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## STORMWATER MANAGEMENT PLAN

For

### PROPOSED DEVELOPMENT OF LOW-IMPACT, SELF-CATERING CAMPING NODES WITH SHARED AMENITIES FACILITIES FOR THE LOVEMORE FAMILY - PORTION 104 OF FARM 216, UITZICHT, KNYSNA, WESTERN CAPE



<b>PREPARE FOR:</b>	Lovemore Children's Secondary Trust
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**DRAFT DOCUMENT – SUBJECT TO REVISION FOLLOWING PUBLIC PARTICIPATION**

# 1. INTRODUCTION AND PURPOSE

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This Stormwater Management Plan (SMP) has been prepared by Eco Route Environmental Consultancy on behalf of the Lovemore Children's Secondary Trust, as a supporting technical document to the Draft Basic Assessment Report (BAR) for the proposed low-impact, private family camping facility on Portion 104 of Farm 216, Uitzicht, Knysna, Western Cape.

The SMP is submitted in direct response to concerns raised during the pre-application engagement with South African National Parks (SANParks), which identified stormwater management as one of three key mitigation areas requiring detailed attention prior to the progression of the Basic Assessment process to formal public participation. The document is therefore prepared in anticipation of the Draft BAR public participation phase and is intended to demonstrate that stormwater risks associated with the proposed development can be adequately managed.

## 1.1 Purpose of this Document

This SMP serves the following purposes:

- To identify and characterise the stormwater-related risks posed by the proposed development, with specific reference to the proximity of the Knysna Estuary, the sandy and erodible nature of soils on the property, and the presence of a coastal cliff face that is currently showing signs of erosion.
- To present a suite of stormwater management measures, both structural and non-structural, that will be implemented during the construction and operational phases of the development.
- To define monitoring, maintenance and reporting requirements that will give effect to the stormwater management objectives set out in the Draft BAR and the Environmental Management Programme (EMPr).
- To demonstrate compliance with applicable legislation, including the National Environmental Management: Integrated Coastal Management Act (NEM:ICMA, Act 24 of 2008) and the National Water Act (Act 36 of 1998).

## 1.2 Relationship to Other Documents

This SMP is a standalone technical annex that must be read in conjunction with the following project documents:

- Draft Basic Assessment Report – Portion 104 of Farm 216, Uitzicht, Knysna (Eco Route, 2025.09.13)
- Draft Environmental Management Programme (EMPr) – Portion 104 of Farm 216, Uitzicht, Knysna (Eco Route, 2025.09.15)
- Aquatic Biodiversity Specialist Assessment (Confluent, 2024)
- Site Development Plan – Portion 104 of Farm 216 (104 of 216 SDP 2026-03-050)

# 2. SITE DESCRIPTION AND STORMWATER CONTEXT

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## 2.1 Property Overview

Portion 104 of Farm 216, Uitzicht, Knysna is a 9.96-hectare property situated on the Western Heads of the Knysna Estuary. The property is bounded by the Knysna River Estuary to the north-east, the Featherbed Private Nature Reserve to the east, and the Garden Route National Park to the north-west. The property is located within the Knysna Protected Environment (KPE) and falls within the Coastal Protection Zone (CPZ) as defined in NEM:ICMA, as the entire property lies within one kilometre of the estuary high-water mark.

## 2.2 Topography and Drainage Characteristics

The property exhibits a variable topography, sloping generally downward from the south-west towards the north-east in the direction of the Knysna Estuary. The north-eastern section of the property terminates in a steep sandy cliff that descends directly to the estuary shoreline. The aquatic specialist assessment (Confluent, 2024) confirmed that:

- No perennial or non-perennial watercourses, rivers, or wetlands are present on the property.
- No hydrogeomorphological features indicative of a watercourse were identified within the proposed development footprint.
- The Knysna Estuary is not classified as a watercourse under the National Water Act.
- The dominant drainage pathway is overland sheet flow across the existing lawn area towards the cliff edge, which has contributed to visible cliff-face erosion.

Soils on the property are characterised as deep, acid Tertiary sands (regic sands and Lamotte form soils), consistent with the Knysna Sand Fynbos substrate. These soils are highly erodible when exposed, particularly on steeper slopes. The existing grassed lawn area in the north-eastern portion of the property provides poor interception of overland flow and acts as a relatively impermeable surface in comparison to intact fynbos vegetation.

## 2.3 Identified Stormwater Risks

The following stormwater risks have been identified based on site visits, specialist assessments, and a review of the proposed development design:

No.	Risk	Description	Significance
R1	Cliff-edge erosion from concentrated overland flow	Existing mowed lawn area generates concentrated sheet flow toward the sandy cliff. Erosion signs are already visible. Additional impermeable surfaces from new decks could exacerbate this.	<b>HIGH</b>
R2	Estuary sedimentation during construction	Vegetation removal for construction exposes erodible sands. Sediment-laden runoff could reach the estuary during rainfall events if not controlled.	<b>HIGH</b>
R3	Increased runoff volumes from impermeable deck structures	Roofed chalets and deck platforms generate concentrated roof runoff which must be directed away from sensitive areas and the cliff edge.	<b>MEDIUM</b>
R4	Groundwater recharge disruption near borehole	Increased impermeable area reduces infiltration. Combined with borehole abstraction during occupation periods, localised groundwater draw-down may occur.	<b>LOW</b>

No.	Risk	Description	Significance
R5	Pollution risk from construction material stockpiles and fuel storage	Hydrocarbons and construction materials stored on-site during construction could be mobilised during rainfall and carried toward the estuary.	<b>MEDIUM</b>

### 3. LEGISLATIVE AND POLICY FRAMEWORK

The following legislation, policies, and guidelines are applicable to stormwater management on this property:

Legislation / Policy	Relevance to Stormwater Management
National Environmental Management: Integrated Coastal Management Act (NEM:ICMA, Act 24 of 2008)	The property falls entirely within the Coastal Protection Zone (CPZ). Section 62 prohibits activities that adversely affect the integrity of the coastal environment. All stormwater measures must prevent degradation of the estuary.
National Water Act (Act 36 of 1998)	Although no Schedule 1 water uses are triggered (no watercourses present), the general duty of care provisions apply. Stormwater must not contaminate groundwater or the estuary.
National Environmental Management Act (NEMA, Act 107 of 1998)	Section 28 imposes a general duty of care to prevent, minimise and remedy significant pollution. Stormwater management measures are a direct application of Section 28.
Western Cape Biodiversity Spatial Plan (WCBSA, 2023)	The property is reclassified as a Protected Area under the 2023 WCBSA. Stormwater must be managed in a manner consistent with maintaining the ecological integrity of the Knysna Sand Fynbos Coastal Corridor.
Knysna Protected Environment Regulations (GN 1175, 2009)	Development within 50 m of the estuary high-water mark requires SANParks authorisation. Stormwater measures within the Development Control Area (DCA) must be consistent with SANParks requirements.
Knysna Municipality: Stormwater Management By-law	Municipal stormwater management requirements apply to the development. The applicant must ensure that the proposed stormwater measures are consistent with municipal requirements and do not direct stormwater onto public roads or neighbouring properties.

### 4. STORMWATER MANAGEMENT OBJECTIVES

The stormwater management objectives for this development are as follows:

1. Prevent erosion of the sandy cliff face and associated sedimentation of the Knysna Estuary during both the construction and operational phases of the development.
2. Intercept and attenuate roof runoff from all enclosed structures (kitchen-dining-lounge chalets and bedroom chalets) using rainwater harvesting tanks positioned at each EUA, thereby reducing peak stormwater discharge volumes.
3. Maintain or improve natural infiltration rates across undeveloped portions of the property through retention of indigenous vegetation cover and targeted rehabilitation of currently degraded and alien-invaded areas.
4. Establish and maintain a minimum 36-metre vegetated buffer zone from the Knysna Estuary high-water mark as a runoff interception and sediment filtration zone, consistent with the recommendation of the aquatic specialist (Confluent, 2024).
5. Prevent contamination of stormwater runoff with construction materials, hydrocarbons, or sewage during the construction phase.
6. Restore natural drainage pathways by phased removal of alien invasive plants and re-establishment of indigenous fynbos vegetation across currently transformed and degraded areas.
7. Ensure that stormwater management measures are compatible with the requirements of SANParks, the Knysna Municipality, and the competent authority.

## 5. CONSTRUCTION PHASE STORMWATER MANAGEMENT MEASURES

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Construction activities pose the greatest acute stormwater risk, as vegetation removal temporarily exposes erodible soils and generates concentrated runoff pathways. The following measures shall be implemented prior to and during construction.

### 5.1 Pre-Construction Requirements

- All no-go zones, buffer areas, and SCC (Species of Conservation Concern) demarcation zones shall be physically marked on site using high-visibility fencing or flagging tape before any vegetation clearing commences.
- The 36-metre estuary buffer zone (measured inland from the cliff edge) shall be clearly demarcated as a no-go zone for all construction activities, material storage, and vehicle access.
- Topsoil stripped from EUA footprints shall be stockpiled in clearly demarcated areas on flat ground, a minimum of 20 metres from the estuary buffer, and covered with hessian or geotextile sheeting when not in active use.
- No vegetation clearing or earthworks shall commence if rainfall is forecast within 24 hours, as confirmed by the site foreman in consultation with South African Weather Service forecasts.

### 5.2 Erosion and Sediment Controls During Construction

- Silt fences or geotextile sediment barriers shall be installed along the downslope perimeter of all active construction footprints, prior to clearing commencing. These barriers shall be inspected during the ECO site visits and after all rainfall events exceeding 10 mm.
- Silt socks or filled sandbags shall be deployed at low points and drainage concentration areas to intercept sediment-laden overland flow before it can reach the cliff edge or estuary buffer zone.
- Erosion control matting or mulch shall be applied to exposed slopes and disturbed areas within three working days of earthworks completion in any given area.
- Only the existing grassed access track shall be used as the primary construction access route. No new access tracks shall be created.
- The access track shall be inspected monthly and after significant rainfall events. Ruts or erosion features that develop on the access track shall be remediated within five working days.

### 5.3 Hazardous Materials and Pollutant Controls

- All fuel and chemical storage areas shall be located on hard, impermeable bases (e.g., drip trays or bunded areas), a minimum of 30 metres from the estuary buffer, and away from any drainage concentration areas.
- Bunded containment areas shall be sized to contain a minimum of 110% of the total storage capacity of all containers within the bunded area.
- The construction contractor shall maintain a fully stocked spill response kit on site at all times. Any fuel or chemical spills shall be reported to the ECO immediately, contained, cleaned up, and recorded in the environmental incident register.
- All concrete mixing, washing of equipment, and disposal of cement water shall take place within designated contained areas equipped with settling sumps. Concrete washwater shall never be discharged to the ground surface within the buffer zone.

### 5.4 Rainfall Event Response

The contractor shall implement the following response protocol during rainfall events:

- Earthworks shall cease immediately when rainfall exceeds 5 mm/hour.
- All exposed soil stockpiles shall be covered with geotextile sheeting prior to forecast rainfall events.
- Silt fences and sediment barriers shall be inspected and cleared of accumulated sediment within 24 hours following any rainfall event exceeding 20 mm.
- If sediment is observed reaching the estuary buffer zone, the ECO shall be notified immediately and construction in the relevant area shall be suspended until mitigation is adequate.

## 6. OPERATIONAL PHASE STORMWATER MANAGEMENT MEASURES

The operational phase stormwater management strategy is centred on three integrated mechanisms: rainwater harvesting, buffer zone protection, and alien invasive species removal combined with indigenous vegetation rehabilitation. Together, these measures address both the quantity and quality dimensions of stormwater management on the property.

### 6.1 Rainwater Harvesting System

Each of the five Exclusive Use Areas (EUAs) is equipped with a dedicated rainwater harvesting system, as described in the Site Development Plan (TMBA Architects, 104 of 216 SDP 2026-03-05):

Component	Specification	Quantity	Function
JoJo Water Tanks	5,250 L each (1,820 mmØ)	3 per EUA (15 total)	Rainwater storage
Rainwater Downpipe (RWDP) System	Connected to roofed chalet structures	Per enclosed deck unit	Roof runoff interception
Induction Pump & Filter	Per EUA	1 per EUA (5 total)	Water pressure & quality
<b>Total on-site storage capacity</b>	78,750 L	All 5 EUAs combined	Runoff attenuation

The rainwater harvesting system directly reduces the volume of roof runoff that would otherwise discharge to the ground surface and contribute to overland flow toward the cliff edge. When tanks reach capacity during extended rainfall events, overflow shall be directed via below-ground piping to infiltration areas within the undeveloped vegetation, away from the estuary buffer zone.

The applicant shall ensure that all tank overflow pipes are fitted with mosquito-proof screens and directed to areas of indigenous vegetation capable of accepting additional infiltration without causing erosion. Tank overflow directions shall be confirmed on the final as-built drawings submitted to the ECO post-construction.

### 6.2 Estuary Buffer Zone Management

The aquatic specialist (Confluent, 2024) identified the 36-metre zone inland of the cliff edge as a critical buffer that must be maintained in a vegetated condition to intercept overland flow, stabilise sandy soils, and prevent sediment input to the estuary. The following operational-phase obligations apply to the buffer zone:

- The 36-metre estuary buffer zone shall be permanently demarcated with physical markers (treated timber posts or similar durable material) and shall be labelled as a no-go zone in the property's site rules and EMPr.
- No structures, paths, furniture, fire pits, or vehicle access shall be introduced within the buffer zone at any time.
- The existing lawn grass within the buffer zone shall be progressively replaced with indigenous fynbos-thicket vegetation through active planting, guided by the Invasive Alien Species Management Plan and the rehabilitation plan prepared by a qualified restoration ecologist.

- A minimum of 10 metres inland of the actual cliff edge shall be treated as a primary erosion management zone, in which re-vegetation using deep-rooted indigenous species is prioritised. Species selection shall be guided by the terrestrial biodiversity specialist.
- The buffer zone shall be inspected quarterly by the ECO and after every storm event exceeding 25 mm. Any signs of erosion, rill formation, or cliff-face slumping shall be reported to the responsible person within 48 hours and remediated within 30 days.

### **6.3 Permeable Surfaces and Access Track Management**

- No hard-surfaced (asphalt, concrete or pavers) access tracks, parking areas, or pathways shall be created on the property. All ground-level access between EUAs shall remain on existing grassed tracks or indigenous vegetation cleared to a minimum standard using low-impact methods.
- Where any new ground-level pathway is required between EUAs, permeable stepping stones or timber boardwalk sections shall be used, embedded at or slightly below grade to prevent ponding or runoff concentration.
- The existing grassed access track shall be maintained to prevent rut formation. Where rutting occurs, it shall be repaired using compacted gravel or equivalent permeable material. The repaired surface shall be seeded with grass within 14 days.
- All stilt-supported deck structures allow natural drainage and infiltration beneath the platform footprint. No sealing or hardening of the ground surface beneath decks shall be permitted.

### **6.4 Alien Invasive Species Removal and Vegetation Rehabilitation**

The removal of alien invasive plant species (IAPs) is a core stormwater management measure, in addition to being a biodiversity requirement. Dense stands of invasive Acacia, Eucalyptus, and other listed IAPs on the property have altered natural drainage patterns, altered infiltration, and increased fire risk. Their removal, combined with re-establishment of indigenous fynbos-thicket, will restore the natural hydrological functions of the site. Please refer to the alien clearing control plan for more information.

### **6.5 Borehole and Groundwater Management**

- The existing on-site borehole shall supplement rainwater harvesting only when the property is occupied. The borehole pump shall be switched off during periods when the property is unoccupied, allowing the shallow aquifer to recharge naturally.
- A borehole yield monitoring log shall be maintained, recording monthly water levels and usage volumes. If water levels show a declining trend across two consecutive monitoring periods, borehole usage shall be reduced and the matter referred to a qualified hydrogeologist.

## 7. Monitoring, Inspection and Reporting

The following monitoring programme shall be implemented to verify the effectiveness of the stormwater management measures and to identify any corrective actions required:

Activity	Indicator	Frequency	Responsible	Record
Buffer zone inspection	No erosion features, no vegetation loss, no informal pathways within buffer	Quarterly + after storms > 25 mm	ECO	Site inspection report
Cliff-edge condition assessment	No new slumping, no regression of cliff edge	Bi-annually	* TBC	Inspection report with photographic record
Rainwater tank performance check	Tanks intact, downpipes connected, overflow directed correctly	Monthly during rainy season	Property caretaker	Maintenance log
IAP re-establishment survey	No re-establishment of cleared IAP species above 5% cover	Every 6 months (years 1–3), annually thereafter	ECO / Property caretaker	IAP monitoring report
Borehole water level monitoring	Monthly water level reading; no declining trend across consecutive readings	Monthly when property occupied	Property owner / caretaker	Borehole log
Access track condition	No significant rut formation, no erosion channels, stable surface	Monthly + after storms > 20 mm	ECO / Contractor	Maintenance record
Construction phase silt fence inspection	Silt fences intact and functional; no sediment breaching perimeter	Weekly + after all rainfall events	Site foreman / ECO	Construction ECO report

All monitoring records shall be retained by the Responsible Person for a minimum of five years and shall be made available to the competent authority or SANParks upon request. A consolidated annual stormwater management report shall be compiled and submitted to the Responsible Person within 60 days of the end of each calendar year.

## 8. Conclusion

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The proposed development on Portion 104 of Farm 216, Uitzicht, Knysna presents defined stormwater management challenges, primarily related to the erodible sandy soils, the presence of an active coastal cliff face, and proximity to the Knysna Estuary. However, these risks are manageable through the integrated suite of measures presented in this Stormwater Management Plan.

The development design, as reflected in the TMBA Architects Site Development Plan (104 of 216 SDP 2026-03-05), incorporates several inherently stormwater-sensitive features: all structures are elevated on stilts with no impermeable ground surface at platform level; rainwater harvesting is integrated into each EUA; and all EUAs are positioned outside the 36-metre estuary buffer zone. These design features, combined with the construction phase controls, buffer zone management obligations, and IAP removal programme described in this plan, provide a sound basis for concluding that the residual stormwater risk associated with the development is low and manageable.

The implementation of this SMP, alongside the obligations of the EMPr and the proposed SANParks stewardship arrangement, will result in a net improvement in stormwater management on the property compared to the current unmanaged baseline, in which alien invasive vegetation disrupts natural drainage, lawn grass concentrates overland flow toward the cliff edge, and no formal stormwater measures are in place.

It is respectfully submitted that this Stormwater Management Plan satisfies the requirement raised by SANParks during Draft Application Phase, and provides a sufficient basis for the competent authority to assess the stormwater-related aspects of the Basic Assessment application.

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### Document Disclaimer

This Stormwater Management Plan is a DRAFT document prepared for review purposes. It will be finalised following review by the competent authority and SANParks. The final version will be submitted as part of the Draft Basic Assessment Report package for public participation in terms of the NEMA EIA Regulations, 2014 (as amended).