ANNEXURE I:

LIGHTING ASSESSMENT

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THE CAR DISTRIBUTION GROUP

JOHNS ROAD CAR STORAGE YARD

ASSESSMENT OF ENVIRONMENTAL EFFECTS: LIGHTING

REVISION: 1 - Final

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1.1 INTRODUCTION

This report has been prepared for The Car Distribution Group by Pedersen Read Limited. It assesses the environmental effects from exterior lighting of the proposed new Johns Road Car Storage Yard, to be located at 711 Johns Road adjacent to State Highway 1 (SH1). The report is based on the Cardno "John's Road Car Storage Yard, Issue 4" set of layout and detail drawings, dated 29.08.2016. The drawing set shows approximate locations of proposed car unloading areas, security fences and boundary bund details.

Refer to the site plan shown in Appendix A.

This update of the Report incorporates the new Planning Zones, Glare Rules and Spill Light Rules of the new Christchurch District Plan (published on 22 February 2017). It considers the Rules as they are applicable to the Zones adjacent to 711 Johns Road, as well as any implications by Civil Aviation Authority restrictions on the property with regards to lighting in the vicinity of aerodromes.

This assessment considers the existing environment, any environmental effects and consequences of the proposed Johns Road Car Storage Yard lighting installation on the existing environment. It discusses mitigation to minimise or eliminate glare for adjacent residents and avoid being a hazard to aircraft movement in the vicinity of the development.

It identifies the most suitable light source, luminaire type and pole configurations for the proposed car unloading area and perimeter security lighting, which also meet the regulatory constraints and operational requirements, while minimising adverse effects.

2. DISTRICT PLAN LIGHTING REQUIREMENTS

The following extracts from the Christchurch District Plan (published on 22 February 2017) are applicable to the proposed Johns Road Car Storage Yard.

The Christchurch District Plan – Chapter 6, General Rules and Procedures.

Rule 6.3.4 Rules – Activity Status tables – Control of Glare:

6.3.4.1 Permitted activities

The activities listed below are permitted activities if they meet the activity specific standards set out in the following table and the activity specific standards in Rule 6.3.5 Control of Light Spill.

Activities may also be restricted discretionary or non-complying as specified in Rules 6.3.4.2, 6.3.4.3 and 6.3.5.2.

Activity		Activity specific standards
P1	Any activity involving artificial outdoor lighting, other than activities specified in Rule 6.3.4.3 NC1 or NC2.	a. All fixed exterior lighting shall, as far as practicable, be aimed, adjusted and/or screened to direct lighting away from the windows of habitable spaces of sensitive activities, other than residential units located in industrial zones, so that the obtrusive effects of glare on occupants are minimised. b. Artificial outdoor lighting shall not result in a greater than 2.5 lux spill (horizontal or vertical) into any part of a major or minor arterial road or arterial route identified in Appendix 7.12 where this would cause driver distraction. Advice Note: See Appendix 6.11.13 for guidance on lighting design to reduce light spill and glare.

6.3.4.3 Non-complying activities

The activities listed below are non-complying activities.

Activity	
NC1	Any activity that results in a greater than 2.5 lux spill (horizontal or vertical) into any land outside the Specific Purpose (Airport) Zone that is within 500 metres of the threshold of a runway at Christchurch International Airport.
NC2	Any non-aeronautical ground lights in the areas shown in Appendix 6.11.7.4 that shine above the horizontal.

Rule 6.3.5 Rules – Activity Status tables – Control of Light Spill:

6.3.5.1 Permitted activities

The activities listed below are permitted activities if they meet the activity specific standards set out in the following table and the activity specific standards in Rule 6.3.4 Control of Glare.

Activities may also be restricted discretionary or non-complying as specified in Rules 6.3.4.2, 6.3.4.3 and 6.3.5.2.

Activity		Activity specific standards
P1	Any activity involving outdoor artificial lighting	a. Any outdoor artificial lighting shall comply: i. with the light spill standards in Rule 6.3.6 as relevant to the zone in which it is located, and; ii. where the light from an activity spills onto another site in a zone with a more restrictive standard, the more restrictive standard shall apply to any light spill received at that site. Advice Note: See Appendix 6.11.13 for guidance on lighting design to reduce light spill and glare.

Rule 6.3.6 Rules – Light Spill Standards by Zone:

a. The added horizontal or vertical illuminance from the use of artificial outdoor lighting must not exceed the limits in the following table of light spill standards by zone, when measured or calculated 2 metres within the boundary of any adjacent site.
b. Where a site is divided by a zone boundary, each part of the site shall be treated as a separate site for the purpose of the standards contained in the following table of light spill standards by zone.

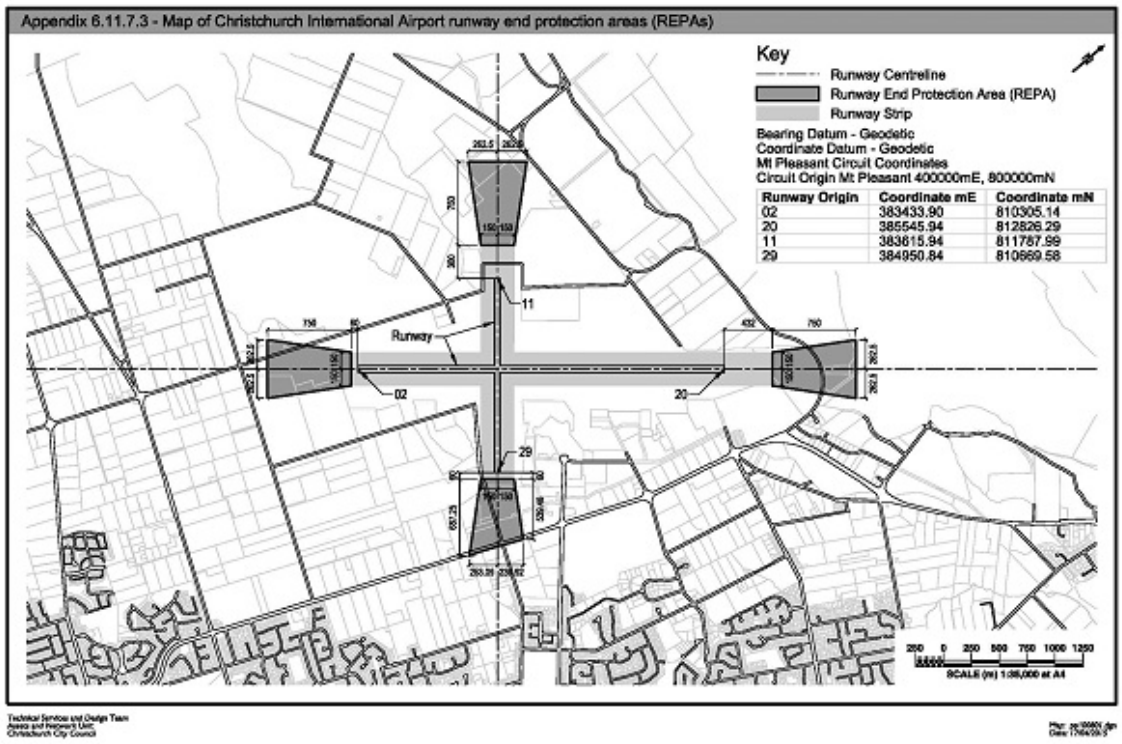
Table of Light Spill Standards by Zone

Zone or scheduled activity		Permitted lux spill (horizontal and vertical)
i.	Open Space Coastal Zone	4.0
ii.	Commercial Central City Business Zone	20.0
iii.	Commercial zones, all other	10.0
iv.	Residential Guest Accommodation Zone	5.0
v.	Industrial Park Zone; Industrial General Zone	10.0
vi.	Industrial zones, all other	20.0
vii.	Open Space Community Parks Zone; Open Space Natural Zone; Open Space Water and Margins Zone and Avon River Precinct / Te Papa Ōtākaro Zone	4.0
viii.	Open Space zones, all other	10.0
ix.	Papakāinga / Kāinga Nohoanga Zone	4.0
x.	Residential zones, all other	4.0
xi.	Rural Quarry Zone	10.0
xii.	Rural zones, all other	10.0
xiii.	Scheduled activities (taverns; service stations)	10.0
xiv.	Scheduled activities, all other	4.0
xv.	Specific Purpose (Cemetery) Zone; Specific Purpose (Hospital) Zone other than Christchurch Hospital; Specific Purpose (Schools) Zone; Specific Purpose (Tertiary Education) Zone; Specific Purpose (Flat Land Recovery) Zone	4.0
xvi.	Specific Purpose (Hospital) Zone - Christchurch Hospital; Specific Purpose (Golf Resort) Zone; Specific Purpose (Ruapuna Motorsport) Zone; Specific Purpose (Styx Mill Road Transfer Station) Zone; Specific Purpose (Defence Wigram) Zone	10.0
xvii.	Specific Purpose (Airport) Zone	20.0
xviii.	Transport Zone Advice Note: Exemptions from this standard can be found in 6.3.3.	Activities in the Transport Zone must meet the standards for the zones in which the adjacent sites are located.

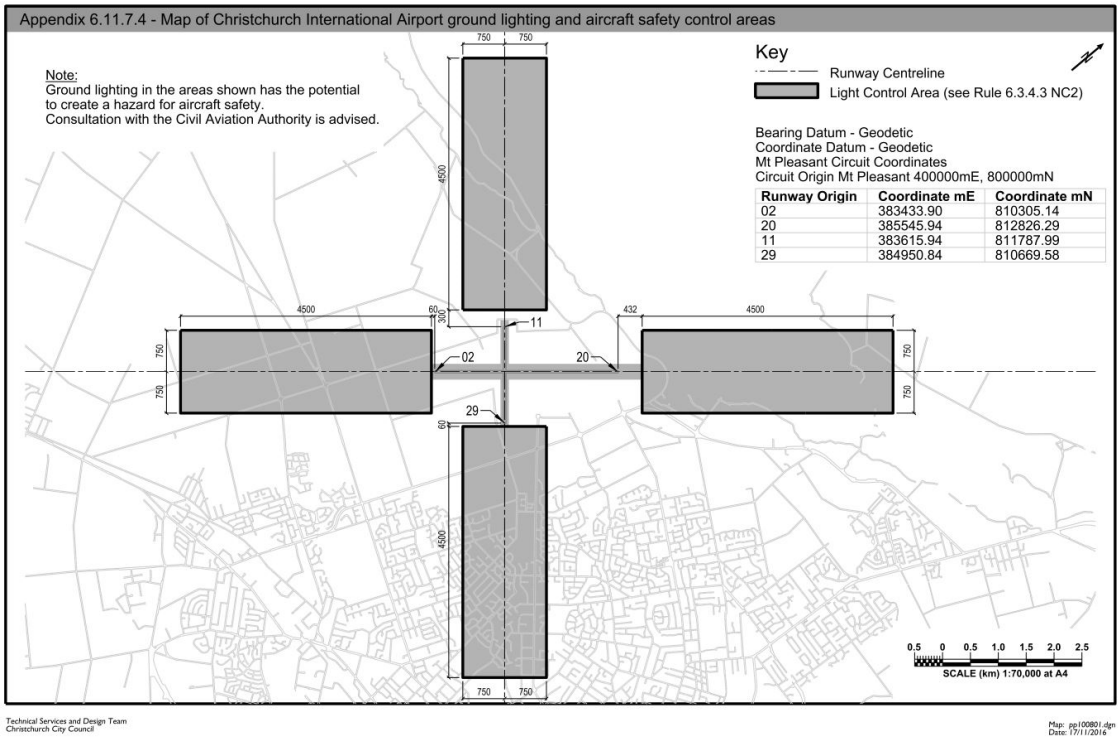
Refer to Appendix B: Glossary of Lighting Terms.

Rule 6.11 Appendices – 6.11.7 Aircraft Protection – Diagrams and Maps:

6.11.7.3 Map of Christchurch International Airport Runway End Protection Areas (REPAs)



6.11.7.4 Map of Christchurch International Airport Ground Lighting and Aircraft Safety Control Areas



Refer to Appendix C: Johns Road Car Storage Yard (CAA Ground Lighting Consultation Area outline detail)

Christchurch District Plan Rule 6.3.2.1 Objective – Artificial outdoor lighting and glare states:

"Artificial outdoor lighting enables night-time work … while: managing adverse effects on residential, commercial, open space and rural amenity values; areas of natural, historic or cultural significance and the night sky; and avoiding interference with the safe operation of transport and infrastructure."

Christchurch District Plan Rule 6.3.2.1.1 Policy - Enabling night-time activity while managing the adverse effects of artificial outdoor lighting states:

" … provide for artificial outdoor lighting … while managing its … direction in a way that: avoids, remedies or mitigates adverse effects on … residents; or any areas of … significance; does not interfere with the safe operation of the transport network or aircraft; minimises unnecessary light spill into the night sky."

Spill light (illumination level) is normally measured in lux (lumens per square metre)

Whilst the Christchurch District Plan Rules refer to Glare (6.3.4), they do not prescribe any maximum values of light technical parameters. The Christchurch District Plan Rules are more accurately dealing with light spill, i.e. the uncontrolled directing of light into adjacent properties, by setting maximum limits of permitted lux spill. The spill light limits are e.g. higher in industrial zones than residential zones to accommodate night-time work, the use of display, advertising, and security lighting.

To provide context to the illumination levels in 6.3.5 Rules – activity Status tables - Control of Light Spill, the following are some typical illumination levels.

- Under a clear sky on a sunny day 100,000 lux
- In the shade of a tree 10,000 lux
- Inside, adjacent to a north facing window 2000 – 3000 lux
- In a typical office 300 – 750 lux
- Inside a domestic house at night 50 - 100 lux
- Under a suburban streetlight <5 – 30 lux
- Moonlight 0.5 – 1 lux

Light spill levels of 20 lux, 10 lux and 2.5 lux (Rules 6.3.6 and 6.3.4.1) are in the order of the illumination levels under a typical suburban night-time street lighting environment.

With respect to the proposed Johns Road Car Storage Yard, 10 lux light spill will apply to the Rural Urban Fringe (RuUF) zone boundaries to the south and east of the site. Along the northern boundary a 2.5 lux light spill as listed in Rule 6.3.4.1 applies in relation to the major arterial road Johns Road (State Highway 1). The industrial zone to the north of Johns Road has a light spill limit of 20 lux.

The requirement of Rule 6.3.4.1 that *"All fixed exterior lighting shall, as far as practicable, be aimed, adjusted and/or screened to direct lighting away from the windows of habitable spaces of sensitive activities, other than residential units located in industrial zones, so that the obtrusive effects of glare on occupants are minimised"* is interpreted as a means to control the effects of "glare". The optimum solution for minimizing any potential effects from glare would be to use Type 6 luminaires in accordance with Table 2.10 "*Classification of Luminaires and Associated Criteria for Control of Glare and Upward Waste Light"* in AS/NZS 1158.3.1: 2005. Type 6 luminaires would typically have a flat horizontal visor, aimed directly down and with full "cut off" at the horizontal plane, i.e. it would emit zero light above the horizontal and would satisfy this requirement.

The Johns Road Car Storage Yard property is outside the 500 metres distance zone from the runway threshold covered by Rule 6.3.4.3 (see Appendix C).

The western end of the Johns Road Car Storage Yard property at 711 Johns Road which is included in the Civil Aviation Authority Ground Lighting Consultation Area (see Appendix C) is not part of the currently proposed fenced Johns Road Car Storage Yard development. Any proposed future expansion of the Johns Road Car Storage Yard into that area would have to adhere to the same design parameters as the current proposed development. Appendix 6.11.7.4 of the Rules advises consultation with the Civil Aviation Authority in regards to any non-aeronautical ground lighting installation in that expansion area. The proposed design parameters will pre-empt any issues.

3. ILLUMINATION REQUIREMENTS FOR THE JOHNS ROAD CAR STORAGE YARD

The Australian / New Zealand Standard AS/NZS 1680 guidelines and recommendations indicate that appropriate illumination conditions are as follows:

- Car transport truck unloading area - 10 lux average horizontal illuminance at ground level

This is based on the assumption that any personnel operating on the site are inducted, i.e. there is no access to the general public.

The design brief is that lighting coverage is not required for the whole car storage site.

The Australian / New Zealand Standard AS/NZS 1680.5:2012 "*Interior and workplace lighting Part 5: Outdoor workplace lighting"* provides recommended lighting technical parameters in Table 3.1. The section of Table 3.1 relevant to the proposed Johns Road Car Storage Yard is shown below in Table 1.

Table 1 - Recommended Light Technical Parameters for General Outdoor Areas

Description	Basic operating characteristics	Average illuminance (lux)	Minimum illuminance (lux)	Uniformity of illuminance	CIE glare rating (maximum)
General Storage – pedestrian access	Large open area for storage of large objects; placement, movement and retrieval of objects by machines with integral movement and working light; through traffic – internal only (site inducted personnel); site inducted pedestrian access only.	10 lux	1 lux	7	50

Other important features include:

- Lighting from two directions to mitigate the effect of obstructions and to provide "depth of field" to assist with visual assessment of distance to objects.
- Appropriate levels of vertical illuminance.
- Minimisation of strong shadows.
- Minimisation of disability glare to vehicle drivers.

These illuminances apply to the primary working plane(s) on which the work task(s) is(are) being undertaken. The working planes will vary throughout the car transport truck unloading area.

Uniformity is given in AS/NZS 1680.5 as the ratio of maximum illuminance to the average illuminance.

Lighting level and good uniformity are necessary for creating a safe working environment with vehicles moving in confined areas when offloading from trucks.

AS/NZS 1680.5 states that roads for vehicular traffic should be designed in accordance with the recommendations of AS/NZS 1158.3.1 "*Lighting for roads and public spaces*" depending on the nature of usage.

Designated vehicular roads within the site have not been specified.

The actual illumination levels on the site should be provided with consideration to the above requirements, the specific activities to be undertaken, the type of vehicles operating on the site, and procedures for access control to ensure a safe working environment.

Additionally, the perimeter security fence lighting should provide sufficient illumination for security cameras to operate as required.

4. LIGHTING EFFECTS

4.1 ENVIRONMENTAL EFFECTS

The impact of artificial lighting on the night environment can be characterised by the following effects:

VISUAL AMENITY

The aesthetic influence of artificial lighting on the night time landscape.

GLARE

Visual impairment or discomfort resulting from the intensity of a light source and the brightness contrast with the associated surroundings. It is affected by the light source size and intensity, background brightness, and the location relative to the viewing position.

Refer also the Glossary in Appendix B for further details of glare.

LIGHT SPILL

Illumination which extends beyond the area which is required to be illuminated, typically a property boundary.

SKY GLOW

The combined luminous effect of direct and indirect lighting on the appearance of the night sky.

It should also be noted that all the above effects are subject to the variable influence of weather conditions. In particular, atmospheric water vapour content (i.e. mist and cloud) accentuates sky glow appearance and has a diffusing effect on glare.

5. EXISTING NIGHT ENVIRONMENT

5.1 GENERAL NIGHT SKY

The proposed Johns Road Car Storage Yard property has Rural Urban Fringe (RuUF) zoned land along the boundary to the south and east, the Specific Purpose Airport (SPA) Zone to the west and State Highway 1 (SH1) separating it from the Industrial Heavy (IH) Zone to the north.

Predominantly amber coloured sodium street lighting from Johns Road (SH1) to the west and north combined with site and building façade lighting in the Industrial Heavy (IH) Zone are the dominant night time lighting features in the area.

Other light sources are landing aeroplanes approaching the runway at quite low level before touchdown during northerly approach conditions. Aeroplane headlights have tightly controlled high intensity beams which are aligned with the orientation of the main Christchurch Airport runway. The density of such intermittent lighting is time and wind direction related, currently reducing to none when there are no flights scheduled at Christchurch International Airport in the early hours of the morning.

A very small amount of artificial lighting contribution is associated with Waimakariri Road, in the form of uncontrolled fluorescent batten street lighting and head lights of infrequent cars, while vehicles on Johns Road are not an issue due to the orientation of the road and existing vegetation.

The existing night sky appearance along Waimakariri Road is relatively dark. The most prominent sky glow is the luminous row of street lights above Johns Road to the north with intermittent glow from illuminated buildings and building signage in the Industrial Heavy (IH) zone north of Johns Road.

The following are images taken around the proposed area on the 12th October 2016 between 8.30pm and 10.00pm under clear sky condition.

Refer to Appendix A for locations and viewing direction of these photographs.

Image 1 – West towards runway approach, 74 Waimakariri house in left foreground
Focal Length (35mm film equivalent): 24mm

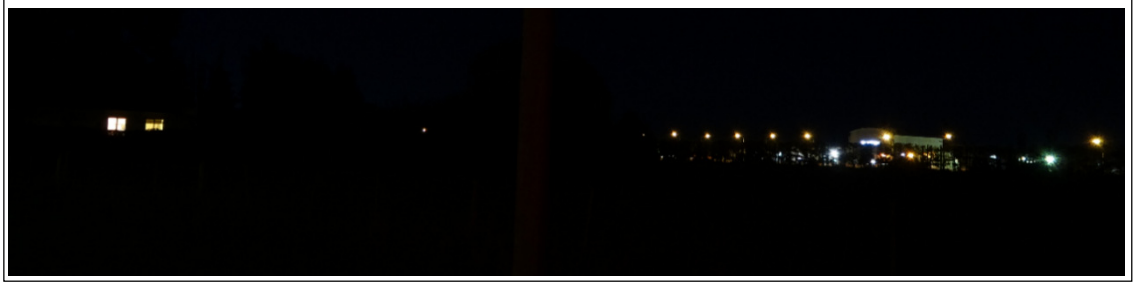


Image 2 – WNW towards runway approach, Johns Road and Industrial Heavy (IH) zone beyond
Focal Length (35mm film equivalent): 24mm

Image 3 – WNW showing light path of landing plane above Industrial Heavy (IH) zone
Focal Length (35mm film equivalent): 143mm

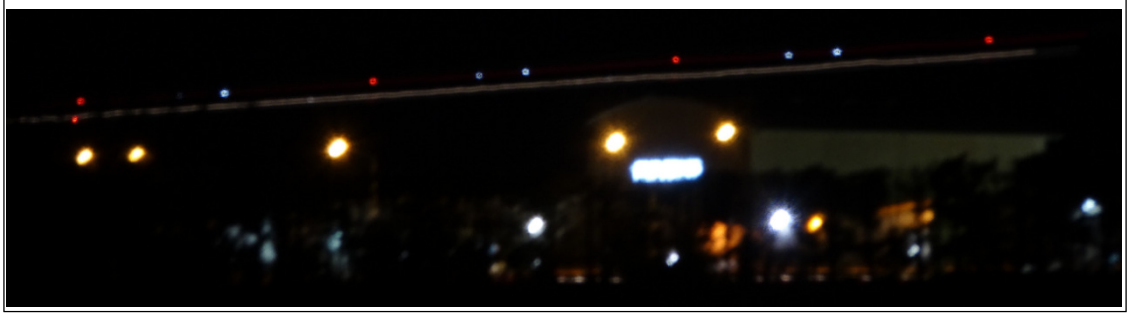


Image 4 – North towards Johns Road (SH1) and Industrial Heavy (IH) zone beyond
Focal Length (35mm film equivalent): 41mm

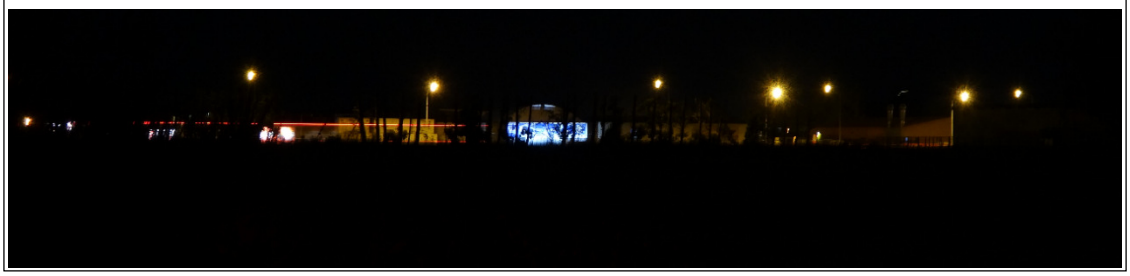


Image 5 – East on Waimakariri Road, 47 Waimakariri Rd house in right foreground
Focal Length (35mm film equivalent): 24mm

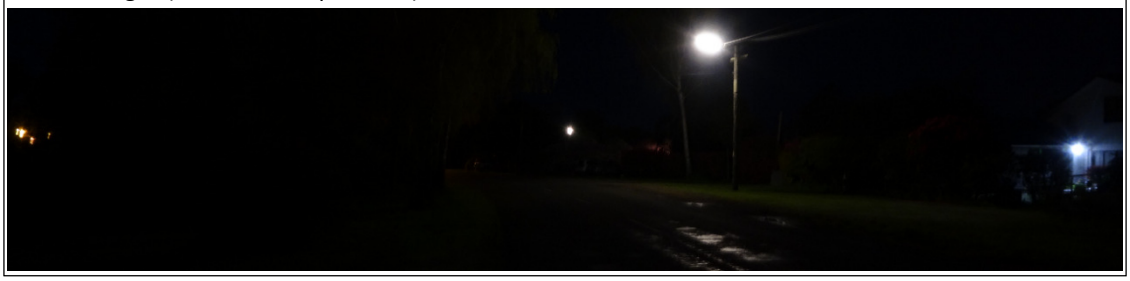


Image 6 – West from proposed site access road towards runway approach
Focal Length (35mm film equivalent): 24mm

Image 7 – West on Johns Road (SH1) towards runway approach
Focal Length (35mm film equivalent): 24mm

6. PROPOSED FLOOD LIGHTING FOR THE JOHNS ROAD CAR STORAGE YARD

The nature and extent of the proposed flood lighting is described as follows:

6.1 PROPOSED LAMP & LUMINAIRE TYPES FOR NEW LIGHTING ARRANGEMENTS

The methodology to illuminate the proposed Johns Road Car Storage Yard will be to utilise new technology LED (light emitting diodes) luminaires.

The goal for the lighting installation will be to have Type 6 “flat glass” LED luminaires with zero upward lighting component. These luminaires will provide:

- Uniform illumination levels to meet the operational and safety requirements
- Minimal direct glare
- Compliant over boundary spill light

Present lighting technology enables these objectives to be achieved for the proposed site on pole heights less than 7 metres. This maximum height of poles would avoid creating another tier of lighting above the Johns Road street lighting currently visible from the properties along Waimakariri Road and minimise the visual impact.

LED luminaires offer significant benefits compared to high pressure sodium lamps (HPS) lamps (which have traditionally been used in similar areas). These benefits are:

- Significant energy savings. These savings result from:
  - Greater luminous efficacy (greater lumens per watt output) compared to HPS lamps).
  - Less wastage of light (light spill) due to more precise and efficient optical control.
  - Greater ability to control the LED compared to HPS lamps. LED lamps start instantly and thus can be turned ‘on’ only when needed (without a start-up delay) and ‘off’ when not needed. The output of LED lamps can also be easily reduced (dimmed down). Examples of energy control schemes are turning lights ‘off’ when an area is not in use or dimming to low levels with time schedules or occupancy detectors switching the lights to full output only when needed.
- The white light from LED lamps and the higher colour rendering index makes colours viewed under light from LED lamps appearance closer to the true colour (as viewed in day-light).
- LED lamps provide longer lamp life and reduced maintenance costs.
- LED light distribution can be very accurately controlled to a defined pattern with a very sharp “cut-off” to achieve the desired light coverage, i.e. minimising spill light and glare.

6.2 PROPOSED FLOOD LIGHTING POLE HEIGHTS AND LOCATIONS

Apart from luminaire orientation, the pole height is the other determining factor with regards to the visibility of the light source. To minimise the impact and to avoid creating an additional line of visible light sources above the existing Johns Road (SH1) street lighting (approximately 12m high poles) the following pole heights are recommended.

Car Transport Truck Unloading Area:

- It is proposed that the height of all poles in the approximately 30x30 metre Car Transport Truck Unloading area should not exceed 7 metres to ensure the visible part of the luminaires is just below the line of visible street lights on Johns Road, as seen from Waimakariri Road. The pole mounted luminaires will be aimed directly downwards, which will minimise glare as required by Policy 6.3.2.1.1a.iii. and Rule 6.3.4.1.

  Four 7 metre poles would illuminate the area from the northern and southern edge of the unloading area to provide sufficient vertical illumination to meet the requirements of AS/NZS 1680.5:2012, stated above. Any additional luminaires necessary for the adjacent entry and site office areas could possibly be mounted off those poles.

Perimeter Security Fence:

- It is proposed that 5 metre poles are used along the security fence and that these poles are spaced at 50 metres to provide minimum illumination of 0.3 Lux coverage for colour imaging of the security cameras. The detailed luminaire specification will need to be matched to the actual lighting coverage required on the bund face just outside the security fence as determined by the security system provider. The planted bund heights of 2 and 3 metres will eliminate any spill light outside the bund area and comply with the District Plan Rules. The downward aiming and orientation away from adjacent properties of the pole mounted luminaires will minimise glare as required by Policy 6.3.2.1.1a.iii. and Rule 6.3.4.1. In some instances, (e.g. the eastern boundary where there is no bund, any poles in close proximity to houses) backlight shield control should be used to minimise any spill lighting or glare effect.

  The 5 metre pole height limit in conjunction with backlight shielding will minimise, (and in some instances eliminate) any visibility of the actual light source, and because of the bund along most of the fence line the illuminated ground should not be visible. Any remaining visibility of light sources will also decrease over time as the bund vegetation increases in height, providing additional shielding.

  Poles would be located relative to the 2- and 3-metre-high bund as dimensioned in the Cardno “John’s Road Car Storage Yard, Issue 4” set of layout and detail drawings to achieve the required spill light illumination levels along the boundaries.

Any additional poles needed for the entry area and possibly in proximity to the site office building should adhere to the height restrictions of flood lighting poles or security fence poles, whichever they are closer to.

6.3 BUILDING MOUNTED FLOOD LIGHTING

It is proposed that any building mounted exterior luminaires will either be of the “flat glass” type or mounted / shielded so that they are not directly visible from adjacent properties or by unnecessarily illuminating the building façade they are mounted on.

6.4 PROPOSED LIGHTING CONTROL

Car Transport Truck Unloading Area:

Lighting control of the unloading area could be manually switched and have additional control via a daylight sensor to eliminate accidental operation of the lighting during daylight hours.

Perimeter Security Fence:

Depending on the overall security concept the lighting control could possibly be linked to activation of the electric security fence to increase lighting levels in case of an event to a level suitable for colour imaging. This option would allow power savings as well as mitigate the effects of light pollution in the area, but might reduce the deterrent effect the full light level might have. Otherwise lighting could be timer controlled via a daylight sensor.

7. ASSESSMENT OF ENVIRONMENTAL EFFECTS

The effect of the proposed exterior lighting on the surrounding environment is assessed as follows:

VISUAL AMENITY

In comparison to the existing lighting street lighting on Johns Road and Waimakariri Road, the use of “flat glass” luminaires proposed for the Johns Road Car Storage Yard area will significantly minimise the direct glare from the light source and will reduce most of the negative visual aspects of the lighting (glare and sky glow).

GLARE

The form and orientation of the proposed new lighting will be to minimise the intensity of the direct glare from the luminaires. The use of “flat glass” luminaires means the orientation is less critical except when close to the fittings. Pole mounted luminaires will be aimed directly downwards, which is interpreted as complying with the requirements of Policy 6.3.2.1.1a.iii. and Rule 6.3.4.1.

LIGHT SPILL

The proposed lighting design can meet the permitted light spill over-boundary illumination levels as stipulated in the new Christchurch District Plan Lighting Rule 6.3.6. To comply with the maximum permitted spill light level on the adjacent Rural Urban Fringe (RuUF) zone, it is necessary to position the 5 metre lighting poles a minimum of 7 metres from the highest point of the 2-metre-high bund inside the bund area (9 metres from the highest point of the 3-metre-high bund inside the bund area) as proposed in the Cardno “John’s Road Car Storage Yard, Issue 4” set of layout and detail drawings.

SKY GLOW

The use of ‘flat glass’ luminaires with LED lamp technology and with constrained directional light output will minimise any significant direct emission to the night sky, which is interpreted as complying with the requirements of Policy 6.3.2.1.1a.iii. These luminaires will have minimal contribution to sky glow compared to the existing adjacent street lighting luminaires on Johns Road and Waimakariri Road. The contribution to sky glow from lighting within the Johns Road Car Storage Yard will predominantly be from reflective surfaces.

8. CONCLUSION

The lighting installation would be designed and installed to meet the requirements of the Christchurch District Plan (published on 22 February 2017) – Chapter 6, General Rules and Procedures, Rule 6.3.4 – Activity Status tables – "Control of Glare", Rule 6.3.5 – Activity Status tables – "Control of Light Spill", and Rule 6.3.6 Rules – "Light Spill Standards by Zone". It should also meet the requirement of the Civil Aviation Authority referred to in Rule 6.11 Appendices – 6.11.7 Aircraft Protection – Diagrams and Maps in regards to any non-aeronautical ground lighting installation.

The proposed methodology will be to utilise new technology LED luminaires. These luminaires will provide significant benefits compared to conventional luminaires including reduced sky glow and glare. All pole mounted luminaires will be "flat glass" type with zero upward lighting component. Any building mounted exterior luminaires will be either "flat glass" type or mounted so they are not directly visible from adjacent properties.

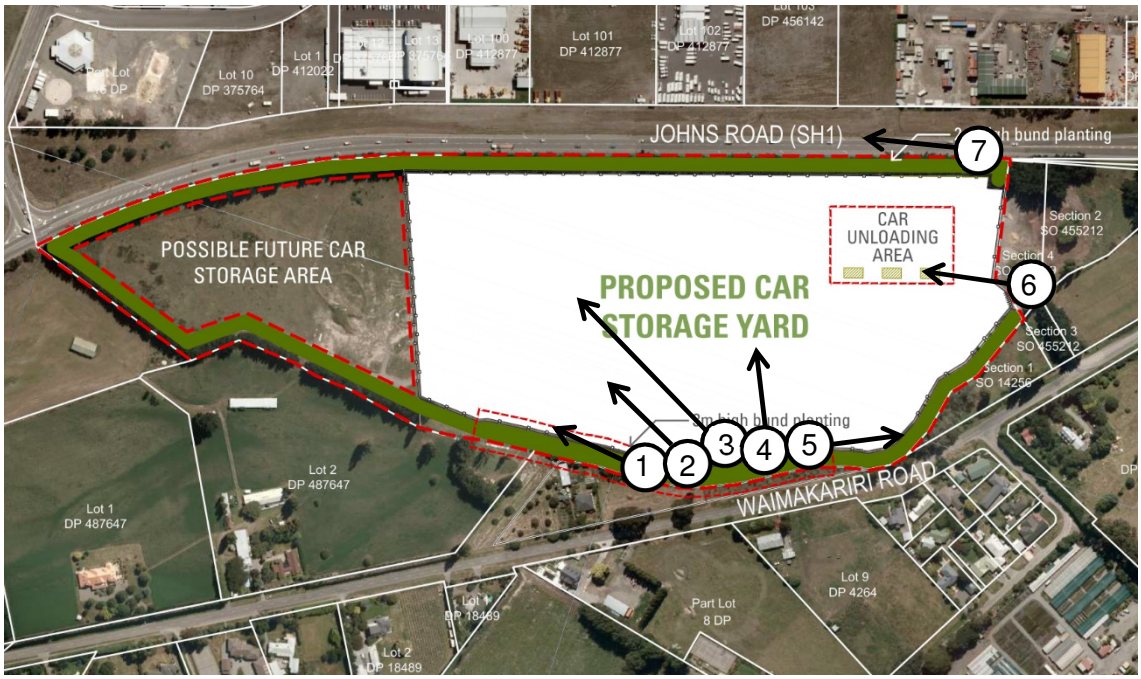
Pole heights up to 7 metres are proposed for the Car Transport Truck Unloading area and 5 metre poles are proposed along the security fence boundary. This will avoid creating an additional line of visible light sources above the existing Johns Road (SH1) street lighting as viewed from the Waimakariri Road neighbourhood.

Security fence pole mounted luminaires will be aimed away from the nearest adjacent boundary / road and fitted with backlight shielding where appropriate to minimise any glare issues for nearby residential housing or road users.

The proposed lighting concept uses best practice techniques to reduce environmental impacts of the proposed Johns Road Car Storage Yard on adjacent properties. The lighting will be designed to comply with the Christchurch District Plan (published on 22 February 2017) and any glare effect will be minimised.

APPENDICES

APPENDIX A – SITE PLAN



(1)	Approximate location where photo was taken for Image 1
→	Approximate direction of view

APPENDIX B – GLOSSARY OF LIGHTING TERMS

The following simple definitions apply to terms used in this report:

GLARE

Visual impairment or discomfort resulting from the intensity of a light source and the brightness contrast with the associated surroundings. It is affected by the light source size and intensity, background brightness, and the location relative to the viewing position.

The two terms that are normally used to describe the effects of glare on the ability to see are *disability* and *discomfort*.

A typical example of *disability* glare is the glare from approaching headlights on the open highway at night, which prevent anything else being seen on the road. The eye is unable to adapt to the bright headlight and to the significantly lower brightness on the road at the same time. Hence the glare is having a disabling effect. This disabling effect is related to the intensity of the source in the direction of the eye with respect to the brightness of the surroundings. As a comparison, the same car approaching with its headlights on during the day will cause almost no disability because of the brightness of the surroundings.

Discomfort glare is where a light source can cause acute discomfort without affecting the ability to see (for example a bright sky on a sunny day can cause discomfort, particularly to those used to wearing sunglasses who are without them, however the ability to see is not impaired).

The key difference between the two is that *disability* glare has a physiological effect and can be objectively measured, whereas *discomfort* glare has a psychological effect and is much more subjective. What may not cause discomfort to one person may cause significant discomfort to another person.

The maximum values of Glare Ratings (calculated in accordance with International Commission on Illumination CIE 112) are given in Table 1 for general outdoor areas. The glare rating values relate to a viewer's perception as indicated in Table 2.

Table 2 Glare Evaluation System for Use within Outdoor and Area Lighting

CIE Glare Rating	Perception of Glare Experienced by an Observer
90	Unbearable
80	
70	Disturbing
60	
50	Just Admissible
40	
30	Noticeable
20	
10	Unnoticeable

LIGHT SPILL

Illumination which extends beyond the area which is required to be illuminated, typically a property boundary.

ILLUMINANCE

The measure of illumination level, which is the amount of light or luminous flux (i.e. Lumens) incident on a surface, per unit area, measured in Lux (1 Lux = 1 Lumen /m^2).

LUMINAIRE

The international term for a lighting fitting, which is the assembly that contains a light source and distributes the light output.

LUMINANCE

The measure of brightness, which is a function of concentration or density of luminous intensity (i.e. Candelas) in a given direction per unit area, measured in Candela/m^2 (Cd/m^2).

LUX

The SI unit of illuminance and luminous emittance, measuring luminous flux per unit area. It is equal to one lumen per square metre.

NOTIONAL BOUNDARY

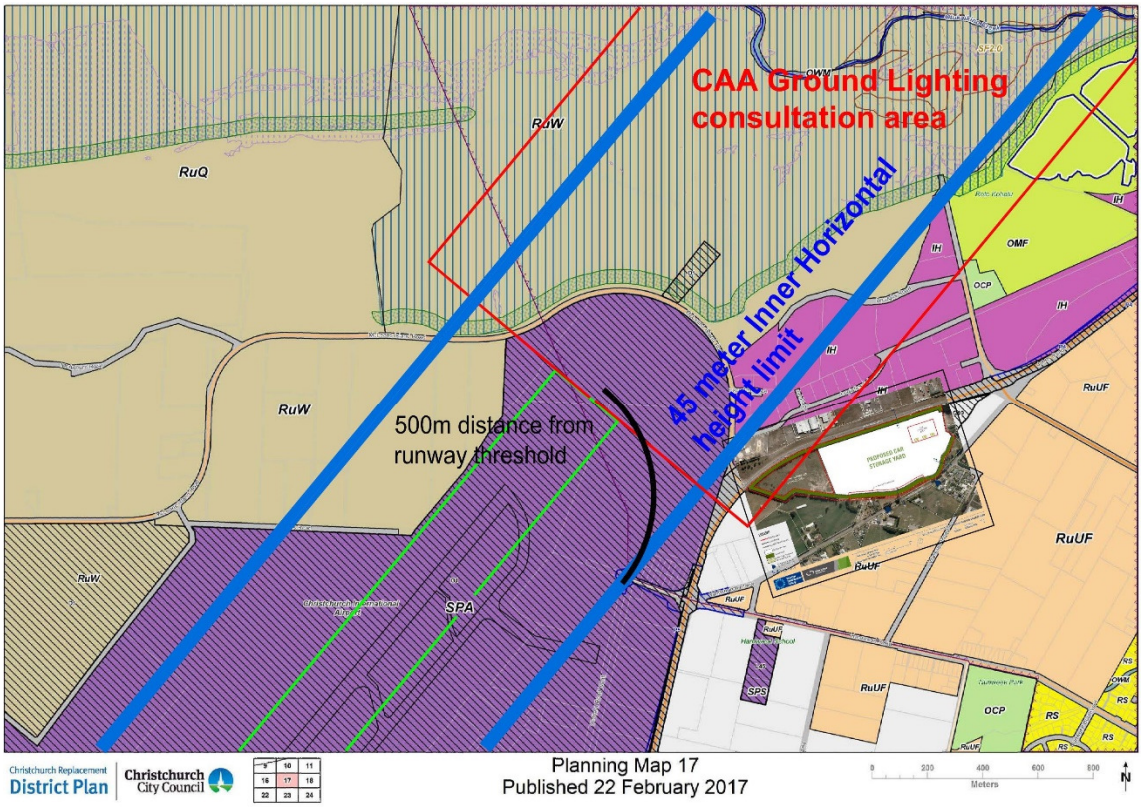
A line 20 metres from any side of a rural dwelling or the legal boundary where this is closer to the dwelling.

UNIFORMITY OF ILLUMINANCE – OUTDOOR LIGHTING

The ratio of the maximum illuminance to the average illuminance on a given plane within the calculation or measurement area.

APPENDIX C – CAA GROUND LIGHTING CONSULTATION AREA

The Car Distribution Group property overlaid on new Christchurch District Plan Planning Map 17 showing District Plan Zoning, proposed Johns Road Car Storage Yard Site (white) with CAA Ground Lighting Consultation Area (red outline), Runway threshold distance (black arc), and Inner Horizontal height limit overlaid (blue lines).



ANNEXURE J:

LANDSCAPE REPORT AND PLAN

Johns Road Car Storage Yard Landscape Assessment

711 Johns Road, Harewood

NZ0110217

Prepared for:
Car Distribution Group Limited

02/03/2017

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Shaping the Future

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Appendices

Figures

1 Introduction

Cardno has been engaged by Car Distribution Group Limited(CDG) to undertake a landscape and visual effects assessment of a proposed new car storage yard to be located at 711 Johns Road, Harewood. This landscape and visual effects assessment forms an appendix of, and supplements, a resource consent application which seeks approval under section 9 of the RMA to use land for the proposed storage yard.

The purpose of this report is to assess the landscape and visual effects arising from the proposed activity, and includes the following:

- site description
- brief description of the project
- relevant statutory documents
- methodology
- landscape and visual effects assessment
- mitigation of visual effects
- conclusion
- appendices (photographs and plans)

2 Site Description

2.1 Introduction

The application site comprises one land parcel (Sec 1 SO 451212) which has a total area of 14.4 hectares and is located at 711 Johns Road. Johns Road is part of SH1 connecting to Main North Road to the northeast and to Russley Road to the south. The site, which was formerly used as a quarry, has been purchased by Kailua Limited for its 100% owned CDG business to use as its main depot in the South Island. It is proposed that the depot will initially utilise some 8.5 hectares of the site to store 2,500 - 5,000 vehicles over an annual cycle. These vehicle inventories are managed by CDG on behalf of their owners being the main new vehicle importers (Toyota, Ford, Holden, Hyundai, Nissan, Mitsubishi, Chrysler, Honda and SsangYong). Vehicles are currently stored at CDG's Bromley depot and five other temporary locations around Christchurch.

A general description of the site and environs is provided below.

2.2 Landscape and Surroundings

The application site comprises a 14.4 hectare part of the 31.2 hectare 'island' encompassed by Johns Road to the northwest and west; and Waimakariri Road/Whitchurch Road/Sawyers Arms Road to the east and southeast. The Sawyers Arms Road/Johns Road roundabout and the Harewood Road/Russley Road/Johns Road roundabout represent the northern and southern limits (respectively) of this 'island' of land.

This land, along with land to the east of Waimakariri Road, is zoned Urban Fringe in the City Plan, while land to the north-west and west of Johns Road is located within an Industrial Heavy zone recently made operative under the City Plan review process. This land to the northwest of Johns Road is used for various industrial and commercial purposes. Christchurch International Airport is located to the west of the site across Johns Road, and within a Special Purpose (Airport) zone.

The land immediately adjacent to, and south of, the application site comprises several rural-residential properties: Nos. 74, 108, 118 and 128 Waimakariri Road; Nos. 2, 4, 7 and 8 Whitchurch Road; and, No. 799 Johns Road. These properties range in area from 707m^2 to 3.4 hectares. The land immediately adjacent to, and north of, the application site comprises a parcel containing an Orion electrical substation facility, and a rural-residential property (No. 4 Waimakariri Road) which is 1.2 hectares in area.

The application site shares a 770m long boundary with Johns Road and a 166m long boundary with Waimakariri Road. The site also has easements over Section 2 SO 455212 and Section 1 SO 14256 which adjoin the application site to the northeast and are owned by Orion NZ Limited and by Christchurch City Council respectively. Three options for accessing the site have been considered - entrance from Johns Road, Sawyers Arms Road or Harewood Road.

Figure 2-2 shows the local area surrounding the new proposed site located between Johns Road and Waimakariri Road.

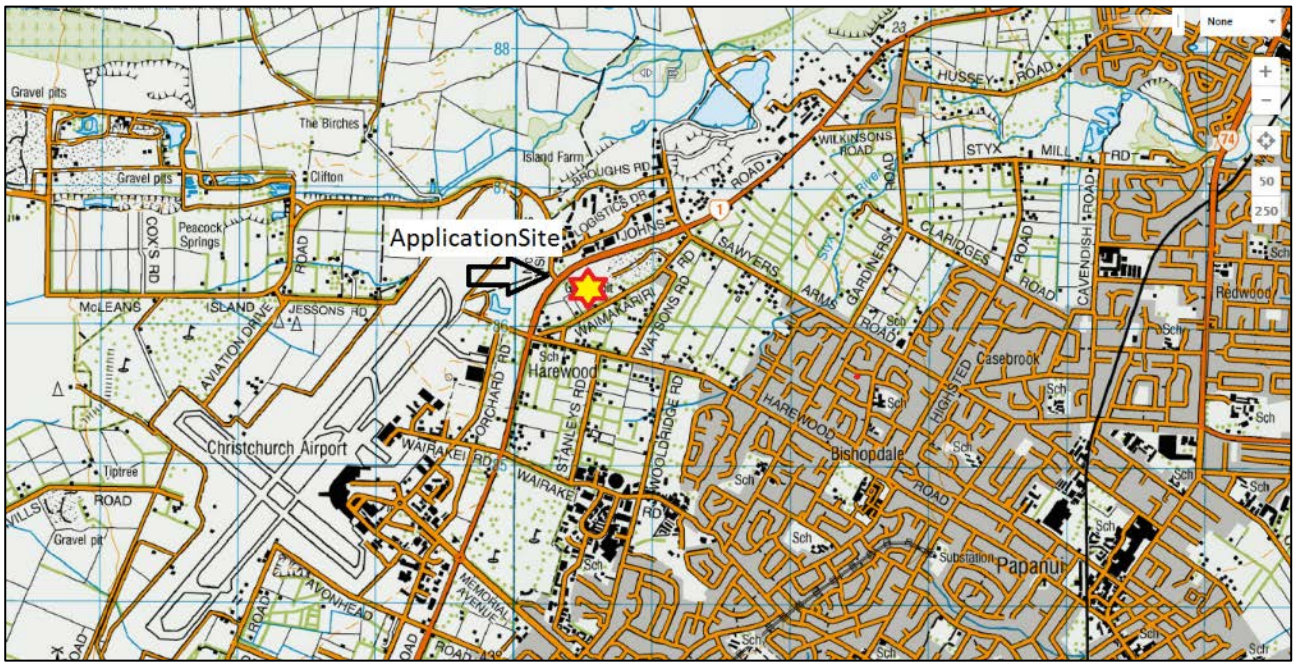

Figure 2-1 Location plan
[source: TopoMaps]

Figure 2-2 Location aerial
[source: Canterbury Maps]

Figure 2-3 Oblique aerial
[source: Google]

2.3 Landuse

A large portion of the application site has previously been excavated as a quarry to a depth of 5 metres. The quarry has subsequently been refilled with clean-fill by City Care, and also used for storing various materials including gravel, soil, bark, asphalt and concrete.

Although the land is zoned for rural uses, typical agricultural is not a practical or realistic use as there is very little soil as a result of the previous quarrying, and non-rural activities consequentially maybe the highest and best use of the land.

Figure 2-5 below depicts, in broad terms, the land use capability of the application site and also the land in the vicinity. Landcare Research's data suggests the application site has "severe limitations for arable uses or cultivation".

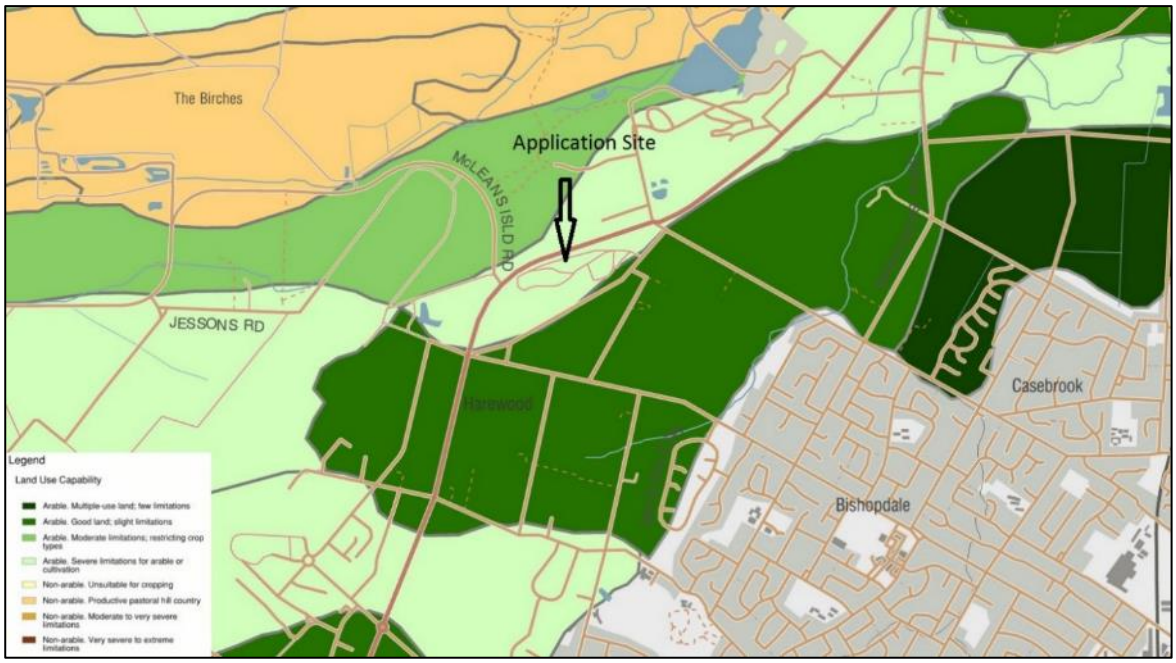

Figure 2-4 Potential land use
[source: Our Environment – Landcare Research]

2.4 Landcover

Figure 2-5 below depicts, in broad terms, the vegetation cover on the land in the vicinity of, and on, the application site. As the figure suggests, and as shown on the small scale aerial photo in Figure 2-6, due to the previous quarrying activity the vegetation cover on the site is sparse and predominantly comprises weeds and grasses. However the site is bounded along its northern boundary (with SH1) and part of its south-western boundaries (with Nos. 108 and 128 Waimakariri Road) with a single line of shelter belt trees (Pines) and there are also more sparse and scattered trees along all its other boundaries except the one shared with Orion's sub-station.

Figure 2-5 Vegetation cover
[source: Our Environment – Landcare Research]

Figure 2-6 Aerial photo of application site
[source: Canterbury Maps]

3 Details of the Proposal

CDG proposes to use the site primarily for the storage of vehicles, and loading/unloading of vehicle transporters. The part of the application site shaded in Figure 2-6 above is where the hardstand areas for vehicles, truck wash facilities and a building to provide administration and staff facilities will be located.

Figure 3-1 below shows the intended layout of the site.

Figure 3-1 Site layout over aerial photo
[source: Cardno]

CDG operates a fleet of vehicle transporters which are generally HPMV 23 metre long units. Typically there would be a total of 15 trucks onsite at any time, however generally there would be no more than five or six operating or loading and unloading at any one time. Vehicles will access the site from Sawyers Arms Road via an existing accessway currently used by Orion as access to its Waimakariri substation.

The northern corner of the site will be used for loading/ unloading the vehicle transporters and will also be where the truck wash and buildings are located in order to maximise separation to residential dwellings. The balance of the site will be used for vehicle storage. It is estimated that CDG will operate with up to 150 vehicle movements per day (75 in and 75 out). These will mostly be during the hours of 0700 to 1700 but some night-time movement will be required to coincide with shipping timetables.

Other features of the proposed use of the site and relevant to this landscape assessment are shown the landscape plan attached at Appendix A, and comprise:

- perimeter fencing 2 metres high and site lights 7 metres high in the loading/unloading area and 5 metres high along the boundary perimeter fence/ vegetated bunds;
- stormwater retention ponds and swales;
- planting bays; and,
- 2m or 3m high bunding (depending on location) along the perimeter of the site.

4 Statutory Considerations

In order to undertake a thorough assessment of the proposal the following national, regional and territorial authority documents have been considered. These documents provide guidance of the significance of landscape and amenity values in the rural locality of the proposed development. Objectives and policies relevant to this assessment within these documents are outlined below.

Relevant statutory and policy documents include:

- Resource Management Act 1991
- Canterbury Regional Policy Statement
- Christchurch City District Plan

4.1 Resource Management Act

The key provisions of the Resource Management Act (RMA) relate to Part 2, Section 7, Other Matters.

Those most relevant to landscape and visual amenity are:

- Section 7 (c) requiring that particular regard is had to "the maintenance and enhancement of amenity values" (as defined in the RMA).
- Section 7 (f) requiring that particular regard is had to "the maintenance and enhancement of the quality of the environment".

There are no section 6 (a) or (b) RMA issues (Matters of National importance) that will apply or arise in relation to landscape and visual considerations.

The resource management provisions are given specific direction in the Canterbury Regional Policy Statement and Christchurch City District Plan as outlined below.

4.2 Canterbury Regional Policy Statement

The provisions of the Canterbury Regional Policy Statement (CRPS) particularly relevant to this proposal are Objective 12.2.1 [Identification and protection of outstanding natural features and landscapes] and Objective 12.2.2 [Identification and management of other landscapes]. These read as follows:

Objective 12.2.1: *Outstanding natural features and landscapes within the Canterbury region are identified and their values are specifically recognised and protected from inappropriate subdivision, use, and development.*

Objective 12.2.2: *The identification and management of other important landscapes that are not outstanding natural landscapes. Other important landscapes may include:*

(1) natural character
(2) amenity
(3) historic and cultural heritage.

The application site does not contain, and does not comprise part of, an outstanding landscape.

Objective 12.2.2 suggests that landscapes can be 'important' due to their amenity values; their natural values or for historic or cultural heritage reasons. The CRPS confirms that section 6 of the RMA is not applicable to 'important' landscapes whereas section 7(c) of the RMA is potentially relevant.

Policy 12.3.3 of the CRPS is to implement Objective 12.2.2 and reads: *"Identifying and managing other important landscapes that are not outstanding natural landscapes, for natural character, historic cultural, historic heritage and amenity purposes."*

Under 12.3.3 of the CRPS the consent authority must determine if a site is, or is part of, 'an important landscape' and if so give consideration to whether the impacts of the proposal on that landscape can be managed.

4.3 Christchurch City Plan

The site of the proposed car storage yard is located within the Urban Fringe zone under the Christchurch City Plan.

There are no site specific provisions or overlays in the City Plan and the Replacement District Plan that are applicable to the site.

The site was previously included within the North West Review Area (NWRA1) within which three areas adjacent to Johns Road (including the application site) were investigated as being potentially suitable for business development. Although a formal industrial or business zoning has not been adopted within the Replacement District Plan the rezoning to Rural Urban Fringe signals an expectation that the land is probably not suitable for rural uses and establishment by a non-rural activity is potentially more appropriate.

4.4 Summary

As noted above, the CRPS confirms that, for this site, it is only concerned with 'important' landscapes and that these are identified in terms of amenity values. This being the case, for the purposes of any assessment of landscape values and visual effects it is important to keep in mind the definition of 'amenity values' in section 2 of the RMA: *"amenity values means those natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes."*

5 Methodology

5.1 Landscape Character

A description of the landscape attributes in the assessment area is provided in section 6 below. This includes the biophysical elements, patterns and processes which are defined by a combination of the vegetation cover, land uses/ activities and structures.

This allows an interpretation of the landscape character to be provided, which is classified through:

- identification of patterns of natural and cultural features, processes and influences; and,
- analysis of their characteristics and spatial location, the extent to which they are distinctive, representative or typical at the different scales.

The seven point scale from the NZ Institute of Landscape Architects' 'Best Practice Note - Landscape Assessment and Sustainable Management 10.1' has been used to assess the magnitude of the change or effects of the proposal. The scale comprises extreme/very high/high/moderate/low/very low/negligible.

The application of these categories is always relative to the context of the assessment, however a general description of these categories has been outlined below;

- Negligible - *Only a small part of the project would be discernible or is at a distance in which no change to the existing view can be appreciated.*
- Very low - *The project would result in a barely perceptible change in the existing view, or would form only an inconspicuous component of the wider landscape which may be missed.*
- Low - *The proposal constitutes a minor component of the wider view.*
- Moderate - *The proposal would result in a noticeable change in the existing view and would form recognisable new elements within the overall view and may be readily noticed by the observer or receptor.*
- High - *The project may form a significant and immediately apparent part of the scene and be readily noticed by the observer.*
- Very high - *The project becomes the dominant feature in the landscape and significantly affects and changes the character.*
- Extreme - *The project results in the total loss of resource and/or quality and integrity of the resource due to the addition of new but uncharacteristic conspicuous features and elements.*

5.2 Visual Effects

The visual impacts from the proposal are also assessed in section 6 below. This is measured as the bearing of an intrusion into, or change to an existing view on identified people (i.e. viewing audiences).

6 Assessment of Landscape and Visual Effects

6.1 Background

The purpose of this section is to interpret the character of the landscape and assess the magnitude of change from the proposal. The visual effects of the proposal will also be assessed, including any effects on nearby properties.

6.2 Landscape Character

6.2.1 Natural Character

Natural character has three main components, natural processes, natural elements and natural patterns. There is a spectrum of natural character from pristine to modified. The absence of certain vegetation, landforms or water features may simply mean that the landscape is less natural rather than non-natural. A place may retain some of its natural character even with a building on it, but may be reduced by their presence.

The natural character of the surrounding environment varies however it has largely been modified over time with the removal of original native vegetation, farming practices, dwellings and associated infrastructure (roading, airport and electricity distribution), commercial enterprises, and planting of non-natives vegetation.

In broad terms the bio-physical characteristics of the site bear little if any resemblance to a pre-human environment. Overall, the environment is considered to display a very low level of naturalness.

6.2.2 Rural Character

Typically the rural landscape comprises both dwellings and accessory buildings. Houses are a common element of the rural environment, particularly in Canterbury, however it is generally perceived that the more buildings present, the lower the quality of the rural landscape. In addition, the properties adjacent to the application and to the north (within the Industrial Heavy zone) and to the west (Christchurch International Airport) have an industrialised or modern feel tending to make the immediate area (including the application site) appear non-rural in character. In addition, the landscape character of the site is also very influenced or affected by SH1 along its western and northern boundary and the connector roads and associated roundabouts.

Taking all relevant factors into account it's concluded that the rural character is low.

6.2.3 Landscape Effects

The character of the landscape is defined by its mixed uses which contribute to a relatively highly modified landscape that has low naturalness. There are many dwellings and buildings scattered throughout the area which creates a landscape which varies between open space and built development.

The character of the landscape is affected by '*changes in the physical landscape, which may give rise to changes in its character and how it is experienced.'*

Change in a landscape does not, of itself, necessarily constitute an adverse landscape or visual effect. Landscape is dynamic and is constantly changing over time in both subtle and more dramatic ways, these changes are both natural and human induced.

Effects on the landscape from this proposal may be due to:

- vegetation removal; and/or
- construction activities including earthworks; and/or,
- additional built development in the landscape.

These physical effects have the potential to have an impact on the character of the landscape. With respect to physical effects, the proposal will result in an increased development footprint which will be apparent by the presence of perimeter fences and site lighting, and of course by the mere presence of parked vehicles.

This change has to be seen in the context of the existing environment, which historically has been significantly modified. The degree of environmental change brought about by undertaking the activity is considered to be of *'moderate'* magnitude on the 7 point scale. However, the modifications will be undertaken within a modified environment and as such, the sensitivity of the receiving landscape has been reduced.

The quality of the landscape relates to landscape values or people's perception of the environment. This includes aspects such as naturalness, vividness, memorability and rarity. As discussed above, the assessment of landscape effects needs to be made in the context of amenity because the CRPS suggests an important landscape may be categorised as such due to its amenity value. Noise can also impact on people's appreciation of an area and is therefore a relevant consideration when assessing impacts on amenity values. Potential noise effects from the proposed activity has been assessed by Acoustic Engineering Services (report no. AC16076-02-D1). It is considered that this is an appropriate and thorough assessment and for this reason, noise, how it may affect amenity and how it may form part of the landscape, is not considered further.

The site does not contain any landscape feature or landform that is notable let alone significant. The site development, whilst covering a relatively extensive area and comprising a change to the land surface, will not create a topography that is incongruous or out of context. The local environment has already been highly modified and contains many dwellings and buildings within the surrounds (particularly in respect of SH1, and the airport and business development to the west and north of the SH1). The landscape therefore doesn't have a high degree of naturalness or rarity and it is considered that the landscape effects due to the proposed activity will be low to very low (less than minor).

6.3 Visual Effects

Landscape and visual effects result from natural or induced change in the components, character or quality of landscape, and often caused by landform or vegetation modification and/or the introduction of new structures, activities or facilities into the landscape. The process of change itself, that is the construction process and/or activities associated with the development, also carry with them their own visual impacts. The visual effects generated by any particular proposal can, therefore, be perceived as:

- positive (beneficial), contributing to the visual character and quality of the environment.
- negative (adverse), detracting from existing character and quality of environment; or
- neutral (benign), with essentially no effect on existing character or quality of environment.

The degree to which visual effects are generated by a development depends on a number of factors, these include:

- The degree to which the proposal contrasts, or is consistent, with the qualities of the surrounding landscape.
- The proportion of the proposal that is visible, determined by the observer's position relative to the objects viewed.
- The distance and foreground context within which the proposal is viewed.
- The area or extent of visual catchment from which the proposal is visible.
- The number of viewers, their location and situation (static or moving) in relation to the view.
- The backdrop and context within which the proposal is viewed.
- The predictable and likely known future character of the locality.

To help with the visualisation of the proposed development visual simulations for key viewing locations have been prepared. These depict sight-lines into the application site and show the potential mitigation achievable with the formation of boundary bunds and locally occurring native vegetation screening.

Visual effects from the development are perceived to be primarily limited to;

- businesses to the north and west of SH1 (including the CIA);
- road users (SH1, Sawyers Arms Road, and Waimakariri Road); and,
- local residents who may see or be aware of physical aspects (such as lighting and fencing) of the activities on the site.[1]

[1] As noted above, the more intangible components (such as noise) are considered to be a component of the landscape and have been referred to earlier.

6.3.1 Businesses and the Christchurch International Airport

The activities on land to the north and west of SH1 are predominantly related to commercial or industrial businesses and also related to air transportation of freight and passengers. It is fair to say that the proposed new use of the application site will result in an expansion of that general category of land use and any development needs to be assessed in the context of existing industrial/commercial/transportation related development. With substantial shelter belt trees along the boundary with SH1 the bulk of the site itself is relatively secluded and is difficult to see easily from adjacent land to the north and west. In addition, most of the developed sites on this land have their 'backs' to the Johns Road boundary and therefore face away from the application site.

Figure 6-1 View looking west along Johns Road
[source: StreetView]

In actuality, the amenity expectations of the owners and occupiers of, and visitors to, the land north and west of Johns Road is considered to be very low, and the proposed activity will easily be absorbed into the location with negligible (less than minor) effects on the amenity values people may associate with it.

6.3.2 Road Users

The visual impacts on passing traffic will be negligible and any effects temporary/transient. As shown in Figure 6-1 above and Figure 6-2 below the margins of SH1 and Waimakariri Road accommodate substantial and established vegetation predominantly consisting of shelter-belt species. As such the application site will only be visible by road users along brief sections along the roads and with only fleeting glimpses or traces of the activities undertaken on the site. In addition, it is proposed to establish 2 and 3-metre-high bunds and native vegetation screening along the perimeters of the application site. This mitigation will prevent, or at least restrict, views into the site.

Sections showing sight lines from the roads and into the site as well as the mitigation achieved with bunding and vegetation are included in the landscape plan attached at Appendix A. From assessing these visual simulations it's concluded that visual effects on users of SH1 and Waimakariri Road will be negligible. It is concluded that the bunding and native planting along the northern boundary of the site with SH1 will actually have a positive impact on the environment and better reflect the local character of the area. The existing pine tree windbreak/shelter break does not enhance the road users experience whilst traveling along SH1.

Figure 6-2 Typical view looking along Waimakariri Road

6.3.3 Dwellings Along Waimakariri Road

As noted above, there are a number of rural-residential properties adjoining and adjacent to the application site. The properties at Nos. 37, 43, 45, 47, 61, 73, and 74 Waimakariri Road and at No. 91 Watsons Road are closest to the application site and with a flat topography this proximity means these properties are more likely to be subject to adverse visual effects.

The view point in Figure 6-3 below is directed towards Nos. 43, 45 and 47 Waimakariri Road, and is typical of the established rural-residential development along Waimakariri Road, comprising dwellings setback from the road boundary and established vegetation between the dwelling and the road boundary. Views of the application site from the dwellings on these properties is, to a certain extent, already impeded by existing vegetation both along the boundaries of the application site and also along the boundaries of the properties themselves. Physical separation is also a relevant consideration and in this regard Waimakariri Road has a legal width of about 20 metres and most dwellings are setback from the road by more than 8 metres. With the flat terrain views down and into the application site need not be considered.

Figure 6-3 View looking towards Nos. 43, 45 and 47 Waimakariri Road

The most significant visual change from the establishment of the car storage activity will result from the erection of perimeter fencing and from the erection and operation of site lighting.

Potential effects from the installation and operation of lighting has been assessed by Pederson Read – consulting engineers, and with consideration being given to visual amenity in terms of: glare, light spill and sky

glow. The report recommends the adoption of best practice techniques that will minimise amenity effects to an acceptable level.

Site visits to the application site and the adjacent land has led to the conclusion that visual effects due to the erection of new structures is capable of being mitigated by screening using a combination of earth bunds and vegetation. The visualisations included in the landscape plan attached at Appendix A confirm that these measures will effectively screen these new built components of the development and to the extent that visual effects will be very low to low (less than minor). The native planting that is to be installed on the earth bunding will be of an increased grade (size) at establishment to ensure added screening of the light poles from Waimakariri Road.

It is considered that other residential properties are sufficiently screened by established vegetation and/or adequately physically separated, to the extent that visual effects will be very low to low (less than minor).

6.3.4 Summary of Visual Effects

Viewpoint	Visual Assessment	Photographs (Appendix B)
Owners and occupiers of land west and north of Johns Road	Negligible	1 - 7
Road users	Negligible	1 – 20
Dwellings Along Waimakariri Road	Very low to low	12 – 23

7 Mitigation of Visual Effects

Consideration has been given to measures and methods for mitigating adverse visual effects of the proposal on adjacent and nearby land. A landscape plan is attached at Appendix A and this shows the mitigation treatments proposed that would provide screening of the car storage facility and thereby lessen the visual impact of the proposed development on the local environment.

In essence the suggested mitigation measures comprise the formation of 2 or 3 metre high bunds along the perimeter of the application site and the establishment of vegetation on the outside bund slopes. As shown in the sections and perspectives included in the landscape plan direct line of sight views into the site will be sufficiently obscured by the bund and the vegetation once it is established.

The main vantage points / viewing audiences of the site look to the site from John's Road (SH1) and from Waimakariri Road. From further review of the site it was determined that two specific locations would undergo the highest degree of change and so perspective views have been simulated from those two points;

1. Near 73 Waimakariri Road looking north to the site
2. Near 47 Waimakariri Road looking north to the site

The perspectives are shown in the landscape plans in Appendix A. In order to protect the rural residential character from Waimakariri Road it is proposed to install a 2 and 3 metre high vegetated bund that would screen views of the car storage facility. The visualisations show the native planting as it would appear at establishment and at maturity. The bunding and native planting installed at establishment will be of a sufficient size to screen the car storage facility. Larger grade plant material will be installed adjacent to the perimeter light poles to screen these structures. The native species that have been selected are shown in the landscape plans in Appendix A are common to the local area and would be eco-sourced locally from the Canterbury Ecological District.

Figure 7-1 below is a copy of Section A-A and shows the nature and effect of the proposed mitigation along Waimakariri Road.

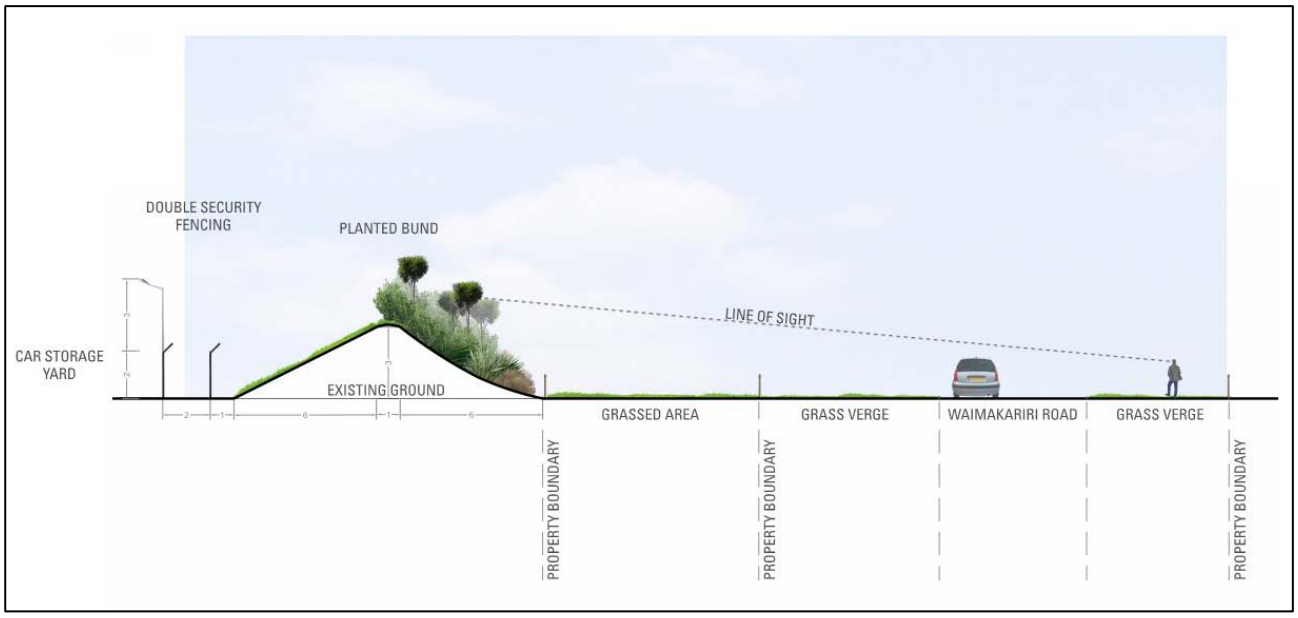

Figure 7-1 Section A-A from Landscape Plan

Of note a similar treatment has been applied to reduce the impact of the newly constructed Orion sub-station which is located directly to the north-east of the proposed development.

Figure 7-2 View from near No. 23 Waimakariri Road to the Orion sub-station vegetated bund

The location of the 3 metre high bunding which is to be established along the southern perimeter of the site adjacent to Waimakariri Road (identified in the Figure 7-3 below by item #9) has been determined to ensure that views from the second storey windows of No. 73 Waimakariri Road to the car parking facility are screened. The cross section with a 3 metre high bund and 2 metre high plantings confirms views from this property to the car storage facility will be obscured.

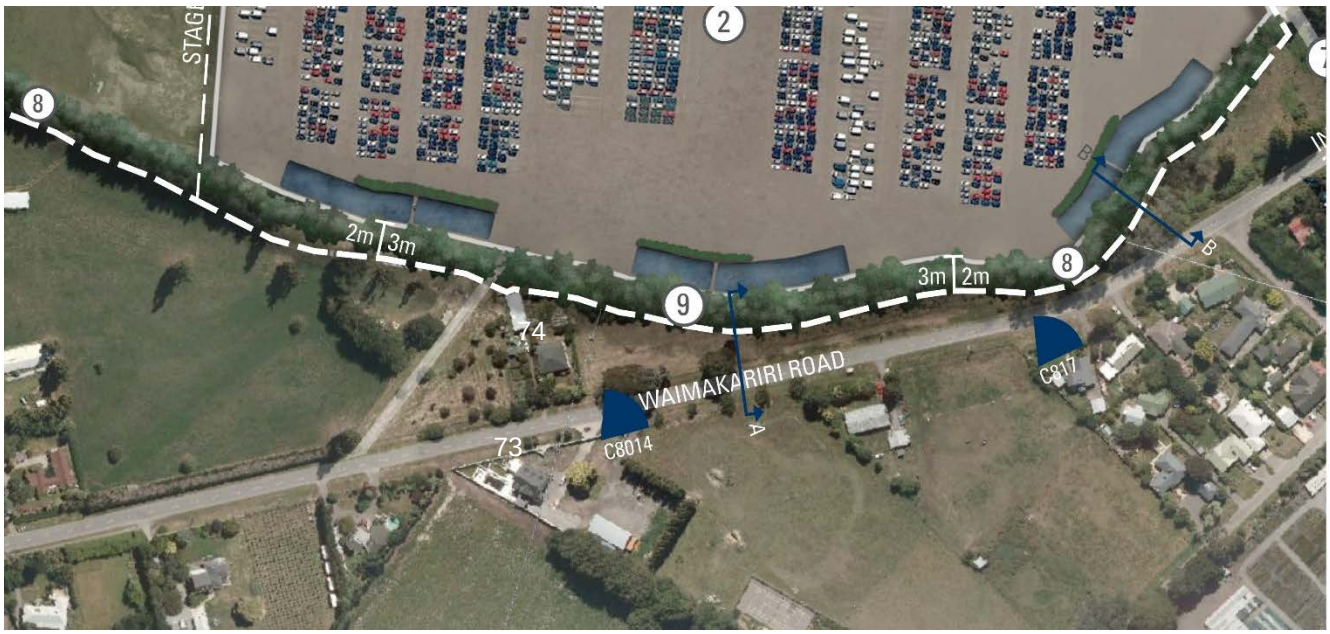

Figure 7-3 Three metre high bund located along Waimakariri Road

As shown in Figure 7-4 below, views to the site from No. 73 Waimakariri Road are limited by the existing street trees along the southern grass verge of Waimakariri Road and also the existing trees in the adjacent property to the north (No. 74 Waimakariri Road). There is only a narrow view shaft to the car storage facility.

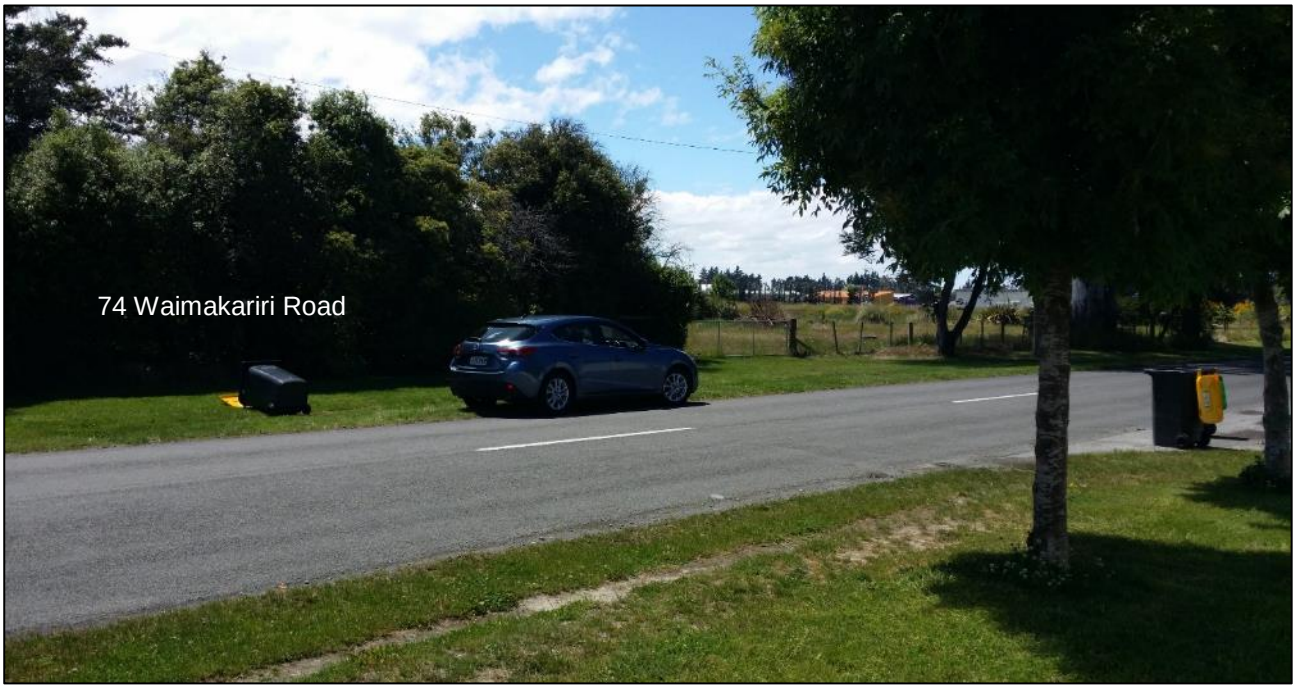

Figure 7-4 View from the front gate of No. 73 Waimakariri Road north to the site

With mitigation measures being established the visual effects of the car storage facility on the local environment will be very low (less than minor). In addition, using native species for the bund planting will contribute to a feeling of rural character along Waimakariri Road and thus avoid any adverse effects on the local character.

From Johns Road the impact of the bund and proposed native plantings are seen to have a positive effect on the character of the SH1 corridor. The bund and planting will provide a green backdrop / margin for the users of SH1 and is a desirable solution for the main arterial road that is the gateway road around and into Christchurch.

8 Conclusions

The proposal will result in a change to the landscape but this does not necessarily result in adverse effects. It is noted that the area is not a natural/wilderness area and the surrounding area encompasses established development with dwellings on rural-residential properties and as well as commercial and industrial enterprises along with the Christchurch International Airport. The entry building and light poles will slightly visible in the landscape, but any changes to the character of the landscape are considered to be of a *'low to very low'* magnitude especially when the CRPS's focus on amenity, is taken into account. The planting of locally occurring native species (and the bunding) around the perimeter of the property will screen views to the car storage facility and thus be in keeping with the existing character of the neighbourhood.

The proposal does have the potential to cause adverse visual effects. However, such effects on owners, occupiers and visitors to the adjacent properties to the north and west are considered to be negligible given the nature of the activities on those sites. In addition, visual effects on road users will generally be temporary and fleeting, and therefore these impacts are rated as very low. The bunding and native planting of the northern perimeter will have a positive effect on the character of Johns Road along this stretch of SH1.

Owners and occupiers of dwellings near and adjacent to the site may potentially experience adverse visual effects due to new structures (site building, fencing and lights). The proposed earth bunding on the perimeter of the site and native plantings on the outside bund slopes will ensure that views to the car storage facility will be obscured. Visualisations included with the attached landscape plan confirm that, once established, this combination of ground modifications and locally occurring native vegetation will mitigate visual effects to the extent that these will be very low to negligible (less than minor).

711 Johns Road, Harewood

APPENDIX A
LANDSCAPE PLAN

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711 Johns Road, Harewood

APPENDIX B
SITE AND LOCATION PHOTOS

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Photograph 1 - View from SH1/Sawyers Road roundabout looking west

Photograph 2 - View from SH1 looking west passed the Orion sub-station to the site

Photograph 3 - View from SH1 looking south into the site

Photograph 4 - View from SH1 looking west adjacent to the site with the Press building on the right

Photograph 5 - View from SH1 looking south to the Harewood Road /SH1 roundabout

Photograph 6 - View from SH1 looking east to the site adjacent to the Press building (left)

Photograph 7 - View from SH1 looking east to the site adjacent to the Storage 2u building (left)

Photograph 8 - View from Sawyers Arms Road looking east, the site and Waimakariri Road to the right

Photograph 9 - View from Waimakariri Road looking west on Harewood Road

Photograph 10 - View from Waimakariri Road looking east on Harewood Road

Photograph 11 - View from Waimakariri Road /Harewood Road looking north on Waimakariri Road

Photograph 12 - View from Waimakariri Road looking northwest adjacent to No. 125 Waimakariri Road

Photograph 13 - View from Waimakariri Road looking northwest adjacent to No. 99 Waimakariri Road

Photograph 14 - View from Waimakariri Road looking northwest adjacent to No. 87 Waimakariri Road

Photograph 15 - View from Waimakariri Road looking northwest adjacent to No. 74 Waimakariri Road (project site on the left)

Photograph 16 - View from Waimakariri Road looking southeast adjacent to No. 47 Waimakariri Road (project site on the right)

Photograph 17 - View from Waimakariri Road looking northwest adjacent to No. 37 Waimakariri Road (Sawyers Road in the distance)

Photograph 18 - View from Waimakariri Road looking southeast at the Sawyers Road intersection

Photograph 19 - View from Waimakariri Road looking north to SH1 and Sawyers Road roundabout

Photograph 20 - View from Waimakariri Road looking south down Sawyers Road

Photograph 21 - View from near No. 47 Waimakariri Road looking west into the site

Photograph 22 - View from near No. 73 Waimakariri Road looking north into the site

Photograph 23 - View from No. 118 Waimakariri Road gates looking north through into the site (The site is behind the shelterbelt of pines in the distance)

About Cardno

Cardno is an ASX200 professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage and deliver sustainable projects and community programs. Cardno is an international company listed on the Australian Securities Exchange [ASX:CDD].

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>

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JOHN'S ROAD CAR STORAGE YARD

LANDSCAPE PLAN

The Car Distribution Group

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DESIGN INTENT

We are committed to creating a solution which will benefit the local environment through native planting and minimise impact on nearby residents. We are proposing a vegetated three metre high bund to reduce any visual impact the facility may have on residential properties (Waimakariri Road and a two metre high bund around other visible parts of the car storage facility. This will be very similar to the nearby bund that is constructed around the substation which is planted with native vegetation.

The bund will contain low to med height native planting to allow for maximum sunlight hours during winter. The species mix will consider the local environment and biodiversity to offer the best possible outcome. The surrounding character of the vicinity will be considered along with possible habitat/food for local native fauna.

LANDSCAPE PLAN

The Car Distribution Group

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environmental management

KEY

1. Grassed area
2. Asphalt car storage area
3. Stormwater pond and swale
4. Truck wash area
5. Entry building
6. Planting bays
7. Main entry and exit
8. 2m high bund planting
9. 3m high bund planting
10. Security fencing
11. Car unloading area

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0 40 80 200m

SCALE 1:4000 @ A3

DATE	DRAWING NO	ISSUE
27.03.2017	NZ0110217-C802	7

KEY

1. Grassed area
2. Asphalt car storage area
3. Stormwater pond and swale
4. Truck wash area
5. Entry building
6. Planting bays
7. Main entry and exit
8. 2m high bund planting
9. 3m high bund planting
10. Security fencing
11. Car unloading area

LEGEND

Perspective Viewpoint:
See Sheets C8013 - 17

Section Line:
See Sheets C804 - 12

JOHNS ROAD (SH1)

STAGE BOUNDARY

SITE BOUNDARY

WAIMAKARIRI ROAD

C8014

C817

2m 3m

3m 2m

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0 20 40 100m

SCALE 1:2000 @ A3

DATE	DRAWING NO	ISSUE
27.03.2017	NZ0110217-C803	7

SECTION A-A

PLANTING SHOWN AT 3 YEARS

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0 1.5 3 7.5m

SCALE 1:150 @ A3

DATE	DRAWING NO	ISSUE
27.03.2017	NZ0110217-C804	7

SECTION A-A

PLANTING SHOWN AT 5 YEARS

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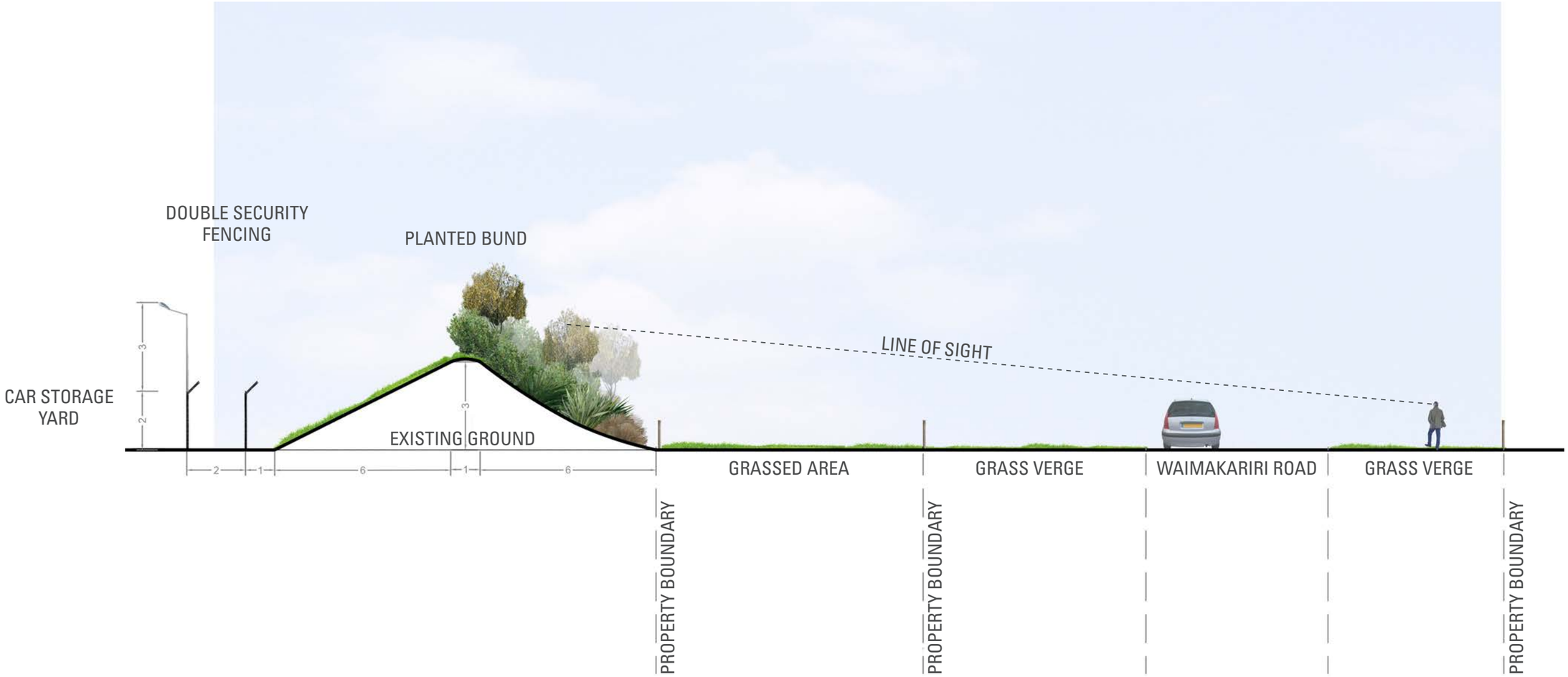
0 1.5 3 7.5m

SCALE 1:150 @ A3

DATE	DRAWING NO	ISSUE
27.03.2017	NZ0110217-C805	7

SECTION A-A



PLANTING SHOWN AT MATURITY

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Cardno Shaping the Future

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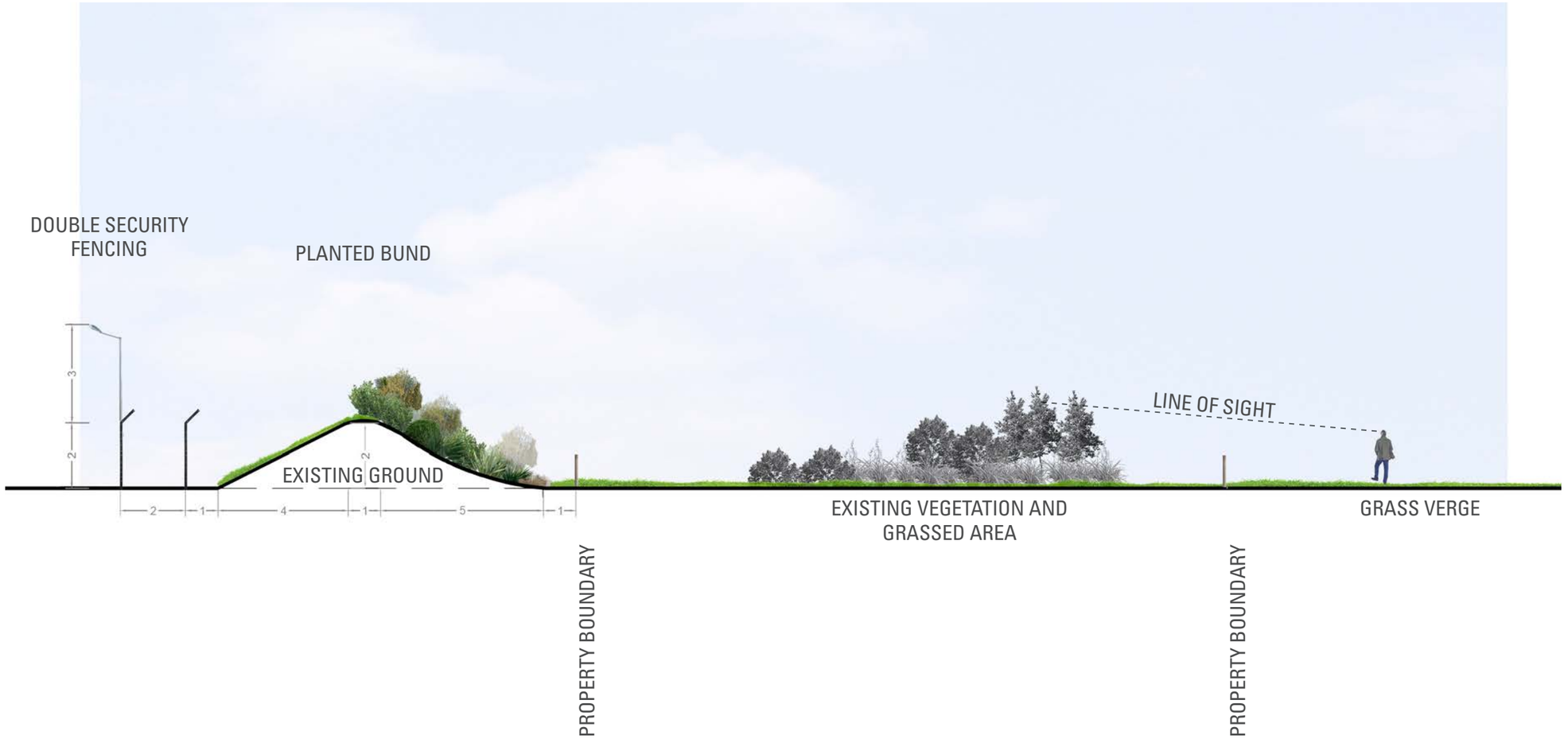
urban design
environmental management

0 1.5 3 7.5m

SCALE 1:150 @ A3

DATE	DRAWING NO	ISSUE
27.03.2017	NZ0110217-C806	7

SECTION B-B



PLANTING SHOWN AT 3 YEARS

The Car Distribution Group

Cardno Shaping the Future

landscape architecture
urban design
environmental management

0 1.5 3 7.5m

SCALE 1:150 @ A3

DATE	DRAWING NO	ISSUE
27.03.2017	NZ0110217-C807	7

SECTION B-B

PLANTING SHOWN AT 5 YEARS

The Car Distribution Group

Cardno Shaping the Future

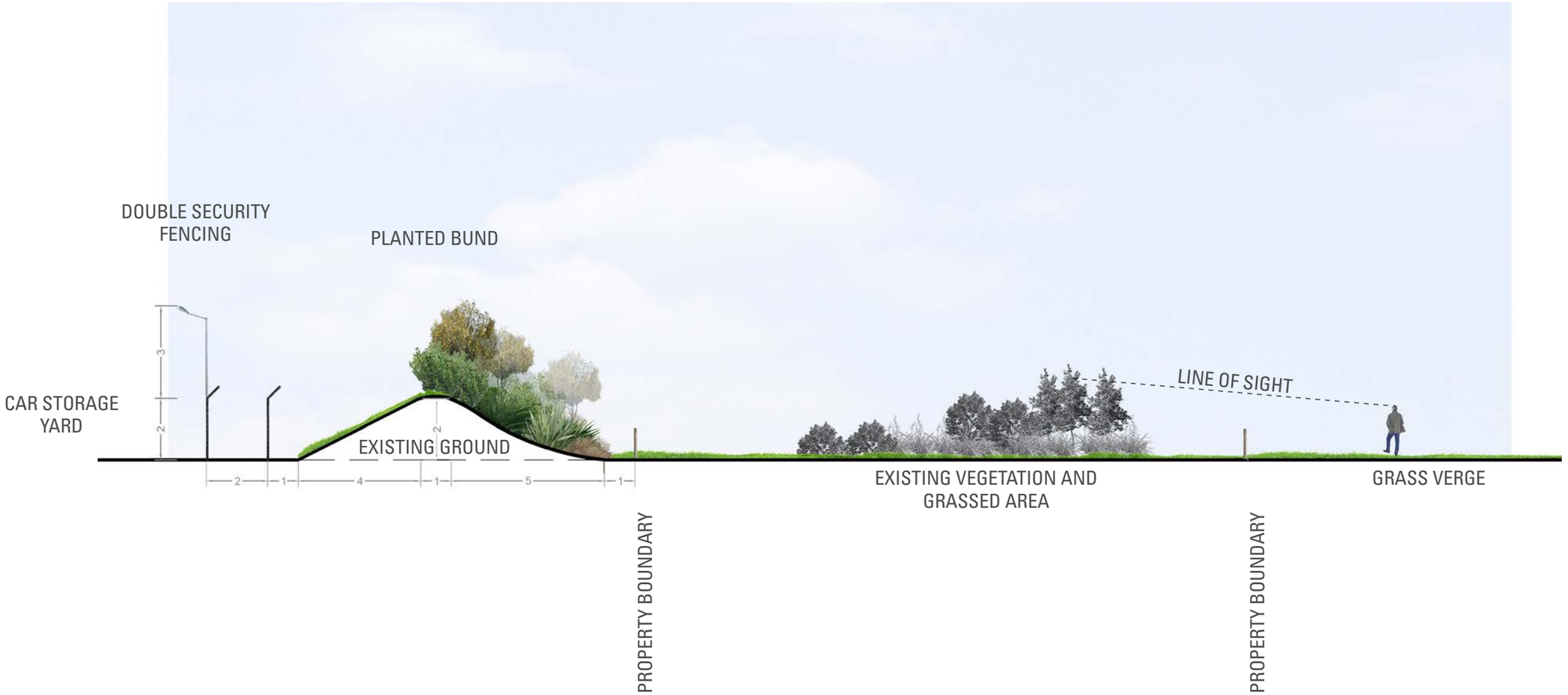
landscape architecture
urban design
environmental management

0 1.5 3 7.5m

SCALE 1:150 @ A3

DATE	DRAWING NO	ISSUE
27.03.2017	NZ0110217-C808	7

SECTION B-B



PLANTING SHOWN AT MATURITY

The Car Distribution Group

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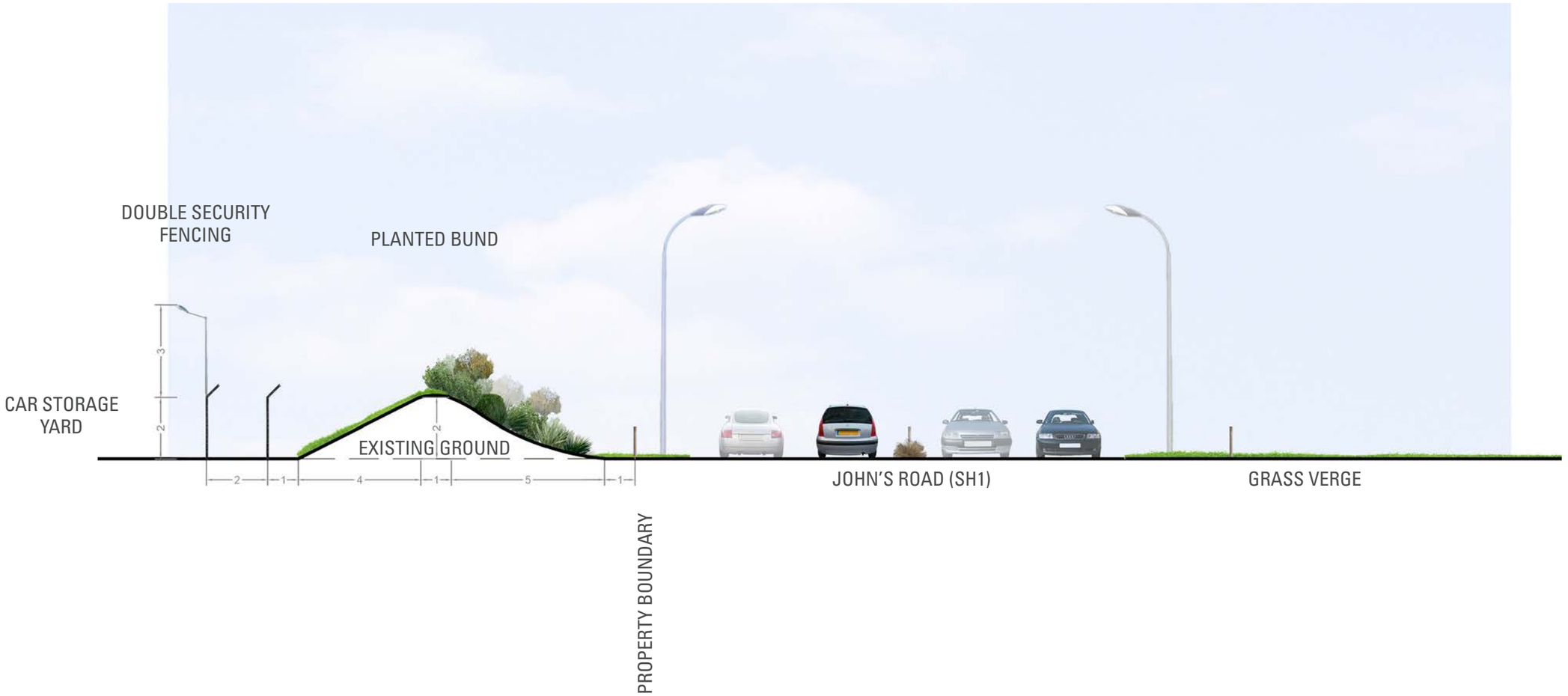
environmental management

0 1.5 3 7.5m

SCALE 1:150 @ A3

DATE	DRAWING NO	ISSUE
27.03.2017	NZ0110217-C809	7

SECTION C-C



PLANTING SHOWN AT 3 YEARS

The Car Distribution Group

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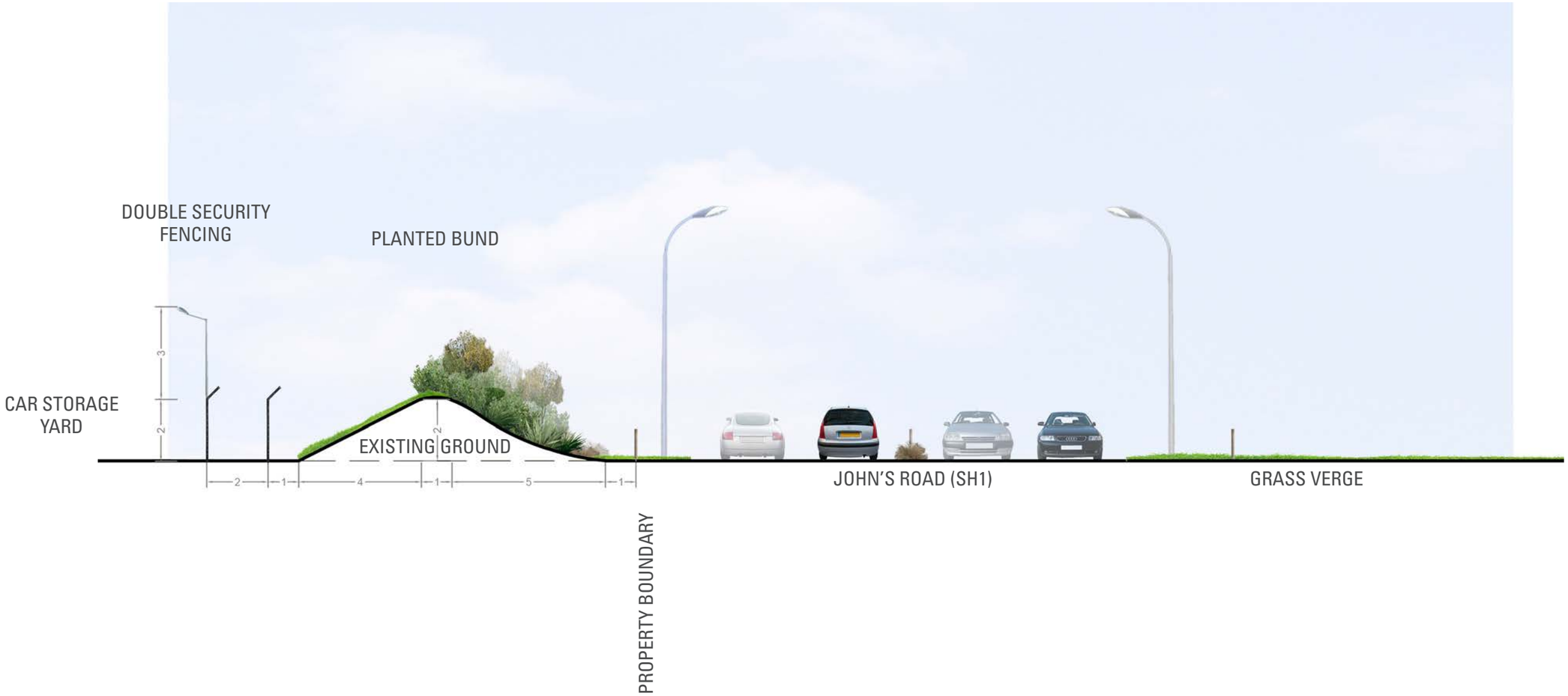
landscape architecture
urban design
environmental management

0 1.5 3 7.5m

SCALE 1:150 @ A3

DATE	DRAWING NO	ISSUE
27.03.2017	NZ0110217-C8010	7

SECTION C-C



PLANTING SHOWN AT 5 YEARS

The Car Distribution Group

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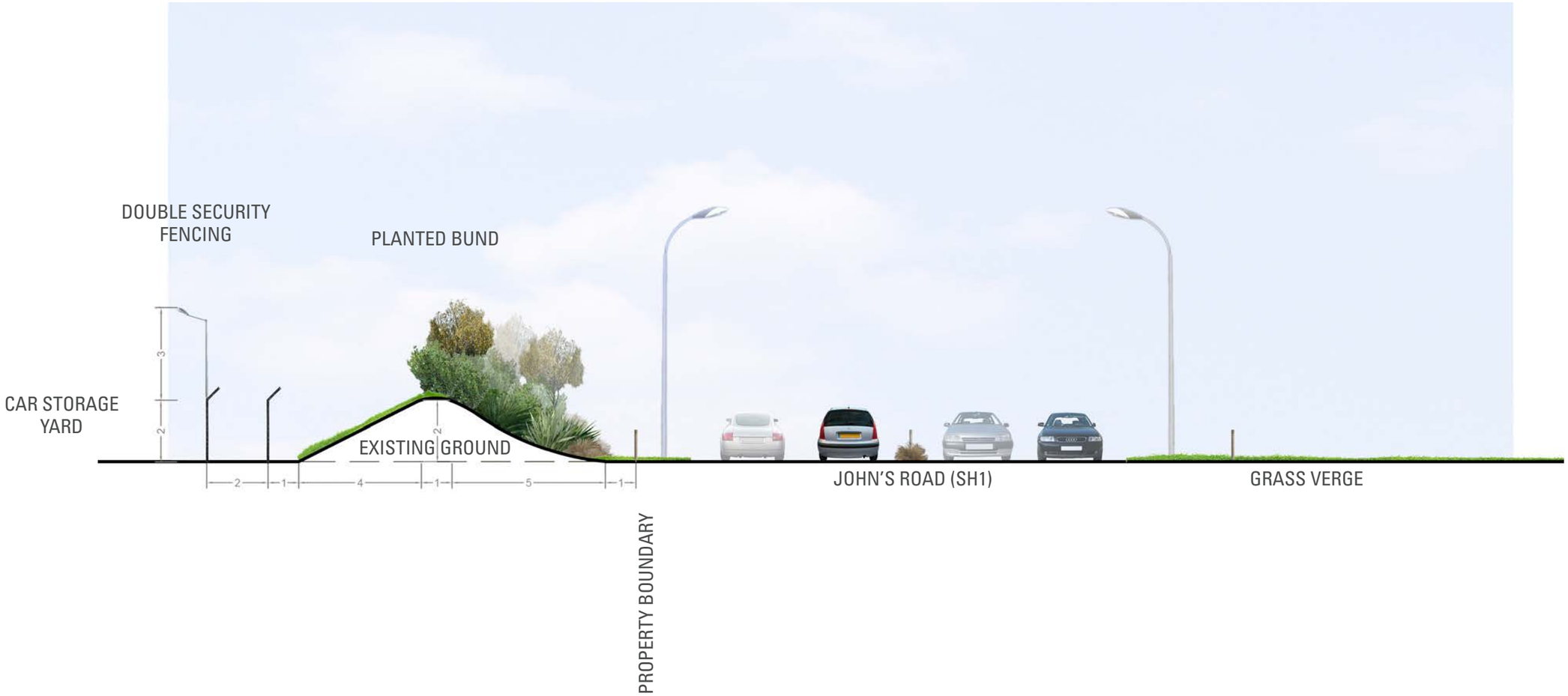
0 1.5 3 7.5m

SCALE 1:150 @ A3

DATE	DRAWING NO	ISSUE
27.03.2017	NZ0110217-C8011	7

SECTION C-C



PLANTING SHOWN AT MATURITY

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0 1.5 3 7.5m

SCALE 1:150 @ A3

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PERSPECTIVE 1

EXISTING SITE - VIEWED FROM NEAR 73 WAIMAKARIRI ROAD

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PERSPECTIVE 1

PLANTING NOTES

Larger grades of plants at 1.5m or taller will be installed along Waimakariri Road to give immediate screening to mitigate the visual effects of the light poles. Light poles may be partially visibile at initial planting (maximum of 0.5m of light pole visible) and it is expected that within 1 - 2 years of plant growth, visibility of light poles will be reduced to zero.

PLANTING ON BUND IMMEDIATELY AFTER CONSTRUCTION - VIEWED FROM NEAR 73 WAIMAKARIRI ROAD

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PERSPECTIVE 1

PLANTING ON BUND SHOWN AT MATURITY - VIEWED FROM NEAR 73 WAIMAKARIRI ROAD

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PERSPECTIVE 2

EXISTING SITE - VIEWED FROM NEAR 47 WAIMAKARIRI ROAD

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27.03.2017	NZ0110217-C8016	7

PERSPECTIVE 2

EXISTING PLANTING SHOWN AT 2020 - VIEWED FROM NEAR 47 WAIMAKARIRI ROAD

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27.03.2017	NZ0110217-C8017	7

PLANTING PALETTE

Makura
(Carex germinata)

Height at maturity
(1m W x 1.5m H)

PB3

Turutu/Ink Berry
(Dianella nigra)

Height at maturity
(1m W x 0.5m H)

PB3

Kowhai
(Sophora microphylla)

Height at maturity
(4m W x 8m H)

PB3

Kapuka/NZ Broadleaf
(Griselinia littoralis)

Height at maturity
(2.5m W x 4m H)

PB3/1.5m High

Koromiko
(Hebe salicifolia)

Height at maturity
(2m W x 4m H)

PB3

Narrow-leaved Lacebark
(Hoheria angustifolia)

Height at maturity
(3m W x 6m H)

1.5m High

Wind Grass
(Anemanthele lessoniana)

Height at maturity
(1.5m W x 1.5m H)

PB3

Mikimiki
(Coprosma propinqua)

Height at maturity
(2.0 W x 3m H)

PB3

Roundleaved Coprosma
(Coprosma rotundifolia)

Height at maturity
(2m W x 5m H)

PB3

Black Matipo
(Pittosporum tenuifolium)

Height at maturity
(3m W x 6m H)

1.5m High

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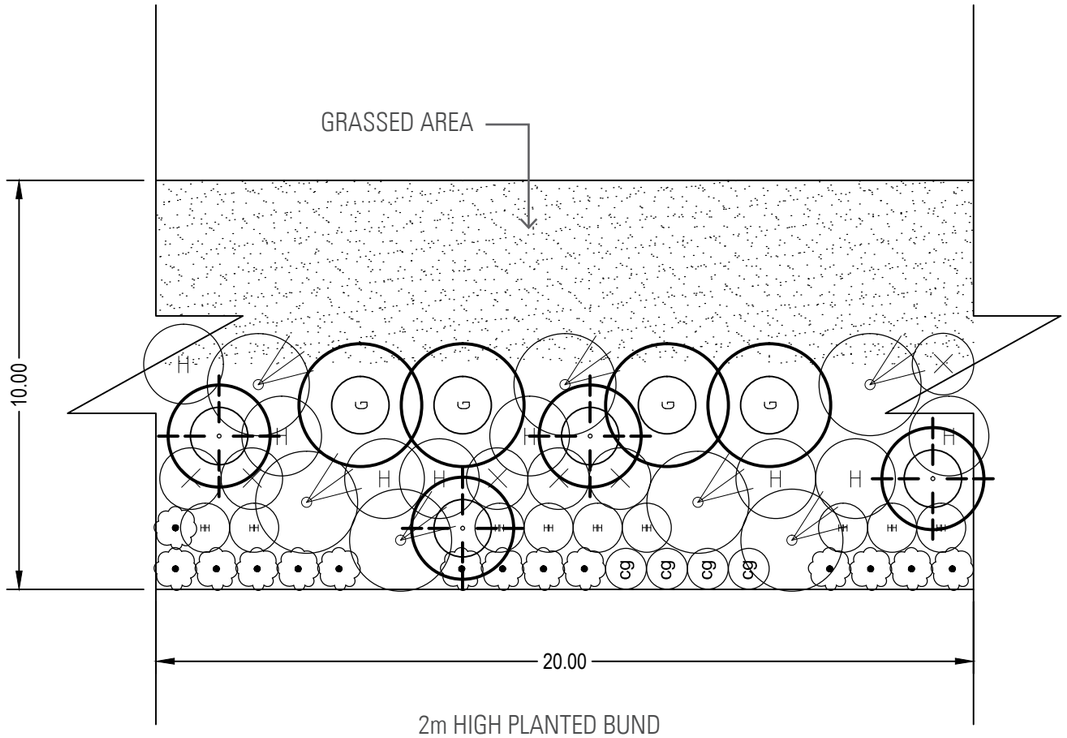
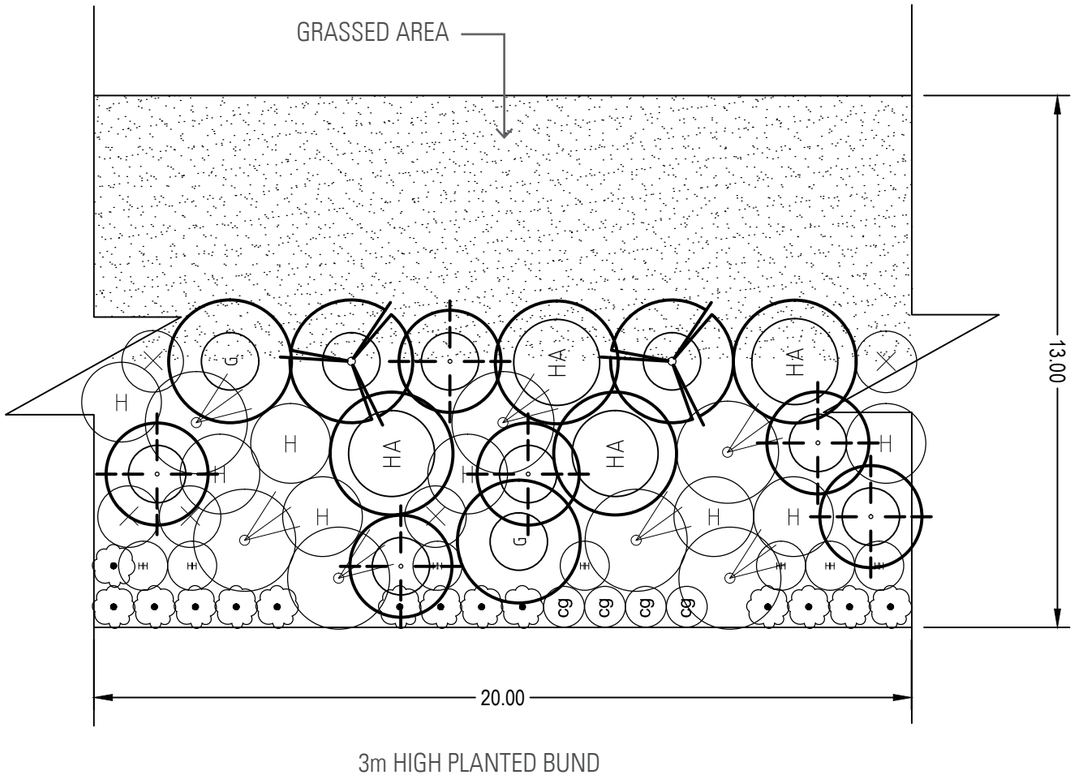
27.03.2017	NZ0110217-C8018	7

TYPICAL PLANTING LAYOUT



2m HIGH PLANTED BUND



3m HIGH PLANTED BUND

PLANTING ESTIMATES						
Symbol	Species (Botanical Name)	Species (Common Name)	Size Required	Height (m)	Spread (m)	Quantity
HH	*Anemanthele lessoniana*	Wind Grass	PB3	1.5	1.5	720
CG	*Carex germinata*	Makura	PB3	1.5	1.0	350
X	*Coprosma propinqua*	Mikimiki	PB3	3.0	2.0	500
	Coprosma rotundifolia	Roundleaved Co	PB3	3.0	2.0	600
	Dianella nigra	Turutu/ Ink Berry	PB3	0.50	1.0	1200
	Griselinia littoralis	Kapuka/NZ Broadleaf	PB3	4.0	2.5	300
G	*Griselinia littoralis*	Kapuka/NZ Broadleaf	1.5m High	4.0	2.5	40
H	*Hebe salicifolia*	Koromiko	PB3	4.0	2.0	650
HA	*Hoheria angustifolia*	Narrow-leaved Lacebark	1.5m High	6.0	3.0	70
	Pittosporum tenuifolium	Black Matipo	1.5m High	6.0	3.0	40
	Sophora microphylla	Kowhai	PB3	8.0	4.0	400
					Grand Total Plants	4870

NOTES

1. The planting layout as shown above is indicative only and may change at detailed design. These planting snippets are to be used as an example for planting layouts and the planting estimates are based on the above percentage mix of the various species of plants.
2. These planting snippets are to be repeated for the entire 2m and 3m high planted bund areas as indicated per the plan on sheet C803.
3. Non-grassed planting areas are to have a min of 50mm mulch and weedmat, and the grassed area is to be planted with a low maintenance grass species or groundcover which does not require maintenance.
4. Planting around light poles to use 1.5m grade plants, integrated into the PB3 planting, to give instant screening. Larger grades of specific species are as indicated and will be planted along the stretch of 3m bund (Waimakariri Road) to minimise the visual effects of the light poles.

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0 1.5 3 7.5m
SCALE 1:150 @ A3

DATE	DRAWING NO	ISSUE
27.03.2017	NZ0110217-C8019	7

ANNEXURE K:

BIRD MANAGEMENT

APPLICATION BY THE CAR DISTRIBUTION GROUP TO DEVELOP A SITE AT 711 JOHNS RD.

SITE DESCIPTION

The site subject of this application is located between Waimakariri Rd and Johns Rd.

It was for many years operated as a gravel pit: it has now been filled and roughly levelled.

It is approximately 1000 m East of the Threshold of 20 Runway at Christchurch International Airport.

The site is surrounded by a mixture of shrubs and trees, comprising in the main untopped and topped *Pinus radiata*, Lombardy and hybrid Poplar, and a variety of indigenous species on the Waimakariri Rd frontage.

The land itself is covered by a wide variety of grasses and weed vegetation, together with gorse and broom.

BIRD SURVEYS AT THE SITE

During the period 9.3.17 and 26.3.17 I visited the site on 10 occasions, at various times of the day, and weather conditions. My aim was to observe and record the species, locations, and behaviour of birds found there.

BIRDS SEEN

The predominant birds seen were small flocks of sparrows/finches, feeding on weeds and grasses that had gone to seed near the southern end of the site. Bird numbers ranged from 10 to 50 birds in each flock each day. A pair of paradise shelduck, a pair of spur-wing plover together with a chick, and 2 pairs of skylark occurred from time to time< and I saw single black-backed gulls flying across or bypassing the site, at an altitude more than 20 m. In addition, small flocks (10-20 birds) of feral pigeons flew across the site, heading east towards Christchurch city centre. These activities predominated in either late morning or late afternoon.

SITE DEVELOPMENT

My observations suggest that few birds use this site; the proposed development of the site (I have seen the plans) should reduce the number of birds there. The plans to level and re-grade the site - **thus removing all the existing bird attracting habitat** is the reason for my opinion. Moreover, the bunds and stormwater swales are to be surfaced with *Avenix colliseum* a perennial ryegrass, which has been developed to discourage insect-eating and grass-eating passerine birds feeding on it. This ryegrass is also tolerant of inundation by water in the stormwater bunds.

I understand that the large topped and untopped trees on the site are to be removed. This will reduce or eliminate the roosting, nesting and perching opportunities for birds (birds use such trees as macrocarpa and pine trees because they provide many lateral branches which are easy for birds to rest and roost on).

In contrast to the trees mentioned above, the envisaged landscape planting for the site will be in accordance with the recommended list provided in Appendix 6.11.9 Plant Species for Water Bodies and Stormwater Basins in the Birdstrike Management Area. This will mitigate the attractiveness of the site for those pastoral birds typical of this area of the city lying within the Birdstrike Management Area .

SITE MANAGEMENT

In accordance with CAA NZ Advisory Circular AC 139-16. Wildlife Hazard Management at Aerodromes. The 'Passive Management Technique' of habitat modification will be undertaken during the development of the site. This includes: minimising and eliminating bird attractants such as food sources, water (except during rainfall events) and shelter, all ground cover will be carefully selected and maintained . Aside from the aforementioned matters the applicant/owner operator of site will:

- ensure that during site preparation, construction, and in the future operation of the site that all workers and visitors to the site are required to avoid feeding birds,
- avoid accumulation of any litter that might encourage insects, rodents and hence birds to the site,
- ensure that during construction, and in the future, any changes to the low bird numbers observed on the site area are monitored, recorded, and reported to the appropriate person at CIAL.
- as soon as practicable the owner operator of the site will enter into discussion with CIAL to develop and implement an agreed Bird Management Plan appropriate to the area, and which will incorporate the management of the stormwater swales such that they are not attractive to birds, and any other matters which are considered necessary for this site and its future operation.

R.K. McAnergney.

Three Persons Consulting Ltd.

Ken.mcanergney@outlook.com

021 437 452.

Mia

From: Ken McAnergney <Ken.McAnergney@outlook.com>
Sent: Monday, 27 March 2017 12:13 p.m.
To: office@rgmc.co.nz
Subject: FW: BIRD MGMNT REPORT WAIMAK RD.

Follow Up Flag: Follow up
Flag Status: Completed

-----Original Message-----
From: Peter Harper [mailto:pl.harper@xtra.co.nz]
Sent: Monday, 27 March 2017 12:06 PM
To: Ken McAnergney <Ken.McAnergney@outlook.com>
Subject: Re: BIRD MGMNT REPORT WAIMAK RD.

Regarding the proposed development of this site at 711 Johns Rd, in my opinion the recommendations by Ken McAnergney are sound.

I am familar with the site, having researched the bird populations around CIA from1986 to 2014.
>
>>
>> Dr Peter Harper
>> Ornithological Consultant
>>
>> 27 March 2017.
>>
>