FOOTPRINT ECOLOGY

Recreation use of the New Forest SAC/SPA/Ramsar:

New Forest Vehicle Counts 2018/19

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Footprint Contract Reference: 499
Date: 6th April 2020
Version: Final
Recommended Citation: Panter, C. & Saunders, P. (2020). Recreation use of the New Forest SAC/SPA/Ramsar: Impacts: New Forest Vehicle Counts 2018/19. Unpublished report by Footprint Ecology.

Summary

Footprint Ecology were commissioned by a partnership of local authorities, with funding from central government, to produce a series of reports related to understanding the impacts of recreation on the New Forest international nature conservation designations. The various studies are intended to determine the impacts of new housing development and inform necessary mitigation approaches.

In this report we present the results of vehicle counts carried out within the boundaries of the New Forest international nature conservation designations. The work aims to understand variations in the level and use of parking locations by visitors within this area.

Key outputs/findings from the vehicle counts were:

- Five transect routes were driven concurrently on 15 survey dates, spanning an entire year between October 2018 and September 2019;
- The transect routes ensured all formal car parks within the New Forest SAC/SPA/Ramsar site were included in the counts and also numerous more informal parking locations (lay-bys etc.). Locations such as grass verges (where people sometimes park at random) and town/village centre car parks were not included;
- The average time to drive each of the 5 transect routes was 2 hours 36 minutes;
- The 15 survey dates spanned a range of day types, including weekends and weekdays, as well as periods during term time and the school holidays, and bank holidays and the festive period;
- In total, the 5 transects covered 270 parking locations (comprising 147 formal car parks, 33 gateways/start of tracks, and 90 laybys), with a total capacity of 4,813 parking spaces;
- An average of 4% of the parking locations surveyed were closed/inaccessibe overall, with a high count of 11% closed during mid-March;
- A total of 17,182 vehicles were counted from all locations across the entire survey period, with an overall mean count per survey date of 1,146 vehicles and a median of 1,006 vehicles;
- An exceptionally high count of 2,908 vehicles was made across the entire survey area on Easter bank holiday Sunday (during a period of unseasonably warm weather), with a low count of 370 vehicles made in mid-March;
- Formal car parks contained the largest proportion of the vehicles counted, overall mean of 92%, with laybys accounting for 6%, and gateways/start of tracks accounting for 2%;
- The largest individual parking location totals were made from Queens (573 vehicles across the 15 transects), Blackwater (565 vehicles), Wilverley Plain (454 vehicles) and Bolderwood (453 vehicles) formal car parks;
- The smallest individual counts within formal car parks were made from Godshill Pit (4 vehicles) and Darkwater (7 vehicles);
- Cars comprised more than 85% (14,948) of the total number of vehicles counted, with vans comprising 6% (880), and camper vans 4% (578);

- Even on the exceptionally busy Easter Sunday count, the total number of vehicles across all surveyed parking locations was only 60% of the potential parking capacity available;
- Parking locations in proximity to urban areas, such as the towns and villages of Brockenhurst and Lyndhurst, and urban areas around the periphery were usually filled closer to capacity than those located elsewhere;
- Despite there being a broadly similar number of formal (147) to informal (123) parking locations, for large swathes in the core of the Forest the nearest parking location is often a formal car park;
- More vehicles were counted during the spring and summer months than during the autumn and winter, and weekends were busier than weekdays;
- More vehicles were counted on weekdays during the school holidays than during term time, and more cars were counted during the morning than in the afternoon;
- There were fewer vehicles on the days where there was rainfall (although few rainy days were surveyed).
- There were indications that a significant minority of vehicles were parked away from formal parking locations included in our counts. On some transects the vehicles parked on verges and other unmapped locations were counted (as a check rather than any systematic count) and these averaged an additional 7% of vehicles. The driving routes did not include every road and so this is a very indicative figure.

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Acknowledgements

This report was commissioned by Test Valley Borough Council on behalf of a number of different local authorities. We are grateful to Karen Eastley (Test Valley Borough Council) for overseeing the work and other thanks to other members of the steering group that included: Richard Burke (Forestry Commission), Adam Egglesfield (Hampshire County Council), Louise Evans (New Forest District Council), Dawn Heppell (Eastleigh Borough Council and Southampton City Council), David Illsley (New Forest National Park Authority), Louisa Kilgallen (Wiltshire Council), Nigel Matthews (New Forest National Park Authority), Graham Smith (Test Valley Borough Council) and Nick Squirrell (Natural England).

Survey work was undertaken by Zoe Caals, Neil Gartshore, Nick Hopper, Alison Jay, Fenella Lewin, Durwyn Liley, Sally Mitchell, Chris Panter, Su Powner, Phil Saunders, David Sadler, Charlie Wilson, Damiano Weitowitz, Mariko White. Fenella Lewin (Footprint Ecology) co-ordinated the survey team.

1. Introduction

Overview

1.1 This report, commissioned by a partnership of local authorities with funding from central government, is part of a series that relates to understanding the impacts of recreation (arising from new housing development) on the New Forest international nature conservation designations. The various studies are intended to inform necessary mitigation approaches.

1.2 In this report we present the results of vehicle counts carried out within the boundaries of the New Forest international nature conservation designations. The work aims to understand variations in the level and use of parking locations by visitors in the New Forest.

Relevant legislation

1.3 The designation, protection and restoration of key wildlife sites is embedded in the Conservation of Habitats and Species Regulations 2017 (as amended), which are commonly referred to as the 'Habitats Regulations.' These Regulations are in place to transpose European legislation set out within the Habitats Directive (Council Directive 92/43/EEC), which affords protection to plants, animals and habitats that are rare or vulnerable in a European context, and the Birds Directive (Council Directive 2009/147/EC), which originally came into force in 1979, and which protects rare and vulnerable birds and their habitats. These key pieces of European legislation seek to protect, conserve and restore habitats and species that are of utmost conservation importance and concern across Europe. European sites include Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) classified under the Birds Directive. Ramsar sites, those wetlands of international importance that are listed in the Ramsar Convention are, through government policy, are also treated as European sites.

1.4 Public bodies, including local planning authorities, have specific duties in terms of avoiding deterioration of habitats and species for which sites are designated or classified, and stringent tests have to be met before plans and projects can be permitted. Importantly, the combined effects of individual plans or projects must be taken into account. For local planning authorities, this means that the combined effect of individual development proposals

needs to be assessed collectively for their cumulative impact, as well as on an individual basis.

The New Forest

1.5 The New Forest is one of the largest tracts of semi natural vegetation in the country, and as such is one of our most important wildlife sites. The area hosts three international wildlife site designations and is closely located to other international wildlife sites such as the Solent and Southampton Water.

1.6 The New Forest is classified as an SPA for its breeding and overwintering bird species of European importance, in accordance with the European Birds Directive. The designation relates to internationally significant breeding populations of Dartford Warbler *Sylvia undata*, Nightjar *Caprimulgus europaeus*, Woodlark *Lullula arborea*, Honey Buzzard *Pernis apivorus*, Hobby *Falco subbuteo* and Wood Warbler *Phylloscopus sibilatrix* and over-wintering Hen Harrier *Circus cyaneus*.

1.7 The New Forest is also designated as an SAC for its habitats and non-avian species of European importance, in accordance with the European Habitats Directive. This designation reflects the unique mosaic of habitats across the New Forest, which includes eight Annex 1 heathland, grassland, woodland, wetland, bog and open water habitats, together with three Annex 2 species, Stag Beetle *Lucanus cervus*, and Southern Damselfly *Coenagrion mercuriale*, and Great Crested Newt *Triturus cristatus*.

1.8 Also relevant is the New Forest's listing as a Ramsar site, under the Ramsar Convention. This recognises the international importance of the site as a wetland, supporting wetland flora and fauna of international importance, and adding to the global network of Ramsar listed wetlands.

Housing growth and recreation impacts

1.9 A challenging issue for UK nature conservation is how to respond to increasing demand for access without compromising the integrity of protected wildlife sites. Areas that are important for nature conservation are often important for a range of other services, including the provision of space for recreation for an increasing population. Such recreation space can be used for a wide variety of activities, ranging from the daily dog walks to competitive adventure and endurance sports.

1.10 There is now a strong body of evidence showing how increasing levels of access can have negative impacts on wildlife. Visits to the natural environment have shown a significant increase in England as a result of the

increase in population and a trend to visit more (O'Neill, 2019). The issues are particularly acute in southern England, where population density is highest. Issues are varied and include disturbance, increased fire risk, contamination and damage (for general reviews see: Liley et al., 2010; Lowen, Liley, Underhill-Day, & Whitehouse, 2008; Ross et al., 2014; Underhill-Day, 2005).

1.11 The issues are not however straightforward. It is now increasingly recognised that access to the countryside is crucial to the long term success of nature conservation projects, for example through enforcing pro-environmental behaviours and a greater respect for the world around us (Richardson, Cormack, McRobert, & Underhill, 2016). Access also brings wider benefits to society that include benefits to mental/physical health (Keniger, Gaston, Irvine, & Fuller, 2013; Lee & Maheswaran, 2011; Pretty et al., 2005) and economic benefits (ICF GHK, 2013; ICRT, 2011; Keniger et al., 2013; The Land Trust, 2018). Nature conservation bodies are trying to encourage people to spend more time outside and government policy is also promoting countryside access in general (e.g. through enhancing coastal access).

1.12 There are two statutory purposes for national parks in England and Wales. The first is to conserve and enhance natural beauty, wildlife and cultural heritage and the second is to promote opportunities for the understanding and enjoyment of the special qualities of national parks by the public. This second purpose includes opportunities for open air recreation. However, if it appears that there is a conflict between the two National Park purposes, the Environment Act 1995 requires greater weight to be attached to the purpose of conserving and enhancing the natural beauty, wildlife and cultural heritage of the National Park (this is known as the Sandford Principle[1]). When national parks carry out these purposes, they also have the duty to encourage the social and economic well-being of local communities within the national park.

1.13 There is therefore, a significant challenge: to avoid or mitigate potential negative impacts associated with recreation so as to comply with legislation without compromising the ability of people to be outside enjoying sites for recreation.

[1] Named after Lord Sandford, who chaired the 1974 National Parks Policy Review Committee.

Aims of this work

1.14 The New Forest has a particular draw for recreation, and it is unique in scale and the recreation opportunities it provides. Previous work has considered the recreation impacts and links to new development (e.g. Sharp, Lowen & Liley 2008; Fearnley *et al.* 2012) and also highlighted the range of use that includes both use by local residents living in or near the New Forest SAC/SPA/Ramsar as well as visitors from a wide area including tourists. Previous visitor survey work on the New Forest (Tourism South East Research Services & Geoff Broom Associates 2005) extended to the whole National Park estimated 13.5 million visitor days to the New Forest. More recent work (RJS Associates Ltd. 2018) estimated that figure had increased to 15.2 million visitor days for recreation and leisure in 2017 and estimated it could rise to 17.6 million visitor days by 2037.

1.15 In order to better understand levels of access within the New Forest SAC/SPA/Ramsar and distribution of access across its entirety, a vehicle count survey was commissioned to:

- Categorise existing New Forest SAC/SPA/Ramsar parking locations by type and size;
- Identify the numbers and types of vehicles using them; and,
- Explore temporal, seasonal, and geographic variation in the levels of use observed.

Other reports

1.16 This report solely relates to on-site vehicle counts at locations across heathland and woodland areas in the New Forest SAC/SPA/Ramsar. The work forms part of a series of reports that relate to understanding the impacts of new development on the New Forest SAC/SPA/Ramsar. The overall project incorporates visitor surveys combined with work to understand the impacts of recreation and relevant mitigation approaches. Other reports, produced in parallel with this one, include:

- **Recreation use of the New Forest SAC/SPA/Ramsar: New Forest visitor survey 2018/19** - results of on-site face-face interviews with visitors conducted at formal car parks and other locations across the New Forest SAC/SPA/Ramsar;
- **Recreation use of the New Forest SAC/SPA/Ramsar: Results of a telephone survey with people living within 25km** - the results of a telephone survey with 2,000 residents living within a 25km radius of the woodland/heathland areas of the New Forest SAC/SPA/Ramsar;

- **Recreation use of the New Forest SAC/SPA/Ramsar: Overview of visitor results and implications of housing change on visitor numbers** - a summary of the visitor survey results, drawing the findings from the telephone survey, on-site survey and vehicle counts together and making predictions for change in recreation as a result of new housing.
- **Recreation use of the New Forest SAC/SPA/Ramsar: Impacts of recreation and potential mitigation approaches** – sets out the impacts of recreation and provides options for mitigation and avoidance

2. Methods

Parking locations

Overall scope

2.1 Parking locations included within the survey were those within, or providing direct access to, the New Forest SPA/SAC/Ramsar site (see Map 1). The survey did not therefore include all parking locations within the National Park – those along the coast, within non-designated countryside areas, within tourist centres (e.g. campsites and parking linked to holiday accomodation, museums, etc.) and in town centres (e.g. Lyndhurst, Brockenhurst) and the laybys on the A31.

2.2 Formal car parks were initially identified using Forestry England GIS data (n=140). Additional parking areas were then identified using Ordnance Survey maps and satellite imagery (n=130). The additional parking areas were varied and included gateways, lay-bys and bare verges clearly regularly used for car parking and also some pub car parks. We did not include areas that were dedicated parking areas for houses, i.e. gravelled areas directly outside houses or grassy road verges which are sometimes used for informal parking. We did include two lay-bys (locations 168 and 169, immediately north of King's Hat) that had recently been closed off using wooden bollards but where it was potentially still possible to park. This provided a final list of 270 parking locations which were surveyed. While this total covers virtually all parking locations (and certainly all main car-parks), no attempt was made to drive all roads and check for additional locations on the ground.

Parking location capacity and type

2.3 An attempt was made to identify the capacity of each of the 270 parking locations (i.e. the total number of individual parking spaces available in each). Estimates of capacity for each of the formal car park locations were provided in the Forestry England dataset, with capacity at the other localities estimated from satellite imagery. Ground-truthing was subsequently carried out at parking locations during the vehicle counts, and their capacity estimates revised accordingly if found to be inaccurate. This resulted in a total capacity of 4,813 spaces being estimated across the 270 parking locations.

2.4 The parking locations were then categorised as one of the following location types: (1) formal car park, (2) gateway/start of track, or (3) lay-by/verge (see

Map 1). Verges included areas on the roadside that were bare of vegetation and clearly used regularly for parking, but not grassy roadsides. The total number of each type and the total capacity within them are summarised in Table 1. 55% of the identified locations comprised formal car parks, they accounted for 92% of parking capacity, see Map 2 and Figure 1 (note in Map 2 where parking locations markers would be overlapping these have been grouped and visualised as rings). A gazetteer of individual parking location identification numbers, names, status (i.e. formal car park versus gateway or layby), and position along each transect is provided in Appendix 1.

2.5 Nevertheless, these figures are still approximate, as it wasn't feasible to ground-truth the capacity of all the localities, and small discrepancies were identified in several of the Forestry England and satellite imagery estimates. It should also be noted that capacities are ultimately fluid, depending on a wide range of factors, including recent management modifications, motorists' parking behaviour, vehicle types present, overflow parking onto nearby verges or over earth bunds, the presence of livestock, weather conditions, and car park damage.

Table 1: Total number of each parking location type within the New Forest SAC/SPA/Ramsar, excluding urban centres (column percentages in brackets).

Location type	Number of parking locations	Capacity (number of spaces)
Formal car park	147 (54)	4,442 (92)
Gateway/start of track	33 (12)	96 (2)
Lay-by/verge	90 (33)	275 (6)
Total	**270 (100)**	**4,813 (100)**

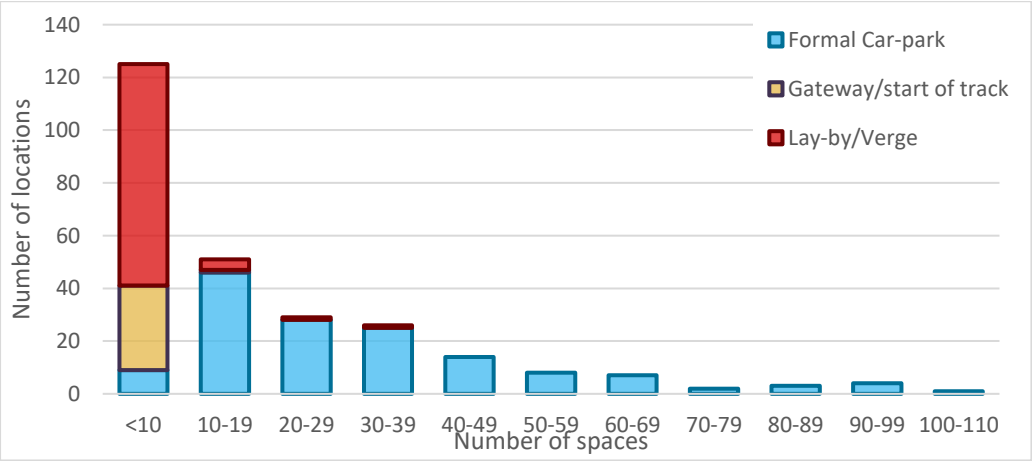
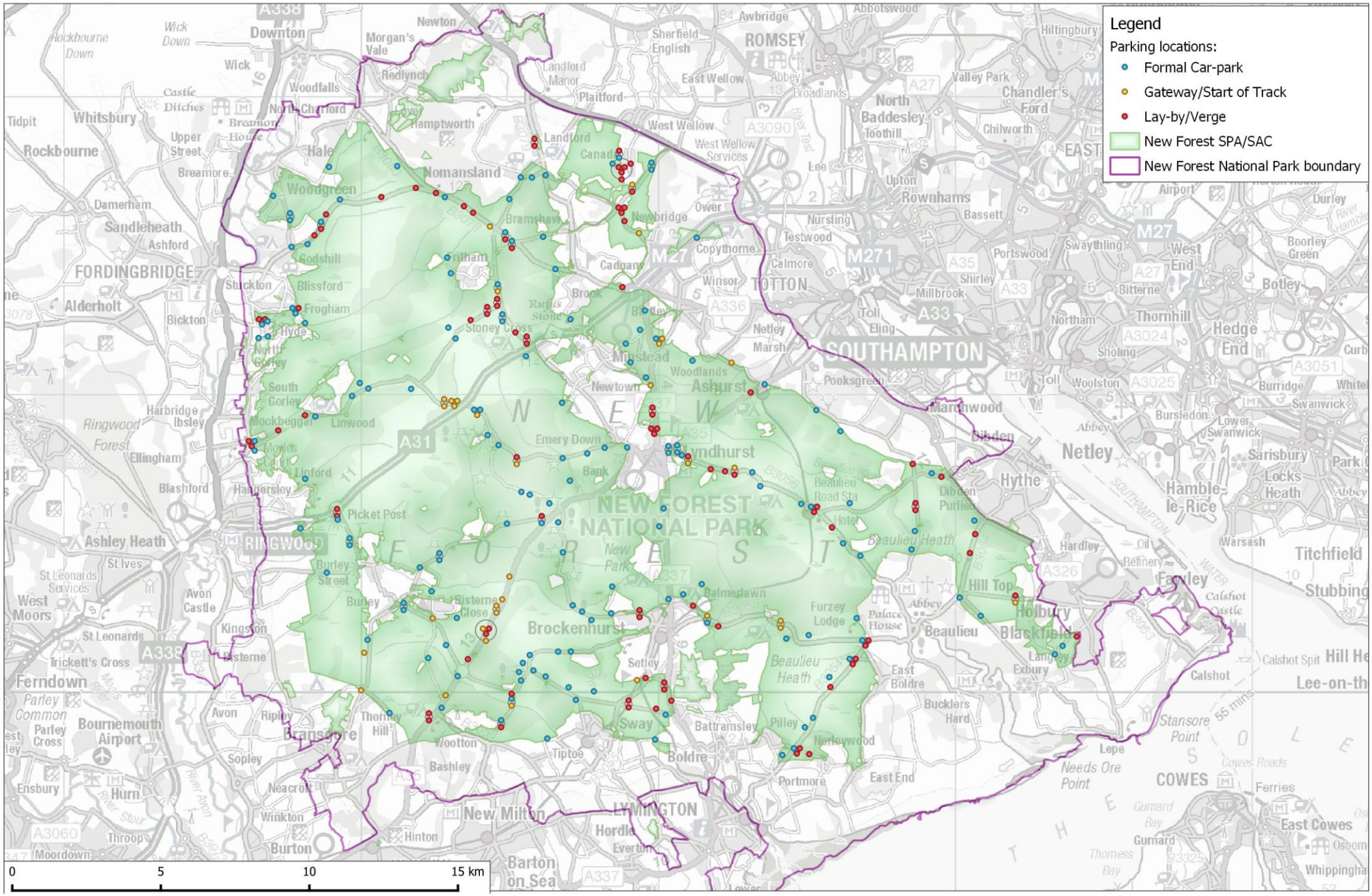
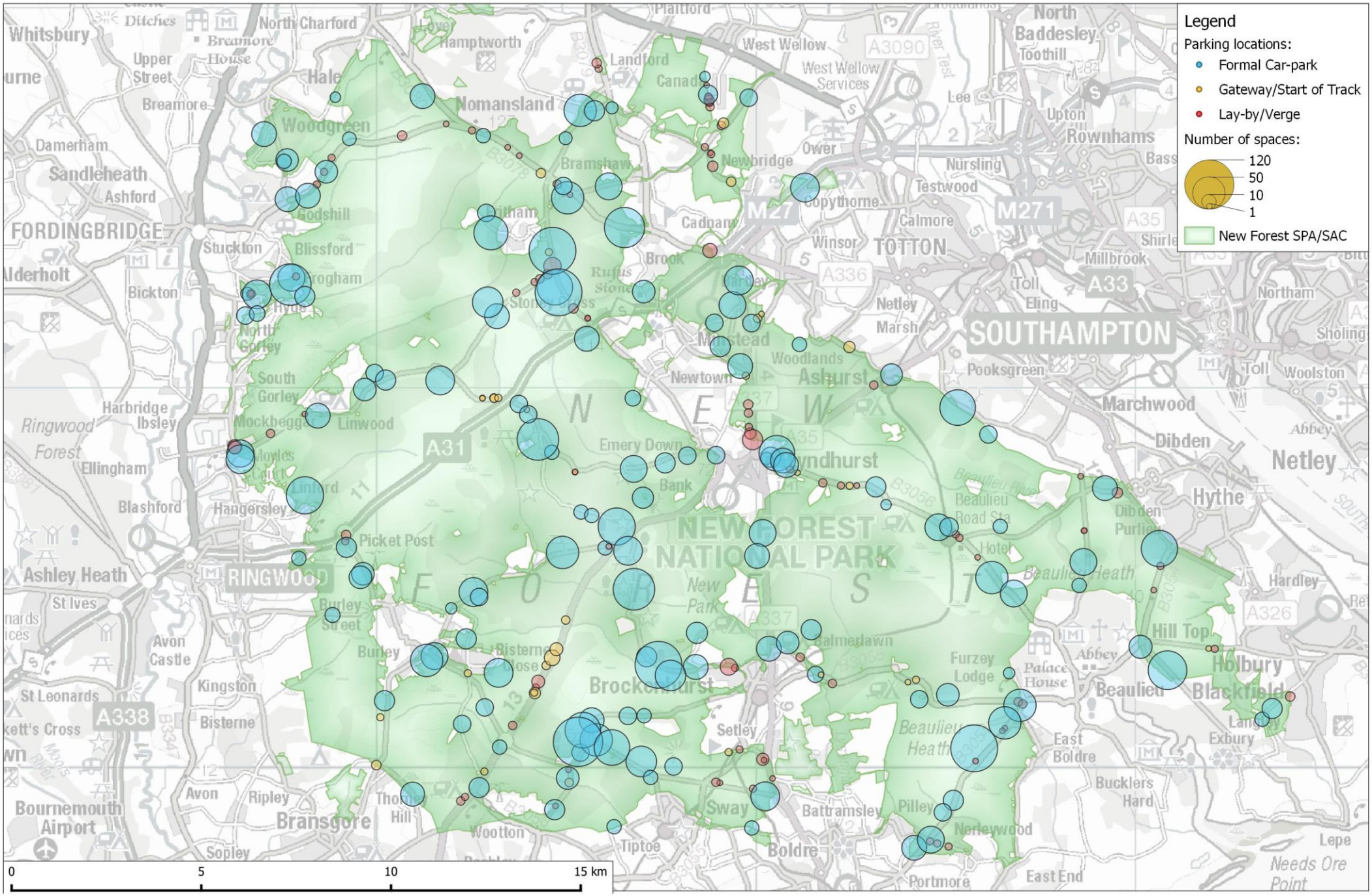


Figure 1: Number of parking locations in each capacity (number of spaces) category for the three types of parking location.

Map 1: Location of identified parking locations within proximity of the SPA/SAC. Parking locations are categorised by the type of parking they provide.



Map 2: Location of identified parking locations categorised by the type of parking they provide and sized by the number of parking spaces at each location.



Timings

2.6 Counts were undertaken on 15 separate dates spread across the calendar year, covering a range of different days and temporal periods (e.g. during known busy periods such as bank holidays, and the Easter and Christmas periods, as well as off-peak weekdays and weekends). All mapped parking locations were visited. As such the counts reflect the number of vehicles parked within the surveyed parking locations.

2.7 The survey dates were selected to ensure that a range of different periods were identified across the year, taking into account the changing seasons. Secondly, we aimed to have a fairly even split between weekdays and weekends. We also ensured that some weekday and weekend dates were close together to allow paired comparisons to be made subsequently. The inclusion of holiday periods, both within term time and the school holidays and including Summer, Christmas, and Easter, was identified as a final priority. We again aimed to ensure that some of the survey dates scheduled during the holiday period could be closely paired with previous/subsequent dates outside the holiday to allow paired comparisons to be made.

2.8 Counts were conducted across a range of times within the day, with the earliest surveys commencing at 07:30hrs and the latest at 17:00hrs. Nevertheless, coverage of a broad range of times of day was considered less important than the selection objectives identified in Section 2.7. This was due to the provision of tally counts of visitor numbers across the day from complementary face-to-face visitor surveys, being conducted by Footprint Ecology at parking locations across the New Forest SAC/SPA/Ramsar (see accompanying report: *Recreation use of the New Forest SAC/SPA/Ramsar: New Forest visitor survey 2018/19*). The key objective during the selection of times of day was therefore to ensure that any potential paired comparisons of weekday versus weekend, and holiday or not, were at the same time.

2.9 The types and times of day are summarised in Table 2. It can be seen that survey dates were evenly spread as far as possible across the seasons, with 3 counts in autumn (September to November, inclusive), 3 in winter (December to February, inclusive), 4 in spring (March to May, inclusive), and 5 in summer (June to August, inclusive).

2.10 9 counts were carried out during term time and 6 during the school holidays, and 9 counts overall were on weekdays and 6 on weekend days. These included a single bank holiday weekday (Monday 26th August), the bank holiday weekend (Sunday 21st April of the Easter weekend), and a weekday

during the festive period (Friday 28th December, between Christmas and New Year's Eve).

Table 2: Summary of survey dates, periods (coloured by season), school status, day type, start time for each of the 15 vehicle counts.

ID	Date	Period	School status	Day type	Start time (hrs)
1	26/10/2018	Late Oct	Holidays	Weekday	13:00
2	25/11/2018	Late Nov	Term time	Weekend	11:00
3	28/12/2018	Late Dec	Holidays	Festive weekday	09:00
4	10/02/2019	Early Feb	Term time	Weekend	13:00
5	12 - 14/02/2019	Early Feb	Term time	Weekday	13:00
6	15/03/2019	Mid-March	Term time	Weekday	07:30
7	21/04/2019	Late April	Holidays	Bank holiday weekend	11:00
8	27/04/2019	Late April	Term time	Weekend	11:00
9	02/05/2019	Early May	Term time	Weekday	17:00
10	19/06/2019	Mid-June	Term time	Weekday	15:00
11	22/06/2019	Mid-June	Term time	Weekend	15:00
12	04/08/2019	Early Aug	Holidays	Weekend	15:00
13	07/08/2019	Early Aug	Holidays	Weekday	15:00
14	26/08/2019	Late Aug	Holidays	Bank holiday weekday	15:00
15	06/09/2019	Early Sept	Term time	Weekday	09:00

2.11 All surveys were conducted on single dates, with the exception of the early February weekday survey. This was spread over 2 dates (12th and 14th February) as a surveyor's vehicle broke down en route and they were therefore unable to complete their part of the count. The missing part of the count was therefore completed on the next available date of broadly similar weather conditions (2 days later).

Driving transects

2.12 In order to undertake the vehicle counts in an efficient manner the identified parking locations were split into 5 groups (A-E; see Map 3 and Table 3), based on their relative proximity and inter-locale travel time. These 5 groups were then covered by separate transects, with each being driven simultaneously by 5 surveyors at the set dates and start times. The number of parking locations, total capacity, route length, and estimated time to complete (the estimated travel time, plus 40% for recording time en route) are provided for each of the 5 routes in Table 3.

2.13 Surveyors were equipped with paper maps and a satnav (or used a hands-free mobile phone app) with the parking locations along the relevant transect already programmed to facilitate navigation.

Map 3: Transect routes and the start and finish point for each route.

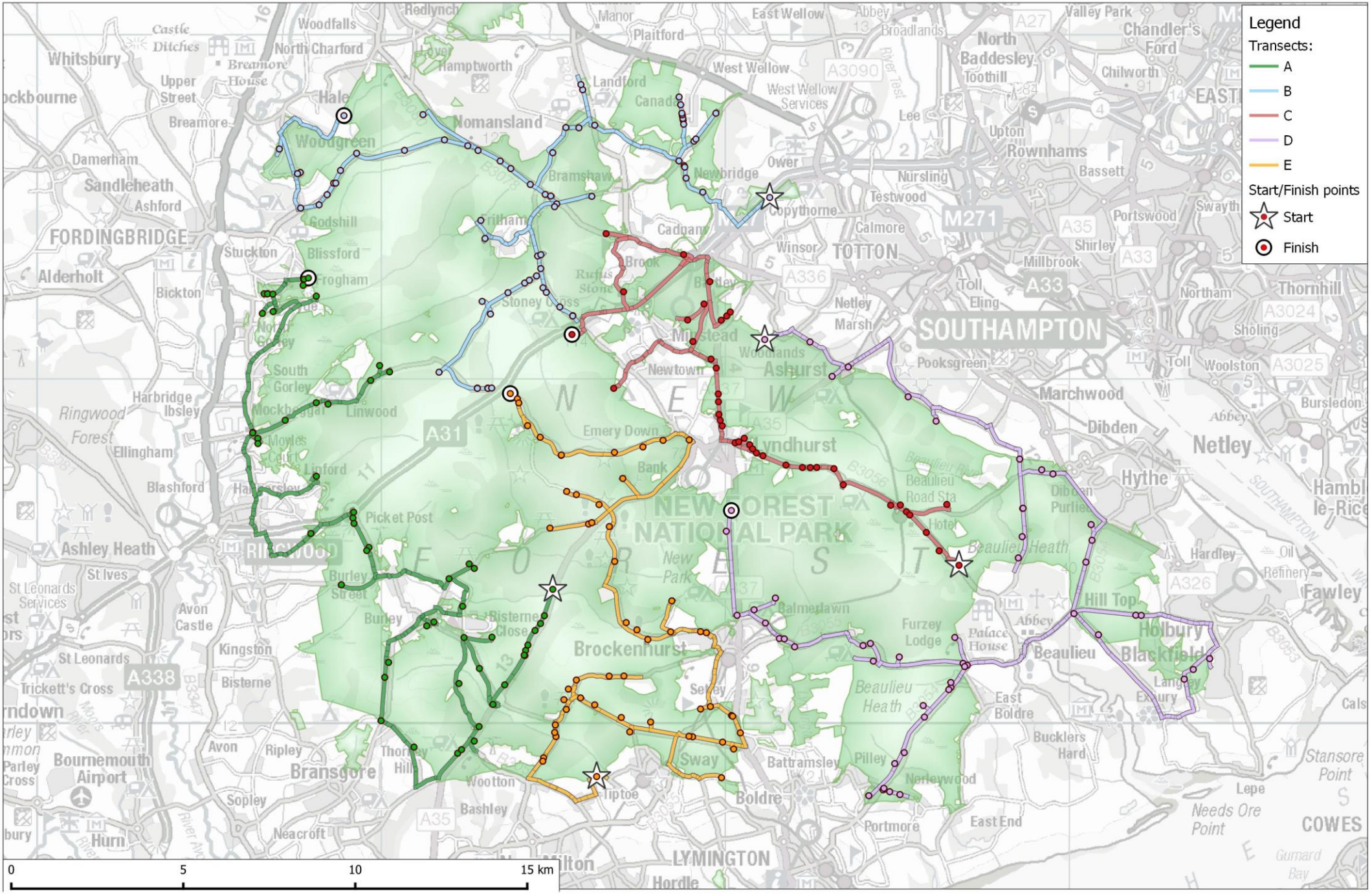


Table 3: Summary metrics for the 5 driving transects used during the vehicle counts.

Transect	No. of parking locations	Total capacity (spaces)	Route length (miles)	Estimated travel time (+ 40%) (hrs)
A	55	906	41	2:50
B	69	1,024	42	2:00
C	40	683	27	1:25
D	52	922	46	2:00
E	54	1,278	36	2:33
Total	**270**	**4,813**	**192**	**10:08**

Data recording

2.14 Every parking location along each of the 5 transects was visited on each survey date, with a standardised form used to record data. The following information was recorded during each survey visit:

- The weather conditions over the entire survey visit;
- The time that each individual parking location was visited; and,
- The number of vehicles parked at each parking location.

2.15 Parked vehicles at each location were further classified into the following categories, and the numbers within each category recorded;

- Vans/lorries – comprising any van, or lorry-type vehicle. This included "commercial" vehicles (i.e. branded businesses stopping for breaks, ice cream vans, or outdoor pursuit companies), as well as individuals with unmarked vans (e.g. as used by some mountain bikers);
- Vehicles used by commercial dog walker (i.e. any vehicle with obvious commercial dog walker branding);
- Cars with bicycle racks or roof racks designed for carrying bicycles;
- Campervans and caravans (from small campervans to large motorhomes), or a car towing a caravan (counted as one);
- Horse boxes (large horse transporters or cars towing a horsebox again counted as one);
- Minibuses and coaches (any type of bus, ranging from minibuses to coaches);
- Total number of motorised vehicles (i.e. all of the above, plus cars without bicycle or roof racks and any other vehicle types not included in the categories, e.g. motorbikes); and,
- Bicycles (comprising push and electric bicycles, but not motorbikes).

2.16 In addition to the information detailed above, surveyors also recorded whether any parking locations were closed during the survey visit, as well as

any other factors that may influence visitor use (e.g. road closures). Parking location closures were for a range of reasons including seasonal closures for bird disturbance, or more temporary closures, for example relating to forestry works, maintenance or to reduce capacity (e.g. Figure 2). When parking locations were closed the surveyors recorded the number of vehicles parked at closed gateways or along road edges in proximity to the closed entrance.

2.17 Similarly, if vehicles were recorded outside of the obvious bounds of the parking location (for example having driven over earth bunds delimiting the boundary of a defined parking area or parking along an access track leading to a parking location) then these were still included in the count for that location. It is for this reason, alongside recorded instances of double parking, that counts over the capacity of the parking location can occur.

Figure 2: Example of formal car park closure sign.

3. Results

Transect survey duration and parking location closures

3.1 The average time to complete a transect across all survey dates was 2 hours 36 minutes, although this varied by transect (Table 4). The minimum time was 1 hour 17 minutes (transect C) and the maximum time was 4 hours 25 minutes (transect A). The mean time taken to complete each transect did not differ significantly from the estimated times provided in Table 3 for most, although transects B and D did take slightly longer than estimated on average. Longer routes, such as these, were however particularly vulnerable to delays caused by livestock and traffic congestion.

Table 4: Summary of surveying by transect route.

Transect	Average (mean) time to complete (hrs)	No. parking locations along each transect	Total no. parking location visits	No. parking location closures/ inaccessible days (and % of total location visits)
A	02:58	55	825	40 (5)
B	02:56	69	1,035	19 (2)
C	01:43	40	600	29 (5)*
D	02:48	52	780	33 (4)
E	02:32	54	810	51 (6)
Total	**12:57**	**270**	**4,050**	**172 (4)**

*Note that this does not include the partial closure of the Roundhill formal car park on 15th March, during which roughly half of the upper car park was closed.

3.2 Table 4 also details the total number of incidences of parking location closure and/or inaccessibility recorded along each transect across the entire survey period. Such instances were relatively infrequent, with a mean of 4% of the total number of visited parking locations closed/inaccessible overall. This again varied between transects however, applying to only 2% of parking locations visited along transect B compared to 6% along transect E.

3.3 Mean survey duration across all transects are summarised by survey date in Table 5. It can be seen that the average transect duration generally decreased across the length of the October to September survey period as surveyors became more familiar with the routes.

Table 5: Summary of surveying by transect date. Values in the final two columns in red/bold indicate the five longest average transect completion times (with mean duration calculated across the five component transects on each date) and the five largest number of closed /inaccessible parking locations.

ID	Period	School status	Day type	Average (mean) time to complete each transect (hrs)	No. parking location closures/ inaccessible days (and % of survey date total)
1	Late Oct	Holidays	Weekday	**03:06**	4 (2)
2	Late Nov	Term time	Weekend	**02:58**	**24 (9)**
3	Late Dec	Holidays	Festive weekday	02:33	**19 (7)**
4	Early Feb	Term time	Weekend	**02:48**	**23 (9)**
5	Early Feb	Term time	Weekday	02:12	**27 (10)**
6	Mid-March	Term time	Weekday	**03:09**	**29 (11)***
7	Late April	Holidays	Bank holiday weekend	02:15	7 (3)
8	Late April	Term time	Weekend	**03:14**	6 (2)
9	Early May	Term time	Weekday	02:33	8 (3)
10	Mid-June	Term time	Weekday	02:05	7 (3)
11	Mid-June	Term time	Weekend	02:24	9 (3)
12	Early Aug	Holidays	Weekend	02:31	2 (1)
13	Early Aug	Holidays	Weekday	02:47	2 (1)
14	Late Aug	Holidays	Bank holiday weekday	02:25	2 (1)
15	Early Sept	Term time	Weekday	02:38	3 (1)
Mean/Total		**02:36**		**172 (4)**	

*Note that this does not include the partial closure (approximately half the capacity) of Roundhill formal car park, although the capacity of that site on this date has been adjusted accordingly in all relevant analyses presented in this report.

3.4 Table 5 also lists the number of parking locations which were closed or inaccessible on each survey date across all 5 transects. At least 1% of all parking locations were closed on any given survey date, although a larger number were closed during the late autumn to early spring period (7% to 11%) than at other times of the year (1% to 3%). Closure of parking locations was focused on formal car parks (96% of closures overall), particularly during the winter months, but could occur at other locations and times.

Vehicle counts

Vehicle totals

3.5 In total, 17,182 vehicles were counted at the 270 locations over the 15 survey dates (see Table 6). The mean total count across all survey dates was 1,146, and the median count was 1,006. A high count of 2,908 vehicles was made during the seventh survey date (on Easter Bank Holiday Sunday) which coincided with particularly good weather. The lowest count (370 vehicles) was made on the previous survey date in mid-March.

Table 6: Number of vehicles counted within each parking location type across all survey visits (row percentages in parentheses; these are rounded to the nearest whole number and combined row values may therefore equate to >100%).

ID	Period	Parking location type			Total
		Formal Car park	Gateway/ Start of Track	Lay-by/Verge	
1	Late Oct	985 (94)	19 (2)	49 (5)	1,053 (100)
2	Late Nov	1,302 (92)	33 (2)	76 (5)	1,411 (100)
3	Late Dec	850 (91)	16 (2)	70 (7)	936 (100)
4	Early Feb	987 (91)	29 (3)	64 (6)	1,080 (100)
5	Early Feb	691 (89)	22 (3)	60 (8)	773 (100)
6	Mid March	301 (81)	14 (4)	55 (15)	370 (100)
7	Late April	2,727 (94)	35 (1)	146 (5)	2,908 (100)
8	Late April	901 (90)	23 (2)	82 (8)	1,006 (100)
9	Early May	386 (88)	9 (2)	44 (10)	439 (100)
10	Mid June	546 (88)	8 (1)	66 (11)	620 (100)
11	Mid June	1,390 (93)	27 (2)	80 (5)	1,497 (100)
12	Early Aug	1,488 (92)	39 (2)	85 (5)	1,612 (100)
13	Early Aug	757 (90)	29 (3)	57 (7)	843 (100)
14	Late Aug	1,717 (94)	32 (2)	79 (4)	1,828 (100)
15	Early Sept	702 (87)	36 (4)	68 (8)	806 (100)
Total		**15,730 (92)**	**371 (2)**	**1081 (6)**	**17,182 (100)**

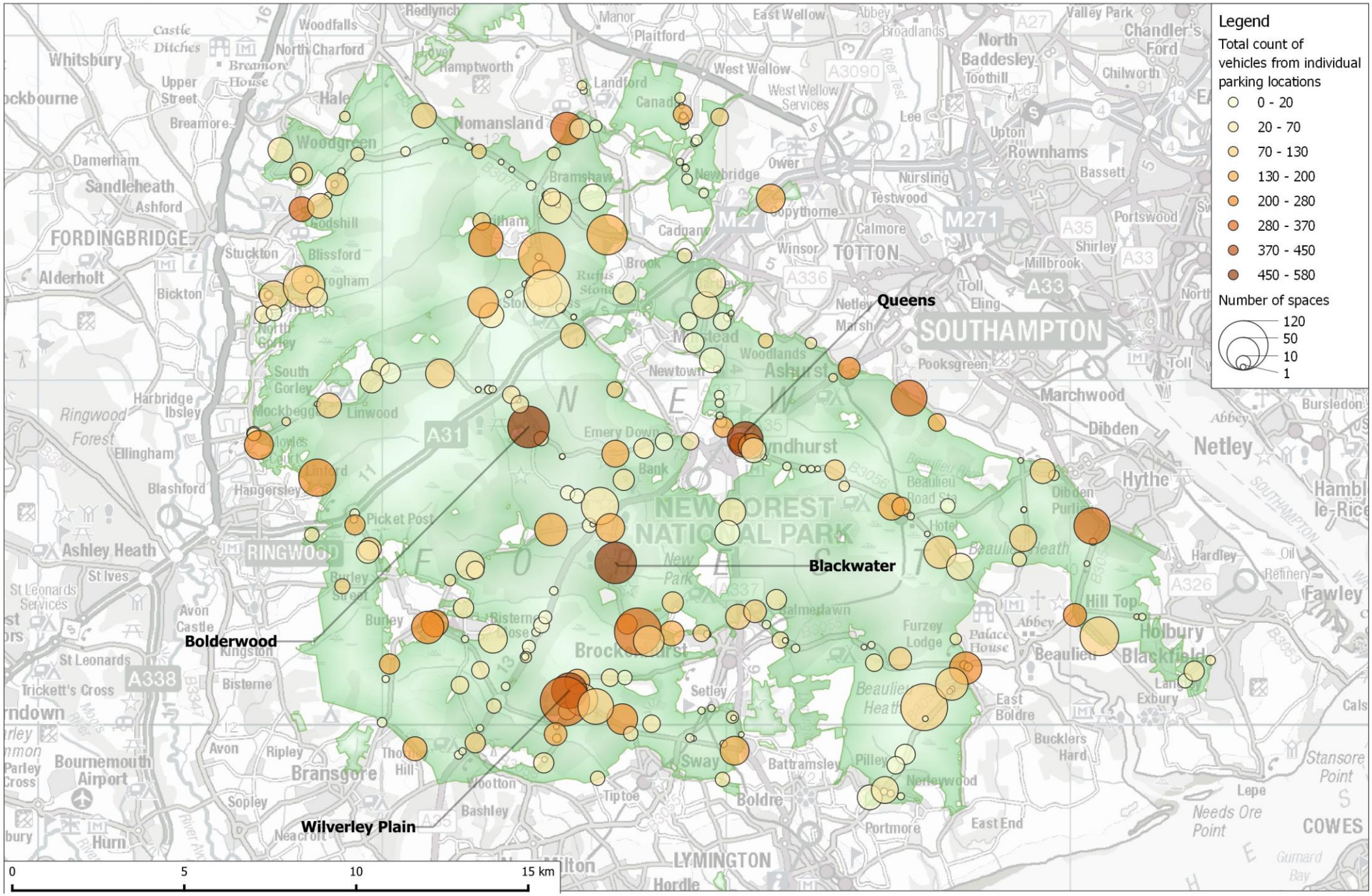
3.6 Formal car parks accommodated the largest proportion of counted vehicles on every survey date (91% to 94%), whilst gateways and track entrances always accounted for the lowest proportion (1% to 4% of the total). The proportion of vehicles recorded parking on lay-bys and verges was the most variable, ranging from 4% to 15% of the total across all survey dates.

3.7 Counts varied by location (see Map 4), with the 4 largest total counts made at Queens (573 vehicles), Blackwater (565 vehicles), and Bolderwood (453 vehicles) parking locations in the centre of the SPA/SAC/Ramsar site, and Wilverley Plain (454 vehicles) formal car park in the south-west. Godshill Pit

and Darkwater provided the lowest total counts from formal car parks, with 4 and 7 vehicles recorded from them, respectively, over the course of the 15 counts.

3.8 Parking locations with larger total counts were generally distributed around the periphery of the SPA/SAC/Ramsar site, in proximity to nearby urban centres such as Ringwood and Southampton (see Map 4). A breakdown of vehicle numbers recorded from each formal car park during each survey visit is provided in Appendix 2.

Map 4: Total vehicle counts within each New Forest parking location across the entire survey period, sized by the number of parking spaces at each, with the four largest count locations annotated.



Vehicle types

3.9 The breakdown of different types of vehicle recorded over the survey period are provided in Table 7. Cars comprised the most numerous vehicle type recorded by far, accounting for more than 85% of the overall total. Vans (6%) and camper vans (4%) were the next most numerous vehicle type, while minibuses/coaches, branded dog-walking vehicles, horse boxes, and cars with bike racks formed a minimal component of the vehicles observed (all 1%).

3.10 Peak counts for most vehicle types were concentrated in the spring, and on the unseasonably warm Easter bank holiday weekend in particular. Nevertheless, high counts of cars, camper vans, and bicycles were also recorded during the late summer, school holiday, period, with a high count of horse boxes recorded on the late autumn survey date.

Table 7: Number of different vehicle types counted on each survey date. Row percentages are provided for all motorised vehicles, with the two highest counts in each vehicle category indicated with grey shading (darker grey indicating the highest count). Percentages are rounded to the nearest whole number and combined row values may therefore equate to >100%.

ID	Survey period	Vehicle types								
		Vehicles with bike racks	Vans etc.	Minibus - coach	Camper-vans/ caravans	Branded dog walking vehicles	Horse boxes	Cars*	Total motor vehicles (any type)	Cycles
1	Late Oct	32 (4)	61 (6)	3 (1)	27 (3)	2 (1)	3 (1)	925 (88)	1,053 (100)	3
2	Late Nov	38 (3)	77 (6)	2 (1)	24 (2)	1 (1)	11 (1)	1,258 (90)	1,411 (100)	4
3	Late Dec	17 (2)	50 (6)	2 (1)	19 (3)	1 (1)	4 (1)	843 (91)	936 (100)	12
4	Early Feb	46 (5)	58 (6)	3 (1)	19 (2)	2 (1)	4 (1)	948 (88)	1,080 (100)	10
5	Early Feb	5 (1)	45 (6)	6 (1)	14 (2)	7 (1)	2 (1)	694 (90)	773 (100)	0
6	Mid March	1 (1)	31 (9)	0 (0)	5 (2)	2 (1)	1 (1)	330 (90)	370 (100)	0
7	Late April	109 (4)	140 (5)	12 (1)	147 (6)	0 (0)	8 (1)	2,492 (86)	2,908 (100)	55
8	Late April	20 (2)	48 (5)	19 (2)	23 (3)	3 (1)	2 (1)	891 (89)	1,006 (100)	2
9	Early May	7 (2)	32 (8)	0 (0)	9 (3)	0 (0)	2 (1)	389 (89)	439 (100)	2
10	Mid June	4 (1)	49 (8)	4 (1)	17 (3)	1 (1)	2 (1)	543 (88)	620 (100)	0
11	Mid June	53 (4)	73 (5)	16 (2)	71 (5)	0 (0)	2 (1)	1,282 (86)	1,497 (100)	14
12	Early Aug	42 (3)	52 (4)	9 (1)	69 (5)	1 (1)	4 (1)	1,435 (90)	1,612 (100)	12
13	Early Aug	22 (3)	38 (5)	11 (2)	34 (5)	3 (1)	2 (1)	733 (87)	843 (100)	0
14	Late Aug	44 (3)	54 (3)	13 (1)	76 (5)	0 (0)	1 (1)	1,640 (90)	1,828 (100)	15
15	Early Sept	12 (2)	72 (9)	1 (1)	24 (3)	4 (1)	1 (1)	692 (86)	806 (100)	0
Total		**452 (3)**	**880 (6)**	**101 (1)**	**578 (4)**	**27 (1)**	**49 (1)**	**15,095 (88)**	**17,182 (100)**	**129**

**Car numbers are calculated by subtracting the combined number of all other vehicle types from the total number of motor vehicles.*

3.11 Examination of the types of vehicle by the types of parking locations showed across all vehicle types a strong preference for parking at formal car parks (84-97% - see Figure 3). Although the proportion of vehicles parked at informal parking locations was greatest for vans/lorries and branded dog walking vehicles.

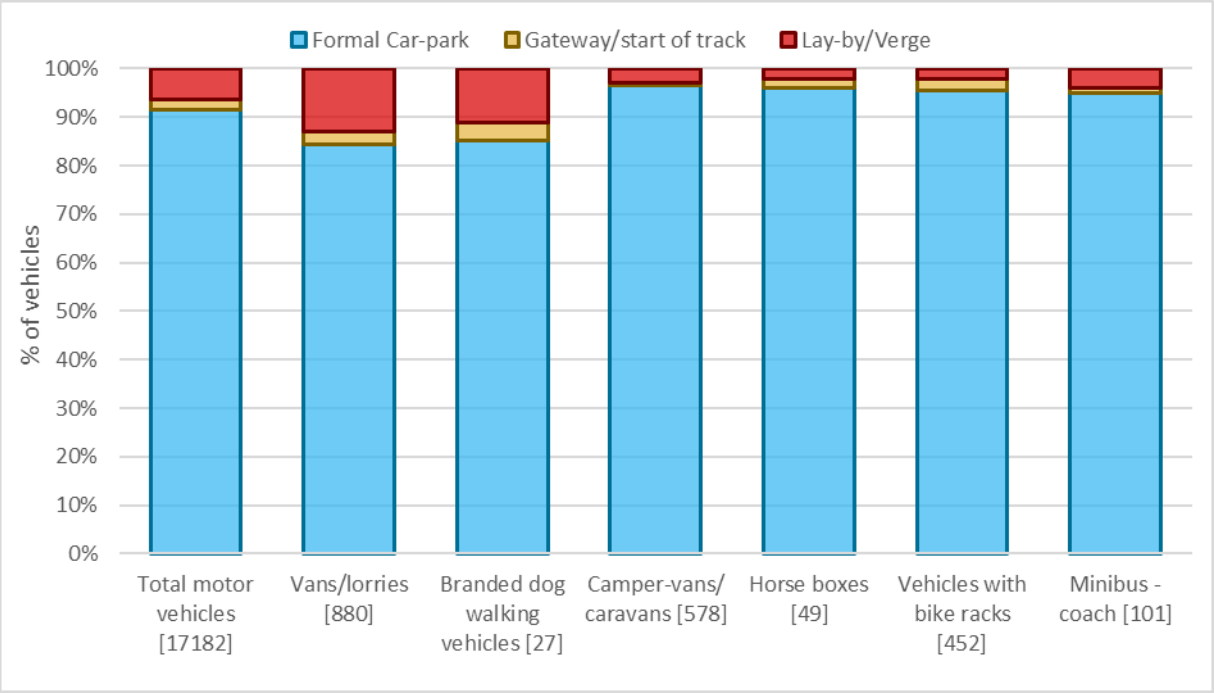
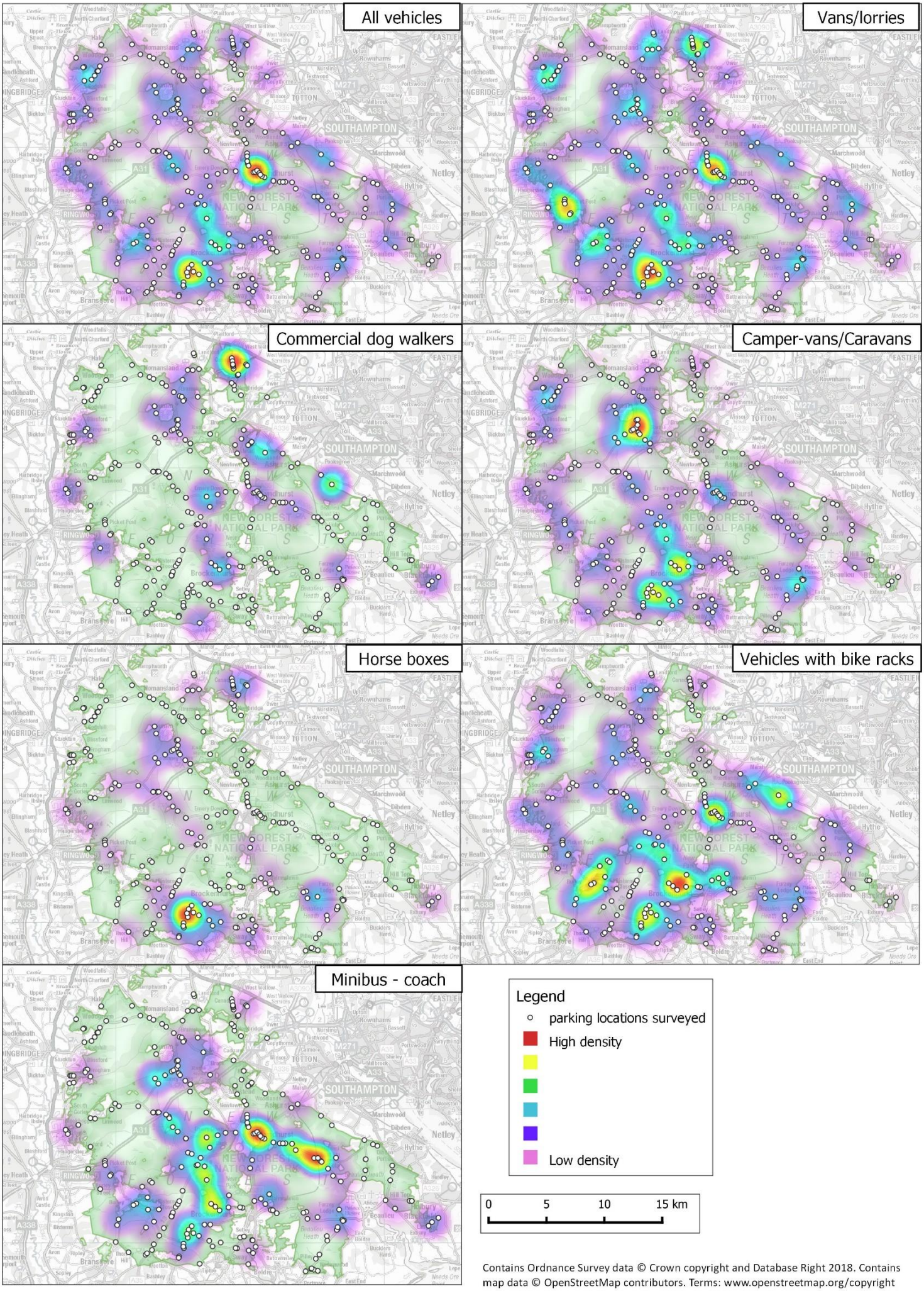


Figure 3: The types of parking location at which different types of vehicles were observed, shown as a percentage of all vehicles of the type recorded on all survey dates. Number of vehicles in each category are shown in square brackets.

3.12 Map 5 uses heatmaps to summarise the distribution of different types of vehicles across parking locations. The distributions of the individual vehicle types were not evenly spread across parking locations, and none of the distributions observed directly matched with the overall pattern seen for all vehicles combined. Closest to this was the distribution of vans and lorries, although it is influenced more by the proximity of urban centres and meeting points for work vehicles (e.g. as often observed at Picket Post). High densities of caravans and camper-vans were often in close proximity to key campsites. Commercial dog walkers and horse boxes are based on very few occurrences, for example commercial dog walker vehicles of which just 27 vehicles were observed and a maximum of 3 per location.

Map 5: Distribution of vehicles categorised by type of vehicle show as a heatmap using the total number per parking location from all 15 counts.



Levels of parking location use in relation to capacity

3.13 Capacity (i.e. the total number of vehicles which can be accommodated within a single site) varied between parking locations (see Map 2). The ratio of the number of cars present in a parking location to the capacity provides a measure of how full a parking location was. We describe this measure as % fullness and data are summarised by date in Table 8. It can be seen that on the busiest date, on the Easter Sunday, the surveyed parking locations were at 60% of their capacity. Across the 15 survey dates, % fullness varied between 8% and 60% overall, with that of formal car parks varying between 7% and 61%. The lowest levels of % fullness were recorded across all 3 parking location types during the Mid-March and early May survey visits.

Table 8: Number of vehicles recorded on each survey date, stratified by parking location type, with figures in brackets indicating % of total available capacity used (% fullness). Grey shading highlights the largest two values of % fullness in each column, with darker grey identifying the largest of the two.

ID	Period	Parking location type			Total
		Formal Car park	Gateway/ Start of Track	Lay-by/Verge	
1	Late Oct	985 (22)	19 (20)	49 (18)	1,053 (22)
2	Late Nov	1,302 (29)	33 (34)	76 (28)	1,411 (29)
3	Late Dec	850 (19)	16 (17)	70 (25)	936 (19)
4	Early Feb	987 (22)	29 (30)	64 (23)	1,080 (22)
5	Early Feb	691 (16)	22 (23)	60 (22)	773 (16)
6	Mid March	301 (7)	14 (15)	55 (20)	370 (8)
7	Late April	2,727 (61)	35 (36)	146 (53)	2,908 (60)
8	Late April	901 (20)	23 (24)	82 (30)	1,006 (21)
9	Early May	386 (9)	9 (9)	44 (16)	439 (9)
10	Mid June	546 (12)	8 (8)	66 (24)	620 (13)
11	Mid June	1390 (31)	27 (28)	80 (29)	1,497 (31)
12	Early Aug	1488 (33)	39 (41)	85 (31)	1,612 (33)
13	Early Aug	757 (17)	29 (30)	57 (21)	843 (18)
14	Late Aug	1717 (39)	32 (33)	79 (29)	1,828 (38)
15	Early Sept	702 (16)	36 (38)	68 (25)	806 (17)
Total capacity		**4,442 (92)**	**96 (2)**	**275 (6)**	**4,813 (100)**

3.14 Figure 4 show the number of vehicles compared to capacity for individual formal car parks. Locations can be compared to the one:one relationship, which would indicate a full car park with an equal number of vehicles to spaces. Figure 4 shows that the mean number of vehicles at individual formal car parks was generally below capacity and could be very much lower for large capacity car parks.

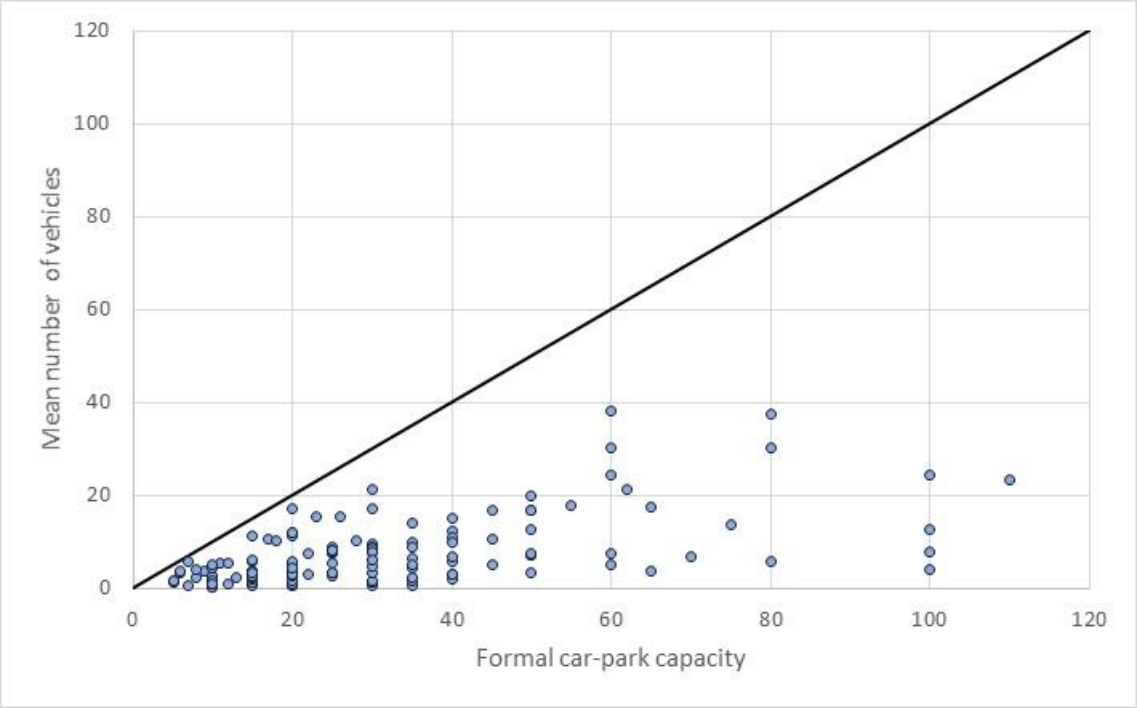


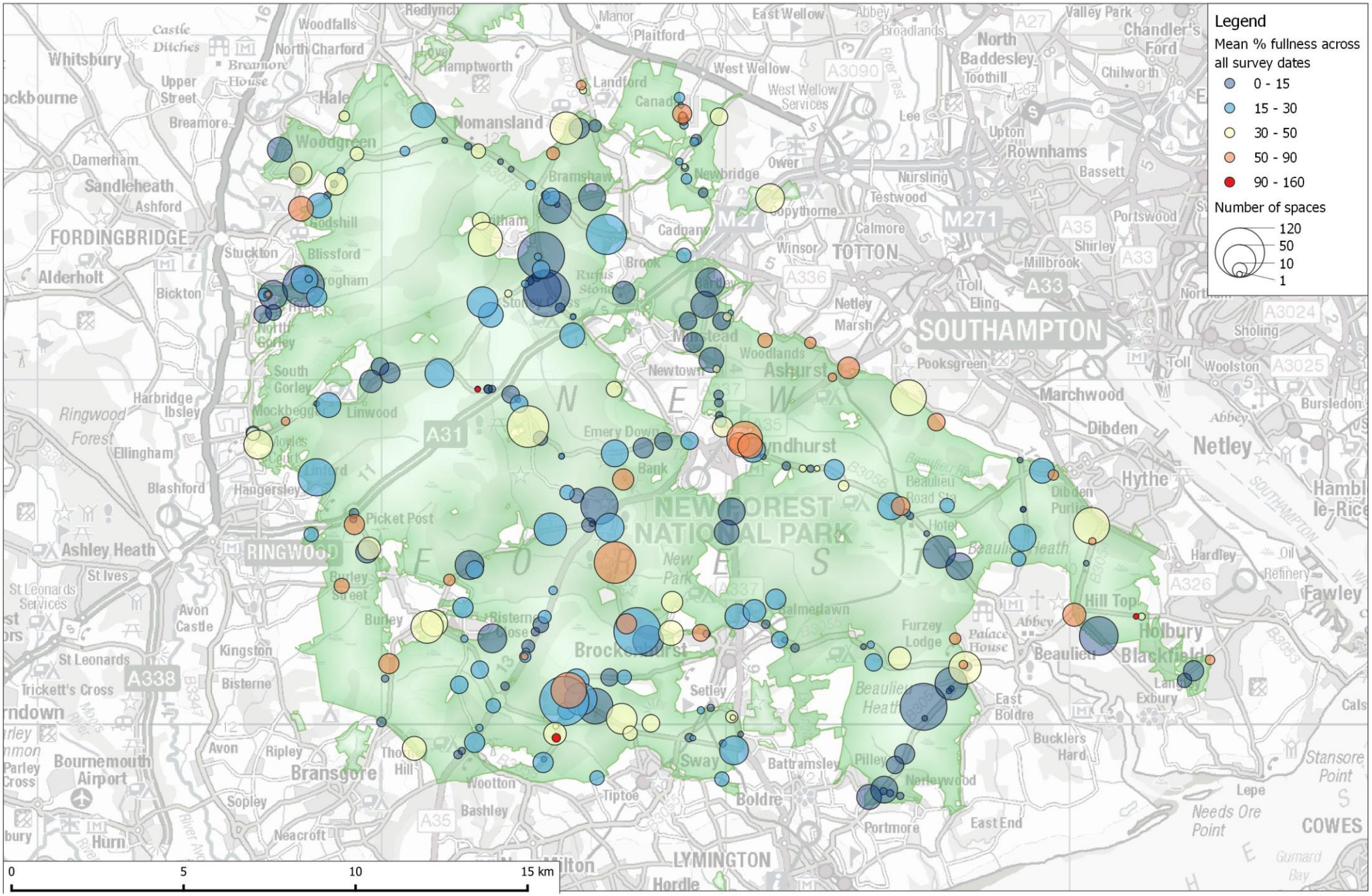
Figure 4: Capacity compared with the mean number of vehicles counted across all 15 transect dates for each formal car park. Black line indicates a one:one relationship.

3.15 Maps 6 to 10 provide the locations and capacities of each parking location across the survey area, alongside a measure of their % fullness. Map 6 presents average % fullness across the entire year, whereas maps 7 to 10 present % fullness for the spring, summer, autumn, and winter survey periods, respectively (with any closed locations removed).

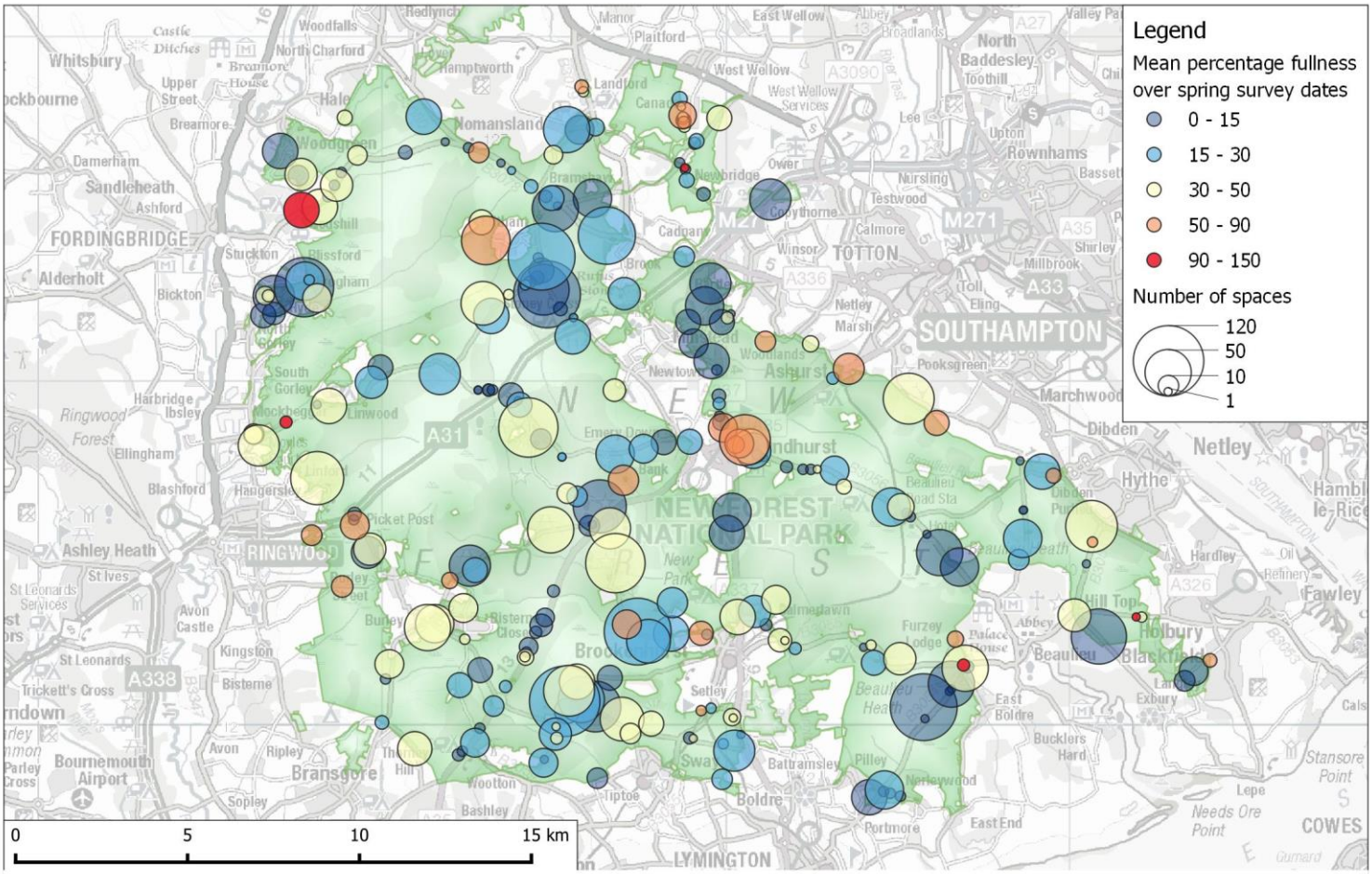
3.16 It is important to note that car park counts from a small number of parking locations were sporadically larger than the identified capacity of the location concerned (as provided by Forest England for formal car parks). This was primarily due to double-parking within the main body of the car park and/or along car park entrance tracks and gateways and explains the >100% fullness values indicated in Maps 6 to 10.

3.17 Information on the location of all formal car parks which were identified as being at overcapacity on at least one survey visit is provided in Appendix 3.

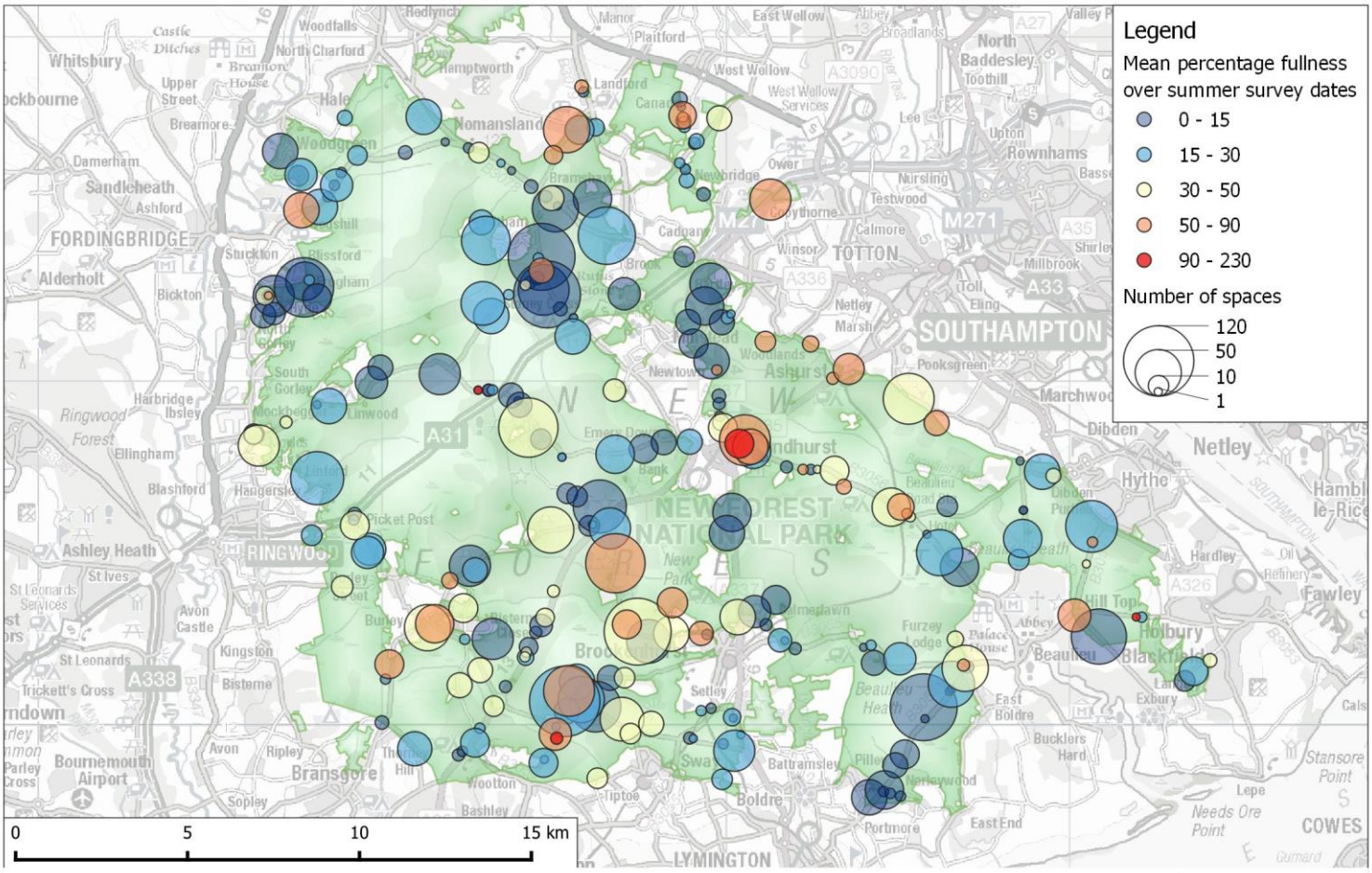
Map 6: Mean percentage fullness of New Forest parking locations across entire survey period, sized by the number of parking spaces at each.



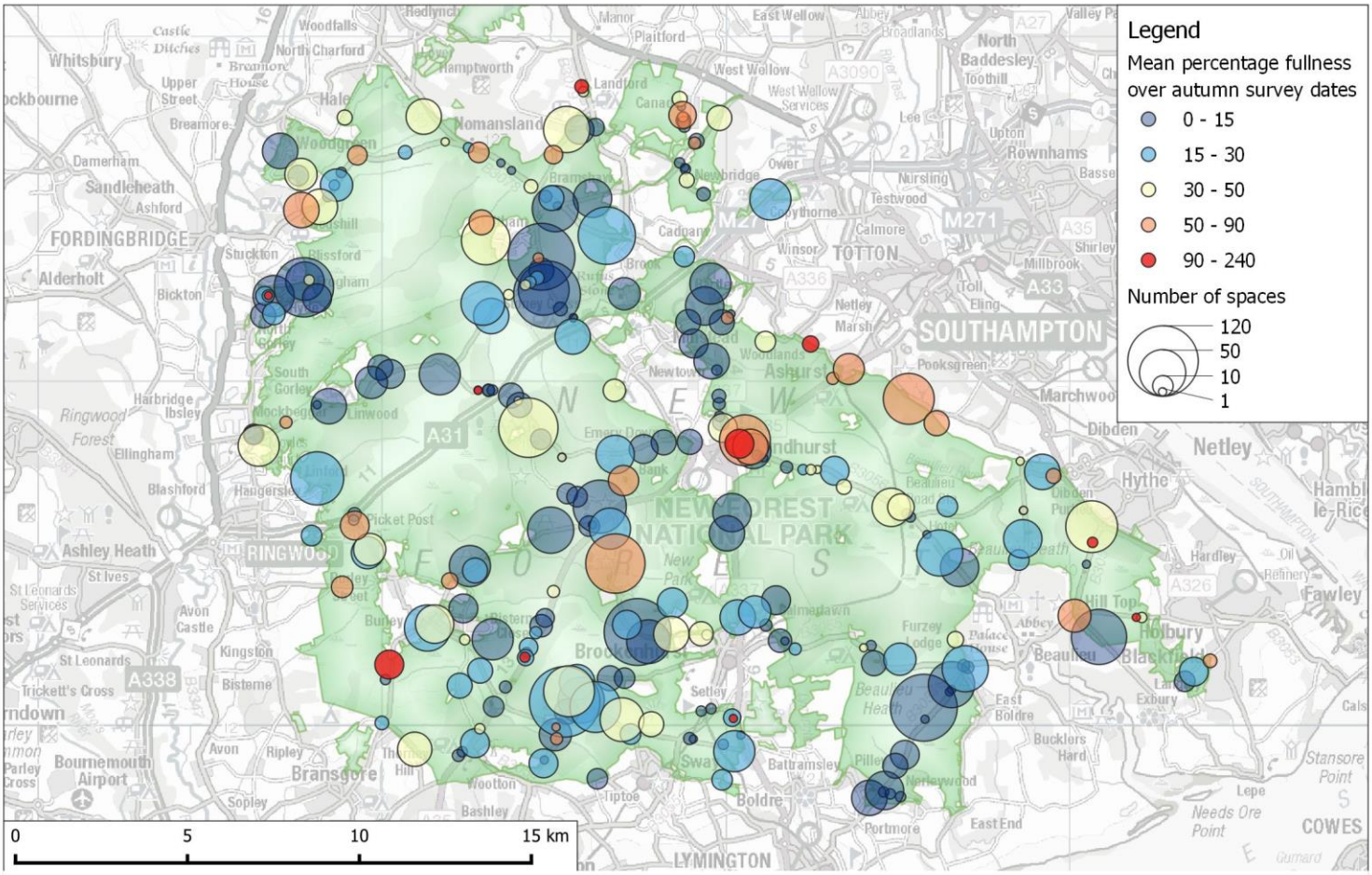
Map 7: Mean percentage fullness of New Forest parking locations during spring, sized by the number of parking spaces at each.



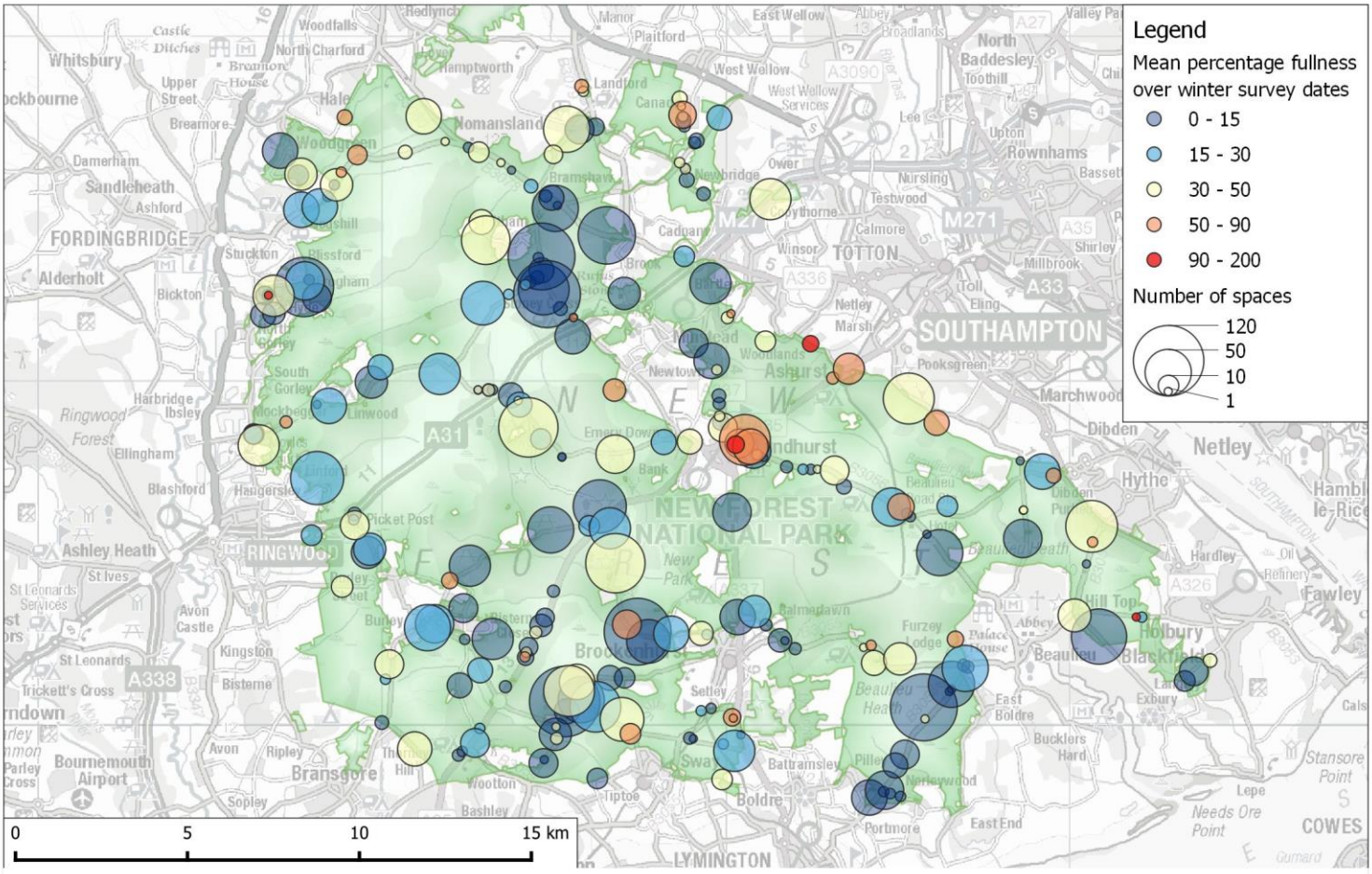
Map 8: Mean percentage fullness of New Forest parking locations during summer, sized by the number of parking spaces at each.



Map 9: Mean percentage fullness of New Forest parking locations during autumn, sized by the number of parking spaces at each.



Map 10: Mean percentage fullness of New Forest parking locations during winter, sized by the number of parking spaces at each.



3.18 Map 6 shows that relatively few parking locations approached full capacity, on average, across the year. Nevertheless, locations with higher levels of % fullness (such as Wilverley Inclosure and Whitefield Moor) were spread across the New Forest SAC/SPA/Ramsar, including concentrations around larger settlements (e.g. locations in the immediate vicinity of Lyndhurst).

3.19 Conversely, concentrations of larger parking locations (i.e. with a greater number of spaces) exhibiting low levels of % fullness were clustered in an arc on the south-eastern edge of the New Forest (e.g. Hatchet Moor and Beaulieu Heath),in the northern centre (east and west of Minstead – e.g. Stoney Cross and Janesmoor Pond), and on the north-western periphery (e.g. Abbots Well and Becky's Orchard). The patterns observed in the annual mean distribution are largely mirrored in the seasonal data (maps 7 to 10).

Influence of season on vehicle counts

3.20 More vehicles were counted during the summer months across all parking location types, at formal car parks and gateways/start of tracks the smallest number were counted during the winter, while an approximately equal number of vehicles were counted from laybys and verges during the autumn and winter (see Table 9). When survey effort (i.e. the number of survey dates per season) are taken into account this pattern held true for formal car parks, although seasonal differences in vehicle counts from gateways/starts of tracks were negligible. Laybys and verges were, on average, relatively more heavily used in the spring than in the summer.

Table 9: Total number of vehicles recorded within each season and average number of vehicles recorded per relevant survey date, stratified by parking location type (column percentages in brackets).

Season	Number of survey dates	Total vehicles counted			Mean number of vehicles/survey date		
		Formal Car park	Gateway/ Start of Track	Lay-by/Verge	Formal Car park	Gateway/ Start of Track	Lay-by/Verge
Autumn	3	2,989 (20)	88 (24)	193 (18)	996	29	64
Winter	3	2,528 (17)	67 (19)	194 (18)	843	22	65
Spring	4	4,315 (28)	81 (22)	327 (31)	1,079	20	82
Summer	5	5,898 (38)	135 (37)	367 (34)	1,180	27	73
Total	**15**	**15,730 (100)**	**371 (100)**	**1,081 (100)**			

Influence of day type and weather on vehicle counts

3.21 Parking locations were, on average, much busier at weekends than on weekdays across the entire survey year (see Figure 5). All weekend counts were equal or exceeded the overall median count. Furthermore, the unseasonably warm Easter bank holiday weekend (survey date 7) was noticeably busier than any other weekend, with approximately double the number of vehicles counted in comparison to the next busiest date (survey 12 in early August).

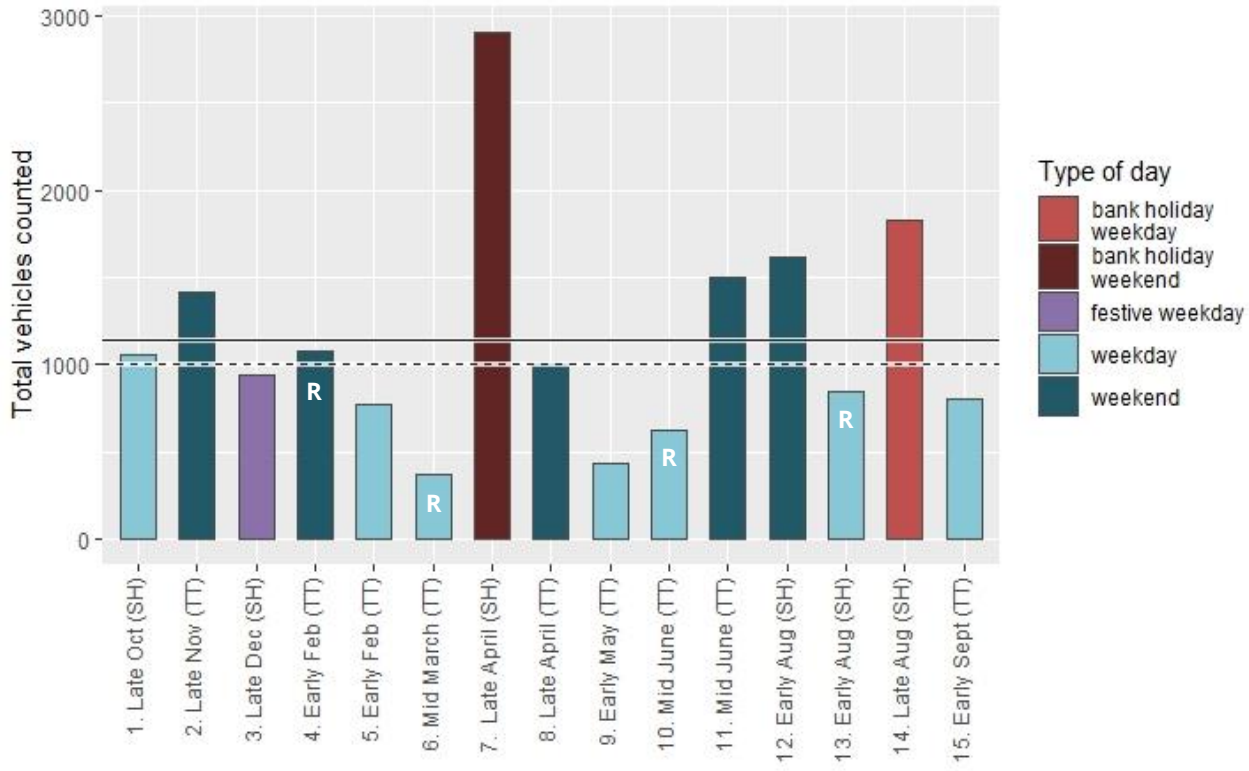


Figure 5: Count totals for each of the 15 survey dates, categorised by type of day. Text in brackets indicates the school status (TT for term time and SH for school holidays). Survey dates with some rainfall are indicated by 'R'. The horizontal solid line across the figure indicates the overall mean vehicle count (1,145), and the dashed line the overall median count (1,006).

3.23 Weekday counts generally comprised half to two thirds of the weekend counts made in the same month/season. The August bank holiday weekday (survey 14) was the key exception to this pattern, with the second largest count of the entire survey. Three of the four survey dates upon which more than three of the five transect routes recorded rainfall nevertheless fell upon weekdays (see Figure 5), and this inclement weather could potentially explain the lower counts made on these dates.

3.24 All three parking location types were significantly busier at weekends, when taking into account survey effort (see Table 10). The mean number of vehicles recorded from formal parking locations at weekends was double that recorded on weekdays, with weekend mean counts for the other two parking location categories a third larger than their respective weekday mean counts.

Table 10: Total number of vehicles recorded during weekend and weekday dates and average number of vehicles recorded per relevant survey date, stratified by parking location type (column percentages in brackets). Note that bank holidays and the festive period are included in the relevant totals.

Type of day	Number of survey dates	Total vehicles counted			Mean number of vehicles/survey date		
		Formal Car park	Gateway/ Start of Track	Lay-by/Verge	Formal Car park	Gateway/ Start of Track	Lay-by/Verge
Weekday	9	6,910 (45)	185 (50)	548 (51)	768	21	61
Weekend	6	8,773 (56)	186 (51)	533 (50)	1,463	31	89
Total	**15**	**15,683 (100)**	**371 (100)**	**1,081 (100)**			

3.25 The 6 weekend surveys do however incorporate the exceptionally high count recorded from the Easter bank holiday weekend. Even with the removal of the Easter bank holiday count, mean counts were still 20% to 35% higher at the weekend for each of the parking location types (mean count of 1,209 for formal car parks, 30 for gateways/starts of tracks, and 77 for lay-bys/verges).

Influence of time of day on vehicle counts

3.26 A marginally larger number of vehicles in total were counted in the morning (i.e. from transect surveys commencing before midday) from all parking location types (see Table 11). Nevertheless, the larger totals only comprised 55% to 57% of vehicles counted within each of the three parking location types.

Table 11: Total number of vehicles recorded in the morning and the afternoon and average number of vehicles recorded per relevant survey date, stratified by parking location type (column percentages in brackets).

Time of day	Number of survey dates	Total vehicles counted			Mean number of vehicles/survey date		
		Formal Car park	Gateway/ Start of Track	Lay-by/Verge	Formal Car park	Gateway/ Start of Track	Lay-by/Verge
Morning	6	8,936 (57)	214 (58)	584 (55)	1,489	36	97
Afternoon	9	6,747 (44)	157 (43)	497 (46)	750	17	55
Total	**15**	**15,683 (100)**	**371 (100)**	**1,081 (100)**			

3.27 When survey effort (i.e. the number of survey dates carried out in the morning versus the afternoon) were taken into account, this pattern held true for all parking location types. Furthermore, the average number of vehicles counted per relevant survey date was approximately twice as large for morning surveys than those carried out in the afternoon.

3.28 The 6 morning surveys do however again incorporate the exceptionally high count recorded from the Easter bank holiday weekend. The bank holiday weekend counts were therefore removed, and the mean weekend counts recalculated for the remaining 5 weekend survey dates. The revised mean morning counts were 1,242 for formal car parks, 36 for gateways/starts of tracks, and 88 for lay-bys/verges. It would therefore appear that all parking location types were more heavily utilised in the morning across the year, even after exclusion of the Easter bank holiday high count.

Pairwise comparisons of different day types

3.29 Following the careful scheduling of surveys, it was possible to identify 'paired' survey dates which could be compared using statistical tests to identify whether or not statistically significant differences exist between the number of vehicles counted during the respective dates. These pairings for comparison (a to e) are identified in Figure 6, and comprise the following:

- a – a winter weekday and weekend;
- b – a typical spring weekend and spring bank holiday weekend;
- c – a term time summer weekday and weekend;
- d – a school holiday summer weekday and weekend; and,
- e – a term time summer weekend (ei) and school holiday summer weekend (eii), and a term time summer weekday and school holiday summer weekday.

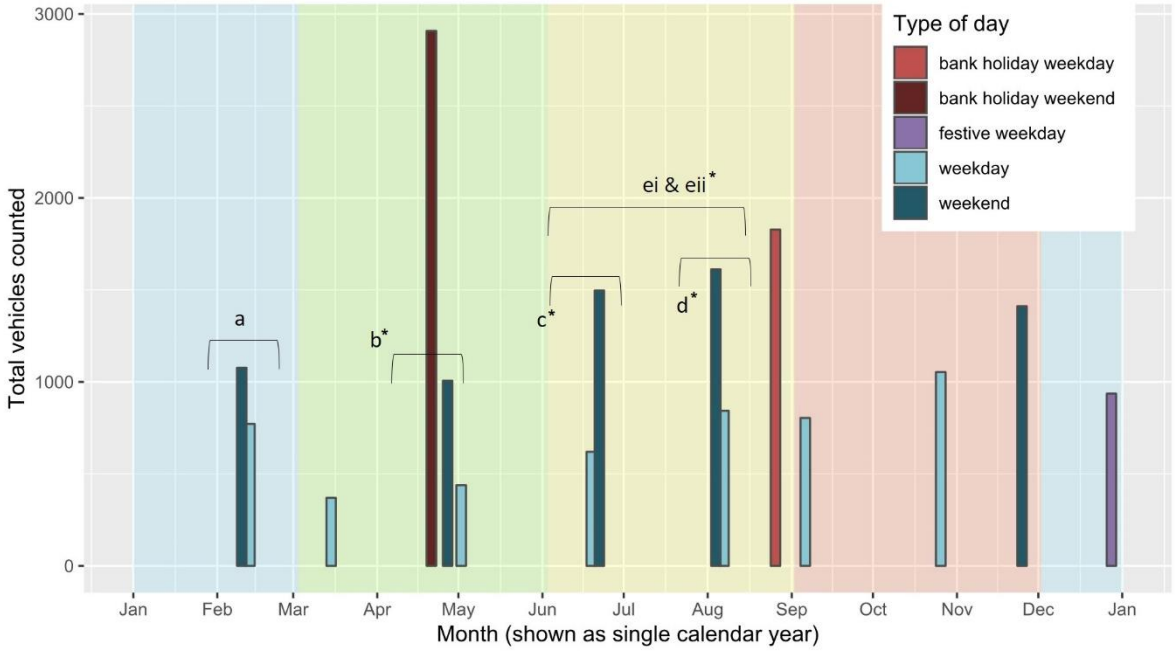


Figure 6: Count totals for each of the 15 transect counts, categorised by the type of day surveyed shown on each date across the calendar year. Data were not from a continuous single calendar year but are presented as this for illustrative purposes only. Background shading indicates the seasons. Annotated brackets (a – e) show the pairings used for comparison later, with statistically significantly different pairs identified with an asterisk.

3.30 Due to the non-normal distribution of the relevant datasets a non-parametric Mann-Whitney test was used to look for significant differences between pairings identified above, with the full outputs of the test provided in Appendix 4.

3.31 Highly significant differences were identified between the vehicle counts recorded on the Easter Bank holiday weekend and its paired, non-bank holiday weekend, and between those undertaken on a weekday and weekend in mid-June. Significant differences were also noted between the weekend and weekday counts carried out in mid-August, and between weekday counts carried out either side of the summer school holidays.

3.32 No significant differences in the number of vehicles counted were identified between the February weekend and weekday surveys, nor between either of the weekend surveys carried out either side of the school holidays in the summer. These findings indicate that the Easter Bank Holiday was a significantly busy survey date, and that weekends are generally significantly busier than weekdays during the summer months.

The Easter Bank Holiday weekend

3.33 An exceptionally large number of vehicles, relative to the other survey dates, were counted during the unseasonably warm Easter Bank holiday weekend (survey date 7). Figure 7 shows the count of vehicles on the Easter Bank Holiday per formal car park in relation to the number of spaces in each. A total of 36 formal parking locations (25% of formal parking locations), had counts equal to or greater than the capacity, and 10 of these locations (7%), had counts with >6 vehicles overcapacity. However, this still meant 111 formal car parks were below capacity, with 58 formal car parks (40%) under capacity by >10 vehicles.

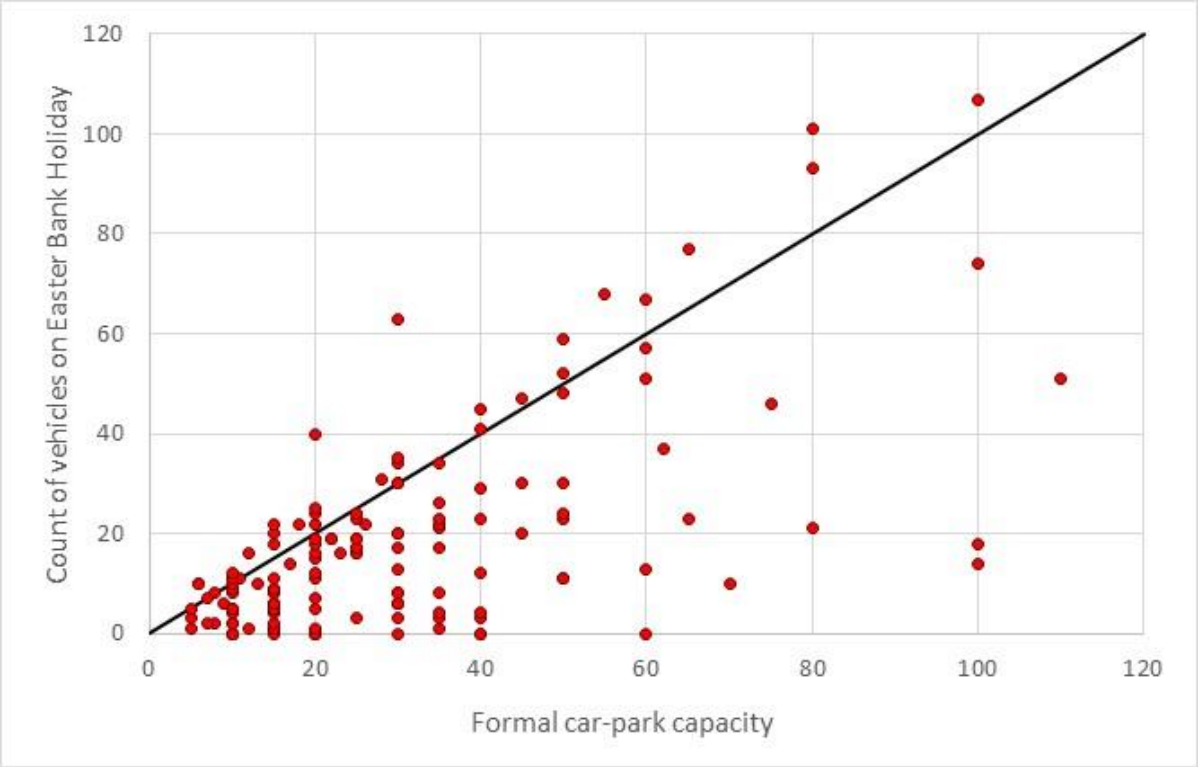


Figure 7: Capacity compared with the mean number of vehicles counted across all 15 transect dates for each formal car park on the Easter Bank Holiday weekend. Black line indicates a one:one relationship.

3.34 Figure 8 plots the number of vehicles counted on the Easter bank holiday from each surveyed parking location against the mean number of vehicles counted in each location over the entire survey period. A one to one gradient line has been added to the figure to aid in interpretation. Points above the line indicate locations with higher values on the Easter bank holiday count and the further above the line, the higher the difference on the Easter bank holiday compared to other counts.

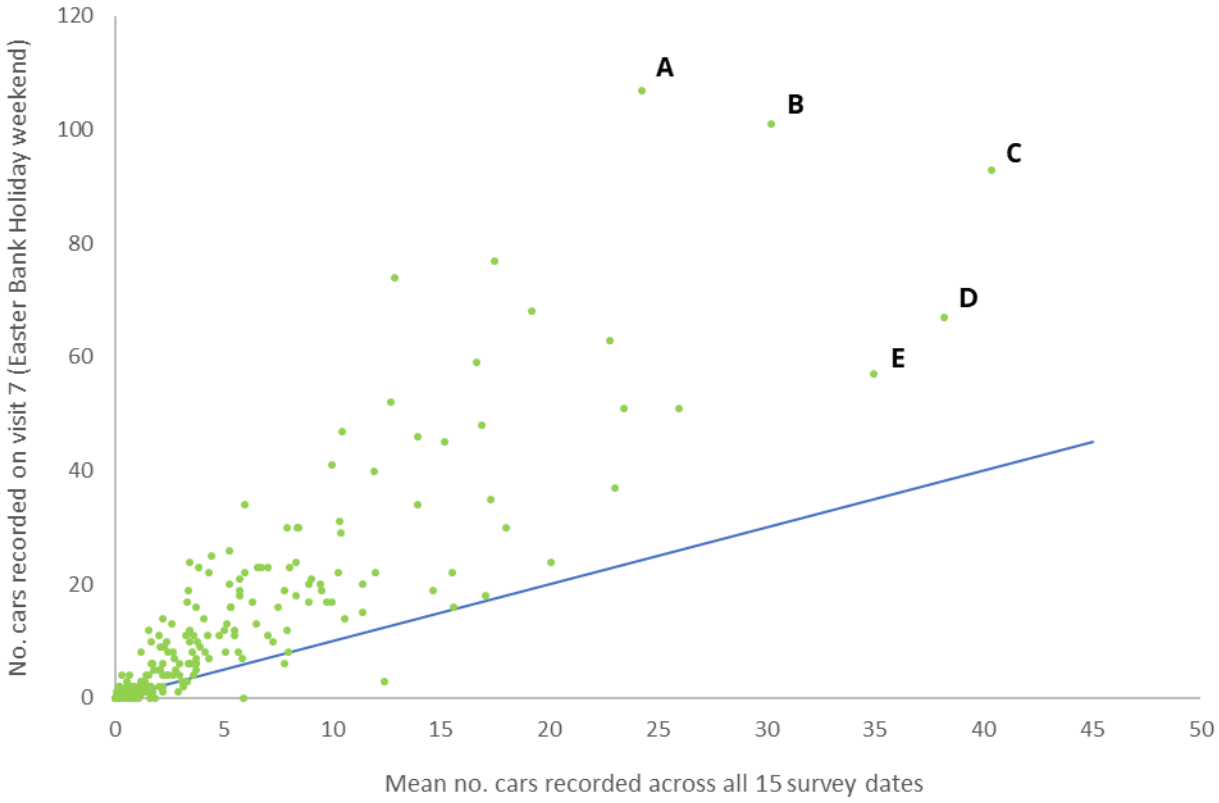


Figure 8: Number of cars recorded within each open parking location on Easter Bank Holiday Sunday (survey date 7: n=263) against mean number of cars recorded from same locations across the entire survey period. A 1:1 trend line has been fitted to aid interpretation, and extreme value localities individually identified (A to E).

3.35 The plot shows that the bank holiday counts were higher for virtually all locations, suggesting that the elevated numbers on the bank holiday were spread across the New Forest SAC/SPA/Ramsar. Only three parking locations had fewer cars that day compared to the mean. The letters A to E denote the 5 parking locations exhibiting the greatest deviation from the one:one and/or the largest number of vehicles, corresponding to: (A) Whitefield Moor; (B) Bolderwood; (C) Blackwater; (D) Queens, and; (E) Wilverley Plain.

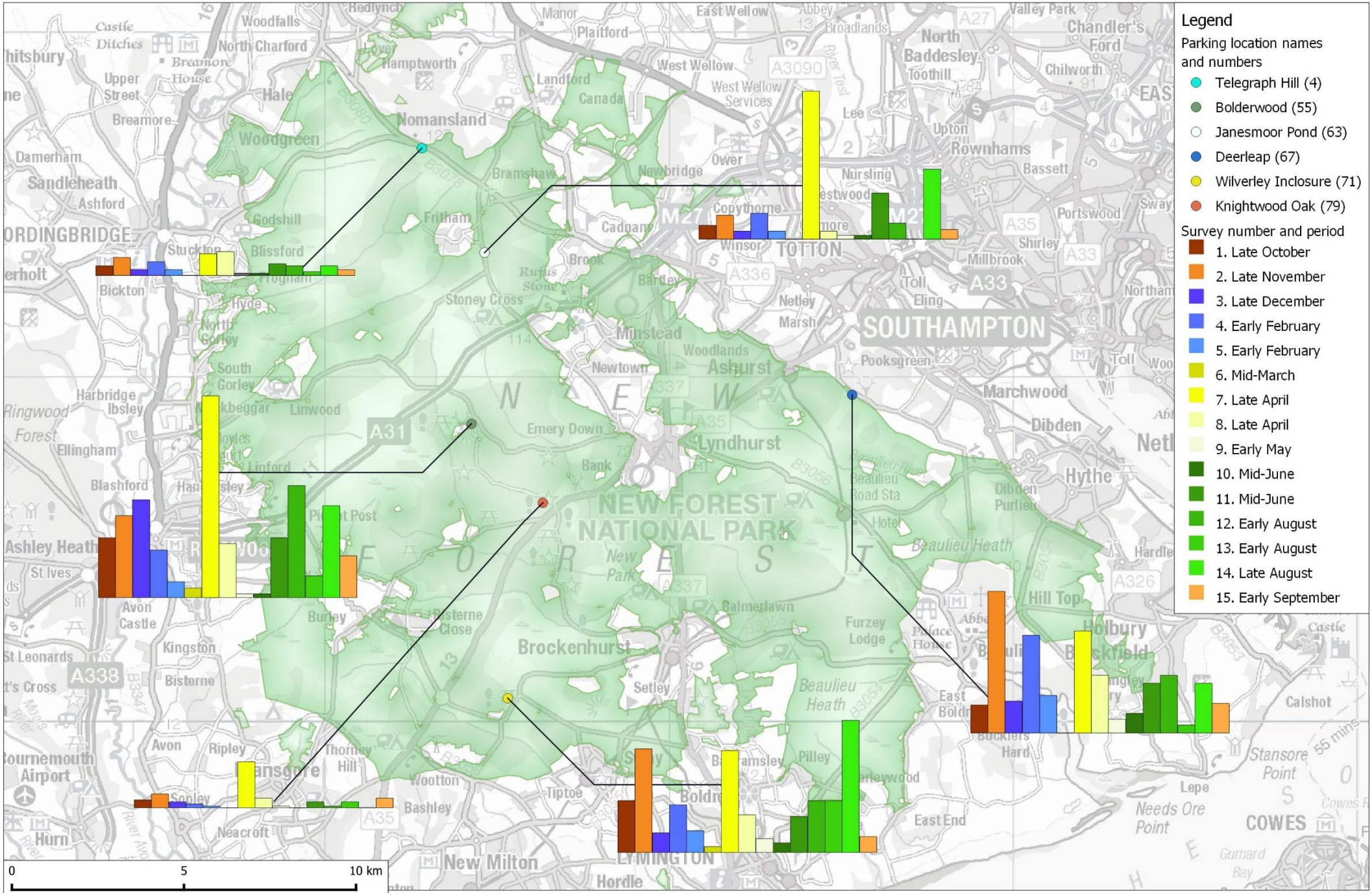
3.36 The data presented above further highlight the exceptional number of vehicles recorded from the SPA/SAC/Ramsar site over the Easter bank holiday weekend. It suggests that the coincidence of public holidays and good weather can potentially lead to much higher levels of use by vehicular transport than at other times of the year.

Seasonal variation at case study locations

3.37 In order to contextualise the results detailed above, the relative vehicle counts from 6 formal car parks (each differing in capacity and location within the SPA/SAC/Ramsar site) are shown in more detail in Map 11. The chosen case studies comprise the following parking locations:

- Telegraph Hill (northen edge of the SPA/SAC/Ramsar site and capacity of 10);
- Bolderwood (centre of the SPA/SAC/Ramsar site and capacity of 80);
- Janesmoor Pond (central northern section of the SPA/SAC/Ramsar site and a capacity of 100);
- Deerleap (north-eastern edge of the SPA/SAC/Ramsar site and a capacity of 60);
- Wilverley Inclosure (south of the SPA/SAC/Ramsar site and a capcacity of 110); and,
- Knightwood Oak (centre of the SPA/SAC/Ramsar site and a capacity of 65).

Map 11: Example vehicle counts from six parking locations across the New Forest SPA/SAC over the entire survey period.



3.38 Telegraph Hill exhibited low levels of use throughout the year, although small peaks of utilisation were noted in late spring (although the Easter bank holiday weekend did not comprise the site's peak count), and late autumn periods.

3.39 Bolderwood was identified as a busy site which nevertheless exhibited extreme variation in counts throughout the study period. A large peak was noticeable on the Easter bank holiday weekend, with high levels of use also recorded in the late autumn/early winter, and during the summer, months. However, extremely low counts were made from the site in comparison in mid-March and throughout late April and early May.

3.40 Janesmoor Pond exhibited low levels of use throughout the autumn and winter periods, prior to a large (relative) spike in use over the Easter bank holiday weekend. Counts from the locality then dropped significantly during late spring and early summer, before building again to a second, lesser, peak in late summer.

3.41 Deerleap was found to be a generally busy site throughout the year, with spikes in use recorded in late autumn and early winter, and over the Easter bank holiday weekend. Counts declined over the remainder of the spring, before generally rising again over the summer months (although a low count was nevertheless recorded in late summer).

3.42 Wilverley Inclosure was another relatively busy location whose usage generally mirrored that of Bolderwood to the north. Peak use was identified in late autumn, early spring, and late summer, with the highest count coming from the latter period. As at Bolderwood, low counts were noted during the late winter/early spring, and late spring/early summer periods.

3.43 Finally, Knightwood Oak exhibited a similar structure in its counts to Telegraph Hill, with sustained low levels of use throughout the year. Nevertheless, a large (relative) peak count was recorded during the Easter bank holiday weekend.

4. Discussion

Vehicle Counts

4.1 The 2018/19 vehicle counts carried out within the New Forest SPA/SAC/Ramsar site identified a large number of vehicles using a myriad of parking locations across the area. The vast majority of vehicles observed comprised cars, and formal car parks were by far the most frequently used parking locations (in relation to gateways/track entrances and laybys/verges).

4.2 Nevertheless, there is much variation in the size and distribution of parking locations across the SPA/SAC/Ramsar site, and this was reflected in the numbers and distribution of vehicles counted. Busy locations were identified in the centre of the SPA/SAC/Ramsar site and on its periphery. Overall, none of the combined totals of the three parking-location types identified in the study were ever more than approximately 60% full at any one time (although individual parking locations were on occasion).

4.3 Clusters of large parking locations with apparent year-round low levels of usage (in relation to their capacity) are located on the south-eastern and north-western perimeter of the SPA/SAC/Ramsar site, as well as in its central northern section. Furthermore, relatively small numbers of vehicles also park at sites away from the pre-identified parking locations used in the study.

4.4 The results of the study indicate that parking locations are busier at weekends than during the week, and in the morning rather than in the afternoon. Nevertheless, weekdays during the school holidays are busier than those during term time. Most parking locations within the SPA/SAC/Ramsar site exhibit some level of use throughout the year, although the spring and summer months appear to comprise the busiest periods.

4.5 Different vehicle types were not evenly spread across the SPA/SAC/Ramsar site, with the distribution of vans and lorries influenced by the proximity of urban centres, and higher densities of caravans and camper-vans observed in proximity to key campsites. There are also apparent concentrations of commercial dog walkers on the northern periphery of the Forest, and of horse boxes in the south. These latter observations are noteworthy, but are also based upon extremely small datasets (in relation to the other vehicle types) and the distributions observed are possibly just a sample size effect.

4.6 Finally, one of the key findings of the study is the significantly higher counts made on the (unseasonably warm) weekend of the Easter bank holiday (approximately 30% to 50% larger than any other survey date). This

highlights the importance in encompassing as wide a span of temporal periods as possible when attempting to identify levels of use by the general public.

Implications for visitation rates within the New Forest SPA/SAC/Ramsar site

4.7 The provision of parking at, or adjacent to, protected sites is an important factor in determining the number of visitors which interact with them. This is likely to be particularly the case in areas like the New Forest where there are relatively low levels of housing directly adjacent to the SPA/SAC/Ramsar site and therefore a high proportion of use is likely to originate from outside the New Forest, with people travelling by car. The on-site visitor survey of New Forest SAC/SPA/Ramsar users, carried out over a similar time period to the vehicle counts, indicated that approximately 90% of people interviewed on site had arrived by car, including 70% of cyclists (Liley, Panter, & Caals, 2019, in prep).

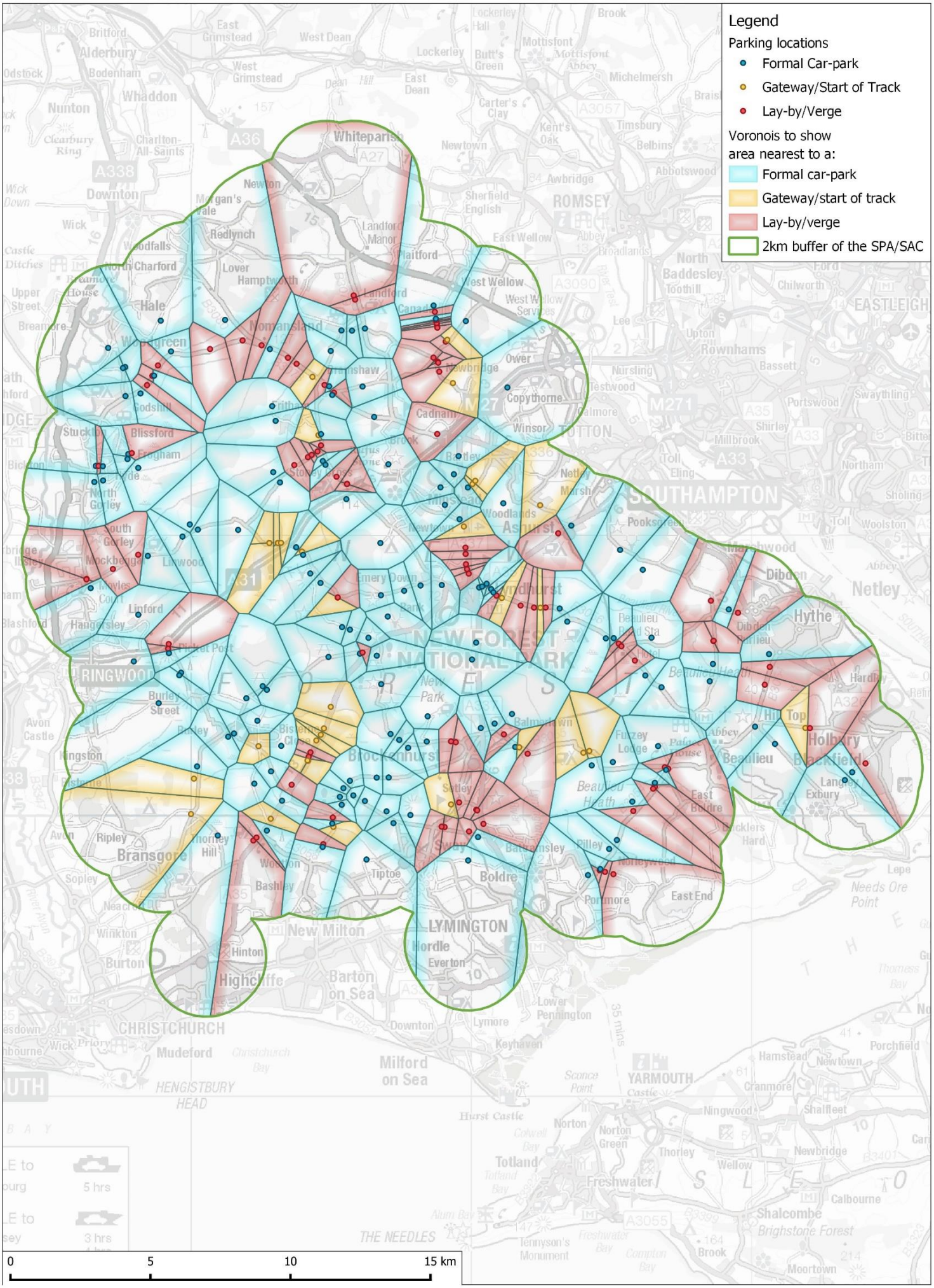
4.8 To better visualise the parking location spread and 'catchments' we examined all the New Forest SAC/SPA/Ramsar parking location using Voronois (see Map 12). Voronois examine the distribution of point locations (in this case the parking locations) and use distances calculated between all points to create rule-based areas (polygons). These polygons categorise the whole landscape into discrete areas based on the nearest parking location as a Euclidean ('as the crow flies') distance. Voronois show that although there are broadly similar numbers of formal (147) to informal (123) parking locations, the informal locations are often clustered. Furthermore, this highlights that for large swathes in the core of the Forest the nearest parking location is often a formal car park.

4.9 The results of the vehicle counts indicate that parking locations within the New Forest SAC/SPA/Ramsar are subject to higher visitor use during the spring and summer months. We can therefore assume that larger car counts equate to larger numbers of visitors using the woodland and heathland areas during the bird breeding season. The distribution of many busier parking locations around the periphery of the New Forest SAC/SPA/Ramsar may mean visitor pressure is to some extent more focussed around the edge of the site. Nevertheless, the high levels of use at certain central locations (e.g. Bolderwood) indicate that high levels of use also occur here.

4.10 A key finding is the incredibly high levels of parking location use on sporadic dates, when weather and holidays combine to create a 'perfect storm' for

high levels of visitation. The high vehicle count made over the Easter bank holiday weekend reflects a roughly 10-fold increase in the number of vehicles compared to the previous count in March. This highlights the potential for visitor numbers to markedly change in a short time window and such fluctuations in use are perhaps unusual and may have particular ramifications for the management of recreation – for example in terms of temporal allocation of resources such as staff time.

Map 12: Voronois used to categorise areas of the New Forest as to whether their nearest parking location in the New Forest is a formal car park, gateway/start of track or lay-by/verge.



Limitations

4.11 Surveys were focussed on formal car parks, lay-bys and well-used verges (i.e. clearly regularly used for parking). We did not include town and village centre parking, nor did we count the vehicles in the camp-sites. As such the data presented here capture the majority of use of the New Forest SPA/SAC/Ramsar site, but by no means all. We will not have recorded cars-parked in town centres where people walked out onto the SAC/SPA nor open verges where people stopped at random locations (for example to take photographs or to feed ponies).

4.12 On certain occasions the surveyors attempted to make a note of all vehicles parked outside of formal parking locations. On the routes that this was carried out there was an average of 7% of vehicles parked randomly on verges or at other unmapped/informal parking locations.

4.13 A small number of parking locations within the New Forest SAC/SPA/Ramsar were not therefore subject to survey. Furthermore, residential parking spaces, and parking locations within town centres yet close to the New Forest SAC/SPA/Ramsar, were not included within the scope of the survey, and it is possible that certain persons may choose to park in such localities and walk (or use public transport) to access areas within the site.

4.14 These additional parking locations are either small or random (i.e. the verge areas not surveyed) or large but focussed in town and village centres (such as the village centre car park at Lyndhurst). As such these are unlikely to have a major impact on the overall totals and the data presented here capture the majority of use and the key locations.

4.15 Finally, the estimates of parking spaces have been based on the number of spaces available for car parking and assume reasonably sensible parking behaviours. The number of parking spaces will be much lower than this when cars park poorly, and when large campervans or cars towing caravans / horse boxes, are present and take up many more than a single parking space.

Vehicle counts and potential for long-term monitoring

4.16 As a check that the number of vehicles does actually provide a reasonable measure of the number of visitors, we checked for correlations between the tally count data in the on-site survey (i.e. the number of people passing through or entering the survey point). These correlations were positive and statistically significant, indicating that the two counts produce similar results

(Kendall's Tau-b (with upper and lower confidence intervals) for all dates: 0.470 (0.389-0.550); weekends only: 0.393 (0309-0.477); weekdays only: (0.294 (0.202-0.386)). While these correlations were significant, there were some wide variations, potentially due to the effects of weather, different dwell-times, different group sizes and other factors that varied across survey points.

4.17 The approach of counting vehicles does therefore provide the potential for regular monitoring of visitor use across the Forest, as all locations can be counted by 5 surveyors within a window of around 3 hours. Repeats of this baseline survey in future years could provide measures of how use in certain parking locations is changing, the effect of any management interventions, and provide an overall estimate of the change in visitor numbers (or at least those arriving by car) across the New Forest SAC/SPA/Ramsar.

4.18 The frequency of any such repeat survey/s will be dependent upon changes in management and/or objectives within the Forest (e.g. timings of the closure of a subset of the existing formal car parks). In the absence of any interventions aimed at changing parking behaviour/distribution within the Forest, it is recommended that repeat surveys could be carried out within the next 2 to 5 years.

References

Clarke, R. T., Liley, D., Underhill-Day, J. C., & Rose, R. J. (2006). *Visitor access patterns on the Dorset Heaths*. English Nature Research Report 683.

Fearnley, H., Hoskin, R., Liley, D., White, J., & Lake, S. (2012). *Urban development and the New Forest SPA*. Footprint Ecology/ New Forest National Park Authority.

ICF GHK. (2013). *The economic impact of Natural England's National Nature Reserves* (Natural England Commissioned Report No. NECR131).

ICRT. (2011). *The Economic Potential of Nature Tourism in Eastern Yorkshire* (p. 61).

Keniger, L. E., Gaston, K. J., Irvine, K. N., & Fuller, R. A. (2013). What are the Benefits of Interacting with Nature? *International Journal of Environmental Research and Public Health*, *10*(3), 913–935. doi: 10.3390/ijerph10030913

Lee, A. C. K., & Maheswaran, R. (2011). The health benefits of urban green spaces: a review of the evidence. *Journal of Public Health*, *33*(2), 212–222. doi: 10.1093/pubmed/fdq068

Liley, D., Lake, S., Underhill-Day, J., Sharp, J., White, J., Hoskin, R., … Fearnley, H. (2010). *Welsh Seasonal Habitat Vulnerability Review*. Footprint Ecology / CCW.

Lowen, J., Liley, D., Underhill-Day, J., & Whitehouse, A. T. (2008). *Access and Nature Conservation Reconciliation: supplementary guidance for England.*

Pretty, J., Griffin, M., Peacock, J., Hine, R., Selens, M., & South, N. (2005). A countryside for health and well-being: the physical and mental health benefits of green exercise. *Countryside Recreation*, *13*(1), 2–7.

Richardson, M., Cormack, A., McRobert, L., & Underhill, R. (2016). 30 Days Wild: Development and Evaluation of a Large-Scale Nature Engagement Campaign to

Improve Well-Being. *PLOS ONE*, *11*(2), e0149777. doi: 10.1371/journal.pone.0149777

RJS Associates Ltd. (2018). *New Forest National Park Recreation and Leisure Visits*. Unpublished report commissioned by the New Forest National Park on behalf of the Recreation Management Strategy Steeringr Group.

Ross, K., Liley, D., Austin, G., Clarke, R. T., Burton, N. H., Stillman, R. A., … Underhill-Day, J. (2014). *Housing development and estuaries in England: developing methodologies for assessing the impacts of disturbance to non-breeding waterfowl*. Footprint Ecology, unpublished report for Natural England.

Sharp, J., Lowen, J., & Liley, D. (2008). *Changing patterns of visitor numbers within the New Forest National Park, with particular reference to the New Forest SPA* [Footprint Ecology / New Forest National Park Authority].

The Land Trust. (2018). *The Economic Value of Greenspaces*. The Land Trust.

Tourism South East Research Services, & Geoff Broom Associates. (2005). *A survey of recreational visits to the New Forest National Park*. Countryside Agency.

Underhill-Day, J. C. (2005). *A literature review of urban effects on lowland heaths and their wildlife*. Retrieved from English Nature website

Appendix 1: Names and distribution of individual parking locations with summary count data

Table A1: Gazetteer of parking location numbers and names, with transect route and location type (FCP = formal car park; Lb/V = layby/verge; Gw/Tr = gateway or start of track) also indicated.

Location no.	Transect route	Location name (where applicable)	Location type	Minimum vehicle count	Mean vehicle count (to nearest whole number)	Maximum vehicle count
1	E	Horseshoe Bottom	FCP	3	9	21
2	A	Goatspen	FCP	0	4	9
3	B	Ashley Walk	FCP	1	8	21
4	B	Telegraph Hill	FCP	0	5	12
5	B	Godshill Pit	FCP	0	0	2
6	A	Ogdens	FCP	0	3	24
7	B	Deadman Hill	FCP	0	4	7
8	B	Cadmans Pool	FCP	2	10	47
9	B	Stoney Cross	FCP	0	4	14
10	C	Andrews Mare	FCP	0	7	16
11	D	Busketts Lawn	FCP	2	6	17
12	E	Wootton Bridge	FCP	0	9	34
13	E	Broadley	FCP	1	4	9
14	E	Hincheslea	FCP	0	2	4
15	E	Whitemoor Pond	FCP	0	5	20
16	E	Puttles Bridge	FCP	0	12	40
17	A	Holmsley	FCP	0	4	11
18	A	Oakley	FCP	0	3	12
19	E	Vinney Ridge	FCP	0	1	5
20	E	Highland Water	FCP	0	1	5
21	E	James Hill	FCP	0	1	4
22	C	Yew Tree Heath	FCP	0	2	4
23	D	Darkwater	FCP	0	0	2
24	D	Rans Wood	FCP	1	3	10
25	D	Beaulieu Heath	FCP	1	8	26
26	D	Bull Hill	FCP	0	1	4
27	D	Ivy Wood	FCP	0	2	10
28	E	Yew Tree Bottom	FCP	0	4	8
29	B	Lords Oak	FCP	0	1	4

Location no.	Transect route	Location name (where applicable)	Location type	Minimum vehicle count	Mean vehicle count (to nearest whole number)	Maximum vehicle count
30	B	Shepherds Gutter	FCP	0	1	3
31	B	Ocknell Pond	FCP	2	6	13
32	A	Spring Bushes	FCP	3	3	3
33	C	Hazel Hill	FCP	0	1	4
34	C	Brockishill Green	FCP	0	1	3
35	C	Minstead Road	FCP	0	1	5
36	E	Barrow Moor	FCP	0	2	10
37	E	Woosons	FCP	0	1	8
38	A	Osmonds Bushes	FCP	0	2	12
39	E	Longslade View	FCP	2	5	9
40	E	Ober Corner	FCP	0	10	26
41	D	Whitley Wood	FCP	0	2	6
42	E	Whitemoor	FCP	0	2	11
43	C	Parc Pale	FCP	1	6	17
44	D	North Gate	FCP	0	2	9
45	C	Culverley	FCP	0	2	6
46	A	Vereley Hill	FCP	0	3	13
47	D	Crockford Clump	FCP	0	1	2
48	A	Clay Hill	FCP	1	3	5
49	D	Crockford	FCP	0	2	4
50	E	Hincheslea Moor	FCP	0	2	5
51	A	Holmsley Walk	FCP	3	10	31
52	B	Bramble Hill Walk	FCP	0	4	10
53	D	Kings Hat	FCP	1	7	23
54	B	Milkham	FCP	0	7	23
55	E	Bolderwood	FCP	2	30	101
56	E	Blackwater	FCP	5	40	93
57	D	Hawkhill	FCP	1	8	19
58	E	Mogshade	FCP	0	2	9
59	A	Broomy Walk	FCP	0	3	17
60	B	Turf Hill	FCP	3	8	18
61	B	Fritham	FCP	3	19	68
62	B	Stoney Cross Plain	FCP	0	5	18

Location no.	Transect route	Location name (where applicable)	Location type	Minimum vehicle count	Mean vehicle count (to nearest whole number)	Maximum vehicle count
63	B	Janesmoor Pond	FCP	0	13	74
64	B	Longcross	FCP	0	3	11
65	C	Acres Down	FCP	0	5	16
66	C	Cadnam Cricket	FCP	0	3	16
67	D	Deerleap	FCP	4	26	71
68	E	Longslade Bottom	FCP	4	18	34
69	E	Setthorns	FCP	0	4	11
70	E	Wilverley Plain	FCP	6	35	117
71	E	Wilverley Inclosure	FCP	3	23	66
72	E	Beachern Wood	FCP	0	9	24
73	E	Whitefield Moor	FCP	0	24	107
74	E	Brock Hill	FCP	0	10	41
75	A	Brownhills	FCP	1	5	12
76	A	Burbush Hill	FCP	2	12	24
77	E	Anderwood	FCP	0	13	52
78	A	Vereley	FCP	2	8	23
79	E	Knightwood Oak	FCP	0	4	23
80	A	Linford Bottom	FCP	4	17	77
81	C	Boltons Bench	FCP	5	17	21
82	D	Longdown	FCP	4	11	22
83	C	Matley	FCP	0	6	19
84	C	Beaulieu Road	FCP	2	11	20
85	D	Dibden Inclosure	FCP	10	23	49
86	D	Moonhills	FCP	2	7	12
87	D	Norley Wood	FCP	0	4	22
88	D	Tilery Road	FCP	0	5	16
89	D	Clayhill Heath	FCP	0	2	8
90	D	Balmer Lawn	FCP	0	8	30
91	A	Woods Corner	FCP	0	4	10
92	C	Queens	FCP	0	38	67
93	C	Boltons Cricket	FCP	3	17	35
94	D	Stockley	FCP	0	3	12

Location no.	Transect route	Location name (where applicable)	Location type	Minimum vehicle count	Mean vehicle count (to nearest whole number)	Maximum vehicle count
95	D	Marchwood Inclosure	FCP	4	8	13
96	E	Reptiliary	FCP	10	15	19
97	A	Lucy Hill	FCP	1	4	9
98	D	Standing Hat	FCP	0	4	16
99	E	Swan Green	FCP	0	4	11
100	E	Wilverley Pit	FCP	1	9	20
101	A	Appleslade	FCP	0	6	34
102	B	Godshill Cricket	FCP	4	8	30
103	B	Castle Hill	FCP	0	2	6
104	B	Eyeworth Pond	FCP	0	6	22
105	C	Rufus Stone	FCP	0	3	19
106	C	Roundhill	FCP	0	14	46
107	B	Bramshaw Wood	FCP	0	3	7
108	C	Football Green	FCP	0	1	5
109	C	Shave Wood	FCP	0	2	5
110	B	Pipers Wait	FCP	1	4	8
111	B	Godshill	FCP	1	8	24
112	E	Shirley Holms	FCP	0	2	8
113	E	Setley Pond	FCP	0	10	29
114	E	Boundway	FCP	0	2	6
115	A	Burley	FCP	1	17	48
116	A	Burley Cricket	FCP	2	14	34
117	A	Mill Lawn	FCP	0	4	25
118	A	Smugglers Road	FCP	1	6	11
119	A	Picket Post	FCP	3	11	21
120	C	Pig Bush	FCP	0	7	19
121	D	Blackwell Common	FCP	0	3	12
122	D	Hatchet Moor	FCP	0	7	23
123	E	Bratley View	FCP	0	1	3
124	E	Millyford Bridge	FCP	1	9	21
125	A	High Corner	FCP	0	2	8
126	D	Hatchet Pond	FCP	2	17	59
127	E	Longslade Heath	FCP	0	8	30
128	C	Shatterford	FCP	2	10	22
134	D	Ashurst	FCP	9	16	20

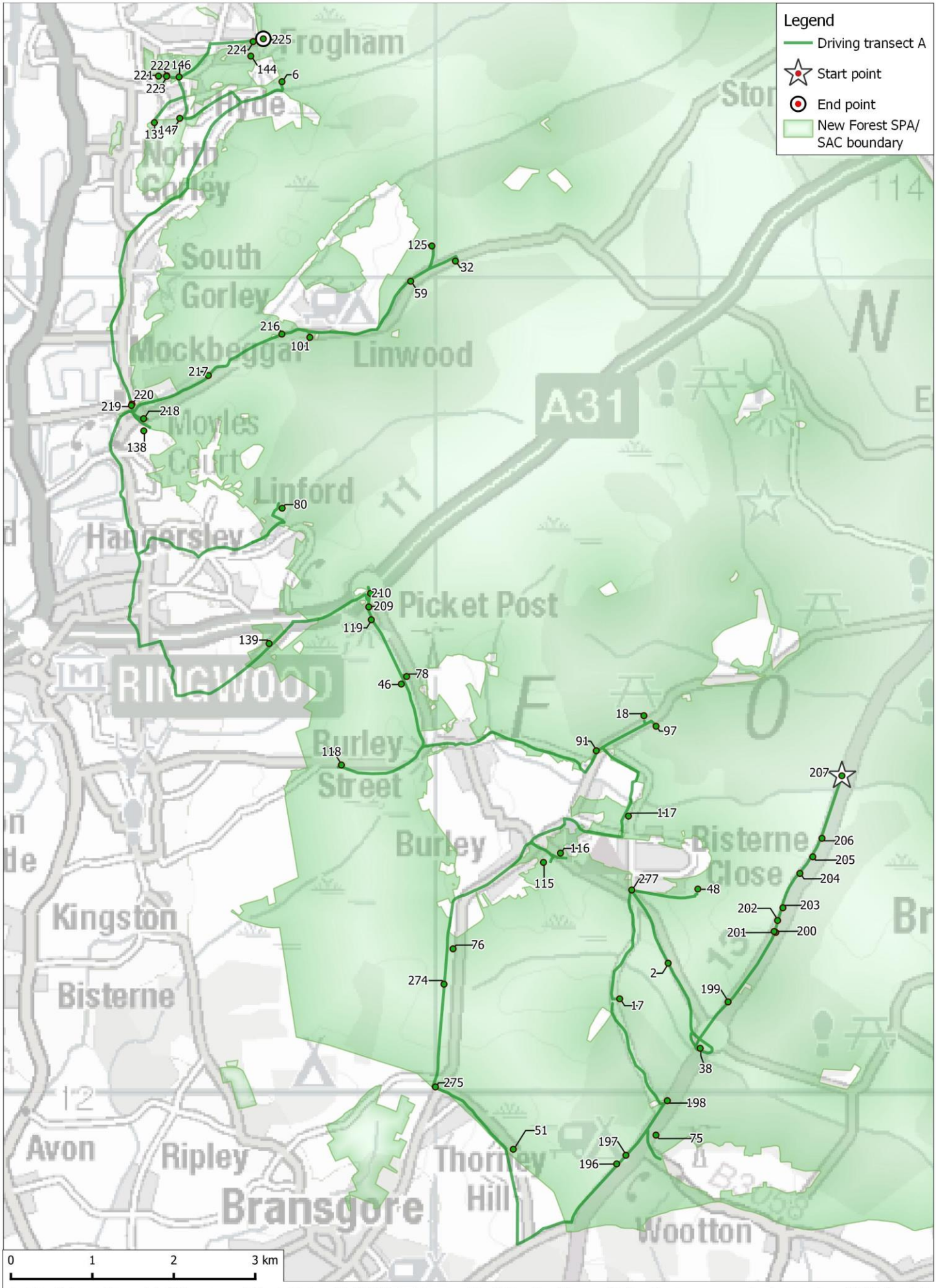
Location no.	Transect route	Location name (where applicable)	Location type	Minimum vehicle count	Mean vehicle count (to nearest whole number)	Maximum vehicle count
135	A	Gorley Common	FCP	0	2	4
136	B	Blackhill	FCP	0	6	18
137	B	West Wellow	FCP	1	10	22
138	A	Rockford Common	FCP	2	15	45
139	A	Hightown Common	FCP	0	3	11
140	B	Hale Purlieu	FCP	0	2	5
144	A	Abbots Well	FCP	0	6	21
146	A	Hyde Cricket Ground	FCP	0	6	33
147	A	Becky's Orchard	FCP	0	1	3
149	D		Lb/V	0	0	0
150	D		Lb/V	0	0	0
151	D		Lb/V	0	0	0
152	D		Lb/V	0	0	1
153	D		Lb/V	0	0	0
154	D		Lb/V	0	0	0
155	D		Lb/V	0	0	1
156	D		Lb/V	0	2	12
157	D		Gw/Tr	0	1	3
158	D		Gw/Tr	0	0	1
159	D		Lb/V	0	0	1
160	D		Gw/Tr	0	0	1
161	D		Lb/V	0	0	1
162	D		Gw/Tr	0	2	5
163	D		Lb/V	0	1	2
164	D	Royal Oak Pub	FCP	2	16	34
165	D		Lb/V	0	0	1
166	D		Lb/V	0	2	3
167	D		Lb/V	0	3	7
168	D		Lb/V	0	0	1
169	D		Lb/V	0	0	1
170	C		Lb/V	0	0	0
171	C		Lb/V	0	0	2
172	C		Lb/V	0	1	2
173	C	Denny Wood campsite	FCP	0	2	5
174	C		Lb/V	0	0	1
175	C		Gw/Tr	0	0	2
176	C		Lb/V	0	1	3

Location no.	Transect route	Location name (where applicable)	Location type	Minimum vehicle count	Mean vehicle count (to nearest whole number)	Maximum vehicle count
177	C		Lb/V	0	0	1
178	C		Lb/V	0	0	2
179	C	Entrance to Appletree Court	FCP	4	6	7
180	D		Lb/V	0	2	4
181	E		Gw/Tr	0	0	1
182	E		Lb/V	0	0	1
183	E		Gw/Tr	0	0	1
184	E		Lb/V	0	0	2
185	E		Lb/V	3	8	12
186	E		Gw/Tr	0	1	2
187	E		Lb/V	0	0	2
188	E		Lb/V	0	3	8
189	E		Lb/V	0	0	3
190	E		Lb/V	0	0	1
191	E		Lb/V	0	0	2
192	E		Lb/V	0	0	1
193	E		Lb/V	0	0	1
194	E		Lb/V	0	0	1
195	E		Lb/V	0	0	1
196	A		Lb/V	0	0	1
197	A		Lb/V	0	0	0
198	A		Gw/Tr	0	0	1
199	A		Lb/V	0	0	2
200	A		Gw/Tr	0	2	6
201	A		Gw/Tr	0	1	3
202	A		Lb/V	0	0	2
203	A		Lb/V	0	1	5
204	A		Gw/Tr	0	0	2
205	A		Gw/Tr	0	1	3
206	A		Gw/Tr	0	1	6
207	A		Gw/Tr	0	1	3
208	E		Lb/V	0	0	1
209	A		Lb/V	0	0	1
210	A		Lb/V	0	0	2
211	B		Gw/Tr	0	0	1
212	B		Gw/Tr	0	0	1
213	B		Gw/Tr	0	0	2
214	B		Gw/Tr	0	0	1
215	B		Gw/Tr	0	1	7
216	A		Lb/V	0	0	0
217	A		Lb/V	0	3	13

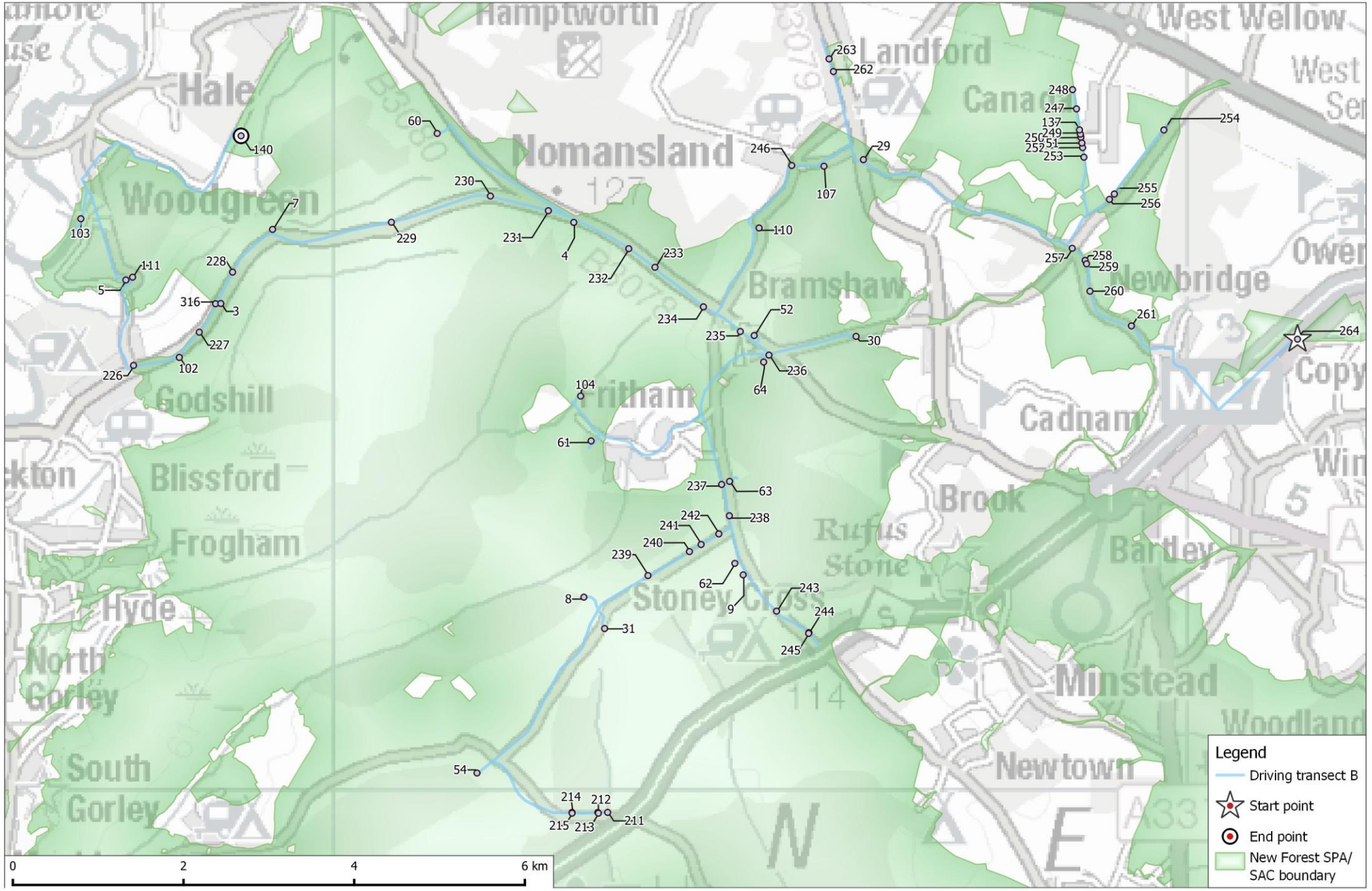
Location no.	Transect route	Location name (where applicable)	Location type	Minimum vehicle count	Mean vehicle count (to nearest whole number)	Maximum vehicle count
219	A		Lb/V	0	3	8
220	A		Lb/V	0	2	14
221	A	Holy Ascension Church	FCP	0	2	8
222	A		Lb/V	0	1	2
223	A		Lb/V	0	1	5
224	A	Frogham	FCP	0	5	26
225	A		Lb/V	0	0	1
226	B	Fighting Cocks pub	FCP	3	23	63
227	B		Lb/V	0	0	2
228	B		Lb/V	0	0	2
229	B		Lb/V	0	1	2
230	B		Lb/V	0	0	1
231	B		Lb/V	0	0	1
232	B		Lb/V	0	0	1
233	B		Lb/V	0	0	1
234	B		Gw/Tr	0	1	2
235	B		Lb/V	0	0	1
236	B		Lb/V	0	0	0
237	B		Gw/Tr	0	0	2
238	B		Lb/V	0	4	15
239	B		Lb/V	0	1	4
240	B		Lb/V	0	1	4
241	B		Lb/V	0	0	2
242	B		Lb/V	0	0	2
243	B		Lb/V	0	0	1
244	B		Lb/V	0	0	1
245	B		Lb/V	0	0	2
246	B	Lamb Inn pub	FCP	0	20	84
247	B		Lb/V	0	0	2
248	B	Canada Common	FCP	0	1	3
249	B		Lb/V	0	1	2
250	B		Lb/V	0	1	6
251	B		Lb/V	0	1	4
252	B		Lb/V	0	2	5
253	B		Lb/V	0	1	5
255	B		Gw/Tr	0	1	4
256	B		Lb/V	0	1	3
257	B		Lb/V	0	0	1
258	B		Lb/V	0	0	4

Location no.	Transect route	Location name (where applicable)	Location type	Minimum vehicle count	Mean vehicle count (to nearest whole number)	Maximum vehicle count
259	B		Lb/V	0	0	2
260	B		Lb/V	0	1	4
261	B		Gw/Tr	0	0	1
262	B		Lb/V	0	1	2
263	B		Lb/V	2	3	4
264	B	The Empress of Blandings pub	FCP	0	12	49
265	C		Lb/V	0	2	6
266	C		Gw/Tr	0	1	4
267	C		Gw/Tr	0	0	2
268	C		Gw/Tr	0	1	3
269	C		Lb/V	0	0	2
270	C		Lb/V	0	0	1
271	C		Lb/V	0	0	2
272	C		Lb/V	0	1	3
273	C	Racecourse View	Lb/V	4	10	17
274	A		Gw/Tr	0	0	1
275	A		Gw/Tr	0	1	1
276	E		Gw/Tr	0	3	10
277	A		Gw/Tr	0	1	3
278	D		Lb/V	0	0	1
279	D		Lb/V	0	2	5
315	C		Gw/Tr	0	0	0
316	B		Lb/V	0	0	1
317	D	Phone box on Woodlands Road	Gw/Tr	0	4	11

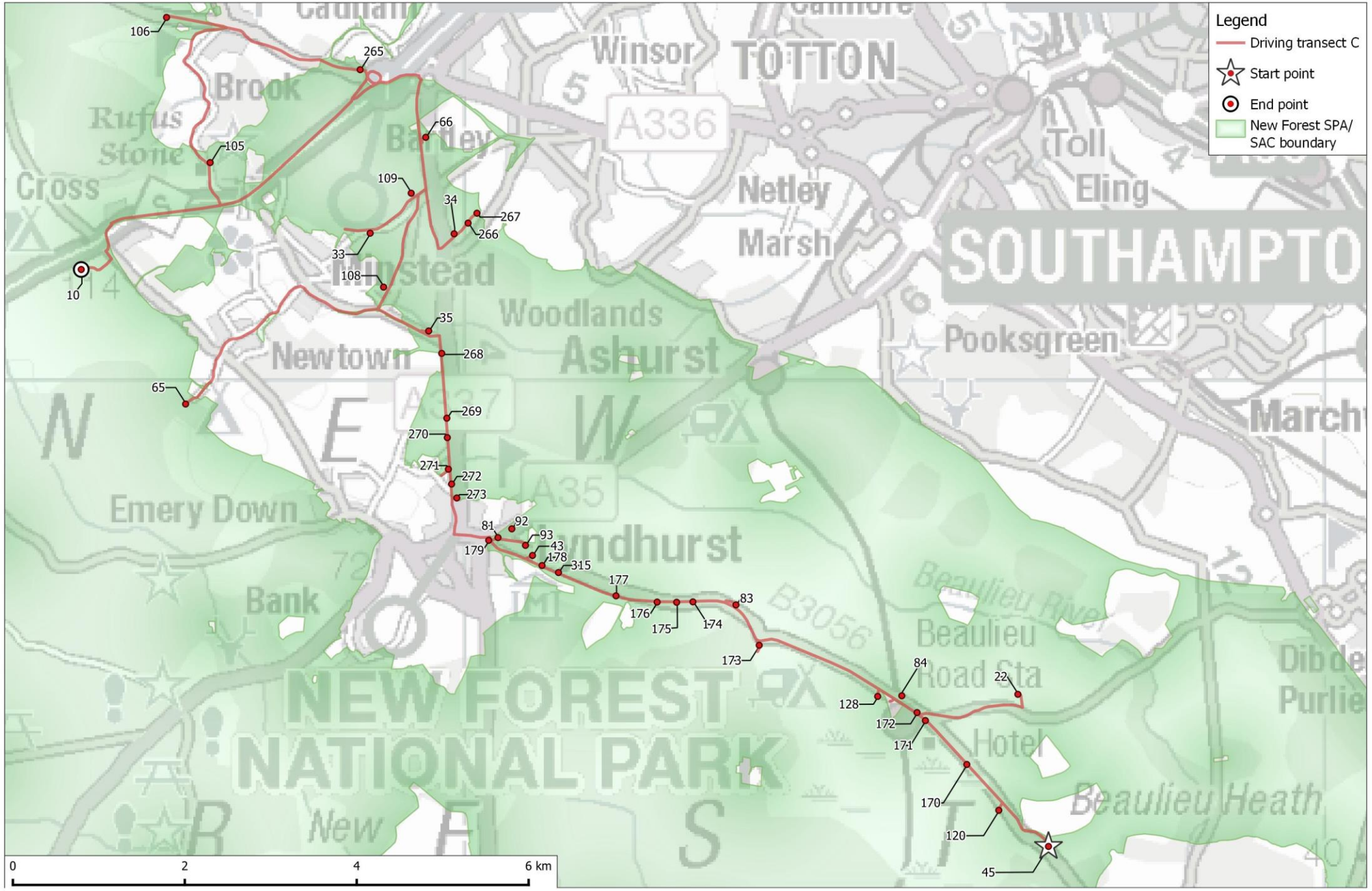
Map A1: Location and numerical identifier of parking locations along transect route A (to be used in conjunction with Table A1).



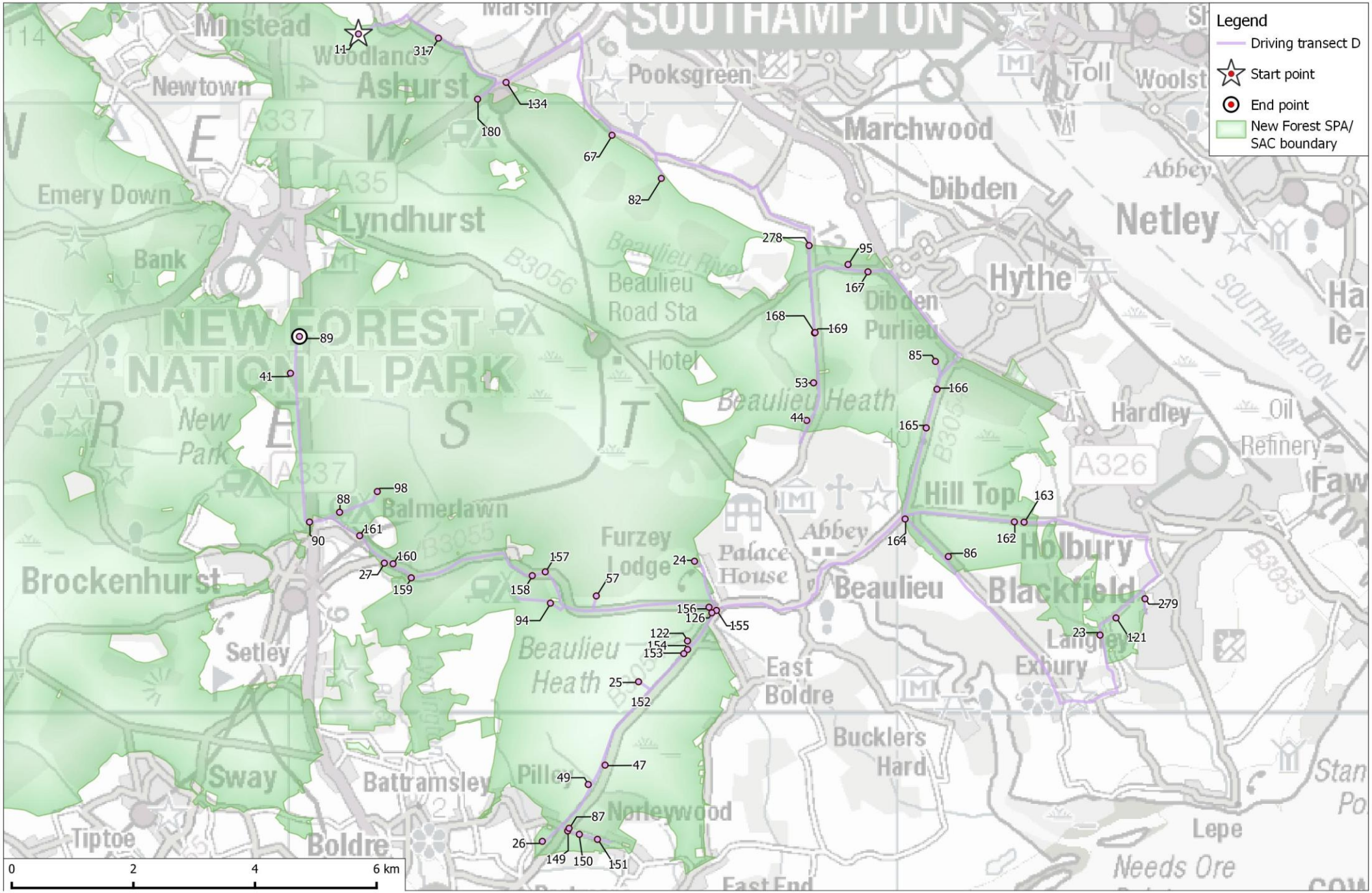
Map A2: Location and numerical identifier of parking locations along transect route B (to be used in conjunction with Table A1).



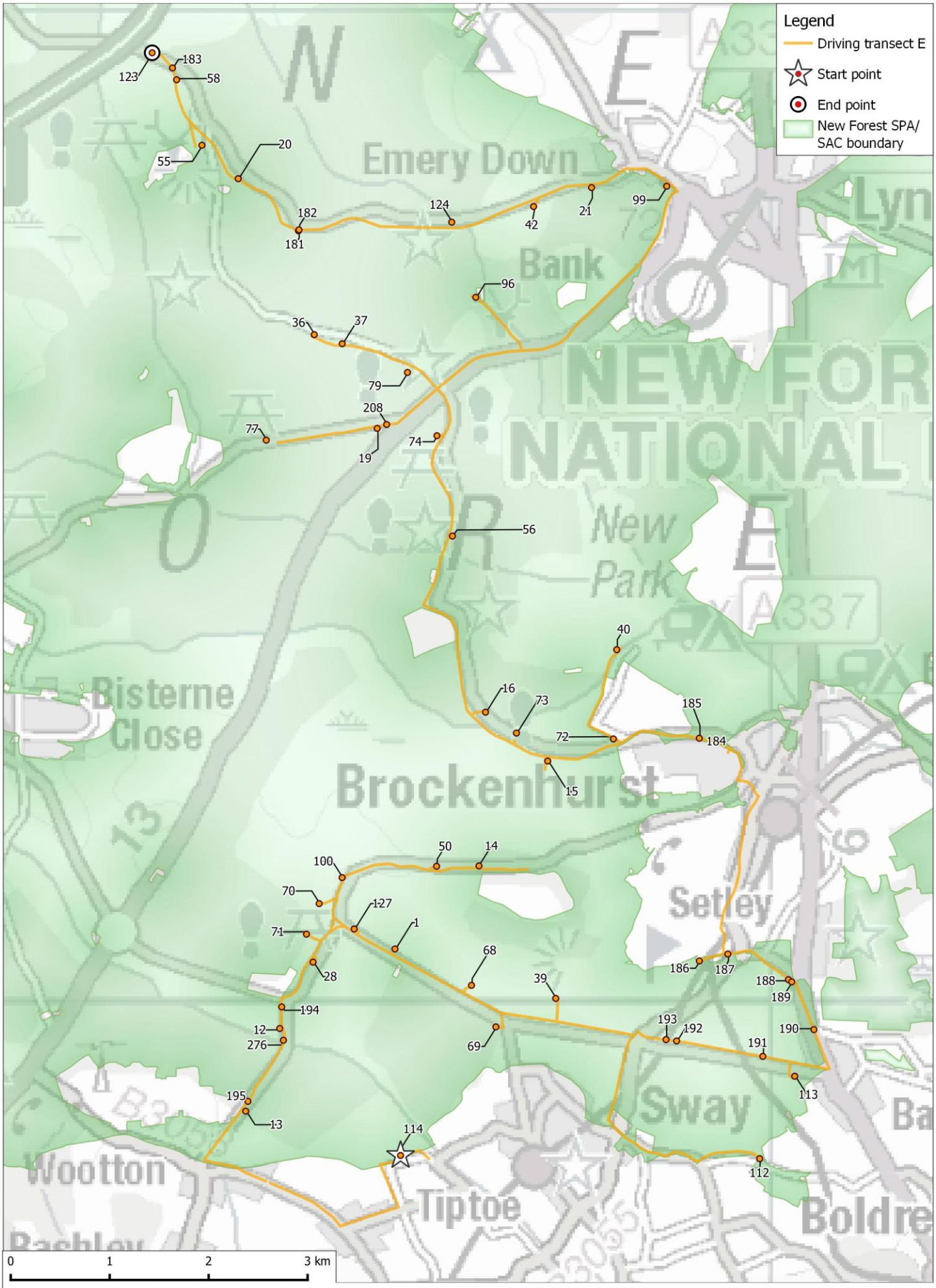
Map A3: Location and numerical identifier of parking locations along transect route C (to be used in conjunction with Table A1).



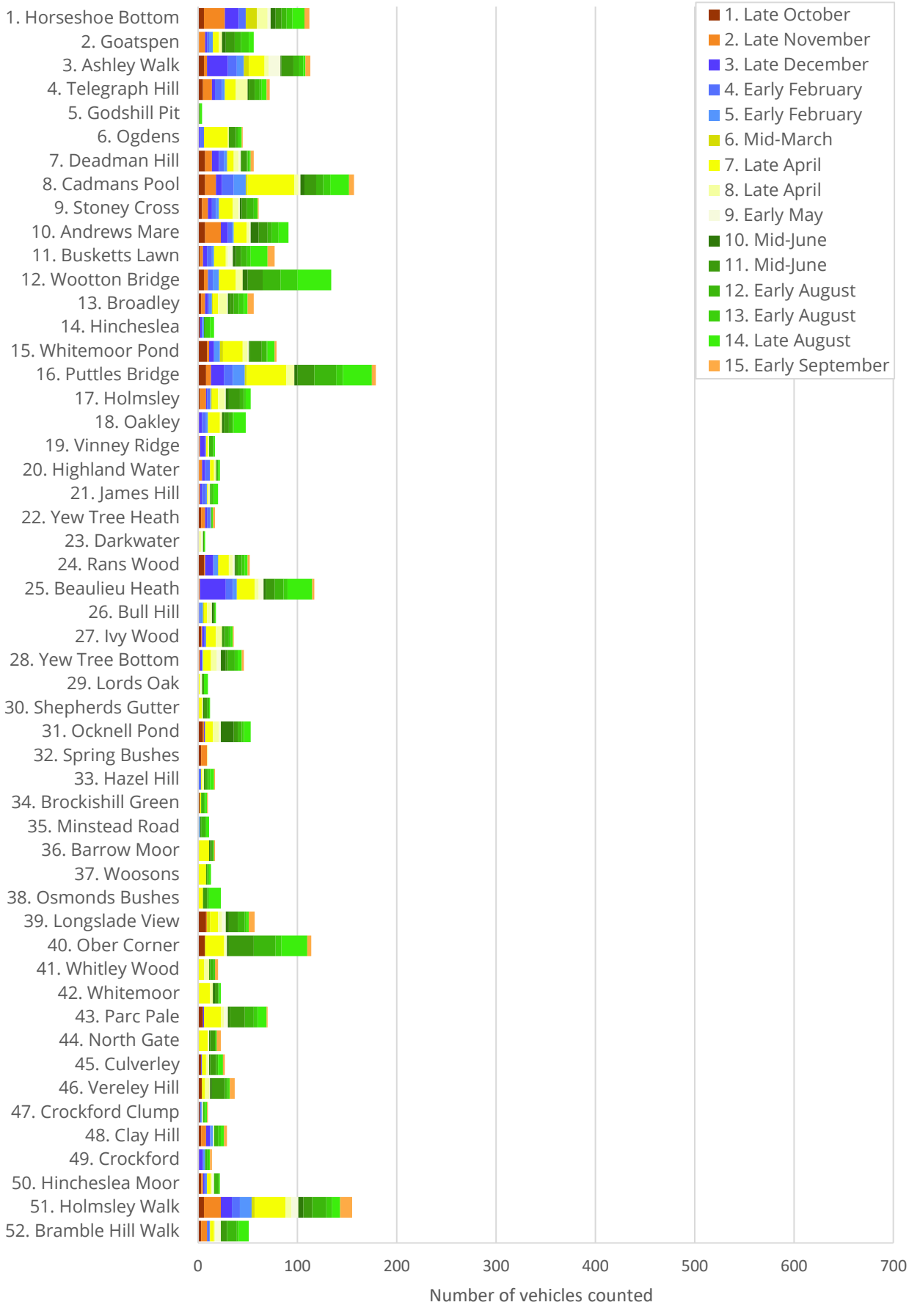
Map A4: Location and numerical identifier of parking locations along transect route D (to be used in conjunction with Table A1).



Map A5: Location and numerical identifier of parking locations along transect route E (to be used in conjunction with Table A1).



Appendix 2: Count data for each formal car park



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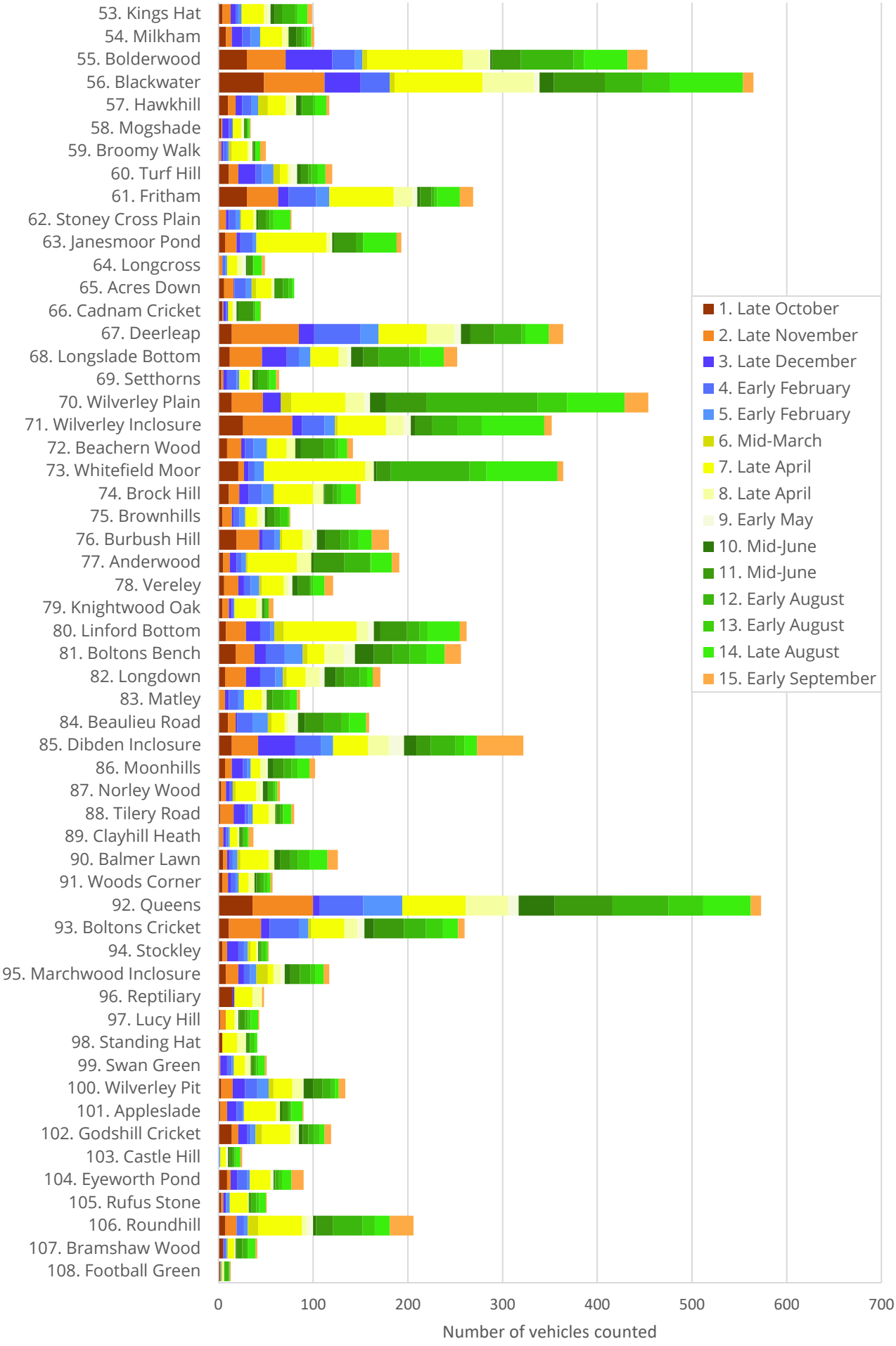

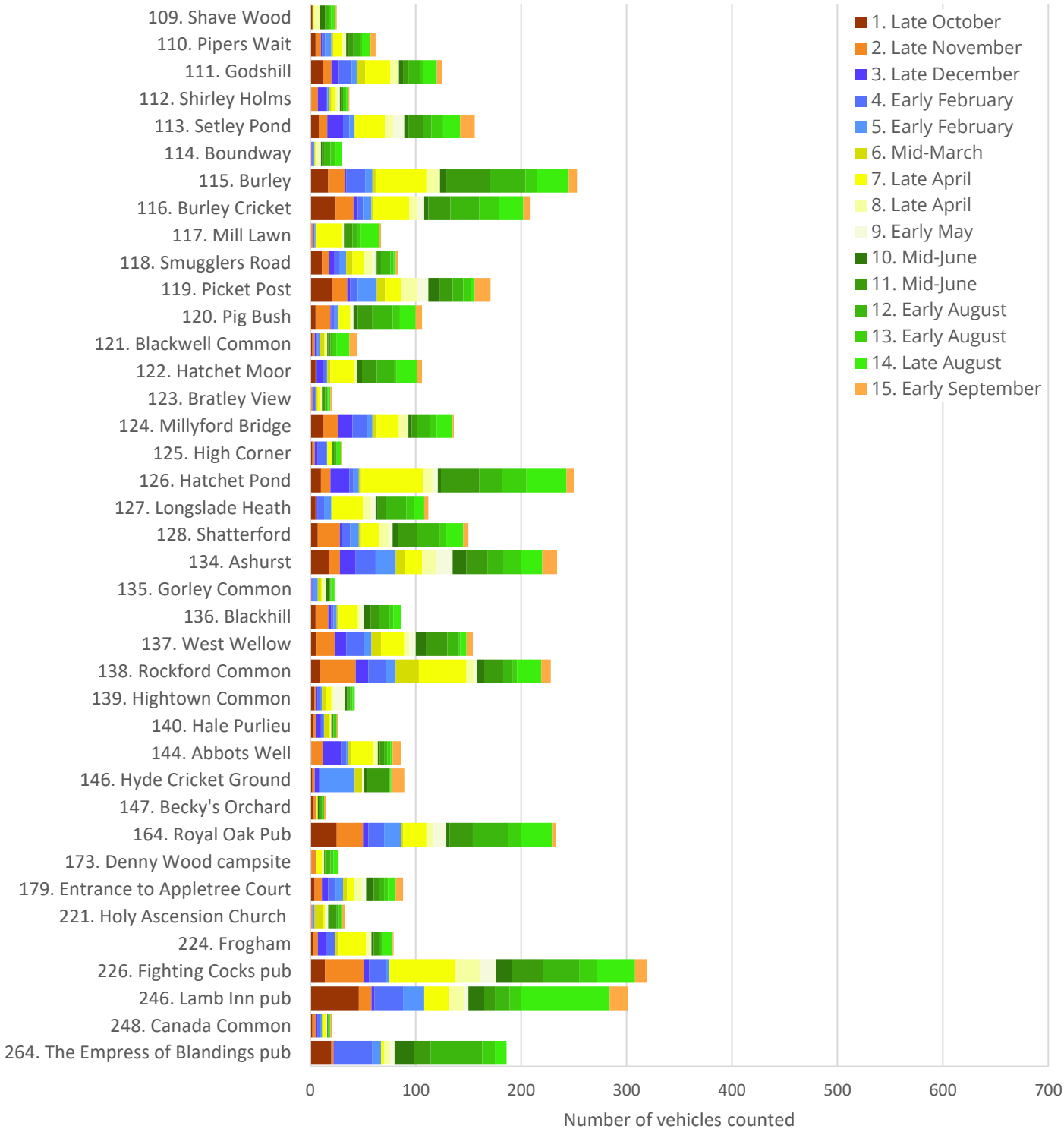
109. Shave Wood
110. Pipers Wait
111. Godshill
112. Shirley Holms
113. Setley Pond
114. Boundway
115. Burley
116. Burley Cricket
117. Mill Lawn
118. Smugglers Road
119. Picket Post
120. Pig Bush
121. Blackwell Common
122. Hatchet Moor
123. Bratley View
124. Millyford Bridge
125. High Corner
126. Hatchet Pond
127. Longslade Heath
128. Shatterford
134. Ashurst
135. Gorley Common
136. Blackhill
137. West Wellow
138. Rockford Common
139. Hightown Common
140. Hale Purlieu
144. Abbots Well
146. Hyde Cricket Ground
147. Becky's Orchard
164. Royal Oak Pub
173. Denny Wood campsite
179. Entrance to Appletree Court
221. Holy Ascension Church
224. Frogham
226. Fighting Cocks pub
246. Lamb Inn pub
248. Canada Common
264. The Empress of Blandings pub
1. Late October
2. Late November
3. Late December
4. Early February
5. Early February
6. Mid-March
7. Late April
8. Late April
9. Early May
10. Mid-June
11. Mid-June
12. Early August
13. Early August
14. Late August
15. Early September
0
100
200
300
400
500
600
700
Number of vehicles counted

Appendix 3: Overcapacity formal car parks

Table A3: Formal car parks which were recorded at overcapacity (based upon Forestry England capacity information) on at least one of the fifteen transect survey visits.

Location no.	Location name	Capacity	No. visits overcapacity (%)	Max no. vehicles overcapacity (%)	Overcapacity on Easter Bank Holiday Sunday? (Y/N)
4	Telegraph Hill	10	2 (14)	2 (20)	Y
6	Ogdens	20	1 (7)	4 (20)	Y
8	Cadmans Pool	45	1 (7)	2 (5)	Y
11	Busketts Lawn	10	2 (14)	7 (70)	Y
12	Wootton Bridge	25	1 (7)	9 (36)	N
16	Puttles Bridge	20	3 (20)	20 (100)	Y
24	Rans Wood	6	2 (14)	4 (67)	Y
38	Osmonds Bushes	10	1 (7)	2 (20)	N
40	Ober Corner	22	2 (14)	4 (19)	N
51	Holmsley Walk	28	1 (7)	3 (11)	Y
55	Bolderwood	80	1 (7)	21 (27)	Y
56	Blackwater	80	1 (7)	13 (17)	Y
61	Fritham	55	1 (7)	13 (24)	Y
65	Acres Down	12	1 (7)	4 (34)	Y
67	Deerleap	60	1 (7)	11 (19)	N
69	Setthorns	10	1 (7)	1 (10)	Y
70	Wilverley Plain	60	2 (14)	57 (95)	N
73	Whitefield Moor	100	1 (7)	7 (7)	Y
74	Brock Hill	40	1 (7)	1 (3)	Y
76	Burbush Hill	20	2 (14)	4 (20)	Y
77	Anderwood	50	1 (7)	2 (4)	Y
80	Linford Bottom	65	1 (7)	12 (19)	Y
81	Boltons Bench	20	1 (7)	1 (5)	N
82	Longdown	15	4 (27)	7 (47)	Y
84	Beaulieu Road	17	3 (20)	3 (18)	N
91	Woods Corner	6	1 (7)	4 (67)	Y
92	Queens	60	3 (20)	7 (12)	Y
93	Boltons Cricket	30	4 (27)	5 (17)	Y

Location no.	Location name	Capacity	No. visits overcapacity (%)	Max no. vehicles overcapacity (%)	Overcapacity on Easter Bank Holiday Sunday? (Y/N)
101	Appleslade	30	1 (7)	4 (14)	Y
104	Eyeworth Pond	15	1 (7)	7 (47)	Y
117	Mill Lawn	20	1 (7)	5 (25)	Y
119	Picket Post	20	1 (7)	1 (5)	N
126	Hatchet Pond	50	1 (7)	9 (18)	Y
136	Blackhill	15	1 (7)	3 (20)	Y
137	West Wellow	18	2 (14)	4 (23)	Y
138	Rockford Common	40	1 (7)	5 (13)	Y
139	Hightown Common	10	1 (7)	1 (10)	N
164	Royal Oak pub	26	2 (14)	8 (31)	N
226	Fighting Cocks pub	30	4 (27)	33 (110)	Y
246	Lamb Inn pub	50	1 (7)	34 (68)	N
264	The Empress of Blandings pub	40	1 (7)	9 (23)	N

Appendix 4: Statistical test output from paired survey dates

Table A4.1: Results of Mann-Whitney tests of significance for pairwise comparisons of vehicle count data. The w-statistic is part of the test output and significance levels are indicated with *(significant difference) and **(highly significant difference).

Pair ID	Survey date	Day type	School status	N	Median value	W-statistic	Significance level
a	4 - Early February	Weekend	Term time	247	1	62039.5	0.36
	5 - Early February	Weekday	Term time	243	1		
b	7 – Late April	Bank holiday weekend	School holidays	263	3	77493.5	0.00**
	8 – Late April	Weekend	Term time	264	2		
c	10 – Mid-June	Weekday	Term time	263	1	60901.0	0.00**
	11 – Mid-June	Weekend	Term time	261	2		
d	12 – Early August	Weekend	School holidays	268	2	75965.0	0.02*
	13 – Early August	Weekday	School holidays	268	1		
e(i)	11 – Mid-June	Weekend	Term time	261	2	70041.5	0.61
	12 – Early August	Weekend	School holidays	268	2		
e(ii)	10 – Mid-June	Weekday	Term time	263	1	65933.5	0.02*
	13 – Early August	Weekday	School holidays	268	1		