Appendix TA - L

PARKING PROPOSALS

TECHNICAL NOTE – VISITOR CAR PARKING

DATE:	24 December 2020	**CONFIDENTIALITY:**	Public
SUBJECT:	LONDON RESORT - VISITOR CAR PARKING		
PROJECT:	70063529	**AUTHOR:**	Allan Norcutt
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LONDON RESORT: VISITOR CAR PARKING

1. INTRODUCTION

This short note sets out the key design parameters which have been determined for providing public car parking for London Resort both on-site and at Tilbury Docks and the resultant options and maximum dimensions considered for the parameter-based plans associated with them. This on the assumption that of the 10,000 public car parking spaces needed, 7,500 are provided on-site and 2,500 are provided at Tilbury Docks. This note does not consider the separate VIP parking area which is proposed adjacent to the entrance to the Resort.

2. SPATIAL SETTING AND ACCESS

ON-SITE CAR PARKING

NUMBER OF CAR PARKS

Three car parking structures are proposed, referred to herein as the southern (i.e. nearest the chalk spine), central and northern (i.e. nearest the resort) car parks.

OVERALL SPATIAL CONSTRAINTS

The maximum width within which the three car parking structures can be provided is constrained by the access road running alongside the proposed coach parking area to the west of the car parks and the HS1 railway line to the east. This width is 112.5m.

In terms of the overall length within which the three car parks can be accommodated it is considered that a maximum distance of 328m should be adhered to. This recognises the distance between the access road running between the northern coach parking area and car parks and leaving sufficient space between the car parks and the chalk spine in the south to accommodate access roads, etc.

OFFSETS TO HS1 LINE

In cognisance of the HS1 line, each of the car parking structures will be set back from the HS1 boundary by a minimum of 14m, albeit any external ramps / cores may extend into that 14m zone. There will be also be a road within that 14m zone between the structure / ramps / cores and the HS1 line. This road will serve the following:

- Exiting car park traffic (with each car park having an independent point of access on to that road);
- Exiting coaches;
- Coaches recirculating between northern coach parking area and coach spaces beneath main podium;

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- Exiting service vehicles;
- Exiting vehicles associated with staff; and
- Emergency vehicles, etc.

MAXIMUM SPATIAL DIMENSIONS OF EACH STRUCTURE

Along the western elevation of the car parks a 10m zone is provided between the car park structure and the podium to accommodate lifts and stair cores (and associated vestibules) such that users of the car park can directly access the podium and thus the walking route through to the resort. As a result, the car parking structure between this and the offset to the HS1 line can be a maximum width of 88.5m (112.5m – 14m – 10m).

To facilitate buildability and future maintenance a gap of 10m is allowed between each structure along with a 5m gap between the northernmost car park and the access road running between it and the coach parking area in the north. As a result, the 328m length available to accommodate the three car parking structures breaks down to 101m maximum length per structure ((328 – 5 – 10 – 10)/3).

Whilst the maximum width and length of each structure is 88.5m and 101m, the actual size of the structure housing the car parking spaces themselves is dependent upon whether internal or external ramps are used to provide vertical circulation between the car park decks. Where external ramps are used an allowance of 10.5m outside the line of the building structure has been allowed for to accommodate a “D-Ramp” as well as emergency escape stair cores. Where an option considers internal ramps an allowance of 5m outside the line of the building structure has been allowed for to accommodate the emergency stair core only.

As a result, the maximum dimensions of each car parking structure are as follows:

- 78m width to allow for an external “D-Ramp” on the eastern elevation with this accommodating an emergency escape stair on that elevations also;
- 90.5m length to allow for an external “D-Ramp” on the northern elevation with this accommodating an emergency escape stair on that elevation also;
- 83.5m width to allow for an emergency escape stair on the eastern elevation assuming internal ramps are used; and
- 96m length to allow for an emergency escape stair on the northern elevation assuming internal ramps are used.

Due to the space needed to accommodate other transport movements, coach parking, etc. there is insufficient space to accommodate a perimeter road on the western side of the car parks from which each car park can then be independently accessed. Consequently, each car park is accessed via the southern car park.

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CAR PARK ACCESS

The access road through the chalk spine will be two lanes and two-lane entry will be provided into the westernmost aisle of the southern car park, with the nearside lane used as a straight through lane to access the Central Car Park and the off-side lane used to access spaces within the Southern Car Park and circulation therein. The Central Car Park has the same layout.

Similarly, the easternmost aisle of each car park will have two lanes, with the nearside lane used to feed the car park exit and the off-side lane used to access spaces and facilitate re-circulation.

Due to topography and the level of the proposed access road through the chalk spine, the southern car park will be accessed at Level 2 and consequently a bridge link will need to be provided at Level 2 between the three car parks to facilitate access. It is currently envisaged that this bridge link is provided to facilitate the entry into each car park only and that no re-circulation between car parks is necessary.

Level 2 is likely to be at circa 11m AOD (based on the lowest deck being 3m AOD), with the access road feeding the car parks through the second chalk spine at circa 9.5m AOD. Level 2 is at approximately the same level as the podium over the coach parking area and consequently Level 2 of each car park will contain the accessible car parking spaces. It is envisaged that Level 1 or Ground Level would contain the short-stay pick-up / drop-off and taxi spaces.

Potential access control measures into and out of the car parks are set out later in this note at Section 8.

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TILBURY DOCKS CAR PARK

NUMBER OF CAR PARKS

A single car parking structure is proposed.

OVERALL SPATIAL CONSTRAINTS

The car park needs to recognise the constraints of the site and in particular the highway corridors of Ferry Road and Fort Road, and the existing retained building structures to the north and east of the site. A pedestrian route needs to be retained down the eastern side of any car parking structure.

MAXIMUM SPATIAL DIMENSIONS OF THE STRUCTURES

Consideration has been given to introducing external “D-Ramps” to facilitate vertical circulation between car parking decks but this is particularly challenging given the constraints of the site and the fact that the car park will sit above a coach parking area beneath, access to which needs to be accommodated alongside car park access. As a result, a two-way ramp along the northern edge of the car park provides access to / from the first car parking deck above the coach parking area, with internal ramps then provided between decks.

The two-way ramp requires a zone of at least 9.5m outside the line of the building structure (based on two 3m wide lanes, a 1m central hatched strip, two 0.25 kerb offsets and two 0.5m structural walls). Taking this into account and an offset to the retained building to the north of the site, Fort Road to the south and the coach parking area access road, leads to a maximum overall building length of circa 189m (including the 9.5m two-way ramp).

The maximum width, taking into consideration the retained building to the east of the site and the access roads required between the structure and Ferry Road, has been determined as 66m. However, once an allowance is made for the ramp to/from the first car parking deck an overall width of 94m is likely to be required.

CAR AND COACH PARKING ACCESSES

As set out above, the car park will sit above a ground floor coach parking area. Consideration of access arrangements has deemed that the most suitable arrangement for coach parking access is for coaches to enter the ground level parking area via Fort Road and exit on to the retained Ferry Road roundabout. Cars would enter / exit via the Ferry Road roundabout access with exiting cars merging with exiting coaches on the approach to the Ferry Road roundabout access.

In order to accommodate coaches at ground level it has been assumed that the first car parking deck is 6m above ground level; this allows for 5m headroom and a 1m structural zone.

Level 1 of the car park would have link bridges over Fort Road to tie-in to the Tilbury Riverside station. As a result, it is envisaged that Level 1 will contain the accessible car parking spaces and most of the short-stay pick-up / drop-off and taxi spaces.

ACCESS CONTROL MEASURES

Potential access control measures into and out of the car parks are set out later in this note at Section 8.

3. PARKING SPACE TYPES AND NUMBERS

In determining the spatial requirements for the car parks, as well as considering the aspects set out above a set of parking space typologies have been identified in order to set the number of spaces being provided across the three car parks at this high-level concept stage. These are as follows:

Table 3.1 Parking Space Typologies

Type of Spaces to be Provided Within the On-Site Car Parks	Number of Spaces to be Provided On-Site	Number of Spaces to be Provided at Tilbury
Public car parking spaces	7,500	2,500
Taxi spaces (1% assumed)	75	25
Short-Stay Pick-up / Drop-Off Spaces (2% assumed)	150	50
Accessible car parking spaces	5% of public car parking spaces	5% of public car parking spaces
Sub-Total	**7,725**	**2,575**
Additional parking spaces allowed for within design parameters to provide sufficient flexibility to accommodate design development in the future (2%)	150	50
Total Minimum No. Spaces Targeted	**7,875**	**2,625**

4. OTHER KEY DESIGN PARAMETERS

In addition to the number and type of car parking spaces to be provided, the parameters determined are also cognisant of a number of other key design parameters which influence the scale of the structures required. These include:

Table 4.1 Other Key Design Parameters

Other Car Park Design Parameters	Dimension Used
Car Park Bay Width	Consideration given to 2.5m, 2.7m and 3m (see Sections 6 and 7 below)
Car Park Bay Length	5m
Accessible Car Park Bay Width	3.7m
Accessible Car Park Bay Length	5m
Car Park Aisle Widths (one-way)	6m
Car Park Aisle Widths Where no Spaces (Other than Main Entry Aisle)	4m
Height between Car Park Decks	4m
Height of lift / stair shaft projecting above upper deck	4m
Height of car ports with PV panels over rooftop parking spaces (if provided)	4m
Width of Structural Walls	0.5m
Minimum Ramp Width	3.5m
Maximum Ramp Gradient	1:10
Form of vertical circulation for pedestrians	Traditional lift and stair cores

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5. CAR PARK LAYOUT OPTIONS

Within a set footprint there are a number of options for providing and setting out car parking spaces and vertical circulation between decks. To afford flexibility on the design of these structures, the parameters which would be required to facilitate either one of the below four options has been considered and then, where appropriate, the largest dimension associated with each option taken as the maximum parameter.

The options considered are:

- Option 1 - Parking aisles run north-south and external “D-Ramps” are provided for vertical circulation (this applies to the on-site car parks only; for the Tilbury car park the two-way external car park ramp is provided between ground level and the first car parking deck)
- Option 2 - Parking aisles run east-west and external “D-Ramps” are provided for vertical circulation (this applies to the on-site car parks only; for the Tilbury car park the two-way external car park ramp is provided between ground level and the first car parking deck)
- Option 3 - Parking aisles run north-south and internal straight ramps are provided for vertical circulation
- Option 4 - Parking aisles run east-west and internal straight ramps are provided for vertical circulation

6. PARKING BAY WIDTH OPTIONS

Consideration has been given to the size of car parking spaces provided, recognising the balance needing to be struck between customer experience, recognition that a high proportion of visitors will be families, cost, etc. Consideration has therefore been given to five options in order to determine the maximum design parameters for the car parking structures, these being as follows:

Table 6.1 Car Parking Space Options Considered

Option	Parking Space Dimensions	Comments
A	2.5m x 5m	Minimum Dimension Required
B	3m x 5m	Enhanced Customer Experience and Recognition that a High Proportion of Visitors will be Families
C	2.7m x 5m	Alternative Option Between the Recommended and Minimum Dimensions

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7. INFLUENCE OF PARKING BAY WIDTHS ON PARAMETERS

INTRODUCTION

Depending on their size, the number of parking spaces which can be accommodated on each deck will differ and consequently the overall parameters of the structures will vary. Consideration has therefore been given to the implications of each of the options set out in Section 6 above on the parameters, taking into consideration the same spatial, typology and design parameters set out earlier in this note.

ON-SITE CAR PARKS

In practice the number of decks which could be provided within each of the three on-site car parking structures could be different, albeit the height associated with the structure(s) requiring the most decks would be used as the parameter. As a result, the maximum number of decks needed in any one car parking structure is identified below taking into consideration whether external or internal ramps are provided and whether spaces are oriented north-south or east-west.

Table 7.1 Parameter Requirements for On-Site Car Parks – Assuming Each Car Parking Structure Has the Same Number of Decks

Option	Parking Space Dimension	Dimension		Height[1]	No. Decks Across the 3 Car Parks[2]	Approx. No. Car Parking Spaces
		Width (East-West)	Length (North-South)			
A	2.5m x 5m	98.5m[3]	101m	48m	11	7,800 - 9,000
B	3m x 5m			52m	12	8,000 - 8,100
C	2.7m x 5m			52m	12	7,800 - 8,900

1 This is the height above ground level and not an AOD level

2 This is the number of decks above a ground level car parking area

3 Including 10m zone for lifts / stair cores, etc. along the western edge of the car parks

TILBURY CAR PARK

In practice the number of decks which could be provided within the Tilbury car parking structure could be different, albeit the height associated with the option requiring the most decks would be used as the parameter. The resultant parameter requirements are as follows taking into consideration whether external or internal ramps are provided and whether spaces are oriented north-south or east-west.

Table 7.2 Parameter Requirements for Tilbury Car Park

Option	Parking Space Dimension	Dimension		Height[1]	No. Decks[2]	Approx. No. Car Parking Spaces
		Width (East-West)[3]	Length (North-South)[3]			
A	2.5m x 5m	94m	189m	34m	7	2,750 – 2,950
B	3m x 5m			38m	8	2,700 – 2,800
C	2.7m x 5m			38m	8	2,950 – 3,100

1 This is the height above ground level and not an AOD level

2 This is the number of decks above a ground level coach parking area

3 This excludes the dimensions associated with the bridge links over Fort Road and the Tilbury Riverside Station building itself

8. CAR PARK ACCESS CONTROLS

OVERVIEW

It is envisaged that the following strategy will be broadly adopted. Whilst there may be a number of options which could be developed around this, we have at this stage considered a single option to demonstrate how this could operate:

- HGVs and Coaches will need to be security checked and, for the on-site coach and car parking provision, this will take place before vehicles travel through the second chalk spine and into the site;
- The general public and taxis, who will enter the car parking structures, will not be security checked; and
- Car parking ticketing will be linked to resort ticketing albeit an allowance needs to be made for people arriving in the evening to use the F&B and / or retail quarter, for taxis and for members of the public picking-up and dropping-off. Consideration of this is therefore provided below albeit as referenced earlier it is envisaged that further discussions around ticketing will be held.

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OPTION FOR MANAGING CAR PARKING

A number of options would be available to manage parking and parking charges, with the below provided as a potential option.

- For the vast majority of the day car parking will only be permitted if pre-paid and associated with a resort ticket;
- When pre-booking their ticket for the resort, customers intending to travel by private car are requested to pre-pay for parking and provide the registration of the vehicle they will be using to travel to the resort;
- Customers wishing to access the F&B and / or retail uses (or indeed the resort) in the evening will be permitted to park in the car park subject to a charge (which could be an hourly rate). A time will need to be set after which visitors can park in the car park and pay for parking prior to exit; e.g. 5pm;
- Anyone parking in the car park for more than a set period of time (e.g. one hour) before the time beyond which parking can be paid for (e.g. 5pm) will be subject to a large fee which will be payable prior to exit (see below);
- There would be a grace period between entering the car park and exiting it to accommodate taxis, members of the public picking-up / dropping-off, etc. Given the nature of the land use it is suggested that the grace period could be as long as 1-hour;
- No barriers are provided on entry, but Automatic Number Plate Recognition (ANPR) cameras are used to capture the registration plate of every vehicle entering the car parks and to cross-check this against the list of vehicles associated with resort ticket purchases;
- Pay stations will be provided within the car park and on the podium. These will be predominantly used by visitors arriving after a certain time of day (e.g. 5pm) who are principally accessing the F&B or retail quarter. However, anyone who has parked during the day to visit the resort prior to the time after which paid parking is permitted would also need to visit one of these pay stations and would be liable to a large fee. Upon exiting the resort, F&B quarter, retail uses, etc. customers will use one of these pay stations, enter their vehicle registration details and then pay the appropriate fee for parking;
- Barriers are provided on exit, with ANPR cameras. Customers with a pre-booked resort ticket, those who have paid for parking at one of the pay-stations or where the computer linked to the ANPR cameras recognises the duration of stay has been less than 1-hour do not need to do anything and will be permitted free exit once the ANPR camera recognises their number plate and opens the barrier; and
- A lay-by and pay station will be provided at each exit to permit anyone who hasn't paid on exit to stop and pay.

9. RECOMMENDATION

ON-SITE CAR PARKS

The recommended design parameters of the three car parks are as Table 9.1 below. It has currently been assumed that the rooftop level has car ports over the spaces to house solar PV.

Table 9.1 Recommended Car Parking Structure Parameters Applied to Each of the On-Site Car Parks

Type	Dimension
Width	100m[1]
Length	106m[2]
Height	52m (i.e. 11 decks above ground level + car ports with PV over the rooftop spaces (which would also cover the lift/stair core extending above roof level)

[1] Figures slightly higher than identified earlier in the report to provide flexibility on design

[2] Additional 5m added to the figure of 101m presented earlier in the report to provide flexibility for additional stair core

The parameters above provide sufficient flexibility to provide the following number of spaces if each of the three car parks is the same height, thereby providing flexibility in future design to deliver at least 7,500 public car parking spaces, 150 pick-up / drop-off spaces, 75 taxi spaces and an allowance of 2% (i.e. 150 spaces) for design flexibility; i.e. a total of 7,875 spaces.

- 2.5m x 5m spaces. The parameters identified above provide maximum flexibility on layout, with all four layout options identified being deliverable (see below) and providing, as a minimum, 8,500 spaces and up to 9,700 spaces depending on the option considered.
  - Parking aisles run north-south and external “D-Ramps” are provided for vertical circulation
  - Parking aisles run east-west and external “D-Ramps” are provided for vertical circulation
  - Parking aisles run north-south and internal straight ramps are provided for vertical circulation
  - Parking aisles run east-west and internal straight ramps are provided for vertical circulation

- 2.7m x 5m spaces. The parameters identified also provide maximum flexibility with all four layout options identified being deliverable (see below) and providing, as a minimum, 7,800 spaces and up to 8,800 spaces depending on the option considered.
  - Parking aisles run north-south and external “D-Ramps” are provided for vertical circulation
  - Parking aisles run east-west and external “D-Ramps” are provided for vertical circulation
  - Parking aisles run north-south and internal straight ramps are provided for vertical circulation
  - Parking aisles run east-west and internal straight ramps are provided for vertical circulation

- 3m x 5m spaces. The parameters identified above provide some flexibility with two of the four layout options identified being deliverable (see below) and providing, as a minimum, 8,000 spaces and up to 8,100 spaces depending on the option considered.
  - Parking aisles run north-south and external “D-Ramps” are provided for vertical circulation
  - Parking aisles run east-west and external “D-Ramps” are provided for vertical circulation

TILBURY CAR PARK

It is recommended that the design parameters of the car park are as Table 9.2 below. It has currently been assumed that the rooftop level has car ports over the spaces to house solar PV.

Table 9.2 Recommended Car Parking Structure Parameters for Tilbury Car Park

Type	Dimension
Width	102m
Length	112m
Height	38m (i.e. 8 decks above the ground level coach parking area + car ports with PV over the rooftop spaces (which would also cover the lift/stair core extending above roof level)

The parameters above provide sufficient flexibility to provide the following number of spaces if the car park is the same height, thereby providing flexibility in future design to deliver at least 2,500 public car parking spaces, 50 pick-up / drop-off spaces, 25 taxi spaces and an allowance of 2% (i.e. 50 spaces) for design flexibility; i.e. a total of 2,625 spaces.

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- 2.5m x 5m spaces. The parameters identified above provide maximum flexibility on layout, with all four layout options identified being deliverable (see below) and providing, as a minimum, 2,750 spaces and up to 3,400 spaces depending on the option considered.

  - Parking aisles run north-south and internal straight ramps are provided for vertical circulation
  - Parking aisles run east-west and internal straight ramps are provided for vertical circulation

- 2.7m x 5m spaces. The parameters identified above provide a good degree of flexibility with three of the four layout options identified being deliverable (see below) and providing, as a minimum, 2,950 spaces and up to 3,100 spaces depending on the option considered.

  - Parking aisles run north-south and internal straight ramps are provided for vertical circulation
  - Parking aisles run east-west and internal straight ramps are provided for vertical circulation

- 3m x 5m spaces. The parameters identified above provide some flexibility with two of the four layout options identified being deliverable (see below) and providing, as a minimum, 2,700 spaces and up to 2,800 spaces depending on the option considered.

  - Parking aisles run north-south and internal straight ramps are provided for vertical circulation
  - Parking aisles run east-west and internal straight ramps are provided for vertical circulation

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