University of Northampton

Report

Active Quarter: Brackmills Industrial Estate 2022 – Active Travel and Physical Activity Infrastructure

For Brackmills Business Improvement District

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01/11/2022

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Suggested citation: Ryan, D. J., Tonkin, T.N., Hardwicke, J. (2022). Active Quarter: Brackmills Industrial Estate 2022 – Active Travel and Physical Activity Infrastructure. University of Northampton, Northampton, United Kingdom.

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Non-technical Summary

The University of Northampton conducted an audit of the footpaths and cycleways through Brackmills Industrial Estate, Northampton, using open-source data from the Census 2011, 2019 English Indices of Deprivation and OpenStreetMap (OSM) for desk-based mapping as well as a site visit to review existing street furniture that has been reported to influence walking and cycling levels. The report provides a detailed audit of the Industrial Estate, and the subsequent recommendations from this work are outlined below.

Recommendations

Short-Term

- Review the wayfinding in the Industrial Estate to cover minor gaps in the current provision and ensure clarity in route signage.
- Update the information board maps to align with existing finger post signs and Brackmills BID branding.
- Review vegetation maintenance schedule to reduce the encroachment of vegetation onto shared use paths and streetlights.
- Review missing or broken streetlighting.
- Targeted active travel support to employees who live within the 20-minute walking and cycling boundaries, e.g., eBike trials.

Medium-Term

- Review crossing points along the footpaths and cycleways to ensure they meet LTN 1/20 standard.
- Work with employers to provide secure cycle parking, storage, and shower facilities.
- Removal of chicanes and bollards that do not meet LTN 1/20 standard.

Long-Term

- Review the provision of bus shelters and seating across the Industrial Estate so employees can shelter during bad weather and pedestrians have places to rest if they are unable to walk for long uninterrupted periods.
- Review all footpaths, cycleways, and shared use paths to determine upgrades needed to meet LTN 1/20 standard across the Industrial Estate.

1. Introduction

Brackmills Industrial Estate is a Business Improvement District (BID) which advocates the use of footpaths, cycleways, and country parks throughout the Industrial Estate to enhance employee and visitor wellbeing, as well as promoting active travel from the surrounding areas. These amenities are viewed as a unique selling point for the estate and the BID have invested in new signage, landscaping, and cycle route maintenance over the past 10-years. In the current BID Business Plan (2019 – 2024), several objectives focus on improvements for footpaths and cycleways:

- Working with partners to maintain and improve, where necessary, the general condition and appearance of roads, footpaths, cycleways and verges throughout the industrial estate;

- Improve lighting where possible on roads and footpaths generally and in particular at vulnerable junctions, parking bays and place of more frequent pedestrian activity to ensure safety of all road and footpath users**;**

- In collaboration with landlords, businesses and the local authorities, maintain signage and all street furniture in a good, clean condition.

Brackmills Industrial Estate is situated within the Active Quarter, a space of collective urban greenspace in the South-East of Northampton Town Centre, identified as a hub for greenspace wellbeing initiatives. The geography of the Estate provides an off-road green corridor cycle and walking route that connects into segments of the Northampton Green Infrastructure Plan (C: East-West Pedestrian and Cycle Link, D: Town Centre Waterside, E: Delapré, F: Washlands and Eastern Nene), which has an objective to 'develop and promote greener, more attractive and better-connected walking and cycling routes as an alternative to driving.'[1]

The encouragement of greater active travel and recreational physical activity within the estate is, in-part, dependent upon the 'quality' of the infrastructure and the service area that visitors are feasibly able to walk, cycle, or eScoot, to the estate from home. Therefore, the University of Northampton conducted an audit of the cycling and walking infrastructure in Brackmills Industrial Estate (Figure 1), drawing upon Government recommendations from LTN 1/20[2] and Gear Change[3] as well as wider academic physical activity literature. An interactive map has been created to display the audited route and pinpoint wayfinding and street furniture that may influence cycling and walking within the Industrial Estate (Figure 4). The findings throughout this report are linked to the interactive map, which includes pictures and videos of the route.

[1]Northampton Borough Council (2016), Northampton green infrastructure plan, URL: https://www.northampton.gov.uk/downloads/file/12162/10-green-infrastructure-plan.
[2]Department for Transport (2020), Local Transport Note 1/20, URL: https://www.gov.uk/government/publications/cycle-infrastructure-design-ltn-120.
[3]Department for Transport (2020), Gear Change: a bold vision for cycling and walking, URL: https://www.gov.uk/government/publications/cycling-and-walking-plan-for-england.

Figure 1. Footpaths (orange dotted line) and cycleways (red dotted line) within Brackmills Industrial Estate (white area) were audited for this report.

2. Service Area Analysis

2.1. Approach

The accessibility assessment involved the identification of 'service areas' in proximity to fixed entry points to the Brackmills Industrial Estate. Here, Isochrones – the zones delimiting access within a given criterion – were generated using the OpenRouteService ver. 1.5.2 Plugin in QGIS ver. 3.22[4]. Entry points onto the Industrial Estate were identified and all analysis were underpinned by a network analysis considering footways, paths, and other pedestrian or cycle-friendly routes included on the OpenStreetMap. The accuracy of the resulting service area is contingent on the completeness of the attributes stored within these data (e.g. the path type), and accuracy of the mapped footpath network. The outcomes of this analysis should be viewed with these limitations in mind.

Distances are a known barrier to active commuting and travel[5]. Encouraging individuals who typically commute over relatively short distances to switch to active travel is seen as an effective method to reduce car usage[6]. In this assessment we generated time-based (20 minute) measures of accessibility as isochrones to eighteen estate entry points using the 'foot-walking' OpenRouteService profile. This profile generates isochrones assuming a constant 5 km/hr pace that is consistent across all waytypes on the OpenStreetMap (e.g. `footways`, `paths`, `steps`). Use of these isochrones provides an opportunity to assess access within a 20-minute neighbourhood – a concept for promoting active travel recommended by the Department for Transport[7].

An assessment of the number of individuals in each service area using population and deprivation estimates at the Lower Layer Super Output Area (LSOA) level of spatial aggregation. We ran a further iteration of this analysis using the 'cycling-regular' profile using a 20-minute ride time (section 2.3.). The cycle profile may be contingent on the recorded data in the route classification, surface type, and track type. This analysis is enriched using data extracted from the English Indices of Deprivation (2019)[8] dataset and the Propensity to Cycle Tool (PCT)[9]. For the latter we use the origin-destination (OD) related data which are derived from questions on workplace location and mode of travel in the 2011 Census for England and Wales. We report on the numbers of individual from various origins commuting in to the LSOA that encompasses the Brackmills Industrial Estate (Northampton 28D).

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[4]QGIS Development Team 2022. QGIS Geographic Information System. Open Source Geospatial Foundation Project. http://qgis.osgeo.org.

[5] Nelson, N.M., Foley, E., O'Gorman, D.J., Moyna, N.M. and Woods, C.B. (2008) Active commuting to school: how far is too far? *International Journal of Behavioral Nutrition and Physical Activity*, **5**(1), 1-9.

[6]Petrokofsky, C. and Davis, A. 2016. *Working Together to Promote Active Travel – A briefing for local authorities*. London: Public Health England.

[7]Department for Transport 2022. Guidance Active travel: local authority toolkit. Available at URL: https://www.gov.uk/government/publications/active-travel-local-authority-toolkit/active-travel-local-authority-toolkit#what-active-travel-means.

[8]Ministry of Housing, Communities & Local Government (2019) English indices of deprivation. Available at URL: https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019.

[9]Lovelace, R., Goodman, A., Aldred, R., Berkoff, N., Abbas, A., Woodcock, J., 2017.The Propensity to Cycle Tool: An open source online system for sustainable transport planning. *Journal of Transport and Land Use*. 10(1), 505–528.

2.2. Walking – 20-Minute Neighbourhood

Excluding areas within the Industrial Estate, the OpenRouteService produced 20-minute foot-walking isochrone encloses a range of land cover types. The area in hectares for the land cover falling within the 20-minute walking service area can be seen below (Table 1). The 20-minute isochrone includes the village of Little Houghton to the east of the Brackmills Industrial Estate, which is located within the Rushmills District Ward. The 20-minute isochrone also indicates reasonable accessibility for the residents of Hardingstone and Wootton (Nene Valley District Ward), and some access for residents in the Delapré and Briar Hill District Ward, but more limited access to the Park, Abington, and Castle District Wards. For all data, print-quality A3 maps are included in the appendix.

Table 1. Land cover classes[10] for areas within the 20-minute walking service area (excluding the BID) as generated using the 'foot-walking' OpenRouteService profile.

Land Cover Map 2021	Hectares	Percent
Neutral grassland	160.1	14.7
Improved grassland	228.8	21.0
Arable	219.3	20.2
Suburban	232.5	21.4
Urban	78.2	7.2
Coniferous woodland	2.4	0.2
Freshwater	47.5	4.4
Deciduous woodland	118.8	10.9

A total of 15 Lower Super Output Areas (LSOAs) were identified to intersect with the 20-minute neighbourhood for walking. Indices of deprivation (deciles) – where low scores indicate the most deprived areas – are presented in Figure 2 (lower panel) and Table 2. One of the LSOAs (E01027257) falls within the most deprived decile for the overall index of multiple deprivation (IMD). Four LSOAs fall within the most deprived (<4) deciles for Health Deprivation and Disability.

Nine LSOAs fall within the least deprived deciles (>8) for living environment, however scores for the outdoor subdomain index – derived from traffic incidents and air quality – varied across the study area (Table 2). In terms the total numbers of commuters into the area, the PCT dataset (see Lovelace *et al.*, 2017) indicates 125 individuals commuted by foot into E02005677 (Northampton 28D) - the aggregated zone that encompasses the Brackmills Industrial Estate - at the time of the 2011 Census. Of the 125 walking commuters recorded in these data, 80 (64%) started their journeys from a LSOA *intersecting* the 20-minute walking neighbourhood. The areas with the highest number of walking commuters into the area (n = 15) originated from the LSOAs located in the Delapré and Briar Hill and Castle District wards (Figure 2 upper panel).

[10]Marston, C.; Rowland, C.S.; O'Neil, A.W.; Morton, R.D. (2022). Land Cover Map 2021 (land parcels, GB). NERC EDS Environmental Information Data Centre. https://doi.org/10.5285/398dd41e-3c08-47f5-811f-da990007643f.

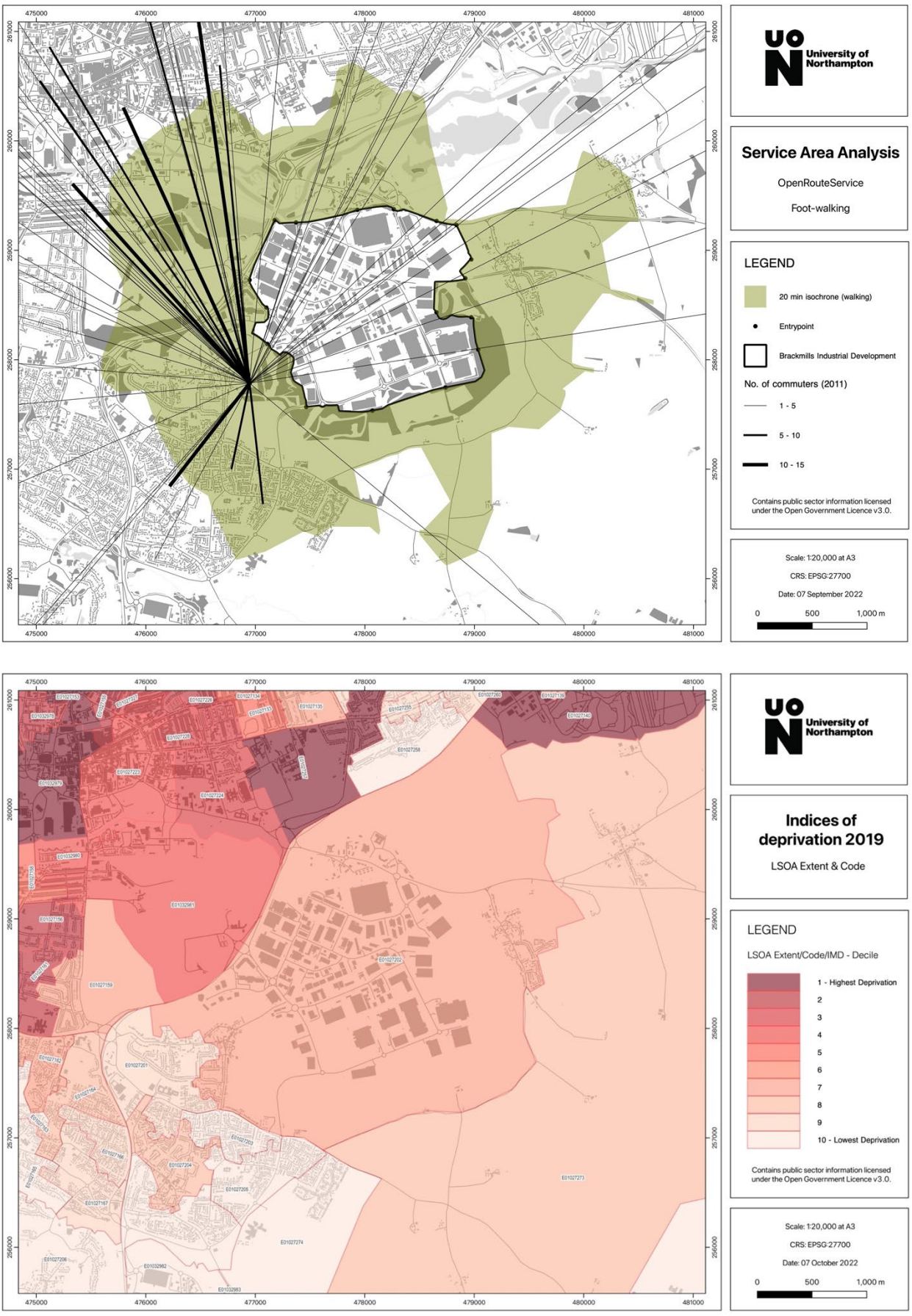


Figure 2. Upper panel: Service area analysis for the Brackmills Estate. Walkable areas within a 20-minute isochrone generated via OpenRouteService. The number of walking commuters (OD 'desire lines') into the LSOA (Northampton 28D) as of 2011 is derived from the PCT tool. Lower Panel: English Index of Multiple Deprivation and LSOA codes for areas in and around the 20-minute walking service area. *Note: A full size (A3) version of this map can be found in the supplementary materials and printed to scale.*

Table 2. LSOAs located within the 20-minute service area (using the 'foot-walking' profile) and the associated deciles from the 2019 English Indices of Deprivation dataset. Note: See supplementary materials for maps annotated with the relevant LSOA codes.

LSOA	% of area in the 20-MIN[1]		IMD[2]	Inc[3]	Emp[4]	Edu[5]	HDD[6]	Cri[7]	Env[8]	Out[9]	TotPop[10]	WorkPop[11]
	Walking	Cycling										
E01027203	100	100	10	10	10	8	8	10	9	5	1,709	1,053.75
E01027205	96	100	10	10	10	9	8	9	10	7	2,245	1,330.25
E01027206	0	100	10	10	10	9	9	8	9	6	2,951	1,605.5
E01027258	37	100	10	10	10	9	8	8	8	4	1,390	876.25
E01027274	1	100	10	10	10	9	10	9	9	10	1,702	921
E01027201	69	100	9	8	9	7	7	8	10	7	2,184	1,230
E01027164	1	100	8	10	10	6	7	6	8	5	1,554	1,038.25
E01027204	14	100	8	7	7	7	6	8	8	6	1,817	1,044.25
E01027273	8	100	8	7	7	7	8	7	6	10	1,785	880.25
E01027159	31	100	7	8	7	5	5	4	4	3	1,266	703.5
E01027202	86	100	7	7	6	7	6	10	9	10	1,506	800.5
E01027223	9	100	4	5	5	4	2	1	4	2	2,701	2,198.25
E01032980	0	100	4	5	6	3	3	1	7	4	1,531	1,164.5
E01027224	59	100	3	3	3	4	2	2	5	2	1,962	1,304.25
E01027257	32	100	1	3	1	5	1	4	8	5	1,520	889.25

[1]20-minute neighbourhood – percentages rounded to 0 decimal place; [2]Index of Multiple Deprivation (IMD) Decile; [3]Income decile; [4]Employment; [5] Education; [6]Health Deprivation and Disability [7]Crime; [8]Living Environment; [9]Outdoors sub-domain; [10]Total Population – entire LSOA; [11]Working Population – entire LSOA.

2.3. Cycling - 20-Minute Neighbourhood

The 20-minute cycling isochrone covers a service area encompassing a large proportion of Northampton Town (Figure 3 upper panel), extending into Hunsbury Hill, Kingsthorpe, Boothville, Billing Park, and various villages to the south and east of the town. Within this 20-minute neighbourhood nine nearby LSOAs were identified in 2011 Census (Lovelace *et al.*, 2017) PCT dataset as having more than five cyclists commuting into E02005677 (Northampton 28D) at the time of the 2011 Census. Data extracted from the PCT indicates a total of 175 commuters cycled into the area for work. Linked to this, 89% (n = 156) of the commuting cyclists started their journeys in LSOAs that intersected the 20-minute cycling neighbourhood. LSOAs within the Castle district ward had the highest share of commuting cyclists into the area (Figure 3 lower panel).

The PCT utilises these data to predict the maximum potential of cycling for active travel based on the distance and hilliness of commuter routes. In the 'Go Dutch' scenario, the PCT looks at each trip and estimates how likely a Dutch person would be to cycle that trip, using the formula the PCT calculated with Dutch data. For example, its estimated that a 2 km, 1% average gradient trip has a 46% probability of being cycled in the Netherlands. The PCT helps to identify where an authority might wish to consider initially investing in cycling infrastructure, to start unlocking some of this potential.

In the LSOAs within a 20-minute *walking* neighbourhood of the Industrial Estate, the 'Go Dutch' scenario estimates an average 17%-point increase in commuter cycling per LSOA (Census 2011: 2% cycling to work, 'Go Dutch': 19% cycling to work) if there were substantial improvements to local cycling infrastructure. This predicted change in commuter cycling is estimated to reduce sick-leave by 148 days per LSOA, on average, and associated sick leave costs by £19,383 per LSOA, on average[11]. In total, achieving the 'Go Dutch' scenario could result in an extra 2,629 people cycling to work (Brackmills and elsewhere in Northampton), in the LSOAs surrounding the Industrial Estate (Table 3). It is recommended that Brackmills BID provide targeted active travel support to employees who live within the 20-minute walking and cycling boundaries, e.g., eBike trials, and that Brackmills BID works with employers to provide secure cycle parking, storage, and shower facilities, which research has highlighted as behavioural nudges that encourage active commuting[12].

[11]Propensity to Cycle Tool (2019), User Manual D: Using the PCT in business cases, URL: https://www.pct.bike/manual.html.

[12] Heinen, E., Maat, K. & van Wee, B. The effect of work-related factors on the bicycle commute mode choice in the Netherlands. Transportation 40, 23–43 (2013). https://doi.org/10.1007/s11116-012-9399-4.

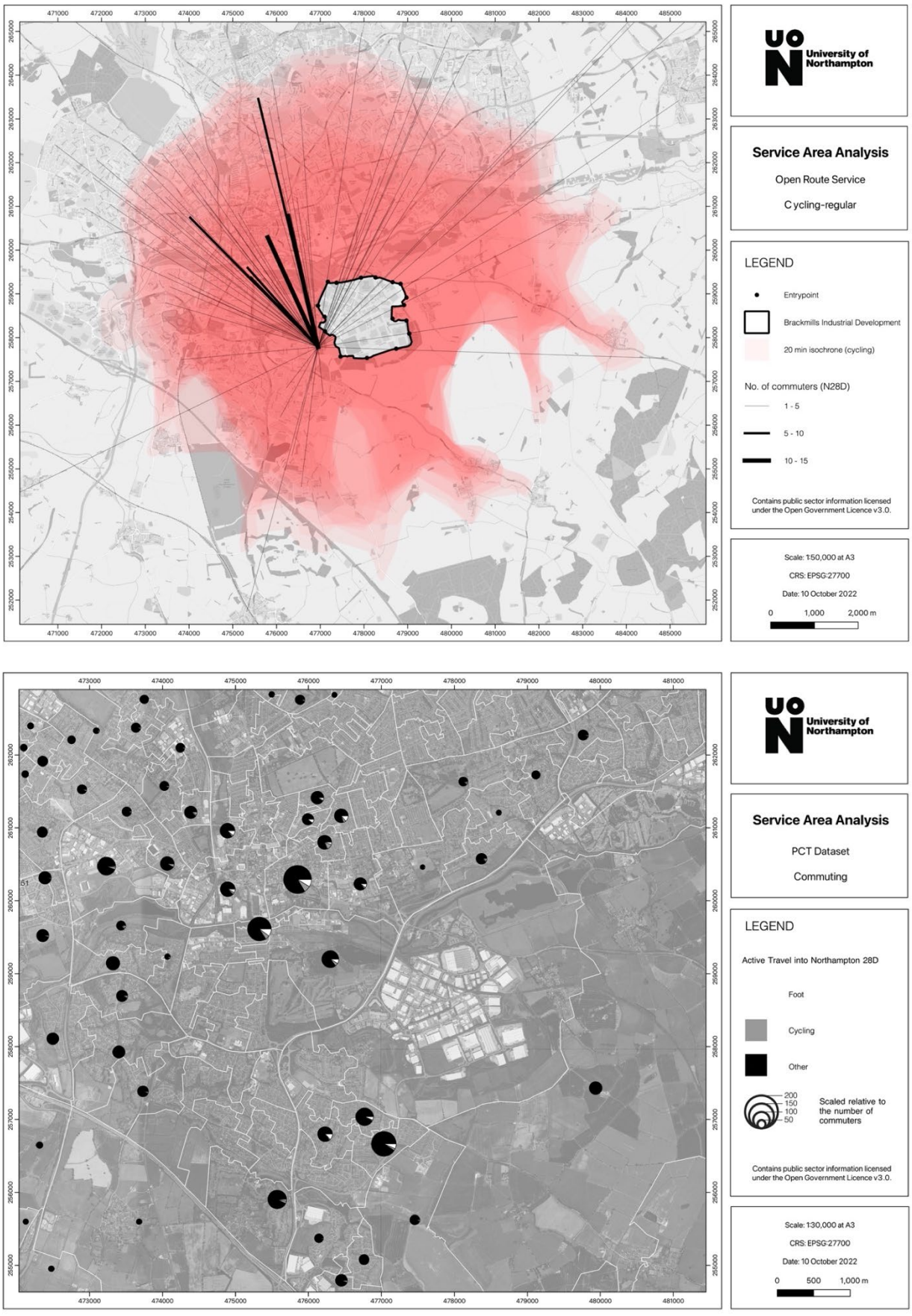


Figure 3. Upper panel: The 20-minute service area for cycling. The darker intensity (red) depicts locations falling within the service area for multiple entry points. These data are displayed alongside PCT Census 2011 data, with the origin and destination lines and number of commuters cycling to the Northampton 28D LSOA. Lower Panel: Combined data for Active commuting into the Northampton 28D LSOA as of the 2011 Census. Data extracted from the PCT tool. *Note: A full size (A3) version of this map can be found in the supplementary materials and printed to scale.*

Table 3. Propensity to Cycle Tool predicted change in commuter cycling levels from LSOAs in the "Go Dutch" scenario.

LSOA	Census 2011			'Go Dutch' scenario				
	%Cycling	Absolute (*n*)	Total Commuters (*n*)	%Cycling	Absolute (*n*)	%-point change in Cycling	Change in sick leave days (*n*)	Change in sick leave cost (£)
E01027203	2	15	818	19	154	17	-152.1	19,936
E01027205	1	12	1096	17	190	16	-206.2	27,023
E01027206	1	13	1290	14	182	13	-253.7	33,239
E01027258	3	22	734	22	165	19	-172.1	22,554
E01027274	1	7	692	9	61	8	-107	14,024
E01027201	2	20	986	20	195	18	-180.7	23,675
E01027164	2	17	868	17	144	15	-163.3	21,394
E01027204	2	13	809	19	157	17	-150.2	19,684
E01027273	1	7	746	13	96	12	-185.9	24,355
E01027159	3	18	620	23	141	20	-130	17,038
E01027202	3	19	656	20	130	17	-128	16,775
E01027223	3	39	1173	23	265	20	-104.3	13,672
E01032980	2	18	899	24	220	22	-111.9	14,666
E01027224	3	28	874	27	250	24	-79.7	10,449
E01027257	3	14	473	24	115	21	-93.6	12,262
Average	2	17	849	19	164	17	-148	19,383

Model utilises Census 2011 origin-destination data. In all the PCT scenarios (apart from gender equity) cycling potential is calculated using a function based on trip distance (people are more likely to cycle a shorter trip than a longer trip) and hilliness (people are less likely to cycle a trip involving hills). In the "Go Dutch" scenario the PCT looks at each trip and estimates how likely a Dutch person would be to cycle that trip, using the formula the PCT calculated with Dutch data. For example, its estimated that a 2km, 1% average gradient trip has a 46% probability of being cycled in the Netherlands. So, in the "Go Dutch" scenario the PCT would assign this 46% probability to all 2km 1% average gradient trips. URL: https://www.pct.bike/m/?r=northamptonshire. Date Accessed: 07.10.2022.

3. Inventory of Signage and Furniture

3.1 Overview

Location data were collected using a Reach RS+ Global Navigation Satellite Systems setup in a rover configuration. All data were collected using the British National Grid (EPSG: 27700) and the Ordnance Survey's Newlyn (ODN) vertical datum (EPSG: 5701). No post-processing was applied to these data and the positional accuracy for these data expressed as a root-mean-square (RMS) error is typically >4 metres. We retained attribute fields for point quality, OS grid reference, and feature type at the observation location (benches, signage, bollards, information board). A video survey was conducted on the footpaths and cycleways noted on the Discover Brackmills map as published by Brackmills BID covering ~ 10 km of cycleways and footpaths. This video survey was undertaken using a cycle-mounted digital camera (GoPro Hero ver. 8 (Sensor size/type: CMOS 1/2.3"). All data were collected at 60 frames per second and resolution of 1920 x 1080 in 'Activity' mode. These data were processed to remove pedestrians and archived in .MP4 format (H.264, AAC) on an unlisted YouTube account, while original videos were deleted from local hard drives. Data were collected in October 2022.

Members of the public should contact the research team if they want their personal data removing from any of the processed videos – E: Declan.ryan@northampton.ac.uk

The audited route and associated observation points are viewable at (Figure 4): https://arcg.is/q11iL0.

An interactive map of the route segment videos is viewable at (Figure 4): https://arcg.is/1H41zD0

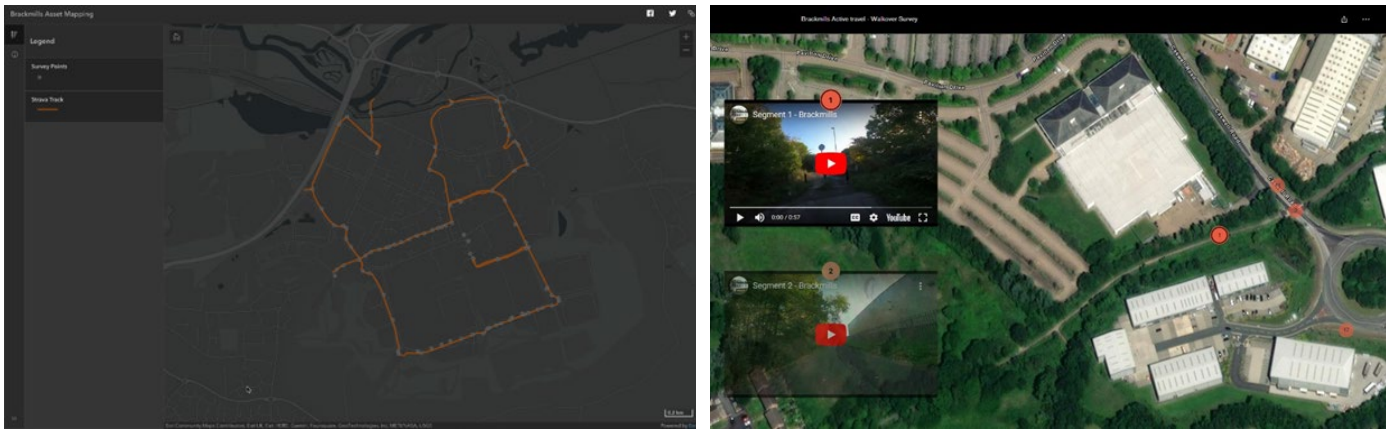


Figure 4. Example Interactive map (left) displaying the audited route with wayfinding and street furniture locations and segmented videos (right) of the audited route. Please see the links provided above to access these data.

3.2. Wayfinding

Directional Signs

The footpaths and cycleways are coherently signposted with finger post signs implemented at each point of decision to direct users to the surrounding destinations. Most of the signs are visible, clean, and pointing in the correct direction. Signs that require attention are listed below.

- Although there are finger posts on the right-fork of the path on the Queensbridge cycleway entrance (Image 1), there is no finger posts for the left-fork. The finger posts could be moved to the lamppost with a new left pointing finger post to direct users to Liliput Road, Brackmills Country Park, Crescent Fishing Lake, Gowerton Road, Salthouse Road, Hardingstone, and Great Houghton.

- A right finger point sign could be added to the exit point of the cycleway onto Liliput Road to direct users to Brackmills Country Park, Crescent Fishing Lake, Gowerton Road, Salthouse Road, Hardingstone, and Great Houghton (Image 2).

- The finger posts are not visible due to overgrown vegetation as users emerge from the Thomas Dachser Way cycleway (Image 3). The finger posts could be moved to an existing post on the highway, which is away from vegetation and in the line of sight of users.

- At the entrance to Brackmills Country Park on Salthouse Road, there is no finger post to direct users to Gowerton Road, even though it was listed on previous signs along the same route (Image 4). This finger post would be important for users emerging from the Sketty Close cycleway.

- The finger posts on the Salthouse Road to Sketty Close cycleway requires cleaning as the information is not legible (Image 5).

- There is overgrown vegetation blocking the finger posts on the Rhosili Road roundabout (Image 6).

- Finger posts on the slipway exit of the A45 towards Delapré Lake and Hardingstone Dyke appear to be facing the wrong way and require cleaning (Image 7).

Images 1. Queensbridge cycleway entrance (point 24). **2.** Exit onto Liliput Road (point 25). **3.** Overgrown vegetation blocking finger posts on the Salthouse Road exit from Thomas Dachser Way cycleway (point 35). **4.** Missing finger post for Gowerton Road on Salthouse Road (point 40). **5.** Dirty finger post makes it difficult to read the information, on the cycleway connecting Salthouse Road to Sketty Close (point 43). **6.** Overgrown vegetation on the Rhosili Road roundabout (point 82). **7.** Finger posts facing the wrong way on the A45 slipway exit (point 87). Click the link to locate the exact point location: https://arcg.is/q11iL0.

Information Boards

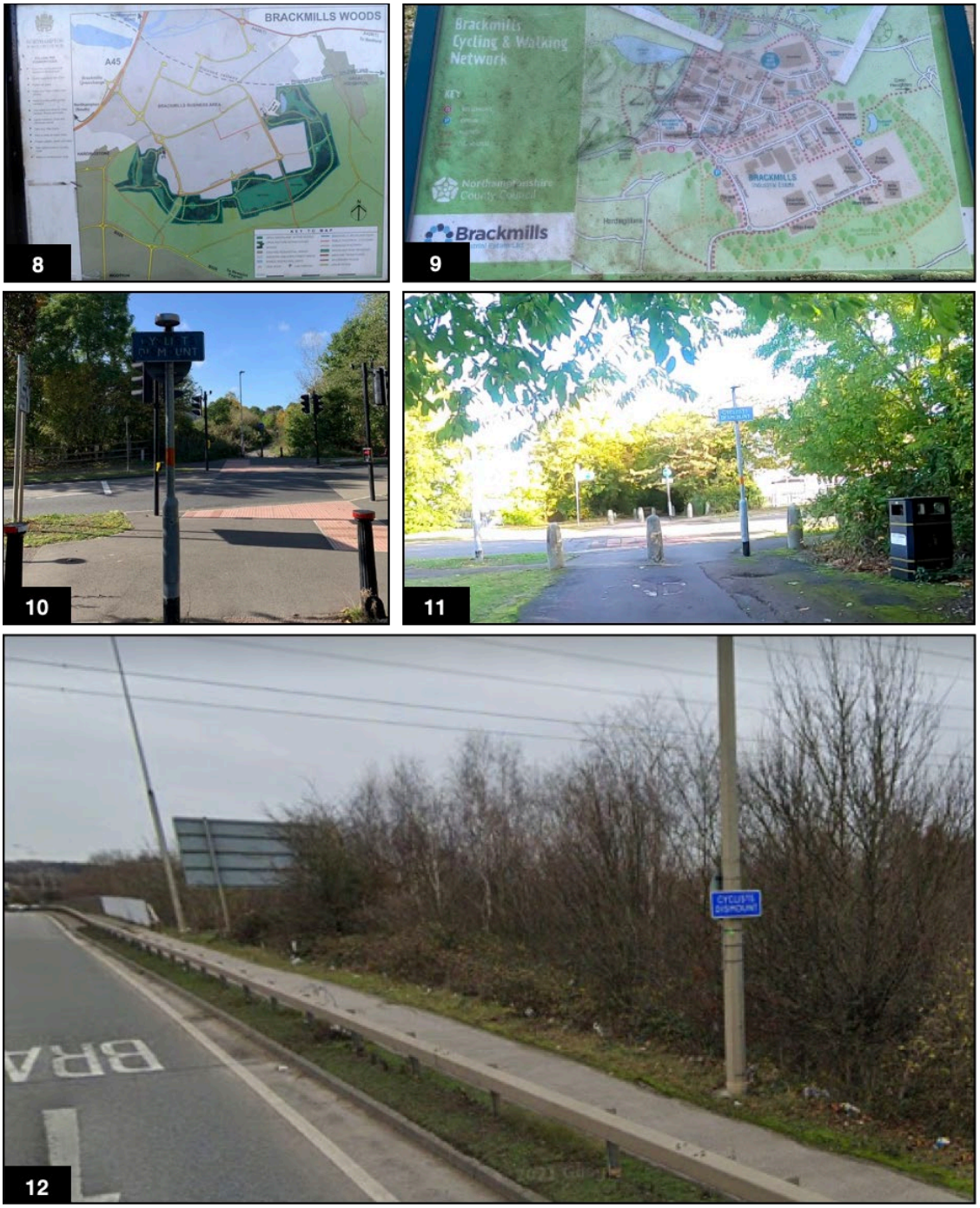
Maps are frequently placed within Information Boards on the Industrial Estate. The maps are branded with the old Northamptonshire County Council or Northampton Borough Council logos and in some cases are damaged (Images 8 and 9). Thus, the maps are due an update. It is recommended that any updates to the maps include:

- Orientation of the map in the same direction as the viewer is facing;
- Street names on the map;
- Sketches/photos of significant buildings and other landmarks;
- Isochrones showing typical walk/cycle times;
- Align with information that is provided on finger point signs;
- 'You are here' location markers.

Cyclist Dismount Signs

The Department for Transport LTN 1/20 reports that the CYCLISTS DISMOUNT sign to TSRGD diagram 966 should not normally be used on a well-designed facility, it is very rarely appropriate and represents a discontinuity in the journey, which is highly disruptive. It should only be used in situations where it would be unsafe or impracticable for a cyclist to continue, or at the complete termination of a route, for example at a railway station forecourt. It should be kept in mind that some people with mobility impairments will be unable to dismount.

There will seldom be justification for using the sign where a cycle route crosses or joins a carriageway. Therefore, it is recommended that the presence of 'Cyclist Dismount' signs are reviewed across the Industrial Estate (Images 10 – 12). For example, if the presence of Cyclist Dismount signs on the A45 are to encourage cyclists to use the routes through the river Nene, then this is causing 1.2 km (0.75 miles) diversion, whereas the direct route across the bridge between the dismount signs is 0.2 km (0.12 miles) (Image 12).



Images 8. Brackmills Woods map (point 39). **9.** Information board example (point 4). **10.** Dismount sign on the cycleway crossing on Caswell Road (point 4). **11.** Dismount sign on the cycleway crossing on Salthouse Road (point 20). **12.** Dismount sign on the shared path along the A45 (point 86). Click the link to locate the exact point location: https://arcg.is/q11iL0.

3.3. Crossing Points

Updates to the Highway Code

The recent changes to the Highway Code[13] now give priority to pedestrians and cyclists going straight-on at junctions. A review of the junctions in the Industrial Estate, particularly business driveways, is recommended to ensure the infrastructure can support these changes to the Highway Code. A recent survey suggests that driver knowledge about these new 'changes in priority' is low (32% awareness)[14], which is a safety concern for vulnerable road users in the Industrial Estate.

Highway Code 2022

The updated code clarifies that:

- when people are crossing or waiting to cross at a junction, other traffic should give way
- if people have started crossing and traffic wants to turn into the road, the people crossing have priority and the traffic should give way
- people driving, riding a motorcycle or cycling must give way to people on a zebra crossing and people walking and cycling on a parallel crossing

A parallel crossing is similar to a zebra crossing, but includes a cycle route alongside the black and white stripes.

Side Road Crossings

It is recommended that the BID review the junctions in the Industrial Estate to determine whether amendments are required to protect the most vulnerable road users. For example, there are junctions indicating that pedestrians and cyclists should Give Way at the junction (Image 13), which means they currently lose priority. Even though these junctions clearly state who has priority, the junctions do not align with LTN 1/20 and are also not consistently implemented across the Industrial Estate. Section 10.5 of LTN 1/20 provides guidance to create vulnerable road user priority junctions (Image 14).

Tactile Paving

Across the Industrial Estate, there are instances of missing blister surfaces at uncontrolled junctions, which does not align with Department for Transport guidance on the use of Tactile Paving Surfaces:

The blister surface should be installed at designated controlled and uncontrolled crossing points:

• where the footway has been dropped flush with the carriageway
• where the carriageway has been raised to the level of the footway

Where side street entry treatments provide an uncontrolled crossing facility they should be treated as per an in-line uncontrolled crossing.

The images provide illustrative examples of missing blister surfaces at uncontrolled crossings along the footpaths and cycleways within the Industrial Estate (Images 15 – 18). Image 16 identifies a missing

[13]Department for Transport (2022), The Highway Code: 8 changes you need to know from 29 January 2022, URL: https://www.gov.uk/government/news/the-highway-code-8-changes-you-need-to-know-from-29-january-2022.
[14]Road CC (2022), Majority of drivers unaware of Highway Code changes, new study suggests, URL: https://road.cc/content/news/majority-drivers-unaware-highway-code-changes-293577.

footpath in its entirety at a roundabout crossing point on the corner of Landimore Road – Gowerton Road. The omission of the footpath appears to be a recent change as there was a complete footpath at this junction as late as March 2021 (according to Google Street View).

Images 13. Salthouse Road sideroad crossing (point 38). **14.** Figure 10.13 from LTN 1/20. **15.** Salthouse Road sideroad crossing (point 38). **16.** Missing footpath on Landimore Road (point 74). **17.** Gowerton Road sideroad crossing (point 75). **18.** Gowerton Road sideroad crossing – second example (point 75). Click the link to locate the exact point location: https://arcg.is/q11iL0.

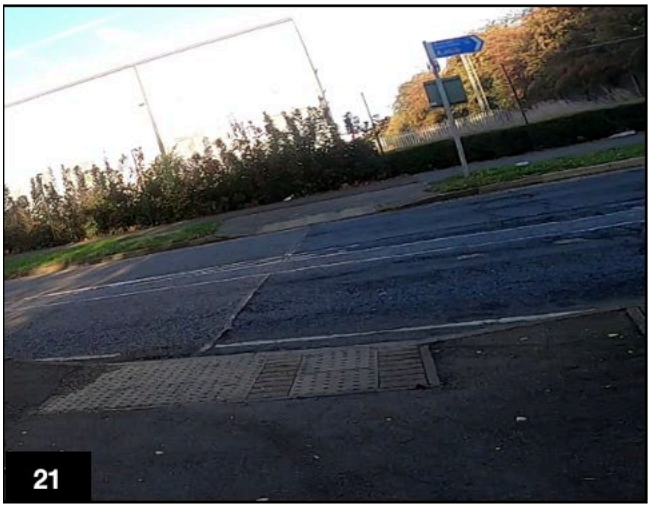
Types of Crossing Points

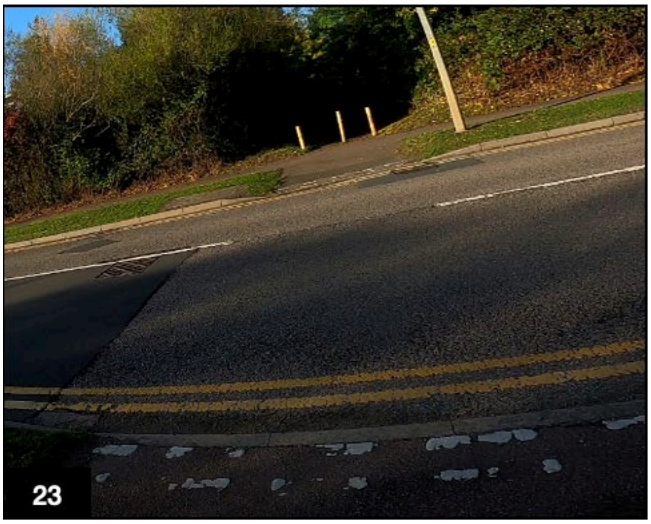
Department for Transport LTN 1/20 recommends that cycle priority or parallel crossings are provided on roads that have a speed limit below 30 mph, total traffic flow between 0 – 4000 pcu, and a maximum number of two lanes to be crossed in one movement.

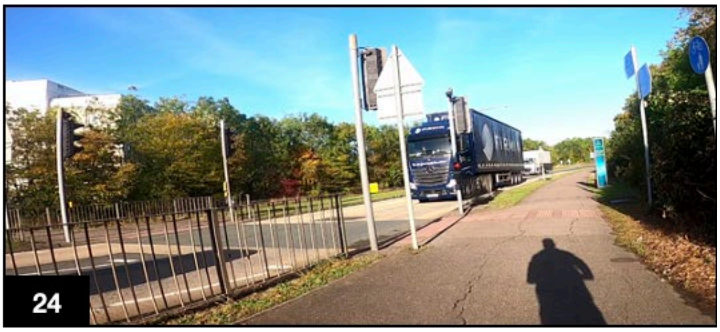
Table 10-2 in LTN 1/20 provides an overview of crossing suitability for different road uses. There are ten crossing points along the footpaths and cycleways where pedestrians and cyclists must cross against the flow of traffic, excluding roundabouts:

- two provide the recommended toucan crossing for the road type (Images 19 and 24),
- three provide a drop kerb with blister surfacing (Images 21, 22, and 28), and
- five provide no blister surfacing (Images 20, 23, 25, 26, and 27).

It is recommended that the eight other crossing points within the Industrial Estate are reviewed in line with LTN 1/20 guidance to determine the need for crossing infrastructure to make the provision suitable for most people.







Images 19. Toucan crossing on Caswell Road (point 4). **20.** Missing crossing and blister surface on Salthouse Road (point 20). **21.** Missing crossing on Burryport Road (point 21). **22.** Missing crossing on Liliput Road (point 23). **23.** Missing crossing and blister surface on Salthouse Road (point 40). **24.** Toucan crossing on Caswell Road (point 83). Click the link to locate the exact point location: https://arcg.is/q11iL0.

Images 25. No pedestrian crossing at the end of the footpath/cycleway on Rhosili Road (point 89). **26.** No pedestrian crossing or drop kerb to access Sketty Close from the Caswell Road exit (point 46). **27.** No pedestrian crossing or drop kerb to access Sketty Close from the Salthouse Road shared path (point 44). **28.** Missing crossing on Thomas Dachser Way (point 33). Click the link to locate the exact point location: https://arcg.is/q11iL0.

3.4. Pavement Quality

The report captured videos of the pavement conditions on the footpaths and cycleways that were audited (Image 29), which can be reviewed in the future planning of the Industrial Estate. Much of the route was shared use paths between pedestrians and cyclists. These paths are suitable where pedestrian traffic is low.

Department for Transport LTN 1/20 recommends a minimum width of 3.0 metres for shared use paths (Image 30). Future planning may investigate the feasibility of increasing the provision of cycleways throughout the Industrial Estate so high-quality infrastructure reaches each business on the estate. LTN 1/20 states that the conversion of existing footways to shared use should only be considered when options that reuse carriageway or other (e.g., verge) space have been rejected as unworkable. There are instances where vegetation is encroaching on footpaths, and it is recommended that regular trimming and verging of vegetation is conducted to maintain shared use path width (Images 31 and 32).

Images 29. Sunken footpath on Salthouse Road (point 37). **30.** Example of shared use path over 3.0 metres wide (point 6). **31.** Example of encroaching vegetation on Liliput Road (point 26). **32.** Salthouse Road shared use path under 3.0 metres wide and encroached by vegetation (point 35). Click the link to locate the exact point location: https://arcg.is/q11iL0.

3.5. Bollards and Chicanes

Chicane barriers cannot be used by people on tandems, tricycles, cargo bikes, adapted bicycles and people with child trailers. They may also be inaccessible to some types of wheelchair and mobility scooters. An access control that requires cyclists to dismount will exclude hand cyclists and others who cannot easily walk.

An alternative method is to provide bollards at a minimum of 1.5 metre spacing, which allows users to approach in a straight line whilst permitting all types of cycle and mobility scooters to gain access. If access is required by wider maintenance vehicles, a lockable bollard can be used. Bollards and barriers should contrast with the background and may be fitted with retroreflective material to ensure they can easily be seen in all conditions. Images 33 - 44 identify chicanes or bollards that do not conform to these LTN 1/20 standards.

Images 33. Chicane on Liliput Road (point 27). **34.** Chicane on Thomas Dachser Way (point 33). **35.** Houghton Hill – Caswell Road bollards do not meet standard (point 4). **36.** Caswell Road – middle gap meets standard (point 4). **37.** Liliput Road do not meet standard (point 23). **38.** Burryport Road do not meet standard (point 21). **39.** Salthouse Road to Burryport Road left gap meets standard (point 20). **40.** Salthouse Road to Burryport Road does not meet standard (point 20). Click the link to locate the exact point location: https://arcg.is/q11iL0.

Images 41. Caswell Road to Salthouse Road does not meet standard (point 20). **42.** Thomas Dachser Way to Salthouse Road does not meet standard if the gate is shut (point 35). **43.** Brackmills Country Park entrance does not meet standard (point 39). **44.** Salthouse Road to Sketty Close does not meet standard (point 41). Click the link to locate the exact point location: https://arcg.is/q11iL0.

3.5. Benches and Bins

There are a lack of benches placed along the footpaths and cycleways within the Industrial Estate. The presence of benches can provide a place to rest for pedestrians who may be unable to walk for long uninterrupted distances and are thus recommended to create more inclusive public spaces[15]. The installation of benches across the Industrial Estate could be incorporated with the installation of Bus Stop shelters, which are not currently available at every Bus Stop across the Industrial Estate. Bins are frequently placed along the footpaths and cycleways and subsequently, the Industrial Estate appearance is clean. The presence of litter is an important issue for physical activity as it can be a perceived indicator of crime and thus can cause people to avoid the area[16].

[15]Ottoni, C. A., Sims-Gould, J., Winters, M., Heijnen, M., McKay, H. A. (2016), "Benches become like porches": Built and social environment influences on older adults' experiences of mobility and well-being. Social Science & Medicine, URL: https://doi.org/10.1016/j.socscimed.2016.08.044.

[16]Medway, D., Parker, C., Roper, S. (2016), Litter, gender and brand: the anticipation of incivilities and perceptions of crime prevalence. Journal of Environmental Psychology, URL: https://doi.org/10.1016/j.jenvp.2015.12.002.

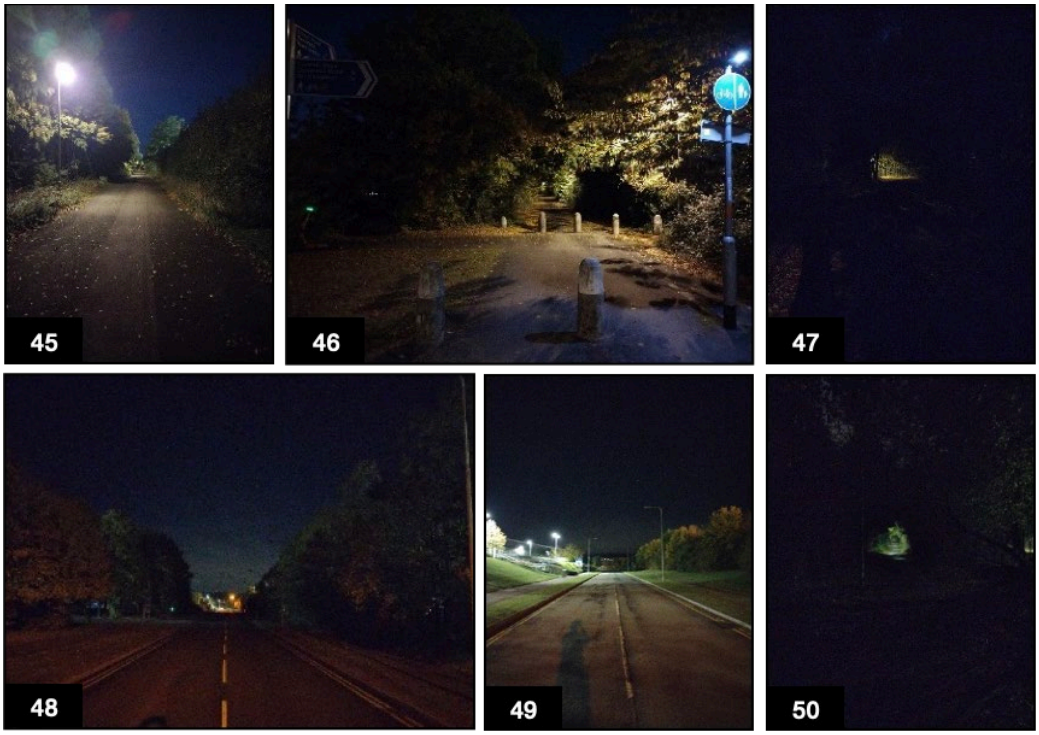
3.6. Street Lighting

The Brackmills Industrial Estate is mostly well lit on the footpaths and cycleways noted on the Discover Brackmills map as published by Brackmills BID covering ~ 10 km of cycleways and footpaths. Images 45 and 46 demonstrate an example of the general lighting provision around the cycleways and footpaths. However, there were a number of streetlights and footpath lights that were not working at the time of assessment which left sections of the route poorly lit. Images 47-50 show the locations where lights were not operating and subsequently had poor visibility. Much of the lighting was also compromised by vegetation along the cycleways, reducing the visibility. There are also three significant sections of cycleways and footpaths on the estate with no lighting provision that are difficult to navigate in the dark, as well as the lack of visibility making it difficult for users to see path quality and potential hazards. The locations of these sections are Queensbridge cycleway entrance to the exit onto Liliput Road, Thomas Dachser Way to Salthouse Road and Salthouse Road to Sketty Close. Many of the bollards throughout the walking and cycle routes do not have reflective material, making visibility difficulty in the dark and present a potential risk of injury to route users. The presence of street lighting is important when hoping to encourage active travel and physical activity behaviours through the potential to reduce crime, increase perceived safety, and facilitating increased likelihood and confidence in using urban spaces in the dark[17, 18]. This is particularly important during winter months where employees on the estate will likely be commuting in reduced daylight. Therefore, it is recommended that:

- The lighting provision on the estate is regularly checked and maintained;
- vegetation blocking lights is maintained;
- sections with no lighting provision are reviewed;
- all bollards are updated with reflective material to ensure visibility when dark.

[17] Chalfin, A., Hansen, B., Lerner, J. et al. Reducing Crime Through Environmental Design: Evidence from a Randomized Experiment of Street Lighting in New York City. J Quant Criminol 38, 127–157 (2022). https://doi.org/10.1007/s10940-020-09490-6

[18] Rahm, J., Sternudd, C. & Johansson, M. "In the evening, I don't walk in the park": The interplay between street lighting and greenery in perceived safety. Urban Des Int 26, 42–52 (2021). https://doi.org/10.1057/s41289-020-00134-6



Images 45 and 46. Caswell Road to Salthouse Road (between points 6 and 20). **47.** Salthouse Road to Burryport Road- Cycleway light not operating (between points 20 to 21). **48 and 49.** Salthhouse Road to Gowerton Road Roundabout - Large sections of streetlights not operating (between points 40 and 51). **50.** Cycleway entrance from Rhosili Road toward Rushmills - Cycleway light not operating (between points 88 and 90). Click the link to locate the exact point location: https://arcg.is/q11iL0.

4. Summary

Brackmills BID are making a concerted effort to improve the walking and cycling infrastructure within the Industrial Estate to increase active travel, physical activity, and wellbeing for employees, residents, and visitors. This is important work due to the influence of the built environment on encouraging active travel and health-promoting behaviours [19], and this report recommends continued efforts in this area. Future steps to encourage, and increase, active travel, physical activity, and wellbeing should place efforts into understanding the social environment of the Brackmills Estate to identify any areas for improvement to meet the strategic aims of Brackmills BID. This has been reported as an important area to understand and account for when encouraging behavioural change toward health-promoting behaviours[12]. This could include exploring factors within the social environment of Brackmills Industrial Estate, such as:

- Attitudes and perceptions of employees toward active travel;
- experiences of active travel;
- current travel behaviours of employees;
- the commuting 'culture' of workplaces on the estate and if this is supported through employer provisions to facilitate active travel and physical activity (e.g. providing facilities and incentives).

In summary, this report has provided a detailed insight to the current active travel and physical activity infrastructure on the Brackmills Industrial Estate. From this, suggestions in this report provide short-, medium-, and long-term opportunities to further enhance the walking and cycling infrastructure within the Industrial Estate.

[19]Losada-Rojas, L. L., Pyrialakou, D., Waldorf, B. S., Banda, J. A., & Gkritza, K. (2022). The effect of location on physical activity: Implications for active travel. Journal of Transport Geography, 104, 103441.