Test Report - Commercial in Confidence
A0011 Bailey Street Furniture Protect Tandem Cycle Parking

Test Laboratory	**HORIBA MIRA Ltd**
Date of Report	**26/05/2022**
Client	**Centre for the Protection of National Infrastructure (CPNI)**
Test Item	**Dual cycle stands with core posts**
Date of Test	**23/03/2022**
Test Number	**A0011**
Report Number	**1225361-004-021-01**
Test Type	**Vehicle Impact**
Product Rating	**IWA14-1:2013 Barrier V/2500[N1G]/48/90:0.0**
Number of Pages	**30**

Prepared By:

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Approved By:

Rachael Kennedy

Head of HSPI Test Centre

Date: 26/05/2022

UKAS TESTING 1105

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1 Introduction

1.1 Test laboratory

Name	HORIBA MIRA Limited
Address	Watling Street, Nuneaton, Warwickshire, CV10 0TU. United Kingdom
Telephone number	+44 (0)24 7635 5000
Facsimile number	+44 (0)24 7635 8000
Internet address	http://www.horiba-mira.com
Test site location	At above address.
Accrediting body	United Kingdom Accreditation Service 21-47 High Street, Feltham, Middlesex. TW13 4UN
Accreditation details	HORIBA MIRA is designated as UKAS testing laboratory 1105, with approval dated 31 July 1992, subsequently renewed periodically, for details of the latest approval, and schedule of accreditation see: http://www.ukas.org/testing/lab_detail.asp?lab_id=826

1.2 Product Manufacturer

Name	Bailey Street Furniture Group
Address	Adlington Buisness Park, London Road, Adlington, Cheshire, SK10 4NL
Internet address / email	https://www.baileystreetscene.co.uk/ john.fairbrother@bsfg.co.uk
Type	Barrier
Model No	Protect Tandem Cycle Parking Dual Core

1.3 Client

Name	Centre for the Protection of National Infrastructure (CPNI)
Address	PPSD - HVM
Internet address	https://www.cpni.gov.uk/
Additional information	Purchase order: 7092991
	Client Engineer: n/a

1.4 Test Area

The test was carried out on the Highway Safety & Protection of Infrastructure (HSPI) Test Area adjacent to the HORIBA MIRA Ltd Vehicle Proving Ground.
The test area was generally flat with a gradient not exceeding 2.5 %. It had a level hardened paved surface and was kept as clear of dust, debris, standing water, ice and snow at the time of the test, as was practicably possible.
Vehicle propulsion was by use of a computer controlled electric drum winch with guidance to the impact point by means of a tensioned wire system attached to the front wheel of the test vehicle. Both towing and guidance systems were detached approximately 3m prior to contact with the test article.

1.5 Test Procedure

Item	Requirement
Test Specification	IWA14-1:2013
Target Speed (km/h)	48.0 +3.0 /-1.0
Target Impact Angle (deg)	90.0 ±2.0
Target test vehicle mass (kg)	2500 ±75
Product Classification	B-Foundation/Passive/Barrier
Target Impact Energy (kJ)	222.2

2 Test Set-up

2.1 Product Description

The tested item was a Protect Tandem Cycle Parking Dual Core, manufactured by Bailey Street Furniture Group and installed by Trueline Midlands Ltd.

This consisted of dual core base unit with removable cycle stand sleeves. The core unit was assembled from 2No. individual units joined together using 2No. 1033mm long, 40x40x 5mm thick angled section attached using 8No. M10x25mm Hex head bolts. Each core unit contained 1No. 10mm thick base plate, 750mm wide x 750mm long. At the front and rear of each base plate 8No. 10mm thick connector brackets welded through which reinforcing bars were slotted and the linking sections bolted. The top face of each base plate contained 4No. 10mm thick interlocking gussets, forming a square locating socket to the centre. The core posts were each constructed from 1No. 100x100x8mm SHS 1010mm long outer posts and 1No. 80x80x8mm SHS 1010mm long inner post, giving a post height of 783mm above running surface once installed. The outer and inner post were secured together with weld at the top and bottom along two sides. The posts were located within the base sockets and fully welded, with 1No. 16mm pin passed front to back through the posts and socket and fully welded. The cycle stand sleeves were constructed from a 139.7mm Outer diameter x 2mm thick stainless steel centre tube and 42.4mm outer diameter x 3.3mm thick outer arms located front and rear.

The tested item conformed to the supplied drawings (see Appendix 2).

2.2 Foundation/Installation Description

The foundation consisted of an excavation 2350x1300mm and 280mm deep. The core base frames were assembled and fitted with a total of 10No. 12mm diameter reinforcing bars positioned longitudinally. The assembled unit was positioned within the excavation on packers to allow concrete to flow under. RC32/40 concrete, CEM1, 10mm aggregate was poured within the core posts and surrounding the base and finished 80mm below ground level. The foundation was brought up to existing finishing level with 80mm of Tarmac.

2.3 Concrete Crush Test Results

Item	Information / Measurement
Date Foundation Cast	16/03/2022 (7 days before test date)
Concrete compressive crush test results for 150mm sample (MPa). Compressive testing carried out at CTS at Doncaster UKAS Accredited Lab No. 4161 to EN12390-3: 2019 and EN12390-7: 2019.	
7 day	36.7
14 day	39.6
28 day	47.5
Test day	36.7

2.4 Test Vehicle Description

Item	Information / Measurement
Vehicle Make and Model	Toyota Hilux
Registration Mark and VIN	LP12VLE / AHTFR22G006059233
Engine	Diesel
Gearbox	Manual
Body Type	Crew Cab Pick-up
Delivery Mass (kg)	2040
Test Mass (kg)	2530
Ballast (kg), Concrete blocks, chains and ratchets	436
Test Equipment (kg), GPS, DAS, Towing & guidance	54
Components removed (kg)	n/a

Test Vehicle condition	Test vehicle acquired with valid current MOT certificate. The roadworthiness of the following items was checked prior to test: Tyres and wheels, Suspension, Wheel Alignment, Bodywork, Brakes and Chassis. The engine was running for the test.

3 Test Results

3.1 General

Item	Information / Measurement
Test Number	A0011
Test Date	23/03/2022
Impact Angle (deg)	90.0
Angle measurement method	V-Box GPS
Impact alignment (mm)	30 Right
Impacted height (mm)	520
Impact velocity (km/h)	48.9
Velocity measurement method	V-Box GPS
Impact energy (kJ)	233.2
Vehicle penetration - dynamic (m)	0.0
Vehicle penetration - static (m)	0.0
Clear gap >1200mm at 600mm above ground?	No
Debris ejected?	0.0
Vehicle immobilised?	Yes
Vehicle restrained or deflected?	Restrained

3.2 Test Sequence Description

The target impact point was the centreline of the vehicle aligned to the centre of the gap between the cycle stands. The initial contact with the cycle stands was made by the bumper which deformed and split open to both sides, the vehicle continued, and the cycle stands went through the bumper fully. The vehicle steering linkages and wishbones contacted the cycle stands deforming rearwards. The front wheels/tyres contacted the rear of the inner wheel arches and front floor. The vehicle lifted from the ground and began to partially rebound. The vehicle returned fully to ground with the front remaining trapped and entangled with the cycle stands.

3.3 Ambient Conditions*

Item	Measure
Rainfall (mm)+	0.0
Temperature (°C)	14.9

+ From midnight to time of test
*Weather records are not UKAS accredited

3.4 System Damage Description

The impacted cycle stands sleeves remained attached to the core posts. The RH sleeve had some distortion, scraping and tearing visible, the front arm tube was fully detached and came to rest X 44.0m, Y-1.9m with a mass of 2.3kg. The detached arm tube was not classified as major debris and is for reference only. The LH sleeve had some distortion, scraping and deformation to the front arm tube. The RH core post had no major damage visible to the inner or outer core with only bending at ground level and movement of 19.1° in the impact direction. The LH core post had bending at ground level and movement of 35.5° in the impact direction. The weld joining the LH inner and outer core posts at the top was broken and the inner post was sitting marginally recessed to the outer post. The front face of the LH outer core post at ground level was torn through exposing the inner core post. The foundation had no major damage visible and residual movement of 0.7° in the impact direction. The tarmac to front edge of the foundation was marginally lifted with a small gap present showing movement.

3.5 Vehicle Damage Description

The vehicle airbags were deployed, and damage was sustained to the front slam panel including inner wing structures. The engine remained running with only a minor coolant leak. The vehicle had damage to the front steering and suspension components.
The LH steering link was deformed along with the lower LH wishbone and mounting bracket. The RH steering link was detached from the hub carrier and the lower RH wishbone detached from the front mounting bracket fully. The upper RH wishbone was detached from the hub carrier at the ball joint connection.
The RH drive driveshaft was damaged, and the CV joint separated from the differential. The vehicle was attempted to be driven but was unable to be disengaged from the product with the rear wheels spinning and loosing traction.

The vehicle was fully disabled.

3.5.1 Assessment of Vehicle

Item	
Vehicle engine running post-test	Yes
Vehicle engine stopped during test but able to re-start	n/a
Vehicle able to move forwards/backwards post-test	No
Vehicle able to disengage from test item	No
Vehicle able to manoeuvre	No

3.6 Assessment of Occupant Injury*

Assessment of Occupant Injury was not required for this test.

4 Assessment of Performance Requirement

Item	
Vehicle prevented from advancing beyond VSB Datum	Yes
Vehicle redirected and kept on the non-protected side of the VSB	No
Vehicle brought to a halt beyond VSB Datum	N/a
Vehicle damaged, unable to progress under own power	-
Vehicle entangled with test item and unable to progress	-
Vehicle trapped/lifted and unable to progress	-

5 Conclusions

The Bailey Street Furniture Group Protect Tandem Cycle Parking Dual Core was assessed according to IWA14-1:2013 and achieved the following classifications:

Product Classification	B-Foundation/Passive/Barrier
Performance Rating	IWA14-1:2013 Barrier V/2500[N1G]/48/90:0.0

6 General Comments and Disclaimers

The installation of the product was the responsibility of the product manufacturer or their representative.

The test results in this report relate only to the product tested.

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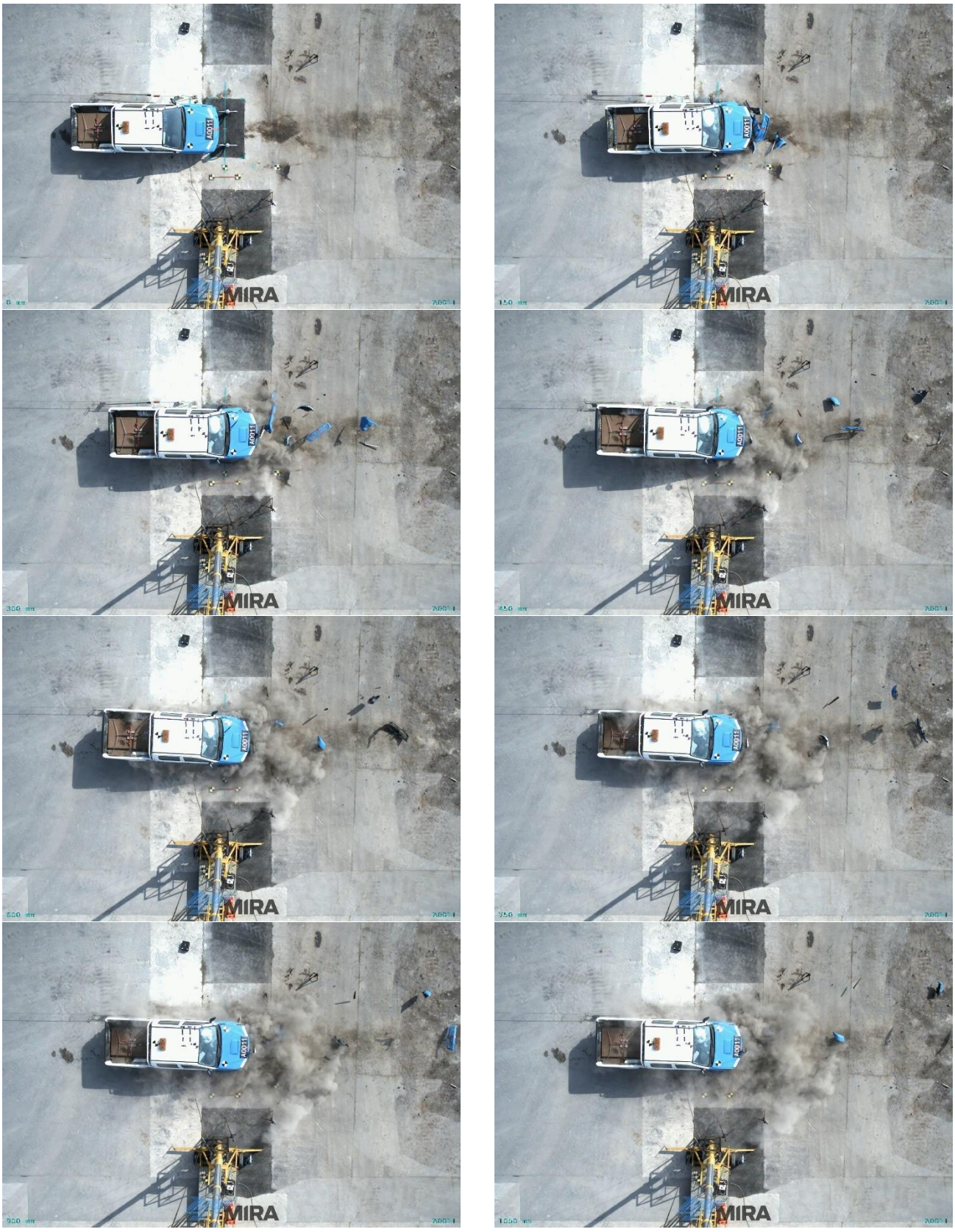
Opinions, interpretations, and meteorological information included in this report are not part of the UKAS accreditation and are marked thus *.

7 Side Views from High-Speed Videos

8 Overhead Views from High-Speed Videos



9 Post Impact Product and Vehicle Images

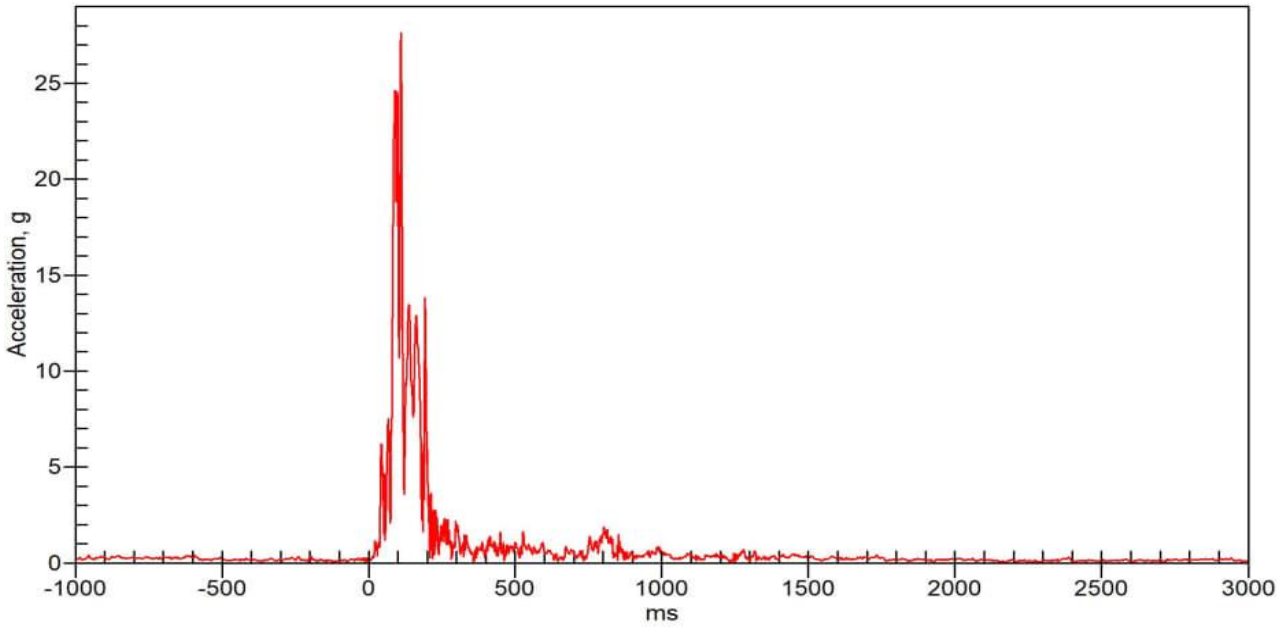
10 Data Plots from Vehicle Transducers

Test Number: A0011
Project: 1225361-004-021

Legislation: IWA14-1:2013
Test Type: HVM-Barrier
Test Date: 2022-03-23

Vehicle 1: Vehicle CofG resultant

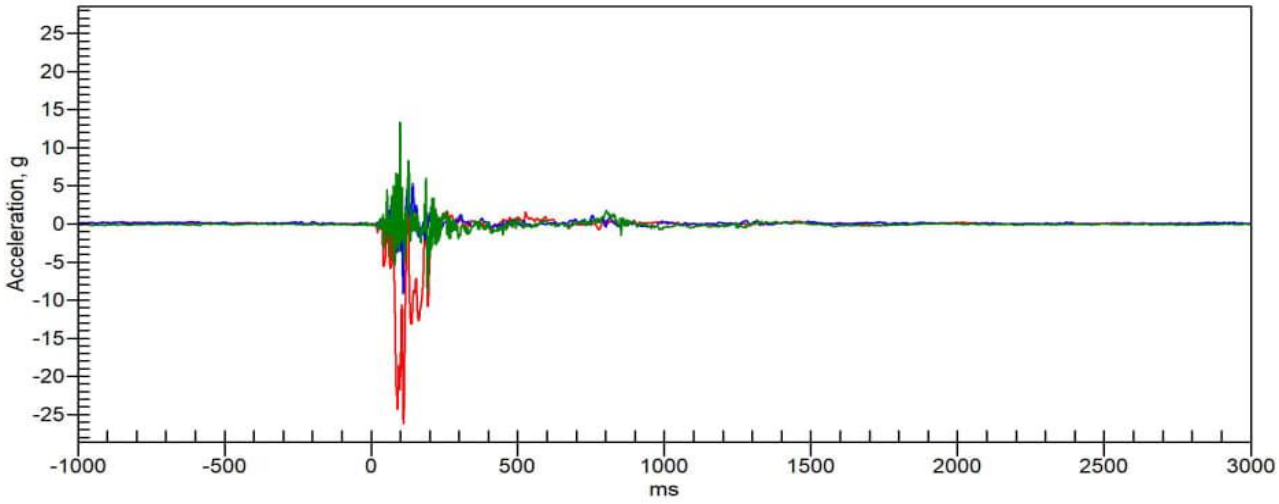
Resultant Acceleration



15VEHCCG0000ACRD
Max: 28g at 110.10ms

Component Accelerations

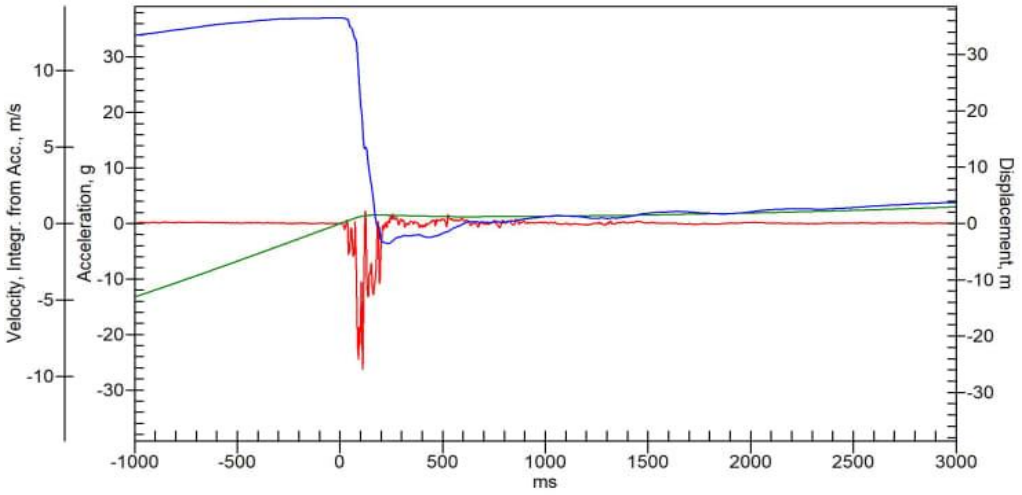
Max: 2.311g at 123.80ms, Min: -26g at 110.20ms 15VEHCCG0000ACXD
Max: 5.302g at 141.70ms, Min: -9.170g at 109.10ms 15VEHCCG0000ACYD
Max: 13g at 98.80ms, Min: -8.892g at 192.10ms 15VEHCCG0000ACZD



Test Number: A0011
Project: 1225361-004-021

Legislation:IWA14-1:2013
Test Type: HVM-Barrier
Test Date: 2022-03-23

Vehicle 1: Vehicle CofG components



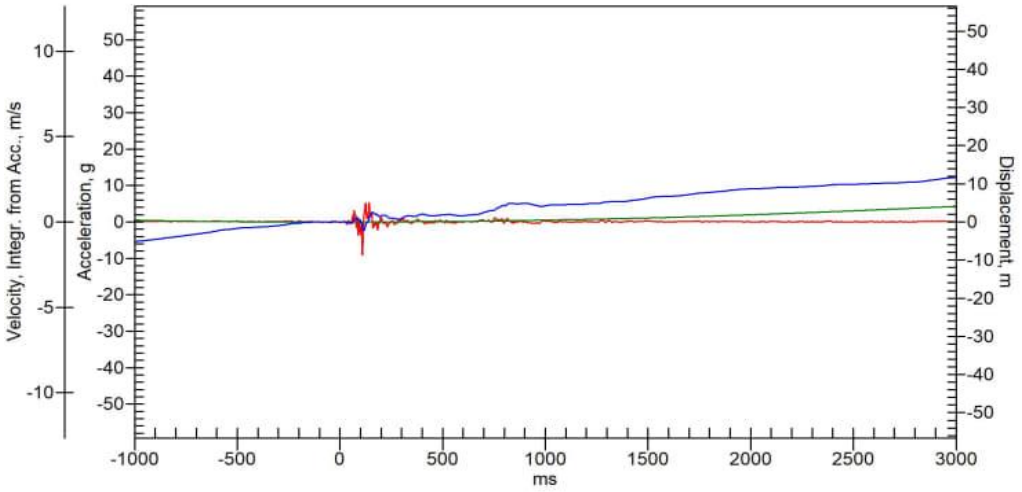
X-axis

QNo:
CAC: 2000

Acceleration
15VEHCCG0000ACXD
Max: 2.311g at 123.80ms
Min: -26g at 110.20ms

Velocity, Integr. from Acc.
15VEHCCG0000VAXD
Max: 13.43m/s at 10.00ms
Min: -1.70m/s at -5000.00ms

Displacement
15VEHCCG0000DSXD
Max: 24.21m at 1E04ms
Min: -35.59m at -4380.00ms



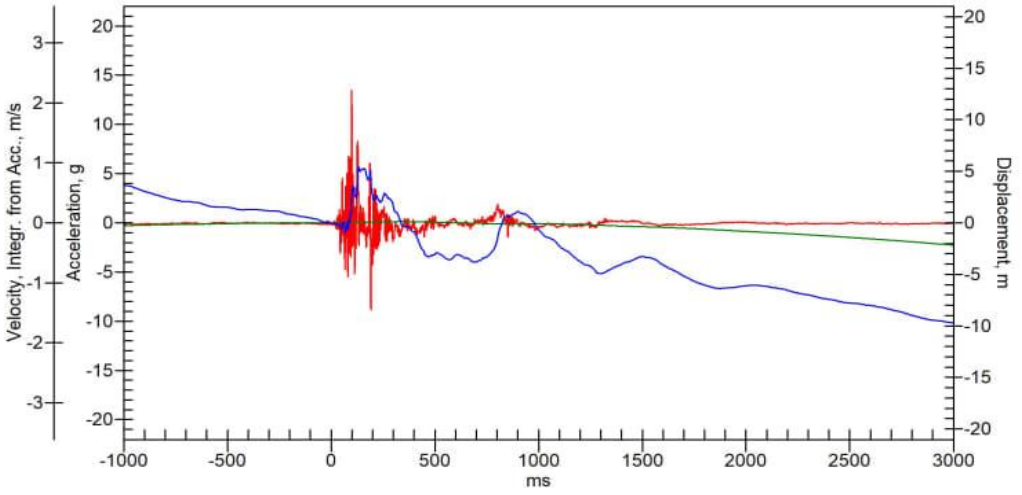
Y-axis

QNo:
CAC: 2000

Acceleration
15VEHCCG0000ACYD
Max: 5.302g at 141.70ms
Min: -9.170g at 109.10ms

Velocity, Integr. from Acc.
15VEHCCG0000VAYD
Max: 11.74m/s at 1E04ms
Min: -6.38m/s at -5000.00ms

Displacement
15VEHCCG0000DSYD
Max: 53.91m at 1E04ms
Min: 0.00m at 140.00ms



Z-axis

QNo:
CAC: 2000

Acceleration
15VEHCCG0000ACZD
Max: 13g at 98.80ms
Min: -8.892g at 192.10ms

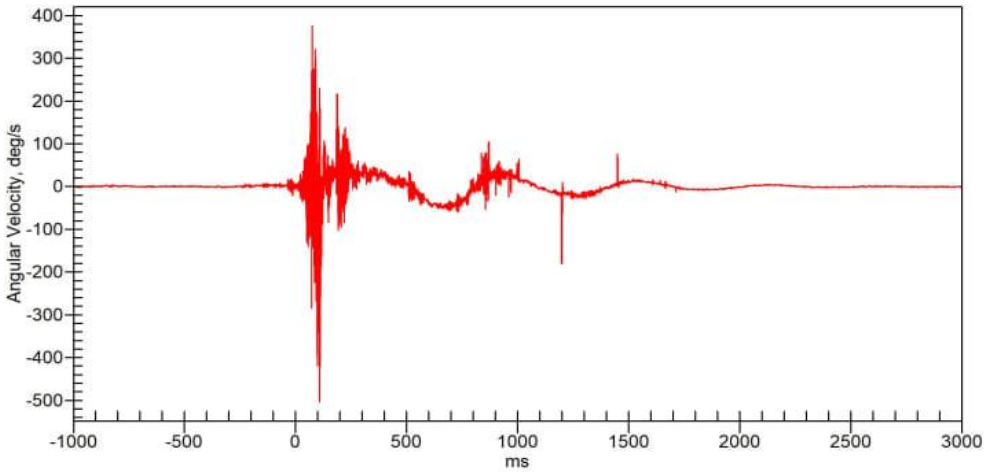
Velocity, Integr. from Acc.
15VEHCCG0000VAZD
Max: 2.46m/s at -5000.00ms
Min: -3.33m/s at 9160.00ms

Displacement
15VEHCCG0000DSZD
Max: 0.12m at 340.00ms
Min: -20.02m at 1E04ms

Test Number: A0011
Project: 1225361-004-021

Legislation: IWA14-1:2013
Test Type: HVM-Barrier
Test Date: 2022-03-23

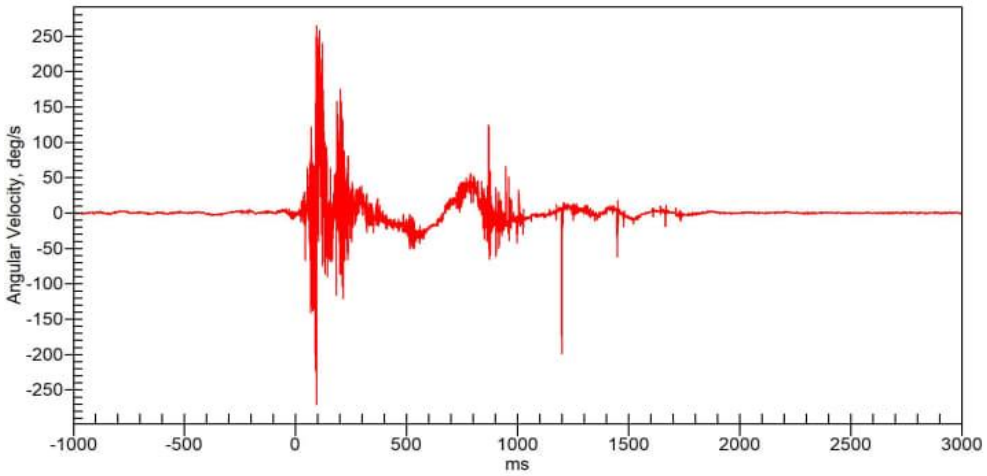
Vehicle 1: Vehicle CofG angular velocities



A0011 : Vehicle CG Roll (CFC180)

QNo:
CAC: 600

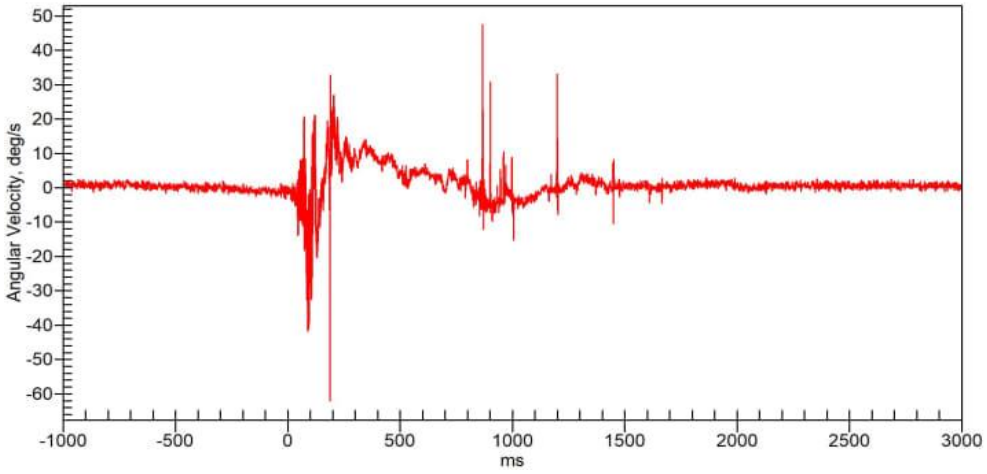
15VEHCCG0000AVXC
Max: 377deg/s at 70.00ms
Min: -504deg/s at 110.00ms



A0011 : Vehicle CG Pitch (CFC180)

QNo:
CAC: 600

15VEHCCG0000AVYC
Max: 265deg/s at 90.00ms
Min: -271deg/s at 100.00ms



A0011 : Vehicle CG Yaw (CFC180)

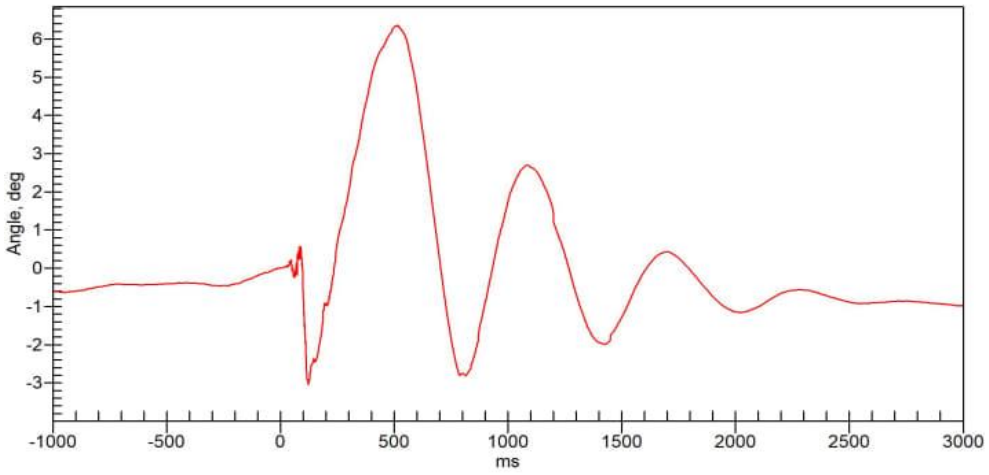
QNo:
CAC: 600

15VEHCCG0000AVZC
Max: 48deg/s at 870.00ms
Min: -62deg/s at 190.00ms

Test Number: A0011
Project: 1225361-004-021

Legislation: IWA14-1:2013
Test Type: HVM-Barrier
Test Date: 2022-03-23

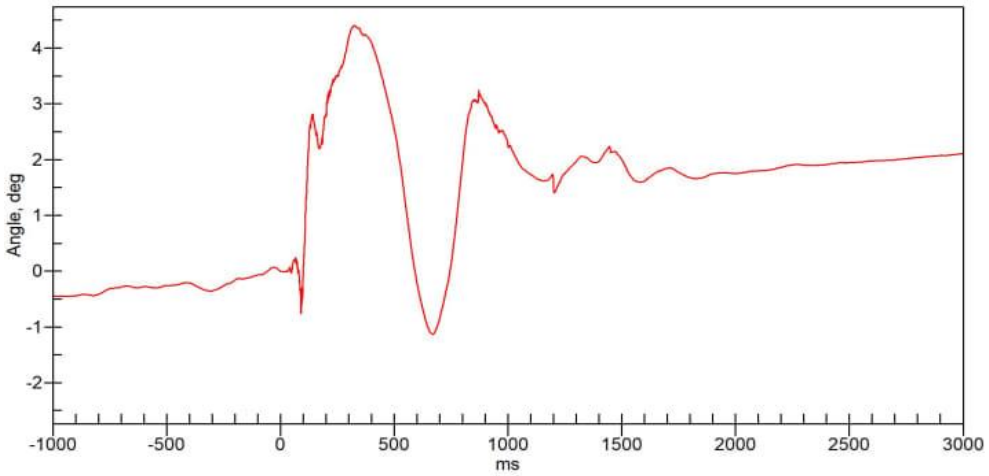
Vehicle 1: Vehicle CofG angles



Vehicle CG Roll Angle

QNo:
CAC: 600

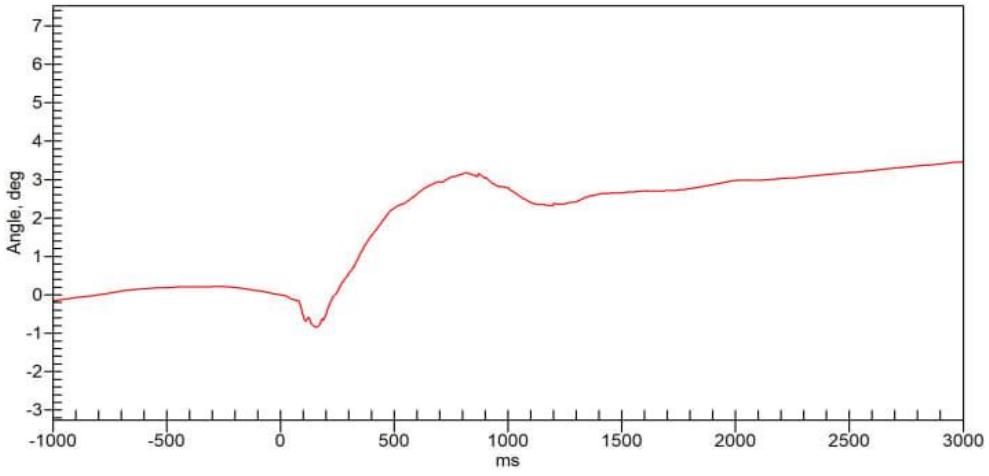
15VEHCCG0000ANXC
Max: 6.36deg at 510.00ms
Min: -3.50deg at 1E04ms



Vehicle CG Pitch Angle

QNo:
CAC: 600

15VEHCCG0000ANYC
Max: 4.40deg at 330.00ms
Min: -2.40deg at -4140.00ms



Vehicle CG Yaw Angle

QNo:
CAC: 600

15VEHCCG0000ANZC
Max: 7.04deg at 1E04ms
Min: -2.77deg at -5000.00ms

Executive Summary

Manufacturer Details

Company Name	Bailey Street Furniture Group
Company Address	Adlington Business Park, London Road, Adlington, Cheshire, SK10 4NL
Contact Name	John Fairbrother
Contact Email	john.fairbrother@bsfg.co.uk

Test Item Details

Item Reference	Protect Tandem Cycle Parking Dual Core
Item Description	Cycle stands test as a pair with HVM core.
Thickness (mm) "X"	750 (Cycle stand sleeves) 100 (Core posts)
Width (mm) "Y"	1200 (Centre to centre of core posts)
Height (mm) "Z"	783 (Core posts above ground) 820 (Cycle stand sleeves above ground)
Material thickness (mm)	8 (Outer core post) 8 (Inner core post) 2 (Cycle stand sleeve)
Foundation type	Depth <0.5m
Foundation depth (mm)	280
Installation Date	16/03/2022
Concrete strength (Mpa)	36.7

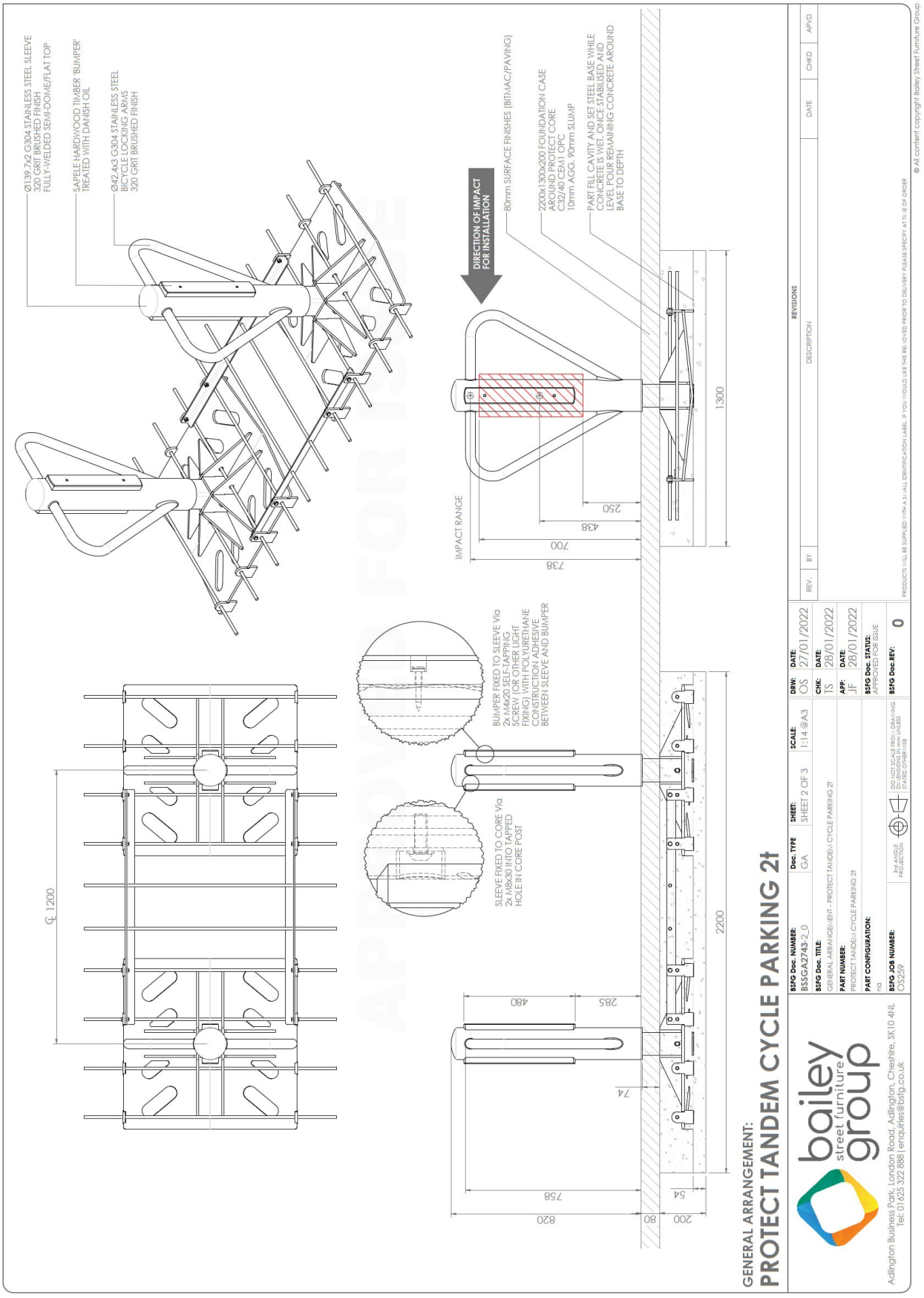
Test Parameters

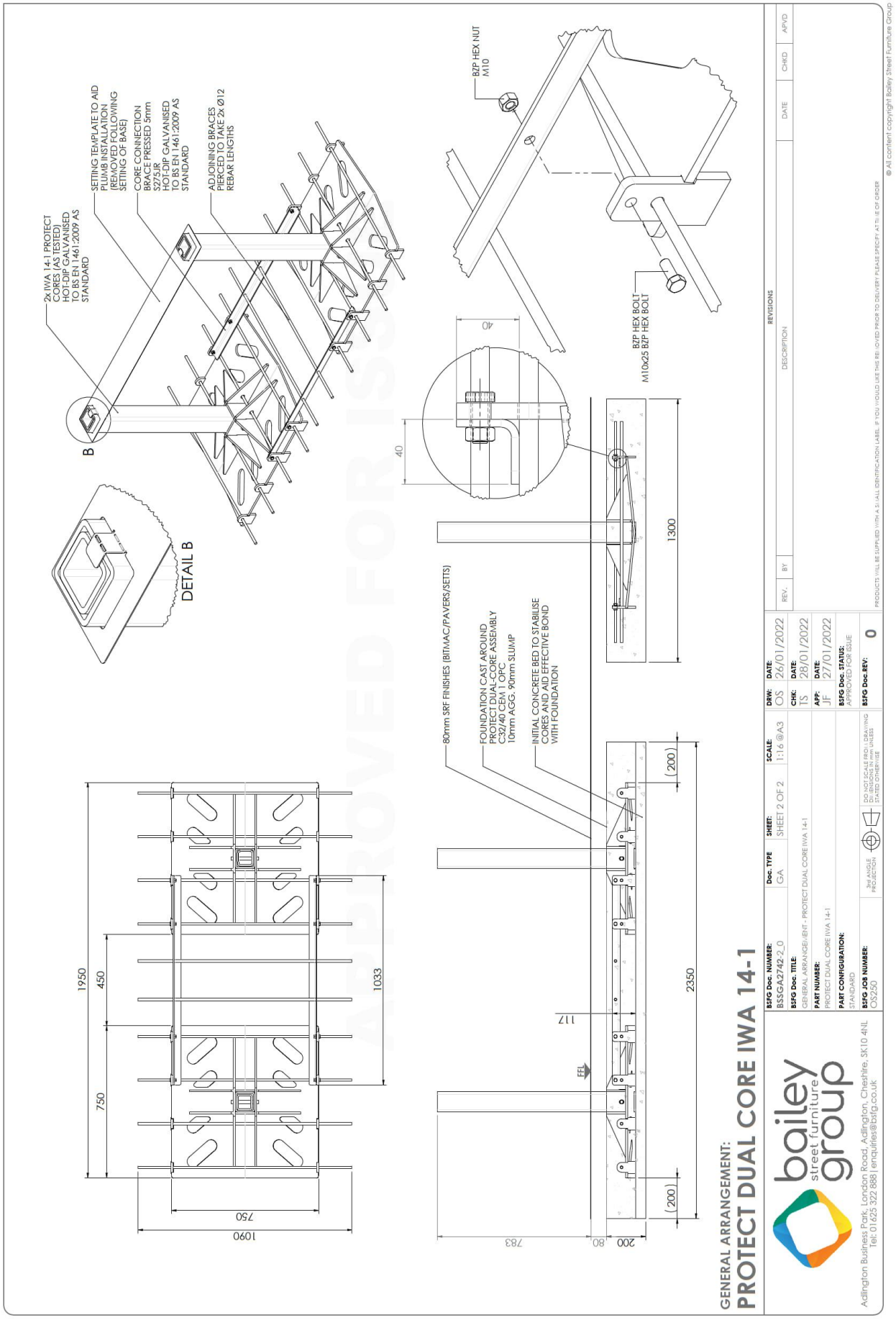
	Requirement	Measured Value
Test Vehicle category	N1G	N1G
Test Mass (kg)	2500 ±75	2530
Impact Speed (km/h)	48 +3/-1	48.9
Impact Angle (deg)	90 ±2	90.0
Alignment (mm)	0 ±100	30 Right
Vehicle penetration – dynamic (m)	-	0.0
Vehicle penetration – static (m)	-	0.0
Major Debris ejection distance (m)	-	0.0
Vehicle disabled?	-	Yes
Follow-on vehicle encroachment possible?	-	No
Follow-on pedestrian encroachment possible?	-	Not assessed

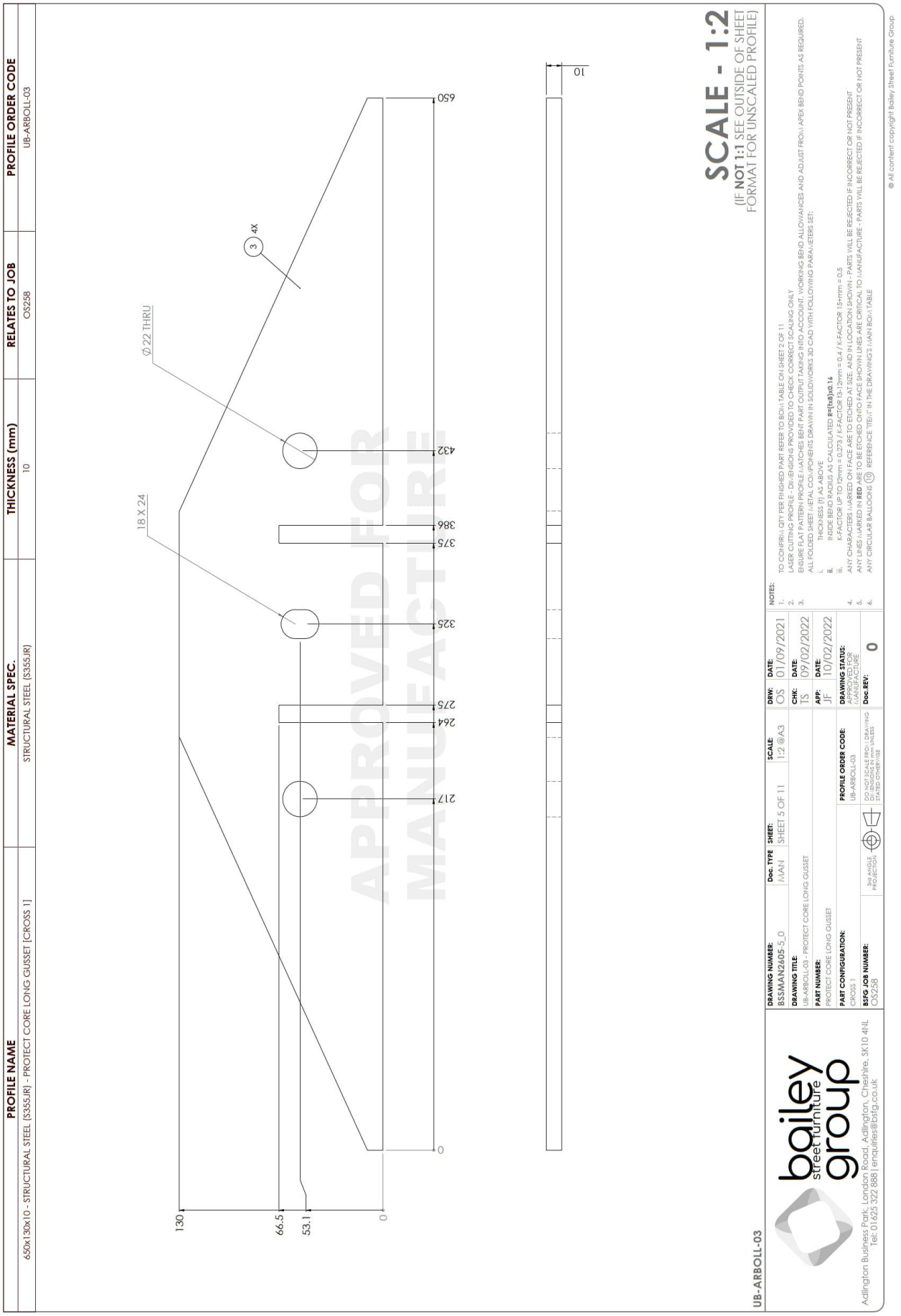
Performance Classification – Vehicle Impact

Performance classification	IWA14-1:2013 Barrier V/2500[N1G]/48/90:0.0
Product Classification	B-Foundation/Passive/Barrier

Appendix 1 Product Drawings and Details






PROFILE NAME
650x130x10 - STRUCTURAL STEEL [S355JR] - PROTECT CORE LONG GUSSET [CROSS 1]
MATERIAL SPEC.
STRUCTURAL STEEL (S355JR)
THICKNESS (mm)
10
RELATES TO JOB
OS258
PROFILE ORDER CODE
UB-ARBOLL-03
SCALE - 1:2
(IF NOT 1:1 SEE OUTSIDE OF SHEET FORMAT FOR UNSCALED PROFILE)
Ø 22 THRU
18 X 24
4X
650
432
386
375
325
275
264
217
0
130
66.5
53.1
0
10
APPROVED FOR MANUFACTURE
UB-ARBOLL-03
bailey street furniture group
Adlington Business Park, London Road, Adlington, Cheshire, SK10 4NL
Tel: 01625 322 888 | enquiries@bsfg.co.uk
DRAWING NUMBER: BSSMAN2605-5_0
Doc. TYPE: MAN
SHEET: SHEET 5 OF 11
SCALE: 1:2 @A3
DRAWING TITLE: UB-ARBOLL-03 - PROTECT CORE LONG GUSSET
PART NUMBER: PROTECT CORE LONG GUSSET
PART CONFIGURATION: CROSS 1
PROFILE ORDER CODE: UB-ARBOLL-03
BSFG JOB NUMBER: OS258
3rd ANGLE PROJECTION
DO NOT SCALE FROM DRAWING DIMENSIONS IN mm UNLESS STATED OTHERWISE
DRW: OS 01/09/2021
CHK: TS 09/02/2022
APP: JF 10/02/2022
DRAWING STATUS: APPROVED FOR MANUFACTURE
Doc.REV: 0
NOTES:
1. TO CONFIRM QTY PER FINISHED PART REFER TO BOM TABLE ON SHEET 2 OF 11
2. LASER CUTTING PROFILE - DIMENSIONS PROVIDED TO CHECK CORRECT SCALING ONLY
3. ENSURE FLAT PATTERN PROFILE MATCHES BENT PART OUTPUT TAKING INTO ACCOUNT, WORKING BEND ALLOWANCES AND ADJUST FROM APEX BEND POINTS AS REQUIRED.
ALL FOLDED SHEET METAL COMPONENTS DRAWN IN SOLIDWORKS 3D CAD WITH FOLLOWING PARAMETERS SET:
i. THICKNESS (t) AS ABOVE
ii. INSIDE BEND RADIUS AS CALCULATED R=[(x.t)+0.1]
iii. K-FACTOR UP TO 12mm = 0.273 / K-FACTOR 13-12mm = 0.4 / K-FACTOR 15+mm = 0.5
4. ANY CHARACTERS MARKED ON FACE ARE TO ETCHED AT SIZE AND IN LOCATION SHOWN - PARTS WILL BE REJECTED IF INCORRECT OR NOT PRESENT
5. ANY LINES MARKED IN RED ARE TO BE ETCHED ONTO FACE SHOWN LINES ARE CRITICAL TO MANUFACTURE - PARTS WILL BE REJECTED IF INCORRECT OR NOT PRESENT
6. ANY CIRCULAR BALLOONS (1) REFERENCE TIEM IN THE DRAWINGS MAIN BOM TABLE
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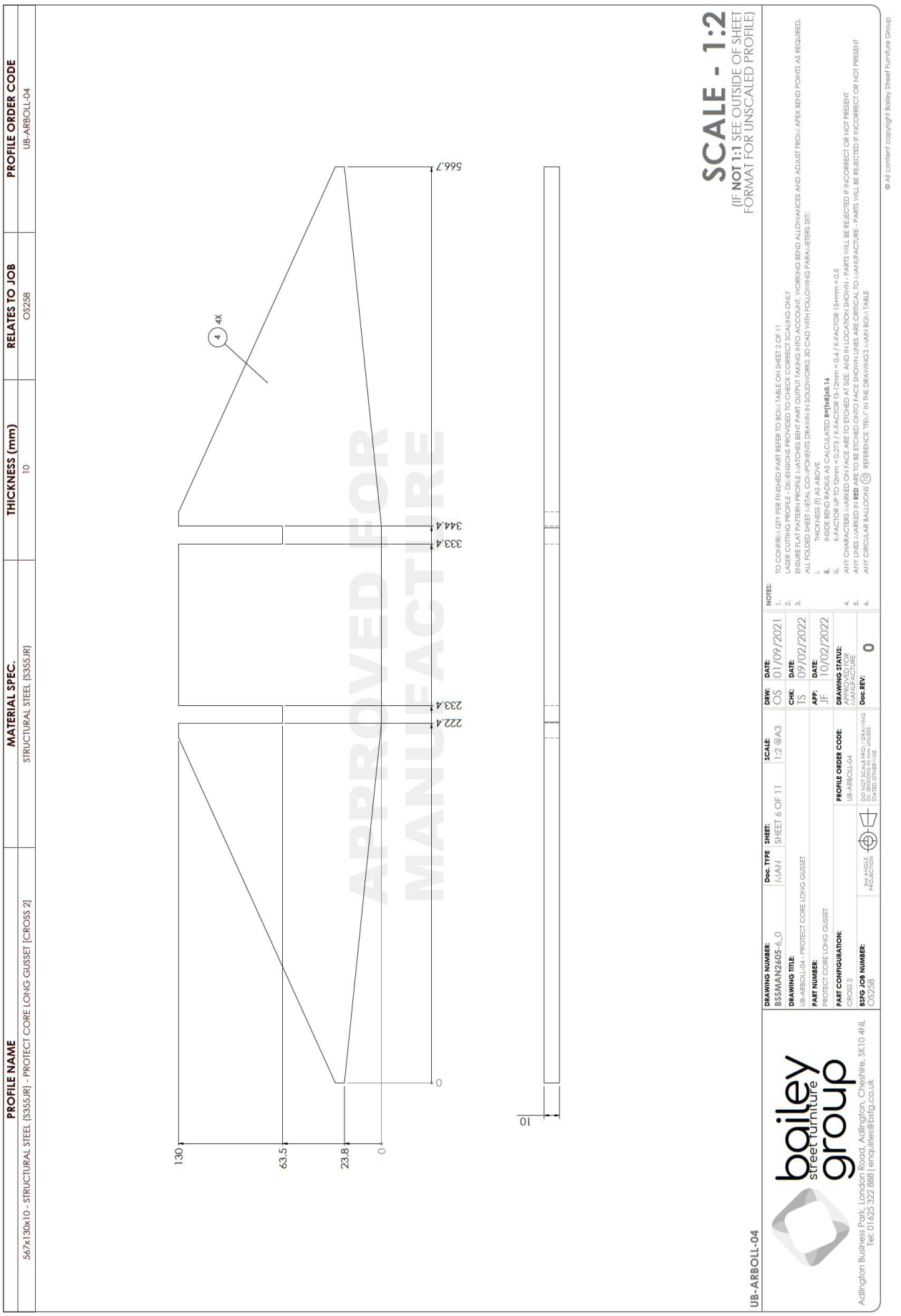
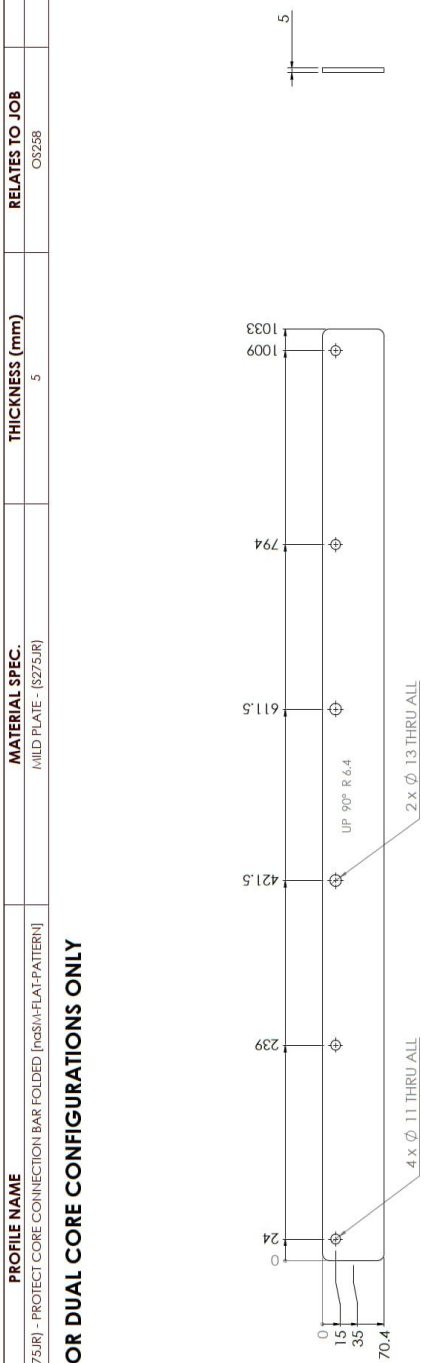
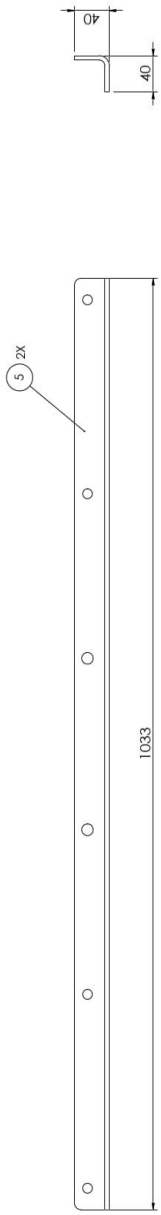


PROFILE NAME	MATERIAL SPEC.	THICKNESS (mm)	RELATES TO JOB	PROFILE ORDER CODE
1033x70x5 - MILD PLATE - [S275JR] - PROTECT CORE CONNECTION BAR FOLDED [noSlAl-FLAT-PATTERN]	MILD PLATE - (S275JR)	5	OS258	UB-ARBOLL-05

2off REQUIRED **FOR DUAL CORE CONFIGURATIONS ONLY**



MACHINE PROCESSES TO FOLLOW LASER PROFILING

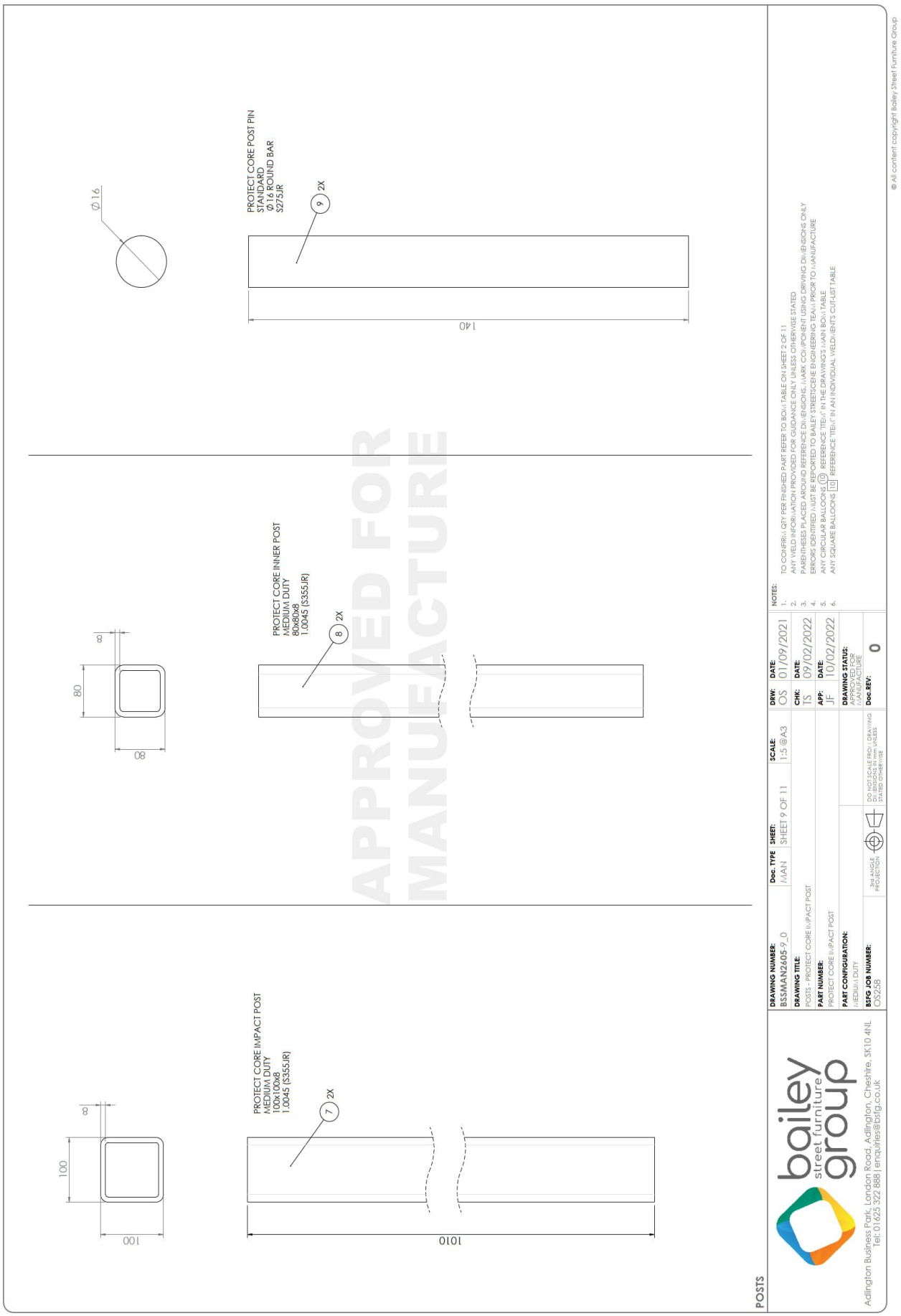


SCALE - 1:5
(IF **NOT 1:1** SEE OUTSIDE OF SHEET FORMAT FOR UNSCALED PROFILE)

NOTES:
1. TO CONFIRM QTY PER FINISHED PART REFER TO BOM TABLE ON SHEET 2 OF 11
2. LASER CUTTING PROFILE - DIMENSIONS PROVIDED TO CHECK CORRECT SCALING ONLY
3. ENSURE FLAT PATTERN PROFILE MATCHES BENT PART OUTPUT TAKING INTO ACCOUNT, WORKING BEND ALLOWANCES AND ADJUST FROM APEX BEND POINTS AS REQUIRED.
   ALL FOLDED SHEET METAL COMPONENTS DRAWN IN SOLIDWORKS 3D CAD WITH FOLLOWING PARAMETERS SET:
   i. THICKNESS (t) AS ABOVE
   ii. INSIDE BEND RADIUS AS CALCULATED **R=(t×β)±0.1δ**
   iii. K-FACTOR UP TO 12mm = 0.273 / K-FACTOR 13-12mm = 0.4 / K-FACTOR 15+mm = 0.5
4. ANY CHARACTERS MARKED ON FACE ARE TO ETCHED AT SIDE, AND IN LOCATION SHOWN - PARTS WILL BE REJECTED IF INCORRECT OR NOT PRESENT
5. ANY LINES MARKED IN **RED** ARE TO BE ETCHED ONTO FACE SHOWN LINES ARE CRITICAL TO MANUFACTURE - PARTS WILL BE REJECTED IF INCORRECT OR NOT PRESENT
6. ANY CIRCULAR BALLOONS (10) REFERENCE ITEM IN THE DRAWINGS MAIN BOM TABLE

UB-ARBOLL-05	DRAWING NUMBER: BSSMAN2605-7_0	Doc. TYPE: MAN	SHEET: SHEET 7 OF 11	SCALE: 1:5 @A3	DRW: OS DATE: 01/09/2021
	DRAWING TITLE: UB-ARBOLL-05 - PROTECT CORE CONNECTION BAR FOLDED				CHK: TS DATE: 09/02/2022
	PART NUMBER: PROTECT CORE CONNECTION BAR FOLDED		PROFILE ORDER CODE: UB-ARBOLL-05		APP: JF DATE: 10/02/2022
	PART CONFIGURATION: noSlAl-FLAT-PATTERN				DRAWING STATUS: APPROVED FOR MANUFACTURE
	B&FG JOB NUMBER: OS258	3rd ANGLE PROJECTION	DO NOT SCALE FROM DRAWING DIMENSIONS ARE IN MM UNLESS STATED OTHERWISE		Doc.REV: 0

bailey street furniture group
Adlington Business Park, London Road, Adlington, Cheshire, SK10 4NL
Tel: 01625 522 888 | enquiries@bsfg.co.uk


PROTECT CORE POST PIN
STANDARD
Ø16 ROUND BAR
S275JR
9 2X
Ø16
140
PROTECT CORE INNER POST
MEDIUM DUTY
80X80X8
1.0045 (S355JR)
8 2X
80
80
8
PROTECT CORE IMPACT POST
MEDIUM DUTY
100X100X8
1.0045 (S355JR)
7 2X
100
100
8
1010
APPROVED FOR MANUFACTURE
POSTS
bailey street furniture group
Adlington Business Park, London Road, Adlington, Cheshire, SK10 4NL
Tel: 01625 522 888 | enquiries@bsfg.co.uk
DRAWING NUMBER: BSSMAN2605-9_0
DRAWING TITLE: POSTS - PROTECT CORE IMPACT POST
PART NUMBER: PROTECT CORE IMPACT POST
PART CONFIGURATION: MEDIUM DUTY
BSFG JOB NUMBER: C5226
Doc. TYPE: MAN
SHEET: SHEET 9 OF 11
3rd ANGLE PROJECTION
SCALE: 1:5 @A3
DO NOT SCALE FROM DRAWING
DRW: OS DATE: 01/09/2021
CHK: TS DATE: 09/02/2022
APP: JF DATE: 10/02/2022
DRAWING STATUS: APPROVED FOR MANUFACTURE
Doc.REV: 0
NOTES:
1. TO CONFIRM QTY PER FINISHED PART REFER TO BOM TABLE ON SHEET 2 OF 11
2. ANY WELD INFORMATION PROVIDED FOR GUIDANCE ONLY UNLESS OTHERWISE STATED
3. PARENTHESES PLACED AROUND REFERENCE DIMENSIONS. MARK COMPONENT USING DRIVING DIMENSIONS ONLY
4. ERRORS IDENTIFIED MUST BE REPORTED TO BAILEY STREETSCENE ENGINEERING TEAM PRIOR TO MANUFACTURE
5. ANY CIRCULAR BALLOONS (10) REFERENCE "ITEM" IN THE DRAWINGS MAIN BOM TABLE
6. ANY SQUARE BALLOONS [10] REFERENCE "ITEM" IN AN INDIVIDUAL WELDMENTS CUT-LIST TABLE
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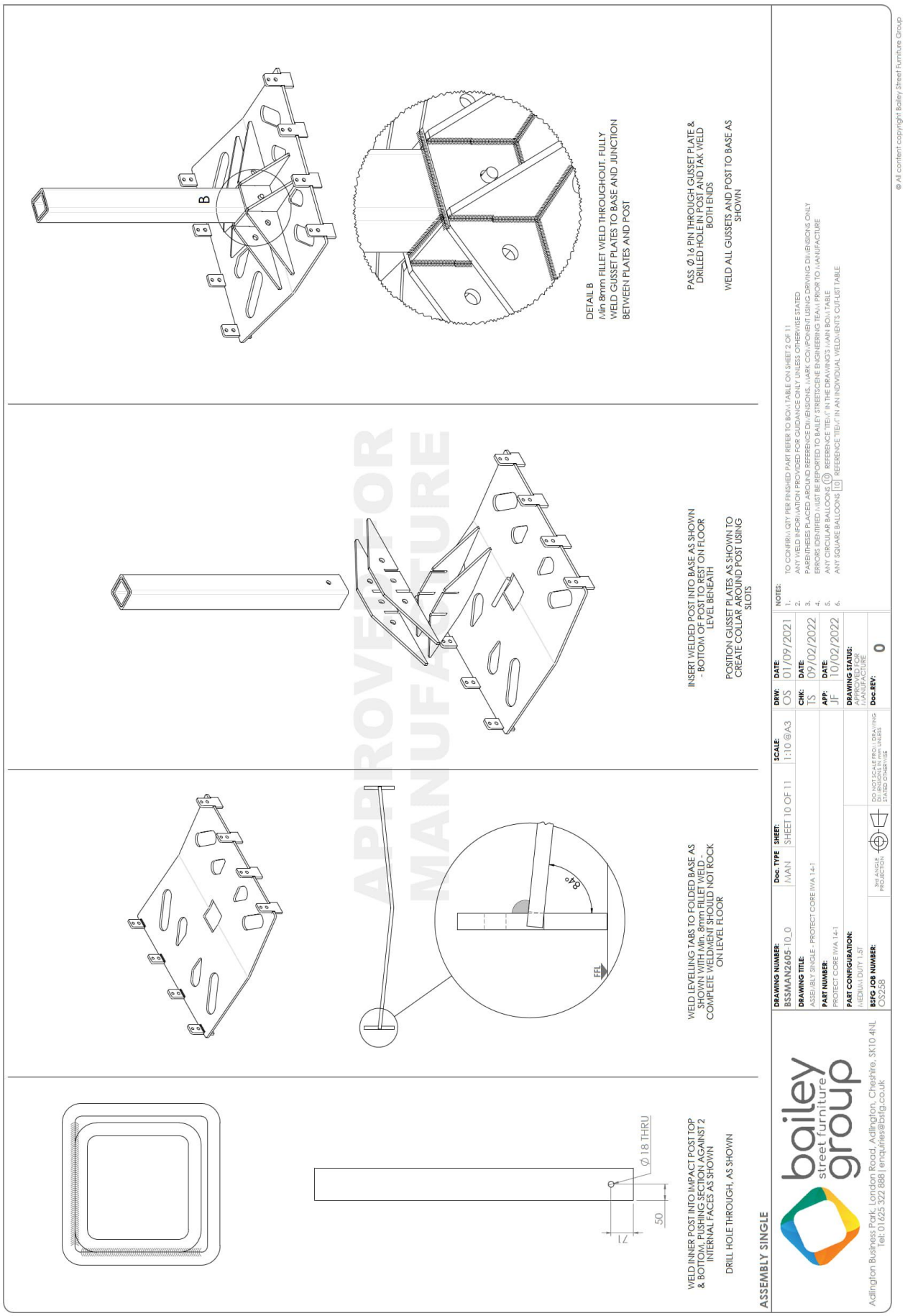
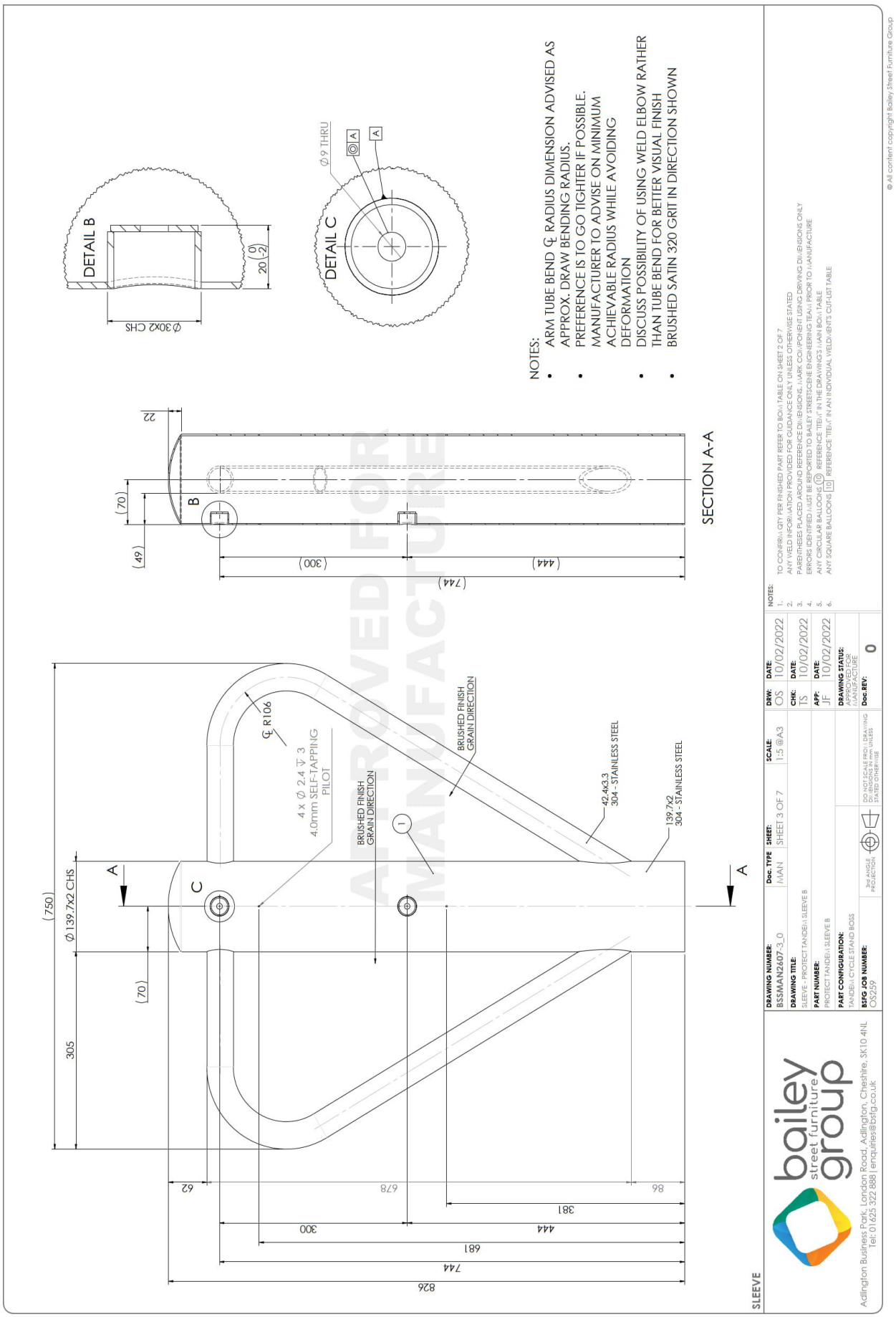
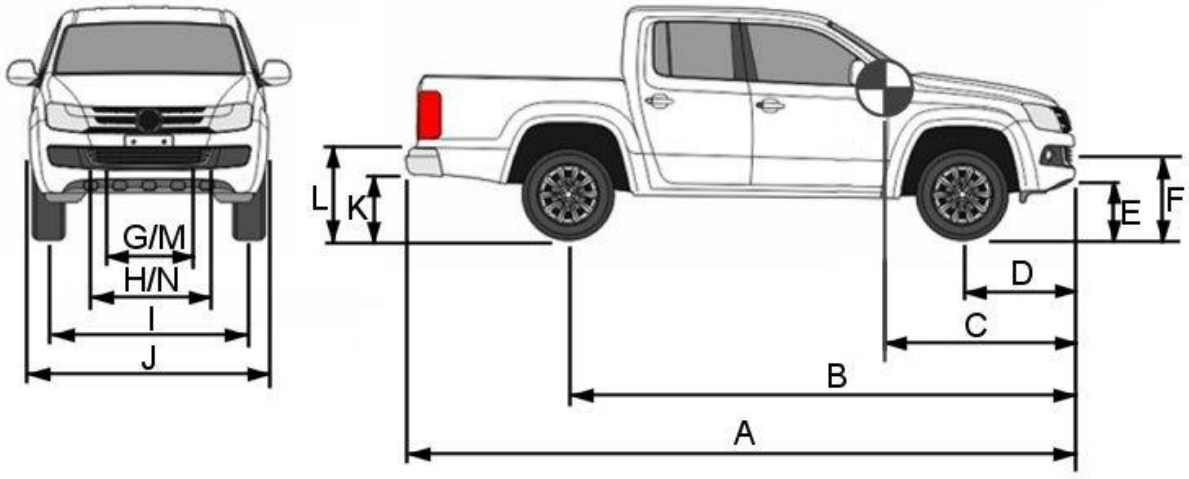




Appendix 2 Test Vehicle Details



Test Vehicle Details	
Vehicle classification	N1G
Vehicle Registration No.	LP12VLE
Vehicle Identity No (VIN)	AHTFR22G006059233
Unladen Mass (kg)	2040
Test Inertial Mass (kg)	2530
Net Ballast Mass (kg)	490
Number of axles x driven axle	2 x 1
Tyre Size	225/70/17

Test Vehicle Measurements (mm)					
A	Vehicle overall length	5160	H	Distance between outside edges of chassis rail at front	870
B	Vehicle front to rearmost axle	3930	I	Front track width (tyre centres)	1500
C	Vehicle front to datum point	1328	J	Vehicle width (excluding mirrors)	1755
D	Vehicle front to front axle	842	K	Height from ground to bottom of chassis at rear	530
E	Height from ground to bottom of chassis at front	428	L	Height from ground to top of chassis at rear	638
F	Height from ground to top of chassis at front	562	M	Distance between inside edges of chassis rails at rear	1025
G	Distance between inside edges of chassis rails at front	730	N	Distance between outside edges of chassis rails at rear	1130

Appendix 3 Calibration Information

Instrumentation

Location	QA No	CAC	Cal Due Date
Vehicle CG X	48398	2000g	12/01/2023
Vehicle CG Y	48308	2000g	17/01/2023
Vehicle CG Z	48399	2000g	17/01/2023
Vehicle CG Pitch	45066	600deg/sec	22/09/2022
Vehicle CG Roll	45068	600deg/sec	22/09/2022
Vehicle CG Yaw	45069	600deg/sec	22/09/2022
Vehicle CG X Backup	48394	2000g	12/01/2023
Vehicle CG Y Backup	50081	2000g	12/01/2023
Vehicle CG Z Backup	50080	2000g	12/01/2023
DTS Slice SPS00316	40398	n/a	28/11/2022

Other Tools

Item	QA No	Used for measuring	Cal Due Date
Scales (LHF)	50461	Vehicle mass	21/10/2022
Scales (RHF)	50462	Vehicle mass	21/10/2022
Scales (LHR)	50461	Vehicle mass	21/10/2022
Scales (RHR)	50462	Vehicle mass	21/10/2022
Tape Measure	50126	Vehicle dimensions	22/03/2022
Tyre Pressure Gauge	48298	Tyre pressure	12/01/2023
Inclinometer	50522	C of G angles	17/11/2022
C of G Loadcell	44810	C of G mass change	15/03/2023
Inclinometer	50521	Product and foundation angles	17/05/2022
Tape Measure	41047	Product dimensions	02/11/2022
VBox GPS	36509	Impact speed and angle	05/06/2022

High Speed Cameras

Position	Camera QA No	Cal Due Date	Lens Type	Image Rate (pps)	X (m) to impact	Y (m) to impact	Z (m) to impact
OH Standard	41527	25/05/2022	12	500	0	0	-12.4
OH Close	41525	03/08/2022	16	500	0	0	-12.4
Side on	41523	25/05/2022	25	500	0	-14	-1.2
Downstream	41526	25/05/2022	Zoom	500	56	0	-1.2
Oblique	41528	25/05/2022	50	500	14	10	-1.2

Appendix 4 Test Sign-off Sheet

Test No:	A0011

Product Information & Documentation ☑

In line with legislative requirements please ensure the following information is provided by completing and returning this form and supplying the requested accompanying documentation.

Client Details	
Company name:	Centre for the Protection of National Infrastructure (CPNI)
Company address:	n/a
Contact name:	n/a
Contact tel:	n/a
Contact email:	n/a
Product Details	
Manufacturer:	Bailey Street Furniture Group
Unique Product Name/Designation:-	Protect Tandem Cycle Parking Dual Core
Prototype or Production sample:	Production
What orientation is required:	Impact Between Gap (Both units)
Test Details	
Legislation to be tested against:	IWA14-1:2013
Test Designation/speed class within	N1G - 4x4 Pick-up
Required Impact Speed(s):	48 +3 -1 km/h
Required Impact Angle(s):	90 +2 -2°
Required Test Vehicle:	N1G @ 2500 ±75kg

Please accompany this form with the following documentation. Please indicate below whether the documentation has been supplied, please also indicate if any information is not available or not applicable.

Product Documentation Supplied	
General Arrangement drawings (including tolerences and installation instructions):	X
Component drawings (including dimensions, tolerences and material specifications):	
Factory Sub-assembly drawings:	
Parts List:	
Material specification certificates:	
Operating Manual	
Other relevant information (disposal/recycling, safety instructions)	

Funding		Product	Install	Removal	Vehicle	Test	Report
Manufacturer		X	X	X			
3rd Party:	CPNI				X	X	X
MIRA							

Test Sign-Off			
Please sign below Confirm that:-			
• The product and installation are to design intent and correct for test.			
• The target test parameters are correct.			
Comments/Agreed Deviations			
	Sign	**Print**	**Date**
On Behalf of Client:	[redacted]	[redacted]	22/03/2022
On Behalf of Manufacturer: (If applicable)	[signature]	J. FAIRBROTHER.	23/03/2022
On behalf of HORIBA MIRA Ltd	[signature]	D Johnstone	23/03/2022

Appendix 5 Revision History

Report Number	Date	Comments	Sections Affected
1225361-004-021-01	26/05/2022	First Issue	n/a