Ndunda

INACCT Resilience

Designing Inclusive African Coastal City Resilience

Integrated climate change risk, resilience & disaster response profile – urban informal settlement

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1. Settlement dashboard

Field	Information
Settlement name	Ndunda
NUSP Category (Durban)	
Location (city, ward, GPS)	Beira, PA Nº4 – Manga Loforte, −19.7676581, 34.8875123
Year established	N/A (in the past 30 years)
Settlement type	(informal, peri-urban, expansion zone, etc.) Informal settlement, peri-urban, expansion zone
Population estimate	21 772 hab (2017)
Number of sections / zones	2
Number of households	N/A
Structure of households	(basic materials, % brick, % double storey) Walls of adobe block, brick block, cement block, wood planks, or caniço/bamboo/palmeira; roofs of zinc/tin sheet, lusalite plate, concrete slab, clay tile, grass/culm/palmeira, or cardboard/bag/shell; floors of earth, cement screed, or tile.
Layout and density	(high density, narrow pathways, % road access) Fast-growing neighbourhood, medium-density (21,772 inhabitants across 7.8 km², 28 hab/ha), with predominantly earth roads of irregular character, vehicle access limited to the N6 corridor, interior circulation largely pedestrian-only, and rapid spontaneous expansion eastward onto agricultural land and wetlands.
Tenure status	(formal, customary, de facto, none) Limited formal land tenure coverage, land is generally occupied under customary or de facto

	arrangements (good faith occupation) and without formal registration (DUAT — Direito de Uso e Aproveitamento da Terra).
Main livelihoods	(e.g. informal/formal employment; food gardening etc). Small-scale farming, small-scale vending, family support, occasional temporary employment, small businesses.
Key physical features	(low-lying, wetland, slope, river proximity, soil type) Low-lying area prone to flooding, mixed wetland area. Flat to sloping alluvial plain at 3–6 m above sea level, on recent Quaternary siliciclastic sediments ranging from sand to clay; drained by seasonal streams within the Púnguè–Rio Maria catchment, with significant areas of mixed wetland and former agricultural land on soils of high fertility but poor drainage and low load-bearing capacity.
Access to services	(water, sanitation, electricity, waste, roads) Access to the municipal water supply and electricity grid is limited to a small portion of the neighbourhood. The remaining areas lack formal water connections, sewerage, or grid electricity. Most households rely on wells for water and pit latrines for sanitation.
Main environmental and climate hazards	(cyclones, floods, heatwaves, landslides etc.) Cyclones, storms, floods, soil degradation, heatwaves.
Trend/pattern observed for climate hazards	(e.g. increasing in frequency/severity/impact) Flooding frequency, storm intensity and soil erosion are all increasing, with shorter recovery time between cyclone events, longer seasonal

	waterlogging, and projected quadrupling of extreme sea-level rise events.
Key vulnerabilities	(Social – e.g. poverty/crime/drugs; economic – e.g. income level; environmental – e.g. loss of trees, poor waste management; infrastructural – e.g. limited access to sanitation; physical – e.g. located in floodplain; etc). Informal low-income settlement on flood-prone wetland soils with no sewage, irregular waste collection, earth roads, limited water and electricity access, high exposure to cyclones, and rapidly expanding population outpacing infrastructure.
Key actors involved in the settlement	e.g. municipal departments, ward councillor, universities, aid organisations, neighbours, NGOs etc. Beira City Municipal Council (CMB); Local Risk Management Committees (CLGR); National Institute for Disaster Risk Management (INGD); Administrative Post No.3 – Inhamízua (Alto da Manga); Administrative Post No.4 – Manga Loforte (Mungassa and Ndunda); Neighbourhood Secretaries and Unit Chiefs; Post-Cyclone Reconstruction Office (GREPOC); Water and Sanitation Infrastructure Administration (AIAS); Water Supply Asset and Investment Fund (FIPAG); Beira Autonomous Sanitation Service (SASB); Electricity of Mozambique (EDM), and more.
Existing adaptation / DRR actions and level of development (e.g. active/ in progress)	(evacuation routes, bank stabilisation, early warning system). -Local Risk Management Committees (CLGR) - active and in re-capacitation -Construction of large drainage valves/canals

	along the open stormwater drainage network in northern Ndunda (Inharimue), and replacement of the informal crossing/bridge over the drainage canal with a permanent structure capable of withstanding annual storm flows from Mungassa - in progress. -Paving and reinforcement of Road "Six", the main unpaved artery linking Mungassa and Ndunda to the highway, including construction of roadside drainage ditches – delayed.

2. Settlement risk analysis

Hazard	Exposure	Main vulnerabilities	Estimated level of risk (Risk is the product of the hazard, exposure & vulnerability)
Floods	Low-lying river floodplains, informal settlements near Mungassa River. The entire settlement is located on flat, low-lying alluvial wetland terrain with very limited drainage. Seasonal floodwater remains standing for months beyond the	Low-income households, women-headed households, orphans, elderly living alone, persons with disabilities, renters, daily-income workers (vendors, moto taxi drivers) dependent on mobility.	High

	end of the rainy season.		
Heat-waves	Areas highly exposed to the sun, with few trees, inconsistent irrigation. Very few shade trees, large open areas exposed to direct sun, no shaded public space.	Outdoor workers, elderly, children, and residents walking long distances on exposed unshaded flooded paths to reach transport, markets or services.	Medium
Storm Surges	Exposed to storm surge and high winds from the coast and Púnguè river corridor, zinc sheet roofs and weak structures offer no resistance, 84% destroyed by Cyclone Idai.	Low-income households in zinc/caniço structures, renters, orphans, elderly, persons with disabilities, trees, electricity poles and other infrastructure create heightened exposure.	High
Drought	Crops in yards and peri-urban plots are more frequently destroyed by flooding than drought, shallow wells do not dry up but become saline and contaminated by seawater and latrines during flood events.	Households dependent on subsistence agriculture, households relying on shallow wells as primary water source, children and elderly most vulnerable to waterborne disease from contaminated wells.	Low

3a. Existing capacities and resilience actions

Hazard	Existing capacities / resilience actions	Critical gaps/ needs
Floods	SMS alerts from INGD; community sirens; CLGRD committees (18 gender-balanced volunteers per neighbourhood) coordinating evacuation and search and rescue; preparedness drills and evacuation route mapping; community-built drainage ditches (some cement-reinforced); regular drain cleaning (limpagem das drenagens); community-built wooden plank bridges and makeshift crossings reinforced with sandbags; use of tyres, stones and rubble to create walkways through flooded areas; land raising with fill material to protect foundations; canals constructed and widened by community; AVSI/UNICEF Committee revitalisation programme; Associação FACE community resilience guide; school buildings and multi-storey structures used as informal evacuation shelters etc.	Evacuation shelters insufficient or absent in parts of the neighbourhood; CLGRD equipment worn out or missing; community maps unable to keep pace with rapid settlement expansion into marshland; tertiary drainage frequently blocked by solid waste, improved waste collection and recycling urgently needed; primary drainage valves closed during high tide causing backwater flooding in peripheral areas; security against gender-based violence in shelters insufficient; no detailed neighbourhood-level urban plans produced by the municipality for the neighbourhood.
Heat-waves	Use of limited available shade, school walls, isolated trees, construction sites, for community gatherings and rest.	No organised community or institutional response to heat specifically; no tree planting or shade

		infrastructure programme; near-total absence of covered public spaces for community gathering; limited awareness among residents and institutions of increasing heat risk and available adaptation measures; no heat-related health monitoring or early warning at neighbourhood level.
Storm Surges	INGD SMS early warning alerts and CLGRD in-neighbourhood mobilisation to assist most vulnerable; evacuation shelters available in most parts of the neighbourhood; community use of sandbags, stones and tyres to weigh down zinc roofs before storms; evacuation to multi-storey buildings and schools; post-storm road clearance by municipality and INGD to restore access; temporary INGD tents provided to families whose homes are destroyed; municipality constructing new housing for post-Idai displaced families; UN-Habitat/GREPOC/AICS resilient housing reconstruction programme developing and piloting improved building standards.	Some families still in temporary shelters years after Cyclone Idai with relocation incomplete; zinc sheet roofing dominant across all three neighbourhoods offering minimal wind resistance — no systematic promotion of stronger roofing materials or standards at neighbourhood level; slow restoration of electricity and phone signal after major events limiting communication; fallen electricity poles and trees blocking

		evacuation routes post-storm; security against gender-based violence in shelters insufficient.
Drought	Household wells generally providing year-round water access; water storage in jerrycans common; basic water treatment practices used when well water is brackish; community-dug irrigation ditches supporting year-round cultivation in yards and peri-urban plots; humid climate and high-water table reduce drought severity.	Well water becomes saline and contaminated during and after flood events, compromising the primary dry-season water source, no formal water treatment or distribution infrastructure as backup.

3b. Additional technical and local information available for the settlement

- Beira neighbourhood boundary maps, INGC/OCHA/HDX, 2019: https://data.humdata.org/dataset/mozambique-admin-level-4-beira-and-dondo-neighbourhood-boundaries
- Beira Flood Risk Map (.qgz), QGIS, neighbourhood-level flood risk
- JICA Flood Hazard and Risk Maps, 3 scenarios, 30m grid, 2022
- UNOSAT/REACH Alto da Manga satellite damage assessment, Cyclone Idai, 2019: https://reliefweb.int/map/mozambique/mozambique-beira-city-alto-de-manga-neighbourhood-damage-assessment-26-march-2019
- UNOSAT/REACH Mungassa satellite damage assessment, Cyclone Idai, 2019: http://www.reachresourcecentre.info/mozambique/mozambique-cyclone-idai-beira-city-mungassa-neighbourhood-damage-assessment-26-march-2019
- Comités Locais de Gestão de Risco de Desastres (CLGRD) community DRR participatory maps, flood zones and evacuation routes per bairro, held by INGD Sofala
- PEU Plano de Estrutura Urbana da Cidade da Beira, 5 volumes, 2021
- Beira Municipal Recovery and Resilience Plan, 2 volumes, 2019

- AIAS Environmental Impact Assessment, Beira Stormwater Drainage Rehabilitation, E2914 V3, 2014
- Urban Mobility Plan for Beira, in development as of 2021/2022, contact CMB for latest status
- Detailed Neighbourhood Plans (Planos de Pormenor), not yet produced for the neighbourhood
- ICLEI Africa, Living with Water, photovoice research, 2025: https://africa.iclei.org/living-with-water-stories-of-resilience-from-beiras-informal-settlements/
- HelpAge International, Rapid Needs Assessment of Older People, Sofala, post-Idai, 2019: https://www.helpage.org/silo/files/rapid-needs-assessment-of-older-people-cyclone-idai-sofala-province.pdf

4. Governance and community institutions supporting disaster preparedness and response

Institution / group	Role in disaster preparedness & response	Strengths	Challenges / gaps
Beira City Municipal Council - Disaster Risk Management Unit	Municipal coordination of emergency response, evacuation planning, liaison with INGD and international partners.	Direct link to municipal resources and provincial authorities; oversees Recovery and Resilience Plan implementation; Beira Masterplan 2035.	Limited resources and staff; partially dependent on external donors; plans not yet translated into neighbourhood-level action for informal areas.
Chefe do Posto Administrativo	Receives alerts from municipality/INGD; coordinates response	Formal authority and local knowledge; key	Limited capacity for disaster management or

— PA Nº4 Manga Loforte	across bairros within the posto; hosts CLGRD; liaises upward with both municipality and INGD.	node in early warning system.	reporting local resilience gaps upwards.
Secretário de Bairro	Primary neighbourhood-level municipal representative; cascades alerts door-to-door; coordinates with CLGRD; oversees evacuation and damage reporting.	Deep local knowledge; direct contact to residents and traditional or community leaders; first point of contact for all municipality-community interaction.	Government appointee with no dedicated disaster management resources or ad-hoc DRR coordination with municipality; overwhelmed during major events.
Chefes de Quarteirão / Community Block Leaders	Block-level last mile of early warning system; door-to-door notification; assists vulnerable households during evacuation.	Immediate local knowledge; trusted by neighbours.	Volunteers with no resources or equipment; usually absent in informal and rapidly expanding peripheral areas.
Comité Local de Gestão de Risco de Desastres (CLGRD) / Committee Volunteer Group	Lead and coordinate community disaster preparedness and responss; roles: early warning radio monitoring, community communications and alert dissemination,	Gender-balanced; trained by INGD and AVSI/UNICEF; some level of community trust; first responders on the ground; motivated volunteers; good	Equipment worn out or missing; reach limited in rapidly expanding areas; community maps cannot keep pace with settlement growth; unable to be

	evacuation coordination, search and rescue, shelter management, emergency kit management, damage and needs assessment; conduct preparedness drills; clearing up drainage; maintain community vulnerability and evacuation maps.	knowledge of the neighbourhood.	present in all parts of the neighbourhood; sometimes the target of the residents' complaints.
INGD (National Institute for Disaster Risk Management)	Coordinates disaster preapredness and response; issues SMS early warning alerts; provides training to CLGRDs; distributes emergency tents and relief materials post-disaster; establishing Beira delegation.	National authority with legal mandate; with organisational experience and well structured; improving capacity after Idai.	Beira delegation still largely understaffed; dependent on civil society partners for last-mile delivery.
Health centre (Centro de Saúde Manga Ndunda)	Provides emergency medical care; manage flood-related disease outbreaks (cholera, malaria, diarrhoea).	Provide emergency medical care.	Outside Ndunda (in Alto da Manga); risk of overcrowding during disasters; medicine shortages during crises

Schools	Shelter during disasters; some store medicine.	Easy for residents to locate during evacuations.	Not always officially recognised as shelters; irregular safety or hygiene standards; GBV risks in overcrowded conditions.

5. Community risk narratives: Integration of critical local knowledge

See Photovoice Stories by residents: https://africa.iclei.org/living-with-water-stories-of-resilience-from-beiras-informal-settlements/

- Cyclone Idai destroyed 84% of the neighbourhood. many families spent months or years in INGD-provided tents. One resident: "This tent was offered by INGD because her house was destroyed by Cyclone Idai and until then she had not been able to establish herself in Ndunda neighbourhood."

- Flooding is almost permanent, not seasonal. Around a resident's house in the northern outskirts of Ndunda, some roads and churches have been under water since last year's rains.

- Early warning comes via INGD SMS alert to mobile phones. CLGRD volunteers then go door-to-door. A resident's evacuation trigger: "When a storm or cyclone approaches, I check my phone for alerts from the authorities and then set off to evacuate my children."

- Roof loss is a recurring cyclone experience: "This house is made of pieces of zinc sheets without good security on the roof, reinforced with stones to prevent it from flying away, as it previously fell in a Cyclone."

6. Additional thematic detail

6.1 Service access & infrastructure

Service	Access Level	Condition	Notes
Water	Limited	Poor	1,471 domestic connections; 8 standpipes (FIPAG); significant areas rely on wells; reliability decreases with distance from mains; contamination during flooding.
Sanitation	Very limited	Poor	No sewage network; pit latrines; overflow during frequent flooding causes waterborne disease outbreaks (cholera, diarrhoea, skin infections confirmed by survey).
Electricity	Limited	Poor	Below city average; grid access limited to N6 corridor; slow restoration after storms; no legal obligation on EDM to extend to new informal areas.
Waste management	Very limited/ Irregular	Poor	No formal collection in most areas; occasional bulk waste containers in central locations in the neighbourhood; tertiary drains frequently blocked by solid waste; worsens flood impact.
Roads & access	Very limited	Very poor	Irregular and degraded earth roads; vehicle access largely confined to N6; northern crossing washed away annually;

			chapas and txopelas main transport modes; interior foot-access only.
Drainage / stormwater	Very limited / absent	Very poor	South canal.

6.2 Key livelihoods & economy

Source of livelihood	Livelihood located in or outside the community	Impacts during a flood event
Small-scale farming	In community (yards and nearby plots).	Crops flooded, washed away and destroyed; soil waterlogged; loss of food security for farming households.
Informal vending	In community (often on road sides).	Loss of products and stock; destruction of seller stalls; reduced customer flow; women vendors most affected with no social protection.
Formal work	Outside community.	Road flooding prevents commuting; income loss during extended flood periods.
Domestic services	In and outside community.	Work interrupted; equipment damaged; considerable repair and reconstruction work; women most affected.

7. Disaster response

7.1 Early warning systems

Additional information can be included in the table below:

Alert Type	Responsible agency	Communication channels	Target audience
Advisory			

Warning			
Evacuation order			

7.2 Preparedness measures in place

Activity	Description	Lead community group

7.3 Critical access & transport routes

Route name	Status in flood / hazard	Alternate route	Notes

7.4 Vulnerable groups

Area/ Household / person	Location	Special needs/ support required	Date verified

7.5 Post-event recovery priority tasks

a. Immediate to short term tasks:

Task	Lead actor	Time frame

b. Medium to longer term tasks:

Task	Lead actor	Time frame

7.6 Key contacts

Role / function	Contact name	Contact number	Notes
Disaster Risk Management Manager, Beira City Municipal Council	José Henrique Jaime	+258 84 841 7286	Coordinates Municipality's work with CLGRs, INGD's local operations, administrative posts and ward councillors.
Chefe do Posto Administrativo/ Sub-district Chief - PA Nº4 Manga Loforte			receives alerts from municipal/INGD, coordinates response across bairros within the posto, hosts the CLGRD and its kits, liaises upward with municipality and INGD.
Secretário de Bairro/ Neighbourhood Secretary - Ndunda			primary neighbourhood-level state representative, cascades alerts downward, coordinates with CLGRD Coordenador, oversees evacuation and damage reporting within the bairro.

Chefes de Quarteirão/ Community Block Leaders			block-level last mile of alert chain, door-to-door notification, assists vulnerable households during evacuation, reports damage to Secretário de Bairro.
CLGR Coordinator & Deputy Coordinator			Other roles in the CLGR: -Coordenador — Coordinator (head) -Vice Coordenador — Deputy Coordinator (co-head) -Pessoa Responsável do Kit — Kit Manager -Membro Ouvinte de Rádio — Radio Listener/Monitor -Membro de Comunicação — Communications Member -Membro de Evacuação — Evacuation Member -Membro de Busca e Resgate — Search and Rescue Member -Gestor do Abrigo — Shelter Manager -Gestão da Informação e Avaliação de Danos e Necessidades — Information Management and Damage/Needs Assessment

8. Post-event review & lessons learned

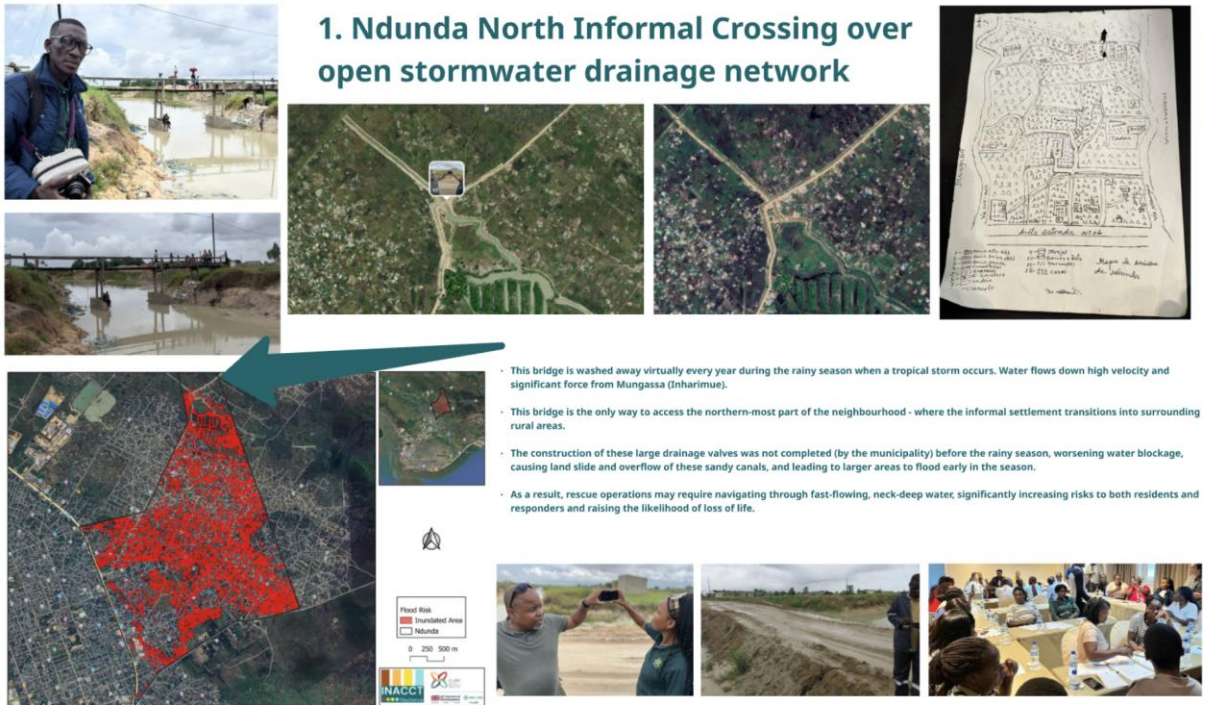
Date of event	Hazard	Key successes	Challenges faced	Actions to improve
March 2019	Cyclone Idai			
January 2021	Cyclone Eloise			
Every rainy season	Seasonal flooding			

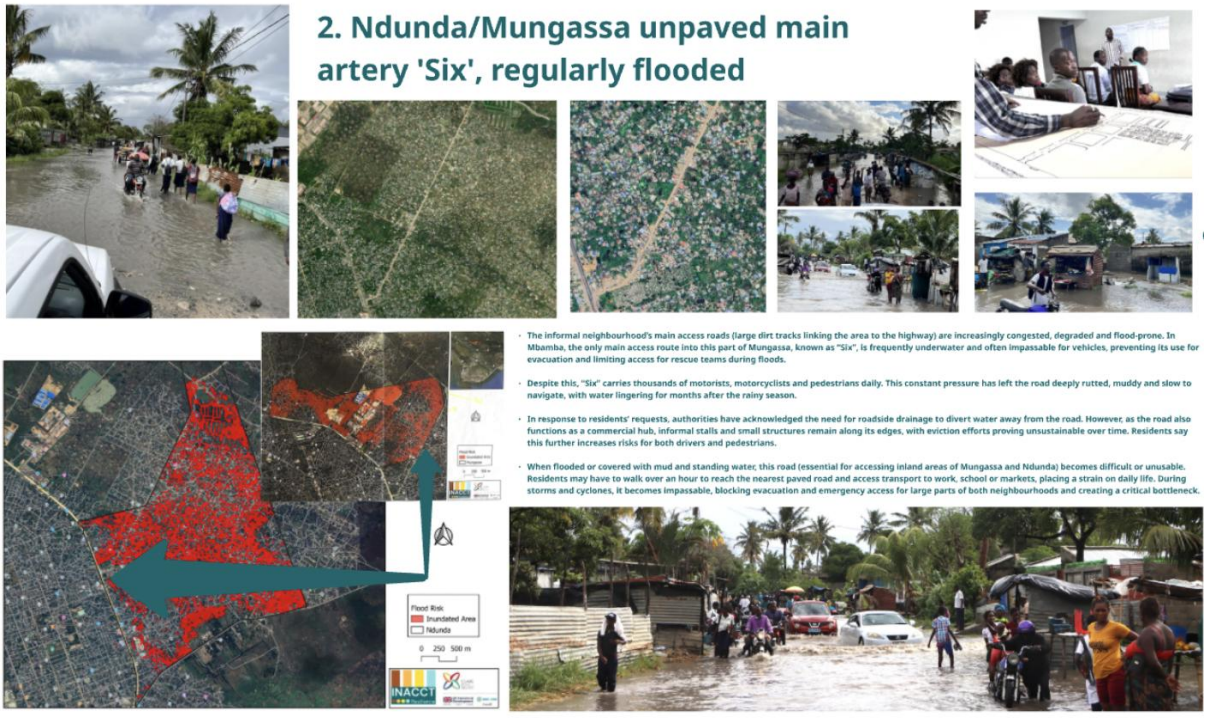
9. Informing future interventions: Priority actions and research areas

Priority area	Specific action / research area	Lead actor	Potential partner/s	Time line	Status
Infra-structure resilience	Paving and drainage of Road Six (main artery linking Mungassa and Ndunda to N6 highway), including roadside ditches Replacement of informal Ndunda North crossing with permanent structure over stormwater drainage canal.	CMB	World Bank/AFD NUCA; AIAS		In progress

	Construction of formal drainage canals.				
Early warning system	Repair and expansion of automatic sirens network.	CMB/INGD	CLGRD	Before next rainy season	
Comm-unity prepared ness	CLGRD kit renewal and revitalisation.	INGD		Before next rainy season	In progress
Urban planning	Detailed Neighbourhood Plans (Planos de Pormenor). Drainage maps and flood risk mapping at neighbourhood level.	CMB			
Waste manage ment	Integrated waste collection.				

10. Additional information





11. Updates to the risk and resilience profile:

This profile was last updated by:

_____Nicolas_____Gate_____ (Name) 6 May 2026_____(Date) _____

_____ (Signed)

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