LAND NORTH OF CULHAM SCIENCE CENTRE, CULHAM, Nr ABINGDON, OX14 3DB

ACCESS TECHNICAL NOTE

1 Introduction

1.1 Miles White Transport Ltd (MWT) has been appointed by Statera Energy Ltd to consider construction vehicle access arrangements to a proposed Battery Energy Storage System (BESS) development site on land to the north of the existing Culham Science Centre, near Abingdon, Oxfordshire. This Technical Note should be read in conjunction with the Construction Traffic Management Plan (CTMP) prepared by Statera Energy.

1.2 The site location in the context of the existing Science Centre and the surrounding area is shown in **Figure 1** below. The proposed layout plan of the BESS is attached as **Appendix A**.

FIGURE 1: Site Location

2 Site Access

General

2.1 Once operational, the proposed development will only require a small number of vehicle trips (cars and vans) primarily associated with routine maintenance. During construction however access will involve standard 16.5m long articulated vehicles transporting the battery units, Abnormal Indivisible Loads (AILs) associated with sub-station equipment, transformers and similar, and large mobile cranes for the installation of the various electrical components. Transporting the AILs will require specialist haulage vehicles such as those shown in **Appendix B** although the AIL report prepared by the specialist haulage contractor (Wynns) provides full details of the vehicles and the associated on-site and off-site routing. Details of the largest mobile cranes likely to be required are also provided as part of Appendix B.

2.2 The CTMP provides details of the likely number of vehicle movements together with details of the proposed vehicle routes to and from the Strategic Road Network. This Technical Note considers the construction vehicle access routes in a local context, i.e., to and from the A415 Abingdon Road.

Options for Construction Vehicle Access

2.3 It is considered that there are four potential options for large construction vehicle access to the BESS site with these being shown indicatively in **Figure 2** below.

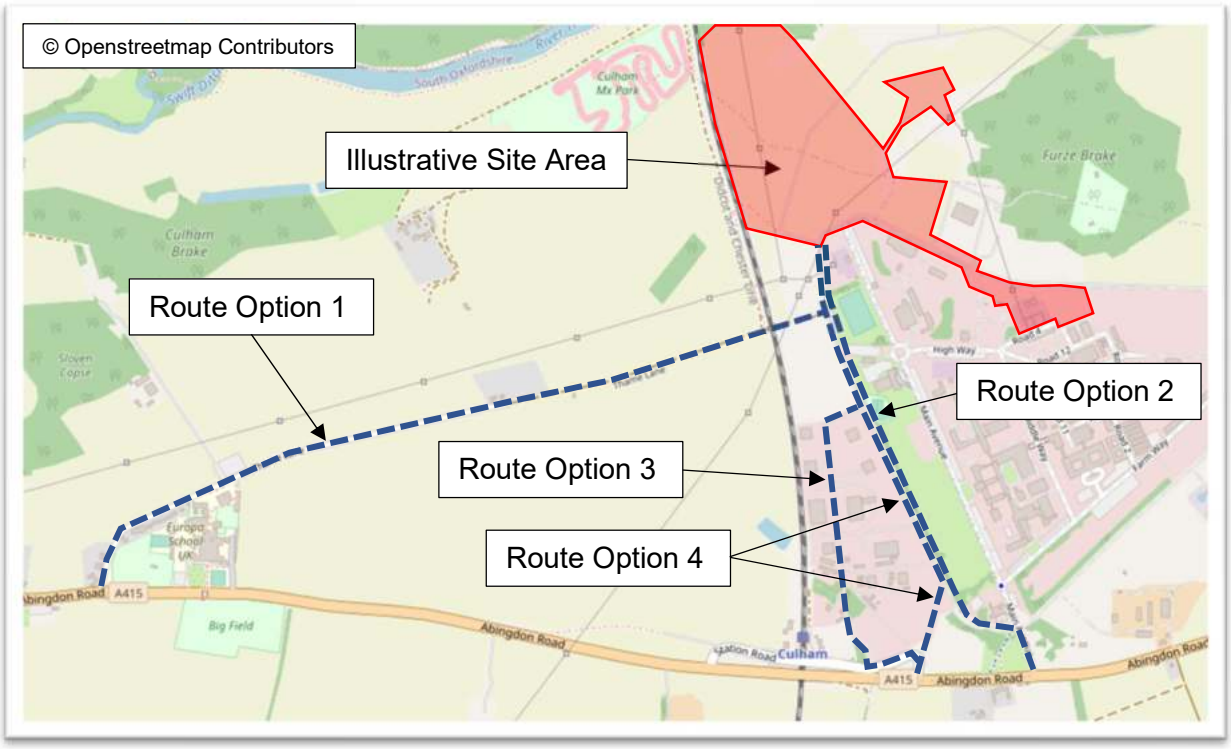


FIGURE 2: Potential Construction Vehicle Access Routes

2.4 Route Option 1 – Thame Lane – Not considered appropriate as the route passes a school and residential properties. The lane also varies in width between approximately 5.5m and 2.75m and may not be able to accommodate the largest vehicles. The lane becomes a Restricted Byway at its eastern end and crosses a railway bridge of unknown strength.

2.5 Route Option 2 – Through Culham Science Park – Not considered appropriate for the main construction access as the Science Centre is a secure site with the internal roads being gated and controlled. A route through the outer boundary fence would be required to access the BESS site itself. Some construction vehicle access through the Science Park will likely be required to create the electrical connections but this will mainly involve smaller vehicle types.

2.6 Route Option 3 – Through the centre of Culham No.1 Industrial Estate – Not considered appropriate as the route passes through an active employment area with the potential for conflicting vehicle movements, both car and lorry. The 90° turn in the northeast corner of the Industrial Estate could not accommodate turning movements without initial enabling works.

2.7 Route Option 4 – To the east of Culham No.1 Industrial Estate – This route is preferred as its alignment is primarily straight between the A415 Abingdon Road and the BESS site itself. The route makes use of a lightly trafficked secondary road through the Industrial Estate along which the interaction with existing traffic can be appropriately managed and controlled. There is also an existing barrier control at the southern end of the route that can be used to manage large vehicle access to the construction site beyond.

Details of Proposed Construction Vehicle Access

2.8 All large construction vehicles will approach the site via the A415 Abingdon Road and use the eastern junction with Station Road. The A415 is a high standard 7.3m carriageway with a broadly straight alignment where it passes the Station Road junction. It is subject to the national 60mph speed limit and is not street lit.

2.9 Department for Transport flow data from count point 17038 located just southeast of Abingdon identifies the average weekday flow on the A415 in 2019 (pre-Covid) as being 10,006 motorised vehicles. This is well below the link capacity of a 7.3m carriageway.

2.10 The ‘crashmap’ website identifies no personal injury collisions occurring at or on the immediate approaches to the Abingdon Road / Station Road junction over the most recent 10 year period which identifies use of the junction to be safe. The safety of the junction benefits from the excellent visibility available in both directions on egress from the Station Road side arm, as shown in Photographs 1 and 2 attached as part of **Appendix C**. Visibility is estimated to be at or greater than the standard 215m required for a 60mph road.

2.11 Station Road has a carriageway width of approximately 6m with 15m radii kerb lines forming the bellmouth of the junction with Abingdon Road. A straight section of Station Road (approximately 50m) leads to a side road junction where a barrier controlled access leads into the Culham No.1 Industrial Estate. This is a secondary access to the Industrial Estate and is not used for day to day vehicle access.

2.12 Again, visibility on egress from the side road is very good as shown in Photographs 3 and 4 (Appendix C). To the left, visibility extends up to the Abingdon Road give way line while to the right it extends approximately 150m and takes in the main Culham No.1 access junction.

2.13 Traffic flows on Station Road are low as the road serves only the Industrial Estate, Culham Railway Station, a Public House and a small number of residential properties.

2.14 Once beyond the existing control barrier, there is a link track of approximately 6m width that extends straight for approximately 140m before connecting with the existing concrete access roads within the Culham No.1 Industrial Estate. Photograph 5 shows this link road looking north past the barrier control with Photograph 6 showing the link looking south back towards Station Road.

2.15 The link road has a rough tarmac surface that is considered appropriate given the short term temporary nature of the construction programme. It can also be repaired during the works should the need arise.

2.16 Photograph 7 (looking north from the southern end) and Photograph 8 (looking south from northern end) show the standard of the access road that runs along the eastern edge of the Culham No.1 Industrial Estate. This road is approximately 5.5m in width with its concrete construction being in a good state of repair. The road is straight along the full route to the BESS site itself thereby allowing excellent levels of forward visibility.

2.17 A significant benefit of the proposed construction vehicle access route is its predominantly straight alignment which minimises the turning requirements of the large delivery vehicles. For completeness however, the plans attached as **Appendix D** provide a swept path analysis of the initial southern section of the access route from Abingdon Road. The construction compound and delivery arrangements will be such that the largest vehicles will be able to turn within the site at the northern end of the access route to facilitate both arrival and departure in a forward gear.

Operational Access

2.18 As previously mentioned, vehicle trips to and from the site once operational will be very low and primarily associated with routine maintenance, as and when required. It is therefore considered that vehicle access through the Culham No.1 Industrial Estate, i.e., Route Option 3 from the above, represents the most appropriate long term arrangement.

3 On-Site Layout

3.1 The proposed development comprises numerous rows of battery storage units across the site each linked to an on-site substation that will receive and distribute the electrical energy. The individual battery storage areas are each served by a compacted stone access track with these being inter-connected before leading to and from the main vehicle access route. A small parking area will be provided to accommodate maintenance related vehicles as and when required.

3.2 During construction a large contractor's compound will be provided within or adjacent the site with this intended to accommodate all contractor parking, material storage and the majority of turning movements associated with the large delivery vehicles. For instance, the battery units themselves will likely be delivered to, unloaded, and temporarily stored within the compound before being transported individually to their final positions by on-site vehicles as and when required. Most delivery vehicles will not therefore be required to enter the main body of the site itself or to turn within.

3.3 Larger components such as the substation transformers will by necessity be transported direct to their final positions within the site once the groundworks are ready to receive them. The existing concrete road through the Culham No.1 Industrial Estate extends to the substation location thereby providing an appropriate standard of route along its full length.

4 Summary

4.1 It is proposed to construct a Battery Energy Storage System on land to the north east of the Culham Science Park, near Abingdon, Oxfordshire.

4.2 Development traffic once operational will be minimal comprising occasional maintenance vehicle access primarily by car and van. An existing route through the Culham No.1 Industrial Estate is of an appropriate standard to accommodate such operational traffic flows.

4.3 Development traffic during construction will involve numerous large articulated vehicle movements together with Abnormal Indivisible Loads and large mobile cranes. Potential routes via Thame Lane, through the Science Centre or through the main body of the Industrial Estate are not appropriate to accommodate such vehicle movements.

4.4 Given the above, it is proposed that an existing secondary access road that runs just inside the eastern boundary of the Culham No.1 Industrial Estate be utilised as the large construction vehicle access route. This benefits from excellent access to and from the A415 Abingdon Road at its southern end and is predominantly straight once within the Industrial Estate. There is also an existing access gate at the southern end which allows its use to be controlled and restricted to site related vehicles only.

4.5 It is considered that the proposed access route between Abingdon Road and the site itself serves to minimise the impact on the existing highway network and the businesses within the adjacent Industrial Estate and Science Centre. It therefore represents an appropriate arrangement for facilitating large vehicle access during construction of the proposed Battery Energy Storage System.

4.6 The on-site layout of the development is such that most construction vehicles will be unloaded within a construction compound and not be required to enter the site itself. The compound will be arranged to ensure that large articulated vehicles can turn appropriately thereby ensuring all vehicles enter and depart the site in a forward gear.

APPENDIX A

Site Layout Plan

N

0 25 50 100 150m

SCALE 1:2,000

Works to be undertaken by National Grid Electricity Transmission (NGET) as the statutory undertaker for electricity transmission in England and Wales.

Water Treatment Works

Lack Wood

Reservoirs (covered)

Ewer's Copse

Tank

Viewpoint

Nuneham and Courtenay Conservation Area

Existing farm access track upgraded to a macadam surface 3.5m wide

Post and wire fence

1.8m high deer fence

EXISTING WOODLAND/TREES

Wildlife pond

Kissing gate

EXISTING TREES

1.5m high stock proof fence

Historic parkland boundary

Main entrance

Camp (disused)

Sports Facility

Hedgestar

SUBSTATION

CATV

Culham Science Centre

THAME LANE

EXTENSION TO SUBSTATION

Electricity

Legend

- Site boundary
- Existing hedgerows and trees
- New woodland planting
- New hedgerow
- Existing tree
- Existing tree
- Land ownership boundary
- Nuneham and Courtenay Conservation Area
- Historic parkland boundary
- Thames water main
- 2.5m high steel weld mesh fence
- 1.8m high deer fence
- Railway easement
- Existing contours
- Proposed contours
- Tower maintenance clearance zone
- Public Right of Way (PRoW)
- Permissive path for the duration of the planning consent
- Wildflower grass
- 4m high infrared CCTV pole
- Overhead electricity line
- New scrubland
- Stone access track
- Existing macadam track
- Attenuation pond
- Loose permeable gravel
- Underground electric cable connection
- Viewpoint
- Inverter building (total 37)
- Transformer
- Battery container (total 296)
- Control room (total 5)
- WT Fire water tank
- Welfare and storage containers
- Impermeable drainage channel with penstocks to allow drainage from the compound to be controlled in the case of an emergency
- New macadam track
- 4m high wooden acoustic fence
- 1.5m high stock proof fence

Revision	Date	Comment
-	-	-

STATERA
BALANCING THE GRID

ON BEHALF
STATERA

PROJECT
CULHAM BATTERY ENERGY STORAGE SYSTEM

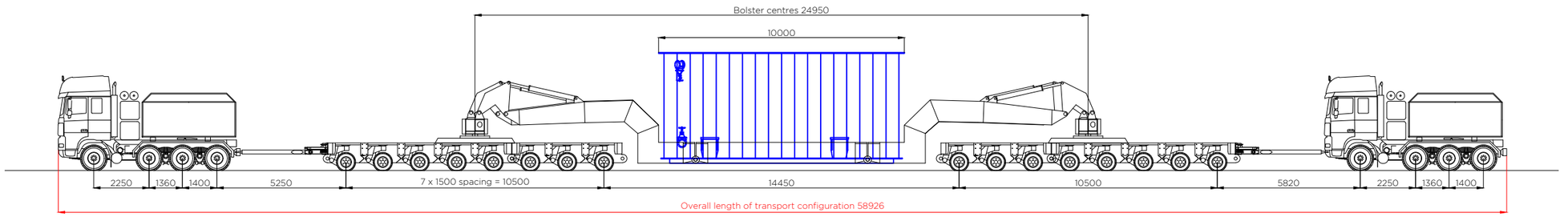
DATE	22 July 2022
SCALE	1 : 2,000 @ A1
DWG No	SL254__L__X__GA__1
APPROVED	CMcD

TITLE

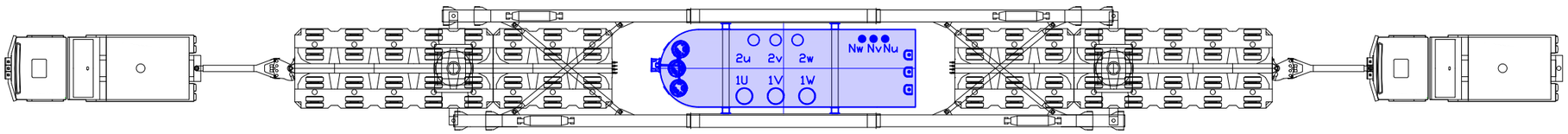
BLOCK PLAN

APPENDIX B

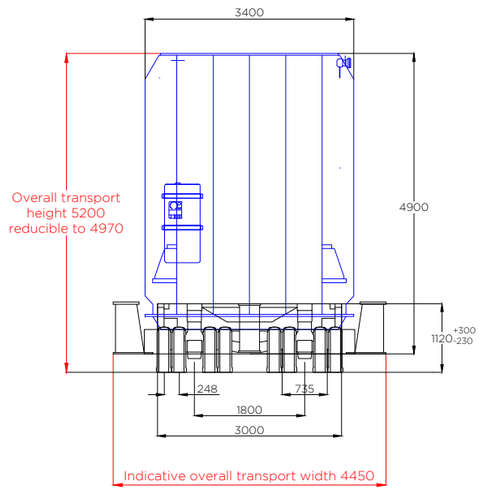
Profiles of Large Construction Vehicles



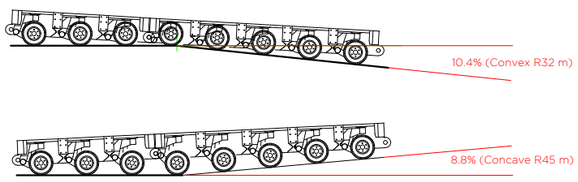
Elevation view - 16 axle girder frame trailer - concept model only
Indicative 150 te transformer
Scale 1:200



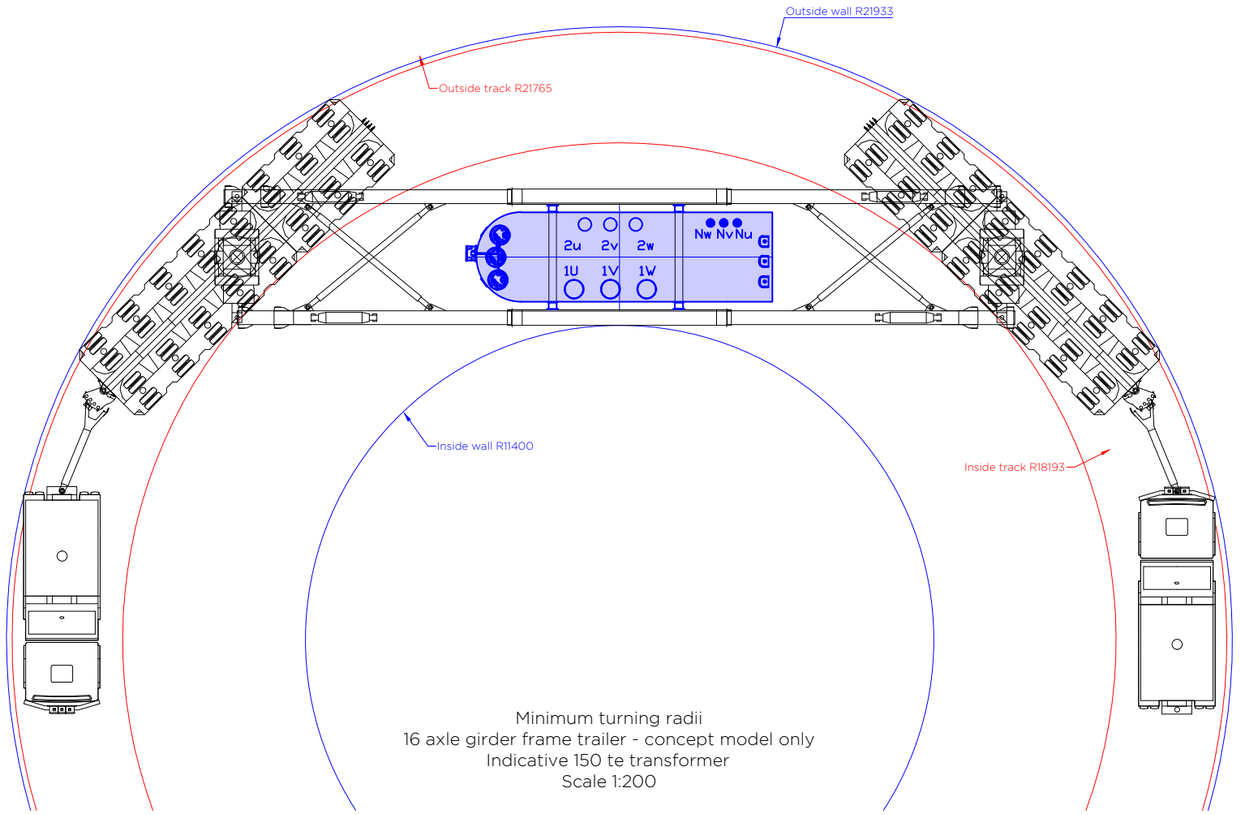
Plan view - 16 axle girder frame trailer - concept model only
Indicative 150 te transformer
Scale 1:200



Profile view
Scale 1:100



Vertical curve negotiability information
based on manufacturers literature
Scale 1:200



Minimum turning radii
16 axle girder frame trailer - concept model only
Indicative 150 te transformer
Scale 1:200

Load table

16 axle girder frame trailer	
Self weight of transformer	150.0 te
Self weight of trailer	91.8 te
Self weight of aux. steelwork (for L&S)	0.0 te
Total combined weight	241.8 te
Load per trailer	120.9 te
Load per axle line	15.11 te
Load per axle	7.56 te
Load per wheel (4 per axle)	1.89 te
Overall ground bearing pressure	3.84 te/m²
Tractor(s) (42 te)	
Front axle	8.0 te
Second steer	10.0 te
Rear axle	12.0 te
Rear axle	12.0 te

Notes:
[1] The figures shown above are representative of the transport configuration portrayed. However, as tractor and trailer arrangements vary then the loads and dimensions indicated should be treated as probable values.

[2] Actual dimensions, including axle spacing and mean running height, may vary slightly depending on manufacturer of trailer deployed.

[3] All linear measures in millimetres unless stated otherwise.

[4] Indicative transformer shown only.

Rev.	Date	Amendments
1		
0	21.04.22	Issued for comment

Revisions

Prepared by:
Shaftesbury House, 2 High Street,
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Tel: (01785) 850411
Independent Transportation Engineers

Client:
STATERA ENERGY

Project:
Sungrow Battery Farm, Exeter

Title:
Indicative transport configuration
Conceptual 150 te transformer carried within
16 axle girder frame trailer
showing minimum turning radii

Drawing status:
Final report

Scale (A3):	Drawn By:	Checked By:
As shown	SJW	ARP
Dwg. no:	**Sheet:**	**Rev:**
22-1069.TC01	1 of 1	0

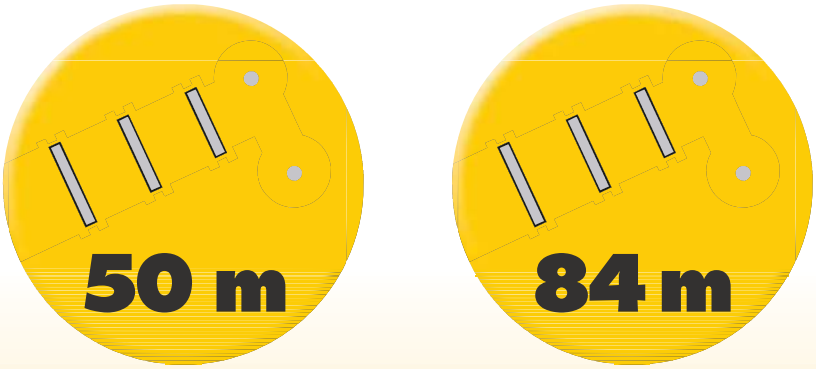
P:\Clients\Existing Clients\Statera Energy Limited\22-1069 Exeter Main\Transport configuration\22-1069.TC01 Exeter 150 te transformer 16 axle frame 1.5 m spacings R0.dwg

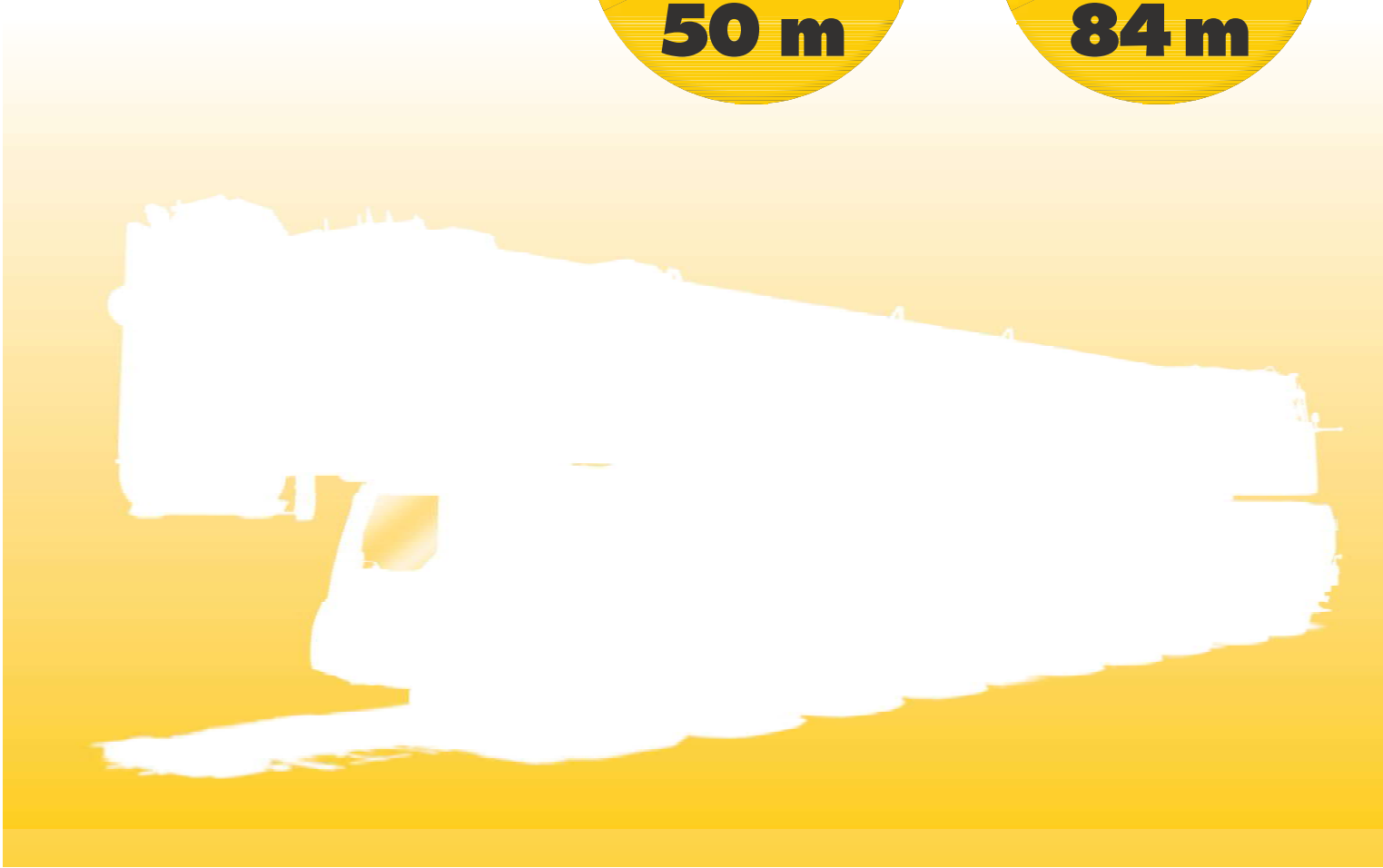
Mobilkran • Mobile Crane LTM 1500-8.1

Grue mobile • Autogrù
Grúa móvil • Мобильный кран

Technische Daten • Technical Data
Caractéristiques techniques • Dati tecnici
Datos técnicos • Технические данные

LTM 1500-8.1





LIEBHERR

LIEBHERR

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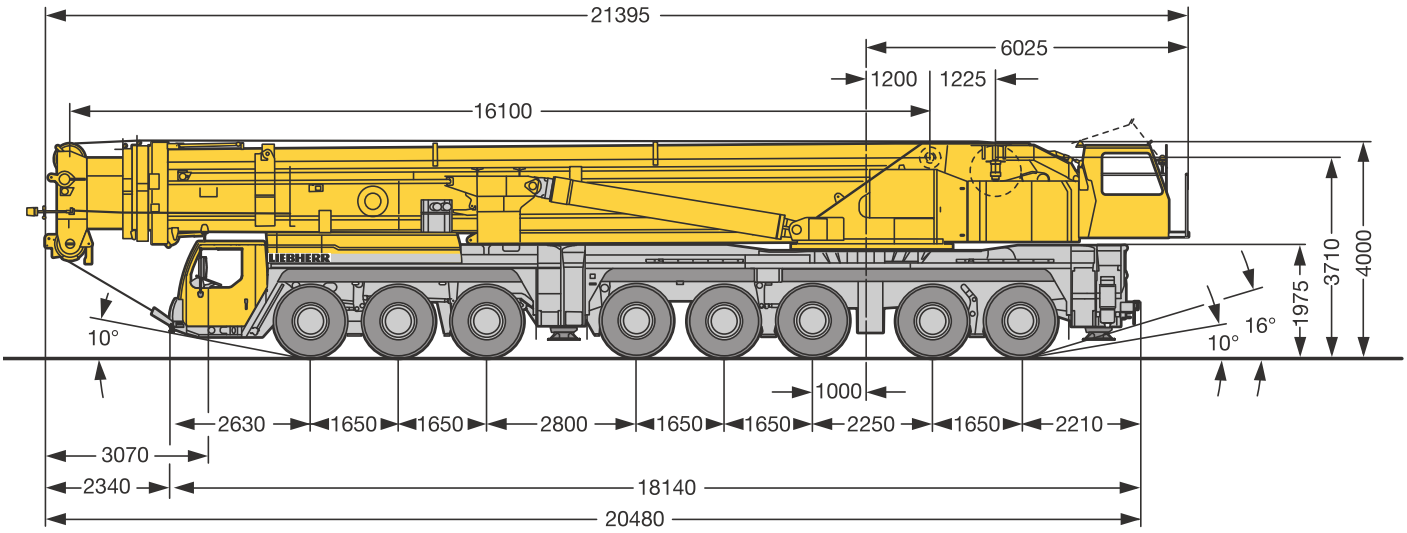
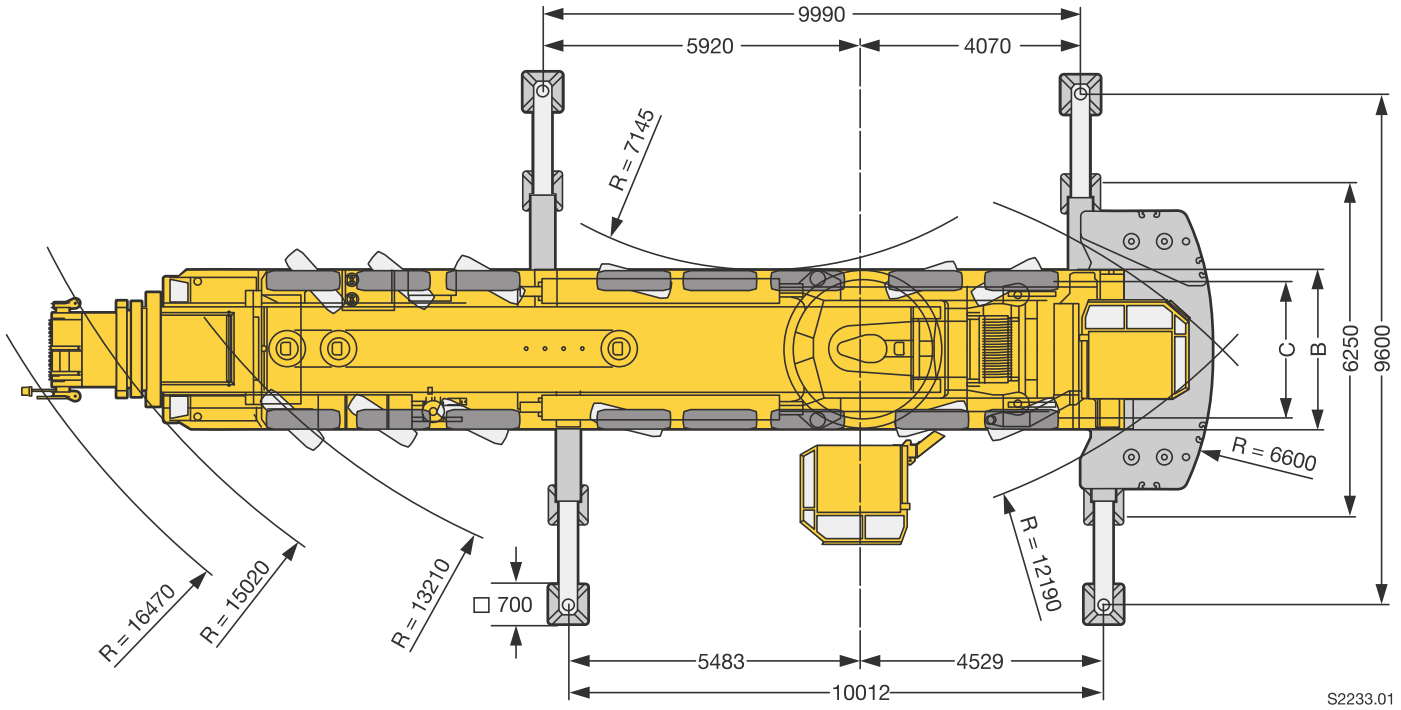
T	B	B
TY3	C	C
TF	D	D
TVF	E	–
TY3F	F	F
TY3EF	G	G
TVY3F	H	–
TN	I	I
TVN	J	–
TY3N	K	K
TVY3N	L	–
TY3SN	M	M
TNZF	N	N
TY3NZF	O	O
TY3ENZF	P	P
Ausstattung · Equipment · Equipement Equipaggiamento · Equipamiento · Оборудование Symbolerklärung · Description of symbols · Explication des symboles Legenda simboli · Descripción de los símbolos · Объяснение символов Anmerkungen · Remarks · Remarques Note · Observaciones · Примечани	Q	Q

Maße
Dimensions
Encombrement · Dimensioni
Dimensiones · Габариты крана

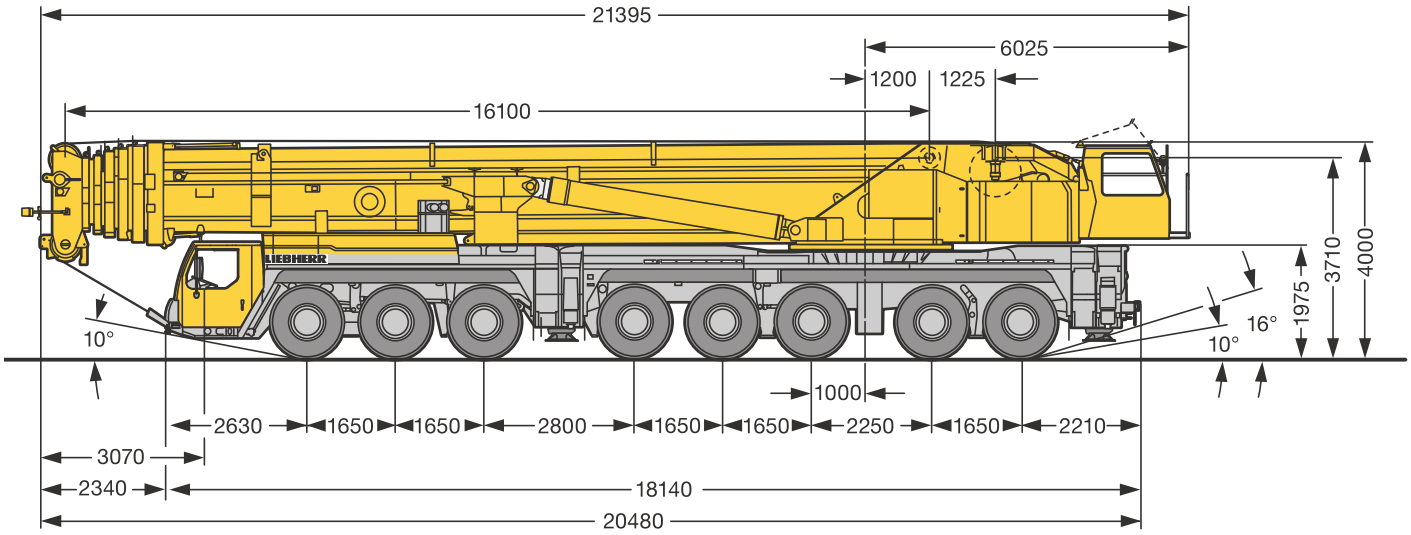
50 m

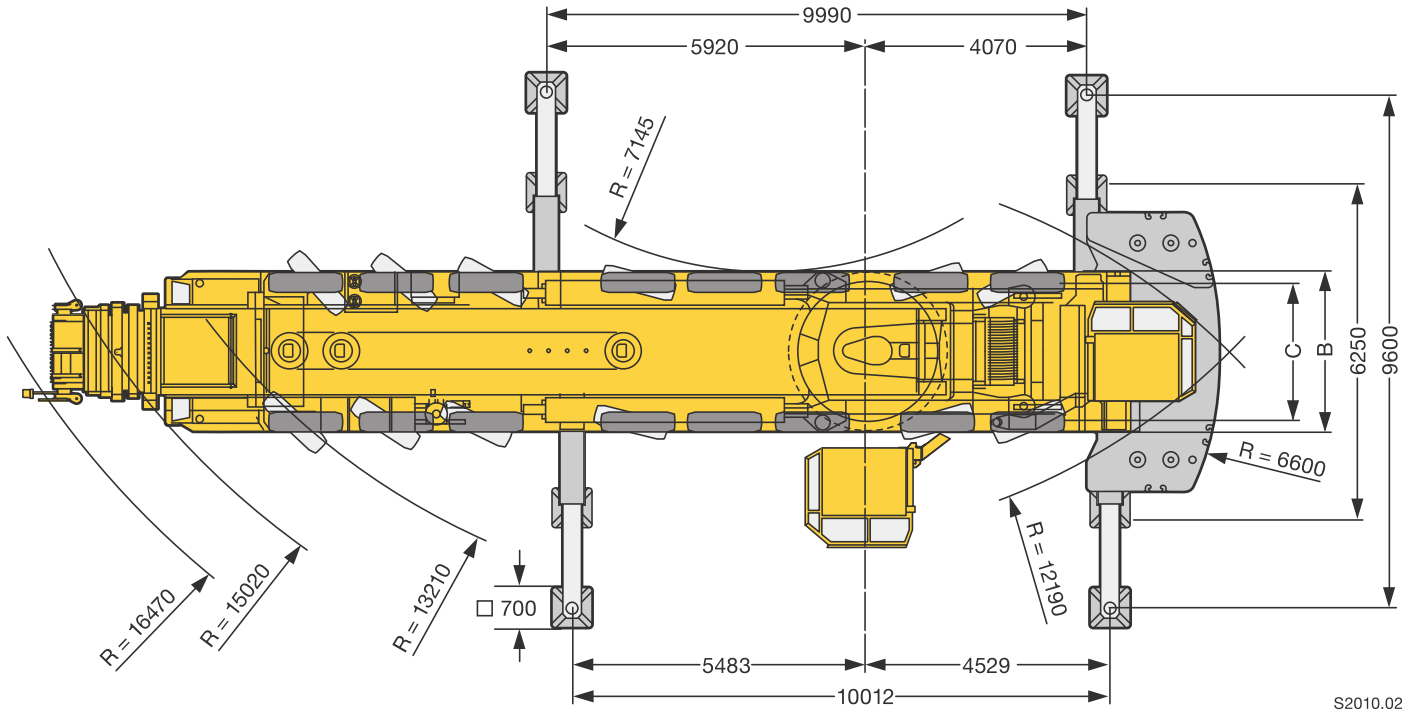




Bereifung 385/95 R 25 (14.00 R 25) · Tyres 385/95 R 25 (14.00 R 25) · Pneumatiques 385/95 R 25 (14.00 R 25) · Pneumatici: 385/95 R 25 (14.00 R 25)
Neumáticos: 385/95 R 25 (14.00 R 25) · Шины: 385/95 R 25 (14.00 R 25)

	Maße · Dimensions · Encombrement · Dimensioni · Dimensiones · Размеры mm	
	B	C
385/95 R 25 (14.00 R 25)	3000	2612
445/95 R 25 (16.00 R 25)	3000	2552
525/80 R 25 (20.5 R 25)	3230	2702



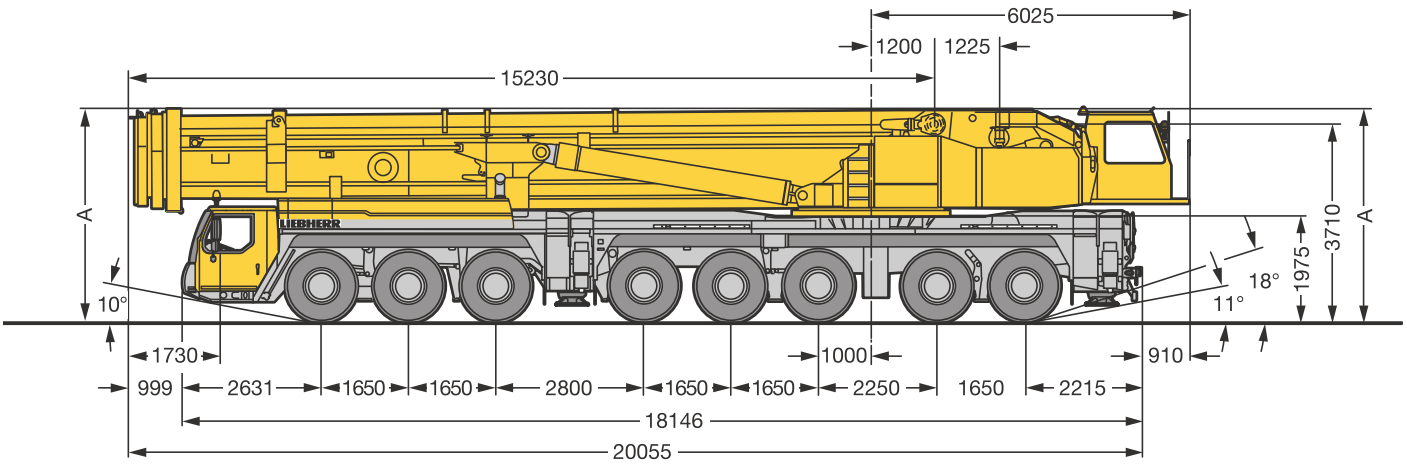


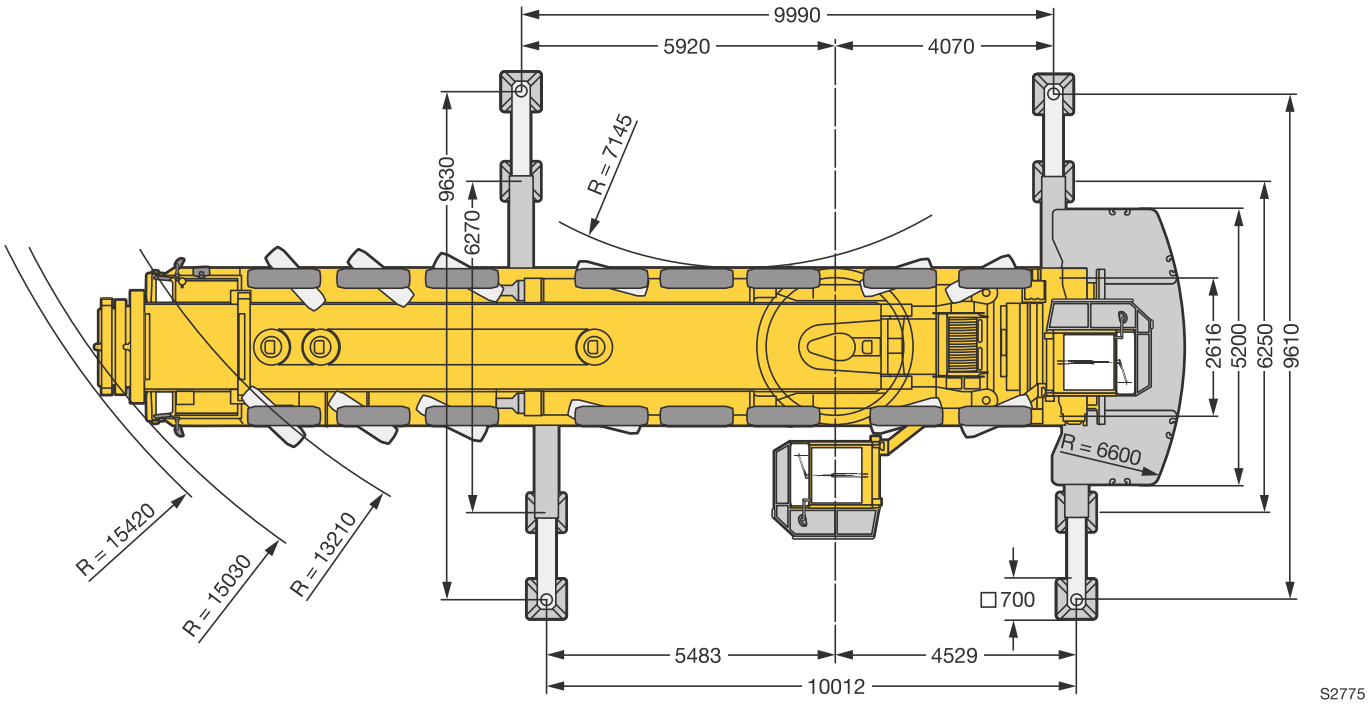
Bereifung 385/95 R 25 (14.00 R 25) · Tyres 385/95 R 25 (14.00 R 25) · Pneumatiques 385/95 R 25 (14.00 R 25) · Pneumatici: 385/95 R 25 (14.00 R 25)
Neumáticos: 385/95 R 25 (14.00 R 25) · Шины: 385/95 R 25 (14.00 R 25)

	Maße · Dimensions · Encombrement · Dimensioni · Dimensiones · Размеры mm	
	B	C
385/95 R 25 (14.00 R 25)	3000	2612
445/95 R 25 (16.00 R 25)	3000	2552
525/80 R 25 (20.5 R 25)	3230	2702

Maße – Verfahren auf der Straße
Dimensions – Operating on road
Encombrement – Déplacement sur route • Dimensioni – Guida su strada
Dimensiones – Conducción en carretera • Габариты крана – Движение по дорогам

84 m

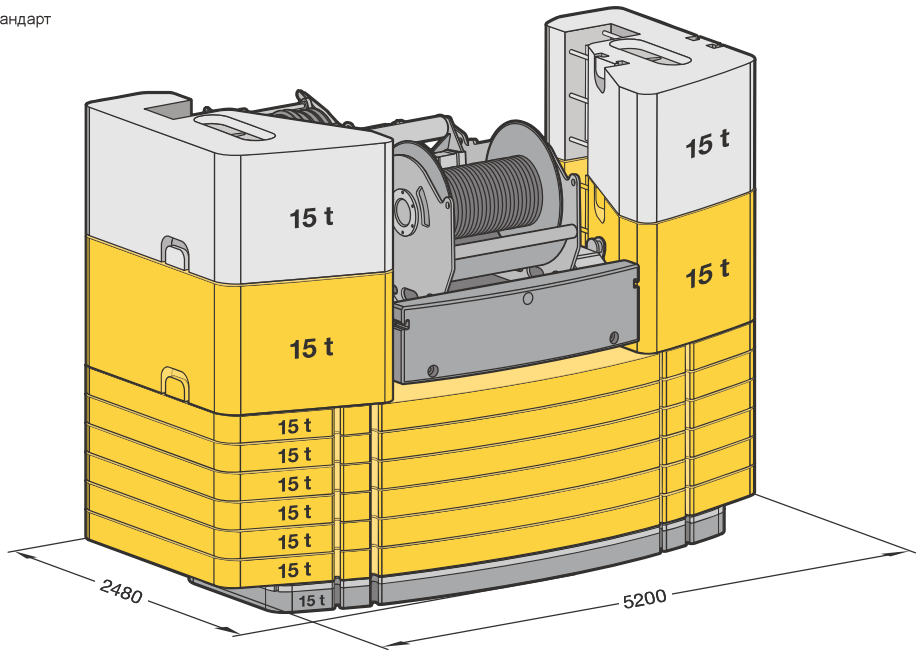




S2775

Maße – Ballast
Dimensions – Counterweight
Encombrement – Contrepoids • Dimensioni – Contrappeso
Dimensiones – Contrapeso • Габариты крана – Устройства безопасности

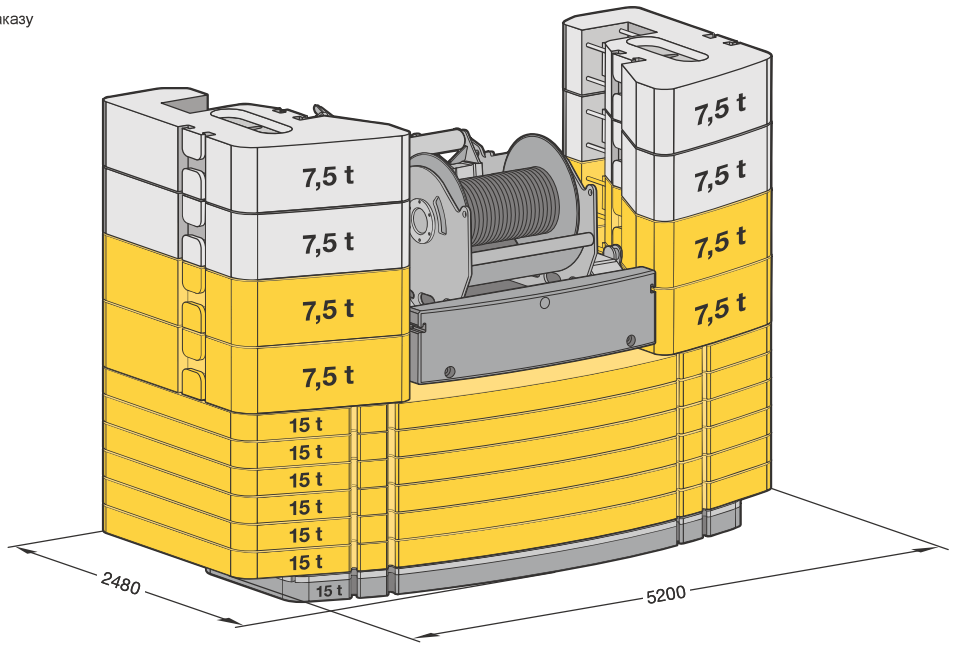
Standard · standard · standard · standard · estandard · стандарт



S2776

Grundballast · Basic counterweight · Contrepoids de base Zavorra base · Contrapeso base · Основной противовес	135 t
Zusatzballast · Additional counterweight · Contrepoids additionnel Zavorra addizionale · Contrapeso adicional · Дополнительный противовес	30 t
Gesamt · Total · Total · Totale · Contrapeso total · Всего	165 t

Option · optional · en option · optional · opcional · по заказу

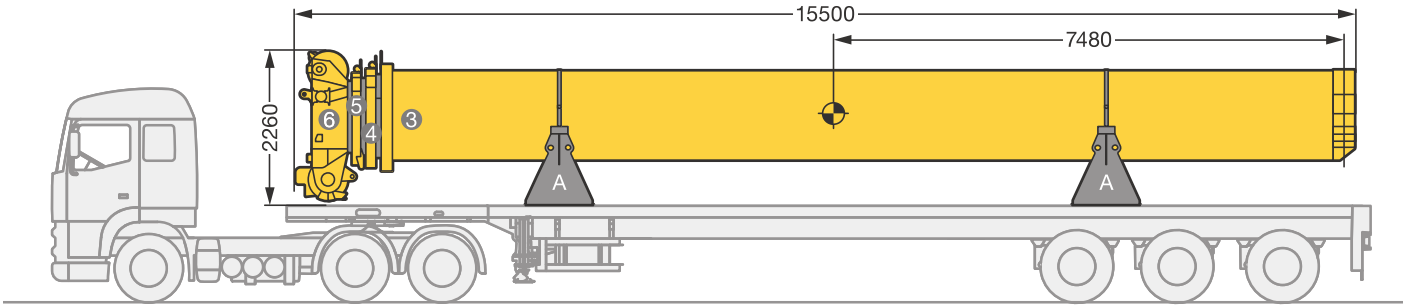


S2777

Transportplan
Transportation plan
Plan de transport · Piano di trasporto
Esquema de transporte · Транспортная схема

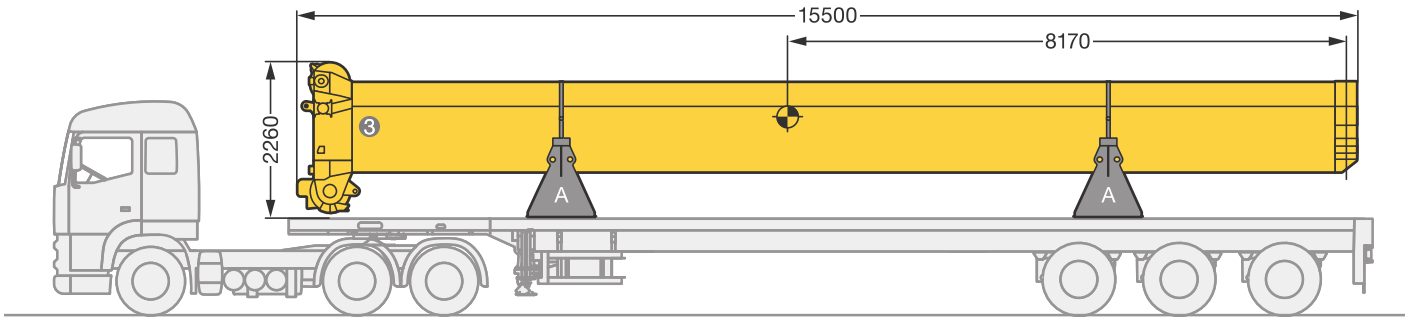
Gewichte Telesektionen ❸–❻ inkl. Ablagekonsolen B: 21,5 t · Weights telescopic sections ❸–❻ including supporting stands B: 21,5 t
Poids des éléments télescopiques ❸–❻ et des consoles de support B: 21,5 · pesi sezioni telescopiche ❸–❻ incl. consolle supporto braccio B: 21,5 t
Pesos de los tramos telescópicos ❸–❻ incl. las consolas de transporte B: 21,5 t · Веса выдвижных секций ❸–❻, включая опорные консоли B: 21,5 т

84 m

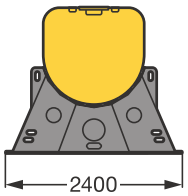


Gewicht Telesektion ❸ inkl. Ablagekonsolen B: 8,4 t · Weight telescopic section ❸ including supporting stands B: 8,4 t
Poid de l'élément télescopique ❸ et des consoles de support B: 8,4 t · Peso sezione telescopica ❸ incl. consolle supporto braccio B: 8,4 t
Peso del tramo telescópico ❸ incl. las consolas de transporte B: 8,4 t · Вес телесекций ❸, включая опорные консоли B: 8,4 т

50 m

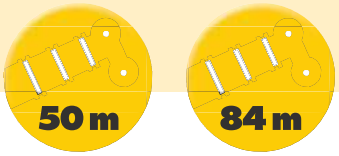


A = Teil A / Part A / Partie A / Parte A / Pieza A / Часть A



S2774

Gewichte
Weights
Poids · Pesi
Pesos · Нагрузки



Achse · Axle Essieu · Asse Eje · Мосты	1	2	3	4	5	6	7	8	Gesamtgewicht · Total weight t Poids total · Peso totale t Peso total · Общий вес, т
t	12	12	12	12	12	12	12	12	96*

* mit 50 m Teleskopausleger / with 50 m long telescopic boom / avec flèche télescopique de 50 m / con braccio telescopico da 50 m / con 50 m de pluma telescópica / телескопическая стрела 50 м

Traglast · Load · Forces de levage t Portata · Capacidad de carga t Грузоподъемность, т	Rollen · No. of sheaves Poulies · Pulegge Poleas · Канатных блоков	Stränge · No. of lines Brins · Tratti portanti Reenvíos · Запасовка	Gewicht · Weight kg Poids· Peso kg Peso · Собст. вес, кг
274,1	13	27	6100
247,7	11	23	3700
171,1	7	15	2700
84,7	3	7	2600
37,4	1	3	1400
12,5	–	1	700

Geschwindigkeiten
Working speeds
Vitesses · Velocità
Velocidades · Скорости

	km/h min. мин.	km/h max. макс.	% %	
385/95 R 25 (14.00 R 25)	1,79	80	43,9 %	12 / R2
445/95 R 25 (16.00 R 25) 525/80 R 25 (20.5 R 25)	1,94	85	39,5 %	

Antriebe · Drive Mécanismes · Meccanismi Accionamiento · Приводы	stufenlos · infinitely variable en continu · continuo regulable sin escalonamiento · бесступенчато	Seil Ø / Seillänge · Rope diameter / length Diamètre / Longueur du câble · Diametro / lunghezza fune Diámetro / longitud cable · Диаметр / длина троса	Max. Seilzug · Max. single line pull Effort au brin maxi. · Mass. tiro diretto fune Tiro máx. en cable · Макс. тяговое усилие
①	0 - 130 m/min für einfachen Strang · single line m/min au brin simple · per tiro diretto · a tiro directo м/мин при однократной запасовке	25 mm / 620 m	126 kN
②	0 - 145 m/min für einfachen Strang · single line m/min au brin simple · per tiro diretto · a tiro directo м/мин при однократной запасовке	25 mm / 620 m	126 kN
③	0 - 130 m/min für einfachen Strang · single line m/min au brin simple · per tiro diretto · a tiro directo м/мин при однократной запасовке	25 mm / 1050 m	126 kN
360°	0 - 1 min^{-1} об/мин		
	ca. 70 s bis 83° Auslegerstellung · approx. 70 seconds to reach 83° boom angle env. 70 s jusqu'à 83° · circa 70 secondi fino ad un'angolazione del braccio di 83° aprox. 70 segundos hasta 83° de inclinación de pluma · ок. 70 сек.до выставления стрелы на 83°		
	ca. 330 s/750 s für Auslegerlänge 16,1 m – 50 m/16,1 m – 84 m · approx. 330/750 seconds for boom extension from 16.1 m – 50 m/16.1 m – 84 m env. 330 s/750 s pour passer de 16,1 m – 50 m/16,1 m – 84 m · circa 330/750 secondi per passare dalla lunghezza del braccio di 16,1 m – 50 m/16,1 m – 84 m aprox. 330/750 segundos para telescopar la pluma de 16,1 m – 50 m/16,1 m – 84 m · ок. 330/750 сек. до выставления от 16,1 м до 50 м/ 16,1 м до 84 м		

APPENDIX C

Photographs of Construction Vehicle Access Route

Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5

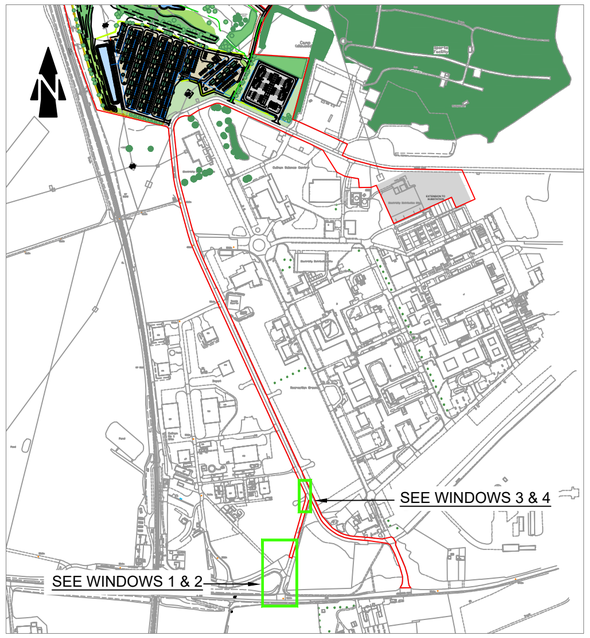
Photograph 6

Photograph 7

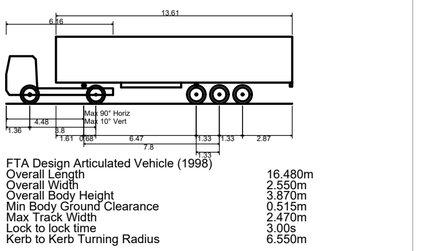
Photograph 8

APPENDIX D

Swept Path Analysis



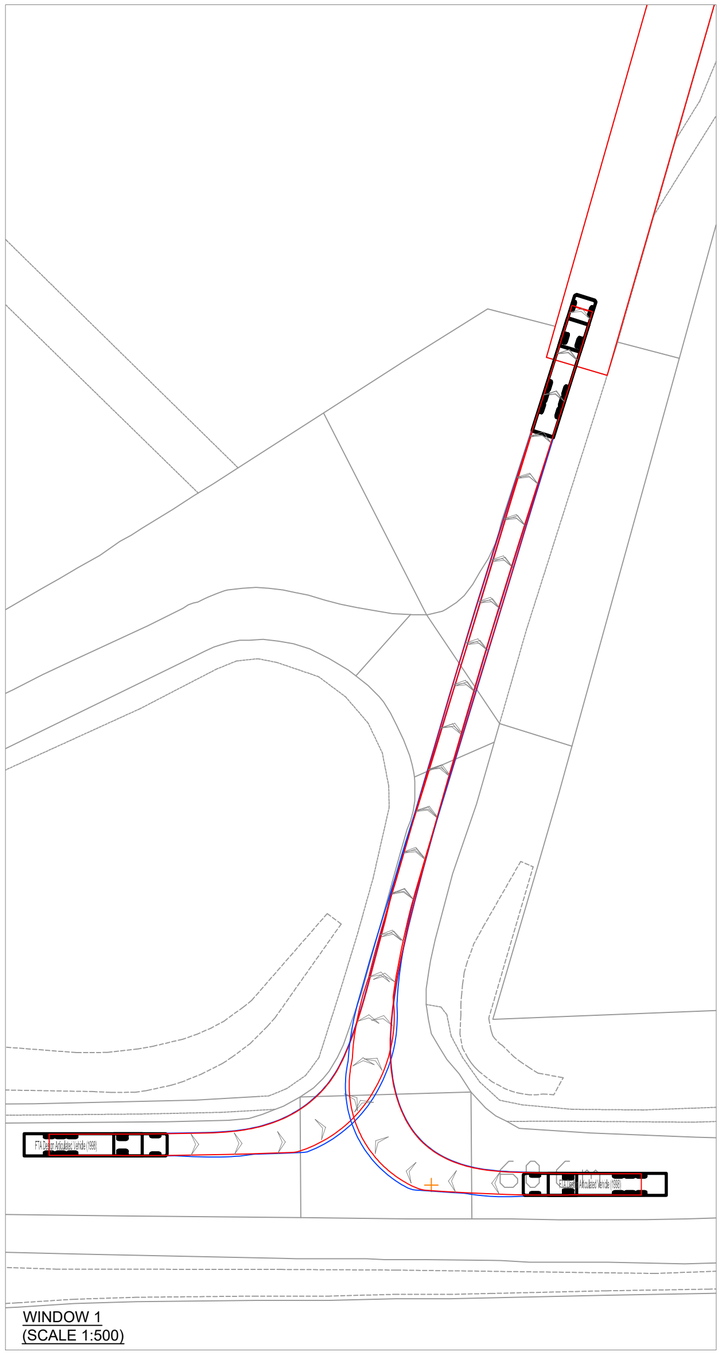
OVERVIEW PLAN
(SCALE 1:10,000)



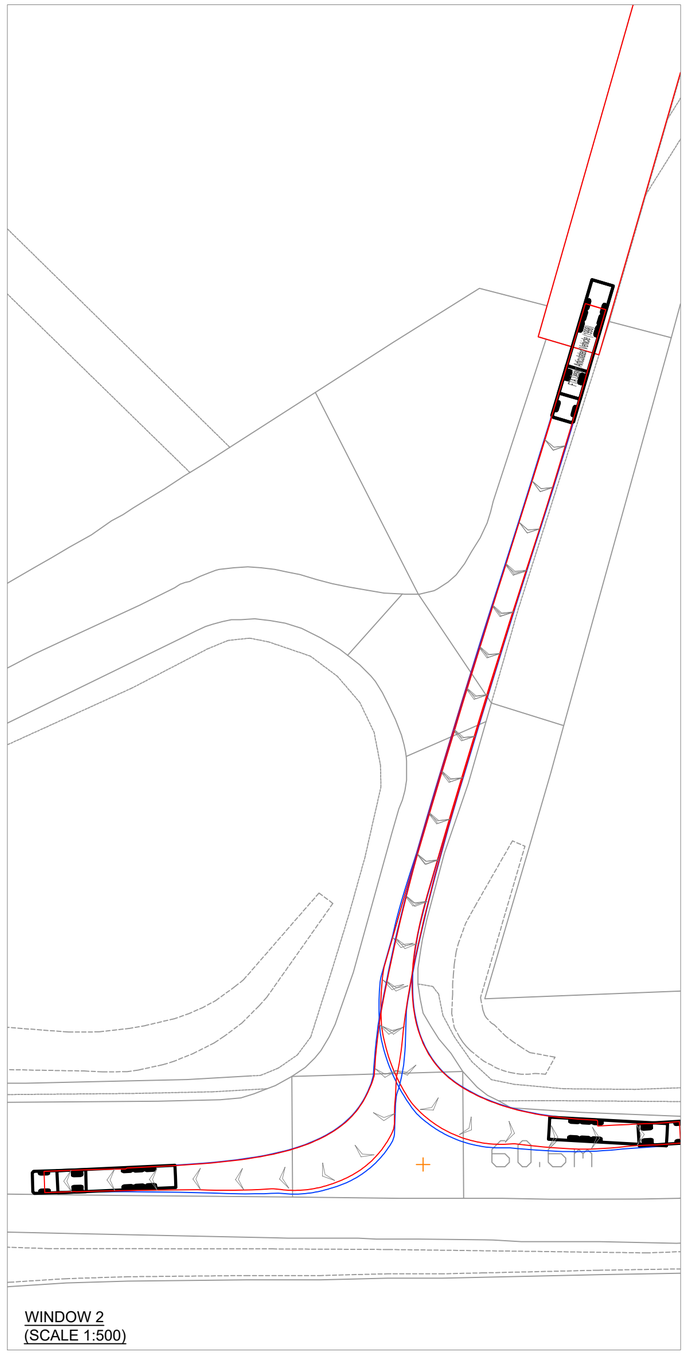
FTA Design Articulated Vehicle (1998)

Overall Length	16.480m
Overall Width	2.550m
Overall Body Height	3.870m
Min Body Ground Clearance	0.515m
Max Track Width	2.470m
Lock to lock time	3.00s
Kerb to Kerb Turning Radius	6.550m

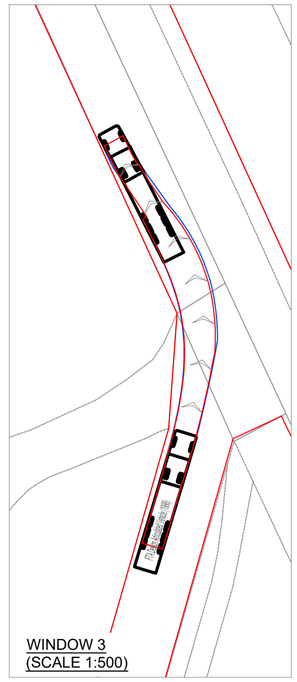
16.5m ARTICULATED VEHICLE PROFILE
(SCALE 1:250)



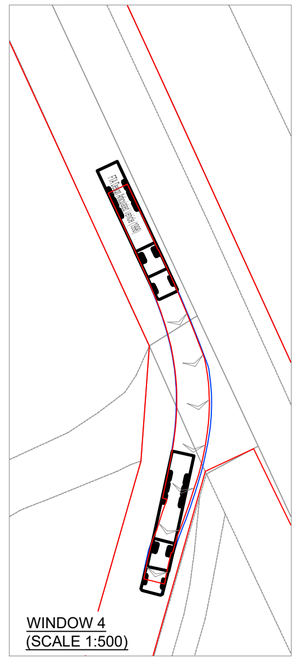
WINDOW 1
(SCALE 1:500)



WINDOW 2
(SCALE 1:500)



WINDOW 3
(SCALE 1:500)



WINDOW 4
(SCALE 1:500)

REV	DETAILS	DRAWN	CHECKED	DATE
A	SITE LAYOUT UPDATED	SLW	CDM	26.04.2024

NOTES:
1. Do not scale from this drawing.
2. This drawing is for illustrative purposes only and not for construction.
3. This drawing is to be read and printed in colour.

PROJECT: CULHAM BATTERY STORAGE

CLIENT: STATERA ENERGY

DRAWING TITLE: SWEPT PATH ANALYSIS OF CONSTRUCTION ACCCESS

MILES WHITE TRANSPORT

DRAWN:	CHECKED:	DATE:	SCALES:	SHEET SIZE:	DRAWING NUMBER:	REVISION:
SLW	CDM	27.01.2023	As Shown	A2	22135-SPA01	A