GROOTVADERSBOSCH MANAGEMENT ROADS

CONDITION ASSESSMENT - STORMWATER DAMAGE

33°58'22"S – 20°50'20"E

PROJECT REF NO: 11755000

EM-GI000103 (DOI), 11755009 (V3)

30 July 2025

Compiled for:

Mr. Keith Weis
Consultant Program Manager
Western Cape Government
Department of Infrastructure

Western Cape Government
6th Floor, 9 Dorp Street
Cape Town, 8000

Contact details:
Email; Keith.Weis@westerncape.gov.za
Tel: 0860 142 142

Compiled by: E Reinke

V3 CONSULTING ENGINEERS

Contact person:
eugene.reinke@V3consulting.co.za
Unit 1B, 4 Mascador Street, Voorbaai,
Mossel Bay, 6500
PO Box 730, Mossel Bay, 6500
South Africa
Tel: +27 (0) 44 691 2305

V3 CONSULTING ENGINEERS

CLIENT	CapeNature
CONTRACT NO: **OUR REF NO:**	EM-GI000103 11755009
PROJECT DESCRIPTION	STORM DAMAGE CONDITION ASSESSMENT - GROOTVADERSBOSCH MANAGEMENT ROADS
REPORT DESCRIPTION	CONDITION ASSESSMENT AND RECOMMENDATIONS

Revision	0	1		
Date	18/07/2025	30/07/2025		
Author(s)	GR BEESLAAR, L ARTHUR	E REINKE, GR BEESLAAR		
Approver	L VAN STADEN	L VAN STADEN		

Author's signature(s) E Reinke

Date 30/07/2025

Approver's signature

Date 30/07/2025

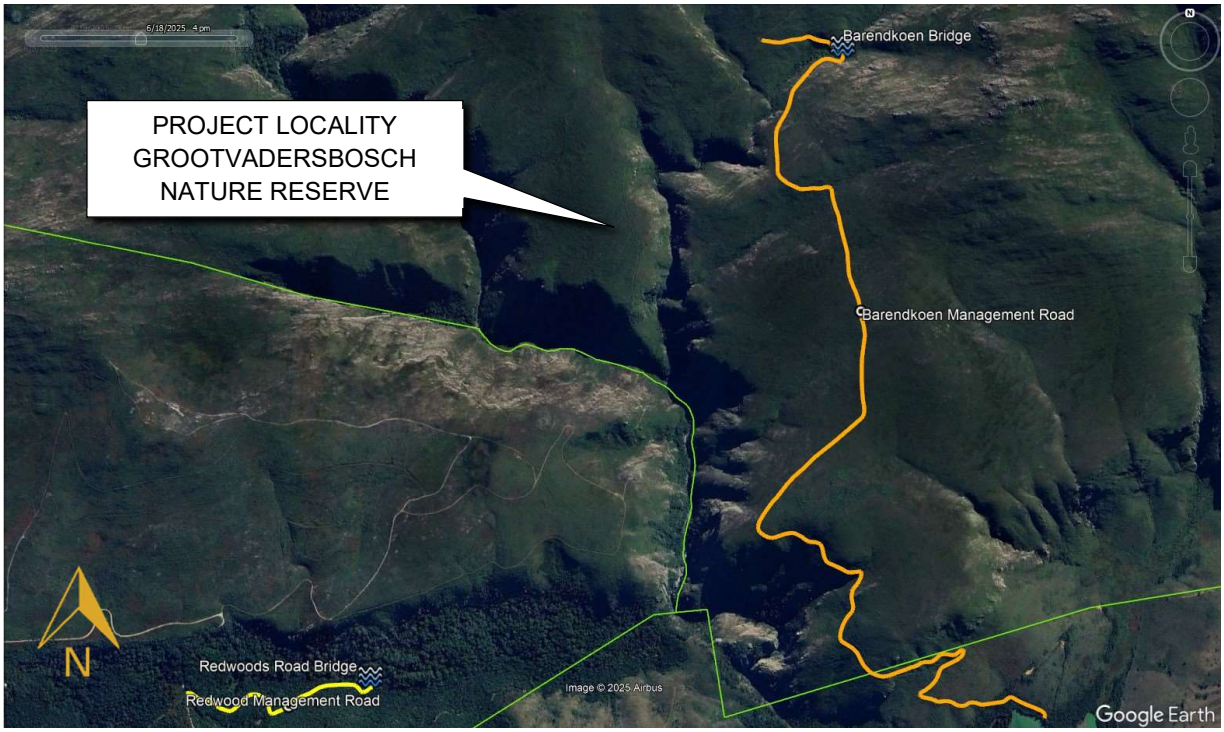

Figure 1: Project locality plan.

LOCALITY PLANS

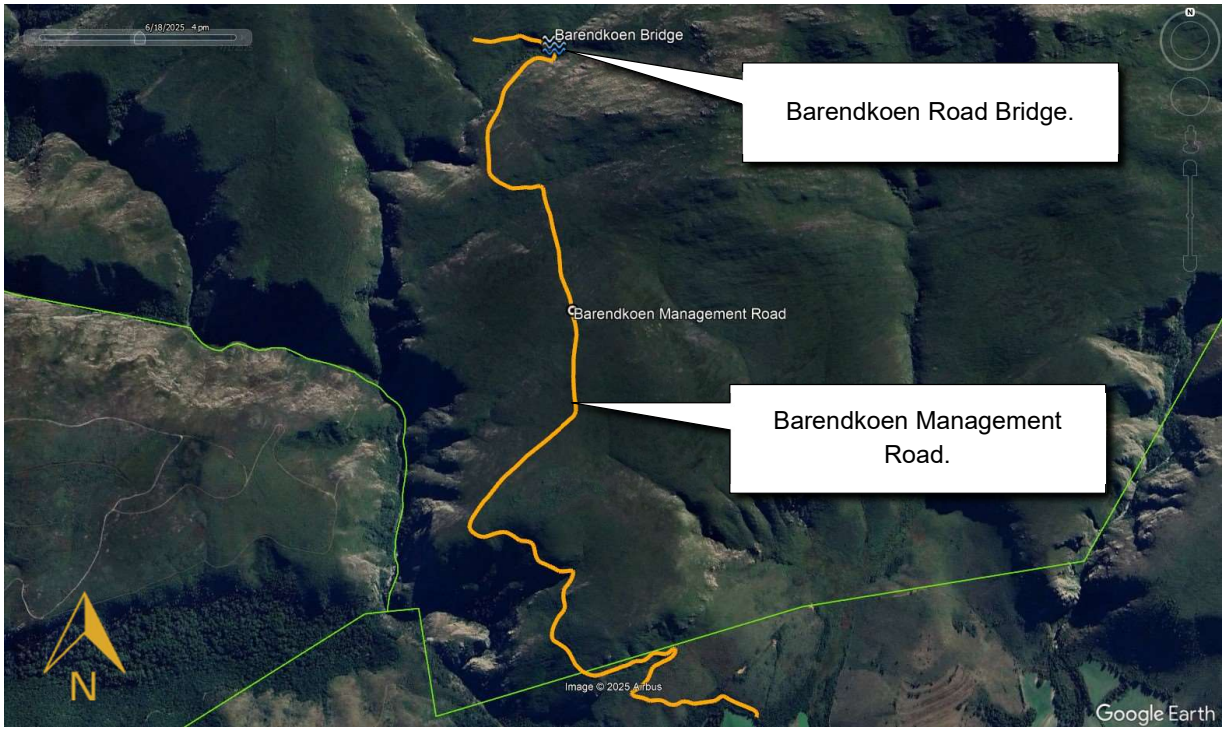

Figure 2: Barendkoen Management Road.

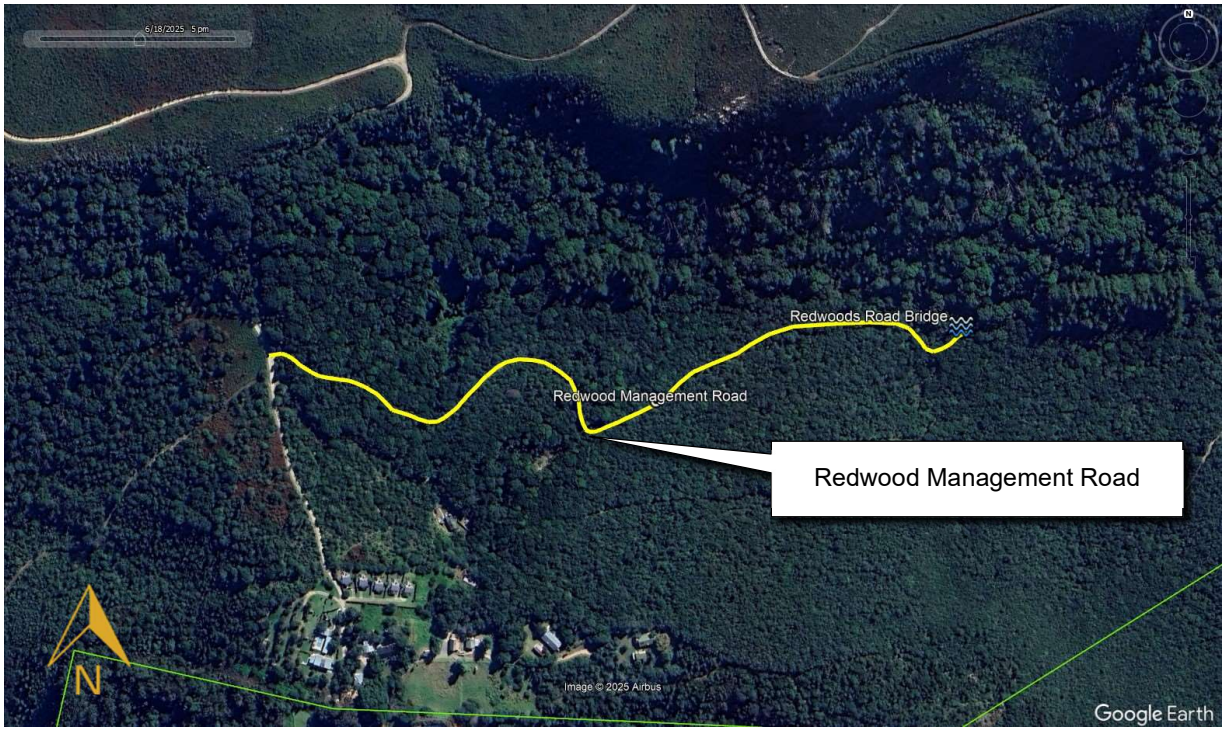

Figure 3: Redwood Management Road.

LOCALITY PLANS

CONDITION ASSESSMENT
GROOTVADERSBOSCH MANAGEMENT ROADS

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1. INTRODUCTION

V3 Consulting Engineers (Pty) Ltd. was appointed by the Western Cape Government Department of Infrastructure to conduct disaster damage condition assessments for 22 of CapeNature reserves in the Western Cape and report on current conditions and any remedial recommendations deemed necessary. This report focuses on the Grootvadersbosch Management Roads, located near the town of Riviersonderend, as indicated on the locality plans (Figures 1 to 4).

The assessment was commissioned following infrastructure damage caused by severe storms across the province in 2024, which raised concerns from the CapeNature authority. The storm damage has negatively impacted operations, and various forms of damage were observed, including:

- Eroded roads
- Flooded crossings
- The loss of fines in road tracks
- Burned down bridge

Site visits were conducted from 17 to 19 June 2025 to assess the current condition of the affected infrastructure within the Grootvadersbosch Nature Reserve. One team, comprising two members from V3 Consulting Engineers (Pty) Ltd, one member from CapeNature, and one member from Western Cape Government Department of Infrastructure, undertook the assessment (refer to Attendance Register – Annexure B).

1.1 PROJECT SCOPE / BRIEF

The scope of work is understood to include:

- Conducting site inspections to assess the condition of storm-damaged elements along the Grootvadersbosch Management Roads
- Compiling a report on findings and offering advice on remedial measures where necessary.

1.2 BASIS OF INFORMATION

This assessment is based on visual inspections conducted on-site. All measurements should be considered approximate.

A conditional assessment report of the infrastructure, including a maintenance plan, was provided by the Client before the site visits. Before fieldwork, the assessment teams conducted desktop studies using the provided drawings and Google Maps imagery to evaluate infrastructure layouts, construction methods, and identify visible storm damage.

Based on this information, the teams developed marked-up drawings and a checklist of roads to inspect. On site, V3 representatives met with CapeNature personnel (refer to Attendance Register – Annexure B) to gather contextual information, including details on prior remedial efforts, to form a holistic understanding of the infrastructure status.

Subsequent assessments were conducted in the presence of representatives from both CapeNature and the Western Cape Government Department of Infrastructure to ensure a consistent baseline approach to evaluating each element.

Please note: No invasive testing or exploratory investigations were performed. Therefore, there remains a possibility of unforeseen issues arising when a contractor begins remedial work.

2. SITE DESCRIPTION

2.1 CAPENATURE – GROOTVADERSBOSCH NATURE RESERVE

The Grootvadersbosch Nature Reserve is in the Breede River valley, about 15km south of Robertson on the road to McGregor in the Western Cape Province of South Africa. The reserve spans semi-arid terrain within the Succulent Karoo biome and is characterised by undulating hills, gravel plains, and shallow seasonal watercourses. The internal management road network traverses a variety of topographies, including flood-prone valley floors, low ridges, and areas of dense Karoo shrubland.

Roads are primarily unpaved and surfaced with compacted gravel, with minimal formalised drainage infrastructure. Several sections cross natural drainage lines and seasonal streams, making them vulnerable to stormwater erosion, gullying, and sediment deposition. Prolonged dry periods followed by intense storm events have led to the progressive deterioration of road surfaces and adjacent embankments.

Vegetation in the reserve is dominated by hardy, low-growing succulent species, interspersed with patches of denser brush and thorny shrubs. Limited vegetation cover on steeper slopes exacerbates surface runoff and contributes to erosion. Access to some road segments is constrained due to washouts, scouring, and the accumulation of loose sediment and debris.

This condition assessment focuses on identifying and documenting stormwater-related damage across the management road network, intending to inform future rehabilitation and drainage improvement measures.

Site name:	CapeNature – Grootvadersbosch Nature Reserve
Management Road Assessments:	1. Barendkoen Road Bridge 2. Barendkoen Management Road 3. Redwood Management Road

2.2 FINDINGS SUMMARY

2.2.1 Barendkoen Road Bridge

The Barendkoen Road Bridge, located along a Management Road within the Grootvadersbosch Nature Reserve, is currently in a severely compromised state, exhibiting significant damage from both fire and severe weather conditions. Local accounts confirm that the bridge was partially burnt down and subsequently eroded and washed away during recent severe weather events. The photographs included in Table 1 visually corroborate the extent of the damage, showing remnants of the structure and the impact of erosion.

Information from locals indicates that the bridge was previously constructed using wood poles. This material has proven inadequate against the combined forces of fire and intense stormwater.

For a detailed breakdown of individual observations and descriptions, refer to the condition assessment attached as Annexure A.

2.2.2 Barendkoen Management Road

The Barendkoen Management Road within Grootvadersbosch Nature Reserve provides critical access for fire management, access to Helderfontein overnight huts, maintenance, and emergency operations. The road condition varies significantly along its length, with increasing levels of vegetation overgrowth, erosion, and stormwater damage from Stake Value 815 onwards. Initial sections remain passable under dry conditions but become hazardous when wet due to clayey terrain. Dense fynbos encroachment and possible slips in later sections limit vehicular access and require maintenance clearance and slope stabilization. A washed-out bridge on the Barendkoen track further disrupts connectivity and requires structural replacement. Geotechnical input is recommended for areas with evident slips or unstable slopes.

Key observations and issues include:

- **Overgrowth:** Many sections are heavily overgrown with fynbos, necessitating frequent trimming to maintain clear passage and prevent vehicle damage.
- **Uneven and Rocky Terrain:** Several sections show significant rock exposure and uneven surfaces, requiring high-clearance vehicles.
- **Erosion/Washouts:** Sections show signs of erosion or washout, which could be a significant obstacle, especially during or after rain.
- **Poor Drainage**: Some areas appear prone to becoming muddy or waterlogged, indicating potential drainage issues.

To improve long-term access and preserve road integrity, the following **interventions are recommended**:

- **Backfill eroded sections** with imported G5 gravel material and level the track surface.
- **Install concrete strips** along affected sections to improve traction and minimise wear.
- **Construct concrete rolling dips (water bars)** to manage stormwater runoff and prevent further erosion.
- **Clear overgrown vegetation** to restore functional access, especially beyond Stake Value 815.
- **Conduct a geotechnical assessment** in areas with slope instability, followed by stabilisation measures such as gabion retaining walls and improved surface drainage.
- **Limit vehicle access** in unstable areas until structural integrity is confirmed through monitoring and assessment.
- **Replace destroyed infrastructure** (e.g., the washed-away bridge) as detailed in Section 2.2.1.

For a detailed breakdown of individual observations and descriptions, refer to the condition assessment attached as Annexure A.

2.2.3 Redwood Management Road

The Redwood Management Road is in generally poor condition, with multiple sections affected by rutting, muddy wheel tracks, and poor surface drainage. These conditions lead to standing water, saturated soils, and slippery surfaces that compromise vehicular safety and accessibility—especially during wet conditions. This route is essential for accessing the Redwoods hiking trail and for ongoing infrastructure maintenance and ecological monitoring.

Key observations include:

- **Poor Surface Drainage:** Multiple sections suffer from pooling water and soft, muddy tracks.
- **Surface Degradation:** Wheel rutting, exposed stones, and loose aggregates contribute to uneven and unstable driving conditions.
- **Risk to Operations**: Difficult access under wet conditions threatens regular reserve operations and emergency response readiness.
- **Contractor Appointed:** A contractor is currently appointed to deal with stormwater damage at the Redwood bridge section, as confirmed by the field ranger (Sam Pinzi).

To address these issues, the following **interventions are recommended**:

- **Drainage Improvements:** Construct and open side drains, cross-drains, and water bars to divert surface runoff.
- **Surface Rehabilitation:** Reshape the track to eliminate rutting and restore proper camber. Backfill eroded areas with compacted rock and G5 gravel.
- **Surface Stabilisation:** Lay a stabilised gravel layer to strengthen the roadbed and reduce slipperiness.
- **Ongoing Maintenance:** Implement a routine maintenance plan to manage erosion, monitor drainage function, and retain access quality.

For a detailed breakdown of individual observations and segment-specific recommendations, refer to the condition assessment attached as Annexure A

3. ONSITE ASSESSMENT

3.1 SITE ASSESSMENT CHECKLISTS AND PHOTOGRAPHS

Each road was assessed using a uniform checklist listing all the elements grouped by function and with details such as size and quantity. A rating system is used to rate the current condition of each element and as guidance to urgency and severity of intervention required. The ratings ranked as follows:

	1- Excellent: No intervention required now. Element should function as intended for another 2-3 years
	2- Good: Element still functioning as intended, but plan for maintenance within the next 1-2 years.
	3- Average: Element in fair condition with no immediate risk, but is recommended to be addressed within a year
	4- Poor: Element poses a risk / is at risk, and remedial action is to be taken as soon as possible.
	5- Critical: Element poses a serious safety/functionality risk and should be barred off / not used at all

Each road has been assessed and reported on individually. For a detailed breakdown of individual observations and descriptions, refer to the condition assessment attached as Annexure A.

Table 1: Photos.

<table>
<tr><th colspan="2">Barendkoen Road Bridge</th></tr>
<tr><td> 
Figure 4: Photo 1, southern abutment of burned-down bridge.</td><td> 
Figure 5: Photo 2, remnant of burned wooden bridge deck.</td></tr>
<tr><td> 
Figure 6: Photo3, northern abutment of burned-down bridge.</td><td> 
Figure 7: Photo 4, view of abutment wall.</td></tr>
</table>

Barendkoen Road Bridge*(continued)*

Figure 8: Photo 5, remnant of burned wooden bridge deck.

Barendkoen Management Road

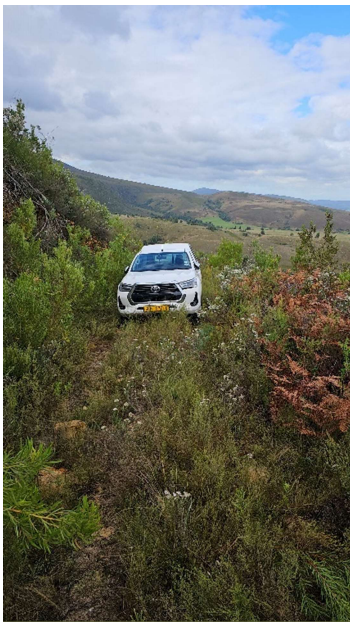


Figure 9: Photo 18, two-track route with vegetation in the center.

Figure 10: Photo 17, track overgrown with dense fynbos, impeding vehicle movement.

Figure 11: Photo 3, dirt and rocky surface.

Figure 12: Photo 4, signs of a developing slope failure or slip were observed along the lower edge of the track.

Barendkoen Management Road *(continued)*

Figure 13: Photo 5, boundary gate delineates the Grootvadersbosch Nature Reserve limits.

Figure 14: Photo 9, extremely uneven terrain, exposed bedrock, and heavy vegetation.

Figure 15: Photo 11, signs of slope failure or slip observed from a photo taken from a distant vantage point.

Figure 16: Photo 19, track surface is generally firm but uneven, with frequently exposed rock and scattered boulders along the route.

Figure 17: Photo 20, burned-down bridge.

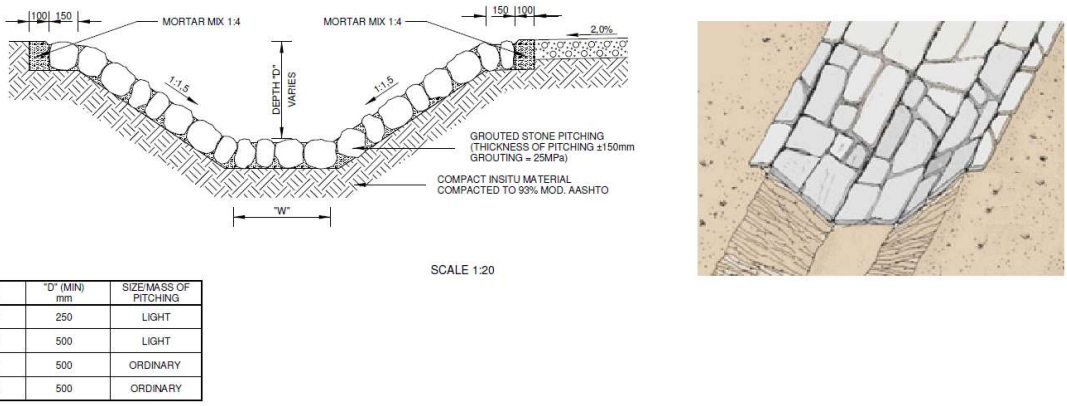
Redwood Management Road	
	
Figure 18: Photo 6, road is in poor condition, with significant rutting and muddy wheel tracks.	**Figure 19: Photo 10, the surface remains uneven and stony, with loose rocks and exposed aggregate further hindering access.**

4. RECOMMENDATIONS

4.1 REPAIR WORKS SPECIFICATIONS

4.1.1 Hand-Laid Stone Pitching:

Hand-laid stone pitching involves preparing the area, then placing stones individually, often with mortar, to create a stable, erosion-resistant surface. This technique is commonly used for lining open drains, protecting slopes, and constructing retaining walls.



"W" mm	"D" (MIN) mm	SIZE/MASS OF PITCHING
250	250	LIGHT
500	500	LIGHT
750	500	ORDINARY
1000	500	ORDINARY

Figure 20: Hand-Laid Stone Pitching

Use stones for hand-laid pitching in the following areas:

- Natural watercourses to remedy erosion.
- Areas adjacent to roads where there are signs of washout or undermining.

Table 2: Approximate length of stone pitching to be constructed

Management Road Assessments	Length(m)
Barendkoen Road Bridge	N/A
Barendkoen Management Road	N/A
Redwood Management Road	N/A

Stones must be:

- Tightly interlocked.
- Embedded slightly below grade to prevent displacement.

Rolling Dips/Water Bars:

Rolling dips collect surface runoff and direct it across and away from the roadway or trail, minimizing erosion.

- Construct using:

- Imported gravel humps, placed at an angled alignment to divert water gently off the road surface.

Table 3: Approximate number of 3m long Rolling Dips to be constructed

Management Road Assessments	Number of Gravel (No)	Number of Concrete (No)
Barendkoen Road Bridge	N/A	N/A
Barendkoen Management Road	145	30
Redwood Management Road	30	N/A

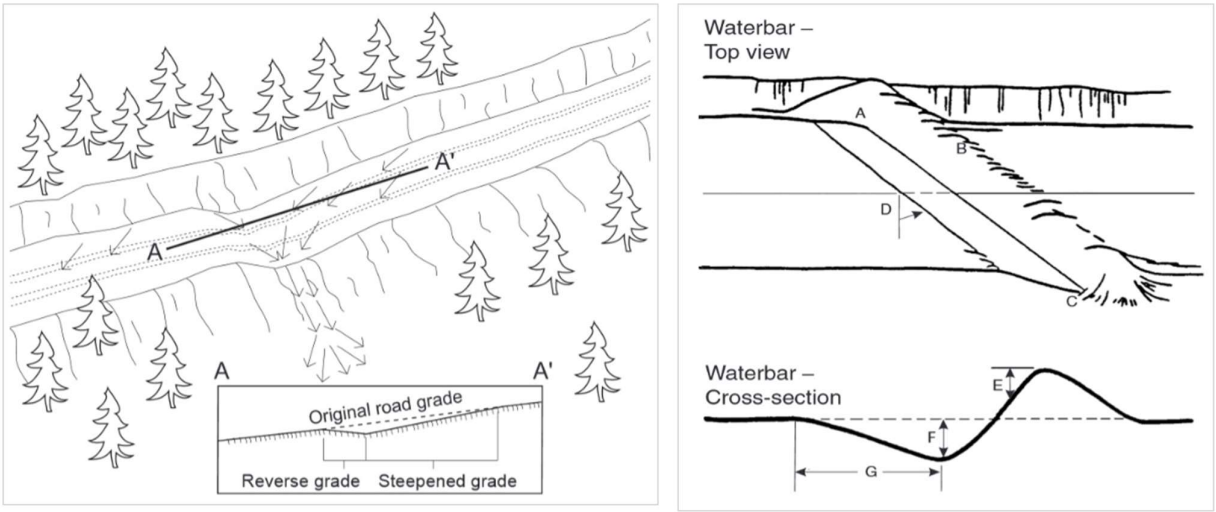


Figure 21: Rolling Dips/Water Bars

4.1.2 Concrete Access Strips

Concrete access strips are often constructed to provide basic, low-maintenance vehicle access over erodible, steep, or wet terrain. While there is no single national standard document specific to rural 4x4 access strips, they are usually designed using principles from the following references:

4.1.2.1 Reference Standards & Guidelines:

1. South African National Standards (SANS):
   - SANS 1200 G: Concrete (Structural)
   - SANS 10100-1: The structural use of concrete – Part 1: Design
   - SANS 10100-2: The structural use of concrete – Part 2: Materials and execution of work
2. TMH 1: Standard Methods of Testing Road Construction Materials – CSIR
3. COLTO (Committee of Land Transport Officials) Standard Specifications
4. SANRAL Standard Drawings (particularly rural road and low-volume roads manual

Table 4: Typical Specifications for Concrete Access Strips

Item	Specification
Strip Width	600 mm to 800 mm per wheel path
Gap Between Strips	600 mm to 1000 mm (depending on wheel track width)
Strip Length per Panel	2.0 m (Cast Alternatively with Expansion joints every 10m)
Concrete Class	25 MPa at 28 days (Class 25/19)
Aggregate Size	Max 19 mm (Standard)
Strip Thickness	150 mm for standard access (light vehicles); increase to 175–200 mm for heavier 4x4s or steep gradients
Base Layer	150 mm G5 or G6 compacted to 95% Mod AASHTO (as per SANS 1200DM)
Subgrade	Minimum CBR of 8%, otherwise subgrade improvement required
Jointing	Cast in alternate 2 m sections to allow for shrinkage cracking (construction joints every 2 m). Provide a 15 mm wide expansion joint at every 10 m interval and all interfaces with fixed structures. Fill joint with bitumen-impregnated fiberboard to full slab depth (150 mm). Seal with flexible mastic if desired to prevent debris ingress.
Surface Finish	Light broom finish for traction
Edge Restraint	Optional – may include edge thickening or shallow side drains for drainage control
Reinforcement	Typically unreinforced for cost, but can include light mesh (A142) if needed for durability or in steep terrain

4.1.2.2 Drainage Considerations:

- Lateral fall or crown to prevent water ponding.
- Provide mitre drains or side ditches at regular intervals.
- Cross-fall of ~3% is typical to ensure runoff.

4.1.2.3 Construction Notes:

- Cast alternate slabs to prevent thermal cracking.
- Cure with plastic sheeting or curing compound for at least 7 days.
- Compact sub-base and base thoroughly to reduce future movement.
- Concrete must be vibrated or well-compacted to reduce voids.

Table 5: Approximate length of concrete strips to be constructed

Management Road Assessments	Length (m)
Barendkoen Road Bridge	N/A
Barendkoen Management Road	780
Redwood Management Road	N/A

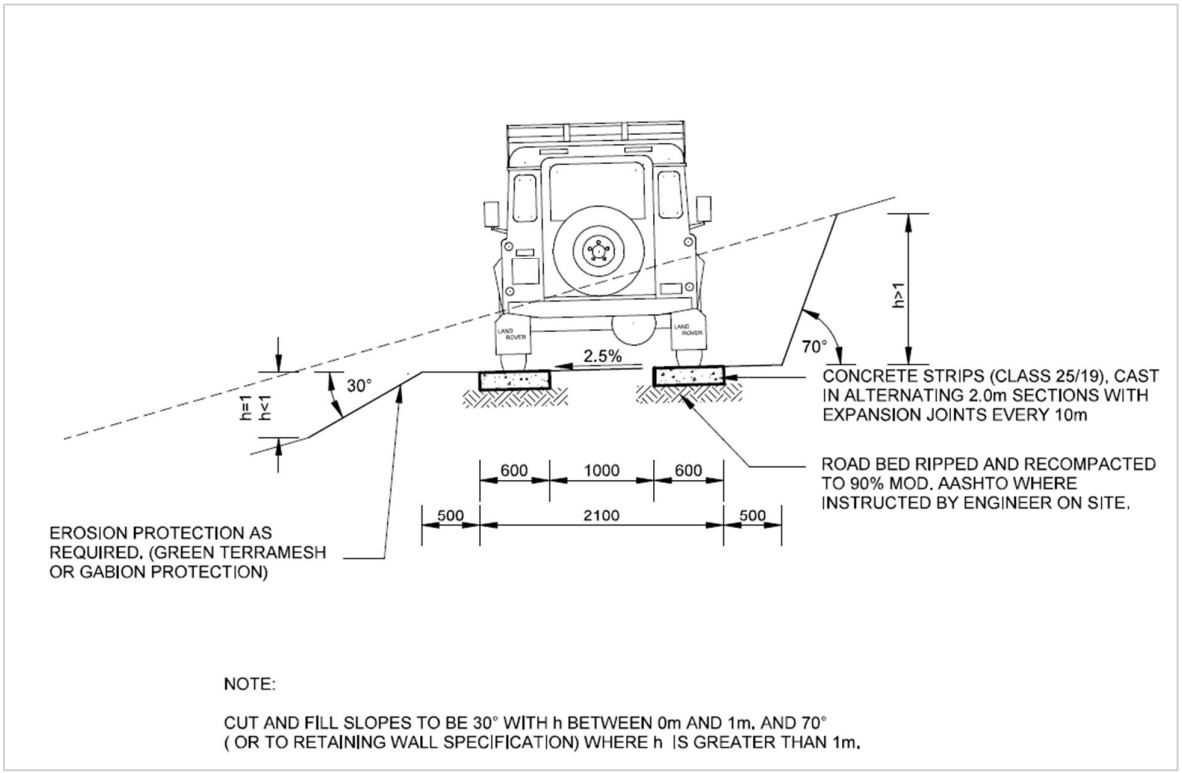


Figure 22: Typical Cross-Section of Concrete Access Strip

4.1.3 Low Level Crossing

Low-level crossings are designed to provide vehicular access over intermittent or seasonal watercourses where high-level bridges are not economically feasible.

Culverts can optionally be incorporated into the low-level crossing to facilitate the controlled passage of water during low to moderate flow conditions. This reduces the risk of erosion and surface washouts, enhances road safety, and prolongs the service life of the crossing. The provision and installation of culverts are dependent on the accessibility of the site for transporting construction materials. In areas with difficult or steep terrain, the delivery of precast elements may not be feasible. In such cases, alternative solutions or omitting culverts may be considered based on practical constructability and environmental conditions.

4.1.3.1 Culvert Specification

- Type: Precast concrete box culvert
- Dimensions: 1200 mm wide x 300 mm high
- Quantity: Optional based on site-specific hydrological assessment
- Placement: Transverse to the road, below the low-level slab or gravel surface
- Inlet/Outlet Protection: Rock pitching or Reno® Mattresses are recommended to prevent scour.

These culverts are suitable for rural and low-traffic volume routes where the watercourse experiences occasional flows. The size (1200 x 300 mm) is effective for small catchments or where flow is shallow and dispersed. In larger or fast-flowing watercourses, additional culverts or alternative hydraulic structures may be required.

4.1.3.2 Maintenance and Monitoring

Regular inspection and removal of debris are essential to maintain flow capacity. Blockages can lead to overtopping and potential damage to the crossing.

4.1.3.3 Summary

The optional use of 1200 x 300 mm culverts in low-level crossings provides a practical and cost-effective solution for managing intermittent water flows. However, implementation is subject to the ability to transport and install culvert units in challenging terrain. Final culvert numbers and placements should be determined through a site-specific assessment, considering hydrology, constructability, and logistical constraints.

Table 6: Approximate number of low-level crossings to be constructed

Management Road Assessments	Number (No)
Barendkoen Road Bridge	1
Barendkoen Management Road	N/A
Redwood Management Road	N/A

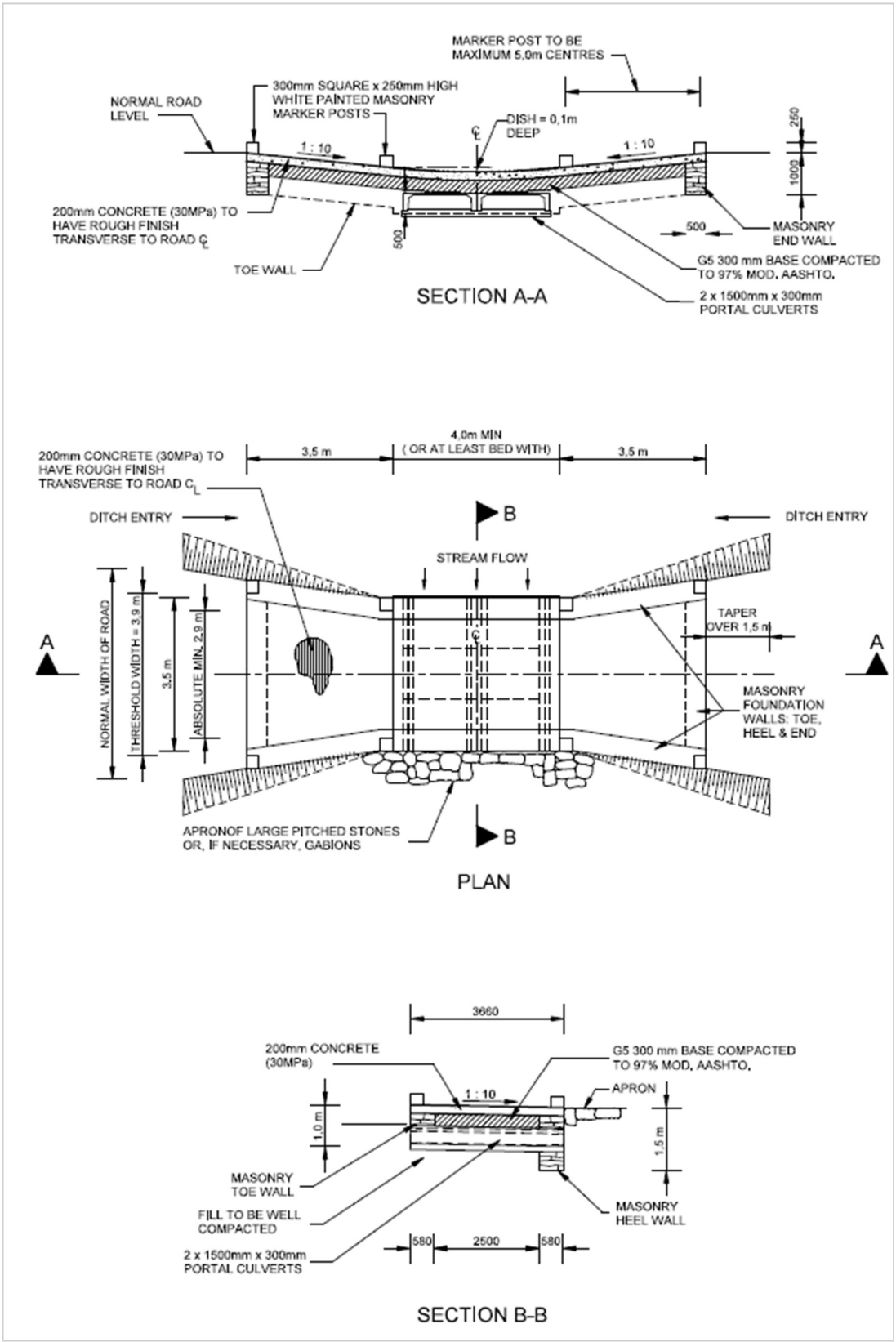


Figure 23: Typical Low-Level Crossing

4.1.4 Concrete Drifts

Concrete drifts are low-water crossings constructed to allow the safe and reliable passage of vehicles over intermittent or low-flow watercourses. In rural areas with two-track maintenance access roads, these drifts serve as cost-effective and low-maintenance alternatives to conventional bridges, particularly in terrains where watercourses cross frequently and where stormwater flow is seasonal.

The primary function of concrete drifts is to facilitate vehicle access during dry conditions while withstanding occasional submersion during floods. For rural two-track maintenance access roads, especially in undeveloped or mountainous areas, they improve accessibility without significantly altering the natural drainage system.

Concrete drifts are especially suitable for rugged terrain where the construction of culverts or bridges is constrained by cost, limited access to heavy machinery, or environmental sensitivity. Their low profile minimizes visual and ecological impact while maintaining essential connectivity for maintenance purposes.

4.1.4.1 Drift Design Considerations

- Concrete Strength: Concrete Class 25/19 is commonly used, offering sufficient durability against abrasion and water exposure.
- Foundation: Drifts are cast in situ on a compacted sub-base or rock bed to prevent undermining and ensure structural stability.
- Hydraulic Capacity: The structure is designed to be overtopped by floodwater.
- Surface Texture: A broom or brush finish is applied to enhance traction for maintenance vehicles.
- Approach Protection: Gabions and Reno® Mattresses may be included upstream and downstream to reduce erosion at entry and exit points.

Table 7: Approximate number of concrete drifts to be constructed

Management Road Assessments	Number (No)
Barendkoen Road Bridge	N/A
Barendkoen Management Road	1
Redwood Management Road	N/A

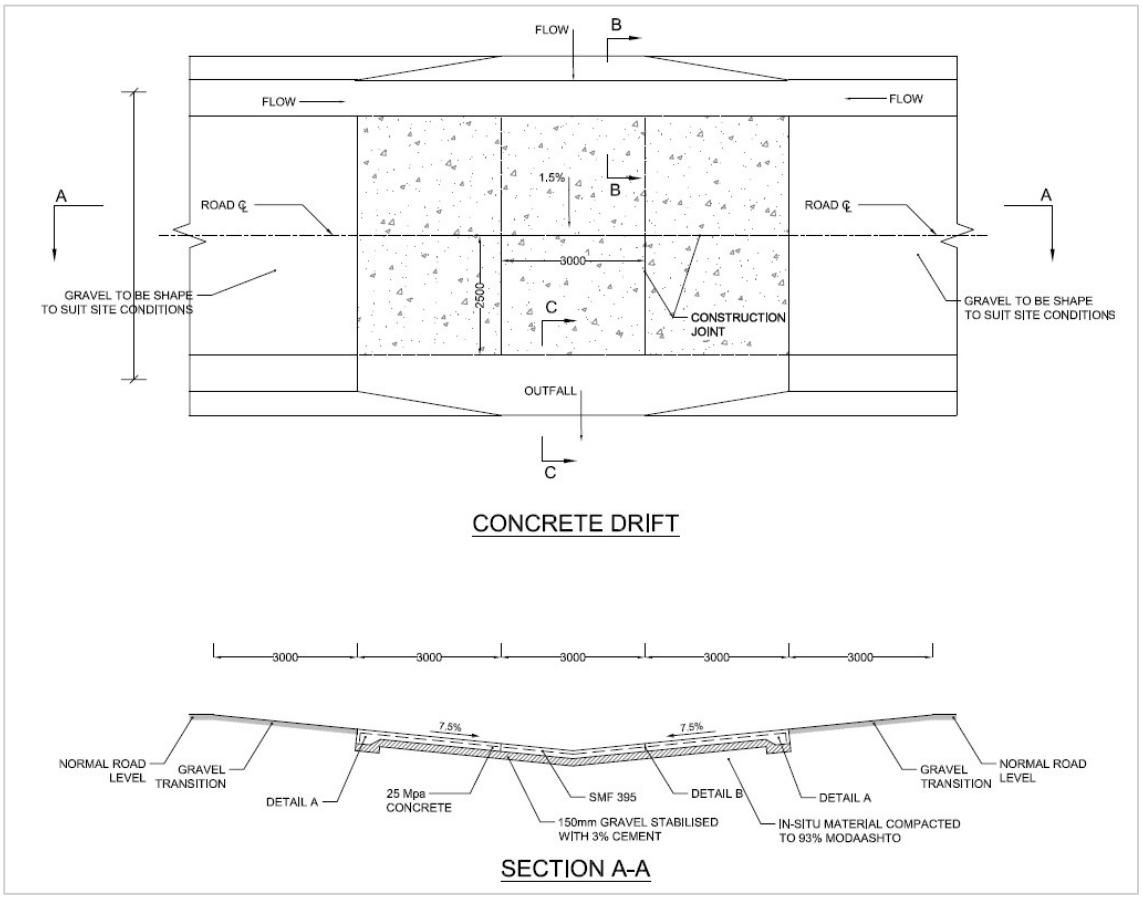


Figure 24: Typical Concrete Drift

Note: Image sourced from https://www.sanparks.org/wp-content/uploads/2021/09/concrete-drift-drawing.pdf

4.1.5 Gabion Wall for Erosion Protection on Steep Slopes

Two-track maintenance access roads traversing steep terrain are particularly susceptible to surface runoff and erosion, which can undermine road stability and cause washaways. In areas where terrain conditions limit the use of conventional stormwater drainage or retaining structures, gabion walls serve as a cost-effective, durable, and locally adaptable erosion protection solution.

Gabion walls are used to:

- Stabilize the toe of steep embankments and cut slopes.
- Prevent soil erosion and retain fill or natural slope material.
- Protect road shoulders and maintain track width and integrity.

4.1.5.1 Design Considerations

- Height: Gabion walls should typically not exceed 3.0 m in height without stepped terraces or additional geotechnical design.
- Batter: A stepped or battered configuration (e.g., 6V:1H) increases stability.
- Foundation: Compact and level foundation with possible use of filter fabric to prevent soil migration.
- Drainage: Adequate weep holes or granular backfill should be provided to relieve hydrostatic pressure.
- Materials: Galvanized or PVC-coated wire baskets filled with well-graded angular rock (preferably 100–200 mm in size).

4.1.5.2 Construction Notes

- Use local rock fill where available to reduce costs and logistics.
- Layer baskets tightly and securely with staggered joints.
- Install from the lowest elevation upward.
- Vegetation can be introduced for additional surface stabilization.

4.1.5.3 Typical Applications

- Downslope protection on outer edges of mountain tracks.
- Retaining material on inside bends of tight curves with cut slopes.
- Intermittent check structures in erosive gullies adjacent to the road.

4.1.5.4 Maintenance

Annual inspection for settlement, wire corrosion, or dislodged rock is essential, especially after heavy rainfall events. Repair or replacement of damaged baskets should be prioritized to prevent further slope degradation.

Table 8: Approximate square metres of Gabion retaining walls to be constructed

Management Road Assessments	Area (m²)
Barendkoen Road Bridge	N/A
Barendkoen Management Road	180 m²
Redwood Management Road	N/A

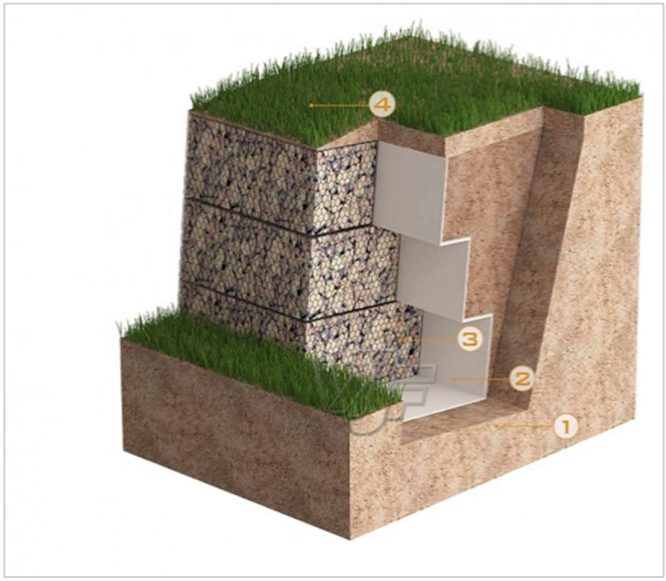


Figure 25: Typical Gabion Wall for Erosion Protection on Steep Slopes

Note: Image sourced from https://www.geotech.hr/en/gabion-walls/

5. GENERAL

The Contractor shall note that the site is within a popular tourist amenity. The Contractor shall comply with all CapeNature, Western Cape Governments and Local Authority regulations including those relating to health, the environment and fire. The Contractor shall ensure that all camp facilities, including those for fueling, comply with all such regulations.

Should the contract include either the Easter weekend and / or the end of year builders' holidays the camp shall be dis-established in its entirety prior to such periods and re-established at the end of such periods.

The Contractor shall provide sufficient latrine facilities for its workers as required by local regulations and these shall be in proximity to the work area.

The following is to be noted when works are undertaken at Cape Nature Reserves:

- **Reinstatement of services and structures damaged during construction**
  The Contractor shall inform the Employer's Agent immediately when a service or structure is damaged. The extent of the damage and a proposal on how to reinstate the service or structure shall be submitted to the Employer's Agent on a sketch with dimensions and time frames.

  The Contractor shall not be allowed to reinstate any service or structure unless indicated so by the Employer's Agent. The Contractor shall render all reasonable assistance to the service or structure owner with the reinstatement of the service or the structure if required.

  The Contractor shall be liable to reinstate the service or structure to its original state or for the full cost thereof if reinstated by others.

- **Water and Power Supply**
  The Contractor shall make their arrangements for water supply, and the cost, if any, will be for the Contractor's account.

  The Contractor shall make his arrangements for the supply of electricity that he may require for the execution of the works and the costs of any connections, additional reticulation and the supply of electricity shall be borne by the Contractor.

- **Waste Disposal**
  The Contractor shall make their arrangements for solid and liquid waste disposal off-site. No disposal of any waste will be permitted within the nature reserve.

- **Ablution Facilities**
  Ablution facilities are not available on site. The Contractor shall therefore make the necessary arrangements to provide these facilities.

- **Dealing with high winds**
  The site is situated in a region where high winds and seasonal rain can be expected. Strong winds occur during the summer and winter months, and rain occurs during the winter.

  All heaps of materials, either forming part of the excavations or imported for use in construction, shall be kept covered during high winds to prevent contamination of surrounding vegetation

- **Excavation**
  All excavations shall be carried out with suitable equipment operating strictly within the work area as defined above. Any excavation by mechanical means shall be carried out by mechanical equipment operating from the existing road surface within the demarcated work area. All excavation shall be carried out such that no damage to the environment, including flora and fauna, shall occur and that the natural vegetation surrounding the working areas is not affected in any way.

  Material from excavations required for backfilling may be stockpiled outside the demarcated work area on the existing road but shall be stockpiled strictly on the surface and shall not be allowed to encroach

onto the shoulders or vegetation abutting the road. If this requirement is not strictly adhered to, the Contractor shall not be allowed to stockpile material on the road but shall stockpile material at locations directed by the Employer's Agent. No compensation for any additional expense that may be incurred in this regard shall be paid.

7 PROJECT BUDGET

7.1 PROVISIONAL BUDGET – PROJECT INCEPTION

Provisional budget for the project by the Department is as follows:

Barendkoen Road Bridge	R 150,000.00
Barendkoen Management Road	R 150,000.00
Redwood Management Road	R 150,000.00

The consultant team was tasked to determine a provisional budget during the combined Stages 1 and 2 scope assessment and determination by compiling an elemental estimate of all works and items deemed to be included in the project scope of work.

Upon review of the combined Stages 1 and 2 reports, the Department is to indicate which items are to be included or not, and a provisional project budget will be established to secure funding. The final project budget will be refined during Stage 3.

7.2 PROVISIONAL BUDGET – CURRENT ELEMENTAL ESTIMATE COST

7.2.1 Cost Consultant

V3 Consulting Engineers will be the approved Cost Consultant from the WCG DOI consultant framework to assist with the high-level cost estimates for all civil-related work. The estimated budget is based on a priced provisional bill of quantities method with rates taken from the Framework BOQ prices of 2025/2026 as supplied by DOI. The estimate will consider the following assumptions:

- Value Added Tax at 15%.
- Normal working hours. No overtime or night shifts factored in.
- Professional fees allowed at 10%, including additional PSPs, Land Surveyor, Arborist, AIAA, and OHS.
- Contingency allowance of 10%.
- Disbursements allowance of 5%.
- Escalation-based BER BCI Pre-tender (December 2023 to October 2024)
- CPAP allowance: HAYLETT: Post Contract - construction stage - (October 2024 to June 2025)
- Construction assumed to start third quarter of 2024 with an 8-month construction period.

Table 9: Budget Summary

	Construction cost	Priority 1 (Critical)	Priority 2 (Poor)	Priority 3 (Average)	Priority 4 (Good)	Priority 5 (Excellent)
1. Barendkoen Road Bridge	R 110,782.00	R 110,782.00	R -	R -	R -	R -
2. Barendkoen Tourist Road	R 10,105,354.45	R 986,853.00	R 9,118,501.45	R -	R -	R -
3. Redwood Tourist Road	R 888,291.50	R -	R -	R 888,291.50	R -	R -
Estimated current Construction cost excl. P & G, Fees, Escalation & VAT	**R 11,104,427.95**	**R 1,097,635.00**	**R 9,118,501.45**	**R 888,291.50**	**R -**	**R -**
Preliminary and General (40%)	R 4,441,771.18	R 439,054.00	R 3,647,400.58	R 355,316.60	R -	R -
Subtotal	**R 15,546,199.13**	**R 1,536,689.00**	**R12,765,902.03**	**R 1,243,608.10**	**R -**	**R -**
Contingency (10%)	R 1,554,619.91	R 153,668.90	R 1,276,590.20	R 124,360.81	R -	R -
Estimated current cost excl. Fees & VAT	**R 17,100,819.04**	**R 1,690,357.90**	**R14,042,492.23**	**R 1,367,968.91**	**R -**	**R -**
Escalation costs (0%)	R -	R -	R -	R -	R -	R -
Estimated final cost excl. Fees & VAT	**R 17,100,819.04**	**R 1,690,357.90**	**R14,042,492.23**	**R 1,367,968.91**	**R -**	**R -**
Professional fees (10%)	R 1,710,081.90	R 169,035.79	R 1,404,249.22	R 136,796.89	R -	R -
Disbursements (5%)	R 855,040.95	R 84,517.90	R 702,124.61	R 68,398.45	R -	R -
Estimated final cost excl. VAT	**R 19,665,941.90**	**R 1,943,911.59**	**R16,148,866.07**	**R 1,573,164.25**	**R -**	**R -**
Value Added Tax (15%)	R 2,949,891.28	R 291,586.74	R 2,422,329.91	R 235,974.64	R -	R -
ESTIMATED FINAL COST ALL INCLUSIVE	**R 22,615,833.18**	**R 2,235,498.32**	**R18,571,195.98**	**R 1,809,138.88**	**R -**	**R -**

8 PROJECT SCHEDULE

8.1 PROVISIONAL SCHEDULE

The provisional timeline for the project is summarized as per the ECSA guidelines, stages 1 to 6.

Table 10: Provisional project timeline

Stage No.	Description	Timeline	Comment
1	Inception	26 May 2025 to 01 Aug 2025	*Stages 1 and 2 combined. **Inclusive of Builder's Break. *Client review and approval period:*
2	Concept and Viability	26 May 2025 to 01 Aug 2025	
3	Detail Design	04 Aug 2025 to 12 Sep 2025	*Client review and approval period:*
4	Document and Procurement	15 Sep 2025 to 13 Oct 2025	*Client review, approval, and procurement period:*
5	Construction	13 Oct 2025 to 27 Mar 2026	Final estimated construction period to be determined at end of Stage 3. **Inclusive of Builder's Break.
6	Closeout	30 Mar 2026 to 24 Apr 2026	All efforts to be made to avoid overall project timeline overrun.

- *Timelines are an estimation and subject to change pending approvals.*

9 CLIENT APPROVAL AND COMMENTS

CLIENT COMMENTS

Name	Designation	Comment

CLIENT APPROVAL

Name		
Designation		
Date		Signature
Name		
Designation		
Date		Signature
Name		
Designation		
Date		Signature

ANNEXURE A

CONDITION ASSESSMENTS – BUFFELSKLIP, MANNETJIESBERG AND VERMAAKSRIVIER

V3 CONSULTING ENGINEERS

Western Cape Government
Transport and Public Works

CapeNature

Unit 1B, 4 Mascador Street
Voorbaai, Mossel Bay, 6500
South Africa
Tel.: +27 (0) 44 691 2305
Fax: +27 (0) 44 873 3263

Our Ref: 11755009

PROJECT:	CapeNature Condition Assessment	DATE:	2025-06-18
DESCRIPTION:	Grootvadersbosch Nature Reserve - Barendkoen Bridge		

Photo ID	Stake Value	Distance	Rating	Description	Erosion Control and Drainage Measures
1	4090		5.Critical	Evidence of burning is visible on the remaining structural elements, suggesting the bridge was impacted by fire. Significant portions of the bridge have been eroded and washed away, indicating its inability to withstand the force of stormwater during severe weather. The existing concrete abutments appear to be the only remaining substantial parts of the original structure, but even these show signs of stress and exposure. The remaining elements are unstable and pose a safety hazard.	To prevent future occurrences of similar damage, the bridge requires complete rebuilding. It is strongly recommended that the new construction utilize more resilient materials. Specifically, a reinforced concrete slab is proposed as the primary remedy for the bridge deck. These materials will offer enhanced resistance to both fire and erosion, ensuring greater durability and longevity, and preventing further dilapidation. Furthermore, a thorough assessment and survey of the existing abutments by a qualified structural and geotechnical engineer is crucial during Stage 3 - Design Development. This will ensure the stability and suitability of the foundations for the new structure. The design should also consider improved hydrological flow to mitigate the impact of future severe weather events, and the supply and type of side protection will be finalized during the design phase to further enhance the bridge's resilience.
2	4090				
3	4090				
4	4090				
5	4090				

** Photos highlighted in Red are referenced in report.*

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Our Ref: 11755009

PROJECT:	CapeNature Condition Assessment	DATE:	2025-06-18
DESCRIPTION:	Grootvadersbosch Nature Reserve - Barendkoen Management Road		

Photo ID	Stake Value	Distance	Rating	Description	Erosion Control and Drainage Measures
1	0			The initial section up to Stake 800 is traversable by maintenance vehicles and is vital for fire response, infrastructure servicing, and emergency access to the Helderfontein huts. The road consists of a clayey, muddy two-track route with vegetation in the centre. During wet conditions, the surface becomes dangerously slippery. Regular traffic is feasible under dry conditions, but mobility and safety concerns arise in rain due to the slippery nature of the soil.	Import G5 gravel material to backfill eroded sections and level the track surface. Install concrete strips to improve traction and reduce further wear along the 270m affected length and construct concrete rolling dips (water bars) to manage stormwater runoff and prevent future erosion. This intervention will restore safe vehicle access, protect the surrounding environment, and support ongoing reserve operations.
18	800		4.Poor		
	800	800			
17	815			From Stake 815 onwards, the road becomes overgrown with dense fynbos, impeding vehicle movement. The track shows no recent maintenance activity, and the dirt and rocky surface remains stable but obstructed. Clearance is necessary to restore functional access. Overgrowth poses challenges for routine and emergency operations, indicating prolonged disuse of this section.	Clear track of vegetation. Import G5 gravel material to backfill eroded sections and level the track surface.
3	840		4.Poor		
	920	120			
4	920		4.Poor	Overgrown vegetation persists along the road's edges. While not distinctly clear in the report photograph, signs of a developing slope failure or slip were observed along the lower edge of the track during the in-person inspection. Although not severe at this stage, this warrants monitoring and potential intervention. If unchecked, this instability may compromise road safety and accessibility further.	Conduct a geotechnical assessment to confirm the extent and cause of the observed slope movement. Based on findings, implement stabilisation measures such as installing a gabion retaining wall. Improve surface drainage by constructing side drains or berms to divert water away from the slope edge and reduce further saturation. Regular monitoring should be scheduled, especially after heavy rainfall, to detect early signs of worsening conditions. Limit vehicular access in the affected area until stability can be assured.
5	1080		1.Excellent	A boundary gate is encountered, which appears to delineate the Grootvadersbosch Nature Reserve limits.	No remedial work is required in this section.
7	1185			This section is marked by extremely uneven terrain, exposed bedrock, and heavy vegetation. Deep washouts have been filled with large rocks, which appear to provide some erosion control but have created a highly uneven and unstable path. This section is currently impassable for most maintenance vehicles and requires significant earthworks to reinstate.	Import G5 gravel material to backfill eroded sections and level the track surface. Install concrete strips to improve traction and reduce further wear along the 130m affected length and construct concrete rolling dips (water bars) to manage stormwater runoff and prevent future erosion.
8	920		4.Poor		
9	920				
	1540	620			

PROJECT:	CapeNature Condition Assessment	DATE:	2025-06-18
DESCRIPTION:	Grootvadersbosch Nature Reserve - Barendkoen Management Road		

Photo ID	Stake Value	Distance	Rating	Description	Erosion Control and Drainage Measures
11	1540		4.Poor	Overgrown vegetation persists along the road's edges. Signs of slope failure or slip were observed along the lower edge of the track and can be seen in a photo taken from an earlier vantage point. Full assessment is limited due to hazardous slope conditions. Although not severe at this stage, this warrants monitoring and potential intervention. If unchecked, this instability may compromise road safety and accessibility further.	Conduct a geotechnical assessment to confirm the extent and cause of the observed slope movement. Based on findings, implement stabilisation measures such as installing a gabion retaining wall. Improve surface drainage by constructing side drains or berms to divert water away from the slope edge and reduce further saturation. Regular monitoring should be scheduled, especially after heavy rainfall, to detect early signs of worsening conditions. Limit vehicular access in the affected area until stability can be assured.
19	4090	3170	4.Poor	The track up to the burned bridge continues to be extremely uneven terrain, exposed bedrock, and heavy vegetation. Deep washouts have been filled with large rocks, which appear to provide some erosion control but have created a highly uneven and unstable path. This section is currently impassable for most maintenance vehicles and requires significant earthworks to reinstate.	Import G5 gravel material to backfill eroded sections and level the track surface. Install concrete strips to improve traction and reduce further wear along the 150m affected length and construct concrete rolling dips (water bars) to manage stormwater runoff and prevent future erosion.
20	4090 4415	325	5.Critical	The Barendkoen track bridge was destroyed during a recent fire and subsequently washed away by heavy rain. The absence of this structure breaks the continuity of the route and compromises critical access.	Detailed findings and recommendations for this specific structure are addressed in a separate bridge condition assessment in this report. Immediate intervention is necessary to restore functional access. Remedy for track beyond bridge up to end of assessment: Import G5 gravel material to backfill eroded sections and level the track surface. Install concrete strips to improve traction and reduce further wear along the 150m affected length and construct concrete rolling dips (water bars) to manage stormwater runoff and prevent future erosion.

** Photos highlighted in Red are referenced in report.*

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South Africa
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Fax: +27 (0) 44 873 3263

Our Ref: 11755009

PROJECT:	CapeNature Condition Assessment	DATE:	2025-06-18
DESCRIPTION:	Grootvadersbosch Nature Reserve - Redwood Management Road		

Photo ID	Stake Value	Distance	Rating	Description	Erosion Control and Drainage Measures
	0			The management road is in poor condition, with significant rutting and muddy wheel tracks, indicating poor drainage and a surface prone to softening during wet conditions. Standing water and saturated soil increase the risk of vehicle slippage, compromising safe access. The road is critical for access to the Redwoods hiking route, as well as for infrastructure management and ecological monitoring. Additionally, the surface remains uneven and stony, with loose rocks and exposed aggregate contributing to rough driving conditions.	Install side drains, cross-drains, and water bars to redirect surface runoff away from the track. Regrade the road surface to restore proper camber and eliminate rutting. Import G5 gravel layer to reinforce the track and reduce softening in wet conditions.
6	350				
7	530		3.Average		
8	640				
9	640	640			
	640			The management road is in poor condition, with significant rutting and muddy sections, especially in the wheel tracks. These features indicate inadequate drainage and a surface prone to softening and damage during wet weather. Standing water and saturated soil increase the risk of vehicles slipping, reducing accessibility and posing safety concerns for routine operations. The surface remains uneven and stony, with loose rocks and exposed aggregate further hindering access.	Open side drains and construct waterbars to divert surface runoff. Fill eroded areas with compacted rocks and gravel to restore surface integrity. Regrade and reshape the road to improve drainage and reduce rutting. Stabilize the surface using a suitable gravel layer, and implement routine maintenance to ensure ongoing accessibility.
10	755		3.Average		
11	755				
	790	150			
13	790		1.Excellent	At the time of the assessment, the field ranger (Sam Pinzi) confirmed that a contractor has been appointed to address the stormwater-related damage at the Redwood Maintenance Road bridge.	No remedial work is required in this section. Repair and rehabilitation work is reportedly underway or scheduled to commence shortly.

** Photos highlighted in Red are referenced in report.*

ANNEXURE B

ATTENDANCE REGISTER

V3 CONSULTING ENGINEERS

Meeting Attendance Register

CONTRACT DESCRIPTION:	GROOT VADERSBOS NATURE RESERVE		
CONTRACT NUMBER:		PROJECT NUMBER:	11755009
MEETING:		DATE OF MEETING:	2025-06-18

Name of Firm	Representative	Postal Address	Contact Information	Signature
V3	L. ARTHUR		Tel. No: 076 251 6447 Cell No: E-mail: louis.arthur@v3consulting.co.za	[signature]
DOI	S. FOMBO		Tel. No: 044 813 2826 Cell No: 073 728 3983 E-mail: sisanke.fombo@westerncape.gov.za	[signature]
V3	C.R Beeslaar		Tel. No: Cell No: 0826696368 E-mail: rudi.beeslaar@v3consulting.co.za	[signature]
DOI	S. XAMETSHATA		Tel. No: 044 813 2833 Cell No: 0837990284 E-mail: Sakhekile.xametshata@westerncape.gov.za	[signature]
CA	K Kirschwell		Tel. No: 0788711930 Cell No: K Hvenuse Con Nature ZA E-mail:	[signature]
CMOR	N.S. Pinzi		Tel. No: 087 087 6093 Cell No: — E-mail: npinzi@capenature.co.za	[signature]

ANNEXURE C

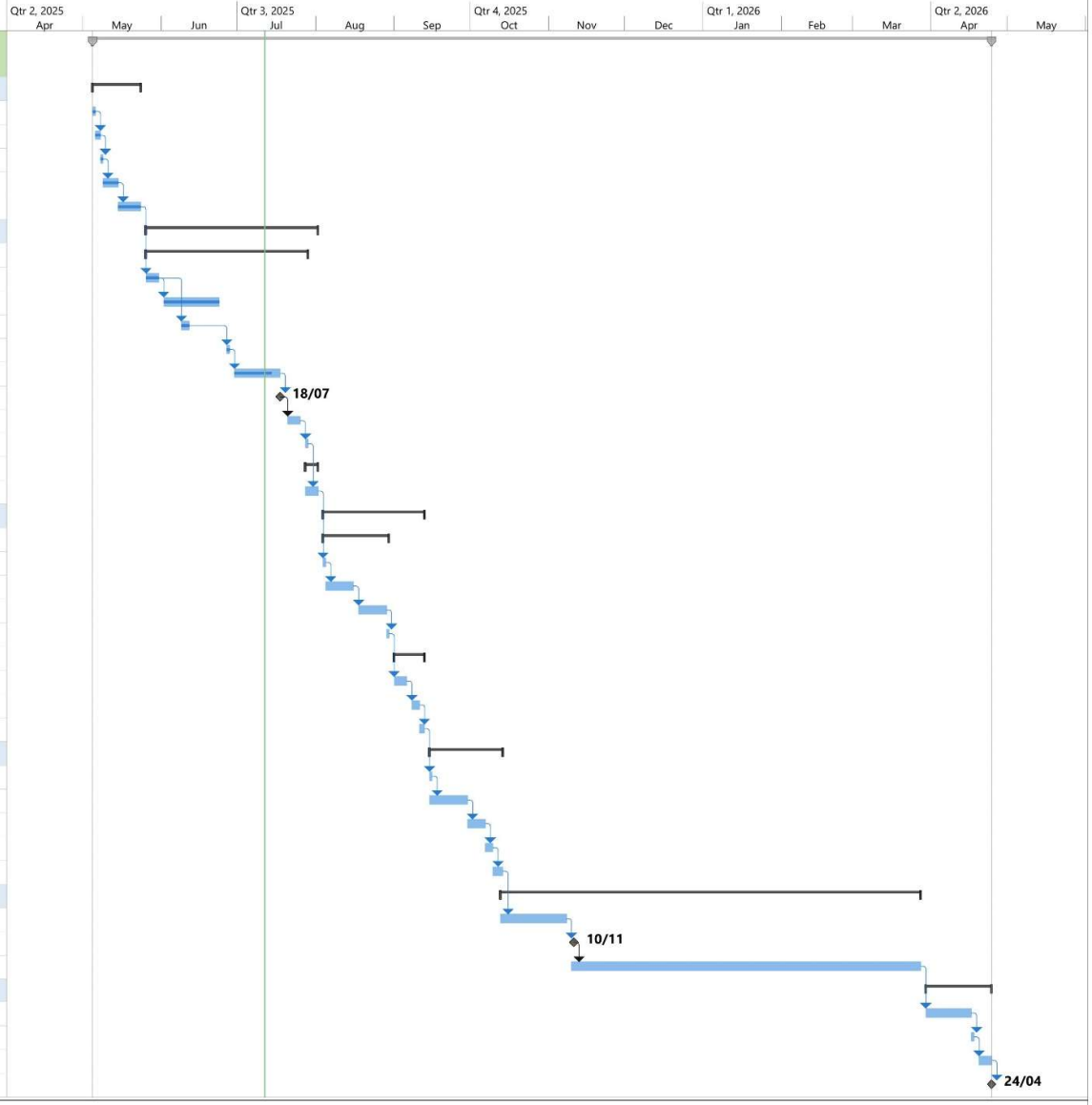
PROVISIONAL PROJECT SCHEDULE: STAGES 1-6

V3 CONSULTING ENGINEERS

EM-GI000103: CAPE NATURE: GROOTVADERSBOSCH: DISASTER DAMAGE CONDITION ASSESSMENT

REV 0

ID		% Comple	Task Name	Duration	Start	Finish
0		**21%**	**EM-GI000103: GROOTVADERSBOSCH: Disaster Damage Condition Assessments**	**236 days**	**Mon 05/05/25**	**Fri 24/04/26**
1	✓	**100%**	**STAGE 0 - Pre-planning**	**15 days**	**Mon 05/05/25**	**Fri 23/05/25**
2	✓	100%	Client Briefing Session	1 day	Mon 05/05/25	Mon 05/05/25
3	✓	100%	Terms and Agreements of Engagement	2 days	Tue 06/05/25	Wed 07/05/25
4	✓	100%	Appointment of V3 Consulting Engineers	1 day	Thu 08/05/25	Thu 08/05/25
5	✓	100%	Finalise Fee proposal - All Sites	4 days	Fri 09/05/25	Wed 14/05/25
6	✓	100%	Client review and commenting. Conclude appointment	7 days	Thu 15/05/25	Fri 23/05/25
7		**70%**	**STAGES 1 & 2: (Combined) Inception + Concept & Viability**	**49 days**	**Mon 26/05/25**	**Fri 01/08/25**
8		**78%**	**PSP Investigations and Reporting**	**45 days**	**Mon 26/05/25**	**Mon 28/07/25**
9	✓	100%	Develop Project Initiation Plan	5 days	Mon 26/05/25	Fri 30/05/25
10	✓	100%	Engagement of Specialist Service Providers	15 days	Mon 02/06/25	Mon 23/06/25
11	✓	100%	Desktop studies and Logistics planning	3 days	Mon 09/06/25	Wed 11/06/25
12	✓	100%	Conditional assessments on site	1 day	Fri 27/06/25	Fri 27/06/25
13		75%	Develop concept designs and reports	14 days	Mon 30/06/25	Thu 17/07/25
14		0%	Submit report for Client commenting (Excl. costing)	0 days	Fri 18/07/25	Fri 18/07/25
15		0%	Elemental cost estimates	5 days	Mon 21/07/25	Fri 25/07/25
16		0%	PSP team collate Drawings, Reports, Costing	1 day	Mon 28/07/25	Mon 28/07/25
17		**0%**	**Client Stage review and approval**	**5 days**	**Mon 28/07/25**	**Fri 01/08/25**
18		0%	Internal Technical review by various departments	5 days	Mon 28/07/25	Fri 01/08/25
19		**0%**	**STAGE 3 & 4.1 : Detailed Design, BOQ and Documentation**	**30 days**	**Mon 04/08/25**	**Fri 12/09/25**
20		**0%**	**PSP Detailed Designs and Reporting**	**20 days**	**Mon 04/08/25**	**Fri 29/08/25**
21		0%	Onboard Client Stage 2 comments, update documents	1 day	Mon 04/08/25	Mon 04/08/25
22		0%	Develop detailed designs	9 days	Tue 05/08/25	Fri 15/08/25
23		0%	Develop Costing and BOQs	9 days	Mon 18/08/25	Thu 28/08/25
24		0%	Stage 3+4.1 Reports and collated documents	1 day	Fri 29/08/25	Fri 29/08/25
25		**0%**	**Client Stage review and approval**	**10 days**	**Mon 01/09/25**	**Fri 12/09/25**
26		0%	Internal Technical review by various departments	5 days	Mon 01/09/25	Fri 05/09/25
27		0%	BSC review and approval	3 days	Mon 08/09/25	Wed 10/09/25
28		0%	Adjustments/Revisions by PSP team to documents	2 days	Thu 11/09/25	Fri 12/09/25
29		**0%**	**STAGE 4.2 Client Procurement process**	**20 days**	**Mon 15/09/25**	**Mon 13/10/25**
30		0%	SCM documents & process - Contractor(s) selection	1 day	Mon 15/09/25	Mon 15/09/25
31		0%	Contractor(s) pricing	10 days	Mon 15/09/25	Mon 29/09/25
32		0%	Tender adjudication by PSP team	5 days	Tue 30/09/25	Mon 06/10/25
33		0%	SCM tender final review	3 days	Tue 07/10/25	Thu 09/10/25
34		0%	SCM documentation. LOA(s) to Contractor(s)	2 days	Fri 10/10/25	Mon 13/10/25
35		**0%**	**STAGE 5: Implementation and Monitoring**	**105 days**	**Mon 13/10/25**	**Fri 27/03/26**
36		0%	Contractor(s) documentation and approvals	20 days	Mon 13/10/25	Fri 07/11/25
37		0%	SHO and Site establishment	0 days	Mon 10/11/25	Mon 10/11/25
38		0%	Construction and Monitoring - All sites	85 days	Mon 10/11/25	Fri 27/03/26
39		**0%**	**STAGE 6: Close-out**	**18 days**	**Mon 30/03/26**	**Fri 24/04/26**
40		0%	Close-out Reports	12 days	Mon 30/03/26	Thu 16/04/26
41		0%	Projects Post Implementation Reviews & Lessons Learned	1 day	Fri 17/04/26	Fri 17/04/26
42		0%	Client review and commenting on close-out reports	5 days	Mon 20/04/26	Fri 24/04/26
43		0%	Hand-over to WCG & Cape Nature	0 days	Fri 24/04/26	Fri 24/04/26



Project: EM-GI000103: GROOTV
Date: Sat 12/07/25

Task | Summary | Inactive Milestone | Duration-only | Start-only | External Milestone | Manual Progress
Split | Project Summary | Inactive Summary | Manual Summary Rollup | Finish-only | Deadline
Milestone | Inactive Task | Manual Task | Manual Summary | External Tasks | Progress