SEARCH AND RESCUE COMPLETION REPORT

PROPOSED WORKS AT THE CULVERTS ALONG, TR 83/1, TR83.2, TR31.5, AND MAIN ROAD 356, BETWEEN RIVERSDALE AND LADISMITH, WESTERN CAPE.

Prepared By

Guillaume Nel Environmental Consultants

GNEC

Contact Person: Mr Christoff Dippenaar

A 45 Fabriek Street, Paarl, 7646

T 021 870 1874

F 021 870 1873

www.gnec.co.za

Guillaume Nel
environmental consultants

05 MAY 2022

Contents

1. INTRODUCTION

Guillaume Nel Environmental Consultants (GNEC) were appointed to conduct a search and rescue within the construction footprint of the culverts along Trunk Road 83/1, Km 25.78 to Km 34.00 and Km 48.50 to Km 58.00, Trunk Road 83/2 from Km 0 to Km 11,16 and Km 15.25 to Km 23.01, Main Road 365 from Km 0 to Km 14.12, and Trunk Road 31/5 from Km 0.42 to Km 0.90, between Riversdale to Ladismith.

The plants within the construction footprint of the culverts/storm water infrastructure have been removed and taken to a rehabilitation nursery where these plants have been bagged and will be multiplied for rehabilitation purposes.

2. SITE LOCATION AND STUDY AREA

TR83/1, TR83/2, TR31/5 and MR365 (The indicated sections) are existing surfaced roads with stormwater infrastructure being present at different locations along the roads to ensure that stormwater is adequately attenuated and dispersed. Some of these stormwater structures require maintenance. These roads are located between the towns of Riversdale and Ladismith, Western Cape.

There are approximately 199 minor concrete pipe culverts passing under the road of which 10 are Armco pipes of varying diameters. Generally, all the culvert inlets and outlets need to be cleaned, and many culvert barrels need to be cleaned out as they are blocked. The culverts will therefore be repaired and cleaned. Erosion protection measures are needed on steep gradients or where erosion has taken place. Some 600mm diameter culverts will be installed under some of the farm and local accesses to improve longitudinal drainage. Proper concrete headwalls, wingwalls and aprons are needed to replace the existing masonry structures, which are mainly in poor condition.

The proposed maintenance period will take approximately 22 months to complete.

The listed activities in term of the National Environmental Management Act (NEMA) EIA Regulations, 2014 (as amended) for the proposed maintenance work are triggered by the construction activities taking place within the watercourses on the site. There are a number of watercourse structures included in the scope of works.

<u>These include:</u>

TR83/1

4 **Bridges** and 6 large Armco type ***culverts***

- **Bridge** 5090: TR 83/1 at km 52.91

  The existing bridge is a 4 span simply supported in-situ concrete structure of which each span is 5m in length. Vegetation overgrowth and silt deposits are to be removed to ensure the free flow of water. Vertical cracks, where moisture is evident, greater than 2.5mm in the abutments, wingwalls and piers are to be neatly cut open (in the form of a v-notch), sealed by crack injection and the v-notch repaired with cementitious repair compound. Cracks smaller than 2.5mm to be sealed using crack injection. Weep holes are to be cleaned out at both abutments. Gabion mattresses are to be installed along the foundation footprint to avoid further scouring. The quantity of gabions and riprap will exceed 10 m^3 - thus triggering a listed activity. Expansion movement joints at the piers and abutments are to be replaced with Thorma joints.

- **Bridge** 5007: TR 83/1 at km 54.00

  The existing bridge is a 10No. 21m span simply supported curved in-situ concrete monolithic beam and slab structure on a 45-degree skew. Vegetation overgrowth and debris deposits on the foundations are to be removed to ensure the free flow of water. Vertical and horizontal cracks in the abutment, piers, wingwalls and deck, exceeding 2.5mm in width, are to be neatly cut open (in the form of a v-notch), sealed by crack injection with an approved epoxy and the v-notch repaired with cementitious repair compound. Cracks smaller than 2.5mm to be sealed using crack injection. Dump rock riprap shall be neatly placed around the piles to prevent further scouring and erosion. The quantity of riprap will exceed 10 m^3 - thus triggering a listed activity. The deck soffit surface (concrete) shall be cleaned using a high-pressure water jet to establish the cause of efflorescence and then sealed with an approved cementitious repair compound. Damaged concrete areas to piers, deck and parapets are to be neatly cut out, reinforcement cleaned of all oxidation and treated with a noncorrosive compound, then reinstated with a cementitious repair compound. Concrete spalling is to be repaired with an epoxy repair mortar to prevent further aggregate loss and exposure. Expansion movement joints at the piers and abutments are to be replaced with Thorma joints.

E-mail to: christoff@gnec.co.za
Tel: 021 870 1874 Fax: 021 870 1873 www.gnec.co.za

- **Bridge** 4837: TR 83/1 at km 57.49

  The existing bridge is an 8 span simply supported in-situ concrete monolithic beam and slab structure consisting of 13m spans. Dense vegetation overgrowth and debris deposits are to be removed to ensure the free flow of water. Vertical cracks in excess of 2.5mm in abutments, piers, wingwalls and the deck are to be neatly cut open (in the form of a v-notch), sealed by crack injection with an approved epoxy and the vnotch repaired with cementitious repair compound. Cracks smaller than 2.5mm to be sealed using crack injection. Backfilling is required with suitable imported materials and dump rock riprap shall be neatly placed around the piers and abutments to prevent further scouring and erosion. The quantity of riprap will exceed 10 m^3 - thus triggering a listed activity.

  Damaged and spalled concrete areas to piers, abutments, wingwalls, deck and parapets are to be neatly cut-out, reinforcement cleaned of all oxidation and treated with a non-corrosive compound, then repaired with a cementitious repair compound. Joints at abutments and deck are to be clearly separated at their interface. All concrete spalling is to be repaired with an epoxy repair mortar to prevent further aggregate loss and exposure. Expansion movement joints at the piers and abutments are to be replaced with Thorma joints.

- **Bridge** 4838: TR 83/1 at km 57.61

  The existing bridge is a 2 span simply supported in-situ concrete monolithic beam and slab structure consisting of 13m spans. Dense vegetation overgrowth and debris deposits are to be removed to ensure the free flow of water. Vertical and horizontal cracks in the abutments and wingwalls, in excess of 2.5mm, are to be neatly cut open (in the form of a v-notch), sealed by crack injection with an approved epoxy and the v-notch repaired with cementitious repair compound. Cracks smaller than 2.5mm to be sealed using crack injection. Backfilling is required with suitable imported materials and dumped rock riprap shall be neatly placed around the piers and abutments to prevent further scouring and erosion. The quantity of riprap will exceed 10 m^3 - thus triggering a listed activity. Expansion movement joints at the pier and abutments are to be replaced with Thorma joints. All road drains to be cleared.

- ***Culvert*** 10875: TR 83/1 at km 26.24

  Dense vegetation at the inlet and outlet are to be removed and trimmed and silt deposits inside the barrel are to be removed and carted to spoil. The clearing of the vegetation and silt from the culvert can be described as maintenance activities and does not trigger a listed activity as the maintenance will be conducted in line with the Maintenance Management Plan (MMP).

- ***Culvert*** 10874: TR83/1 at km 29.99

  The existing structure is a double cell Armco drainage culvert with an approximate 3.7 m wide x 3.0 m high opening. The overall culvert length is approximately 35.0 m. Dense vegetation at the inlet and outlet is to be trimmed and removed, and silt deposits inside the barrel are to be removed and carted to spoil. Dump rock is to be neatly packed at the inlet to prevent further scouring and erosion. The quantity of riprap will exceed 10 m^3 - thus triggering a listed activity. New guardrails as per the WCG Standard Plans are to be installed for safety requirements. The clearing of the vegetation and silt from the culvert can be described as maintenance activities and does not trigger a listed activity as the maintenance will be conducted in line with the Maintenance Management Plan (MMP).

- ***Culvert*** 10692: TR 83/1 at km 30.63

  The existing structure is a single cell Armco drainage culvert with an approximate circular diameter of 1.85m. The overall length is approximately 21.3m. The ends of the Armco panels are exposed and are additionally not supported on a concrete slab. The Armco panels are nevertheless in a fair condition with minimal corrosion damage to the joints and panels. There is an accumulation of debris and silt deposits within the barrel and there is dense vegetation overgrowth in the waterways due to a lack of maintenance. The existing head and wingwalls are stone pitched and they are in a fair condition. The existing in-situ concrete apron slabs at both the inlet and outlet have a loss of aggregates and require rehabilitation. There are no guardrails for the culvert, which increases the associated safety risk towards road users. The clearing of the vegetation and silt from the culvert can be described as maintenance activities and does not trigger a listed activity as the maintenance will be conducted in line with the Maintenance Management Plan (MMP).

- ***Culvert*** 10089: TR 83/1 at 50.82

  The existing structure is a single cell Armco drainage culvert with an approximate 4.9m wide x 4.9m high opening. The overall length is approximately 25.85m. Dense vegetation and debris is to be removed and carted to spoil. Gabion baskets are to be installed along the waterway and embankments to prevent further scouring and erosion. The gabion baskets will exceed 10 m³ and therefore triggers a listed activity. The Armco barrel walls are to be cleaned, affected corroded areas painted with a cold galvanized paint and the entire internal surface area is to be painted with a mastic asphalt coating to prevent further corrosion. The cracks less than 2.5mm in the sloping headwall are to be sealed by injection and cracks greater than 2.5mm are to be cut back with a v-notch and sealed with cementitious repair compound. New guardrails as per the WCG Standard Plans manual are to be installed for safety requirements.

- ***Culvert*** 10867: TR 83/1 at km 52.61

  The existing single cell Armco drainage culvert is 3.2m wide x 2.1m high structure in very poor condition. There is significant chemical attack and corrosion evident in the walls and roof of the Armco structure. The culvert is to be repaired by placing a new prefabricated concrete pipe within the existing culvert and the remaining space to be filled with self-compacting concrete. The hydraulic information indicates that an 1800mm concrete pipe is sufficient. The length of the new culvert is to be confirmed on site. A new headwall, apron slab and wingwalls are to be constructed at the outlet and new gabion mattresses are to be installed to prevent further scouring and erosion. The new gabions, headwall, wingwalls and apron slabs will exceed 10 m³ and therefore a listed activity is triggered.

- ***Culvert*** 10867: TR 83/1 at 55.19

  The existing structure is a single cell, in-situ portal drainage culvert with an approximate opening of 3.2m wide x 2.0m high. The overall length is approximately 12.8m. Vegetation is to be cleared and debris is to be removed. The existing deck at both the inlet and outlet are to be demolished and reconstructed with a raised headwall. New guardrails as per the WCG Standard Plans are to be installed for safety requirements. The total disturbance will be less than 10 m³ and therefore no listed activities are triggered by the proposed maintenance activities.

TR 83/2

2 **Bridge** and 4 concrete culverts:

- **Bridge** 5359: TR 83/2 at km 6.73

  The existing bridge is a 4 span simply supported in-situ concrete deck slab structure of with 10.6m spans. Clear vegetation and remove all debris from the waterway. Clean all scuppers and abutment weep holes. Replace existing expansion joints with Thorma joints. Cracks greater than 2.5mm are to be cut back and repaired with a cementitious repair compound and cracks less than 2.5mm are to be sealed by injection with an approved epoxy. The clearing of the vegetation and silt from the culvert can be described as maintenance activities and does not trigger a listed activity as the maintenance will be conducted in line with the Maintenance Management Plan (MMP).

- **Bridge** 5490: TR83/2 at km 15.56

  The existing bridge is a 7-span prestressed, continuous concrete deck slab consisting of 12.5m spans. The structure is in good condition with minor repairs required. Crack in deck slab to be sealed by injection with an approved epoxy. Seal all damaged concrete with epoxy repair mortar. All road drains and existing joints to be unblocked and cleaned. The total disturbance will be less than 10 m^3 and therefore no listed activities are triggered by the proposed maintenance activities. The proposed maintenance does not require any approvals in terms of the NEMA EIA Regulations, 2014 (as amended).

- ***Culvert*** 10972: TR 83/2 at km 9.32

  The existing structure is a single portal, cast in-situ concrete structure with a deck slab supported on in-situ RC walls. The culvert opening is 3.0m wide with an approximate height of 1.7m. The overall culvert length is approximately 20.7m. Clear out the dense vegetation and remove debris from the waterway. Regrade the banks at a slope of 1:1.5 to prevent material spillover. All scuppers and weepholes to be cleared. Clear out the dense vegetation and remove debris from the waterway. The clearing of the vegetation and silt from the culvert can be described as maintenance activities and does not trigger a listed activity as the maintenance will be conducted in line with the Maintenance Management Plan (MMP).

- ***Culvert*** 10976: TR83/2 at km 19.93

  The existing culvert is a single portal, cast in-situ concrete structure. The culvert opening is approximately 3.9m wide and 2.0m high. Vegetation at wingwalls is to be removed and gabion boxes installed to prevent further scour. Gabion mattresses are to be installed in outlet waterway to prevent further scour and erosion. The new gabion mattresses will not exceed 10m³ and therefore does not trigger a listed activity. Spalled and damaged concrete areas to deck are to be neatly cut out, reinforcement cleaned of all oxidation and treated with a non-corrosive compound, then reinstated with a cementitious repair compound. All weepholes are either entirely or partially buried and must be fully exposed and cleared. Cracks greater than 2.5mm are to be cut back and repaired with a cementitious repair compound and cracks less than 2.5mm are to be sealed by injection with an approved epoxy. New guardrails as per the WCG Standard Plans are to be installed for safety requirements. The clearing of the vegetation and silt from the culvert can be described as maintenance activities and does not trigger a listed activity as the maintenance will be conducted in line with the Maintenance Plan (MMP).

- ***Culvert*** un-numbered: TR83/2 at km 20.37

  The existing culvert is a minor single portal, cast in-situ concrete structure. The culvert opening is approximately 2.0m wide and 2.0m high. Vegetation overgrowth is to be cleared at the inlet and sediment build up removed in waterway. New gabion boxes are to be installed in outlet waterway to prevent further scour. The new gabion boxes will not exceed 10 m³ and therefore does not trigger a listed activity. Damaged concrete areas to deck are to be neatly cut out, reinforcement cleaned of all oxidation and treated with a non-corrosive compound, then reinstated with a cementitious repair compound. All weepholes are either entirely or partially buried and must be fully exposed and cleared. Cracks greater than 2.5mm are to be cut back and repaired with a cementitious repair compound and cracks less than 2.5mm are to be sealed by injection with an approved epoxy. The clearing of the vegetation and silt from the culvert can be described as maintenance activities and does not trigger a listed activity as the maintenance will be conducted in line with the Maintenance Management Plan (MMP).

- ***Culvert*** 10977: TR83/2 at km 22.25

  The existing culvert is a double cell portal, cast in-situ concrete structure. Each cell's openings are approximately 2.9m wide and 2.9m high. New guardrails as per the WCG Standard Plans are to be installed for safety requirements. Vegetation overgrowth is to be cleared at the inlet. Excessive erosion is evident in the eastern cell due to the rerouting of the waterway by a vagrant living in the western cell. The eastern cell is to be partially backfilled and the natural waterway reinstated. The vagrant is to be removed from the western cell. Damage and spalling of deck edge to be neatly cut out, reinforcement cleaned of all oxidation and treated with a noncorrosive compound, then reinstated with a cementitious repair compound or concrete. Crack at deck/abutment interface to be sealed and joint to be reinstated to allow for movements. Cracks greater than 2.5mm are to be cut back and repaired with a cementitious repair compound and cracks less than 2.5mm are to be sealed by injection with an approved epoxy. The clearing of the vegetation and silt from the culvert can be described as maintenance activities and does not trigger a listed activity as the maintenance will be conducted in line with the Maintenance Management Plan (MMP).

MR 365

2 **Bridges** and 3 large in- situ concrete culverts

- **Bridge** 9061: MR 365 at km 3.30

  The existing bridge is a single cellular cast in-situ concrete structure with a deck slab supported on abutment walls. The opening is 7.8m wide with an approximate height of 3.5m. Clear vegetation adjacent the wingwalls and remove debris in the waterway. Damaged deck edge to be neatly cut out, reinforcement cleaned of all oxidation and treated with a non-corrosive compound, then reinstated with a cementitious repair compound or concrete. Cracks greater than 2.5mm are to be cut back and repaired with a cementitious repair compound and cracks less than 2.5mm are to be sealed by injection with an approved epoxy. Regrade existing backs to a slope of 1:1.5 to avoid material spillover. Damaged area at abutment and wingwall to be demolished, reinforcement to be exposed and portion to be recast. Joint between crack and abutment to be reinstated to ensure cracking does not reoccur. New guardrails as per the WCG Standard Plans are

to be installed for safety requirements. Roadway cracks to be sealed. The replacement of the wingwalls relates to the Like for Like replacement of infrastructure and does not trigger a listed activity. Additionally, less than 10 m³ of material will be disturbed as part of the maintenance activities and therefore no approvals in terms of the NEMA EIA Regulations, 2014 (as amended) are required for the proposed maintenance activities.

- **Bridge** 4515: MR 365 at km 13.10

  The existing bridge is a 3 span simply supported cast in-situ concrete deck slab structure consisting of 9.8m spans. Clear vegetation in the waterway and cart to spoil. Excavate, shape and remove boulders from within the waterway to match original design level. Replace existing deck movement joints with thorma joints, at piers and at abutments. Spalling of parapet to be neatly cut out, reinforcement cleaned of all oxidation and treated with a non-corrosive compound, then reinstated with a cementitious repair compound or concrete. Remove damaged deck edge and repair with approved cementitious repair compound. Cracks in excess of 2.5mm, are to be neatly cut open (in the form of a v-notch), sealed by crack injection with an approved epoxy and the v-notch repaired with cementitious repair compound. Seal all cracks less than 2.5mm in with, with an approved epoxy by crack injection. All weep holes in the abutments to be cleared. The proposed maintenance relates to the shaping of the watercourse can be described as maintenance activities and does not trigger a listed activity as the maintenance will be conducted in line with Maintenance Management Plan (MMP).

- ***Culvert*** 10969: MR 365 at km 4.54

  The existing structure is a single cell, in-situ portal drainage culvert with an approximate 5.5m wide x 2.1m high opening. The overall length is approximately 12.0m. Vegetation is to be cleared and carted to spoil. Repair all vertical cracks in walls, wingwalls and deck in excess of 2.5mm, are to be neatly cut open (in the form of a v-notch), sealed by crack injection with an approved epoxy and the v-notch repaired with cementitious repair compound. Seal all cracks less than 2.5mm in with, with an approved epoxy by crack injection. Remove damaged deck edge and repair with approved cementitious repair compound. Crack between abutment and slab to be reinstated to avoid further restraint cracking. New guardrails as per the WCG Standard Plans are to be installed for safety requirements. The total disturbance will be less than 10 m³ and therefore no listed

activities are triggered by the proposed maintenance activities. The proposed maintenance does not require any approvals in terms of the NEMA EIA Regulations, 2014 (as amended).

- ***Culvert*** 10970: MR 365 at km 5.57

  The existing structure is a single cell, in-situ portal drainage culvert with an approximate 5.2m wide x 2.7m high opening. The overall length is approximately 12.0m. Clear all vegetation from the waterway and cart to spoil. Repair all cracks in walls, wingwalls and deck in excess of 2.5mm, are to be neatly cut open (in the form of a v-notch), sealed by crack injection with an approved epoxy and the v-notch repaired with cementitious repair compound. Seal all cracks less than 2.5mm in with, with an approved epoxy by crack injection. Install new guardrails as per the WCG Standard Plans for safety requirements. The total disturbance will be less than 10 m^3 and therefore no listed activities are triggered by the proposed maintenance activities. The proposed maintenance does not require any approvals in terms of the NEMA EIA Regulations, 2014 (as amended).

- ***Culvert*** 10971: MR 365 at km 8.33

  The existing structure is a single cell, in-situ portal drainage culvert with an approximate 3.7m wide x 3.0m high opening. The overall length is approximately 11.2m. Remove all debris from the waterway. Install new gabion boxes and mattresses in the waterway and embankments. The new gabion boxes and mattresses will exceed 10 m^3 and therefore a listed activity is triggered. Deviate existing services. Missing culvert number to be replaced. Repair all cracks in walls and wingwalls in excess of 2.5mm, are to be neatly cut open (in the form of a v-notch), sealed by crack injection with an approved epoxy and the v-notch repaired with cementitious repair compound. Seal all cracks less than 2.5mm in with, with an approved epoxy by crack injection. Install new guardrails as per WCG Standard Plans for safety requirements.

TR31/5

- ***Culvert*** Unknown Number: TR31/5 at km 0.7

  Vegetation clearing and removal of debris from the culvert. Less than 10 m³ of material will be disturbed as part of the maintenance activities and therefore no approvals in terms of the NEMA EIA Regulations, 2014 (as amended) are required for the proposed maintenance activities.

Please refer to Figure 1 below: Digital satellite image depicting the identified roads requiring periodic maintenance and investigation areas in relation to the surrounding areas.

Please refer to Figure 2 below: Location of the identified roads requiring periodic maintenance and investigation areas depicted on a 1:50 000 topographical map, in relation to the surrounding areas.

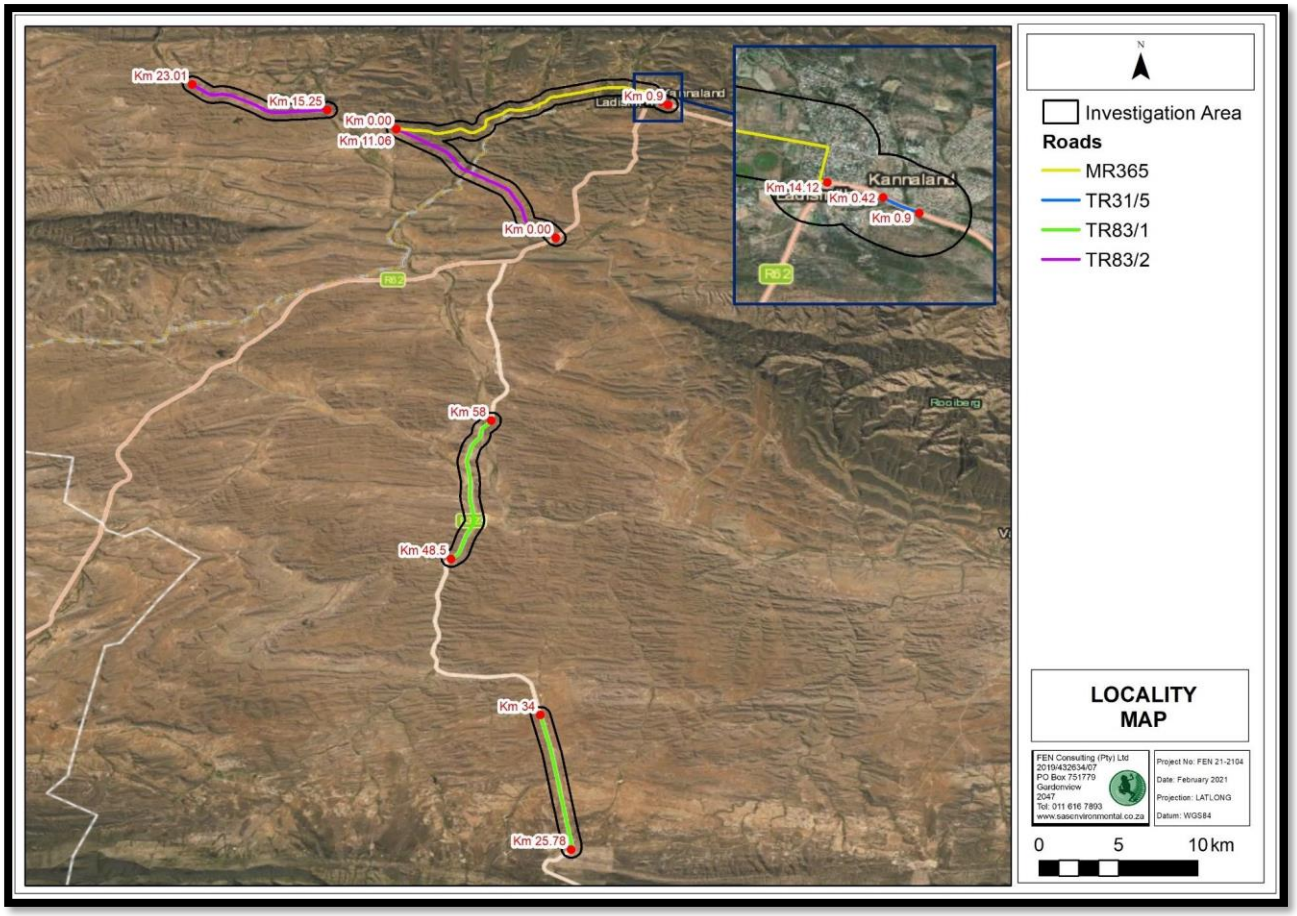

Figure 1: Locality map; Digital satellite image depicting the identified roads requiring periodic maintenance and investigation areas in relation to the surrounding areas.

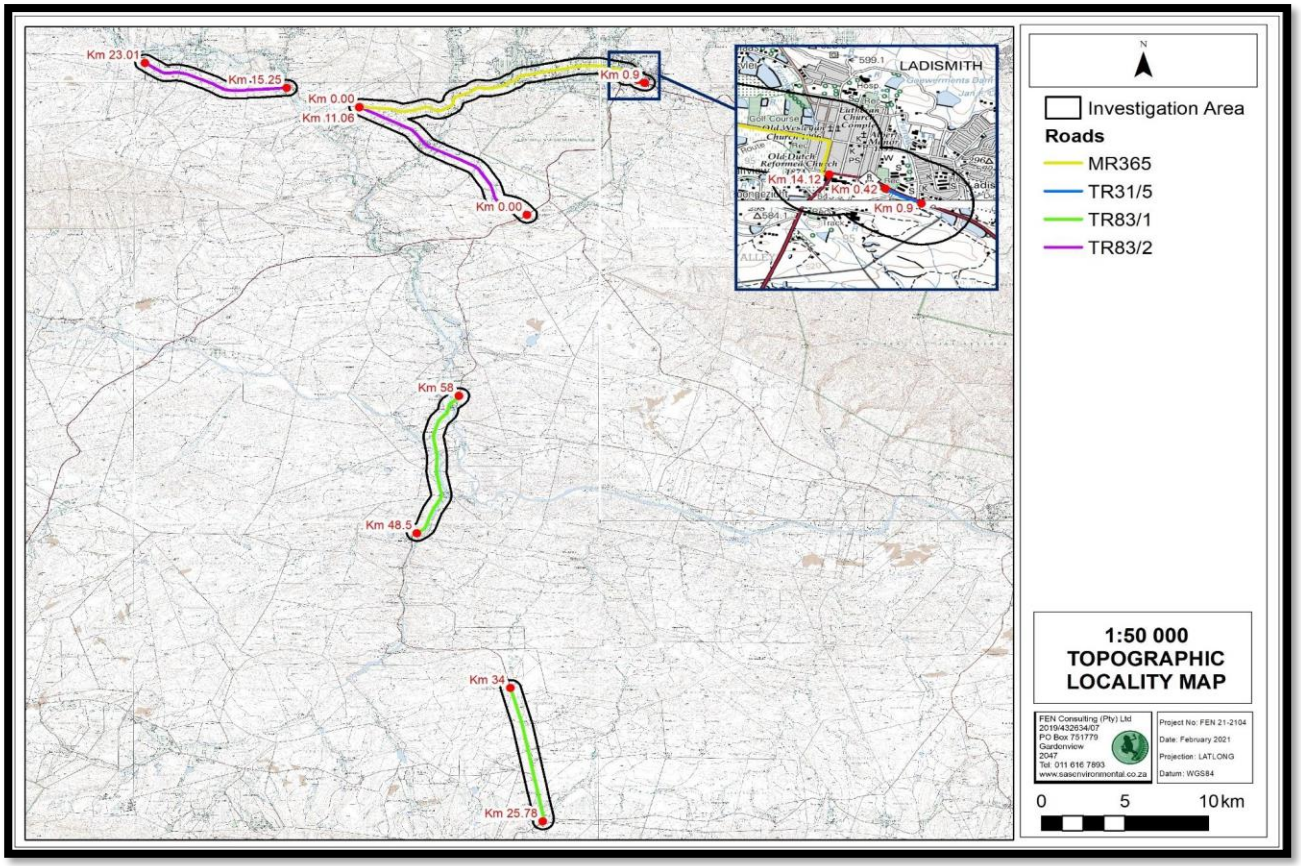

Figure 2: Location of the identified roads requiring periodic maintenance and investigation areas depicted on a 1:50 000 topographical map, in relation to the surrounding areas.

3. THE VEGETATION

3.1 Vegetation of study area:

According to STS (2021), the habitat of the area is associated with the identified roads and is highly fragmented and located within the existing public road reserve. Therefore, historically and at present, the road infrastructure has led to the transformation of vegetation and habitat. Habitat associated with the locations of major road crossings (culvert crossings) might still contain some indigenous vegetation. The identified roads with related storm water infrastructure fall within seven vegetation types, as confirmed by STS (2021):

1. **Little Karoo Quartz Vygieveld** (Least Concern): Flat and slightly undulating plains covered by open, low vegetation dominated by fruticose or compact lead-succulent dwarf members of Aizoacease (*Gibbaeam*), Crassulaceae and Euphorbiaceae, accompanied by non-succulent astercaeuos shrubs and dwarf shrubs.
2. **Matjiesfontein quartzie fynbos** (Least Concern): Low flat mountains and parallel ridges in a west-east orientation. Fynbos and Succulent Karoo vegetation. It is a medium dense, medium tall shrubland.
3. **Montagu Shale Renosterveld** (Least Concern): Undulating hilly landscape with broad valleys supporting a complex open, tall shrubland in a medium dense matrix of short, divaricate shrubs.
4. **Muscadel Riviere** (Endangered): Flat, in places very broad alluvia originally supporting complex of riverine thickets dominated by *Acacia karroo* and accompanying succulent gannabos (*Salsola species*) and low vygie shrublands.
5. **North Langeberg Sandstone Fynbos** (Least Concern): Gentle to steep, north-facing slopes, not much dissected over much of the range. Surface is gently sloping foothills of Waboomsberg, Warmwaterberg and Aasvoëlberg.
6. **Western Gwarrieveld** (Least Concern): Low hilly country supporting low Succulent Karoo shrublands, peppered with solitary trees and tall shrub group (*Euclea, Lycium, Pappea, Rhus*).
7. **Western Little Karoo** (Least Concern): Flat or slightly undulating landscapes dominated by a mosaic of Karoo shrublands of low and medium height encompassing (as dominants) both nonsucculent (*Chrysocoma, Pentzia, Pteronia, Rhigozum, Tripteris*) as well as succulent (*Crassula, Euphorbia, Ruschia, Tylecodon*) shrubs.

According to the Vegetation map of South Africa, Lesothos, and Swaziland (Mucina, Rutherford & Powrie 2005; SANBI 2012; 2018), the vegetation that originally would have occurred at the site is Swarland Alluvium Fynbos. (Endangered)

Please refer to Figure 3 below: Vegetation types associated with the identified roads and related storm water infrastructure.

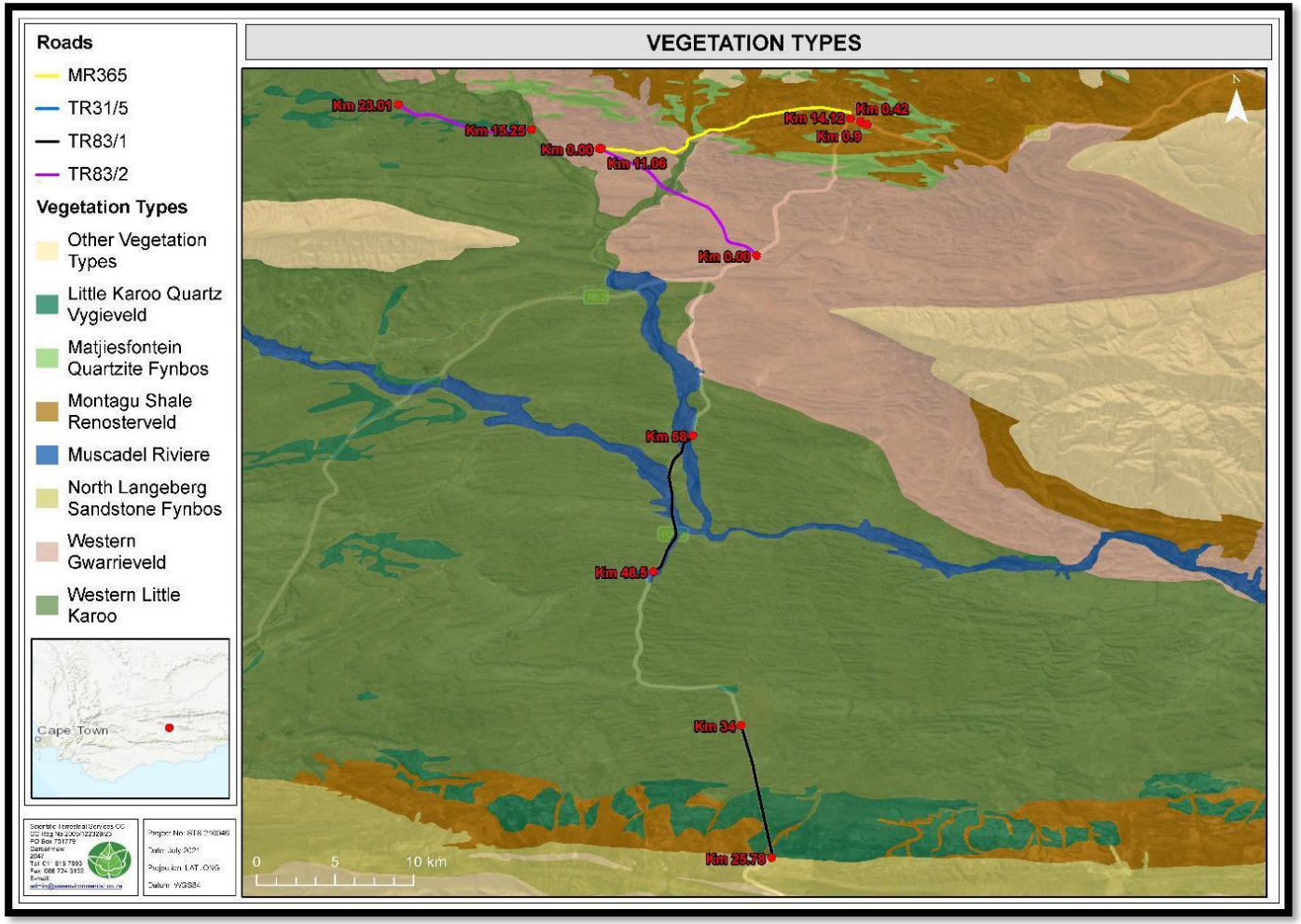

Figure 3: Vegetation types associated with the identified road

4. SEARCH AND RESCUE OF ENDEMIC SPECIES WITHIN THE CONSTRUCTION FOOTPRINT

A search and rescue have been conducted within the access road of the culverts and within the construction footprint of the culverts. Very few endemic species have been identified within the construction footprint that can be successfully search and rescued. The search and rescue mainly focused on succulent species (characteristic to all identified vegetation types) that can be easily searched and rescued and re-planted during rehabilitation as part of embankment stabilization.

The 'Search and Rescue' has been conducted by a qualified team, consisting of a Horticulturist / Botanist / Rehabilitation specialist with well-trained staff to ensure that the work is conducted successfully and sustainably.

The collected species have been taken to a rehabilitation nursery, where the plants have been bagged and will be multiplied for rehabilitation purposes.

4.1 Searched and Rescued Species

<table>
<tr><th colspan="3">Plant Identification Species List</th></tr>
<tr><td colspan="3">MAINTENANCE ACTIVITIES ASSOCIATED WITH VARIOUS ROADS NEAR LADISMITH AND RIVERSDALE, WESTERN CAPE PROVINCE</td></tr>
<tr><td colspan="2">S&R Date: 26/04/2023</td><td>Total plants collected: 1153</td></tr>
<tr><td>Specie</td><td>Quantity collected</td><td>Photo of specie</td></tr>
<tr><td>Lampranthus sp</td><td>250</td><td>  </td></tr>
</table>

Plant Identification Species List

MAINTENANCE ACTIVITIES ASSOCIATED WITH VARIOUS ROADS NEAR LADISMITH AND RIVERSDALE, WESTERN CAPE PROVINCE S&R Date: 26/04/2023		
Specie	**Quantity collected**	**Photo of specie**
Ruschia spp.	288	

Plant Identification Species List		
MAINTENANCE ACTIVITIES ASSOCIATED WITH VARIOUS ROADS NEAR LADISMITH AND RIVERSDALE, WESTERN CAPE PROVINCE S&R Date: 26/04/2023		
Specie	**Quantity collected**	**Photo of specie**
Drosanthemum sp	120	

Plant Identification Species List		
MAINTENANCE ACTIVITIES ASSOCIATED WITH VARIOUS ROADS NEAR LADISMITH AND RIVERSDALE, WESTERN CAPE PROVINCE S&R Date: 26/04/2023		
Specie	**Quantity collected**	**Photo of specie**
Senecio wittebergensis	40	
Eriospermum porphyrium	5	

Plant Identification Species List
MAINTENANCE ACTIVITIES ASSOCIATED WITH VARIOUS ROADS NEAR LADISMITH AND RIVERSDALE, WESTERN CAPE PROVINCE S&R Date: 26/04/2023

Specie	Quantity collected	Photo of specie
Cotyledon tomentosa subsp. ladismithiensis	410	
Euphorbia sp.	25	
	15	

4.2 Searched and Rescued species planted within rehabilitation nursery

Searched and rescued species successfully planted with the rehabilitation nursery.
These plants will be multiplied for rehabilitation purposes.

5. CONCLUSION

A total of 1153 plants have been searched and rescued within the construction footprint.
These plants have been taken to a rehabilitation nursery where these plants have been bagged and will be multiplied for rehabilitation purposes.

GNEC in our professional capacity as rehabilitation specialist strongly feel that the search and rescue of endemic species have been very successful.