

Glasgow City Council – Neighbourhoods and Sustainability

Cycle Lane Soft Segregation Trial Report

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1. INTRODUCTION

Segregated cycle lanes play an important part in the delivery of Glasgow City Council's Strategic Plan for Cycling.

Segregated cycle lanes are dedicated bike lanes that increase cyclists' feelings of safety and comfort and make cycling an attractive commuting option for those who are not used to riding their bikes regularly and on traffic.

Segregated space allocates a section of the carriageway for cycle use only. On-street 'hard segregation' involves the use of features such as kerbs, islands, grass verges or planting to create a continuous physical barrier acting as a protective buffer between moving or parked vehicles and cyclists. These lanes are at carriageway level and thus are also separated from pedestrians by a level difference.

Traditional at grade kerb segregation involves major construction, considerable expense and heavy drainage works.

The City Ways, which constitute Glasgow's core cycle network are characterised by 'hard segregation'. Such lanes are already in place as part of the West City Way and the South West City Way. It is envisaged that much of the future core network will be constructed from segregated cycle lanes.

In order to explore new solutions for a less expensive and labour intensive installation of segregated cycle tracks, a 'soft segregation' trial was carried out on Aikenhead Road in 2015-2016, followed by further installation of permanent soft segregated routes on the 'Routes to Knightswood Park' (2017), 'Glasgow Bridge' (2016), 'Wallacewell Road' (2017) and a small portion of the 'River Clyde South Bank Route' (2016) and part of Berkeley Street (2012).

The purpose of these trials is to monitor how each segregation product stands up to the climate, how durable the units are and how they are perceived by pedestrians, cyclists and drivers.

2. LIGHT SEGREGATION

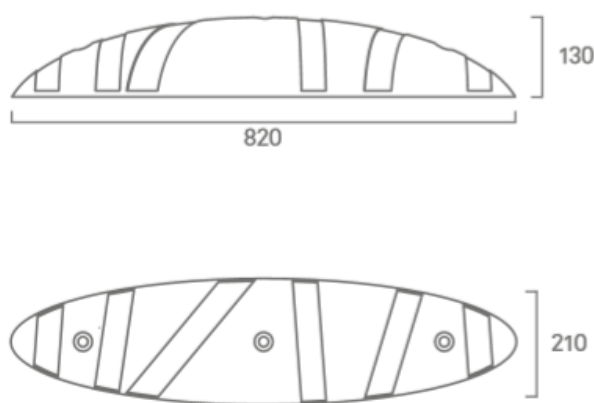
Traditional methods to segregate cyclists from traffic tend to involve either sharing space with pedestrians on 'shared use' pathways or significant infrastructure construction, such as kerb segregation on the carriageway. This has a significant implications for drainage, maintenance, road sweeping and gritting.

For these reasons, nationally, there has been recent interest in so-called 'light' or 'soft' methods for separating cyclists from traffic, which utilises a variety of different forms of intermittent features, such as blocks, planters, or bolt-on delineators, bollards or marker posts, or enhancement of conventional lane markings, such as rumble strips or reflective studs. 'Light' methods require less space and can therefore be used without interfering with drainage. By virtue of not creating a continuous barrier, 'soft' segregation enables cyclists to leave or access the separated cycle lane should they need to do so and presents cheaper installation costs and cheaper maintenance costs per linear metre.

The types of products trialled by GCC are listed and explained in the following paragraphs.

2.1 ARMADILLOS (ZICLA)

Armadillos are small dividers bolted onto road surface to give protection to cycle lanes from the roadway. Armadillos were approved for use in the UK by the DfT in 2013. They were first officially trialled on Royal College Street in Camden, London. GCC has trialled Zicla Armadillos, which are made from 100% recycled PVC. The units are bolted onto the ground and spaced out so that cyclists can enter or exit the cycle lanes as needed and so that emergency vehicles can drive over them when access is required. Covered in reflective stripes, the Armadillos are visible to deter vehicles from driving into the cycle lane. The soft material helps absorb any impact whilst also preventing damage to the underside of a vehicle when accidentally driven over. Figure 1 below shows specifications and dimensions for the Zebra 13 Armadillo as trialled by GCC.



<i>Dimensions</i>	
Weight per unit	8.5 kg
Length	820 mm
Height	130 mm
Width	210 mm
Recommended spacing	1.3 m
Maximum spacing	2.6 m

Figure 1: specifications and dimensions of Zebra 13 armadillo, (<https://www.zicla.com/en/project/zebra-separator/>)

2.2 PASSIVELY SAFE IMPACT BOLLARDS (GLASDON)

The passively safe impact bollards are rebound-able units which are typically mounted on to a traffic island or within the carriageway to segregate cycle traffic from motorised traffic. They are either

mounted on traffic cycle lane defender units to mark the potential hazard of a traffic island or they can be grounded in the surface to delineate a cycle lane.

Figure 2 below shows the units' specifications as product trialled by GCC.

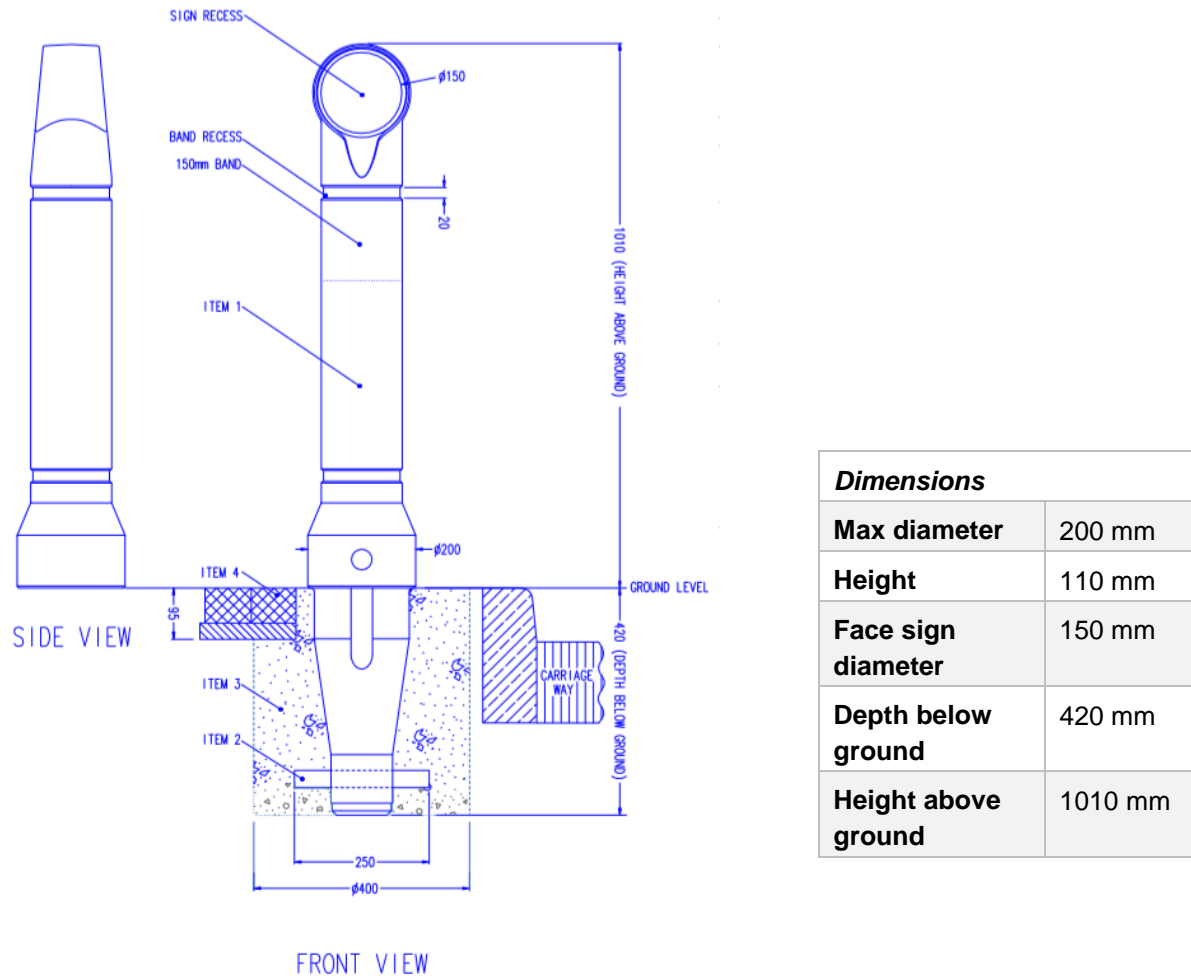


Figure 2: specifications and dimensions for passively safe impact bollards, (<https://uk.glasdon.com/road-safety/bike-lane-bollards/mini-ensign-tm-bollard>)

2.3 JISLON DIVIDING ISLANDS (REDIWELD)

Jislon Satellite Islands are a permanent solution offering a different application to traditional materials but can also be used for temporary layouts as can be relocated if needed. The islands are made from recycled rubber, which is durable and safer on impact as it absorbs energy on impact without cracking or fracturing. The island is suitable for manual handling with no mechanical lifting required and it is surface mounted, minimising disruption with no spoil. The product is fixed to the ground with stainless

steel screws, anchor blocks, washer and a tough nylon plug. The islands have high visibility markings and they are made of 100% recycled material. GCC trialled the Jislon Satellite Islands with incorporated City Pole Cones mounted on the unit along the Aikenhead Road Soft Segregation Trial and a permanent one on Glasgow Bridge. The cones have diameter of 80 mm and 130mm NS Anchor.

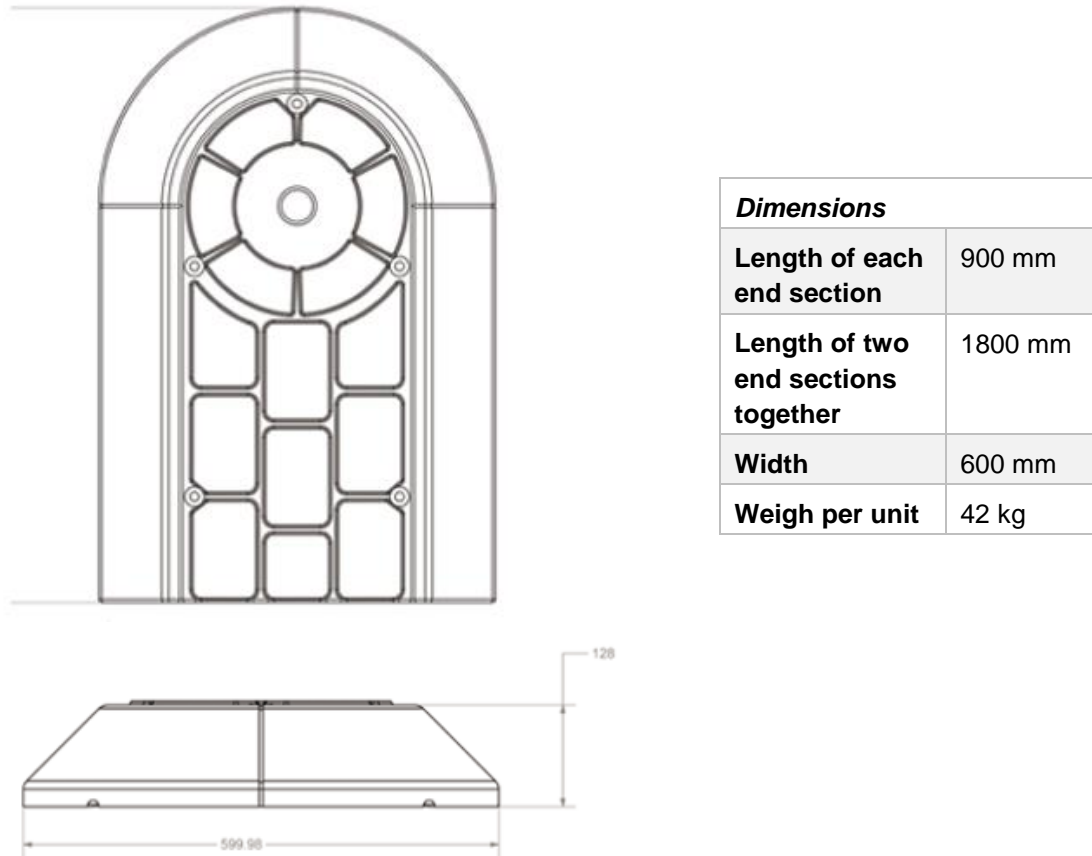


Figure 3: specifications and dimensions for dividing islands, (www.rediweldtraffic.co.uk/products/cycle-lane-products/redipave-splitter-jislon-satellite-islands/)

2.4 ORCAS (REDIWELD)

Orcas are designed to provide light segregation and protection for cyclists as a standalone product. The Orca should be placed within the cycle lane and positioned up to the white marking which highlights the edge of the carriageway. Typical spacing goes from 2.5m up to 10m depending on the application and location. Orcas have high visibility markings and are made from tough recycled rubber, which is durable and safer on impact as it absorbs energy without cracking or fracturing. The units are suitable for manual handling with no mechanical lifting required and they are surface mounted minimising disruption with no spoil. Orcas are fixed with stainless steel screw, washer and tough nylon plug. These units can be easily relocated to 'future proof' against changes in network layout and width of cycle lanes. The units present zig-zag or tip-toe markings.

Figure 4 below shows specifications and dimensions for the Orcas as installed by GCC.

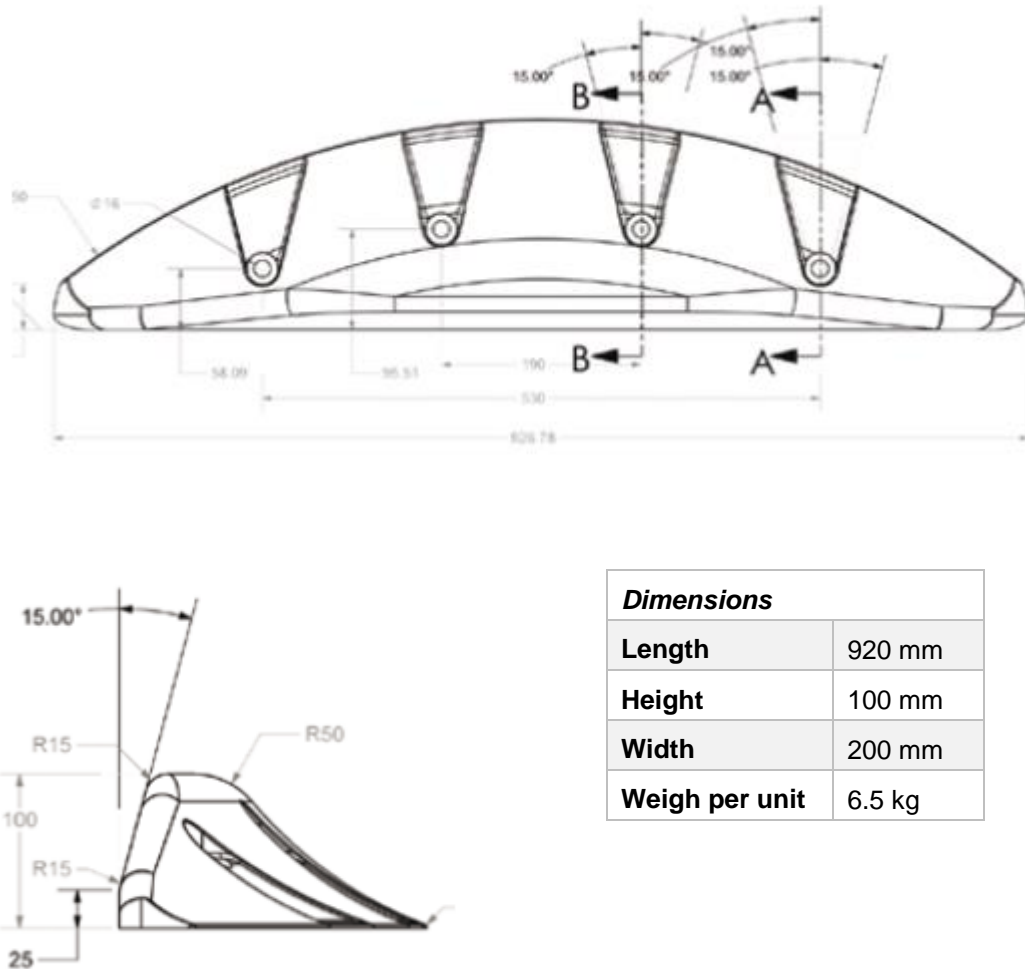
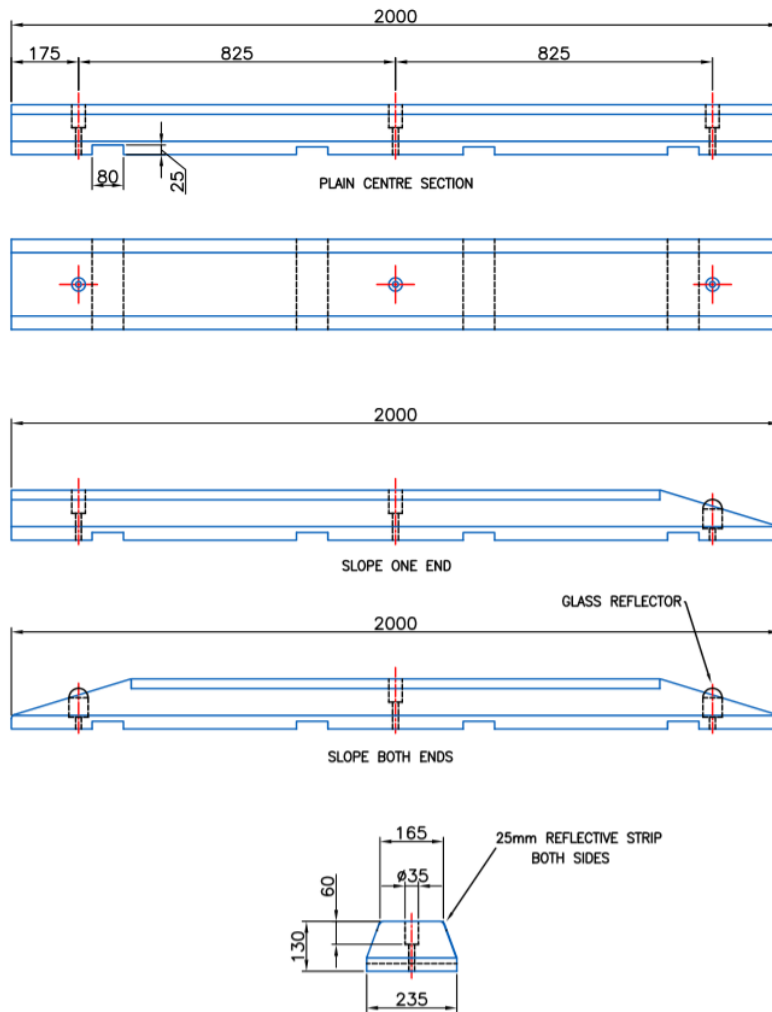


Figure 4: specifications and dimensions of Orcas Tip Toe, (<http://www.rediweldtraffic.co.uk/products/cycle-lane-products/orca-cycle-lane-product/>)

2.5 CYCLE LANE DEFENDERS (ROSEHILL)

Cycle lane defenders are long rubber units made from 100% recycled tyre rubber. The units are bolted to the road surface so that dislodged or damaged units can be removed and replaced quickly. The cycle lane defenders can be install to construct new cycle schemes or can be retro-fitted into existing projects. The units are made of solid rubber which makes them impact resistant and impact safe.

Figure 5 below shows specifications and dimensions for the cycle lane defenders as trialled by GCC.



Dimensions	
Length	2000 mm
Height	130 mm
Width	235 mm
Weigh per unit	60 kg

Figure 5: specifications and dimensions for narrow cycle lane defenders,
[\(https://www.rosehillhighways.com/products/cycle-lane-defenders/technical/\)](https://www.rosehillhighways.com/products/cycle-lane-defenders/technical/)

3 SOFT SEGREGATION TRIALS: LOCATIONS AND SURVEY METHODOLOGY

An initial trial was installed by GCC in 2015 on Aikenhead Road followed by other five permanent soft segregated routes: the 'Routes to Knightswood Park' (2017), 'Glasgow Bridge' (2016), 'Wallacewell Road' (2017), a small tract of the 'River Clyde South Bank Route' (2016) and part of Berkeley Street (2012).

The figure below shows the location of all current 'light' segregation trials in Glasgow.

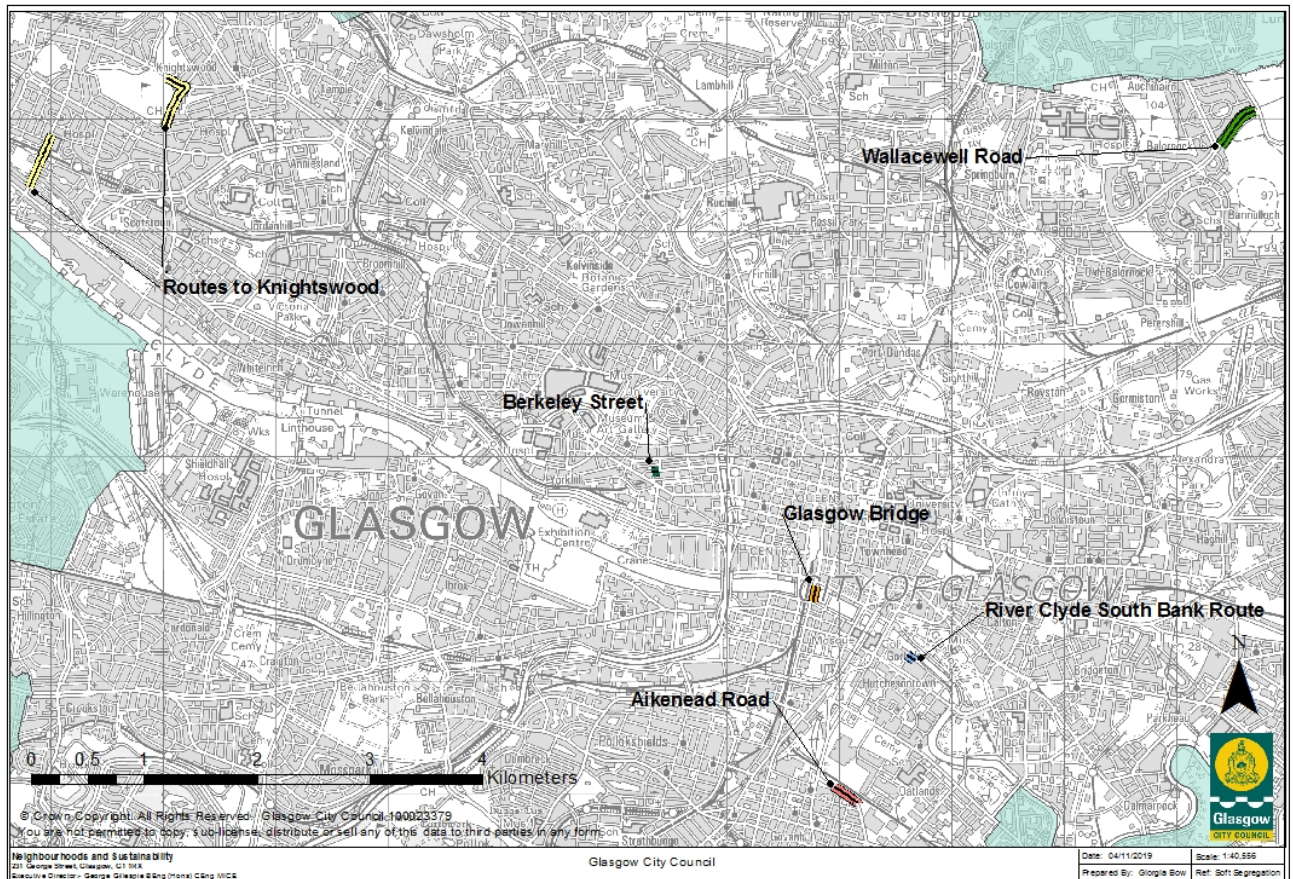


Figure 6: 'Soft' segregation schemes in Glasgow.

All schemes were surveyed in the summer/autumn of 2019.

The products were surveyed by observation. The surveying officer visually observed the product's status and noted the products' conditions, probed the products to check they were still securely fixed to the ground and collected data and notes according to the following scoring matrix, (refer to figure 6).

Product Type	Damaged	Slightly Damaged	Good
Passively safe impact bollards Armadillos dividing islands orcas cycle lane defenders	The product is considerably damaged, (e.g. loose or missing bolt, product not firmly fixed to the surface, rubber body damaged with parts or small segments missing).	The product shows signs of impact, (i.e. visible marks on the rubber body), colour change due to discolouration, darkened surface or signs of vandalism. The damage does not compromise the product's functionality.	No signs of physical damage, no parts missing, no marks, no discolouration and no darkened surface.

Table 1: surveying scoring matrix.

Each soft segregated route was analysed individually. Where multiple roads were part of a single route, each road was analysed individually but results were also aggregated to give a summary of the project as a whole.

The analysis was carried out separately per each type of soft segregation, characterised according to the scoring matrix showed above.

4 CYCLE LANE SOFT SEGREGATION TRIAL – AIKENHEAD ROAD

An initial site at the north end of Aikenhead Road was chosen by GCC to trial a new range of segregation concepts: passively safe impact bollards, armadillos, dividing islands, orcas and cycle lane defenders.

The trial started in 2015 and a review survey was carried out on 25/07/2019 to test and to monitor how each segregation product stands up to the climate, how durable they are and to improve maintenance procedures.

4.1 PASSIVELY SAFE IMPACT BOLLARDS

A total of 15 units were observed. This number coincides with the number of units originally installed. 2 bollards were damaged (refer to figure 8 & 9) and 13 were found to be in good conditions (refer to figure 10) as shown in the graph below, (refer to figure 7 and table 2).

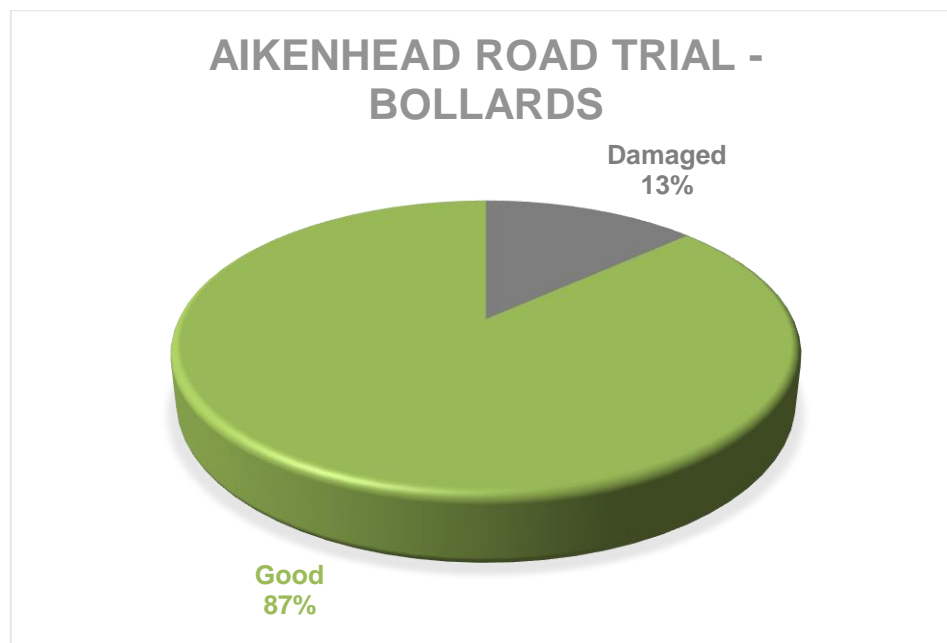


Figure 7: survey results for bollards along Aikenhead Road.

Observations	Damaged	Slightly Damaged	Good
15	2	0	13

Table 2: survey results for bollards along Aikenhead Road.



Figure 8: damaged bollard on Aikenhead Road.



Figure 9: damaged bollard on Aikenhead Road.



Figure 10: bollards in good conditions on Aikenhead Road.

4.2 ARMADILLOS

A total of 30 units were observed. This number coincides with the number of units installed. All Armadillos are intact but 4 Armadillos (refer to figures 12 & 13), showed signs of damage mainly to the top/surface area. 16 units were found to be slightly damaged (refer to figure 14), showing signs of discolouration.

The graph and table below, (figure 11 and table 3) show the survey results for the Armadillos on Aikenhead Road categorised by observed conditions.



Figure 11: survey results of Armadillos on Aikenhead Road.

Observations	Damaged	Slightly Damaged	Good
30	14	16	0

Table 3: survey results of Armadillos on Aikenhead Road.



Figure 12: example of damaged Armadillo on Aikenhead Road.



Figure 13: example of damaged Armadillo on Aikenhead Road.



Figure 14: Armadillo defender showing signs of discolouration within reflective area on Aikenhead Road.

4.3 DIVIDING ISLANDS

A total of 4 units were observed. This number coincides with the number of units originally installed. 3 out of 4 dividing islands are intact and 1 island (refer to figure 16) was missing. 3 units were found to be in good conditions (refer to figure 17).

The graph and table below, (figure 15 and table 4) show the survey results for dividing islands on Aikenhead Road categorised by observed conditions.

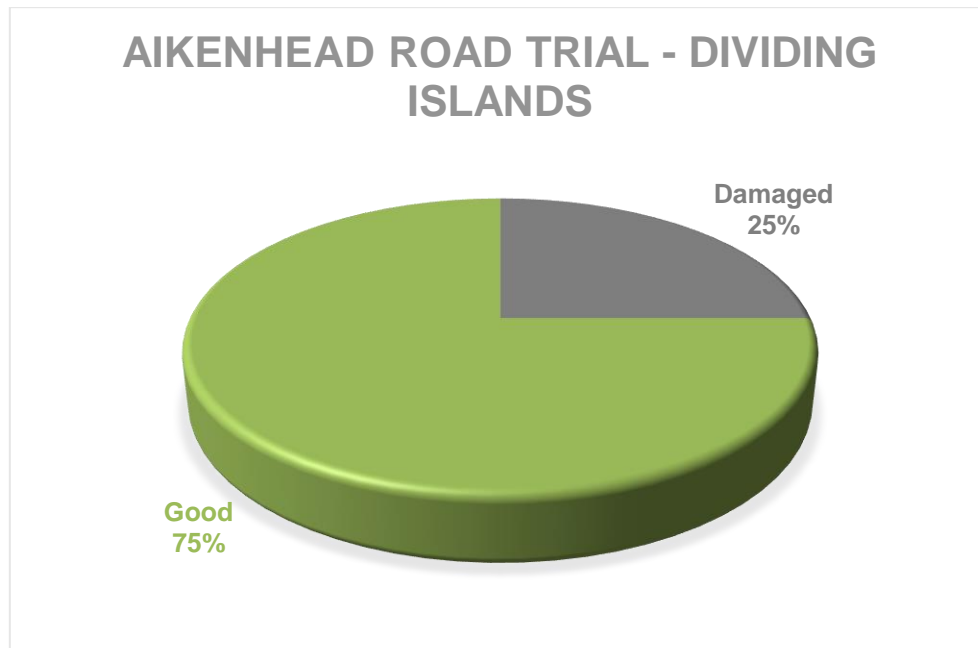


Figure 15: survey results for dividing islands on Aikenhead Road.

Observations	Damaged	Slightly Damaged	Good
4	1	0	3

Table 4: survey results for dividing islands on Aikenhead Road.



Figure 16: dividing island with missing bollard on Aikenhead Road.



Figure 17: example of dividing island in good conditions on Aikenhead Road.

4.4 ORCAS

A total of 30 units were observed. This number coincides with the number of units originally installed. All Orcas are intact. One Orca was found to be showing signs of minor damage (refer to figure 19) and all remaining 29 units were found to be in good conditions (refer to figure 20).

The graph and table below, (figure 18 and table 5) show the survey results for Orcas on Aikenhead Road categorised by observed conditions.



Figure18: survey results of Orcas on Aikenhead Road.

Observations	Damaged	Slightly Damaged	Good
30	0	1	29

Table 5: survey results of Orcas on Aikenhead Road.



Figure 19: Orca showing signs of minor damage on Aikenhead Road.



Figure 20: example of Orcas in good conditions on Aikenhead Road.

4.5 CYCLE LANE DEFENDERS

A total of 26 units were observed. This number coincides with the number of units originally installed. All Defenders are intact, however the reflective strip on all 26 units has or is in the process of peeling off, this seems to be happening mainly on the side of the cycle lane. All weepers appeared to be blocked with debris/silt. 9 units were found to be showing signs of major damage attributable to impact and all remaining 17 units showed signs of minor damage (refer to figure 22).

The graph and table below, (figure 21 and table 6) show the survey results for Defenders on Aikenhead Road categorised by observed conditions.

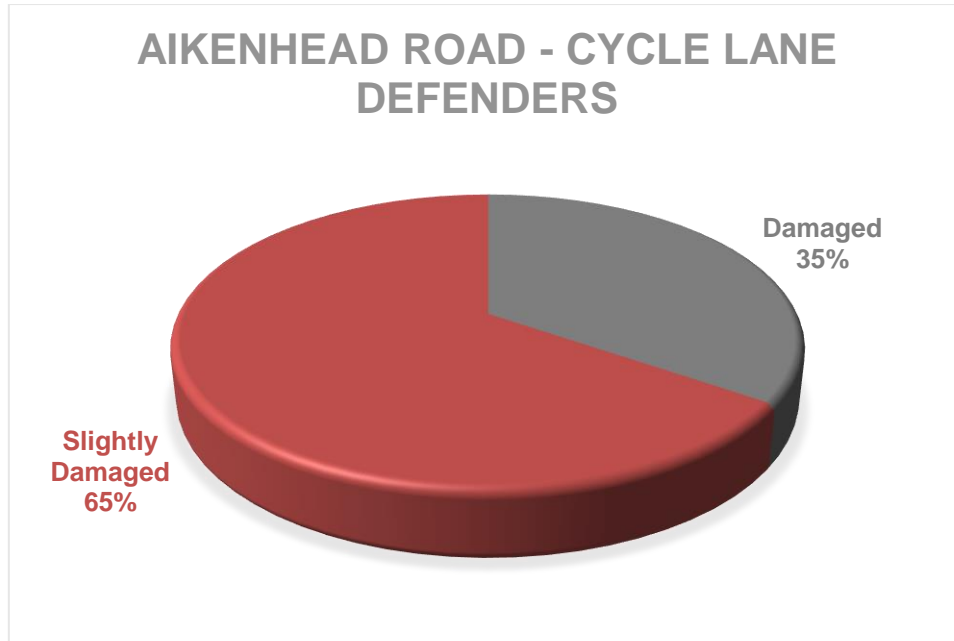


Figure 7: survey results for Cycle Lane Defenders on Aikenhead Road.

Observations	Damaged	Slightly Damaged	Good
26	9	17	0

Table 6: survey results for Cycle Lane Defenders on Aikenhead Road.



Figure 22: example of Cycle Lane Defenders showing slight damage due to reflective strip peeling off.

5 CYCLE LANE SOFT SEGREGATION – GLASGOW BRIDGE

In 2016, 53 Orcas were initialled on Glasgow Bridge to create a southbound cycle lane on the east side of the bridge.

A review survey was carried out on 24/09/2019 to test and to monitor how each unit stands up to the climate, how durable they are and to improve maintenance procedures.

5.1 ORCAS

A total of 52 units were observed, (refer to figure 24). 53 units were originally installed. 40 Orcas were found to be showing signs of slight damage (refer to figure 25), 12 units were found to be showing signs of major damage, mainly to the top surface area, (refer to figure 26) and 1 unit was missing, (refer to figure 27).

The graph and table below, (figure 23 and table 7) show the survey results for Orcas on Aikenhead Road categorised by observed conditions.

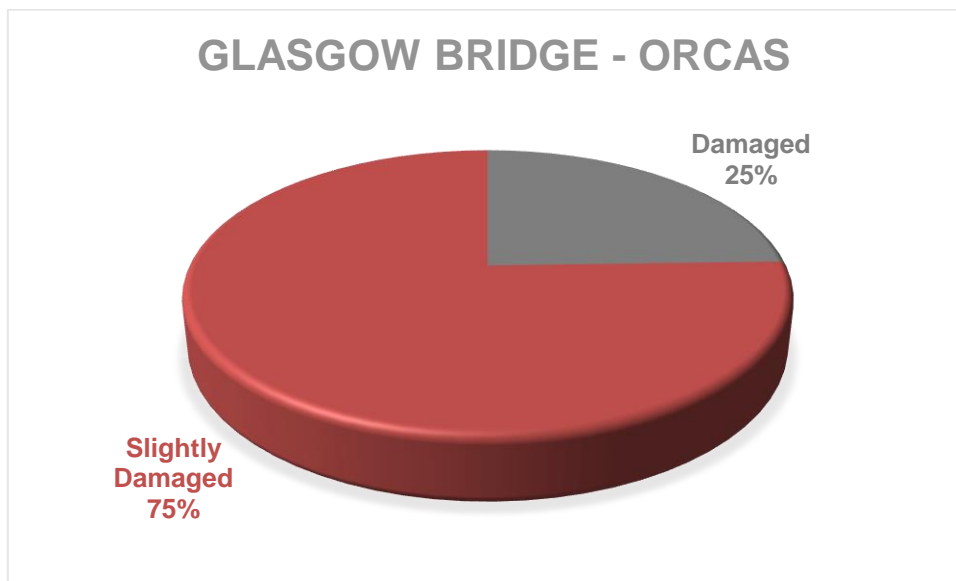


Figure 23: survey results for Orcas on Glasgow Bridge.

Observations	Damaged	Slightly Damaged	Good
53	13	40	0

Table 7: survey results for Orcas on Glasgow Bridge.



Figure 24: southbound Orcas trial on Glasgow Bridge.

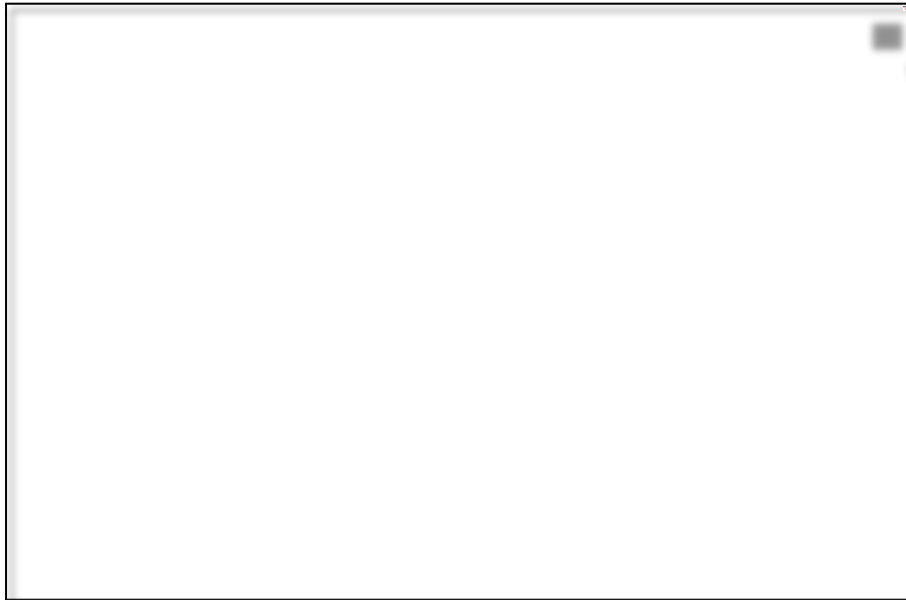


Figure 25: example of slightly damaged Orca on Glasgow Bridge.



Figure 26: example of major damage to Orca on Glasgow Bridge.



Figure 27: missing Orca on Glasgow Bridge.

5.2 DIVIDING ISLANDS

1 dividing island was installed on Glasgow Bridge in the summer of 2019 and the unit was missing on the day of the survey.

6 CYCLE LANE SOFT SEGREGATION – ROUTES TO KNIGHTSWOOD PARK

In 2018 Glasgow held the European BMX Championships at the newly built BMX track in Knightswood Park. The event provided GCC with an opportunity to improve active travel connectivity to Knightswood Park. 'Soft' segregation products, (Orcas and bollards) were installed in the part of the route designed to be physically separated from motorised traffic. A bidirectional soft segregated route was installed along Lincoln Road and Archerhill Road along the perimeter of Knightswood Park, another bidirectional soft segregated route was installed along part of Dyke Road.

A review survey was carried out on 25/09/2019 to test and to monitor how each unit stands up to the climate, how durable they are and to improve maintenance procedures.

Cumulative results for Dyke Road and Lincoln Road/Archerhill Road are discussed in the following two paragraphs, a breakdown of data for each segregated section can be found in Appendix 3.

6.1 ORCAS

A total of 381 units were observed. 382 Orcas were originally installed. The vast majority of weepers appeared to be blocked with debris/silt, (refer to figure 29). 176 units were found to be showing signs of minor damage; this included slight or moderate levels of darkened surfaces (refer to figure 30), and tyre marks on the units. Darkened Orcas were observed predominantly under wide-leaf trees, possibly due to limited exposure to sunlight and subsequent effects of increased humidity. 10 Orcas were found to be showing signs of major damage (refer to figure 31); including damage to the top surface, loose or missing bolts and extremely darkened surface (refer to figure 32). 1 Orca was found to be missing on Dyke Road. 195 units were found to be in good conditions.

The graph and table below, (figure 28 and table 8) show the survey results for Orcas along the routes to Knightswood Park's soft segregated cycle lanes, categorised by observed conditions.

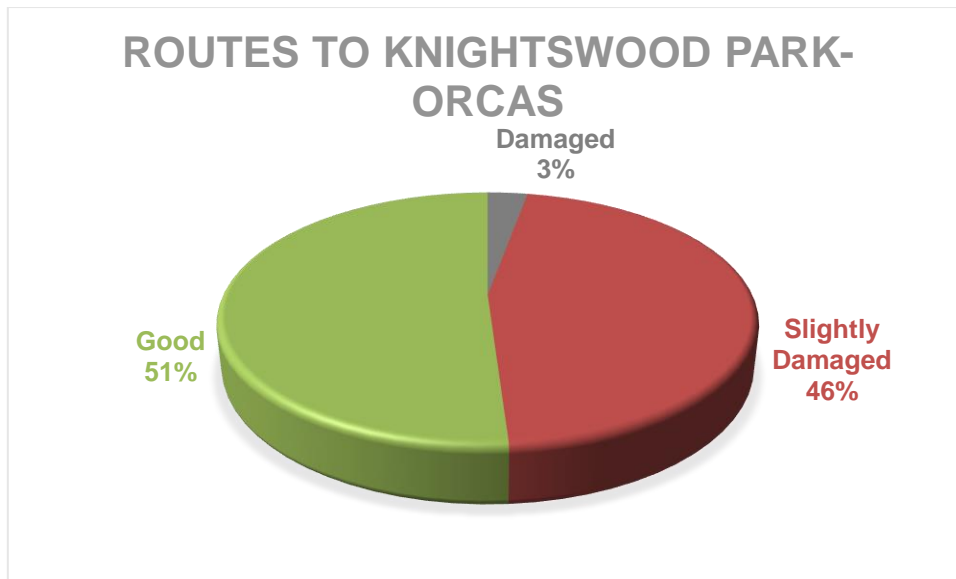


Figure 28: survey results for Orcas along the routes to Knightswood Park.

Observations	Damaged	Slightly Damaged	382
382	11	176	195

Table 8: survey results for Orcas along the routes to Knightswood Park.



Figure 29: example of weepers blocked by debris/slit along the routes to Knightswood Park.



Figure 30: example of moderate darkening of Orcas' surface along the routes to Knightwood Park.



Figure 31: example of Orcas showing major damage to the top surface along the routes to Knightwood Park.



Figure 32: example of Orcas showing major damage due to extremely darkened surface along the routes to Knightswood Park.

6.2 PASSIVELY SAFE IMPACT BOLLARDS

A total of 26 units were observed. This number coincides with the number of units originally installed. 2 bollards were damaged (refer to figures 34 & 35), 2 units were slightly damaged (refer to figure 36) and 22 bollards were found to be in good conditions (refer to figure 37).

The graph and table below, (figure 33 and table 9) show the survey results for bollards along the routes to Knightswood Park's soft segregated cycle lanes, categorised by observed conditions.

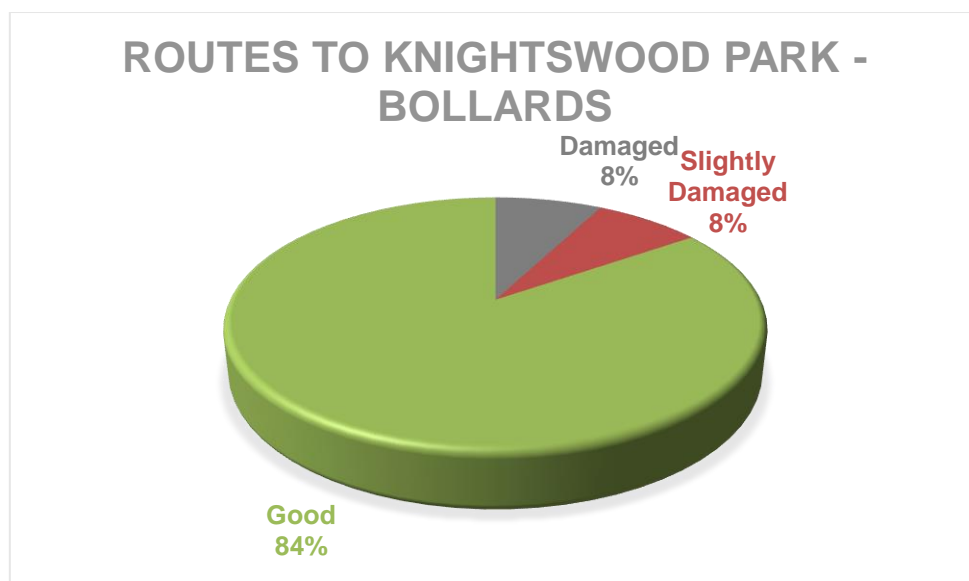


Figure 33: survey results for Passively Safe Impact Bollards along the routes to Knightswood Park.

Observations	Damaged	Slightly Damaged	Good
26	2	2	22

Table 9: survey results for Passively Safe Impact Bollards along the routes to Knightswood Park.



Figure 34: damaged bollard along the routes to Knightswood Park - Dyke Road.



Figure 35: damaged bollard presenting signs of vandalism along the routes to Knightswood Park - Dyke Road.



Figure 36: slightly damaged bollard showing signs of vandalism as observed along the routes to Knightswood Park - Dyke Road.



Figure 37: example of bollard in good conditions as observed along the routes to Knightswood Park - Dyke Road.

7 CYCLE LANE SOFT SEGREGATION - RIVER CLYDE SOUTH BANK ROUTE

In 2016, 23 Orcas and 23 Passively Safe Impact bollards were installed on Adelphi Street as part of the River Clyde South Bank Route. The River Clyde South Bank Route forms part of the NCN 756. The route is a mixture of off-road shared footpath, soft segregated and hard segregated sections. Soft segregation was installed on a tract of Adelphi Street.

A review survey was carried out on 08/10/2019 to test and to monitor how each unit stands up to the climate, how durable they are and to improve maintenance procedures.

7.1 ORCAS

A total of 20 Orcas were observed. 23 Orcas were originally installed. The vast majority of weepers appeared to be blocked with debris/silt, (refer to figure 39). 4 units were found to be showing signs of minor damage; this included slight or moderate levels of darkened surfaces and tyre marks on the unit (refer to figure 40). 14 Orcas were found to be showing signs of major damage; including damage to the top surface and loose or missing bolts (refer to figure 41). 3 Orcas were found to be missing (refer to figure 42) and 2 units were found to be in good conditions.

The graph and table below, (figure 38 and table 10) show the survey results for Orcas along Adelphi Street's soft segregated cycle lanes, categorised by observed conditions.

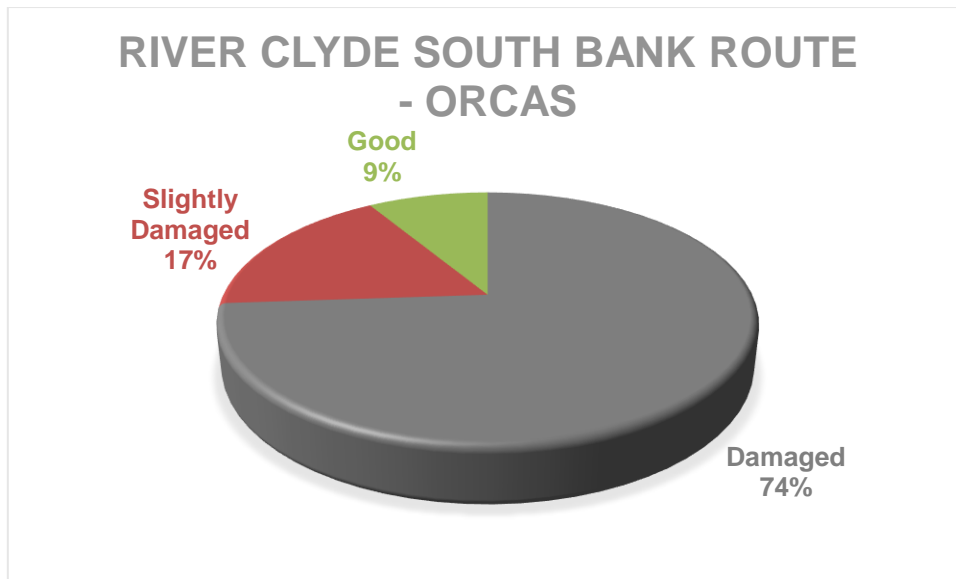


Figure 38: survey result for Orcas on the River Clyde South Bank Route.

Observations	Damaged	Slightly Damaged	Good
23	17	4	2

Table 10: survey result for Orcas on the River Clyde South Bank Route.

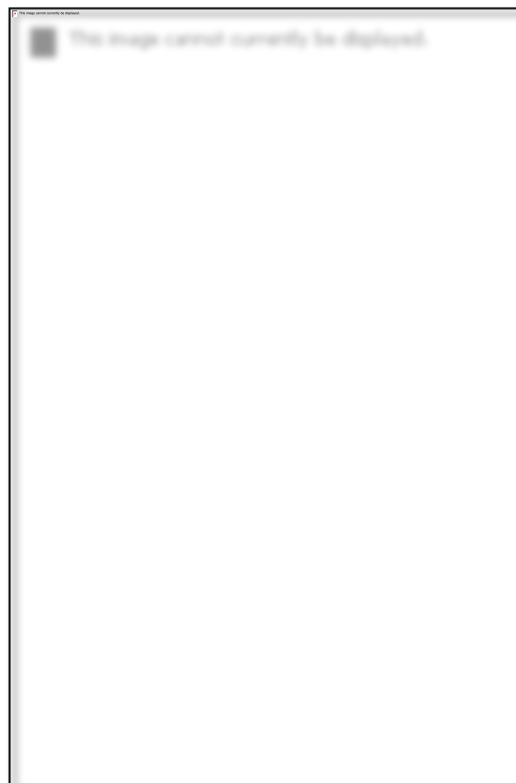


Figure 39: example of Orca's weepers blocked by debris/slit.



Figure 40: example of minor damage due to Orca on the River Clyde South Bank Route due to darkened surface.



Figure 41: example of major damage to Orca on the River Clyde South Bank Route.



Figure 42: example of missing Orcas on the River Clyde South Bank Route.

7.2 PASSIVELY SAFE IMPACT BOLLARD

A total of 17 units were observed. 23 units were originally installed. 11 bollards were damaged (refer to figure 44); including displaced bollards and units with loose or missing bolts, (refer to figure 45). 6 units were missing, 1 unit was slightly damaged and 5 bollards were found to be in good conditions (refer to figure 46).

The graph and table below, (figure 43 and table 11) show the survey results for bollards along the River Clyde South Bank Route's soft segregated cycle lane, categorised by observed conditions.

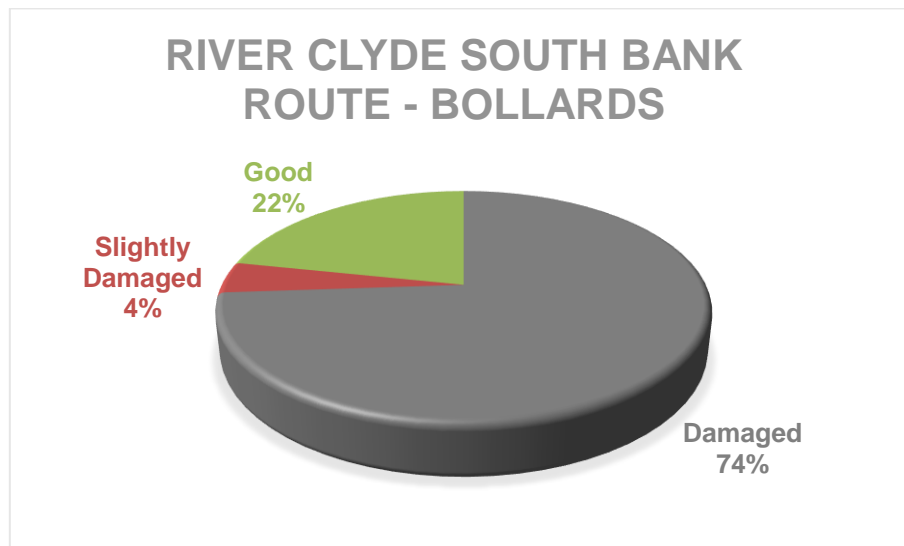


Figure 43: survey results for Passively Safe Impact Bollards on the River Clyde South Bank Route.

Observations	Damaged	Slightly Damaged	Good
23	17	1	5

Table 11: survey results for Passively Safe Impact Bollards on the River Clyde South Bank Route



Figure 44: example of damaged bollard on the River Clyde South Bank Route.



Figure 45: example of a displaced bollard and a unit with loose/missing bolts on the River Clyde South Bank Route.



Figure 46: example of bollard in good conditions on the river Clyde South Bank Route.

8 CYCLE LANE SOFT SEGREGATION – WALLACEWELL ROAD

In 2017, 209 Orcas and 12 Passively Safe Impact Bollards were installed on Wallacewell Road, in between Northgate Road and Hillhead Road. At this location, Wallacewell Road comprises two lanes of motorised traffic separated in the middle by a grass verge with a single direction soft segregated cycle route on the outer side of each of the two traffic lanes.

A review survey was carried out on 22/10/2019 to test and to monitor how each unit stands up to the climate, how durable they are and to improve maintenance procedures.

8.1 ORCAS

A total of 209 Orcas were observed. This number coincides with the number of units originally installed. The vast majority of weepers appeared to be blocked with debris/silt, (refer to figure 48). 74 units were found to be showing signs of minor damage; this included slight or moderate levels of darkened surfaces and tyre marks on the unit (refer to figure 49). 5 Orcas were found to be showing signs of major damage; including damage to the top surface, extreme darkening and loose or missing bolts (refer to figure 50). 130 Orcas were found to be in good conditions.

The graph and table below, (figure 47 and table 12) show the survey results for Wallacewell Road's soft segregated cycle lanes, categorised by observed conditions.

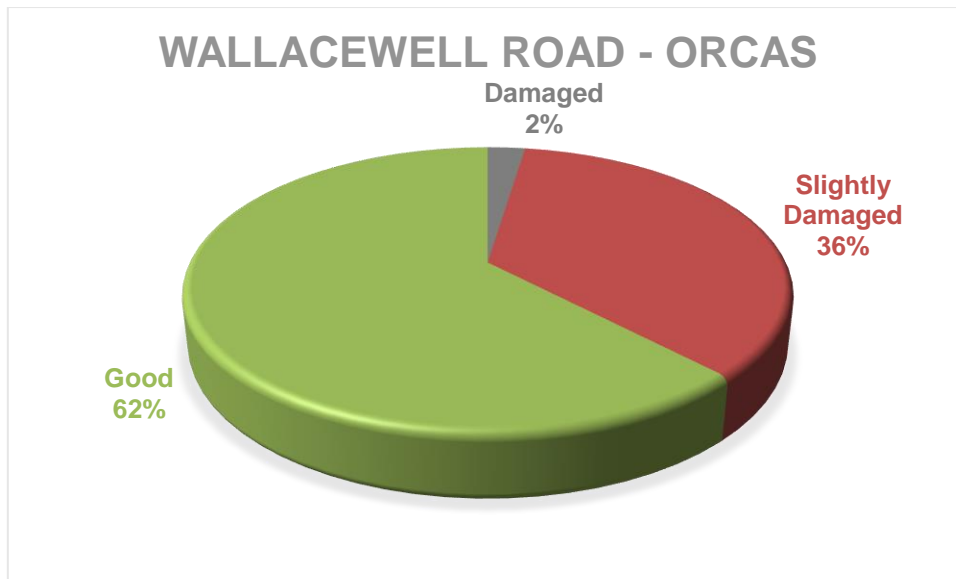


Figure 47: survey results for Orcas on Wallacewell Road.

Observations	Damaged	Slightly Damaged	Good
209	5	74	130

Table 12: survey results for Orcas on Wallacewell Road.



Figure 48: example of Orca's weepers blocked by debris/slit on Wallacewell Road.



Figure 49: example of Orca's slight damage due to the unit's darkened surface as observed on Wallacewell Road.



Figure 50: example of damaged Orca on Wallacewell Road.

8.2 PASSIVELY SAFE IMPACT BOLLARDS

A total of 12 units were observed. This number coincides with the number of units originally installed. 1 bollard was damaged (refer to figure 52) and 11 bollards were found to be in good conditions.

The graph and table below, (figure 51 and table 13) show the survey results for bollards along the segregated cycle lanes on Wallacewell Road, categorised by observed conditions.

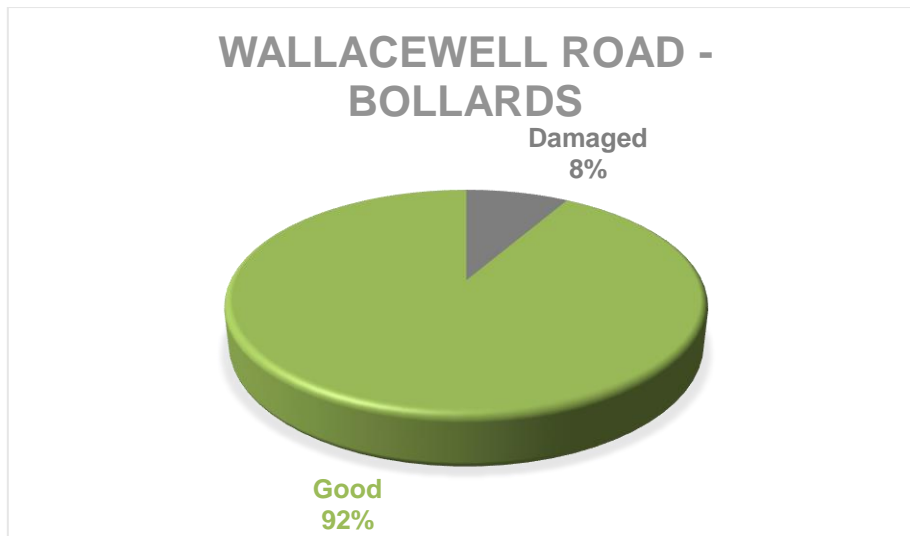


Figure 51: survey results for bollards on Wallacewell Road.

Observations	Damaged	Slightly Damaged	Good
12	1	0	11

Table 13: survey results for bollards on Wallacewell Road.



Figure 52: damaged bollard on Wallacewell Road.

9. CYCLE LANE SOFT SEGREGATION - BERKELEY STREET

In 2011, 11 cycle lane Defenders were initialled on Berkeley Street, in between North Claremont Street and Argyle Street. The soft segregation forms a 22 m bidirectional cycle lane on the southern side of the carriageway which merges eastbound into the hard segregation for Berkeley Street towards Anderston.

A review survey was carried out on 25/07/2019 to test and to monitor how each unit stands up to the climate, how durable they are and to improve maintenance procedures.

9.1 CYCLE LANE DEFENDERS

A total of 11 units were observed. This number coincides with the number of units originally installed. 4 Defenders were damaged (refer to figure 54) and 7 Defenders were found to be slightly damaged (refer to figure 55), mainly as a consequence of the reflective strips peeling off and minor deterioration to the surface due to impact.

The graph and table below, (figure 51 and table 14) show the survey results for cycle lane Defenders along the soft segregated cycle lane on Berkeley Street, categorised by observed conditions.

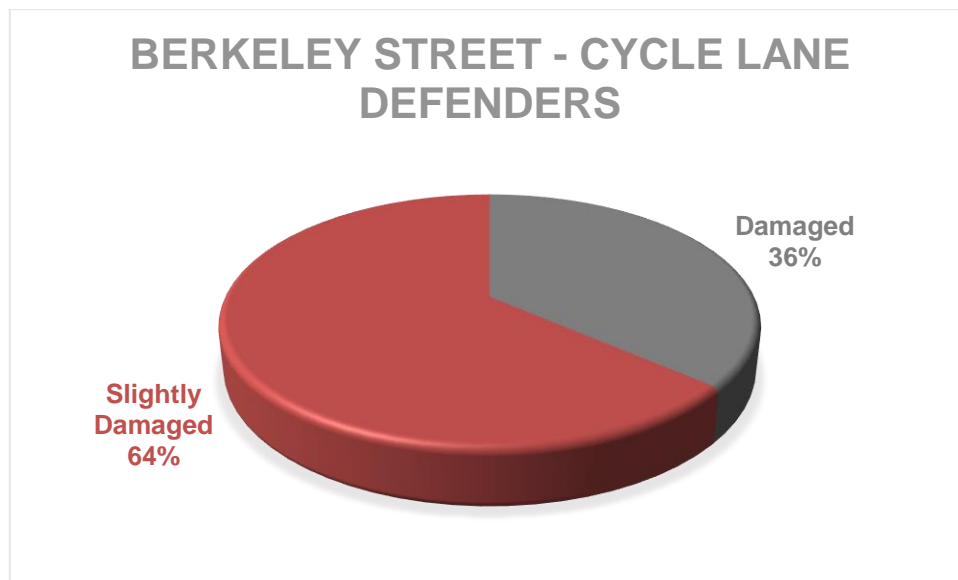


Figure 53: survey results for cycle lane Defenders on Berkeley Street.

Observations	Damaged	Slightly Damaged	Good
11	4	7	0

Table 14: survey results for cycle lane Defenders on Berkeley Street.



Figure 54: example of damaged Defender on Berkeley Street.



Figure 55: cycle lane Defender on Berkeley Street showing signs of minor damage.

10. RECOMMENDATIONS AND CONCLUSION

The surveys have demonstrated how well the soft segregation products in place have performed through the years since installation.

It is necessary to highlight that a maintenance plan should be in place in order to address the following points:

- Blocking of weep holes in Orcas, Defenders and Armadillos due to accumulation of debris and/or slit;
- Regular cleansing of Orcas and Armadillos to clean darkened surfaces;
- Regular replacement of reflective strips on cycle lanes Defenders; and
- Regular inspections to check loose or missing bolts and broken or missing units.

For further installation of Bollards it is recommended for the products to be resin in rather than bolted.

It is recommended to investigate means to cleanse the surface of Orcas especially those installed under trees and to include the Routes to Knightswood in GCC's new Multihog 'Cleansing and de-icing' programme in order to remove foliage from the cycleway which increase blockage of weep holes on soft segregation products.

GCC will repeat the survey twice in 2020, in April and October in order to gather additional data on the effects of deterioration.

Such data will be recorded and visualised on ArcGIS and a degradation factor will be generated following all data gathering.

A final data analysis in late 2020 will inform GCC on a maintenance plan for soft segregated routes.

Following the successful 'soft' segregation trial on Aikenhead Road and the further permanent 'soft' segregation on the other sites mentioned in this report, GCC is looking at using 'light' segregation products to expand the city's cycle network.

[illegible]

11.2 APPENDIX 2 – GLASGOW BRIDGE

Glasgow Bridge			
Survey date	24/09/2013		
Site location	Glasgow Bridge		
Direction of data collection	Sothbound		
Installation	2016		
Redweld Orcas			
Observations	Damaged	Slightly Dama	Good
2	1	1	0
2	1	1	0
2	1	1	0
2	1	1	0
2	1	1	0
2	1	1	0
2	1	1	0
2	1	1	0
2	1	1	0
2	1	1	0
2	1	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
Total no. of Observations	Subtotal - Damaged	Subtotal - Slightly Damaged	Subtotal - Good
53	13	40	0

11.3 APPENDIX 3 – ROUTES TO KNIGHTSWOOD PARK

Routes to Knightswood Park	
Survey date	25/03/2019
Site location	Lincoln Road and Archerhill Road
Installation	2018
Direction of data collection	Lincoln Road towards Archerhill Road

Bollards				
Observations	Damaged	Slightly Damaged	Good	
2	1	0	1	
2	1	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
1	0	0	1	
Total no. of Observations	Subtotal - Damaged	Subtotal - Slightly Damaged	Subtotal - Good	
16	2	0	14	

[illegible]

Dyke Road

Direction of data collection: southbound

Bollards					
Observations:	Damaged	Slightly Damaged	Good		
	2	0	1		
	2	0	1		
	1	0	1		
	1	0	0		
	1	0	0		
	1	0	0		
	1	0	0		
	1	0	0		
	1	0	0		
	0	0	0		(
	0	0	0)
	0	0	0		(
	0	0	0)
	0	0	0		(
	0	0	0)
Total no. of Observations	Subtotal - Damaged	Subtotal - Slightly Damaged	Subtotal Good		
10	0	2			

[illegible]

Routes to Knightswood Park	
Survey date	25/03/2013
Site location	Lincoln Road and Archerhill Road
Installation	2018
Direction of data collection	Lincoln Road towards Archerhill Road

Bollards			
Observations	Damaged	Slightly Damaged	Good

Rediweld Orcas			
ons	Damaged	Slightly Damaged	Good

[illegible]

Dyke Road

Direction of data collection: southbound

Bollards			
Observations	Damaged	Slightly Damaged	Good

Rediweld Orcas			
Observations	Damaged	Slightly Damaged	Good

[illegible]

Routes to Knightswood Park

Survey date

25/09/2013

Site location

Lincoln Road and Archerhill Road

Installation

2018

Direction of data collection

Lincoln Road towards Archerhill Road

Bollards

Observations	Damaged	Slightly Damaged	Good

11.4 APPENDIX 4 – WALLACEWELL ROAD

[illegible]

[illegible]

Wallacewell
Project - Summary

Bollards

Observations	Damaged	Slightly Damaged	Good
12	1	0	11

Rediweld Orcas

Observations	Damaged	Slightly Damaged	Good
209	5	74	130

11.5 APPENDIX 5 – RIVER CLYDE SOUTH BANK ROUTE

River Clyde South Bank Route

Survey date	08/10/219
Site location	Adephi Street
Installation	2016
Direction of data collection	Westbound

Bollards

Observations	Damaged	Slightly Damaged	Good
3	1	1	1
2	1	0	1
2	1	0	1
2	1	0	1
2	1	0	1
1	1	0	0
1	1	0	0
1	1	0	0
1	1	0	0
1	1	0	0
1	1	0	0
1	1	0	0
1	1	0	0
1	1	0	0
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1			

11.6 APPENDIX – AIKENHEAD ROAD

[illegible]

11.7 APPENDIX 7 – BERKELEY STREET

Berkeley Street			
Survey date	25/07/219		
Site location	Berkeley Street		
Installation	03/07/1905		
Direction of data collection	Westbound		
Cycle Lane Defenders			
Observations	Damaged	Slightly Damaged	Good
2	1	1	0
2	1	1	0
2	1	1	0
2	1	1	0
1	0	1	0
1	0	1	0
1	0	1	0
Total no. of Obsevation	Subtotal - Damaged	Subtotal - Slightly Damaged	Subtotal - Good
11	4	7	0

11.8 APPENDIX 8 – GRAND TOTAL OF INSTALLED SOFT SEGREGATION UNITS BY PRODUCT TYPE

Grand Total														
Orcas					Bollards					Armadillos				
Site	Observations	Damaged	Slightly Damaged	Good	Site	Observations	Damaged	Slightly Damaged	Good	Site	Observations	Damaged	Slightly Damaged	Good
Glasgow Bridge	53	13	40	0	Glasgow Bridge	0	0	0	0	Glasgow Bridge	0	0	0	0
Lincoln Road and Archerhill Road	216	7	136	73	Lincoln Road and Archerhill Road	16	2	0	14	Lincoln Road and Archerhill Road	0	0	0	0
Dyke Road	166	4	40	122	Dyke Road	10	0	2	8	Dyke Road	0	0	0	0
Wallacewell Road Westbound	119	5	55	59	Wallacewell Road Westbound	6	1	0	5	Wallacewell Road Westbound	0	0	0	0
Wallacewell Road Eastbound	90	0	19	71	Wallacewell Road Eastbound	6	0	0	6	Wallacewell Road Eastbound	0	0	0	0
Adelphi Street	23	17	4	2	Adelphi Street	23	17	1	5	Adelphi Street	0	0	0	0
Aikenhead Road	30	0	1	29	Aikenhead Road	15	2	0	13	Aikenhead Road	30	14	16	0
Berkeley Street	0	0	0	0	Berkeley Street	0	0	0	0	Berkeley Street	0	0	0	0
	697	46	295	356		76	22	3	51		30	14	16	0

Dividing Islands					Cycle Lane Defenders				
Site	Observations	Damaged	Slightly Damaged	Good	Site	Observations	Damaged	Slightly Damaged	Good
Glasgow Bridge	0	0	0	0	Glasgow Bridge	0	0	0	0
Lincoln Road and Archerhill Road	0	0	0	0	Lincoln Road and Archerhill Road	0	0	0	0
Dyke Road	0	0	0	0	Dyke Road	0	0	0	0
Wallacewell Road Westbound	0	0	0	0	Wallacewell Road Westbound	0	0	0	0
Wallacewell Road Eastbound	0	0	0	0	Wallacewell Road Eastbound	0	0	0	0
Adelphi Street	0	0	0	0	Adelphi Street	0	0	0	0
Aikenhead Road	4	1	0	3	Aikenhead Road	26	9	17	0
Berkeley Street	0	0	0	0	Berkeley Street	11	4	7	0
	4	1	0	3		37	13	24	0