

An aerial photograph of Nakuru, Kenya, showing a dense urban grid of buildings and streets in the upper left, transitioning into green agricultural fields and a large, dark, circular water feature in the center. The lower right portion of the image shows a rugged, brown, hilly landscape. The text is overlaid on the lower left and bottom right.

**HOTSPOT:
LANET-PIPELINE**

**WATER AS LEVERAGE NAKURU
FOR A RESILIENT SPONGE CITY**

*NATURE KAMA KUJINUA [NATURE AS LEVERAGE]
A NATURE-BASED SPONGE SYSTEM*



**Water as Leverage
Nakuru**
for a resilient sponge city



NOTE

The Water as Leverage (WaL) – Nakuru Programme is a design-driven climate adaptation initiative jointly developed by the Government of the Netherlands, the County Government of Nakuru, and a broad coalition of Kenyan, Dutch and international partners. It brings together technical, governance, and financial expertise to identify implementable, water-resilient projects that address flooding, water scarcity, environmental degradation, and the wider systemic pressures affecting the Lake Nakuru basin.

Over the past year, the WaL programme has worked closely with communities, institutions, and local experts to understand the city through a water lens and explore how Nature-Based Solutions, traditional knowledge, and integrated planning can restore the fundamental role of water as a driver of prosperity—today and in the long term.

As part of this process, several hotspot areas across Nakuru were studied in depth. Each hotspot reflects a specific combination of challenges, opportunities, and local priorities within the broader water system. This booklet documents the work developed for Kiamunyi, Ngosur, or Lanet/Pipeline during the WaL conceptual and scoping phases.

While these hotspots are not continuing within the current phase of the WaL programme, the material produced is an important starting point for further development. The analyses, insights, and concept interventions presented here offer clear perspectives on pressing water issues and propose pathways that can guide future action. These ideas may evolve further through other municipal programmes, community initiatives, academic collaborations, or future investment opportunities.

This document is intended as a supporting knowledge foundation to inform future discussions and potential initiatives by different stakeholders. It reflects the collaborative spirit of the WaL programme and supports the ongoing ambition to contribute to a resilient, inclusive, and water-positive Nakuru, even beyond the scope of the current WaL phase.

LANET URBAN CORRIDORS



Project Description and Rationale

Lanet is designated as Nakuru’s second commercial center, focusing on smart agro-industrial development. However, progress is stalled by poor planning, lack of sanitation infrastructure, and disjointed land ownership. The area is also exposed to flood risks, particularly in the depression east of Lion Hill, threatening industrial assets like the OLA Energy depot and surrounding communities.

The Lanet–Pipeline Impact Project applies Nakuru’s sponge city principles by embedding water management into urban development, mobility, and public space. Building on the corridor-based approach used in the CBD, this project envisions a network of green-blue infrastructure along existing roads and railway lines, transforming them into multifunctional corridors for stormwater capture, recreation, and connectivity.

The project reimagines the valley floor—currently fragmented by informal drainage and unplanned roads—as a sponge system that can absorb runoff from surrounding hills and growing developments. A hydrolog-

ical study will identify stormwater convergence points, which will be enhanced with bioswales, infiltration parks, and seasonal retention zones to reduce flood risks and improve groundwater recharge.

Infrastructure corridors—including the railway and arterial roads—will be restructured with tree-lined walkways, vegetated channels, and bike lanes, linking Lanet to the CBD and Nakuru Nature Reserve. This integrated network guides structured urban expansion, addressing one of the hotspot’s key challenges: uncontrolled sprawl caused by freehold land tenure and a lack of infrastructure investment. At the heart of the project is Junction Park—a flagship sponge park that combines stormwater retention, tree nursery development, and community recreation. It functions as an educational hub and a catalyst for future densification and green infrastructure investment. This project turns Lanet–Pipeline into a model for water-smart urbanization, demonstrating how water-sensitive planning can support climate resilience, investment readiness, and healthy urban growth.

Project Objectives	<ul style="list-style-type: none"> • Include and embrace water in the planning of this area • Reduce flood hazard and risk
Project Size	120 ha
Capex (€)	22 million (€) // 3,100,000 (Ksh*1000)
Opex (€)	660,000 annual (€) // 98,000 annual (Ksh*1000)
Impact flood reduction	330,000 (m³)
Water Resources	280,000 (m³/year)
Benefits	<p>Economic viability indicated by a benefit-cost ratio greater than 1.</p> <ul style="list-style-type: none"> • Flood risk reduction • Water security benefits via infiltration • Improved WASH facilities • Improving biodiversity • Increased land values • Increase sustainable mobility
Components	<ul style="list-style-type: none"> • 30 ha Sponge Park, including retention and wetlands • 36 ha Tree planting/reforestation • 25 km Bioretention and Swales • 2 ha of Quarry restoration, including floating wetland and retention basin • Accompanying measures (5 km of trails and bike paths, 1 ha of plazas and sports)
Project owner / Implementing Agency	<ul style="list-style-type: none"> • City • Other relevant institutions: County Government, NAWASSCO, Nakuru City Board
Potential financing instruments & sources	<ul style="list-style-type: none"> • The project is not suited for private project-based finance due to limited direct revenue generation. • Public funding is relevant given its public goods nature and co-benefits. Sovereign loans, for larger possibly pooled projects, and especially grant programs could be explored. • It requires engaged project owners and endorsement from line ministries (Water, Urban Development), and eventually the Ministry of Finance. • Some private sector engagement - management and funding - may be viable only in operation and maintenance roles. • Positive features for the WaL Nakuru program are the champions at Nakuru City, EKN and Ministry of Water level. • Potential for revenue generation through Avoided cost of water filtering or water supply expansion, WASH service fees, Serviced land (plot) sales, CSR/WTE pilots.
Points of attention	<ul style="list-style-type: none"> • Limited revenue generation potential. • Funding Operation costs from government budgets



LANET-PIPELINE

CURRENT SITUATION

Located southeast of Nakuru City, the Lanet–Pipeline hotspot occupies a pivotal position in the county’s long-term urban development strategy. Officially designated as Nakuru’s future second commercial center, the area is envisioned as a smart-city hub for agro-industrial innovation and logistics, with supporting infrastructure such as a proposed international airport (County Government of Nakuru, 2013). Despite its strategic designation, actual development has remained fragmented. The dominance of freehold land tenure has led to uncontrolled land subdivision and low-density sprawl, undermining coherent growth and leaving zoning regulations unenforced.

The area’s hydrological setting presents significant vulnerabilities. Cradled between Lion Hill, Dundori Forest, Menengai Crater, and Bahati, Lanet lies within a natural catchment basin. Seasonal rainfall from these highlands converges here with intensity, generating flash floods that threaten both human settlements and critical infrastructure, such as schools, roads, markets, and the OLA Energy refinery. Depression zones east of Lion Hill act as flood collection points, particularly hazardous due to the presence of oil storage facilities. Abandoned quarries repurposed for informal housing exacerbate the risks, lacking the drainage capacity to manage stormwater surges.

Outside the rainy season, water scarcity takes center stage. The area is not connected to a centralized piped network, and residents rely on informal vendors or

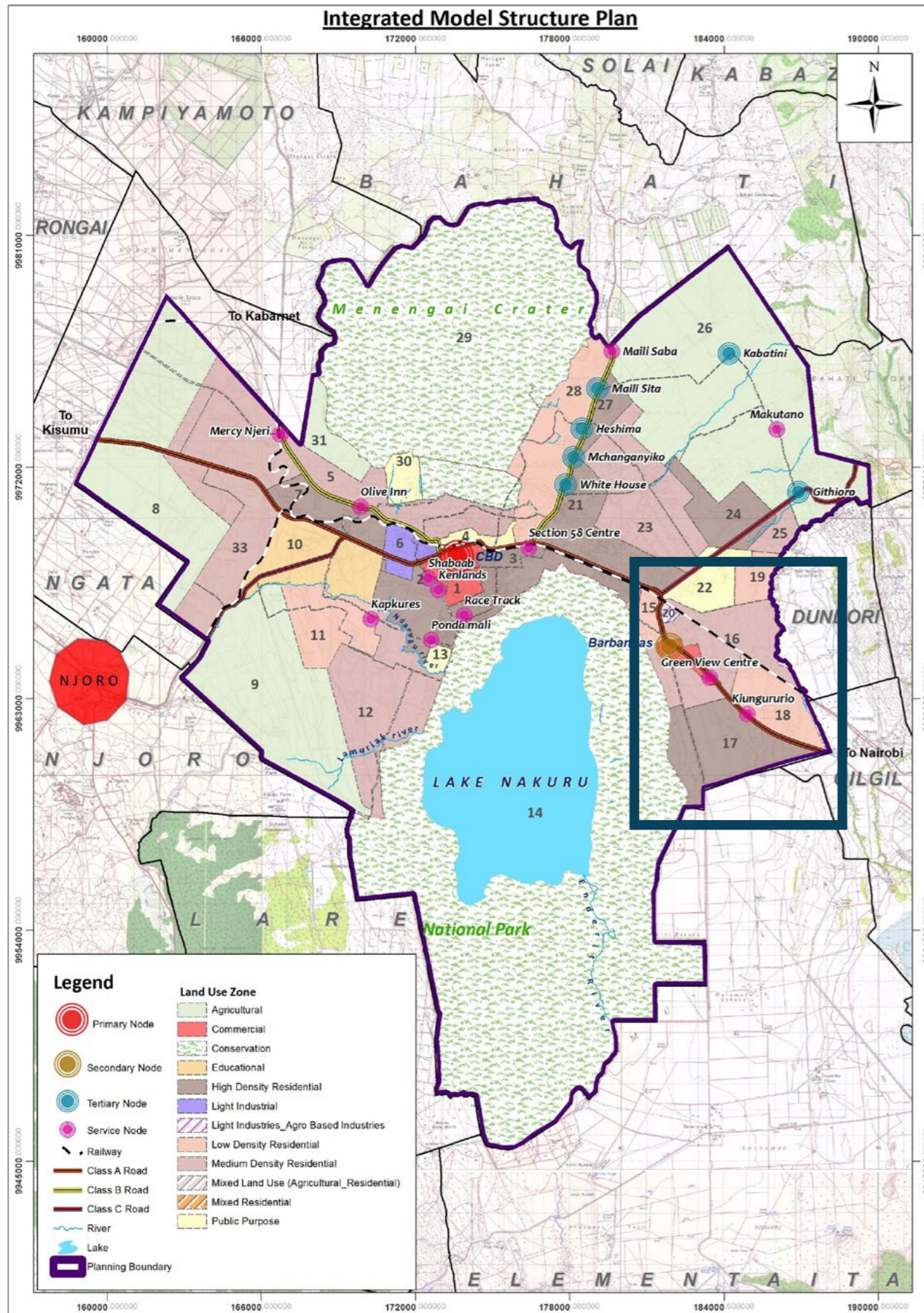
trucked-in supply. Groundwater quality is poor—often saline—and over-abstraction worsens long-term sustainability. Sanitation infrastructure is similarly lacking; widespread use of septic tanks and pit latrines leads to regular overflows during floods, increasing contamination risks and amplifying public health concerns.

Environmental degradation compounds these challenges. Lion Hill’s deforestation and illegal sand harvesting have weakened natural defenses against erosion and runoff. Dust storms, poorly managed waste, and agricultural chemicals leaching into waterways further degrade environmental quality and threaten downstream ecosystems.

Socially, the impacts are tangible—school closures, lost income, health burdens, and deepening inequality. Despite its development potential, Lanet–Pipeline suffers from weak institutional presence and limited awareness of sustainable practices.

To realize its role as a smart urban-industrial hub, Lanet–Pipeline must undergo a coordinated transformation—grounded in enforceable planning, ecological restoration, improved basic services, and Nature-Based Solutions. Without decisive intervention, it risks becoming a cautionary tale of peri-urban failure rather than a driver of regional prosperity





The CIDP 2023–2027 provides a strong policy foundation to guide the area’s transformation. It supports integrated land use planning, innovation-driven industrial growth, and investment in smart, resilient infrastructure. Priority actions include zoning enforcement, land consolidation, and infrastructure corridors that combine road, water, energy, and ICT systems. The CIDP also emphasizes environmental restoration on Lion Hill, water access expansion, flood risk mitigation, and land tenure reform—critical to enabling cohesive urban development and unlocking public–private investment.

The Urban Resilience Strategy frames Lanet / Pipeline as a testbed for managing peri-urban growth through climate-responsive planning. It promotes equitable access to services, nature-based flood control, job creation through green infrastructure, and participatory governance to ensure inclusive and risk-informed urban expansion.

The Lands and Housing Sub-Sector Report (2023) reinforces this vision by prioritizing spatial planning enforcement, affordable housing, digitized land management (via LIMS), and environmental safeguards. It identifies Lanet as a priority for infrastructure upgrades and land tenure regularization to reduce service gaps and mitigate development-related risks.

The ISUDP positions Lanet / Pipeline as part of Nakuru’s structured urban expansion strategy. It provides a comprehensive planning framework for compact growth, agro-industrial zoning, stormwater infrastructure, and climate-resilient housing. It also calls for the coordination of development around key ecological areas and strategic assets like the OLA Energy depot and Lion Hill catchment.

(Here on the adjacent page, an extract of the Integrated Urban Structure Plan)

DETAILED HOTSPOT VISION: FROM FLOODPLAIN TO FUNCTIONAL URBAN WATERSCAPE

The defining opportunity for Lanet–Pipeline lies in integrating water management with urban development. As Nakuru’s designated second commercial center emerges, growth must not passively adapt to water challenges—it must evolve with them. Water should be embraced as a guiding force that shapes land use, infrastructure, and urban form. This calls for a sponge-based approach where each zone—residential, commercial, or industrial—hosts context-specific Nature-Based Solutions (NBS). Infiltration basins, rain gardens, bioswales, and permeable pavements must be embedded across the urban fabric, forming a network of interventions that delay runoff, promote infiltration, and improve water quality. Streets, corridors, and plots should be designed as active components of the hydrological system.

Lanet–Pipeline’s extensive infrastructure network—roads, railways, and utility corridors—offers a spatial backbone to support this transformation. Two linear systems are especially strategic:

- A green sponge buffer between Nakuru and the Nature Reserve, doubling as flood control and recreational boundary.
- The railway and road spine connecting to the CBD and Nairobi, positioning the area as a corridor for climate-adaptive development.

Together, they enable the rollout of interconnected sponge city clusters: development blocks where water is captured, reused, and purified through layered green infrastructure.

Transforming Quarries into Assets

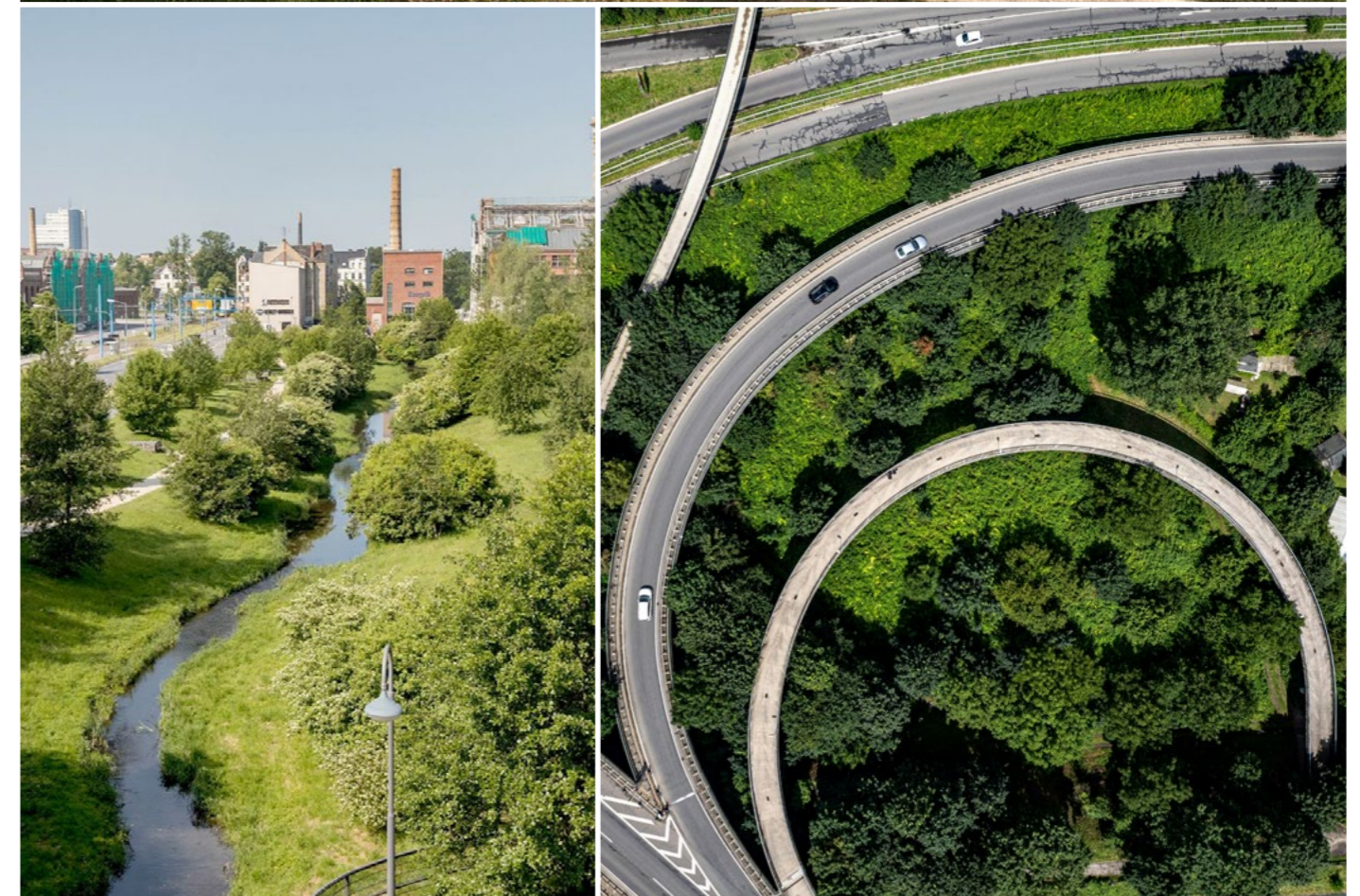
Legacy sand quarries—now poorly drained and sometimes informally settled—can be transformed into multifunctional water retention zones. Retrofitted with wetlands, aquaculture, or community gardens, these depressions buffer floods while offering public space, food production, and ecological value. In areas of informal settlement, resettlement-in-place approaches can be pursued to balance human needs with environmental rehabilitation.

Sponge Urbanism from Hill to Plot

Reforestation around Lion Hill and surrounding slopes is essential to slow runoff and stabilize soils. In the built environment, bioswales, street trees, permeable paving, and household-level systems (rain barrels, greywater reuse) will form the basic toolkit. Lanet–Pipeline can follow the CBD’s example in applying sponge cluster principles—ensuring that every development parcel contributes to resilience.

A Living Model for Resilient Growth

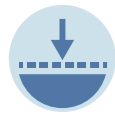
With its exposure to flood risk, infrastructure gaps, and potential for smart growth, Lanet–Pipeline can become a flagship for climate-resilient urbanism. By planning water and city in unison, it offers Nakuru the chance to leapfrog outdated models and build a thriving, future-ready district rooted in ecological design.



Project references

NATURE-BASED SPONGE SYSTEM (NBSS) APPROACH

The NBSS framework for Lanet–Pipeline centers on transforming the valley into a functional sponge district that balances growth with hydrological and ecological resilience. Interventions follow the five NBSS principles:



Recharge: The area’s numerous abandoned sand quarries—currently unregulated flood traps—can be repurposed into engineered infiltration basins or constructed wetlands. These spaces can enhance groundwater recharge while filtering pollutants and providing green infrastructure for public use. Forest and shrub restoration on Lion Hill and Dundori slopes will further stabilize soils and increase water retention upstream.



Delay: Terracing and re-vegetation of hillside catchments will slow runoff and minimize sediment loads entering the valley floor. In flatter urban zones, seasonal wetlands or swales can act as buffers, storing floodwater and delaying discharge into drainage channels and roads.



Collect: Rainwater harvesting systems in residential and institutional buildings—paired with small water tanks and retention ponds—can provide localized water supply for non-potable uses. Enhanced rain gardens and green roofs on new buildings will reduce



surface runoff volumes while extending water availability during dry spells.

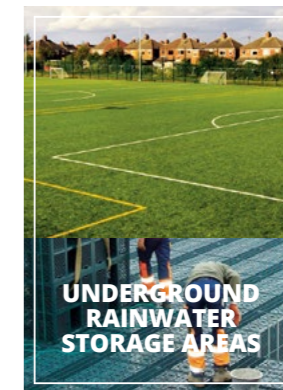
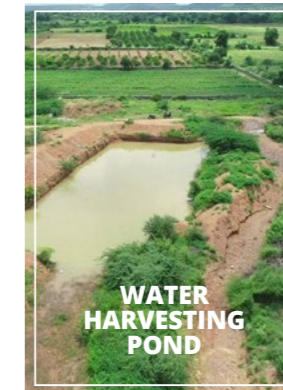
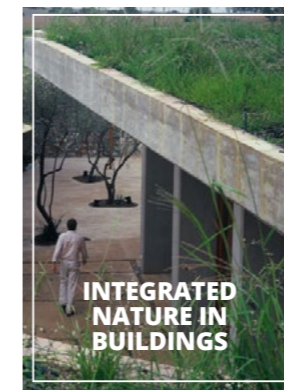
Transport: A network of bioswales and vegetated corridors can guide stormwater safely through dense developments, replacing or complementing failing grey infrastructure. Special attention must be given to directing flows away from fuel depots, residential pit latrines, and poorly planned industrial zones to reduce health hazards.



Clean: Constructed wetlands and biofiltration zones—especially near polluted quarries and outflow points—can intercept contaminants before they reach Lake Nakuru or Lake Elementaita. These green filters will also improve water quality in seasonal streams like Jogoo River.

Contribution to Lake Nakuru’s Health and Systemic Resilience

Lanet–Pipeline plays a systemic role in Nakuru’s watershed. It lies downstream of multiple hotspots, receiving water from Menengai, Dundori, and Bahati. If restored, the area could regulate stormwater volume and quality, recharge aquifers, and protect surrounding communities from both flooding and drought, including outflows into the Nakuru Lake.

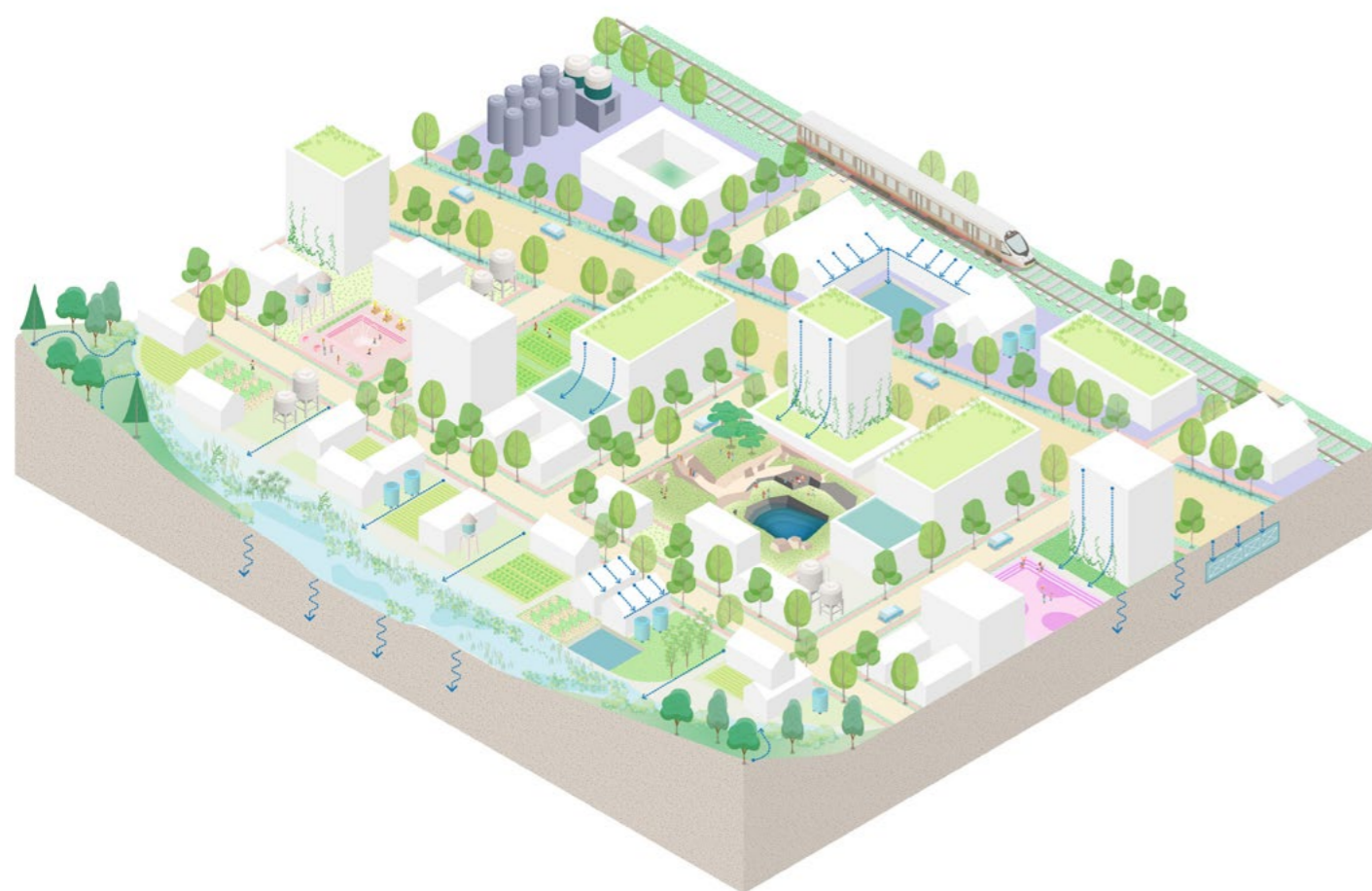


Low density

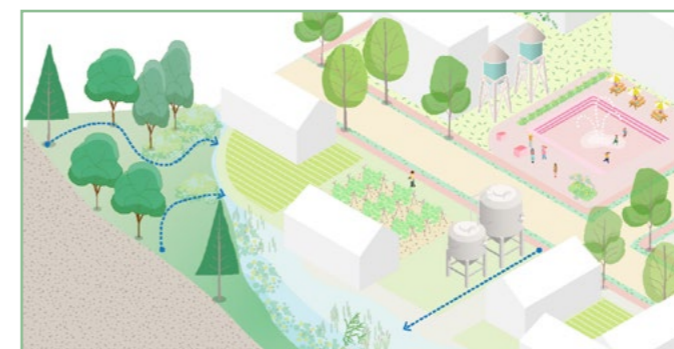
Mid-high density

Industrial

1 OPERATIONAL TOOLS VISION PRINCIPLES AND GUIDELINES



Design Principles and Planning Guidelines for Lanet – A strategic area where urban growth ambitions must align with natural systems and infrastructure. Integrating the city into a water-sensitive environment is essential to ensure sustainable development



ZONING FOR ENVIRONMENTAL PROTECTION:

Urban expansion must be guided by clear zoning rules that prioritize ecological health—separating industrial and residential zones, protecting infiltration areas, and reinforcing forested buffers.

- Restore and Enhance Ecosystems: Forest recovery, quarry transformation, and riparian protection must be prioritized to strengthen biodiversity, improve microclimates, and enhance water infiltration.

WATER & DRAINAGE MANAGEMENT

- Integrate Water into Urban Form: Water management must be embedded into the design of streets, plots, and public space—treating water as a resource, not a risk.
- Implement smart drainage systems to reduce flooding and manage runoff sustainably.
- Develop sponge parks on repurposed government land to retain water, green the urban environment, and demonstrate NBS in action.
- Promote rainwater storage solutions, scaling up from small tanks to community-level systems.

GREEN INFRASTRUCTURE & VEGETATION

- Enforce the use of green roofs and green walls through building permits for residential and commercial development.
- Establish tree nurseries in road reserves and railway lands, discouraging grazing and supporting forest cover expansion.
- Expand urban forests and reforestation programs to improve infiltration and biodiversity.

SANITATION & WASTE

- Develop decentralized fecal sludge treatment plants (FSTPs) using pre-identified land, especially in areas not connected to sewer infrastructure.
- Integrate waste management education into community networks like Nyumba Kumi and local religious organizations.

COMMUNITY & FOOD SYSTEMS

- Promote controlled urban farming and agriculture in designated zones to ensure food security and sustainable land use.
- Encourage community education programs on household-level water efficiency and reuse, particularly rainwater harvesting.
- Support the reuse of quarry sites for water retention, constructed wetlands, or vertical farming initiatives to address both stormwater and food security.
- Promote Community Stewardship: Local residents and organizations should play an active role in sustaining water and green infrastructure. Education, empowerment, and community-led initiatives are essential to long-term success.

2 OPERATIONAL TOOLS IMPACT PROJECT

LANET URBAN CORRIDORS

PROJECT DESCRIPTION AND KEY INFORMATION

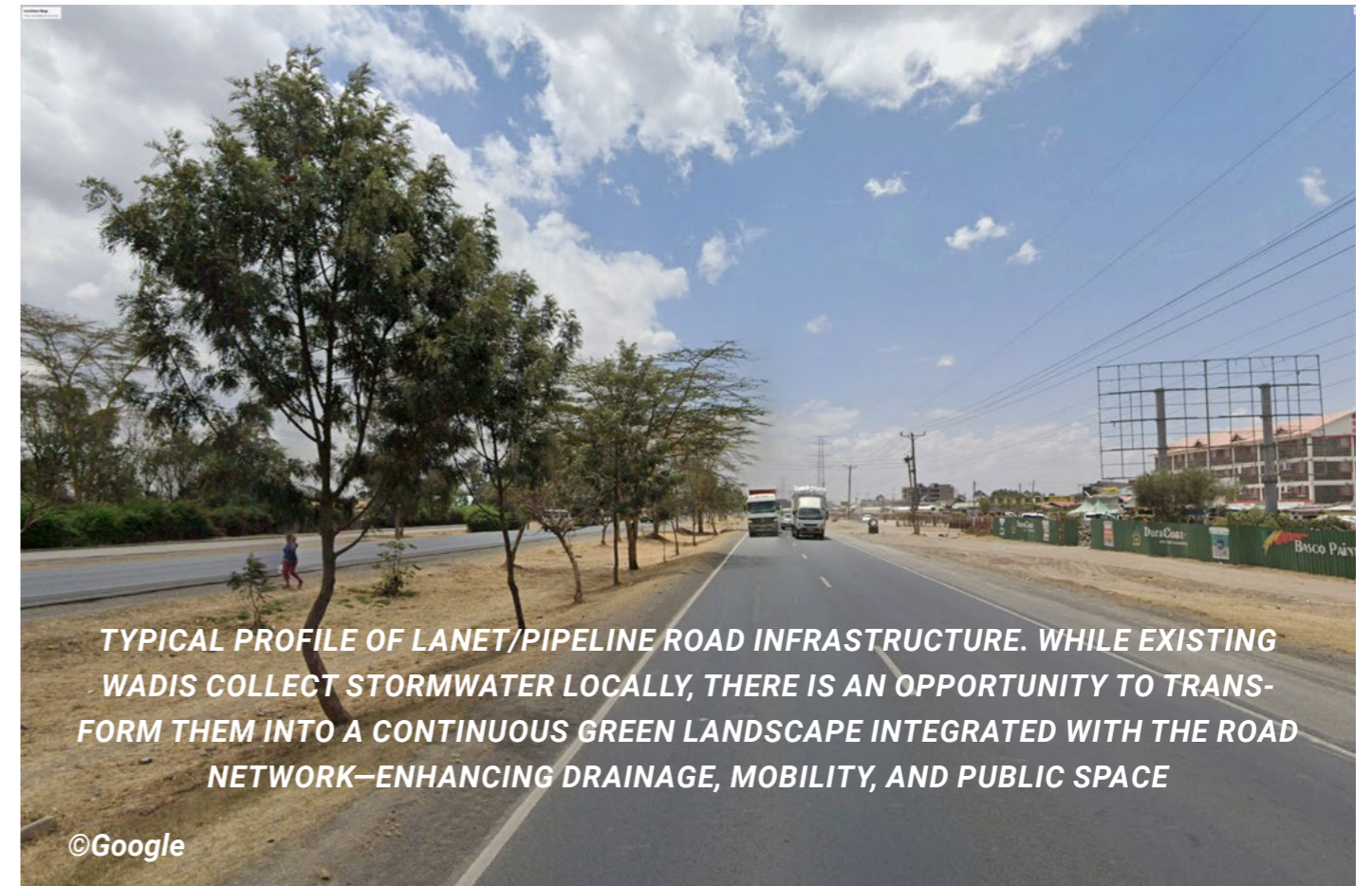
The Lanet–Pipeline impact project builds on the core principles of Nakuru’s sponge strategy—treating water as a structuring force in urban development. Inspired by the corridor approach in the CBD, this intervention proposes a network of green-blue infrastructure aligned with existing road and railway lines. These linear corridors are not only drainage routes but multifunctional systems for water capture, mobility, and public space.

At the heart of the project lies the transformation of the valley floor into a functioning urban sponge. The lowest part of the landscape—currently crisscrossed by roads and informal drainage—is reimagined as a climate-resilient backbone. A detailed hydrological assessment will identify key convergence points where stormwater accumulates. These areas will be upgraded with XXL bioswales, infiltration parks, and seasonal retention zones, designed to absorb runoff from surrounding hills, roads, and developments.

The existing infrastructure corridors—especially the railway and main arterial roads—will be enhanced with bike paths, tree-lined trails, and vegetated channels that connect Lanet to Nakuru’s core and extend the green infrastructure links to the CBD and the Nature Reserve boundary. These corridors serve as both mobility arteries and water-sensitive infrastructure, setting the framework for future sustainable growth.

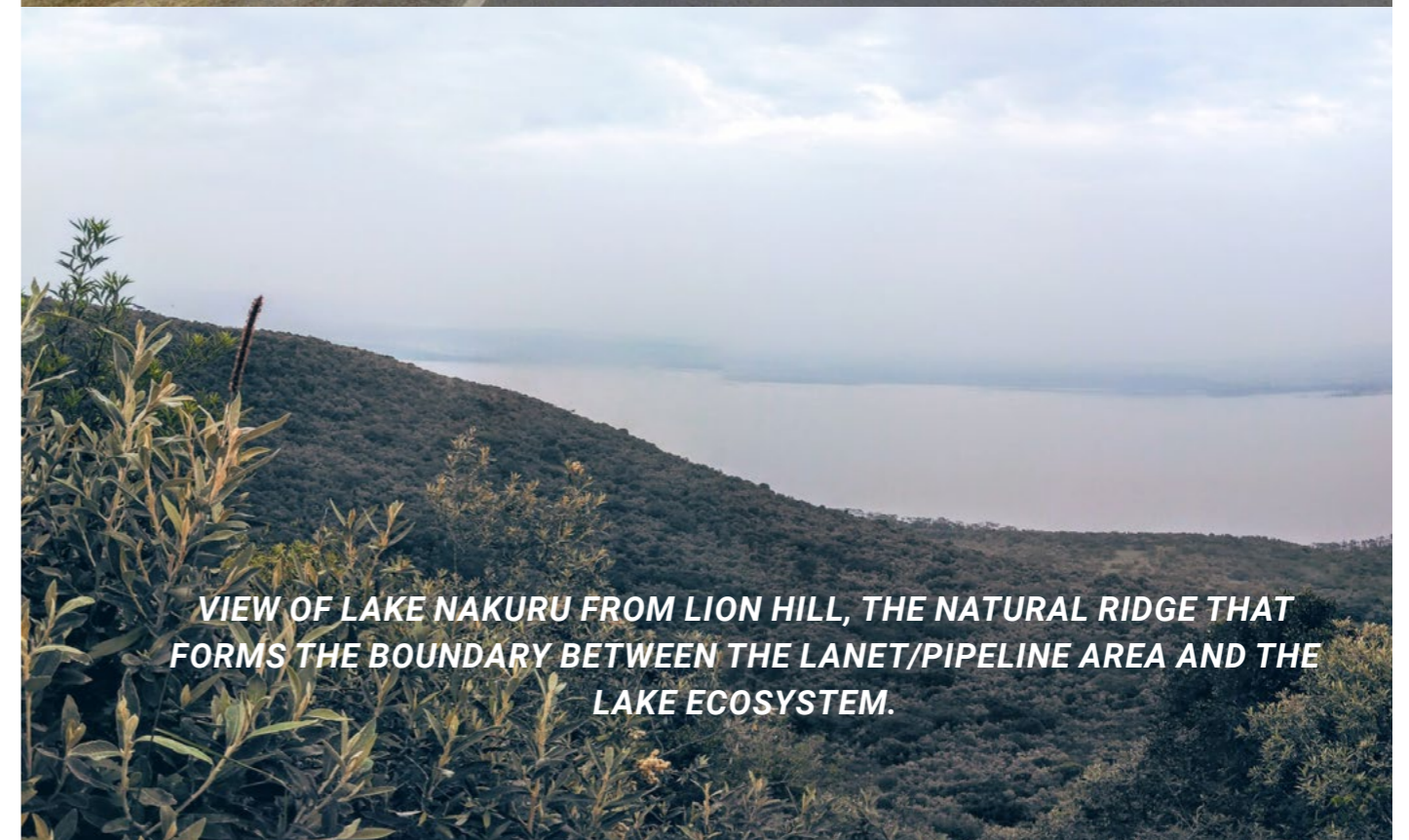
A flagship element of this vision is the creation of the “Junction Park”, located at a major confluence of roadways. This underutilized space between lanes will be converted into a community sponge park—a green public space designed for flood mitigation, tree growing, and climate adaptation. Functioning as both a water retention area and an urban nursery, the park will produce trees for local use while fostering environmental education and stewardship. It also acts as an anchor for future urban densification, attracting investment by showcasing the potential of integrated green infrastructure in planned growth hubs.

By embedding water logic into land use, mobility, and development plans, this impact project turns Lanet–Pipeline into a model district for climate-smart urbanization—where infrastructure supports ecosystems, and every drop of rain is an opportunity for resilience.



TYPICAL PROFILE OF LANET/PIPELINE ROAD INFRASTRUCTURE. WHILE EXISTING WADIS COLLECT STORMWATER LOCALLY, THERE IS AN OPPORTUNITY TO TRANSFORM THEM INTO A CONTINUOUS GREEN LANDSCAPE INTEGRATED WITH THE ROAD NETWORK—ENHANCING DRAINAGE, MOBILITY, AND PUBLIC SPACE

©Google



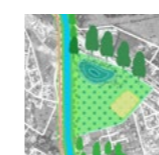
VIEW OF LAKE NAKURU FROM LION HILL, THE NATURAL RIDGE THAT FORMS THE BOUNDARY BETWEEN THE LANET/PIPELINE AREA AND THE LAKE ECOSYSTEM.



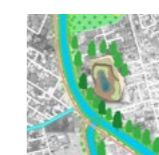
IMPACT PROJECT FLOORPLAN AND KEY INFORMATION



Project area	120 ha
Capex	22 million (€) // 3,100,000 (Ksh*1000)
Opex	660,000 annual (€) // 98,000 annual (Ksh*1000)
Impact flood reduction	330,000 (m³)
Water Resources	280,000 (m³/year)
Benefit-Cost ratio	Economic viability indicated by a benefit-cost ratio greater than 1.
Public land and large property owners in the project areas	<ul style="list-style-type: none"> Kenya Railways Authority Kenya National Highways Public Schools Kenya Pipeline Corporation (fuel storage facility) Kenya Power & Lighting Company (KPLC) (sub-station) Military (military facility) Kenya Airports Authority Kenya Plant Health Inspectorate Service (KEPHIS) Kenya Agricultural and Livestock Research Organization (KALRO)



Sponge Park, including retention and wetlands



Quarry, including a floating wetland and retention



Tree planting/reforestation



Accompanying measures (trails, bike path, plaza, sport, interpretation centre)



Swales

Components	Quantities	Design Costs	Impact flood (m³)	infiltration and water supply (m³/year)	Cost effectiveness per component	
					Flood (Euro/m³)	Infiltration (Euro/m³)
Sponge Park, including retention and wetlands	30 ha	19,360,000	200,000	160,000	96.8	121.0
Tree planting/reforestation	36 ha	510,000	20,000	100,000	25.5	5.1
Swales	25 km	260,000	90,000	10,000	2.9	26.0
Quarry, including a floating wetland and retention	2 ha	780,000	30,000	10,000	26.0	78.0
Accompanying measures (trails, bike path, plaza, sport, interpretation centre)	5 km of trails and bike paths, 1 ha of plazas and sports	1,030,000	N/A	10,000	0.0	103.0

BENEFITS ON WATER MANAGEMENT AND ADDITIONAL BENEFITS



WATER MANAGEMENT BENEFITS

- **Reduces flood risk in urbanized and industrial zones** through sponge infrastructure, quarry retrofitting, and drainage restoration.
- **Enhances infiltration and groundwater recharge** by reforesting slopes and introducing permeable surfaces.
- **Improves water quality** by filtering runoff via bioswales, wetlands, and vegetated buffers.
- **Introduces stormwater harvesting** in quarries and public spaces to supplement household supply and mitigate scarcity.



ENVIRONMENTAL

- **Restores degraded land and slopes**, especially around Lion Hill, reducing erosion and sedimentation.
- **Converts abandoned quarries** into multifunctional green zones, enhancing biodiversity and landscape functionality.
- **Reduces urban heat island** effects through increased vegetation and shaded corridors.
- **Improves air quality** by curbing dust and encouraging non-motorized transport.



ECONOMIC

- **Unlocks development potential** by aligning water infrastructure with spatial growth plans.
- **Boosts local employment via green infrastructure** construction, maintenance, and agro-enterprise zones in retrofitted quarries.
- **Attracts private sector interest through improved** land values and infrastructure in planned commercial areas.



SOCIAL & CULTURAL

- **Improves mobility through bike paths and pedestrian networks**, linking Lanet / Pipeline neighborhoods to the CBD.
- **Provides recreational, educational, and communal functions** in retrofitted quarries and green corridors.



POLITICAL & INSTITUTIONAL

- **Supports Nakuru's strategic urban expansion goals** and aligns with national smart city objectives.
- **Demonstrates a replicable model of water-sensitive urban development** in rapidly growing peri-urban zones.
- **Enables coordination with private developers**, offering a platform for co-investment and PPPs in sustainable infrastructure.

SDG ASSESMENT



SDG6 (Medium)

Aquifer restoration through water filtering (6.6), leading to water quality enhancement (6.3) and improved access to drinking water (6.1), through integrated water resource management (6.5). WaL Nakuru project expands international cooperation and capacity building to developing countries in water and sanitation(6a).



SDG8 (Low)

Reduction of flood-related economic losses (8.1).



SDG11 (High)

Contribution of Nakuru's ISUDP key urban corridors, creation of NMT routes (11.2) and inclusive accessible green public spaces (11.7) that Nakuru to its surrounding peri-urban and rural areas (11.a). Reducing per capita environmental impact (11.6) and safeguarding Lake Nakuru (11.4) through flood mitigation (11.5). Demonstration project that may lead to policy development in integrated disaster risk management (11.b).



SDG 13 (Low):

Strengthening resilience and adaptive capacity to climate-related hazards and natural disasters through flood mitigation (13.1). WaL Nakuru project as a whole supports the GCF initiatives (13a) and may mainstream integrated disaster risk management (11.b) and climate-change (13.2) in local and national policies.

STAKEHOLDERS

- **National government:** Ministry of Water, Sanitation & Irrigation; State Department of Environment and Climate Change
- **Nakuru county government:** County Dep. for Lands, Physical Planning, Housing & Urban Development; County Dep. for Infrastructure
- **Local government:** City Manager for Nakuru City; Nakuru City Board
- **Water utilities:** Nakuru Water and Sanitation Services Company Ltd (NAWASSCO); Nakuru Water and Sanitation Services Company Limited
- **Regional authorities:** Water Resources Authority (WRA) Nakuru; The National Environmental Management Authority (NEMA); Kenya Pipeline Company; Kenya Power and Lighting Company - Kenya Power (sub-station); Kenya Defence Forces/Kenya Military Academy (Military Facility); Kenya airport authority
- **Academia/research:** The Research Institution- Egerton University; Kabarak University; KARLO (Kenya Agricultural and Livestock Research Organization)
- **Multilateral and international Organizations:** SNV; UN-Habitat; World Bank; Triangle Environment; Meta-Meta; GIZ; Unicef; Finish Mondial; WSUP
- **National Organizations:** WASPA; Women in Water and Sanitation (WIWAS); KEWASNET
- **Local organizations:** Nakuru Residents Association
- **Community leaders:** Assistant County Commissioner/ Ward representatives; Member(s) of the County Assembly; Chief(s)
- **Other community actors:** Residents formal areas; Informal settlement residents; Ward Climate Planning Committees; Faith based institutions; Local businesses (hotels, small businesses, shops)

FINANCIAL AND POLICY CHECKLIST

RATIONALE FOR THE PROPOSED DESIGN	<p>Lanet has been designated as Nakuru’s future second commercial center, envisioned as a hub for smart city development and agro-industrial growth (County Government of Nakuru, 2013). Strategically located along key transport routes, the area holds strong potential for economic expansion.</p> <p>Yet, development has stalled. Dominated by freehold landownership, Lanet suffers from fragmented growth and uncontrolled low-density sprawl. Basic services—especially water and sanitation—are lacking, and infrastructure remains largely undeveloped.</p> <p>The area is also increasingly vulnerable to flooding, particularly in the depression east of Lion Hill, where stormwater from surrounding hills accumulates. These floods pose serious risks to both residents and critical infrastructure, including the nearby OLA Energy refinery and Nakuru KPC.</p> <p>The Lanet–Pipeline project proposes a shift: planning water and urban growth together. Through sponge infrastructure, integrated drainage, and serviced land development, the project seeks to transform Lanet into a climate-resilient, inclusive urban expansion zone that aligns with Nakuru’s long-term vision.</p>
SPECIFIC COST (CAPEX/OPEX)	<p>22 million (€) // 3,100,000 (Ksh*1000) 660,000 annual (€) // 98,000 annual (Ksh*1000)</p>
SPECIFIC COST BREAKDOWN PER PROJECT	<ul style="list-style-type: none"> • 30 ha Sponge Park, including retention and wetlands – 19,360,000 (€) • 36 ha Tree planting/reforestation – 510,000 (€) • 25 km Bioretention and Swales – 260,000 (€) • 2 ha of Quarry restoration, including floating wetland/retention basin – 780,000 (€) • Accompanying measures (5 km of trails and bike paths, 1 ha of plazas and sports) – 1,030,000 (€)
IMPACTS	<ul style="list-style-type: none"> • Include and embrace water in the planning of this area • Reduce pluvial flooding in the urban settlements of CBD by retaining water 330,000 (m³) • Improve water resources of groundwater 280,000 (m³/year)
POTENTIAL PROJECT OWNER	<ul style="list-style-type: none"> • City
OTHER RELEVANT INSTITUTIONS	<ul style="list-style-type: none"> • County Government • NAWASSCO • Nakuru City Board

ALIGNMENT WITH LOCAL, REGIONAL, NATIONAL PRIORITIES

NATIONAL	<p>Constitution of Kenya, 2010: Contribution to improving urban access to green public spaces through the creation of the Junction Park, providing accessible recreational areas and addressing environmental justice concerns by transforming underutilized land.</p> <p>Kenya Vision 2030 and Medium Term Plan IV: Contribution to sustainable urban growth and resilience by integrating green infrastructure and sustainable mobility solutions, fostering economic development and climate resilience within the Lanet area.</p> <p>Water Act, 2016: Contribution to sustainable water management by integrating stormwater retention solutions such as bioswales, infiltration parks, and retention basins, reducing urban runoff, and promoting water conservation in urban areas.</p> <p>Climate Change Act, 2016: Contribution to climate adaptation by establishing flood mitigation strategies and green infrastructure within urban spaces, ensuring climate resilience through natural solutions like Junction Park, which functions as both a sponge park and a community space.</p> <p>Environmental Management & Coordination Act (EMCA): Contribution to sustainable land use and environmental protection by transforming degraded urban spaces into functional green infrastructure, providing environmental services such as flood control, and improving air quality.</p>
COUNTY	<p>Nakuru County Integrated Development Plan (CIDP) 2023–2027: Contribution to directed urban growth through green infrastructure and sustainable mobility along the Barut–Lanet–Lion Hill corridor.</p> <p>The Nakuru County Water and Sanitation Services Act No. 6 of 2021: Contribution to efficient stormwater management in urban development zones.</p> <p>Nakuru County Climate Action Plan (NCCAP): Contribution to the development of green open spaces and non-motorized transport (NMT) routes in urban centers.</p>
LOCAL	<p>Nakuru’s Urban Resilience Strategy: Contribution to improved urban infrastructure resilience, including flood mitigation and stormwater management.</p> <p>Nakuru Integrated Strategic Urban Development Plan (ISUDP): Contribution to planned investments in road networks, drainage, sanitation, and green public spaces for the emerging residential zones.</p>
BREAKDOWN OF NECESSARY AND OPTIONAL INTERVENTIONS	<p>SHORT TERM</p> <p>Start with a detailed hydrological assessment to inform corridor design and drainage priorities. Begin implementation of key green infrastructure elements such as vegetated channels, bike paths, and tree-lined trails in high-visibility or flood-prone zones to generate quick impact and community support.</p> <p>MID TERM</p> <p>Construct XXL bioswales, infiltration parks, and seasonal retention areas to manage stormwater, enhance urban green space, and reduce flood risk. Scale up linear green corridors along strategic roadways, integrating active mobility routes with nature-based drainage.</p> <p>LONG TERM</p> <p>Consolidate the corridor system into a fully connected, multifunctional green-blue network. Expand vegetated infrastructure into adjacent neighborhoods, integrating it into land-use planning to future-proof the city against intensifying climate events.</p>

INDICATIVE PROJECT STRUCTURING

Ownership and Governance

Primary project ownership is expected to lie with the City of Nakuru, supported by the County Government of Nakuru and the Nakuru City Board. The City will lead spatial planning and infrastructure upgrades, while the Board coordinates implementation across informal settlements and commercial nodes. NAWASSCO plays a critical role in sanitation, solid waste management, and long-term utility operations. Cross-departmental coordination will be vital to manage land-use enforcement, drainage, and public service delivery in tandem.

Revenue Potential and Cost Optimization

While direct financial returns are limited, the project offers value through:

- Avoided costs related to water filtering, flood response, and public health
- WASH service fees, especially in higher-density areas
- Serviced land sales, tied to regulated urban expansion and infrastructure delivery.
- CSR and pilot Waste-to-Energy (WTE) projects, including composting or anaerobic digestion, can provide targeted income if supported by local industries and donor-backed de-risking.

Cost-effectiveness can be improved by retrofitting existing infrastructure (e.g., roads, quarries) into multi-functional assets and implementing sponge measures through community labor and local materials.

Points of Attention

- Land ownership and tenure issues may hinder phased development and complicate plot-level service delivery.
- Unregulated sprawl and weak zoning enforcement undermine long-term investment outcomes.
- Waste-to-Energy systems require strong feasibility backing, environmental clearance, and capable local operators.
- Full spatial transformation will be incremental, requiring continuity of leadership and multi-phase planning.

FUNDING AND FINANCING CONSIDERATIONS & IDENTIFIED INVESTOR INTEREST

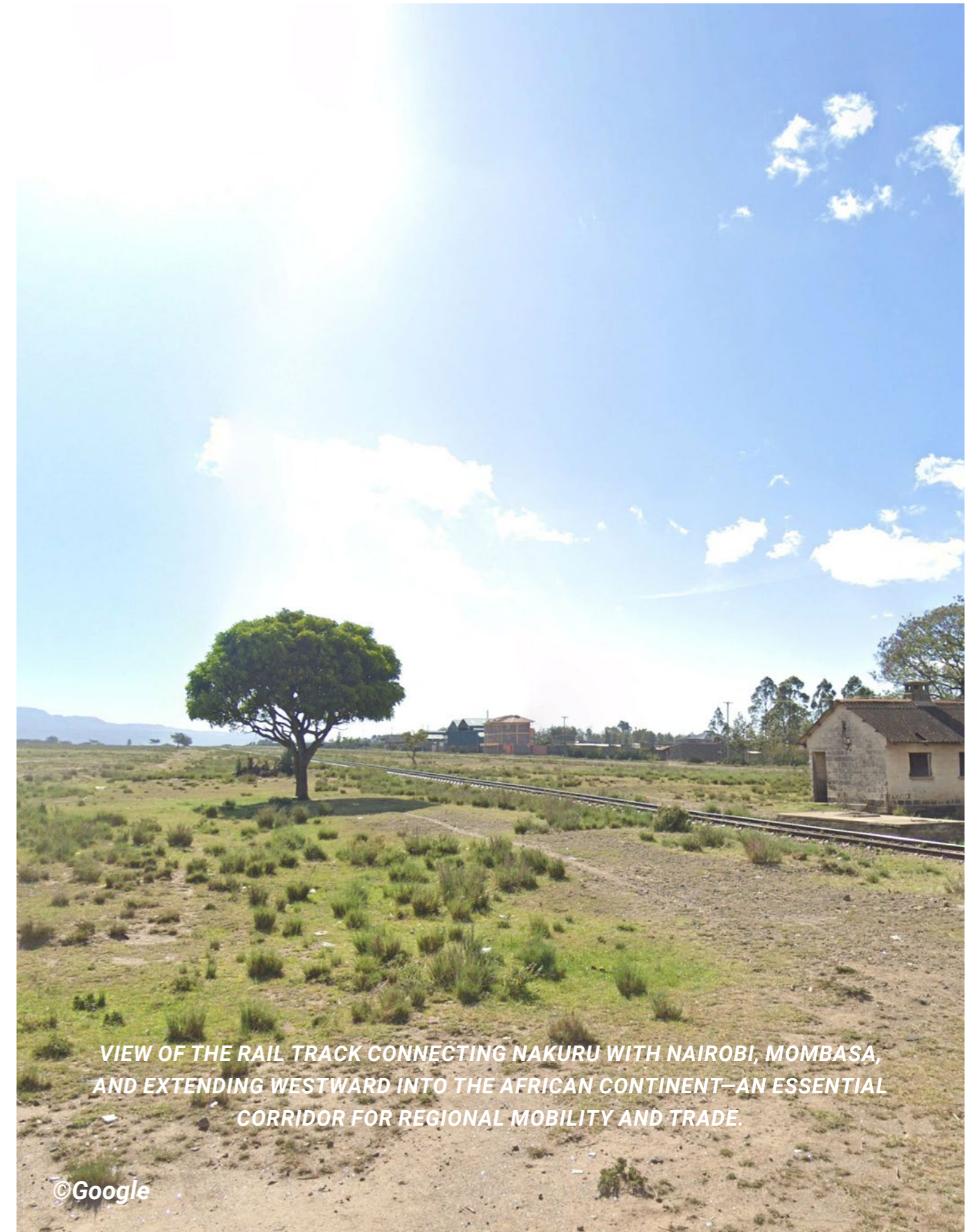
Funding is expected to rely primarily on public grants and concessional loans, including:

- National allocations from the Ministry of Water and Sanitation.
- World Bank, AfDB, and EIB urban upgrading, WASH, and solid waste management programs
- County budget co-financing for early-phase infrastructure and zoning enforcement

Additional investment opportunities may come from:

- Private sector involvement through CSR, especially for WTE pilots.
- Blended finance mechanisms, combining public funding with real estate co-development.
- Serviced plot sales in newly upgraded areas, conditional on transparent PPP frameworks.

Operational costs are expected to remain publicly funded, with NAWASSCO or contracted operators ensuring long-term maintenance. The area’s strategic role as a commercial expansion zone justifies sustained public investment despite modest direct returns.



VIEW OF THE RAIL TRACK CONNECTING NAKURU WITH NAIROBI, MOMBASA, AND EXTENDING WESTWARD INTO THE AFRICAN CONTINENT—AN ESSENTIAL CORRIDOR FOR REGIONAL MOBILITY AND TRADE.

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3 OPERATIONAL TOOLS CAPACITY BUILDING AND PILOT PROJECTS

"ACTIVATING THE LANET WATER CORRIDOR "

To complement the strategic impact corridors and catalyze long-term transformation in Lanet–Pipeline, a set of targeted pilot projects can serve as entry points for action, learning, and local ownership. These interventions are not only technical prototypes but also platforms for community engagement, institutional coordination, and capacity building—critical to ensuring the success of water-sensitive urban development.

1. Redevelopment Activation:

Quarry Transformation and Junction Sponge Park

The first pilots will focus on the abandoned quarry sites and the Pipeline Junction Park, reimagining these underutilized and flood-prone spaces as living laboratories for sponge infrastructure. The quarry site will be repurposed into a Community Water Park, combining stormwater retention, wetland restoration, and ecological education. The Pipeline Junction Sponge Park will function as a climate-adaptive public space, showcasing tree growing, infiltration gardens, and flood-buffering landscapes.

Both sites will include a Farming and Water Harvesting Demonstration Zone, co-designed with local communities and schools. Here, vertical farming units, rooftop rainwater harvesting systems, and composting stations will be tested—integrating climate-smart agriculture with water reuse and circular practices.

2. Corridor Prototyping:

Vegetated Mobility and Drainage Lanes

A second set of pilots will upgrade segments of existing road and railway infrastructure into vegetated mobility

corridors. Small-scale sections will be retrofitted with bioswales, tree-lined walkways, permeable shoulders, and bike paths to demonstrate how stormwater can be slowed, stored, and filtered while enhancing public mobility. These prototypes will serve as reference models for replicating such corridors throughout the district.

3. Cluster Catchment Labs:

Plot-Scale Rainwater and Greywater Pilots

To address stormwater at source, selected housing clusters—particularly in new and planned developments—will be supported to install rain barrels, soak pits, raised gardens, and household-scale reuse systems. These micro-pilots will build resident awareness and demonstrate the benefits of decentralized water management, particularly in areas without access to piped infrastructure or sewer systems.

4. Capacity Building and Youth Engagement

Each pilot will be paired with training programs in partnership with local schools, youth groups, and community-based organizations. Key topics include:

- Water-sensitive urban planning
- Urban tree nursery management
- Community water infrastructure maintenance
- Sponge cluster monitoring and impact tracking

These pilots will lay the foundation for Lanet–Pipeline to become a living showcase of integrated, water-sensitive growth—bridging the gap between vision and implementation, and empowering local actors to shape a resilient future.



INITIAL ASSESSMENT ON PHASING

OPERATIONAL TOOL

VISION PRINCIPLES AND GUIDELINES

IMPACT PROJECT

BUILDING AND PILOT PROJECTS

ACTION

ST MT LT

VISION PRINCIPLES AND GUIDELINES	Zoning for environmental protection	Restore and Enhance Ecosystems	ST	MT	LT
	Water & drainage management	Integrate Water into Urban Form		ST	MT
		Implement smart drainage systems		ST	MT
		Develop sponge parks on repurposed government land		ST	MT
		Promote rainwater storage solutions		ST	MT
	Green infrastructure & vegetation	Enforce the use of green roofs and green walls through building permits		ST	MT
		Establish tree nurseries in road reserves and railway lands		ST	MT
		Expand urban forests and reforestation programs		ST	MT
	Sanitation & waste	Develop decentralized fecal sludge treatment plants		ST	MT
		Integrate waste management education into community networks		ST	MT
Promote controlled urban farming and agriculture in designated zones			ST	MT	
Community & food systems	Encourage community education programs on household-level water efficiency and reuse		ST	MT	
	Support the reuse of quarry sites for water retention		ST	MT	
	Promote Community Stewardship:		ST	MT	
IMPACT PROJECT	Urban Corridors for a climate resilient future	hydrological assessment	ST	MT	LT
		XXL bioswales, infiltration parks, and seasonal retention zones	ST	MT	LT
		bike paths, tree-lined trails, and vegetated channels	ST	MT	LT
BUILDING AND PILOT PROJECTS	Activating the lanet water corridor	Quarry Transformation and Junction Sponge Park	ST	MT	LT
		Vegetated Mobility and Drainage Lanes	ST	MT	LT
		Plot-Scale Rainwater and Greywater Pilots	ST	MT	LT
		Capacity Building and Youth Engagement	ST	MT	LT



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