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memorandum

TO	Tim Carter	FROM	Inge Martens and Nicki Papworth
	Carter Group Limited	DATE	28 October 2026
RE	Westhaven Residential Development Fast-track Substantive Application - Assessment of ecological effects on wetland values		

1.0 Introduction

1.1 Overview

Carter Group Limited (CGL) has engaged Pattle Delamore Partners (PDP) to carry out a desktop ecology assessment and site surveys relating to a proposed residential subdivision development (Westhaven) on the western edge of Rolleston Township ('the site'; Figure 1). This is to support a substantive application made under the Fast-track Approvals Act 2024 (FTAA) to facilitate the project. The project is a 'listed' project within Schedule 2 of the FTAA; the project listing reference is 'Rolleston West Residential Project', however it is now referred to as Westhaven.

The following assessments were requested:

- Wetland presence and likely ecological values.
- Potential ecological effects of the activities associated with the construction and operation of the proposed development.
- Recommendations for future ecological investigations and management actions to avoid, minimise, remedy, or offset potential effects.

PDP understands that freshwater values are being assessed in another report by Stantec Ltd. This technical memorandum summarises the results of the requested wetland assessments.

This assessment has been prepared in accordance with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. The authors have complied with that Code in preparing this report and confirm that the opinions expressed are within their respective areas of expertise, except where reliance has been placed on information or opinions provided by others. Author biographies are available in Appendix A.

1.2 Site Description and Proposed Activities

The existing site consists of two contiguous blocks of land located along Dunns Crossing Road (Figure 1). These are divided into four named blocks: Holmes, Brookside, Skellerup, and Skellerup South. The site is zoned General Residential Zone (GRZ) under the Partially Operative Selwyn District Plan Appeals Version (POSDP). The applicant has already obtained the necessary resource consent approvals for Stage 1 of the development (referred to as 'Stage 1') under the Resource Management Act 1991 (the RMA). This stage is currently being developed as authorised under Selwyn District Council consents RC265048, RC265049 and regional consents CRC263616, CRC270049 and has therefore been excluded from the scope of this assessment.

The proposed subdivision will comprise residential lots, commercial lots, roading and infrastructure and public reserves. A design drawing of the subdivision layout is included in Appendix B as provided by Inovo.

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NOTES

1. AERIAL IMAGERY SOURCED FROM THE LINZ DATA SERVICE [https://data.linz.govt.nz] AND LICENCED BY LINZ FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 INTERNATIONAL LICENCE.

CLIENT

CARTER GROUP

FIGURE 1: WESTHAVEN SUBDIVISION SITE BOUNDARIES (RED LINES) AND BLOCKS

WESTHAVEN ECOLOGY

2.0 Environmental Context

The site is located within the 'Low Plains' Ecological District of the 'Canterbury Plains' Ecological Region. It is relatively flat, consists predominantly of agricultural land, and underlying groundwater is typically several metres deep.

The digitised Black Maps layer on Canterbury Maps contains some of the earliest (mid 1800's) survey plans of the Canterbury Region (Environment Canterbury, n.d.). Alongside aerial imagery, these maps provide insight into the historical characteristics and natural features of Canterbury, including any presence of wetlands, streams, and vegetation, before the region was further modified.

Black Maps show that the proposed development site was historically categorised as 'herbaceous plains (ferns/grass/herbs)' with grass as the dominant landcover type. This suggests that site lacked significant surface water features during this time. The earliest available aerial imagery for the site (1940-1944; Figure 2) shows a highly modified agricultural landscape, with little housing present in Rolleston township. Remnants of fluvial channels travelling in a broadly northwest-to-southwest direction through the property are visible and are likely historic braids from the nearby Waimakariri River.

In its present-day state, the site consists predominantly of exotic pasture grasses and rotational cropland. Soil cores from bores drilled during groundwater investigations in 2026 in Skellerup and Skellerup South were found to be predominantly dense gravel and sand-based deposits (PDP, 2026). This is consistent with S-Map Online, which shows well drained silts with high stone content on old river terraces and fans (Manaaki Whenua, 2025).

The groundwater investigations (April 2026 to July 2026) found depth to groundwater generally reduced from north to south, varying between approximately 7 m below ground level (bgl) in the north to around 4 m bgl in the south (PDP, 2026). Groundwater flow direction was interpreted to be from north to south, away from the Waimakariri River (PDP, 2026). Surface water is generally absent with the exception of intersecting stock water races, or water derived from pooling rainfall or irrigation.

No wetlands mapped by regional or territorial councils occur within the site, nor does the area contain any predicted wetland extent prior to human arrival (Ministry for the Environment, 2017).



Figure 2: Aerial photography of the project site (outlined in orange) taken between 1940 and 1944, Canterbury Maps.

3.0 Desktop Assessment

An initial desktop assessment using recent and historical aerial imagery (Google Earth, ESRI Wayback, and Retrolens) was undertaken to assess the possible presence of wetlands within the property boundary prior to a field survey (see Section 3.2). Several areas were identified as potential wetlands and targeted for investigation during the field survey. Of particular note were two ponded areas within the Skellerup South Block which were prominent in early 1980's imagery and appeared to have been well-established by the early 2010's (Figure 3).

These ponds appear to be a result of drainage channels or water races intersecting with historic river braids. The braids are visible in the Digital Elevation Model (DEM) for the area (Environment Canterbury, 2023) and ponding is visible through multiple periods of time in historic imagery.

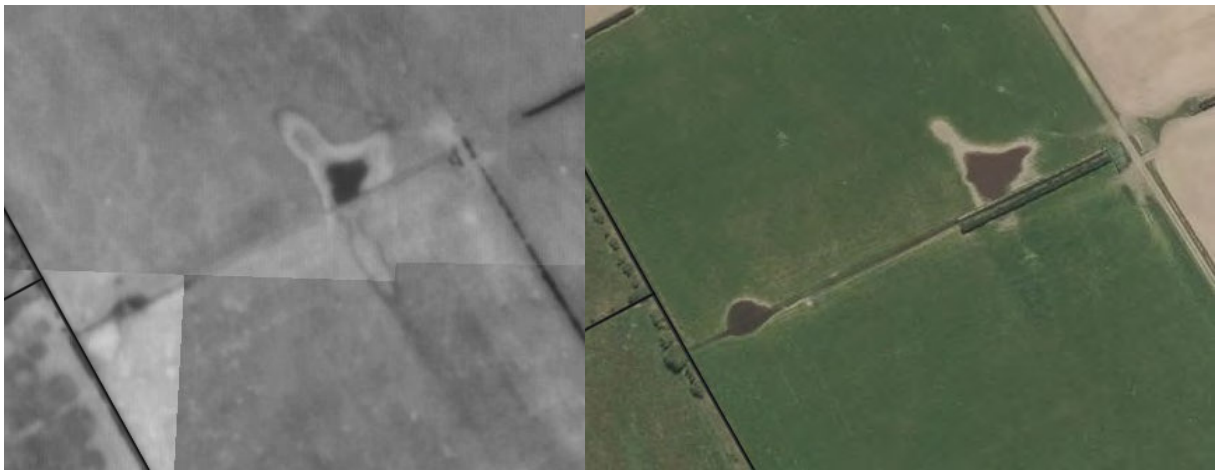

Figure 3: Aerial imagery from the early 1980s (left) and early 2010s (right) showing the two ponded areas within the Skellerup South Block (Canterbury Maps).

4.0 Field Surveys

4.1 Overview

A field survey of the site was undertaken on 13 of July 2026. Areas identified in the desktop assessment were targeted for field assessment to confirm the vegetation types present, as per the wetland delineation protocols for Aotearoa New Zealand (Ministry for the Environment, 2022). Approximately 30 mm of rain had fallen in the area in the seven days prior to the visit (Christchurch Airport weather station, MetService).

As the site is under active cropping and grazing use, dominant vegetation was primarily perennial ryegrass (*Lolium perenne*) with other exotic species commonly associated with pastoral environments (Figure 4). Unused areas and fencelines had higher abundances of other exotic pasture-associated species such as Yorkshire fog (*Holcus lanatus*), Kentucky blue grass (*Poa pratensis*), mallow (*Malva* sp.), white clover (*Trifolium repens*), cocksfoot (*Dactylis glomerata*), and yarrow (*Achillea millefolium*). All dominant plants observed were dryland species (i.e., not commonly present in wetlands).

Some hydrophytic (wetland-associated) plants species were present in low abundances on water race margins and in the lower contours of historic braided channels (Appendix C). These likely persist due to the collection and longer retention time of surface water in these depressions. Hydrophytic species observed included creeping bent (*Agrostis stolonifera*), floating sweet grass (*Glyceria declinata*), and toad rush (*Juncus bufonius*).



Figure 4: Skellerup South Block, facing East.

4.2 Wetland Delineation

All areas of land identified as potential wetland during the desktop assessment were strongly associated with the accumulation of water from rainfall, water races, irrigation infrastructure, or stock water troughs within former river braids or surface water flow paths. Several of the areas investigated also appeared to have been deliberately constructed or modified for stock drinking purposes. Most were found to be dominated by pasture and dryland species or consisted only of sparsely vegetated depressions with no hydrophytic vegetation. Some areas of surface water pooling (Figures 5 - 7) were pugged by stock and had hydrological indications of wetland presence. However, little hydrophytic vegetation was observed, and soils were often comprised of well-draining soil types overlaid by a thin layer of finer material collected from surrounding land-use (e.g., road dust).



Figure 5: Skellerup South Block. Areas of surface water ponding were present throughout. Vegetation was dominated by perennial ryegrass, white clover, and yarrow seedlings. All areas were in topographical depressions where surface water can pond after rainfall. In this southern area of the site, these are likely historic river braids/channels.



Figure 6: Brookside Block. Areas of water ponding were present, but vegetation throughout the paddock was dominated by pasture grasses. All areas were in topographical depressions where surface water can pond after rainfall.



Figure 7: Holmes Block. Ponding was inconsistent in aerial imagery from 2011 to 2026. It is possible the feature in the top photo was created to provide water for stock.

4.3 Results

Of the areas surveyed, only one location met the criteria for 'natural inland wetland' under the National Policy Statement for Freshwater Management (NPS-FM; Ministry for the Environment, 2020) (Figure 8).



Figure 8: The wetland identified in the Skellerup South block. The red line represents the site boundary.

This wetland was located in the westernmost ponded area identified in aerial imagery (Figure 3) and passed the rapid hydrophytic vegetation (RHV) test (Ministry for the Environment, 2022)[1]. Dominant plant species were creeping bent, jointed rush (*Juncus articulatus*), and mudwort (*Limosella australis*) surrounding an area of saturated and pugged soils (Figure 9). Cracked soils and algal mats were present throughout the small area (Figure 10).

The hydrological origin of this area is uncertain, as historic aerial imagery shows little evidence of wetland vegetation either here or the surrounding landscape. Although groundwater is likely to be reasonably shallow in this location (PDP, 2026), the overlying soils are well drained. The presence of any naturally occurring impermeable lenses or pans that could cause water to pond are considered unlikely, particularly given the decades of agricultural modification, including cultivation and tillage.

There was no flowing water in the remnant channel at the time of the survey, and it was not connected to an existing drain or water race, though it is thought to have been connected to the drainage or water race network originally. However, a very clear line of saturated and pugged soils was observed from the fenceline in the west to the centre of the block (Figure 11). Aerial imagery shows this channel to have been regularly filled with water and often modified for human and agricultural use (e.g., stock water).

[1] Meaning all dominant species present at the time of the survey are rated as obligate or facultative wetland species in the New Zealand Wetland Plant List (Clarkson et al., 2021). Plant species observed during the site survey and their wetland indicator ratings are provided in Appendix C.

The nearby ponded area identified in desktop imagery to the east of the wetland (see Figure 3) contained some areas of standing water, but no hydrophytic species were present (Figure 12).



Figure 9: Wetland habitat identified in the Skellerup South Block.



Figure 10: Soil surface cracking and algal mats, with abundant mudwort and creeping bent on the margins. Pasture grasses were dominant beyond this.



Figure 11: Skellerup South Block. Saturated soils pugged by stock along a drainage channel.



Figure 12 Skellerup South Block. Small areas of ponded surface water amid open soils.

5.0 Potential Ecological Effects

5.1 Wetland Ecological Values

This wetland is considered to have low ecological value and is unlikely to meaningfully contribute to ecosystem processes on local or regional scales. This is due to its position in an area unlikely to naturally support wetland habitats, and the likelihood of its presence being a result of human modifications for agriculture, such as the water-race network. As the original water race appears to have been removed sometime in the past, this wetland is also disconnected from the wider surface water network, and the nearest known wetland is approximately 8.5 km to the south (Tārerekautuku Yarrs Lagoon Reserve, Lake Ellesmere). It also provides very limited, low-quality habitat for indigenous wetland flora and fauna. Its isolated occurrence and lack of connectivity mean it is unlikely to function as a habitat resource for wetland birds within the wider landscape.

5.2 Effects of the Proposed Subdivision

The proposed subdivision will likely result in the total loss of the wetland identified in Skellerup South, which covers approximately 160 m^2, including non-vegetated areas. Under the guidelines provided by the Environmental Institute of Australia and New Zealand (EIANZ; Roper-Lindsay et al., 2018), total loss of a wetland represents a very high magnitude of effect.

When assessed strictly in line with the EAINZ criteria, this would constitute a 'moderate' level of effects, however taking into account the wetlands' small size, likely induction by modified hydrological conditions, lack of connectivity, limited habitat provision and value, and its location within the wider landscape, a moderate rating likely overstates the significance of any impact. The loss is unlikely to result in meaningful or cumulative effects on indigenous flora or fauna, given the wetland's limited ecological function and isolation.

Given that this wetland is not considered to represent a remnant of a naturally occurring wetland system in the area, specific mitigation, offsetting or compensation for the loss of wetland extent is not considered necessary in this context. Notwithstanding this, indigenous riparian planting and habitat enhancement is recommended as part of the wider subdivision design to enhance habitat quality and connectivity for indigenous fauna.

6.0 Conclusion

Overall, the proposed subdivision is expected to result in the loss of a small, isolated wetland of low ecological value, likely induced by human modification for stock watering purposes. Based on the information described above, the likely level of effect of this loss, when assessed in conjunction with habitat value and features, is considered to more accurately reflect a **very low** level of effect. Appropriately planned and implemented indigenous planting and habitat restoration elsewhere within the subdivision would provide higher-quality habitat for indigenous fauna, improve habitat connectivity, and establish habitat more consistent with the natural character of the wider area, more than compensating for the ecological function lost through removal of the wetland.

7.0 References

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8.0 Limitations

This memorandum has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Carter Group Limited. PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the memorandum. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

This memorandum has been prepared by PDP on the specific instructions of Carter Group Limited for the limited purposes described in the memorandum. PDP accepts no liability if the memorandum is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

Ecological conditions may vary seasonally and over time. The findings in this memorandum are based on the information available and site conditions observed at the time of the assessment.

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Prepared by



Nicki Papworth

Senior Ecologist – Botany



Inge Martens

Ecologist

Reviewed and approved by



Anna Madarasz-Smith

Technical Director - Ecology

Appendix A: Project Team Bios

The assessments outlined in this memorandum were undertaken by the following qualified ecologists:

Nicki Papworth - Senior Wetland Ecologist

Nicki is a botanist and wetland ecologist with six years' experience working in the private sector and holds a Master of Science in Ecology and Biodiversity. She is a member of the Environmental Institute of Australia and New Zealand (EIANZ) and the New Zealand Plant Conservation Network (NZCPN).

Nicki has a strong technical skillset and extensive experience in wetland assessments and delineation, ecological impact assessments, botanical surveys, and terrestrial habitat and vegetation assessments. She regularly undertakes technically complex and highly specialised ecological assessments, drawing on detailed botanical and ecological knowledge to address challenging project requirements. She has a strong understanding of the policy and regulatory context of ecological assessments across a wide range of consenting contexts.

Since joining PDP in 2022, Nicki has undertaken numerous wetland delineations and ecological impact assessments for clients across the public, agricultural, urban development, and industrial sectors. Her project experience includes wetland assessments for the Miramar Links Golf Club redevelopment, biodiversity offsetting and threatened plant surveys for Waka Kotahi, and ecological assessments supporting vineyard reconsenting processes in North Canterbury.

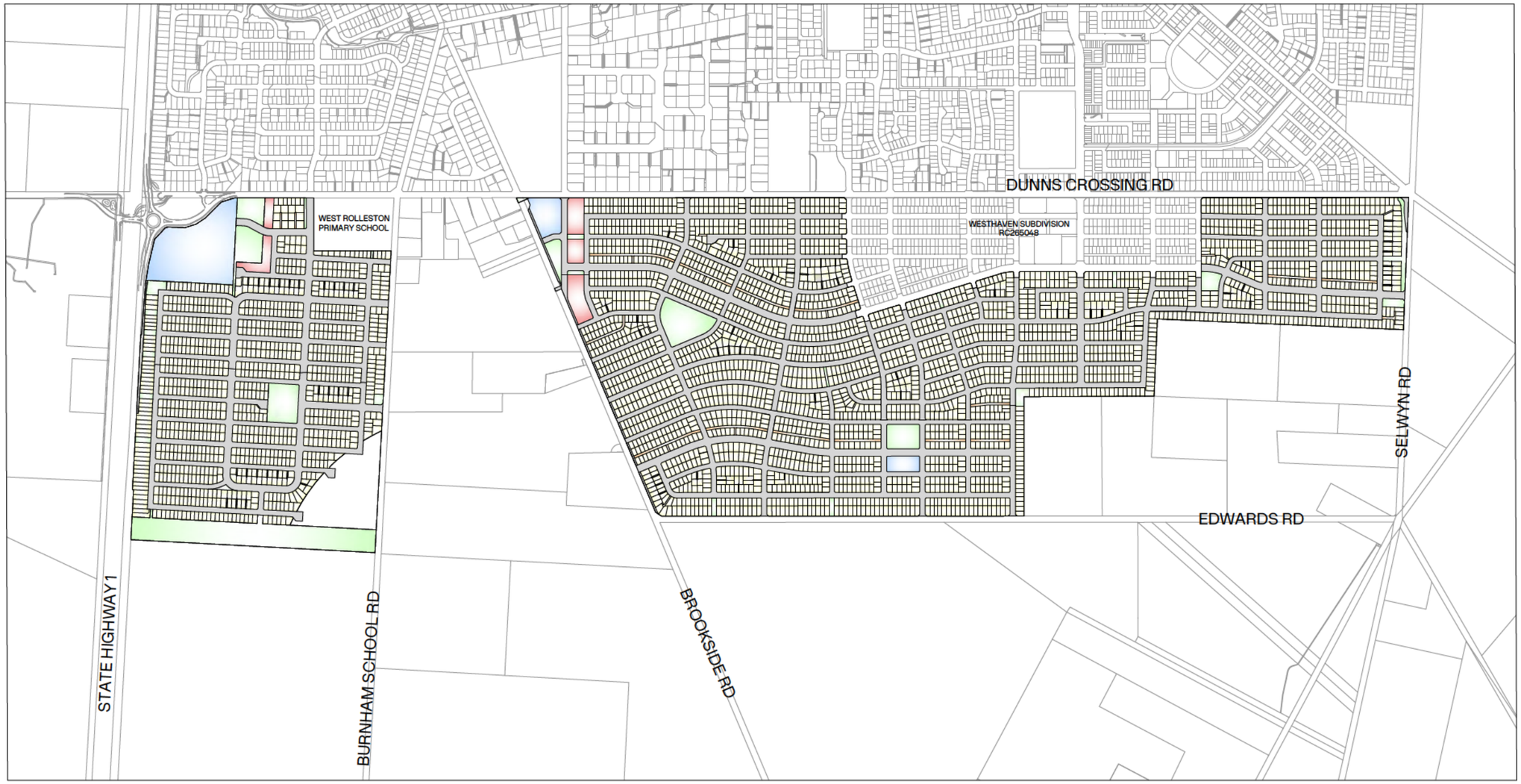
Inge Martens - Ecologist

Inge is a freshwater ecologist with three years' experience working at PDP. She graduated from the University of Canterbury with a Master of Science (Ecology) in 2023 and is a member of the New Zealand Freshwater Sciences Society (NZFSS).

Inge has a wide range of experience in projects relating to assessments of environmental effects, surface water quality analysis, freshwater ecology, and wetland ecology. Inge is a capable field ecologist, with experience in conducting standard freshwater and wetland ecosystem monitoring (i.e., macroinvertebrate, water quality, habitat, vegetation surveys, wetland soil assessments). She also has experience in data analysis using R, python, and Microsoft Excel.

Since joining PDP, Inge has been involved in a variety of projects for both private and public clients. These include conducting wetland delineations across multiple sites in Canterbury for wastewater discharge, subdivision, and water use consent applications.

Appendix B: Subdivision Layout



LEGEND:

- PROPOSED BOUNDARY
- PROPOSED EASEMENT
- ABUTTAL BOUNDARY
- MEDIUM DENSITY
- HIGH DENSITY
- COMMERCIAL AREA
- RESERVE
- ROAD
- PRIVATE ACCESS WAY

NOTES:

SURVEY DISTRICT:	CANTERBURY
LEGAL DESCRIPTION:	SECTION 1 SO 608925, LOT 3 & 4 DP 20007, LOT 1 DP 82068, PART RS 31356, PART SECTION 4 RES 1342, PART RS 31354, LOT 1 & 2 DP 72132, RS 25807, RS 23614
COMPRISED IN:	RT 1285849, CB772/69, CB47B/859, CB24F/1018, CB41D/425, CB41D/426, CB8B/345, CB27B/97
APPLICANT:	CARTER GROUP
REGISTERED OWNERS:	[redacted]
LOCAL AUTHORITY:	SELWYN DISTRICT COUNCIL
ZONE:	GENERAL RESIDENTIAL ZONE [GRZ]

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERVISE SPECIFIED.
2. AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY AND DEPOSIT OF PLANS.
3. SERVICE EASEMENTS TO BE CREATED AS REQUIRED.
4. ANY MEASUREMENTS TAKEN FROM INFORMATION WHICH IS NOT DIMENSIONED ON THE ELECTRONIC COPY ARE AT THE RISK OF THE RECIPIENT.
5. THIS PLAN HAS BEEN PREPARED FOR THE USE OF OUR CLIENT ONLY AND NO LIABILITY IS ACCEPTED IN RELATION TO ANY OTHER PARTIES.
6. LOTS 101-103, 201-202, 301, 401-407, 501, 601-604 & 701-703 TO BE VESTED AS ROADS IN SELWYN DISTRICT COUNCIL.
7. LOTS 1803, 1805, 2804, 4802, 5802, 5803, 5804, 6801, 6802 ARE LOCAL PURPOSE (ACCESS) RESERVE TO VEST IN SELWYN DISTRICT COUNCIL.
8. LOTS 1804, 2803, 2806, 2807, 2808, 3802, 3803, 3804, 3806 ARE LOCAL PURPOSE (UTILITY) RESERVE TO VEST IN SELWYN DISTRICT COUNCIL.
9. LOTS 1801, 1802, 2801, 2802, 2805, 3801, 3805, 4801, 5801, 6803, 7801, 7802, 7803 ARE LOCAL PURPOSE (RECREATION) RESERVE TO VEST IN SELWYN DISTRICT COUNCIL.
10. LOT 3010 IS FEE SIMPLE TITLE TO BE HELD BY THE DEVELOPER.
11. SEE SHEET 16521-00-AP-1013 & 1014 FOR EASEMENT TABLES.

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1:15,000 @A3

CLIENT: CARTER GROUP

PROJECT: WESTHAVEN FAST TRACK

DRAWING TITLE: SUBDIVISION APPLICATION PLAN OVERVIEW

A	FOR CONSENT	ZC	21/10/2026
REVISION DETAILS		BY	DATE

SURVEYED	-		-
DESIGNED	MP		21/10/2026
DRAWN	ZC		21/10/2026
REVIEWED	MP		21/10/2026
APPROVED	MP		21/10/2026
SCALE	1:7,500 @A1	1:15,000 @A3	REVISION
STATUS	FOR CONSENT NOT FOR CONSTRUCTION		A
DWG NO	16521-00-AP-1000		

Synergy Version:

Plot Date: 10:05:32 am,21 October 2026,ZHIWO.CHINGO

File: C:\12DS\DATA\INOVO-12D\16521-ROLLESTON WEST FAST TRACK_236\03 CAD\001 CURRENT\16521-00-AP-1000.DWG

Appendix C: Wetland Indicator Ratings

Plant species observed during site surveys are given in Table C1 below. Wetland indicator ratings describe the likelihood of that species occurring within wetland habitats (Clarkson et al., 2021). The categories are:

- **OBL: Obligate**. Almost always occurs in wetlands, very rarely occurs in upland environments (non-wetlands). >99% estimated probability of occurrence in wetlands.
- **FACW: Facultative Wetland**. Usually in wetlands but occasionally occurs in upland environments. 67-99% estimated probability of occurrence in wetlands.
- **FAC: Facultative**. Occurs with similar frequency in wetland and upland environments. 34-66% estimated probability of occurrence in wetlands.
- **FACU: Facultative Upland**. Usually occurs in upland environments but occasionally in wetland habitats. 1-33% estimated probability of occurrence in wetlands.
- **UPL: Obligate Upland**. Almost always occurs in upland environments and rarely in wetlands. <1% estimated probability of occurrence in wetlands.

Where a wetland indicator rating includes "Pasture Excluded", this species is included in the national list of exotic pasture species (Ministry for the Environment, 2022a).

Table C1: Wetland indicator ratings of plant species observed at the Westhaven Development site

Species	Common Name/s	Biostatus	Wetland Indicator Rating
*Achillea millefolium**†	Yarrow	Exotic	FACU - Pasture Excluded
Agrostis stolonifera^	Creeping bent	Exotic	FACW
*Dactylis glomerata**†	Cocksfoot	Exotic	FACU - Pasture Excluded
Glyceria declinata	Floating sweet grass	Exotic	OBL
Holcus lanatus†	Yorkshire fog	Exotic	FAC - Pasture Excluded
Juncus articulatus^	Jointed rush	Exotic	FACW
Juncus bufonius var. *bufonius*	Toad rush	Exotic	FACW
Limosella australis^	Mudwort	Indigenous - Not Threatened	OBL
*Lolium arundinaceum**†	Tall fescue	Exotic	FAC - Pasture Excluded
Lolium multiflorum†	Italian ryegrass	Exotic	UPL - Pasture Excluded
*Lolium perenne**†	Perennial ryegrass	Exotic	FACU - Pasture Excluded
Malva species*	Mallow	Exotic	Not identified to species level. However, no *Malva* species is listed in Clarkson et al. (2021).
Paspalum dilatatum†	Paspalum	Exotic	FACU - Pasture Excluded
Plantago lanceolata†	Narrow-leaved plantain	Exotic	FACU - Pasture Excluded
Poa pratensis†	Kentucky bluegrass	Exotic	FACU - Pasture Excluded

Table C1: Wetland indicator ratings of plant species observed at the Westhaven Development site

Species	Common Name/s	Biostatus	Wetland Indicator Rating
Poa trivialis†	Rough-stalked meadow grass	Exotic	FACU - Pasture Excluded
Rumex obtusifolius	Broadleaf dock	Exotic	FAC
Stellaria media	Chickweed	Exotic	FACU
*Trifolium repens**†	White clover	Exotic	FACU - Pasture Excluded

Notes:

1. ** denotes species which were dominant or abundant either locally or generally across the site.*
2. *^ denotes species which were dominant or abundant in the wetland identified in Skellerup South.*
3. *† denotes species included in the national list of exotic pasture species (Ministry for the Environment, 2022a) and are therefore excluded from inclusion in the NPS-FM 'natural inland wetland' criteria due to the current and historic use of the land for grazing.*
4. *All other species are listed for reference only and were not observed in any dominant assemblages at the time of the site survey.*