



The Jersey Tornado

1 November 2023

Site investigation report by the Tornado and Storm Research Organisation (TORRO)

SI20231101_Jersey

On 1 November 2023, during Storm Ciarán a strong tornado affected the eastern side of
Jersey in the Channel Islands.

This report covers the findings from the site investigation conducted by Sarah Horton
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Introduction

This is a TORRO report regarding findings from the site investigation following reports of a tornado on the island of Jersey, Channel Islands around midnight 1-2 November 2023.

The tornado occurred during Storm Ciarán, which had been named by the United Kingdom Met Office. The area of low pressure deepened rapidly beneath the left exit of the North Atlantic jet stream at 300hPa as it approached northwest Europe. A broad area of heavy rain spread across the Channel Islands and into southern parts of the UK through the early to mid-evening of 1 November. This was associated with the warm front of the system. A more detailed discussion of Storm Ciarán can be found on the Met Office website¹.

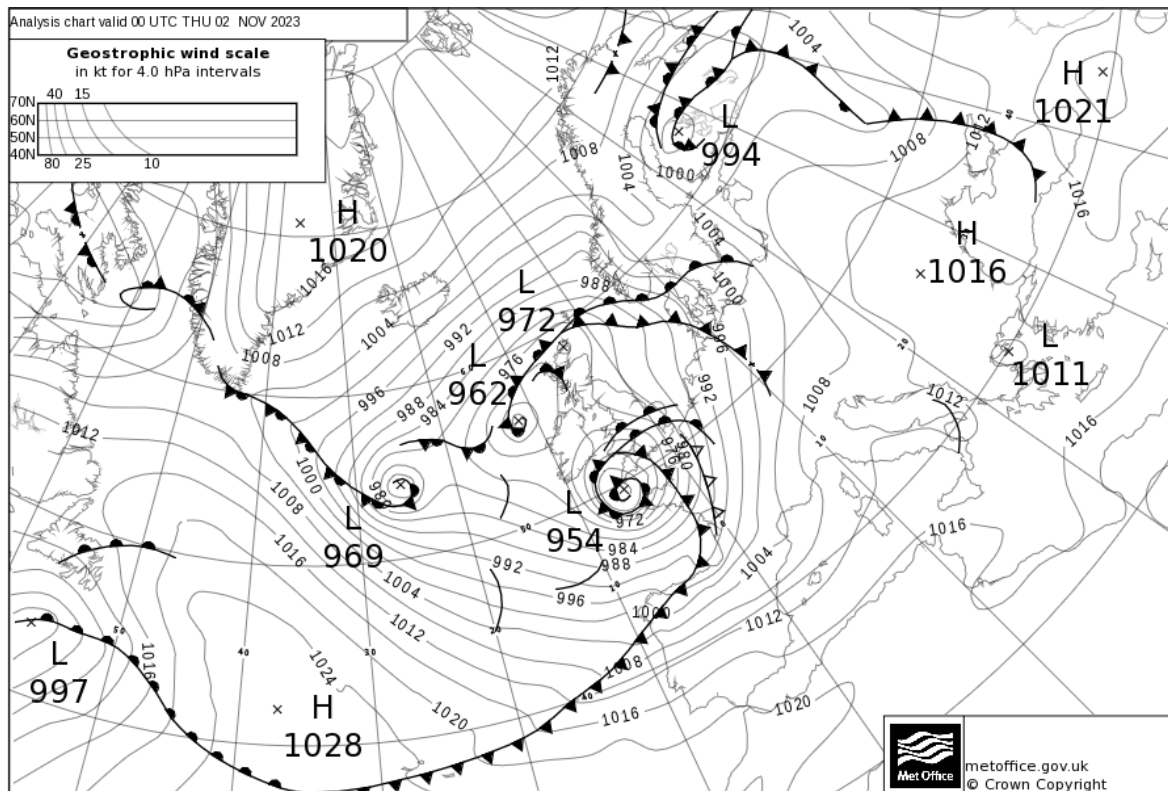


Figure 1: UKMO analysis 00UTC 2 November 2023. (Crown copyright)

Various warnings had been issued that covered the period. In particular, Jersey had issued a red warning² for high winds and flooding. Islanders were urged to stay at home during Storm Ciarán. TORRO had issued a tornado watch³.

At around 2200 UTC, a cluster of showers formed over western Brittany. This cluster evolved into a persistent, single-cell thunderstorm in the warm sector as it moved north-eastward. By 2345 UTC, the leading edge of the precipitation from this cell was across

¹ https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/interesting/2023/2023_09_storm_ciaran.pdf Note: all URLs were accessed in the report 08 January 2024

² <https://www.gov.je/News/2023/pages/stormciaranlatestsafetyadvice.aspx>

³ <https://x.com/TorroUK/status/1719773229164699708?s=20>



Jersey. In addition to the tornado, large hail was reported in parts of Jersey with stones of at least 5cm diameter. The persistence, radar presentation, and subsequent effects in Jersey suggest that this storm was a *supercell* thunderstorm⁴.

During the investigation, an 8km damage track was recorded across east Jersey. It ran from St Clement on the south coast to Fliquet on the north coast. The site investigation was undertaken on 4/5 November 2023 by TORRO Site Investigator Sarah Horton aided by staff from Jersey Met.

As well as the tornado in Jersey, at least two other tornadoes are known to have occurred in association with Storm Ciarán in the British Isles. One was at Loders in Dorset, and the other at Lancing and Sompting in West Sussex. These have been rated T2/3 and T2 respectively.

The following report details the findings of the site investigation⁵.

⁴ Personal communication with Matt Clark, TORRO.

⁵ A summary version of the most severe damage can be found at https://www.torro.org.uk/pdf/SI/SI20231101_Jersey_SupplementaryDamageIndicators.pdf



General notes

The Tornado and Storm Research Organisation (TORRO) is a privately supported research body serving the national and international public interest, specialising in severe convective weather in Great Britain and Ireland. Data collection, research and co-ordination is undertaken by the directors of TORRO, supported by a number of observers, investigators, and other contributors. Work by all TORRO staff is undertaken voluntarily.

The damage locations noted in this report are presented from south to north, in the direction of travel of the tornado. Distances are in metres or kilometres. The discussion has been broken down into individual areas of damage. Key locations are noted by latitude and longitude. Map screenshots are taken from ‘Google My Maps’. A description of the TORRO International Tornado Intensity (T) Scale used to describe tornado strength is presented in Appendix A.

Symbol	Item	Colour	Definition
	Fencing	Green	T1 strength
	Broken windows - house	Yellow	T2 strength
	Trees and vegetation	Orange	T3 strength
	House or substantial outbuilding such as brick barn	Dark Orange	T4 strength
	Debris	Red	T5 strength
	Car	Black	T6 strength
	Campervan	Purple	Debris – uncategorised by strength
	Brick or stone wall	Blue	Reports from members of the public and damage spotted on drone footage – strength unrated
	Outbuildings such as sheds, wooden summerhouses etc.		
	Utility poles		

Table 1: List of symbols used and their meaning, along with colour coding used.

Note that the strength rating at each location is a best estimate, considering factors such as exposure of location, condition of trees and the type of construction/condition of any buildings.



Detailed Site Investigation

Overview

The in-person site investigation took place over two days, 4 November 2023 and 5 November 2023. It was assisted by staff from Jersey Met. Time constraints with additional factors such as the large number of damaged properties, many closed roads and continuing poor weather mean that a great deal of information could not be recorded at the time of the investigation. It should be noted that following the tornado, a few hours later, straight line winds intensified greatly. Jersey airport, on the western side of the island recording a gust of 81Kn and there was widespread wind related damage across the island. A best effort was therefore made to isolate tornadic damage from straight line wind damage, but this may not be exact in every location.

Subsequent to the in-person investigation, additional information was gathered by Jersey residents and from drone footage⁶. This information has been included in the report.

Figure 2 shows an overall map of damage points plotted across Jersey. Figure 3 gives a guide to locations mentioned in the report.

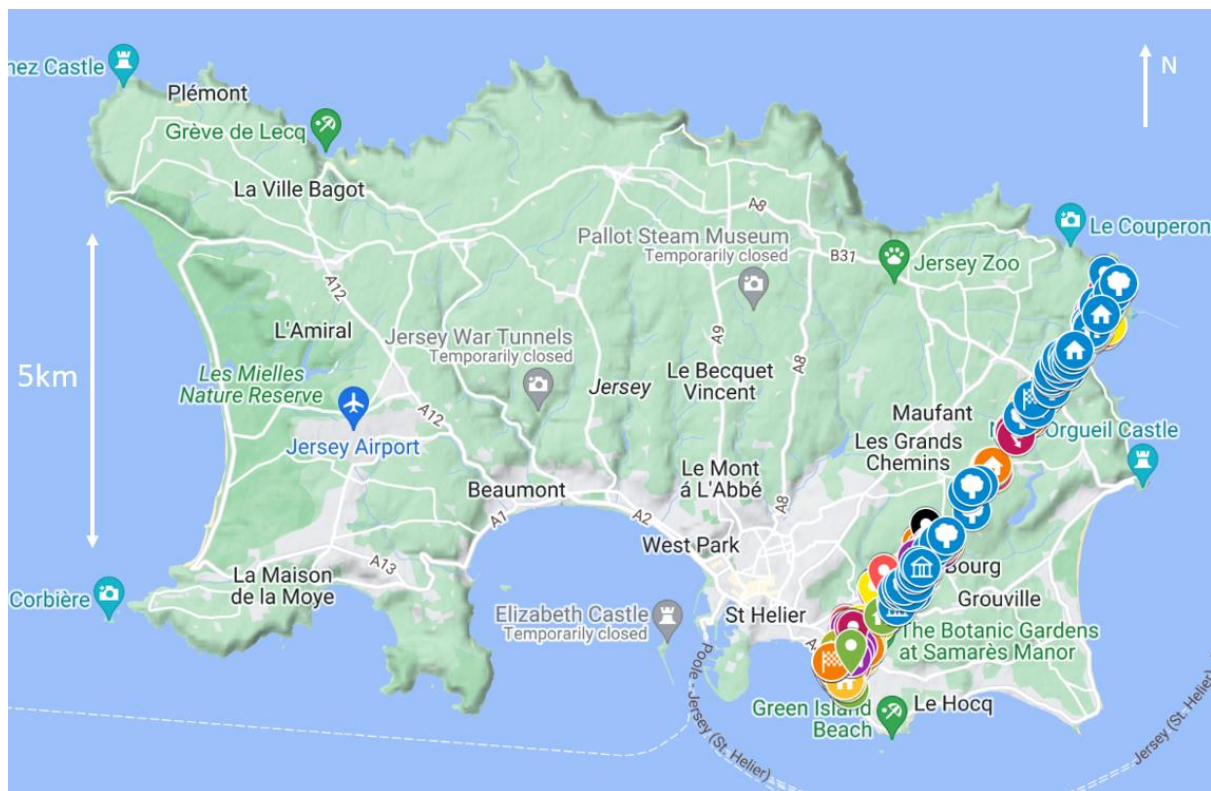
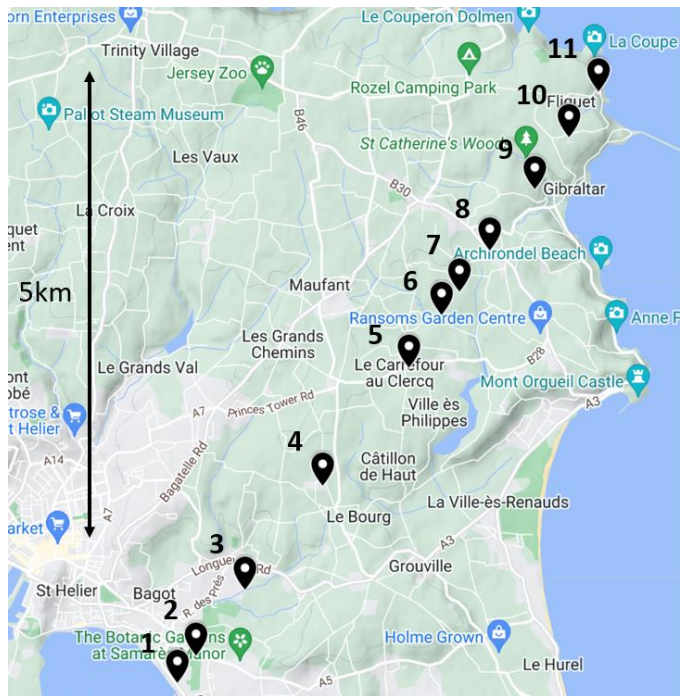


Figure 2: Overview map of Jersey with damage points plotted. All maps contained in this report are oriented northwards.

⁶ https://www.youtube.com/watch?v=Vxdd-UrLIWw&ab_channel=Jerseydronefootage





Guide to locations in report

1. St Clements beach front and Florence Boot Cottages.
2. FB Playing Fields
3. La Rue Des Pres Trading Estate
4. Le Boulivot
5. La Route de la Hougue Blie
6. Rue Saint-Julien
7. Beuvelande Campsite
8. Les Ruettes
9. St Catherine's Woods
10. Fliquet
11. Fliquet Bay

Grey shading represents populated areas.

Figure 3: Guide to locations in report.

1. St Clement beach front and Florence Boot Cottages.



- a) Florence Boot Cottages
- b) St Nicholas Church
- c) Not surveyed
- d) Severely damaged home on St Clement's beach front

Figure 4: Map of damage points in St Clement around the coast and into Florence Boot Cottages.

Damage was found across a 550m swath along the seafront. The most eastern point (49.1697N, -2.0849W) consisted of some missing ridge tiles on a house roof. A nearby brick wall was also found collapsed towards the west. It is unclear whether the damage was definitely tornadic at this point, but it is considered likely as no damage was evident further east along the seafront near to this location.



To the west of this point, at (49.1708N, -2.0854W) a house was spotted with general roof damage on its south-east facing side and was categorised as **T2** damage intensity. Nearby, to the north-west a single layer garden wall had collapsed to the south and north. A car parked close by had multiple windows smashed and dents in the rear nearside door. It was determined that the blocks next to the car were probably intended to hold down a protective tarp rather than having travelled from the wall a few metres away (Figure 5).



Figure 5: Collapsed garden wall and a damaged car parked by it.

To the west of this point, damage became abruptly more intense with the south-western face of properties having lost most or all of their windows on the beachfront face. More substantial roof damage was evident along here and damage was rated at **T3**.

A two-storey brick built residential home (49.1717N, -2.0869W) suffered severe damage to the north-western end of the upper floor. Collapsed walls revealed the interior of the building. The walls fell to the north-west. The roof also appeared to be missing (Figure 6). This damage was rated as **T5**.



Figure 6: Beach front property in St Clement, before and after. This lost a substantial part of the upper floor as well as the roof. All beachside windows were smashed.

100m to the north-west of this location, Tiles had been stripped from both sides of the roof of St Nicholas Church (49.1725N, -2.0876W). People who were clearing up at the church at the time of the investigation felt that the roof structure had been lifted and replaced by the tornado. The bell tower and front fascia of the building were missing (Figure 7).



Figure 7: St Nicholas Church, St Clement. Before (looking from the south) and after (looking from the west).

15m to the north-west of the church, a home, which appeared to be in good condition, had an intact south-west facing roof apart from a beam of wood projecting out of the south-eastern side of the roof. It is uncertain where this debris came from, but there was speculation from people working at the church that it may have come from the church (Figure 8).



Figure 8: Two views of a property close to the sea front which appeared intact other than debris projecting from the south-eastern side of the roof.

Continuing westwards along the coast road there was relatively little damage for around 100m. **T1** roof damage was evident from the footpath with slightly more intense damage around the most westerly point of damage (the junction of Plat Doet Road and La Grand Route de la Côte (49.1738N, -2.0880W).) A window in a garage was said by a resident to have blown outwards. Pieces of guttering were found by the aforementioned resident to be embedded between windows and window frames. A piece of wood, thought to be a joist, flew through the air and smashed tiles and a sun lounger before becoming embedded in an artificial lawn (Figure 9). Residents did not know where this joist had come from. Car and house windows were described as being ‘sandblasted’ and will need replacing.



Figure 9: Damaged roof (left) and embedded roof timber in artificial lawn (right). Credit Angela Little.

Behind St Nicholas Church lies an area known as the Florence Boot Cottages. Numerous houses at this location suffered damage consistent with between **T2-T4** strength. Some homes within a terrace, directly behind St Nicholas Church (49.1728N, -2.0869W), had their roof timbers exposed (Figure 10). Homes showed considerable damage to the render from debris. Some chimneys which fell were noted to have fallen from east to west.



Figure 10: Homes behind St Nicholas with exposed roof joists.



Figure 11: Typical damage to many homes in Florence Boot Cottages. Roof damage and deep gouges to the render.

A block of garages lost their roofs. Rafters were missing and there was no sign of the majority of them (49.1723N, -2.0866W). The garage doors on the north-east face of the garage block had blown inwards (Figure 12).



Figure 12: Block of garages with missing roof.

Overall in this area, while there was a swath of damage 550m across at the beach front, the worst damage was confined to a central core of around 200m across. As well as the upper floor walls of one residential property already mentioned and classified at **T5**, there were numerous other examples of evidence for a strong tornado, including badly damaged roofs and airborne debris causing significant secondary impacts.

2. Florence Boot Playing Fields.



- a) Large recycling bin bounced off a car before landing in the road.
- b) Large beam penetrating lawn. An internal bedroom wall blew down.
- c) 100m long fence damaged.
- d) Pile of debris including 5.4m long wooden beam.
- e) 100m long fence buckled. Severe tree damage and twisted metal structures found here.
- f) Geoff Reed Table Tennis Centre

Figure 13: Map of some of the damage found in this area. Most individual damage and debris points are not indicated. Purple lines denote debris travel.

At the south-western end of Florence Boot Playing Fields, the Geoff Reed Table Tennis Centre (JE2 6QN) was badly damaged (Figure 14), especially across the south-western end where approximately 1/3 of the sheet metal roof was lost. Drone footage shows the damaged front wall fell forward.

Wooden beams (dimensions over 5m long with a cross section of 0.3x0.12m) were lost from the building and were carried 150m across the playing fields to land on the fields, and in at least one case, over a wall into a garden. The beams were estimated to weigh around 100kg (Figure 15). The throw of these beams was assigned a rating of **T6**.



Figure 14: Geoff Reed Table Tennis Centre looking at the south-western face of the building.



Figure 15: Large beam of wood from the Geoff Reed Table Tennis Centre thrown 150m north-west.

Spread across the field was a 200m wide swath of debris. Intense damage to trees and the southern and northern boundary fences occurred for 100m across both sides of the field, indicating the strongest core area of wind in this part of the track. The metal fence posts were bent north-eastwards in places and metal structures were torn and twisted, indicating **T4** damage. In the carpark to the north of Florence Boot Playing Fields, a large metal clothes recycling bank rolled onto a car before landing on the road approximately 40m from where it started. A lamp post, apparently hit by debris, folded to the road. Both of these were assigned **T5**.



Figure 16: Metal structures torn and twisted at the southern side of Florence Boot Playing Fields.

At the same home where the large wooden beam landed (49.1745N, -2.0847W), there was **T3** roof damage. A resident of these cottages (pictured in Figure 15) was clearing up damage and was happy to show some of the damage that occurred. He described lying in his low-profile bed, when suddenly the window shattered, and debris flew just above him. He said that “Tiles and stuff like that shot like a cannon across the room.” His internal bedroom wall blew down. He said that he left the room rapidly and sheltered downstairs.



Figure 17: Houses on the northern boundary of Florence Boot Playing Fields where the internal bedroom wall blew down. The boundary fence can be seen to be badly damaged.

70m to the north-west of these houses (49.175N, -2.0856W) a sports complex known as 'Island Padel' suffered severe damage to the canopy metal structures (Figure 18).



Figure 18: Island Padel sports pavilion was badly damaged. (Before image included for comparison).

Structures around Florence Boot Playing Fields exhibited damage consistent with **T3-T5** and the throw of wooden beams from the Geoff Reed Table Tennis Centre was assigned a **T6** rating.

A tight core of damage of around 100m across was centred within this track. Heavy objects were thrown some distance and there was severe damage to roofs and to the internal structure of one home.

North of this area, for a distance of around 600m lay a golf course. Damage was evident along the entire length of track here, where the track intersected with trees.



3. La Rue Des Pres Trading Estate.

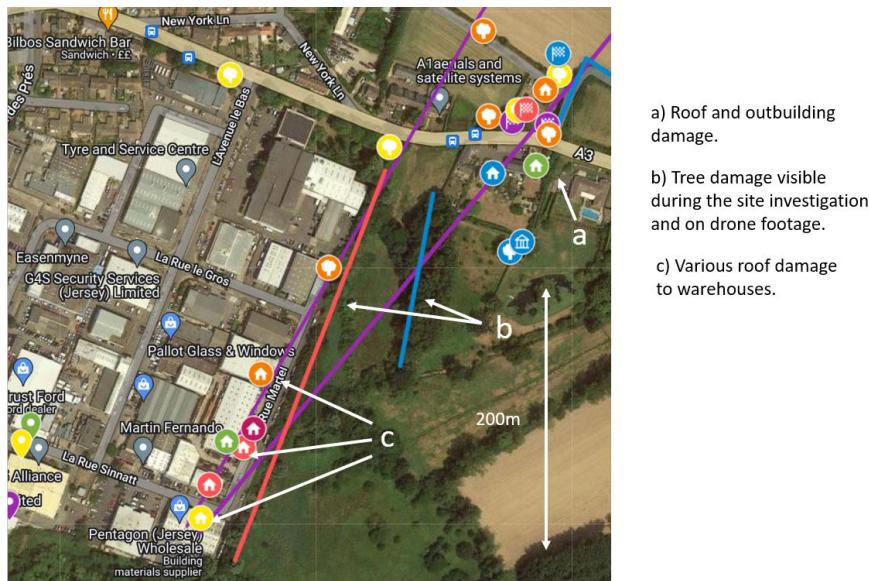


Figure 19: Map of damage points at Rue Des Pres Trading Estate

The south-eastern corner of the Rue Des Pres Trading Estate (JE2 7QR) was hit by the tornado. There was substantial damage to warehouses and other buildings. One warehouse (49.1802N, -2.0776W) lost almost half of the metal sheeting from the roof. Metal sheeting from this warehouse and others was found in various locations along the track, wrapped around trees and in hedges up to 1.4km away (Figure 20).



Figure 20: Metal sheeting from the Rue Des Pres Trading estate 1.4km away.

The building belonging to *Pentagon Wholesale* on the trading estate suffered damage to the upper floor (49.1806N, -2.0771W; Figure 21). Part of the eastern upper wall caved inwards and some of the wall was missing. This collapsed wall appeared to be made of clad blockwork. On the north-eastern corner the brick and block pillar partially collapsed with around ten courses of bricks missing. Brick and blockwork pillars which had supported the windows on the northern wall were missing. This was rated as **T5**.

Another warehouse (49.1800N, -2.0770W; Figure 22) also suffered from partial roof loss.

It was noted that building materials stored next to the warehouses on the ground appeared to be relatively undisturbed, implying that they were sheltered from the tornado. The strip of trees on the other side of the road from the warehouses showed severe damage with many of them having been felled by the tornado. Debris was enmeshed within them.

While the bulk of the damage lay on the eastern side of the trading estate, there was a small amount of damage was also found in the south-central part of the trading estate, 150m to the west of the main damage swath, and there was a bent-over traffic sign close to the entrance.



Figure 21: *Pentagon Wholesale* building, before (top left) and after (remaining photos).



Figure 22: Partial roof loss from another warehouse in Rue Des Trading Estate.

To the north-east of the estate a cluster of homes had been damaged. One property (49.1824N, -2.0741W) suffered some tile loss to the southern face of the roof, but there was much more extensive tile loss to the northern face of the roof. Around 50% of the timbers were exposed. This was rated as **T3** damage.

A property (49.1828N, -2.0740W) 45m to the north of this was hit by debris from the aforementioned house (Figure 23). In the garden, a ridge tile pierced garden furniture, buckling the metal frame. Trees had been felled by the tornado. One tree was found 25m from where it was felled. Windows were shattered by fragments of slate roof tiles and ridge tiles from across the road. An upstairs bedroom was showered with debris.

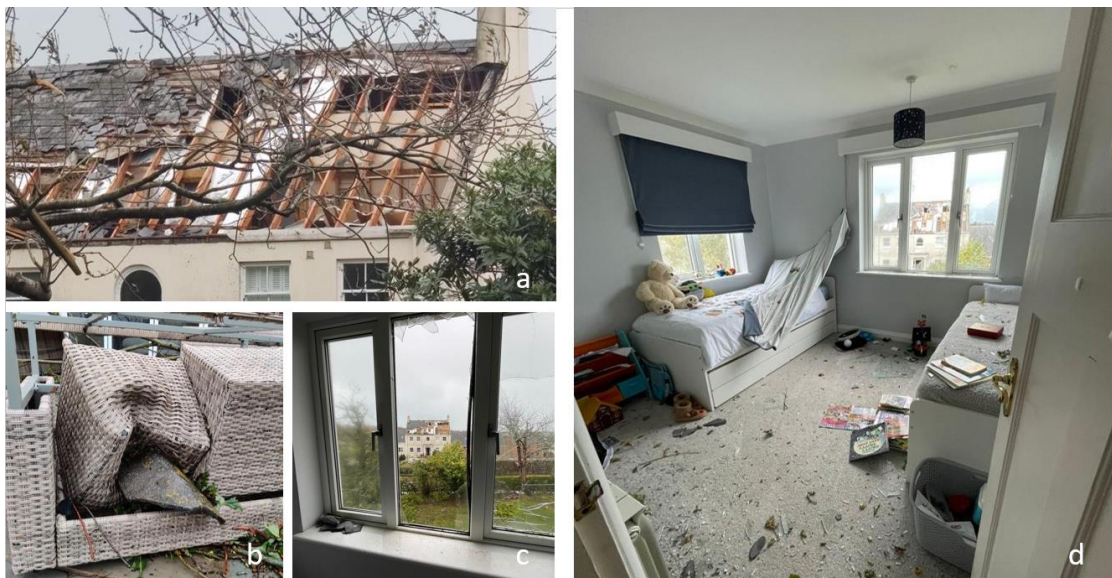


Figure 23: a) Partially stripped roof (49.1824N, -2.0741W). b) Garden furniture impaled by a concrete ridge tile that flew around 45m. c) Window smashed by slates and ridge tile fragments, with a view to the home to the south. d) Childrens bedroom covered in debris.

In this area, the width of the tornado was estimated to be around 250m. However, the strongest winds were around 120m across. After this area, the tornado crossed several open fields. Damage to field boundaries could be seen on drone imagery.

Le Boulivot, Grouville

Properties at 49.1871N, -2.0691W, suffered loss of some roof tiles. Debris pierced through garage roofs to cause dents to the cars inside them. There were embedded slate fragments in wooden sleepers to the west of one house, in the soffit on the eastern side of the same house and embedded in the render. A summerhouse in the garden lost its roof and a greenhouse had collapsed. One car was badly dented and scraped by flying debris. The embedded slates fit the criteria for **T6**. However, damage to the properties, other than that caused by flying debris, was estimated to be **T2**. There were many trees felled by the tornado around this area and a road adjacent to the property was impassible due to fallen trees.



Figure 24: a) and c) show embedded fragments of slate roof tiles in render and wooden sleepers. b) Rear wing of a car showing dents and scrapes from a sharp object. d) A collapsed greenhouse.

At a property (49.1894N, -2.0677W; Figure 25) the tornado was said, by a resident, to sound like “machine gunfire”. The roof on the south facing section lost many tiles. Debris was found embedded in the render, including a small twig. Debris was also embedded in wall hanging tiles. Damage from this embedded debris was rated as **T6**. A 7m tubular steel flagpole had been bent and had been partially levered off the base plate.

Nearby the roof of another home was said to have been lifted off and dropped in situ by the tornado. On inspection the house was becoming badly damaged by water flowing into the property through the roof.



Figure 25: A property in Boulivot. a) Smashed window and embedded debris. b) Twig with estimated diameter 1cm embedded in render. c) View of house showing roof damage. d) Bent Flagpole which had partially been separated from its baseplate, separating partially from the baseplate. (credit Lee Battrick)

One of the most significant areas of damage along the track was at a property in Boulivot. A single storey property, which included bedrooms (one of which was being slept in at the time) a storeroom and a solid carport, all with apex roofing suffered collapse on the southern end of the building. Interior walls were exposed. This damage was rated **T6**.

An attached part of the building had a flat roof. Part of this landed in a neighbour's tennis court 150m east-northeast.

One of the lumps of concrete (dimensions around 0.30-0.50x0.12m - the property owners were not sure which concrete lump out of two shown was the actual piece of concrete) from the collapsed building travelled around 35m north-northwest into the roof of another house, piercing the roof and damaging a section of joist before landing in the bedroom.

A car (weight estimated as 1540kg) that had been parked to the north-east of the collapsed building, and therefore initially on the sheltered side of the building ended up 25m away east-northeast. It suffered damage to its roof but was upright and both wing mirrors were intact. There was no sign of drag across the ground. It appeared to have cleared low shrubs of

around 0.5m in height. Trees had fallen perpendicular to the travel direction of the car to the north-west.

A property owner said of the water in the swimming pool to the north of the property that they thought it was notably lower than it was prior to the tornado passing over.

An old steel fuel tank (dimensions 1.83m by 1.2m by 1.2m) landed on this property intact, after travelling around 160m north-eastwards from another property. There were no drag marks on the ground, and it appeared to have cleared hedges and badly damaged polytunnels to arrive at this point.

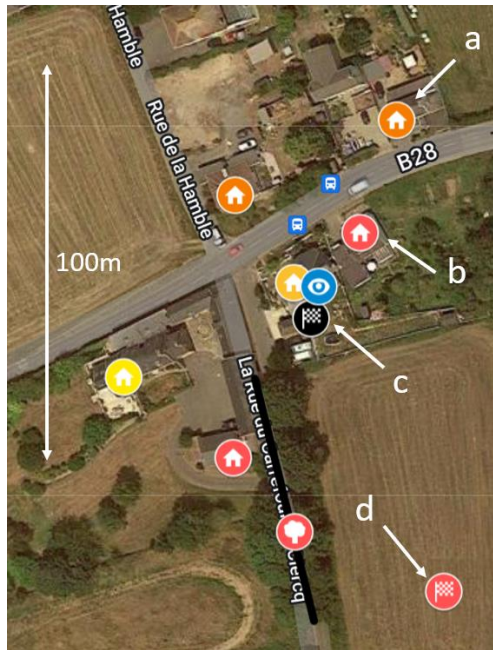
In general, many of the properties around at this location had roof damage, much of which was caused by penetrating debris. Many trees had been felled and it was felt that this was one of the more severe damage locations along the track with damage by the tornado rated at **T6**.

North-east of Boulivot drone footage supplied by BBC camera operator Tracey Cahill showed the path of the tornado through a maize field (around 49.1931N, -2.0626W)



Figure 26: Path of the tornado through a maize field, looking south-southwest. Credit Tracey Cahill.

5. La Route de La Hogue Blie, Grouville



- a) Missing flat roof.
- b) Embedded branch in tiled roof.
- c) Embedded tile in render.
- d) Tree debris.

Figure 27: Damage to properties on the La Route de La Hogue Blie.

This was the only area along the tornado track where a resident reported seeing large hail. They said they were “woken up by large hail and then all this happened.” They estimated that there was around five minutes between the hail and the tornado. They mentioned that an internal door blew outwards.

As well as roof damage at their property (49.2010N, -2.0533W), a fragment of a roof tile was found embedded in render. This embedded debris was rated at **T6**. A garden wall had been blown down, as had many trees.

Visible from their home was their neighbour’s property. A large branch was embedded in the roof of that property. The aforementioned resident said that the ceiling in the house came down and the property was now uninhabitable. The gentleman living there was said to have slept through the event. An inspection of the photo reveals what appears to be a flagpole snapped at the top.



Figure 28: Property with embedded branch and a damaged flagpole and an example of embedded roof tile at another property along the La Route de la Hougue Bie.

6. Rue Saint-Julien

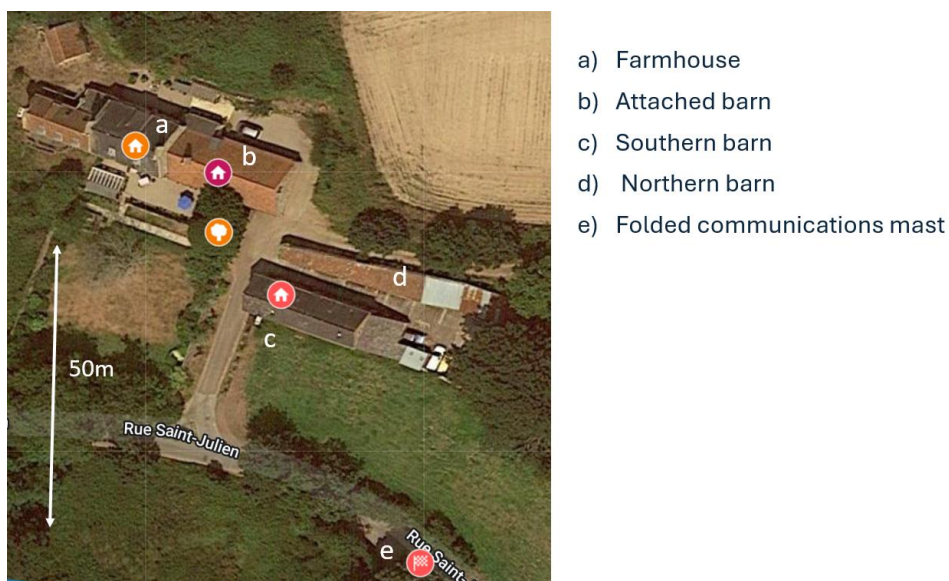


Figure 29: Residential and farm buildings on Rue Saint-Julien

This location was visited by Jersey resident Ian Tillotson on behalf of TORRO on 19 November 2023. All locations refer to those marked in Figure 29. The farmhouse (marked ‘a’ on the map) lost tiles from the unfelted roof and the two chimneys were partially toppled. There was significant roof damage from the toppled chimneys. Some of the windows blew in. Internal doors inside the farmhouse now jam and it was felt that there had been movement to the internal walls. The kitchen lean-to extension appeared to have shifted as there was internal cracking at the ceiling and wall corners. This damage was rated at **T3**. Mr Tillotson spoke to the resident tenants. They described being woken by a lightning storm, quickly

followed by the windows blowing in (likely due to debris). They got up to check their dogs were OK, and at that stage they started to realise the scale of the damage.



Figure 30: North face of the farmhouse (a) and attached barn (b). The farmhouse suffered tile damage, partially collapsed chimneys and blown out windows. The cream building is the lean-to extension, less well constructed building which appears to have shifted position. Credit Ian Tillotson.

At the front (southern face) of the main farmhouse, there was visible lifting of the guttering and the linked fascia, and it was evident that the roof had been detached in an upwards direction. The large tree at the front of the property had fallen towards the west.



Figure 31: Evidence of the roof having lifted on the southern face of the farmhouse. A tree toppled towards the west.

The attached barn (Figure 32 and 39) showed severe damage with almost total loss of the roof. A single skin brick chimney stack had been partially toppled and this landed on the barn roof. Mr Tillotson spoke with the roofing contractors on site. They said that the roof had been replaced approximately 6-7 years ago and at that time they had been instructed to cement down the ridge tiles. The remaining granite wall at the north-eastern corner of the barn had visibly moved and was leaning outwards with cracking visible in the wall. At the top of the gable end that was still standing, there was a missing lintel. It was not clear if this was wood or stone, but there was no sign of the lintel.

The internal stone side wall on the barn was also significantly cracked from where it has been moved. This damage was rated as **T5**.



Figure 32: Attached barn (Figure 35 'b') showing roof loss and damage to remaining walls. View of the eastern end of the northern side. Credit Ian Tillotson.



Figure 33: Closer detail of damage to the attached barn.

The southern barn (Figure 34) lost much of its roof and the eastern gable end collapsed. There was a large crack evident to a remaining wall at the north-western corner. Towards the eastern end of the north side, an area of the wall above and around one of the windows had been ripped out. The eastern end of this roof had been destroyed including the end gable wall.



Figure 34: a) Damage to the north wall of the southern barn (Figure 29 'c') b) Inside the southern barn, showing the loss of roof and collapse of the gable end. Credit Ian Tillotson

The northern barn (Figure 35) suffered from some roof damage. The adjacent section of barn which had been reroofed and replacement doors fitted approximately two years ago was undamaged.



Figure 35: North barn (Figure 29 'd') showing some damage to roofs and windows. Credit Ian Tillotson

Just across the road from the property (49.2067N, -2.0476W) the trees to the south-west were flattened. A tubular steel communications mast was folded towards the ground in a north-westerly direction (Figure 36). This was rated at **T5**.



Figure 36: Flattened trees and a folded communications mast. Credit Ian Tillotson

7. Beuvelande Campsite, St Martin

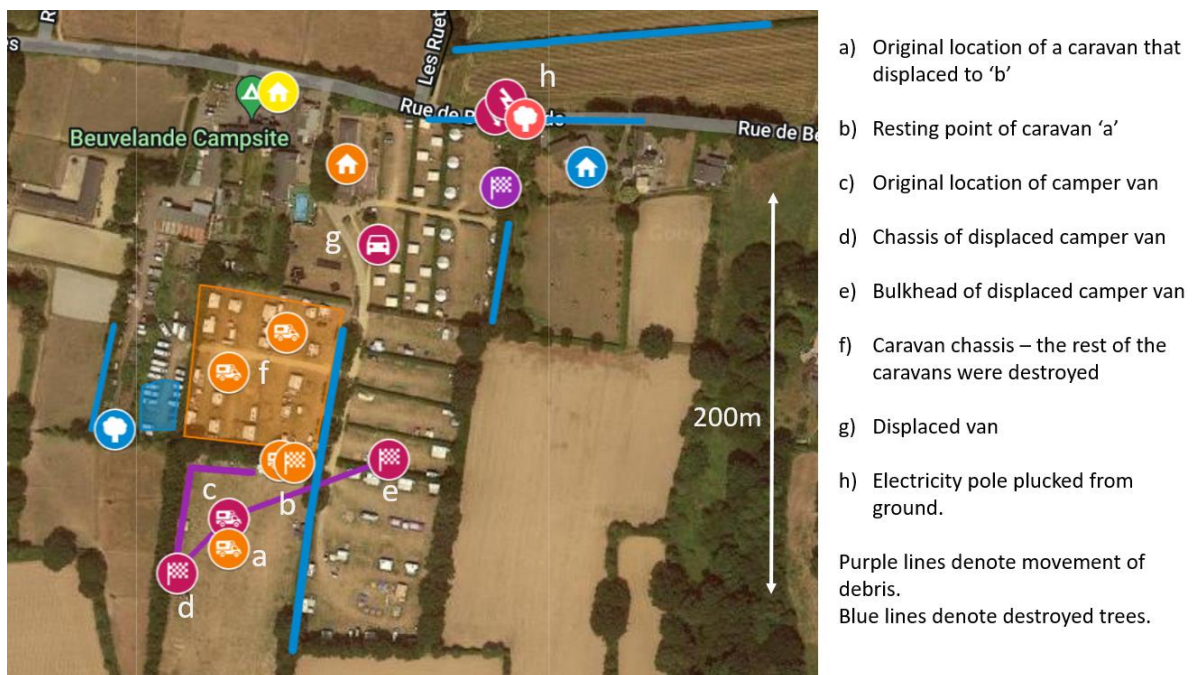


Figure 37: Map of Beuvelande campsite damage.

Many caravans were completely destroyed at the campsite. Pieces of them were wedged against hedges, particularly in the south-western field where they came to rest in the north-west corner. Caravan debris was also found scattered across the track in fields to the north-east of the campsite.



The chassis of a camper van (Figure 38) was displaced around 40m to the south-east of where it started, while the front cabin was found around 80m north-east of its original position. This was rated at **T5**.



Figure 38: Chassis of campervan amidst general caravan debris

In the same field a caravan could be seen to be resting against another caravan wedged into the hedge (Figure 39). The caravan appeared to be undamaged and although there were some marks in the grass, they did not originate from where the caravan was said to have originally started. In the field to the north-west a number of caravan chassis could be seen.



Figure 39: Caravans displaced from their original position by approximately 50m. Photo taken from estimated start position of the closest caravan.

A red van had been displaced and rotated by a few metres south-eastwards (*Figure 40*).



Figure 40: Van displaced south-eastwards.

There was damage created by tree branches impaling buildings on the northern side of the campsite and general damage to vehicles.

In the field north-east of Beuvelande Campsite several snapped electricity poles were found. More substantially, one had been pulled out of the ground with no sign of drag or disturbance to the ground, landing around 10 metres away (*Figure 41*). This was rated at **T5**.



Figure 41: Telegraph pole which had been lifted from the ground, landing around 10m away.

Across the fields to the north-east a great deal of debris had been scattered. This ranged from tree limbs, to parts of caravans, to roof slates embedded in the ground. Electricity poles were

snapped or toppled. A wheelie bin could be seen hanging from the wires of one partially toppled pole.

350m to the north-east of Beuvelande Campsite another home was hit. Roof tiles had been stripped off the southern, northern, and western aspects and the full roof ridge was detached. South facing windows were smashed. Tile debris was embedded in the render wall, into gates and into trees felled by the tornado.

The resident said of their attic room: “The internal door was blown out the wrong way through the door frame. The door frame was left hanging out of the wall and the door was hanging into the top floor landing. The internal loft covers all were sucked up and were no longer in position. The dormer windows had most of the glass shattered. The internal shutters, which had been closed, were all impact damaged with holes blasted through, and significant debris blasted into each room - small (ten inch) pieces of tree branch, roof slate pieces, other soil, glass, gravel debris strewn across the rooms”.

In the garden, a 200-year-old stone 400mm wide double skinned Jersey wall had been flattened towards the north-west (Figure 42). A tree, which had been snapped off at ground level had been lofted 20m over a large wall and hedge north-westwards.



Figure 42: Remains of 200+-year-old stone wall at a property on the Grand Route de Faldoet.

Analysis of drone footage and reports from members of the public revealed a clear track across fields.

8. St. Catherine's Woods, St Martin



Figure 43: Overview map and photographs of a displaced car at St. Catherine's Woods.

As well as general felled trees across part of St. Catherine's Woods a car was lifted from its original position (49.2191N, -2.0345W) in a parking area to around 20m to the north-east down a slope (Figure 43). The car had its handbrake still deployed. There were no obvious drag marks on the ground and the car roof was not obviously damaged.

9. Fliquet, St Martin



Figure 44: Map of Fliquet damage.



Analysis of drone footage showed many roofs were damaged just north of St Catherine's Woods (centred around 49.2225N, -2.0303W). On inspection, some were covered with tarpaulins; others exhibited a large number of missing roof tiles. It was not possible to assign damage ratings to some of the homes where only the south-western aspect of roofs could be viewed on drone footage. The south-western aspect of these however appeared to reveal damage between **T1** and **T3**.

Homes to the north and east of the aforementioned houses were visited in person. There was roof damage consistent with a T3 tornado and as in many other places along the track, many windows were smashed. Trees generally fell towards the north-west.

The width of the tornado track was estimated here to be around 250m.

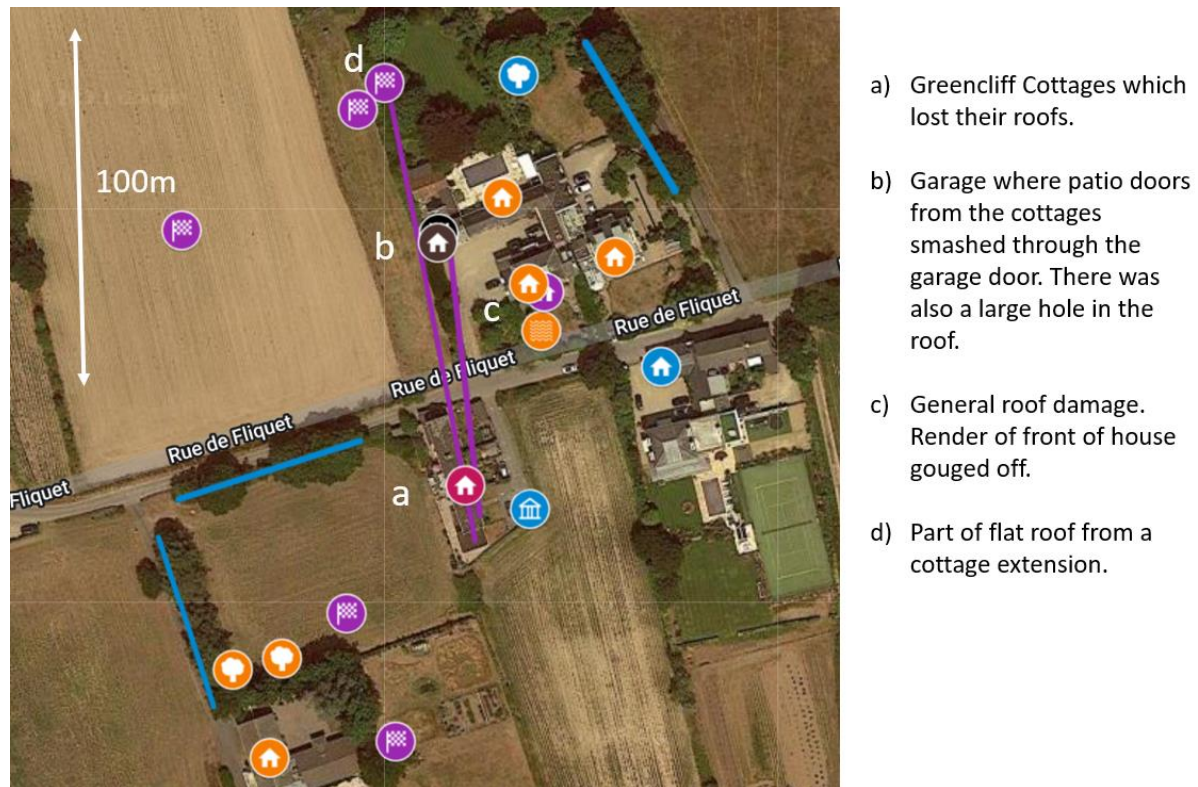


Figure 45: Detailed view of the most severe damage in Fliquet.

The in-person site investigation centred around where three terraced cottages, known as Greencliff Cottages, (49.2241N, -2.0294W; Figure 45 and Figure 46), had lost their roofs⁷. The cottages had been built in 1843 with apex roofs, with a flat roofed extension added to the southern-most property in 1978.

Both the flat roof and the apex roof had blown off. The northern gable end wall had also suffered some collapse at the height of the attic. An external wall of the extension was

⁷ Footage of the damage to cottages can be viewed on ITV. <https://www.itv.com/news/channel/2023-11-07/man-bombarded-with-concrete-remains-in-hospital-after-storm-tore-off-roof>

thought to be unstable and wall props were visible on the western side (Figure 47). It is reported that part of one of the cottages will need to be demolished⁸.



Figure 46: View of western face of Greycliff Cottages, Fliquet.



Figure 47: View of northern and eastern faces of Greycliff Cottages, showing partial loss of the gable wall.

⁸ <https://jerseyeveningpost.com/news/2024/01/02/jersey-couple-praise-island-spirit-which-kept-them-going-after-storm-ciarn-destroyed-their-home/>

On the eastern side of the cottages there was a great deal of debris from the cottages. This appeared to include some of the contents of the attics of the cottages. A flagpole which had been erected in the garden north-east of a cottage could be seen leaning against the cottages. Debris, said to be from the cottages was also found to the south-west of the cottages (Figure 48).



Figure 48: Debris from Greencliff cottages, Fliquet. View looking to the north-west.

One of the residents, Mrs ***** who lived in one of the cottages gave an account of the events her and her husband experienced. She described being in bed. “Just before midnight there was a thunderstorm with incredible lightning. Suddenly there was a pause. There was a cracking sound...I felt a gust of air. There was a huge bang. The roof lifted off and we could see the sky.”

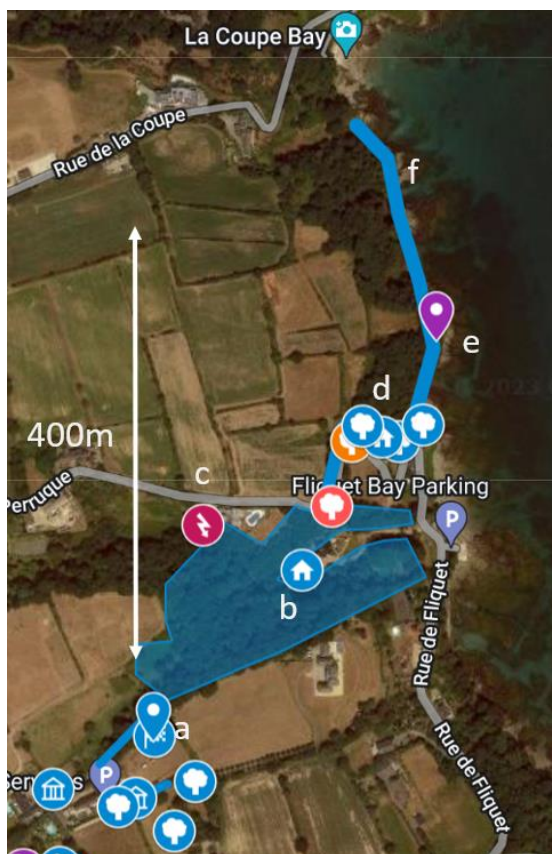
Part of the flat roof of the extension was found approximately 100m to the north on a neighbouring property (49.2247N, -2.0295W). The patio doors from the southern cottage penetrated a garage door 60m to the north-northeast on this neighbouring property and had severely dented the car inside. There was a large hole in the roof of one building here and render had been damaged due to penetrating debris. There was general damage to roofs with stripped tiles (Figure 49). A stone wall, which had recently been rebuilt by a masonry expert and described as “pristine” before the tornado, had fallen to the north.



Figure 49: Damage to neighbouring properties in Fliquet.

The tornado was rated at a maximum of **T6** here. This was due to the penetrating debris from the cottages hitting homes up to 60m away.

10. Fliquet Bay parking – La Coupe Bay.



- a) Trailer blown over
- b) General tree damage
- c) Fallen telegraph pole
- d) Roof damage to cottage
- e) Debris
- f) Tree damage

Figure 50: Map of where the tornado crossed the coast between Fliquet Bay and La Coupe Bay

Drone footage revealed a continuing tornadic track to the north-east of the cottages in Fliquet. There was an overturned trailer and debris in a field (49.2261N, -2.0280W). Fallen trees and damaged buildings can be viewed on the footage. The site investigation intersected this path



on Rue de la Perruque (49.2281N, -2.0257W). It was difficult to traverse this tight and twisty road safely due to a large number of fallen trees. Subsequent to the investigation Ian Tillotson supplied photographs taken on 11 November looking south-east across the valley above Fliquet (Figure 52).



Figure 51: Looking south-east across the valley above Fliquet from Rue De La Perruque.

Also subsequent to the site investigation, further tree damage was revealed by residents between Fliquet Bay and La Coupe Bay. The damage intensity varied across the width of the track here.

The tornado crossed the coast between Fliquet Bay parking and La Coupe Bay with an estimated track width of 440m

Impacts on residents and the community.

During the in-person site investigation, everyone who was spoken to expressed both shock and astonishment that only three people were taken to hospital. Residents described it as very frightening event. Just before the event one person said that the rain was “like turning on a hundred fire hoses”. Many people described “feeling pressure in their ears” and that they could feel their homes shaking. The sound was described in various ways by different people; “three great thumps, one after the other”, “Like machine-gun fire”, “It was like a roar”.



A week after Storm Ciarán more than 150 islanders remained displaced from their homes by the storm, many of them as a result of the tornado⁹. Sporting facilities were badly hit affecting both leisure and training.¹⁰

Electricity supplies were hit across the island, both due to Storm Ciarán to as a whole¹¹ and the tornado in particular. *Jersey Electricity* reported over 100 incidents, leaving around 600 customers without power. During the site investigation, numerous electricity poles were found snapped and uprooted/lifted out of the ground. *Jersey Electricity* reported restoring power to all properties by 8 November with support from overhead line teams from the UK.

While Storm Ciarán and the tornado created devastation for many, people in Jersey came together to support those affected in the community. A community group was set up on social media to offer support in many different and a Bailiff's Fund was set up by the government¹². A local radio station¹³ created a recognition list of those who "went above and beyond".

⁹ <https://jerseyeveningpost.com/news/2023/11/08/storm-no-one-will-be-made-homeless-promises-minister/>

¹⁰ <https://jerseyeveningpost.com/sport/2023/11/30/padel-star-battered-by-storm/>

¹¹ <https://www.jec.co.uk/the-energy-blog/4-45pm-storm-ciaran-an-update-from-jersey-electricity/>

¹² <https://www.jerseycommunityfoundation.org/news/bailiffs-fund-storm-ciar%c3%a1n/>

¹³ <https://tindlenews.co.uk/channel-103-honours-jersey-heroes-of-storm-ciaran/>



Conclusions

The Jersey tornado on 1 November 2023 made landfall at St Clement just before midnight, with a track width of around 550m, with the most intense damage in the central 200m across the track width at this point. It demolished upper floor walls of one property as it hit the beach front and badly damaged many roofs further into St Clement. The tornado here was rated as **T5**.

The tornado was first rated as **T6** strength as it hit FB Fields, where very large wooden beams from the badly damaged Geoff Reed Table Tennis Centre flew around 150m. When the tornado hit the Rue Des Pres trading estate it lofted large metal roofing sheets into the air, leaving a damage trail of 1.4km long.

One of the most significant indicators of a **T6** tornado was found 2.7km along the track in Boulivot, where a single storey property collapsed. Here, a heavy concrete lump was lofted around 35m to penetrate into a second-floor bedroom. A car was displaced around 25m. In this area, the damage plotted indicated a track width of around 125m

Vehicles were also thrown at Beuvelande Campsite, where a campervan was thrown and a car was lifted in St. Catherine's Woods.

T6 damage was also noted where roofs were lifted from cottages in Fliquet and were lofted, along with other debris, to cause secondary damage to neighbouring properties. In Fliquet, a track width of 265m was measured.

The tornado exited Jersey around Fliquet Bay parking, creating a damage track of around 8km in length. Numerous houses were rendered badly damaged or uninhabitable. This, the strongest tornado on record in Jersey,¹⁴ left a community deeply in shock.

Table 2 summarises the indicators that have been determined to warrant a T6 rating for this tornado. Figure 52 shows the path taken by the tornado.

Location	Description	Rating
St Clement Beach front (49.172N, -2.087W)	Roof loss and collapsed external upper floor walls of one home.	T5
FB Playing fields (49.174N, -2.085W)	Partial roof loss of a sports building leading to lost wooden beams (estimated 100kg) carried 150m. Internal wall collapsed inside a home. Folded lamp post.	T6 T5 T5
La Rue Des Pres Trading Estate (49.181N, -2.077W)	Roof loss, several courses of bricks collapsed on one wall.	T5

¹⁴ https://www.torro.org.uk/pdf/20231106_TORRO_PressRelease_JerseyTornado.pdf



Le Boulivot (49.191N, -2.066W)	Collapse of a substantial part of a single storey property. Concrete lump travelling 35m to pierce a roof and enter a bedroom. Old 2500l fuel tank carried approximately 160m.	T5/T6 T6 T5/T6
Rue Saint Julien (49.207N, -2.048W)	Stone barn lost roof. Remaining walls show cracking and movement. Communications mast folded towards the ground.	T5 T5
Beuvelande Campsite (49.209N, -2.0456W)	A destroyed campervan with chassis displaced 40m. Snapped telegraph poles, one pulled out of the ground.	T5 T5
Fliquet (49.224N, -2.029W)	Total roof loss of three homes. Penetrating debris.	T5 T6

Table 2: Summary of T5 and T6 indicators.

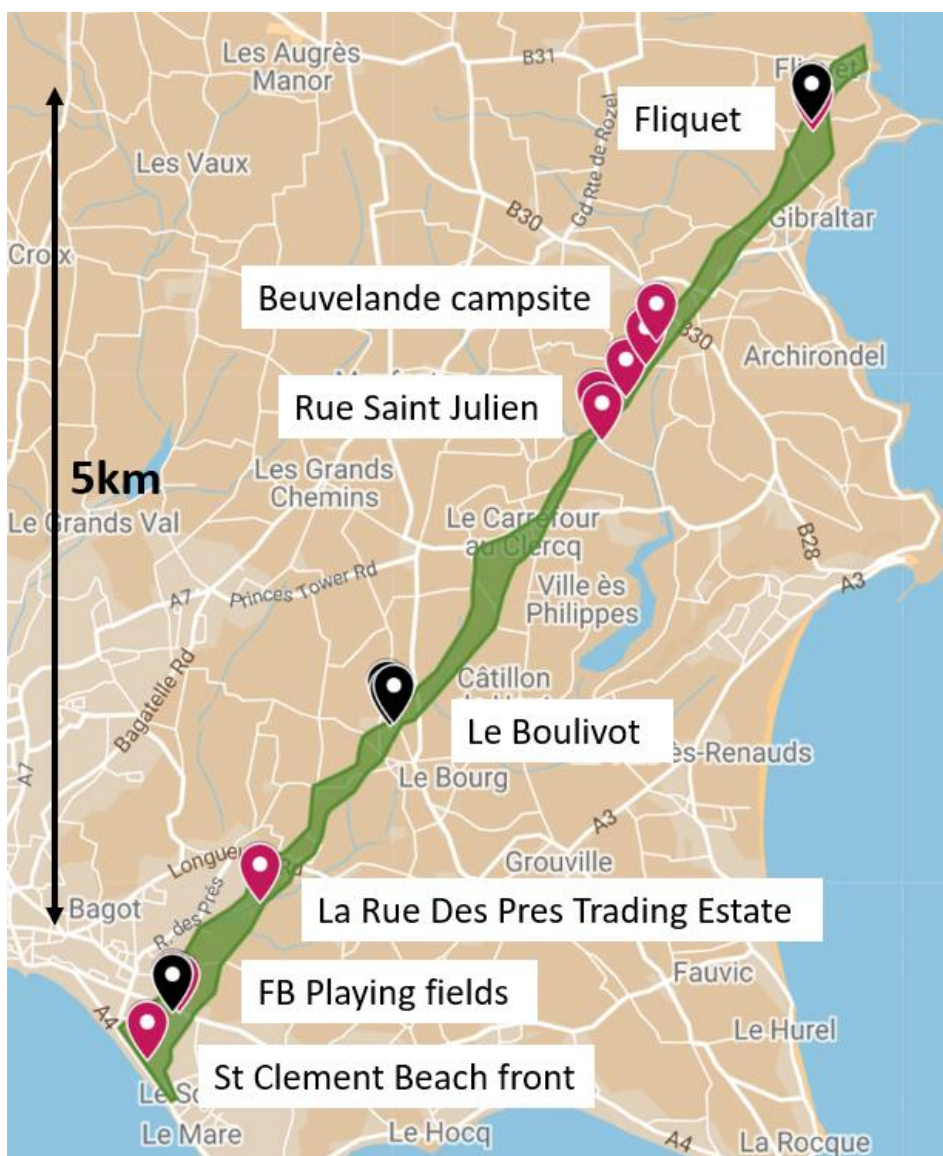


Figure 52: Map of track with T5 (red) and T6 (black) locations marked.

Acknowledgements

An enormous debt of thanks is owed to everyone in Jersey for all their help during a very difficult time. Residents provided information both during the site investigation and before/after it. They also granted access to their property to TORRO and provided interviews.

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A general thank you too to Jersey radio and news organisations for helping TORRO obtain additional information and making appeals for information at our request.

Thank you to David Smart for reviewing this document.

GDPR and privacy statement.

The Tornado and Storm Research Organisation (hereafter TORRO) is obliged by law to comply with the General Data Protection Regulations (GDPR). In the present document names and personal details of witnesses and interviewees have been redacted. For the purposes of site investigations names and contact details of witnesses and interviewees are held as secure digital records. TORRO will not use personal details for other purposes without explicit permission and will not pass them onto third parties. If, at anytime, witnesses and interviewees wish to know exactly what personal details TORRO does hold and/or wish them to be deleted or changed in any way then they may contact: sarah.horton@torro.org.uk

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Appendix A

Scale	Wind speed (T)	Description of damage (for guidance only)	Track length (L)	Track width (W)	Track area (A)
0	Light tornado 17-24 m/s (39-54 mph)	- Loose light litter raised from ground level in spirals. - Tents, marquees, awnings seriously disturbed. - Some exposed tiles, slates on roofs dislodged. Twigs snapped; trail visible through crops. - Wheelie bins tipped and rolled. - Garden furniture & pots disturbed.	≤215 m	≤2.1 m	≤464 m ²
1	Mild Tornado 25-32 m/s (55-72 mph)	- Deck chairs, small plants, heavy litter becomes airborne. - Minor damage to sheds. - More serious dislodging of tiles, slates. - Chimney pots dislodged. Wooden fences flattened. - Slight damage to hedges and trees. - Some windows already ajar blown open breaking latches.	216-464 m	2.2-4.6 m	465-2150 m ²
2	Moderate Tornado 33-41 m/s (73-92 mph)	- Heavy mobile homes displaced. Light caravans blown over. - Garden sheds destroyed. Garage roofs torn away and doors imploded. - Much damage to tiled roofs and chimneys. Ridge tiles missing. - General damage to trees, some big branches twisted or snapped off, small trees uprooted. - Bonnets blown open on cars. - Weak or old brick walls toppled. - Windows blown open or glazing sucked out of frames.	465-999 m	4.7-9.9 m	2160-9990 m ²
3	Strong Tornado 42-51 m/s (93-114 mph)	- Mobile homes overturned / badly damaged. Light caravans destroyed. Garages and weak outbuildings destroyed. - House roof timbers considerably exposed. Some of the bigger trees snapped or uprooted. - Some heavier debris becomes airborne causing secondary damage breaking windows and impaling softer objects. - Debris carried considerable distances. Garden walls blown over. - Eyewitness reports of buildings physically shaking. - Mud sprayed up the side of buildings	1.0-2.1 km	10-21 m	0.01-0.046 km ²
4	Severe Tornado 52-61 m/s (115-136 mph)	- Motorcars levitated. Mobile homes airborne / destroyed. - Sheds airborne for considerable distances. Entire roofs removed from some houses. - Roof timbers of stronger brick or stone houses completely exposed. Gable ends torn away. - Numerous trees uprooted or snapped. Traffic Signs folded or twisted. - Some large trees uprooted and carried several yards. - Debris carried up to 2km leaving an obvious trail.	2.2-4.6 km	22-46 m	0.047-0.21 km ²

5	Intense Tornado 62-72 m/s (137-160 mph)	• Heavier motor vehicles (4x4, 4 Tonne Trucks) levitated. • Wall plates, entire roofs and several rows of bricks on top floors removed. • Items sucked out from inside house including partition walls and furniture. • Older, weaker buildings collapse completely. • Utility poles snapped.	4.7-9.9 km	47-99 m	0.22-0.99 km ²
6	Moderately-Devastating Tornado 73-83 m/s (161-186 mph)	• Strongly built houses suffer major damage or are demolished completely. • Bricks and blocks etc. become dangerous airborne debris. • National grid pylons are damaged or twisted. • Exceptional or unusual damage found, e.g. objects embedded in walls or small structures elevated and landed with no obvious damage.	10-21 km	100-215 m	1.0-4.6 km ²

Extract from the TORRO International Intensity (T) Scale. The full version can be seen at <https://www.torro.org.uk/research/tornadoes/tscale>

