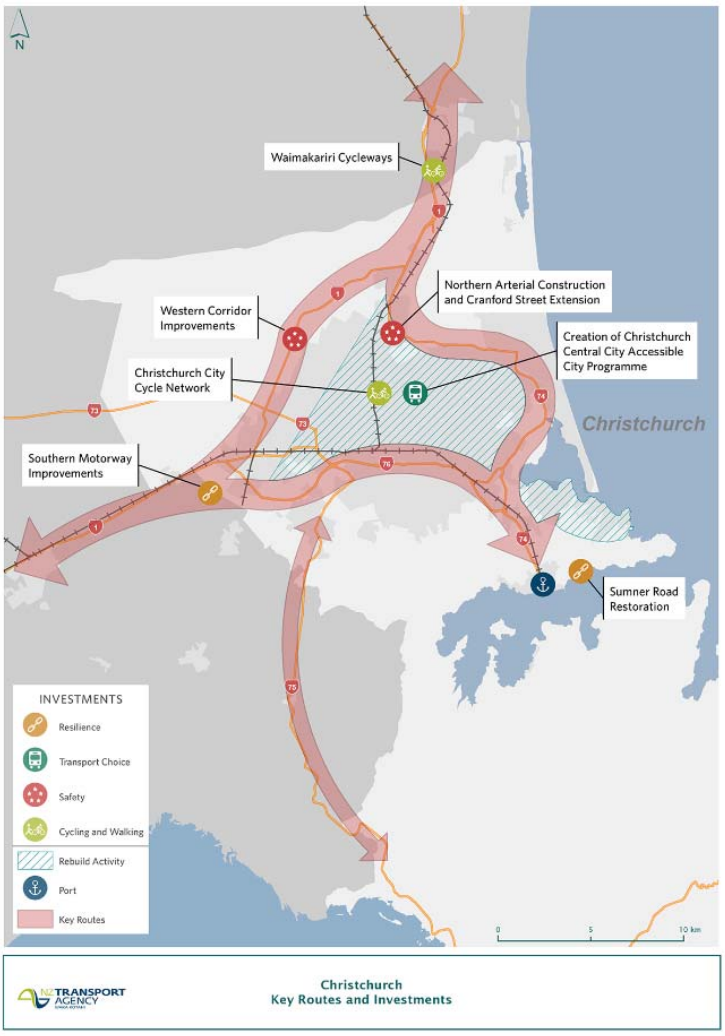


Figure 6-1: Plan of NLTP Key Projects

The NLTP projects with committed expenditure on State Highway projects are set out in Table 6-1 below, which is sourced from the NZTA website[1].

[1] https://www.nzta.govt.nz/planning-and-investment/national-land-transport-programme/2018-21-nltp/nltp-snapshot-and-tables/

Table 6-1: NLTP Major Project Details

Improvement	Phase Type	Total Phase Cost ($,000)	2018/19NLTF ($000)	2019/20NLTF ($000)	2020/21NLTF ($000)	Funding Priority
CHCH Northern Arterial Rural with QE2	Construction	262,506	63,411	68,006	24,614	Committed
CHCH Northern Arterial Rural with QE2	Property	27,919	2,062	0.0	0.0	Committed
CHCH Southern Motorway HJR to Rolleston (Stage 2 & 3)	Construction	192,252	55,496	33,209	125	Committed
Lyttelton Tunnel Safety Retrofit (Deluge) System	Implementation	29,666	18,344	0	0	Committed

The new southern motorway will provide better access from the south through to Brougham Street (SH76), halving travel times from Rolleston through to Christchurch's central city and reducing deaths and serious injuries along SH1. As the main freight route from the inland ports at Rolleston, as well as the southwest industrial hubs through to Lyttelton Port, SH76 goes through a mix of residential suburban streets, retail hubs and semi-industrial estates.

In 2018-21, work will continue on the detailed business case to look at how to make this route safer and more efficient to cater for the increased traffic volumes and also create safer walking and cycling opportunities for the local community and wider network south of Moorhouse Avenue.

Both safety and access to the Lyttelton Port of Christchurch will be/has been improved with:

- The completion of the Lyttelton Tunnel deluge system - a sprinkler system to help reduce risk by preventing the spread of fire within the tunnel;
- Completion of the alternative hazardous goods route over Evans Pass, from Sumner to Lyttelton, which has been closed since the 2011 earthquake.

These two projects will also build greater resilience into the connections between Christchurch and Lyttelton Port, critical for both fuel supplies for the South Island and access to export markets.

7. Christchurch City Council (CCC)

7.1 CCC Long Term Plan 2018-2028

The CCC Long Term Plan Infrastructure Strategy notes that the current priority to address resilience is to protect key lifeline routes, such as connections to isolated parts of the community (Sumner, Lyttelton and Banks Peninsula) and key elements of infrastructure (Christchurch Airport and Lyttelton Port). Having alternative routes where topography allows is preferable, otherwise infrastructure needs to be designed and constructed to a sufficient level of robustness and maintained appropriately. In that respect, the capital programme includes provision for Sumner Road, which has now largely been reopened, with ongoing risk mitigation work to be completed.

The Capital Programme also provides for delivery of the Lyttelton Suburban Masterplan, with approximately $740,000 allocated for transport changes within Lyttelton over the four year period 2018/19 to 2021/22. The masterplan was developed in 2012 to guide recovery in the township and included a range of goals and actions. It included provision for street amenity and access improvements. The CCC website page for the masterplan shows that a range of actions have already been completed, and from a transport perspective that includes the pedestrian crossing treatment and bus stop on Norwich Quay, and reopening the Sumner Road.

8. Other Studies

8.1 'Greater Christchurch Freight Study – Freight Management Directions Statement', Aurecon, 2014

The Greater Christchurch Freight Study identified that completion of the Christchurch Southern Motorway Stage 1 put additional pressure on a number of strategic intersections and routes during peak periods. Brougham Street is used extensively for local freight movements to and from distribution centres and customers; and it is also the main corridor for freight movements to and from the Port. Studies are currently underway investigating responses to increased transport use of the corridor, which will further increase with the Christchurch Southern Motorway Stage 2.

The Greater Christchurch Freight Study considered that optimisation of the freight network may relieve pressures on strategic roads during peak hours. Moving greater quantities of goods in off-peak hours was also identified as helping to achieve this. It was considered that capacity issues were not a problem with the Lyttelton Tunnel over the planning horizon, although resilience and risk was a particular concern.

In the event of an incident occurring during the transport of hazardous goods through Lyttelton Tunnel, the likely result would be closure of the tunnel for an extended period of time; this would have significant issues for the movement of freight to and from the Port. Sumner Road may have ongoing resilience issues (due to the unstable nature of the cliff face) but it is a vital alternative route for freight if the Lyttelton Tunnel were ever closed.

8.2 Canterbury Regional Public Transport Plan 2018-2028' ECAN,

Lyttelton is highlighted in the Canterbury Regional Public Transport Plan as a node for a future high frequency public transport route linking Lyttelton with the CBD. Further extension to the network, to Diamond Harbour, is also considered. The increase in public transport can provide alternative transport mode choice for residents, workers, and visitors to and through Lyttelton, potentially reducing increases in traffic volume over time.

PART C: PROPOSED CONTAINER TERMINAL

9. Planned Reclamation

LPC is seeking landuse consents for the Proposed Container Terminal at the eastern end of the port, at Te Awaparahi Bay. This will allow the Port operations to be reconfigured so that the existing container terminal operations can be expanded and set up more efficiently. The current reclamation and proposed reclamations are shown at the eastern end of the Port in Figure 9-1 below, with detail previously shown in Figure 1-1.

Figure 9-1: Future Port Map

10. District Plan Requirements

The Proposed Container Terminal requires assessment as Discretionary Activities. In that respect, the CCC has discretion to consider transport effects.

However, as discussed earlier, the District Plan permits high trip generating traffic[2] to and from the Specific Purpose (Lyttelton Port) Zone, via existing access to the state highway, and new or existing access to local roads.

The District Plan rule framework is also supported by policy relating to provision for expansion of the Port operational area onto reclaimed land in Te Awaparahi Bay[3]; and ensuring safe and effective access along Norwich Quay to the Lyttelton Port to meet the needs of the Port as a strategic transport and freight hub[4].

Transport standards included in Chapter 7 of the District Plan are not applicable to activities in the Specific Purpose (Lyttelton Port) Zone.

11. Lyttelton Port Recovery Plan

The Lyttelton Port Recovery Plan (LPRP) was produced by the Canterbury Earthquake Recovery Authority (CERA) in November 2015 to enable Lyttelton Port to recover from the extensive damage that it received during the series of earthquakes in greater Christchurch in 2010 and 2011.

Included in the LPRP were amendments to the planning framework to facilitate Port recovery and rebuild activities. That includes (amongst other things) providing for the reclamation of up to 24 hectares of land and wharf for a new container terminal within Te Awaparahi Bay adjacent to the existing consented 10-hectare reclamation for port operational land. It is expected that the additional reclaimed land will enable Lyttelton Port to gradually move some of its operations to the east.

Following comprehensive assessment of transport effects[5], a direction was made to exclude the Port from District Plan transport rules, including high trip generators. Essentially, the level of transport activity able to be generated by the operational Port activities, including the expected future reclamation in the Specific Purpose (Lyttelton Port) Zone was to be permitted.

The LPRP included a non-statutory agreement by Christchurch City Council, Canterbury Regional Council, the New Zealand Transport Agency, Lyttelton Port Company Limited and KiwiRail to develop a

[2] 13.8.4.2.9 Transport Standards
[3] Policy 13.8.2.1.3-a-iv
[4] Policy 13.8.2.1.4
[5] Lyttelton Port Recovery Plan Transport Assessment, Nov 2014, Abley Transportation Consultants

Memorandum of Understanding that set out the principles of working together to ensure a transport network that supports recovery while maintaining safe and efficient transport solutions for users.

PART D: TRANSPORT EFFECTS

12. Freight Growth Projections

12.1 Container Volumes

The LPRP Transport Assessment was based on assessment of a high and low range for the volume of containers passing through the Port. LPC has provided an updated projection for the purpose of assessment of the Proposed Container Terminal, and this has been compared to the assessed TEU from the LPRP. Figure 12-1 shows that current projections based on compounding growth still sit well within the lower and upper bounds of the earlier assessments.

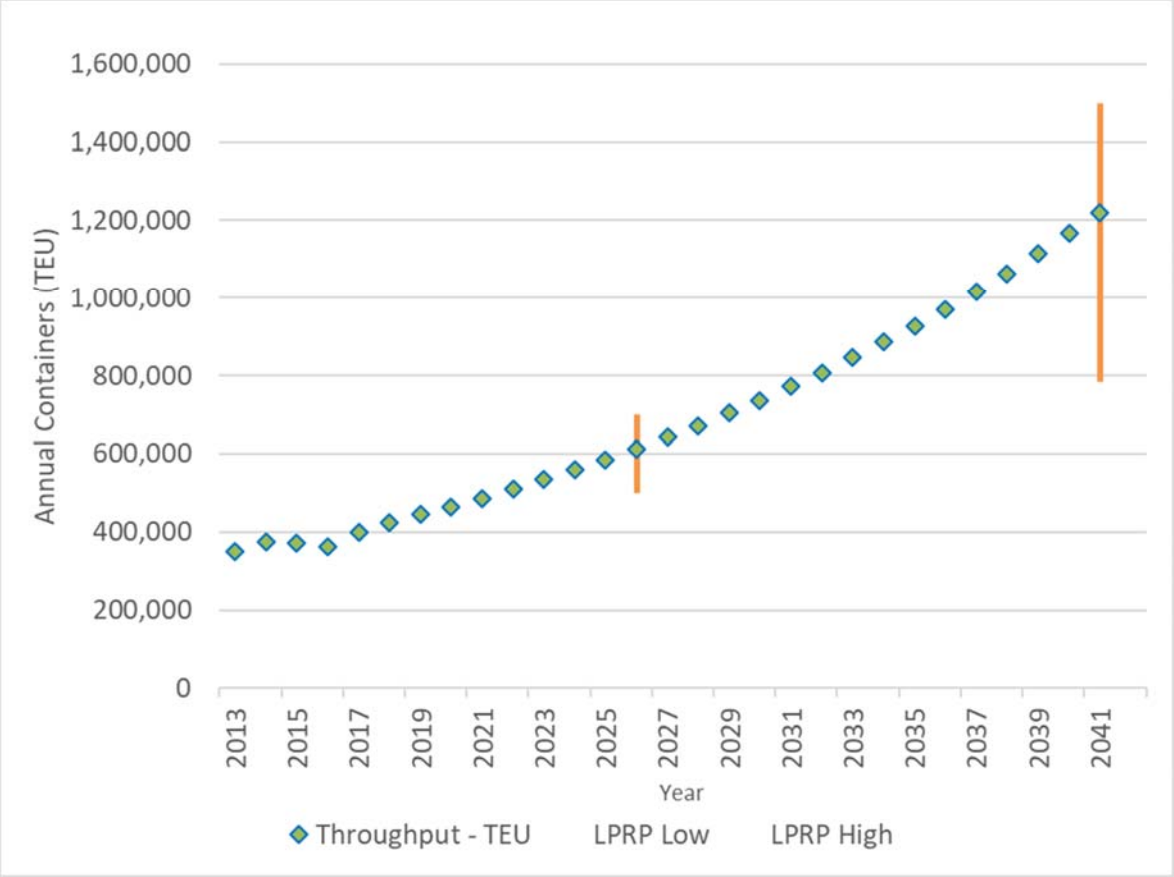


Figure 12-1: Container TEU Growth

The container volumes are forecast to increase by approximately 44% over the next eight years (to 2026), and then double between 2026 and 2041. This growth will only be achievable if the reclamations proceed and the Proposed Container Terminal is granted consent to allow reconfiguration of the existing container terminal and address existing Port operating constraints.

The container volumes include those that are "trans-shipped", moved by rail, and moved by truck. An analysis of container movement by truck has been undertaken by calibrating existing gate movements to the volume of "units" moved. The current estimate is that local unit movements, approximately 12% are made by rail. In the long term, this is forecast to increase to approximately 20%.

After allowance for rail to take some of the units, the following daily heavy vehicle traffic volumes on a weekday have been estimated. With increasing volumes on the road network, and large growth in container movement, it is assumed that Port operations will spread to include additional movement at weekends, i.e. moving from approximately 5.5 to 6 day a week operation (full year volumes divided by 310).

Table 12-1: Container Truck Movements between Road Network and Port

Year	TEU	Yearly Units by Road	Weekday Traffic Volume	Weekday Peak Hourly (interpeak)
2018/19	444,515	253,000	1,154	76
2025/26	613,075	336,197	1,396	92
2040/41	1,220,995	626,234	2,600	172

It can be seen that the hourly container truck movements are forecast to increase from approximately 76 to 172 vehicle movements per hour (where a vehicle movement is either a truck entering the Port, or a truck exiting the Port).

12.2 Other Heavy Vehicle Generators

The traffic counts indicate existing heavy traffic other than container movements equate to approximately 40 heavy vehicle movements per hour at the busiest time of day on Norwich Quay. Assuming a similar peak to daily ratio, that would equate to approximately 600 heavy vehicle movements per day currently. This traffic is comprised of movements associated with logs, fertiliser, dry bulk, and other goods. Fuel movements are in addition to this volume, as they use Simeon Quay rather than Norwich Quay. Based on the traffic counts, the indicative traffic volume associated with bulk fuel is up to approximately 17vph, equating to approximately 240vpd.

Growth in traffic movements associated with the bulk goods has previously been forecast by LPC to occur at a slower rate than containers. The LPRP analysis is provided in the table below. It shows that non-container (and removing other trucks related to immediate post-earthquake recovery) movements increase as follows:

- 2013-2026: 692vpd to 997vpd; 24vpd p.a.
- 2026-2041: 997vpd to 1,463vpd, 31vpd p.a.

Table 1: Truck Movement Forecasts (Two way movements)

Commodity	% by other modes	2013 Truck Mvmnts		2026 Truck Mvmnts		2041 Truck Mvmnts	
		per annum	per Day	per annum	per Day	per annum	per Day
Containers Lower Bound	20% inc to 40% rail	280,974	947	296,154	906	360,923	1,104
Containers Upper Bound	20% inc to 40% rail	-	-	376,923	1,153	692,308	2,117
Bulk fuels	40% pipeline	55,559	187	85,000	260	155,000	474
Logs	20% rail	23,658	80	23,680	72	32,000	98
Coal	100% rail	-	-	-	-	-	-
Fertiliser		63,288	213	100,971	309	135,922	416
Dry bulk		62,802	212	116,505	356	155,340	475
Other		61,070	206	-	-	-	-
TOTAL Trips to/from Port	lower bound	425,492	1,845	622,310	1,903	839,185	2,566
	upper bound			703,079	2,150	1,170,570	3,580

Figure 12-2: LPRP Truck Movement Forecasts (Abley ITA)

With the reopening of Sumner Road, the LPRP ITA estimated that approximately 50% of heavy vehicle movements to/from Simeon Quay will travel via the hazardous vehicle route involving transport along Norwich Quay. No further information is available to suggest that estimate needs to be adjusted.

12.3 Total Heavy Traffic Volume

The daily traffic volume forecast is set out below, adopting the current container forecasts and LPRP forecasts for bulk movements.

Table 12-2: Port Related Truck Movements on Norwich Quay

Year	Daily Traffic Movements (vpd)				Peak Hourly Traffic Movements (vph)		
	Container	Bulk	Hazardous (via Simeon and Sumner)	Total	Hazardous (via Simeon and Sumner)	Container and Bulk	Total
2018/19	1,154	612	-	1,766	-	116	123
2025/26	1,396	737	130	2,263	9	149	149
2040/41	2,600	989	237	3,825	16	236	251

It can be seen that the future heavy traffic volume on Norwich Quay could increase from approximately 123vph current (in the interpeak period), to 251vph in the long term. This assumes the same pattern of hourly movement across a day.

12.4 Light Vehicle Growth

12.4.1 Port Traffic Generation

Future growth forecasts for jobs at the Port are unknown at this stage due to uncertainties such as technology changes at the container terminal. The LPRP ITA undertook assessment based on a forecast that Port employment would be approximately 50% to 100% higher than existing year 2006 Port employment. Taking the mid-point (based on current TEU forecasts provided by LPC), the following growth rates compared to 2019 have been determined:

- 2019 to 2026 10% increase
- 2019 to 2041 50% increase

These increases have been applied to the light vehicles movements recently surveyed entering and exiting the Port.

The forecast volumes are set out below:

Table 12-3: Light Vehicle Movements (via Oxford St and Main Gate) – (vehicles per hour)

Year	AM Peak	Inter Peak	PM Peak
2018/19	146	199	229
2025/26	161	219	252
2040/41	219	299	344

12.4.2 Other Light Vehicle Increases

Increases in other Lyttelton traffic movements have also been allowed for, albeit at a low level of 0.5% per annum based on 2018/19 as household growth is expected to be limited. This is comparable to the growth allowed for in the LPRP ITA (Section 4.9) which was based on Christchurch Transport Model landuse forecasts.

12.5 Cruise Ships

The construction of a cruise berth at the western end of Cashin Quay has commenced. The traffic assessment carried out as part of the LPRP process (discussed earlier) assessed that in the long term there may be between 81 to 118 vessels per season, (which runs October to April). LPC have advised on the expectation that the Port could accommodate the world's largest international cruise ships, and there will be a large increase in movement at the Port when that type of vessel is docked. A typically sized cruise vessel has approximately 2,850 passengers, many will disembark for visits within Canterbury. The LPRP included assessment of modal split for passengers based on information available from prior to the earthquakes. Approximately 42-45% would utilise organised tours, 45-48% use shuttle buses, 2.5% use taxis, and 6-7% use shuttles to Lyttelton. Movement could occur in the peak periods, with cruises arriving early morning, and leaving evening.

Applying the same modal split to the large cruise ship, and assuming approximately 90% of passengers disembark (2,565 passengers), this could potentially equate to approximately:

- 45% Coach tour, approximately 30 passengers per bus — 38 vehicles
- 45% Shuttle bus, approximately 30 passengers per bus — 38 vehicles
- 3% Taxi, approximately 2 passengers per taxi — 38 vehicles
- 7% Shuttle bus to Lyttelton, approximately 40 passengers per bus — 5 vehicles

On that basis, it is likely the inbound or outbound volume would be approximately 120 vehicle movements associated with passenger transport in a peak period.

13. Traffic Forecasts

The anticipated future traffic forecasts for 2026 are set out in the drawings below for each of the peak periods. Forecasts for 2041 have also been produced for assessment purposes. As the cruise ships are not expected every day, and the scale of traffic generation will vary considerably depending on size of the ship, the traffic forecasts have not included the cruise ships. Instead, a separate test has been undertaken to show the indicative change in performance and that is reported in section 14.3 of this report.

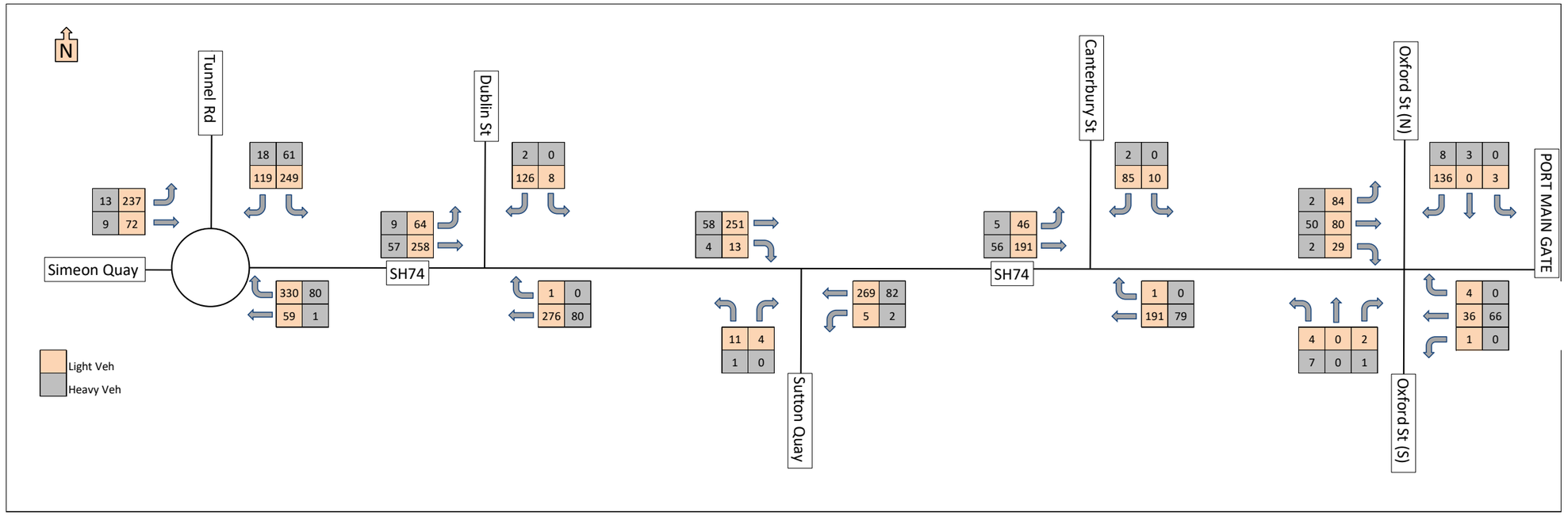


Figure 13-1: 2026 AM Peak Traffic Forecast

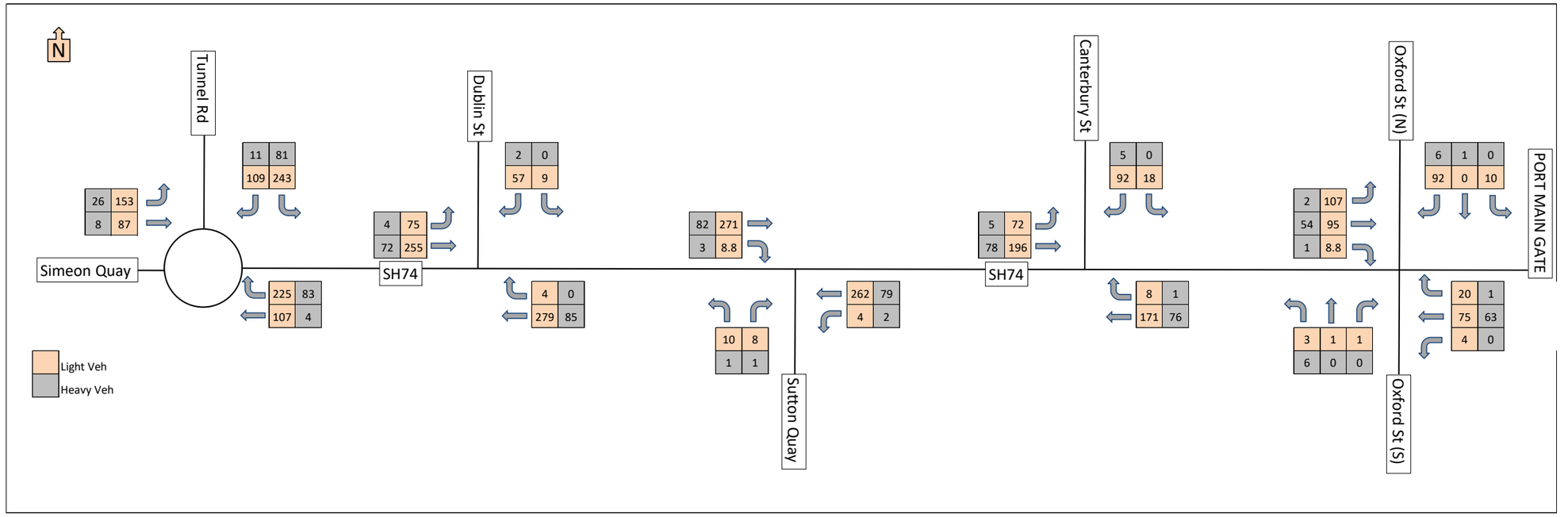


Figure 13-2: 2026 Inter Peak Traffic Forecast

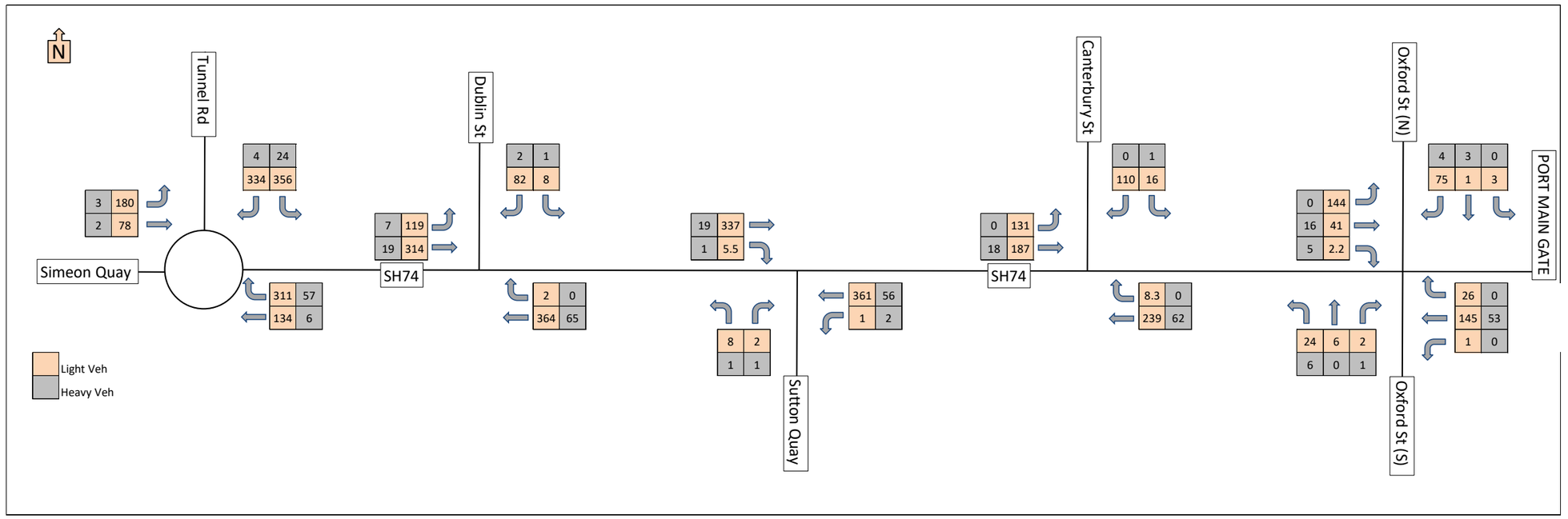


Figure 13-3: 2026 PM Peak Traffic Forecast

14. Traffic Network Performance

The forecast traffic volumes have been tested within SIDRA intersection v8, and the performance summary is included below.

14.1 2026 Performance

Table 14-1: Norwich Quay Intersection Performance – 2026 AM Peak

Intersection	Critical Movement	Volume (vph)	Average Delay (s/veh)	Level of Service
Tunnel / Norwich / Simeon	Intersection	1,249	5	LOS A
Norwich / Dublin	Dublin - Right	128	21	LOS C
Norwich / Sutton	Sutton - Right	4	16	LOS C
Norwich / Canterbury	Canterbury Right	87	12	LOS B
Norwich / Oxford	Oxford (N) Right	144	11	LOS B

Table 14-2: Norwich Quay Intersection Performance – 2026 Inter Peak

Intersection	Critical Movement	Volume (vph)	Average Delay (s/veh)	Level of Service
Tunnel / Norwich / Simeon	Intersection	1,134	5	LOS A
Norwich / Dublin	Dublin - Right	59	24	LOS C
Norwich / Sutton	Sutton - Right	9	19	LOS C
Norwich / Canterbury	Canterbury Right	97	13	LOS B
Norwich / Oxford	Oxford (N) Right	98	12	LOS B

Table 14-3: Norwich Quay Intersection Performance – 2026 PM Peak

Intersection	Critical Movement	Volume (vph)	Average Delay (s/veh)	Level of Service
Tunnel / Norwich / Simeon	Intersection	1,487	6	LOS A
Norwich / Dublin	Dublin - Right	84	28	LOS D
Norwich / Sutton	Sutton - Right	3	24	LOS C
Norwich / Canterbury	Canterbury Right	110	12	LOS B
Norwich / Oxford	Oxford (N) Right	79	11	LOS B

The forecast 2026 performance shows that intersections are still expected to be operating in the LOS C to LOS D range at the western end of Norwich Quay. Even with Port related growth, as through-traffic volumes are not significantly higher than existing. Through-traffic volumes remain in the order of 700 to 725vph at peak, at which volume it would typically be expected a road and its intersections can operate efficiently, as supported by the analysis.

14.2 2041 Performance

Table 14-4: Norwich Quay Intersection Performance – 2041 AM Peak

Intersection	Critical Movement	Volume (vph)	Average Delay (s/veh)	Level of Service
Tunnel / Norwich / Simeon	Intersection	1,485	6	LOS A
Norwich / Dublin	Dublin - Right	136	48	LOS E
Norwich / Sutton	Sutton - Right	6	26	LOS D
Norwich / Canterbury	Canterbury Right	93	16	LOS C
Norwich / Oxford	Oxford (N) Right	154	19	LOS C

Table 14-5: Norwich Quay Intersection Performance – 2041 Inter Peak

Intersection	Critical Movement	Volume (vph)	Average Delay (s/veh)	Level of Service
Tunnel / Norwich / Simeon	Intersection	1,383	6	LOS A
Norwich / Dublin	Dublin - Right	63	64	LOS F
Norwich / Sutton	Sutton - Right	12	44	LOS E
Norwich / Canterbury	Canterbury Right	105	23	LOS C
Norwich / Oxford	Oxford (N) Right	106	21	LOS C

Table 14-6: Norwich Quay Intersection Performance – 2041 PM Peak

Intersection	Critical Movement	Volume (vph)	Average Delay (s/veh)	Level of Service
Tunnel / Norwich / Simeon	Intersection	1,708	6	LOS A
Norwich / Dublin	Dublin - Right	90	83	LOS F
Norwich / Sutton	Sutton - Right	5	49	LOS E
Norwich / Canterbury	Canterbury Right	118	17	LOS C
Norwich / Oxford	Oxford (N) Right	84	16	LOS C

The analysis of the long term 2041 period shows that with through-traffic volumes of approximately 900vph, intersections at the western end of Norwich Quay will start to have lower levels of performance. In this case the higher proportion of heavy vehicles is expected to contribute to a lower level of performance than what might be expected from a road with the same volume, but lower level of heavy vehicles. Ultimately, the level of performance will be governed by the heavy vehicle mix. It can also be seen that there is a marked difference between delay at Canterbury Street and Dublin Street. In practice, drivers will tend to balance the delay, with some diverting from turning at Dublin Street to turning at Canterbury Street.

It is anticipated that performance of Norwich Quay will also depend on the rate of growth of Lyttelton township. If the township grows faster than allowed for, clearly the performance results identified above could come forward in time. It is considered that will be relatively independent of the Proposed Container Terminal.

14.3 With Cruise Ships

As described in Section 12.5, the cruise ships are not expected every day, and the scale of traffic generation will vary considerably depending on size of the ship. For that reason the traffic forecasts and detailed intersection assessment did not include the cruise ships, and a separate sensitivity test of intersection performance on Norwich Quay has been undertaken. The traffic generation forecasts for the largest cruise ship is for the addition of approximately 120vph. An additional sensitivity intersection analysis at 2026 has been undertaken and shows for Norwich Quay / Canterbury Street there will be negligible change in performance compared with the typical day assessed earlier, with right turn delay changing by only 2-3 seconds per vehicle and remaining well within acceptable level of service. The Port can also manage the timing of arrival and departure of coaches, and some of its other activities to spread peak traffic movements on days that cruise ships visit.

15. Future Infrastructure Requirements

Assuming all traffic east of Oxford Street is Port related, the traffic counts indicate up to 290 vehicles per hour entering and leaving though the main gate at the Port during the middle of the day, of which 110vph are heavy vehicles. Going forward, this is forecast to increase to approximately 500vph in the long term, of which 215vph are heavy vehicles. That is equivalent to approximately 1 heavy vehicle every 30 seconds.

As a means to manage this predicted increase in Port related traffic, it is understood that LPC has recently implemented a vehicle booking system to redistribute traffic into off-peak periods. The booking system has improved container truck turn-around time from approximately 34 minutes to 24 minutes. This has resulted in some spreading of traffic to off peak periods. LPC are to continue to monitor the performance of the gate to ensure that it can efficiently accommodate increases.

With the additional Port related traffic, the SIDRA analysis shows that performance of intersections is expected to continue to operate at acceptable levels in the short and medium term (i.e. as indicated by the 2026 analysis). A similar level of performance was forecast in the LPRP for 2026.

In the longer term, intersection performance will deteriorate, with the increased contribution of Port related light and heavy traffic but traffic volumes are likely to need to be above 900 to 1,000 vph before improvements might need to be contemplated. Intersection safety has not been an issue recently, suggesting drivers are able to undertake maneuvers safely. A key driver for future improvements may relate to perception of safety, and ease of access to the Lyttelton town centre, in which case traffic signals at one of the side road intersections might be a consideration. The Canterbury Street intersection has been tested in the 2041 PM peak, with additional traffic added from right turns that would otherwise use Dublin Street, and with additional through traffic associated with the largest cruise ship. The intersection would perform with good levels of service, indicating solutions exist to provide improved levels of service and accessibility in the future. Based on the Port expansion traffic forecasts, the need for improvements to enhance access to and from Norwich Quay is not of immediate concern, but is rather a matter for longer term monitoring and forward planning by the road controlling authorities.

16. Railway Network

The LPRP anticipated up to 40% of container freight to be moved to and from the Port by rail. This current transportation assessment has taken a more conservative approach based on current LPC data which indicates rail freight will account for approximately 20% of "units" moved in 2041. The effect of this is more movement by heavy vehicles than assessed in the LPRP, but significantly lower railway movements. In that respect, the LPRP assessment remains a worst-case scenario.

Whilst individual train movements will have the same level of effect on roads with level crossings in Christchurch as assessed in the LPRP, the frequency of train movements and level crossing closures will be reduced (potentially by as much as half) compared to the LPRP assessment.

PART E: CONCLUSION

17. Conclusion

The assessment in this report has shown that expansion of the Port is an anticipated activity within wider transport planning documents and strategies, and traffic generation is permitted by the Special Purposes (Lyttelton Port) Zone resulting from prior planning processes for Lyttelton Port, including the LPRP and District Plan replacement.

In the wider network, various improvements and studies are being undertaken to maintain and improve efficiency of movement to the Port via the road network. A pedestrian crossing facility has been implemented on Norwich Quay, and although it is not recording a lot of use, it will provide for future increases in movements to and from Te Ana marina developments.

Freight growth forecasts still fit within the bounds of growth forecasts assessed for the LPRP. Detailed intersection surveys and intersection analysis demonstrate the supporting road network accessing the Port operates within its traffic carrying capacity, with intersections performing with good levels of service. With future Port growth, good intersection performance is maintained in the short and medium terms. In the longer term, intersection performance may warrant consideration of additional improvements to intersections, although at projected traffic volumes this is unlikely to be required for some time.

There is plenty of scope for Port operations to utilise available road network capacity at off-peak times, either through expanding the primary operating hours (e.g. from a 5.5 day to 6 day week), or increasing movements in the periods before and after the daytime peak periods. Recent implementation of a booking system for container trucks has been effective in shifting time of truck movements, and improving transfer times for trucks.

The Proposed Container Terminal will facilitate reinstatement of a cruise ship berth. Movement would not be daily, and the impact on the road network is expected to be readily managed and accommodated.

Assessment of the freight growth has allowed for a lower percentage of freight movement by rail compared with the LPRP. In that respect, the impact of the increased rail freight on the road network (at level crossings) will be less than anticipated by the LPRP.

It is considered the traffic related effects of the Proposed Container Terminal have largely been anticipated by previous studies and planning processes, and updated assessment at local intersections suggests similar longer term timeframes will continue to apply for any necessary improvements to intersections within Lyttelton. Further development traffic generation facilitated by the expansion and improvements to the strategic transport hub can be supported from a transportation effects perspective.

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APPENDIX 8

POWER

LYTTELTON PORT COMPANY

RECLAMATION LAND USE CONSENT

ASSESSMENT OF ELECTRICAL POWER SUPPLY INFRASTRUCTURE:

Date: 05/06/2019

Revision: C – Final

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6.1 Appendix A Proposed Stages of 11kV Upgrade Works .

6.2 Appendix B 11kV Main Reticulation Network Overview Plan .

1. Introduction

This report has been prepared by Pedersen Read Limited to assist Lyttelton Port Company (LPC) obtain land use consents to enable 'Port Activities' to be established on the reclamation area in Te Awaparahi Bay, at the eastern end of Lyttelton Port.

'Port activities' on the reclamation area that require power supplies may include the following:

- Ship to shore container cranes
- Shore power connections
- Electrified container/cargo handling equipment
- Moring systems
- Maintenance activities
- Building services
- Site lighting
- Construction activities
- Refrigerated containers
- Fuel Storage/Distribution Equipment
- Rail infrastructure

2. Description of the Power Supply Infrastructure

External Orion Network

The present Orion supply to all of Lyttelton is via dual circuit 11,000 volt (11kV) aerial cables on a single line of poles over the Port Hills from the Orion Heathcote substation. These cables each have a maximum rated capacity of 7MVA (megavolt ampere). However, Orion's policy is to provide ''N-1"[1] redundancy and this limits the maximum rated capacity for Lyttelton to 7MVA with one backup circuit available if a fault occurs in one of the aerial circuits.

Allowing for Orion power supplies to other power consumers in the wider Lyttelton area, Orion's connection agreement for an 11kV connection to LPC at present has a maximum available capacity of 3.75MVA to the port.

The Orion Heathcote Zone substation supplying Lyttelton is able to be connected to two Transpower grid exit points at the Bromley and Islington (via Halswell substation). This dual supply option provides an "N-1" level of redundancy.

The Port complex receives two incoming 11kV power supplies from Orion.

1. The existing LPC Main Substation on Sutton Quay is fed from Orion's Dublin Street substation via underground cable.
2. The new LPC No.2 Jetty Substation, located under the Oxford Street overhead bridge, is fed from Orion's Norwich Quay substation via underground cable.

The points of connection to the incomer circuit breakers in the above two LPC substations are the demarcation points between LPC and Orion.

[1] The maximum power supply capacity with the loss of one (largest) of the available supplies.

There are mechanisms within the Orion supply network for the increased capacity to meet the future demand in the reclamation area as outline below.

Internal LPC Network

Beyond the above demarcation points, LPC own and operate an independent internal 11kV and 400 volt distribution network. The power supply is also supplemented with limited capacity 400 volt standby diesel generators for essential loads, at the Lyttelton container terminal (LCT) substation.

Since the 2011 earthquakes, a considerable amount of electrical work has been undertaken to repair and reinforce the Port's 11kV network to increase the internal power network capacity and resilience. All of the Port's primary substations are now configured with two 11kV supply cables (more commonly referred to as ring mains). These ring mains provided an alternative power supply option if one supply cable, or its associated 11kV switchgear, is damaged or out of service for maintenance purposes.

Four of the primary substations (No.2 Jetty. Officers Point, Te Bay and Straddle Workshop) now have vacuum circuit breakers as the primary switchgear with new electronic protection relays.

New Major LPC Electrical Projects Currently in Design Planning

The following is a brief summary of the proposed new major electrical projects works currently in the design planning phase to improve the LPC internal 11kV network:

- A new replacement Main Substation to be mounted under the Sutton Quay ramp.
- A new 11kV / 400V transformer on wharf 7 to provide for load growth in the area.
- New reefer substations and associated diesel standby generation.

The LPC network is presently configured to enable it to be readily expanded to supply the expected electrical requirements of the port activities on the reclamation area.

In addition, further upgrade work is planned to meet the needs of the Port's expansion and growth to 2039. This upgrade works will be implemented as required to suit the Port's expansion onto the reclamation area. The post 2039 upgrade works are yet to be planned and will be dependent upon actual load growth and port activities.

3. Reclamation Area Future Electrical Load Growth

The scale and location of port activities proposed on the reclamation area will require modifications to the existing electrical infrastructure at the Port to provide reliable and resilient electrical supply. This is critical for port activities in the reclamation area as more systems become automated and electrically driven.

Table 1 below indicates the estimated power maximum demand for the port based on predictions for expansion of the port and and the anticipated growth in freight volumes.

It is estimated that the electrical peak demand of the Port could be around 10MVA in 2039 with the expansion of port activities onto the reclamation area. This electrical demand and future supply requirements can be met by engineering works that have been conceptually designed. The extent of works and sequencing of these stages will be developed to suit the staged expansion on to the reclamation area.

If the load growth continues beyond 2039, this will result in a shortfall in the LPC network capacity. This short fall could be addressed by further electrical infrastructure enhancement, load control measures or LPC standby diesel generators could be run to reduce the peak demand.

Alternatively, consideration could be given to dispensing with the requirement for redundancy in the reticulation system during times of peak load. This could potentially lead to productivity constraints, if an electrical fault occurs or during electrical equipment maintenance.

Year	HPC Container Terminal Estimated Maximum Demand (MVA)	Estimated Diversified Other LPC Load (MVA)	Total Estimated LPC Load (MVA)	Orion Supply Available "N-1" to LPC (See Note 1) (MVA)	LPC 11kV Network "N-1" Capacity (See Note 2) (MVA)	Available "N-1" Capacity to East Reclamation (MVA)
~2022	5	0.7	**5.7**	12 - 13	5.5	6
~2030	7	0.8	**7.8**	12 - 13	10.8	6 / 8
~2038	9.3	0.8	**10.1**	12 - 13	10.8	10
~2039	9.6	0.8	**10.4**	12 - 13	10.8	10
~2040	10.1	0.9	**11**	12 - 13	10.8	10
~2045	12.5	1.0	**13.5**	12 - 13	10.8	10
~2048	13.7	1.0	**14.7**	12 - 13	10.8	10

Table 1 Estimated Electrical Maximum Demand

Table 1 Notes

1. Orion supply available to LPC assumes the Lyttelton load does not exceed 1 to 2 MVA and has not been allocated to other consumers.

2. LPC 11kV network “N-1” capacity with planned upgrade work carried out as identified in the Electrical Infrastructure Strategic Development Concept Design Report Rev. C June 2015.

4. Power Infrastructure Upgrade Works to Supply LPC and the Reclamation Area

External Orion Network

In response to the vulnerabilities of the Port Hills aerial transmission line identified in the previous section, and following discussions with the LPC on the port’s longer term strategic growth, Orion has commenced the installation of a new 11kV cable through Lyttelton road tunnel. This will provide a third supply to Lyttelton via an independent route and will significantly improve the reliability of the power supply to Lyttelton with an “N-1” redundancy maximum capacity for Lyttelton of 14MVA.

This third Orion cable to Lyttelton will cater for estimated LPC load growth to approximately 2045.

This tunnel cable will enhance the security of supply to the wider Lyttelton area and greatly reduce the risk of an extended power outage to Lyttelton due to adverse weather events or possible damage to the aerial transmission line.

The increased available capacity will also mitigate potential power disturbances (extend low voltage events or sudden changes or ‘spikes’) that could occur on the Lyttelton power network with large changeable loads, such as the operation of the container cranes.

If the LPC load increases above 12 - 13MVA, or the electrical demand of the wider Lyttelton area increases to a level approaching 14 MVA, Orion will need to consider increasing the power supply capacity to Lyttelton. If this does occur, the solution may be an upgrade of the Orion network from Heathcote substation and a second 11kV cable through the road tunnel. Any external upgrade work would be subject to Orion’s priorities and resources to implement the work.

Internal LPC Network

LPC has undertaken investigations[2] into the 11kV electrical infrastructure to establish how their network can be upgraded to meet the foreseeable needs.

A number of necessary stages of works have been identified to install additional 11kV cables and substations to allow the Port’s expansion on to the reclamation area. These include:

- New 11kV cables from LPC Officers Point and Te Bay Substations to the reclamation area (Stage 6).
- A new direct 11kV cable from the Orion Norwich Quay substation to the reclamation area (Stage 7).
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[2] Pedersen Read Ltd. 11,000 Volt Electrical Infrastructure Strategic Development Concept Design Report Rev. C June 2015 and Pedersen Read Ltd. 11,000 Volt Electrical Infrastructure Strategic Review Rev. C September 2017

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Refer to Appendix A for schematic diagrams of the proposed stages of work.

The proposed electrical works will involve typical engineering solutions for works of this type and scale.

The extent of works and sequencing of these stages may vary to suit the expansion on to the reclamation area.

These stages of work will be reviewed as details of the port's expansion plans onto the reclamation area are developed.

5. Conclusions

This report has been prepared to inform and support the application for landuse consent to enable 'Port Activities' to be established on the reclamation area in Te Awaparahi Bay, at the eastern end of Lyttelton Port

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Lyttelton Port Company operates its own internal 11kV power network. The network demarcation points at the Port's Main Substation on Sutton Quay and the No.2 Jetty Substation.

The proposed expansion of activities on to the reclamation area will significantly increase the power requirements of the Port.

It is estimated that the electrical peak demand of the Port could be around 10MVA in 2039 with the expansion of port activities onto the reclamation area. This electrical demand and future supply requirements can be met by engineering works that have been conceptually designed. The extent of works and sequencing of these stages will be developed to suit the staged expansion on to the reclamation area.

If the port electrical demand increases above 12 -13MVA further investigations will be required to determine the most suitable solution. It may be possible to consider load control measures or LPC standby diesel generators could be run to reduce the peak demand. Another option is to dispense with the requirement for redundancy in the reticulation system during times of peak load. However, this could potentially lead to productivity constraints, if a fault occurs or during equipment maintenance.

If the above options are not suitable, further LPC electrical infrastructure enhancement may be required. These works would involve typical engineering solutions normally associated with upgrading of power supply systems.

If the combined electrical demand of LPC and the wider Lyttelton area increases to a level approaching 14 MVA, Orion will need to consider increasing the power supply capacity to Lyttelton. If this does occur, the solution may be an upgrade of the Orion network from Heathcote substation and a second 11kV cable through the road tunnel.

6. Appendices

Appendix A Proposed Stages of 11kV Upgrade Works

Appendix B 11kV Main Reticulation Network Overview Plan

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Stage 6 – East Reclamation up to 2 – 2.5 MVA
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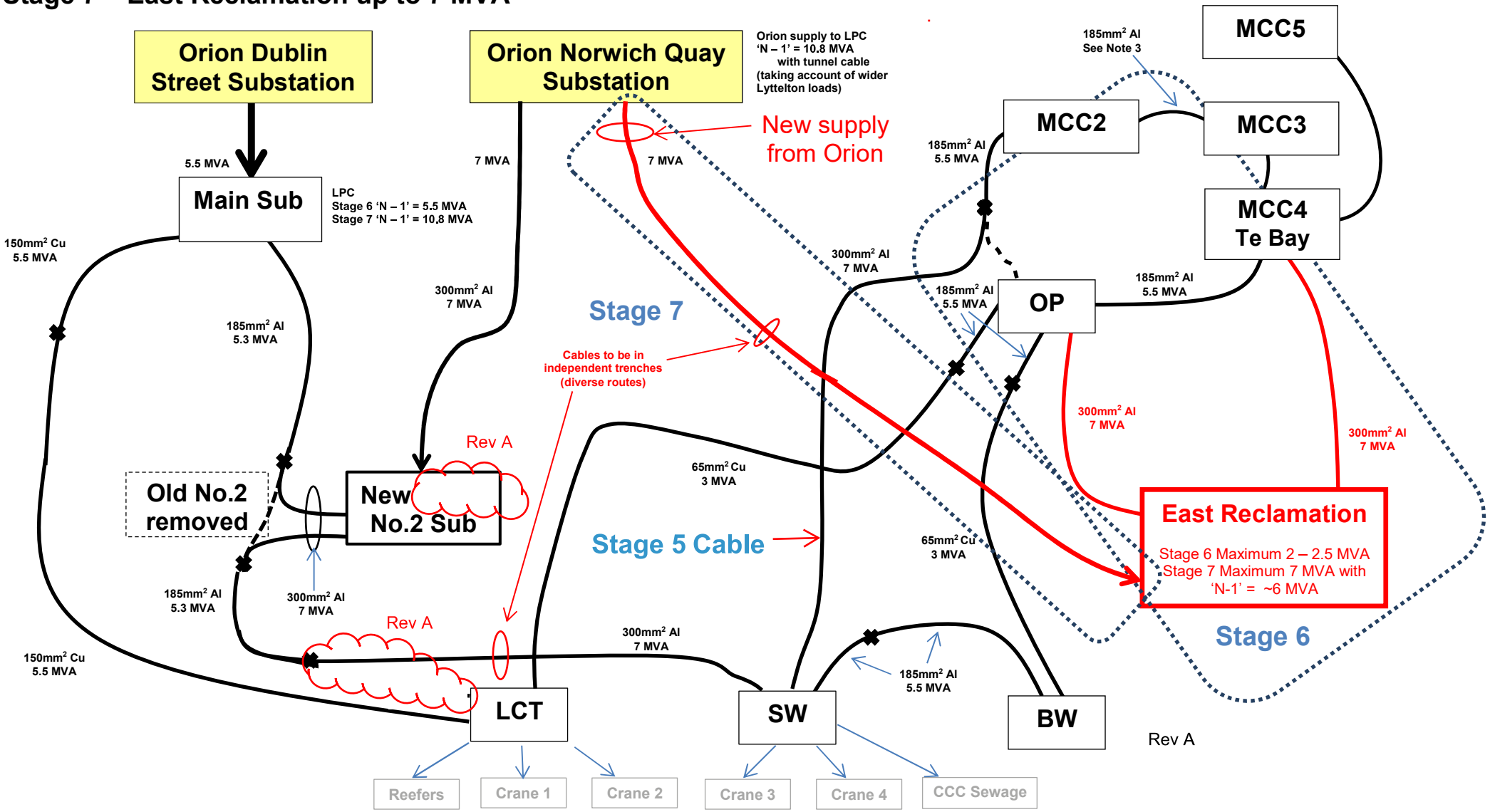

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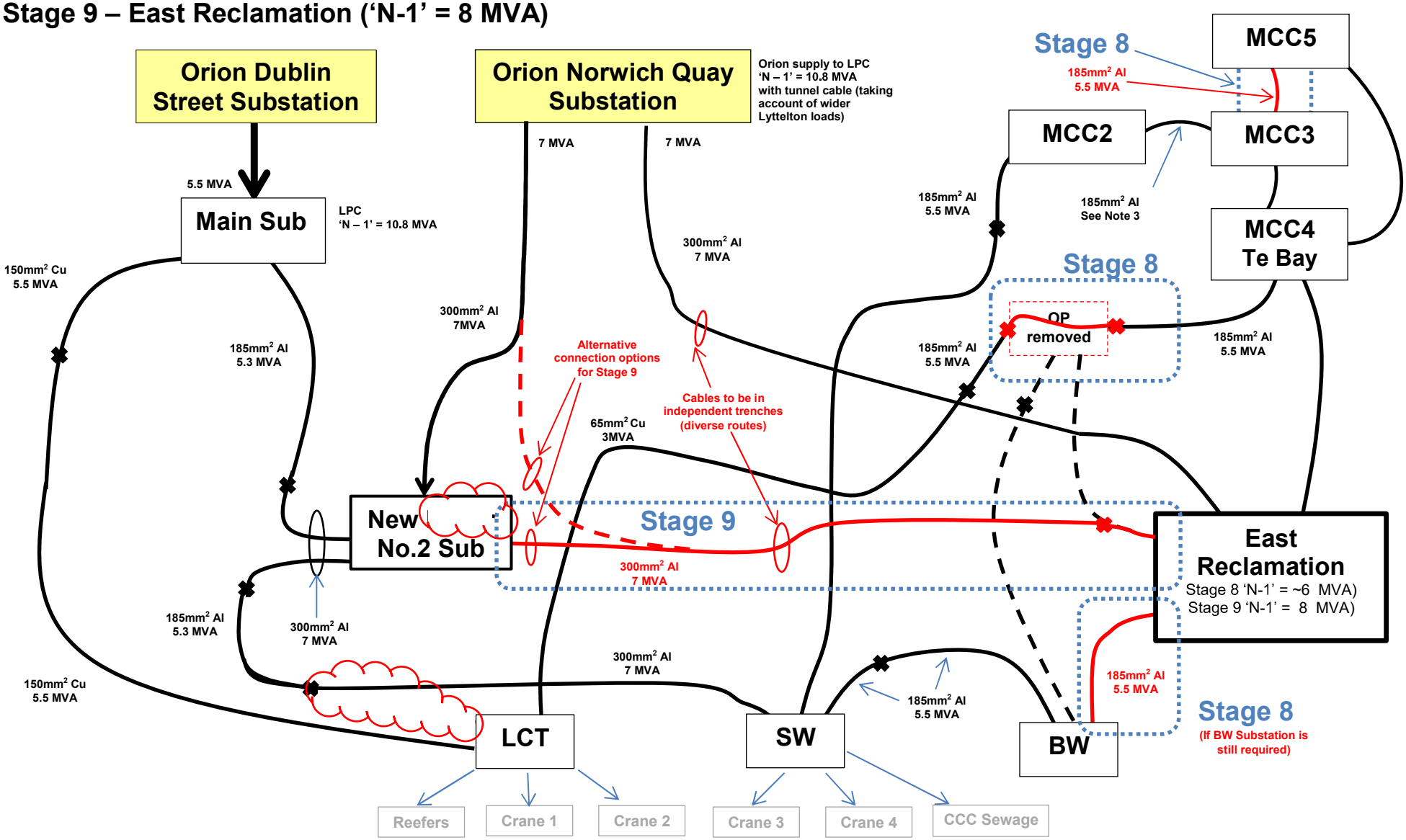

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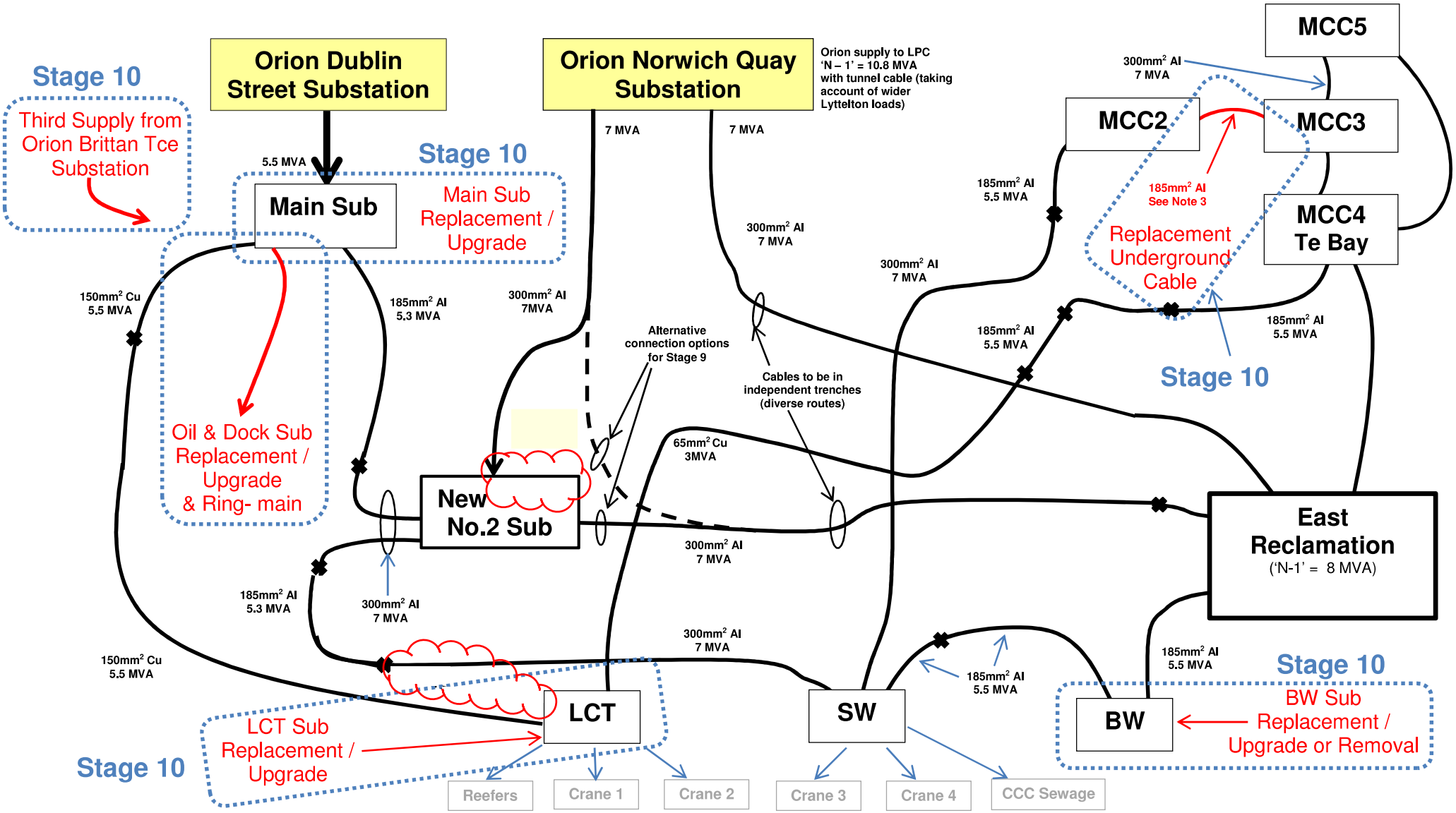

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6.2 Appendix B 11kV Main Reticulation Network Overview Plan

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LYTTELTON PORT COMPANY

RECLAMATION LAND USE CONSENT

ASSESSMENT OF ELECTRICAL POWER SUPPLY INFRASTRUCTURE:

Date: 05/06/2019

Revision: C – Final

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6.1 Appendix A Proposed Stages of 11kV Upgrade Works .

6.2 Appendix B 11kV Main Reticulation Network Overview Plan .

1. Introduction

This report has been prepared by Pedersen Read Limited to assist Lyttelton Port Company (LPC) obtain land use consents to enable 'Port Activities' to be established on the reclamation area in Te Awaparahi Bay, at the eastern end of Lyttelton Port.

'Port activities' on the reclamation area that require power supplies may include the following:

- Ship to shore container cranes
- Shore power connections
- Electrified container/cargo handling equipment
- Moring systems
- Maintenance activities
- Building services
- Site lighting
- Construction activities
- Refrigerated containers
- Fuel Storage/Distribution Equipment
- Rail infrastructure

2. Description of the Power Supply Infrastructure

External Orion Network

The present Orion supply to all of Lyttelton is via dual circuit 11,000 volt (11kV) aerial cables on a single line of poles over the Port Hills from the Orion Heathcote substation. These cables each have a maximum rated capacity of 7MVA (megavolt ampere). However, Orion's policy is to provide ''N-1"[1] redundancy and this limits the maximum rated capacity for Lyttelton to 7MVA with one backup circuit available if a fault occurs in one of the aerial circuits.

Allowing for Orion power supplies to other power consumers in the wider Lyttelton area, Orion's connection agreement for an 11kV connection to LPC at present has a maximum available capacity of 3.75MVA to the port.

The Orion Heathcote Zone substation supplying Lyttelton is able to be connected to two Transpower grid exit points at the Bromley and Islington (via Halswell substation). This dual supply option provides an "N-1" level of redundancy.

The Port complex receives two incoming 11kV power supplies from Orion.

1. The existing LPC Main Substation on Sutton Quay is fed from Orion's Dublin Street substation via underground cable.
2. The new LPC No.2 Jetty Substation, located under the Oxford Street overhead bridge, is fed from Orion's Norwich Quay substation via underground cable.

The points of connection to the incomer circuit breakers in the above two LPC substations are the demarcation points between LPC and Orion.

[1] The maximum power supply capacity with the loss of one (largest) of the available supplies.

There are mechanisms within the Orion supply network for the increased capacity to meet the future demand in the reclamation area as outline below.

Internal LPC Network

Beyond the above demarcation points, LPC own and operate an independent internal 11kV and 400 volt distribution network. The power supply is also supplemented with limited capacity 400 volt standby diesel generators for essential loads, at the Lyttelton container terminal (LCT) substation.

Since the 2011 earthquakes, a considerable amount of electrical work has been undertaken to repair and reinforce the Port's 11kV network to increase the internal power network capacity and resilience. All of the Port's primary substations are now configured with two 11kV supply cables (more commonly referred to as ring mains). These ring mains provided an alternative power supply option if one supply cable, or its associated 11kV switchgear, is damaged or out of service for maintenance purposes.

Four of the primary substations (No.2 Jetty. Officers Point, Te Bay and Straddle Workshop) now have vacuum circuit breakers as the primary switchgear with new electronic protection relays.

New Major LPC Electrical Projects Currently in Design Planning

The following is a brief summary of the proposed new major electrical projects works currently in the design planning phase to improve the LPC internal 11kV network:

- A new replacement Main Substation to be mounted under the Sutton Quay ramp.
- A new 11kV / 400V transformer on wharf 7 to provide for load growth in the area.
- New reefer substations and associated diesel standby generation.

The LPC network is presently configured to enable it to be readily expanded to supply the expected electrical requirements of the port activities on the reclamation area.

In addition, further upgrade work is planned to meet the needs of the Port's expansion and growth to 2039. This upgrade works will be implemented as required to suit the Port's expansion onto the reclamation area. The post 2039 upgrade works are yet to be planned and will be dependent upon actual load growth and port activities.

3. Reclamation Area Future Electrical Load Growth

The scale and location of port activities proposed on the reclamation area will require modifications to the existing electrical infrastructure at the Port to provide reliable and resilient electrical supply. This is critical for port activities in the reclamation area as more systems become automated and electrically driven.

Table 1 below indicates the estimated power maximum demand for the port based on predictions for expansion of the port and and the anticipated growth in freight volumes.

It is estimated that the electrical peak demand of the Port could be around 10MVA in 2039 with the expansion of port activities onto the reclamation area. This electrical demand and future supply requirements can be met by engineering works that have been conceptually designed. The extent of works and sequencing of these stages will be developed to suit the staged expansion on to the reclamation area.

If the load growth continues beyond 2039, this will result in a shortfall in the LPC network capacity. This short fall could be addressed by further electrical infrastructure enhancement, load control measures or LPC standby diesel generators could be run to reduce the peak demand.

Alternatively, consideration could be given to dispensing with the requirement for redundancy in the reticulation system during times of peak load. This could potentially lead to productivity constraints, if an electrical fault occurs or during electrical equipment maintenance.

Year	HPC Container Terminal Estimated Maximum Demand (MVA)	Estimated Diversified Other LPC Load (MVA)	Total Estimated LPC Load (MVA)	Orion Supply Available "N-1" to LPC (See Note 1) (MVA)	LPC 11kV Network "N-1" Capacity (See Note 2) (MVA)	Available "N-1" Capacity to East Reclamation (MVA)
~2022	5	0.7	**5.7**	12 - 13	5.5	6
~2030	7	0.8	**7.8**	12 - 13	10.8	6 / 8
~2038	9.3	0.8	**10.1**	12 - 13	10.8	10
~2039	9.6	0.8	**10.4**	12 - 13	10.8	10
~2040	10.1	0.9	**11**	12 - 13	10.8	10
~2045	12.5	1.0	**13.5**	12 - 13	10.8	10
~2048	13.7	1.0	**14.7**	12 - 13	10.8	10

Table 1 Estimated Electrical Maximum Demand

Table 1 Notes

1. Orion supply available to LPC assumes the Lyttelton load does not exceed 1 to 2 MVA and has not been allocated to other consumers.

2. LPC 11kV network “N-1” capacity with planned upgrade work carried out as identified in the Electrical Infrastructure Strategic Development Concept Design Report Rev. C June 2015.

4. Power Infrastructure Upgrade Works to Supply LPC and the Reclamation Area

External Orion Network

In response to the vulnerabilities of the Port Hills aerial transmission line identified in the previous section, and following discussions with the LPC on the port’s longer term strategic growth, Orion has commenced the installation of a new 11kV cable through Lyttelton road tunnel. This will provide a third supply to Lyttelton via an independent route and will significantly improve the reliability of the power supply to Lyttelton with an “N-1” redundancy maximum capacity for Lyttelton of 14MVA.

This third Orion cable to Lyttelton will cater for estimated LPC load growth to approximately 2045.

This tunnel cable will enhance the security of supply to the wider Lyttelton area and greatly reduce the risk of an extended power outage to Lyttelton due to adverse weather events or possible damage to the aerial transmission line.

The increased available capacity will also mitigate potential power disturbances (extend low voltage events or sudden changes or ‘spikes’) that could occur on the Lyttelton power network with large changeable loads, such as the operation of the container cranes.

If the LPC load increases above 12 - 13MVA, or the electrical demand of the wider Lyttelton area increases to a level approaching 14 MVA, Orion will need to consider increasing the power supply capacity to Lyttelton. If this does occur, the solution may be an upgrade of the Orion network from Heathcote substation and a second 11kV cable through the road tunnel. Any external upgrade work would be subject to Orion’s priorities and resources to implement the work.

Internal LPC Network

LPC has undertaken investigations[2] into the 11kV electrical infrastructure to establish how their network can be upgraded to meet the foreseeable needs.

A number of necessary stages of works have been identified to install additional 11kV cables and substations to allow the Port’s expansion on to the reclamation area. These include:

- New 11kV cables from LPC Officers Point and Te Bay Substations to the reclamation area (Stage 6).
- A new direct 11kV cable from the Orion Norwich Quay substation to the reclamation area (Stage 7).
- Possible reconfiguration of the supply around Officers Point Substation, or an upgraded supply to this substation and upgrade 11kV cabling to Breakwater and MCC5 Substations (Stage 8 and / or alternative works).

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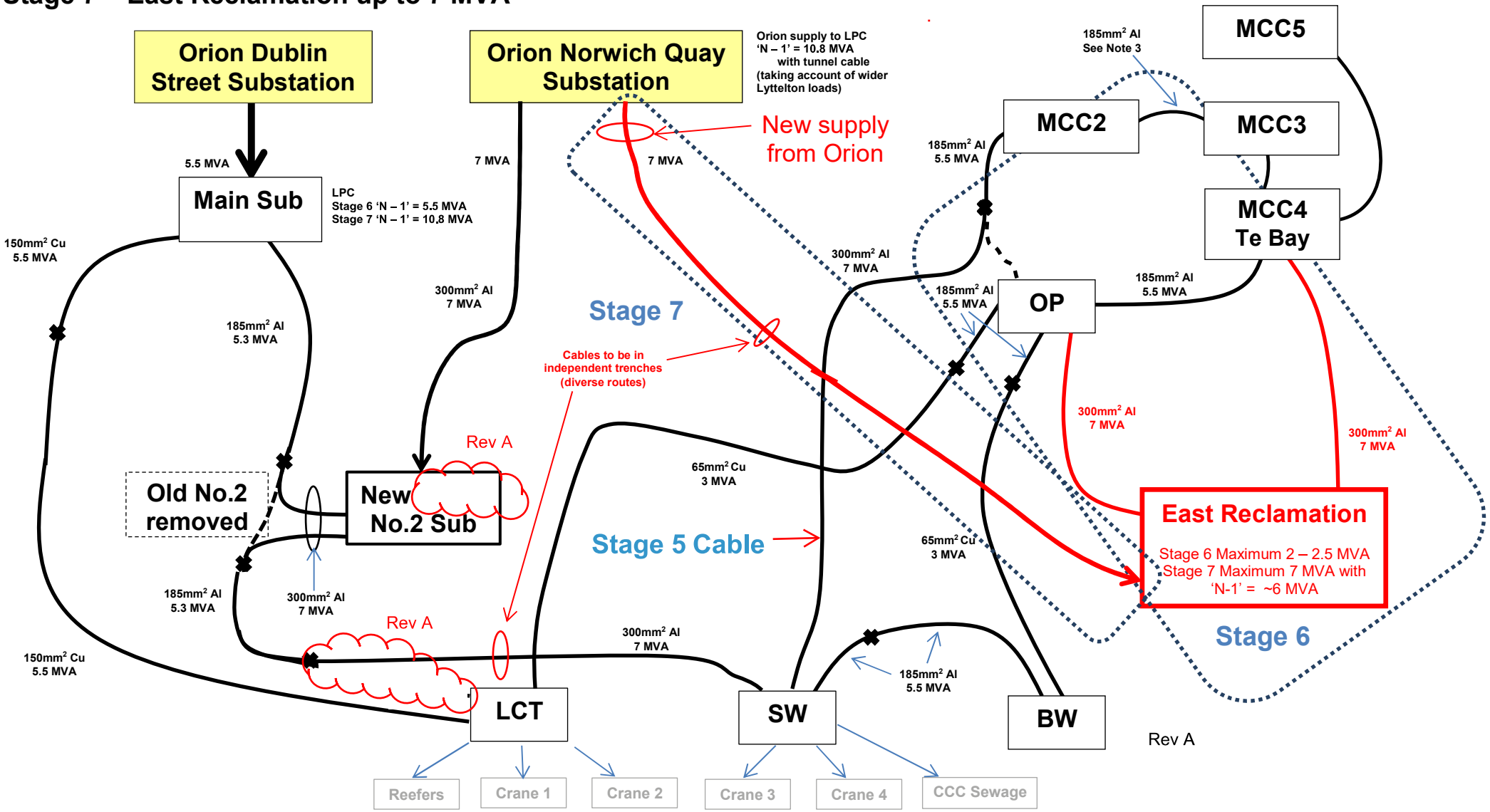

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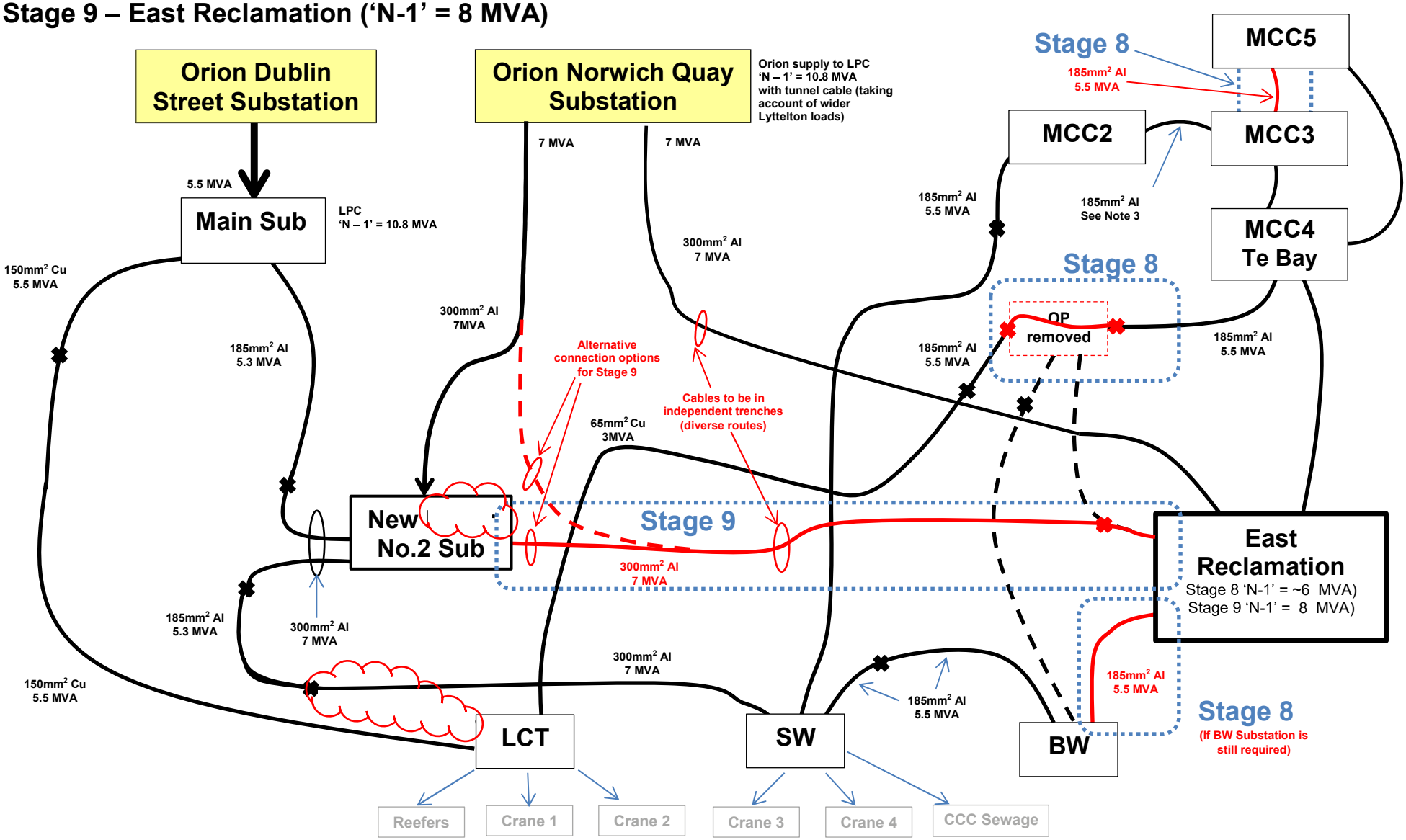

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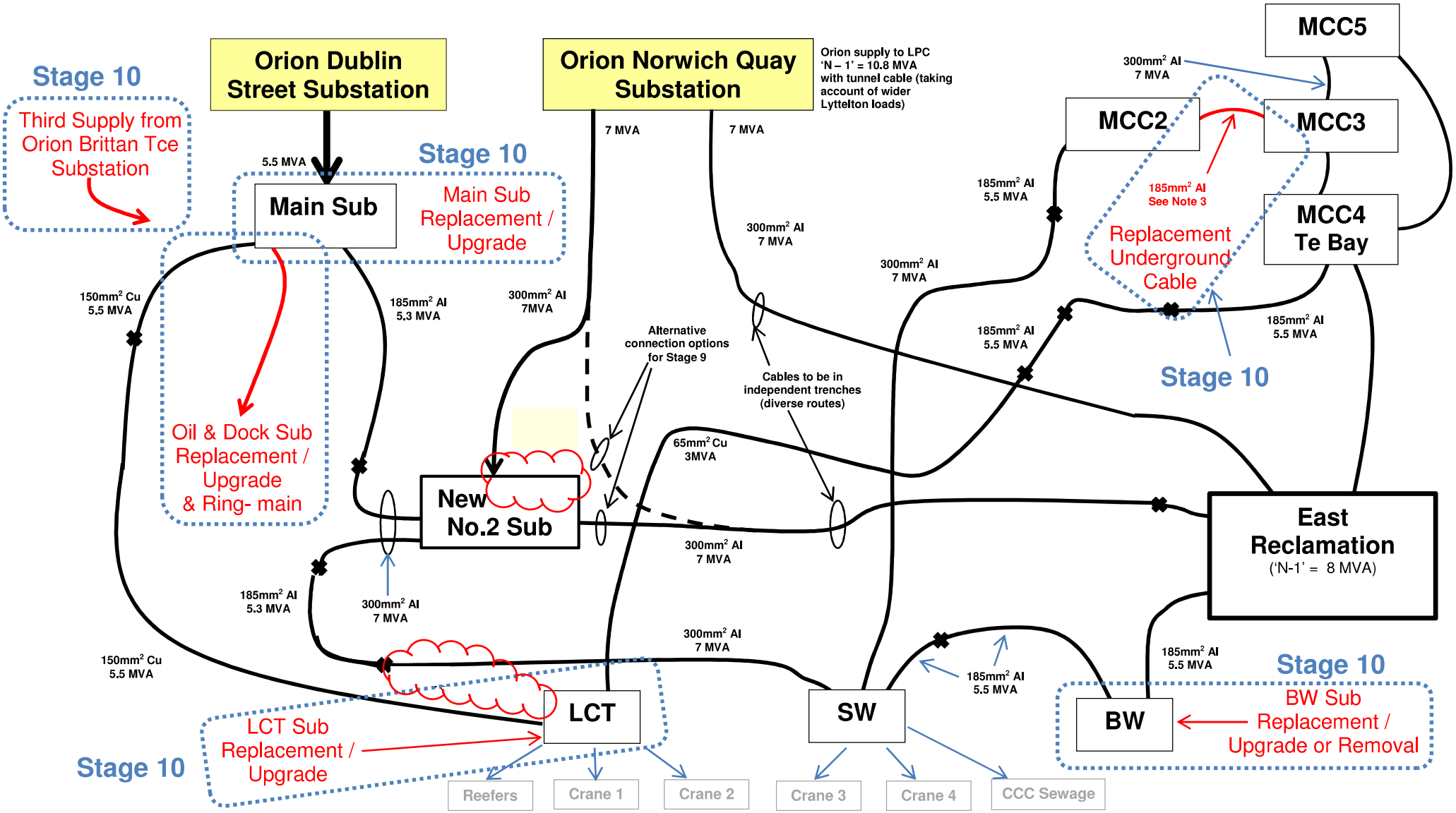

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