Manage RMM Projects

Welcome

I'VE COME HERE TO SHARE ALL MY EXPERIENCE AND KNOWLEDGE – IT'S UP TO YOU WHAT YOU TAKE AWAY

Lecturer: Marthinus Wilken

1

Manage RMM Projects

Introduction

The purpose of this Learning material is to enable learners to be competent agency project managers, Route Managers, Site agents or persons of similar responsibility on Routine Road Maintenance (RRM) projects.

2

WHY ROUTINE ROAD MAINTENANCE

- Roads are taken for granted without acknowledging their vital contribution to various aspects of society's well being.
- How affectively we manage our National Roads is key to the quality of the environment we live in.

3

WHY ROUTINE ROAD MAINTENANCE

- The importance of RRM is generally underestimated in the preservation of the road infrastructure as an asset.
- SANRAL is using the RRM contracts for maintaining their asset and to extend its life expectancy.
- And for the development of targeted enterprises. – (Knowledge transfer)

4

WHY ROUTINE ROAD MAINTENANCE

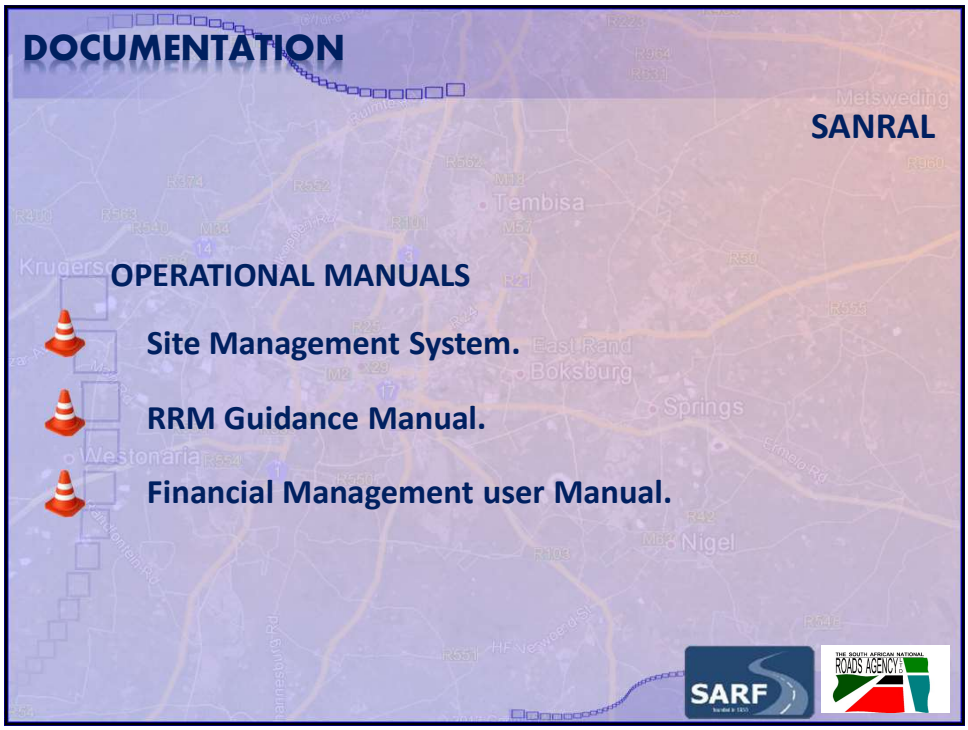
- The RRM programme was established in 1998 with 6748 km National Roads.
- Today more that 20 000km is covered by Routine Road maintenance contracts.
- The Routine Road maintenance project has as primary object, the provision of a safe road environment for all road users.

5

DOCUMENTATION

- Documentation was developed to help the Site maintenance team to manage different projects to the same standards.
- It helps to assist those involve in RRM to identify remedial actions to be taken to preserve and render the road safe.

6


DOCUMENTATION
SANRAL
OPERATIONAL MANUALS
Site Management System.
RRM Guidance Manual.
Financial Management user Manual.
SARF

7


DOCUMENTATION
SANRAL
OPERATIONAL MANUALS - OTHER
National Slope Management System.
Road Incident Management System.
Drainage Manual.
Bi-Annual Bridge, Culvert and Gantry Inspections.
SARF

8

DOCUMENTATION

OTHER REFERENCES

- Bituminous Pavement Repairs; General Repairs and patching.(SABITA)
- South African Road Traffic Signs Manual (Chapter 13)
- Problem vegetation of South Africa.
- Occupational Health and Safety Act.

9

DOCUMENTATION

SPECIFICATIONS

- Standard Specifications RRM April 2019,
- Standard Specifications for road and bridge works; COLTO; 1998 for the Community development project.
- Proforma Contract Document.

10

DOCUMENTATION

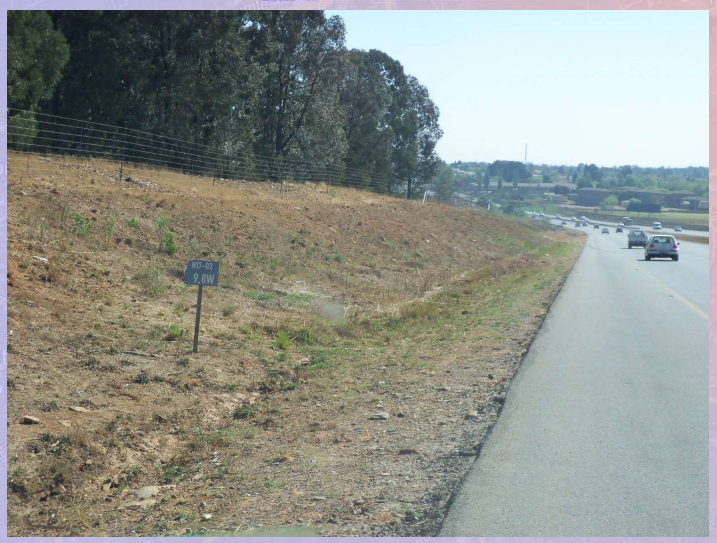
CONTRACT DOCUMENTS

- VOLUME 1: FIDIC Conditions of Contract.
- VOLUME 2: Standard Specification for RRM.
- VOLUME 3: The Project Document includes: Condition of Tender , Particular Condition of Contract , Scope of Works and Returnable Forms.
- VOLUME 4: The standard Drawings.
- VOLUME 5: Condition Report

11

Manage RMM Projects

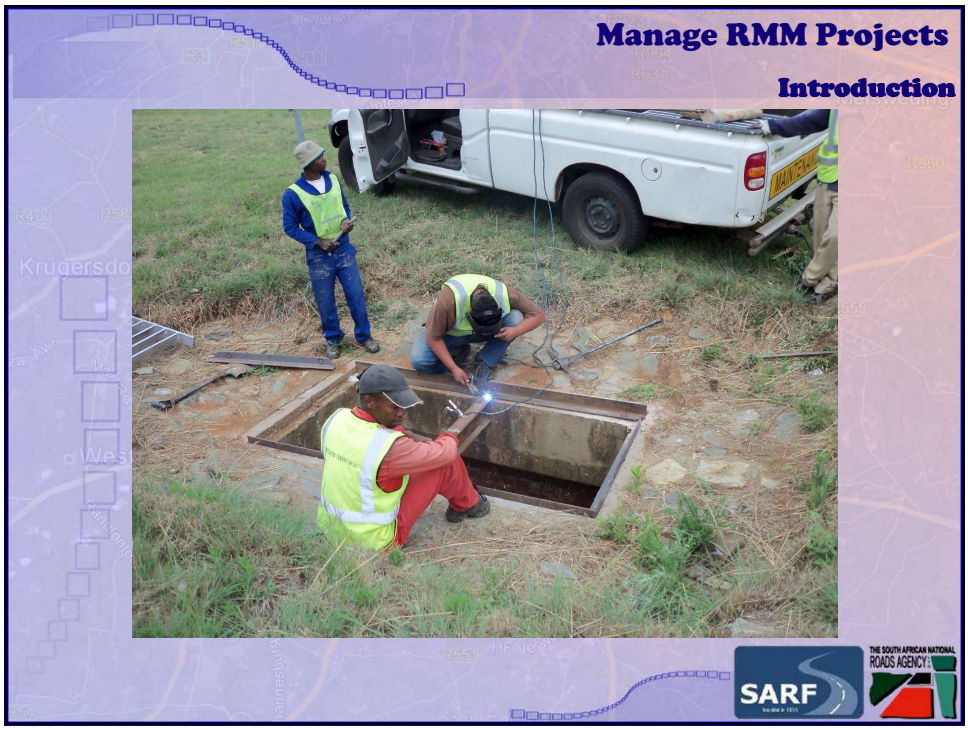
Introduction



12


Manage RMM Projects
Introduction
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

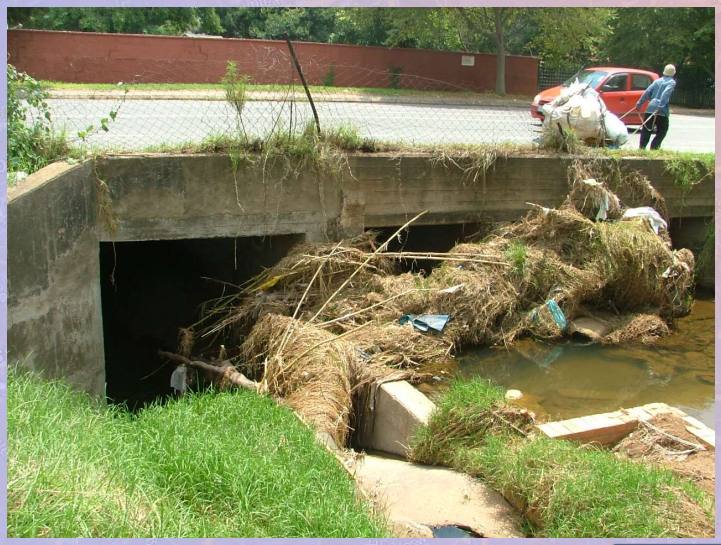
13


Manage RMM Projects
Introduction
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

14

Manage RMM Projects

Introduction



15

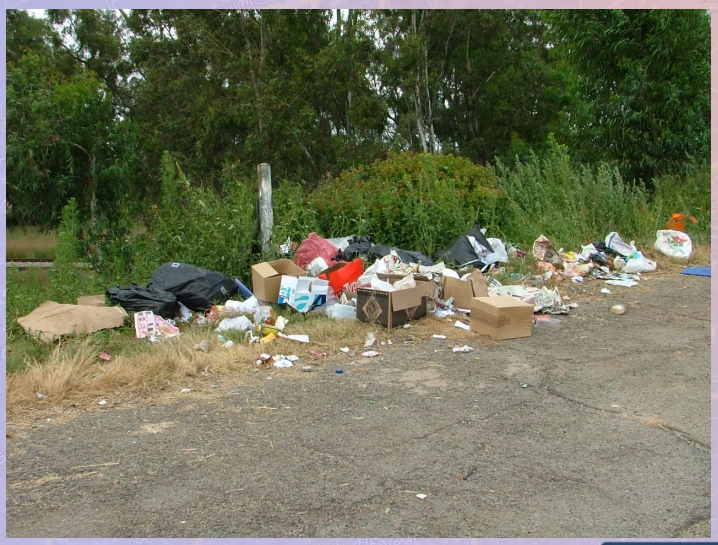
Manage RMM Projects

Introduction

16

Manage RMM Projects

Introduction



17

Manage RMM Projects

Introduction

18

Manage RMM Projects

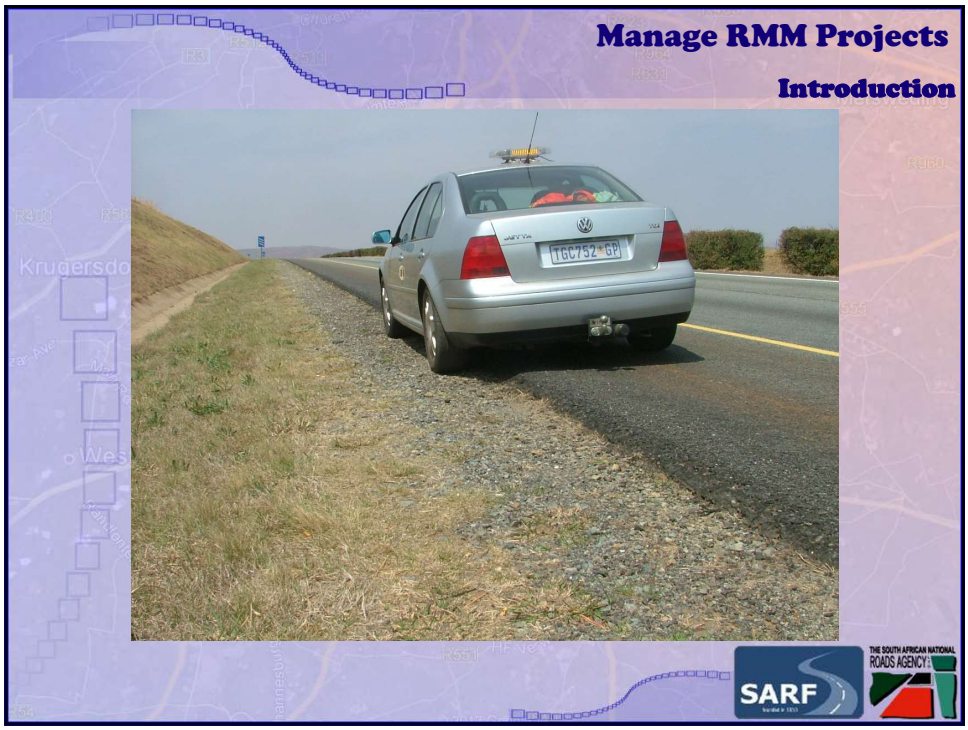
Introduction

19

Manage RMM Projects

Introduction

20


Manage RMM Projects
Introduction
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

21


Manage RMM Projects
Introduction
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

22

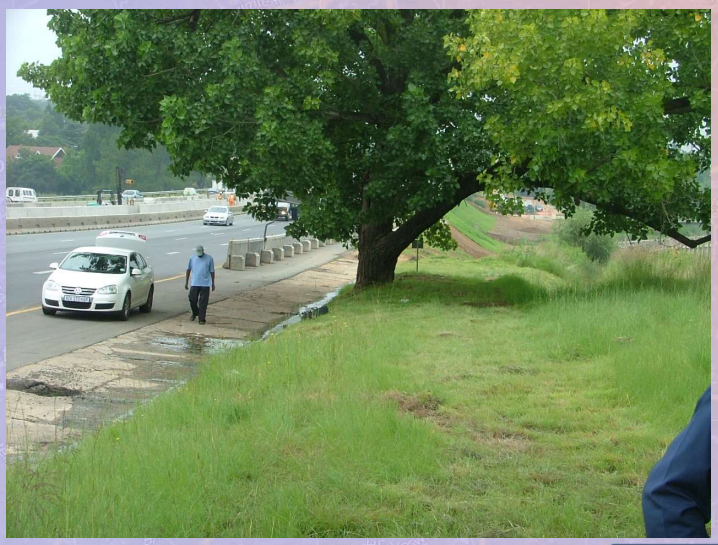
Manage RMM Projects

Introduction

23

Manage RMM Projects

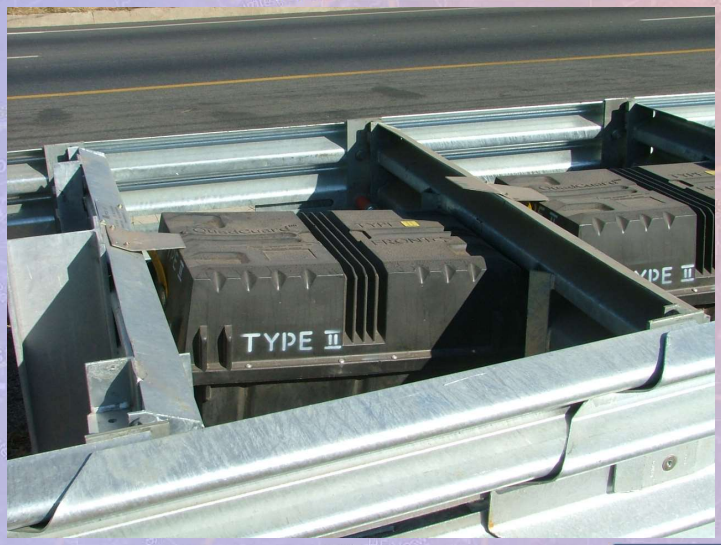
Introduction



24

Manage RMM Projects

Introduction



25

Manage RMM Projects

Introduction

26

Manage RMM Projects

Introduction

27

Manage RMM Projects

Introduction

ROUTE MANAGER:

PERSON ON SITE RESPONSIBLE FOR DAY-TO-DAY MANAGEMENT OF ACTIVITIES OF THE RRM CONTRACT. AS DEFINED IN THE CONTRACT DOCUMENTATION.

28

Manage RMM Projects

Introduction

Specific Outcome 1: Preparation

You will have the knowledge to do the necessary preparation work before the contract phase of a Routine Road Maintenance (RRM) project

- Compile/update an inventory within the road reserve
- Conduct/update a condition assessment within the road reserve
- Prioritize maintenance needs

29

Manage RMM Projects

Introduction

Specific Outcome 2: Contract Documents & Tenders

You will have the knowledge to prepare and manage the documentation required for the RRM project

- Develop contract documents with applicable specifications
- Develop a Bill of Quantities
- Identify work activities reserved for targeted enterprises and specialist sub-contractor activities
- Be able to tender for each activity and to determine a unit rate, for use in a RRM projects and to develop method statements
- Manage the tender process from advertising to adjudication and appointment of contactors

30

Manage RMM Projects

Introduction

Specific Outcome 3: Manage, Coordinate & Operate

You will have the knowledge to manage, coordinate and operate a RRM project

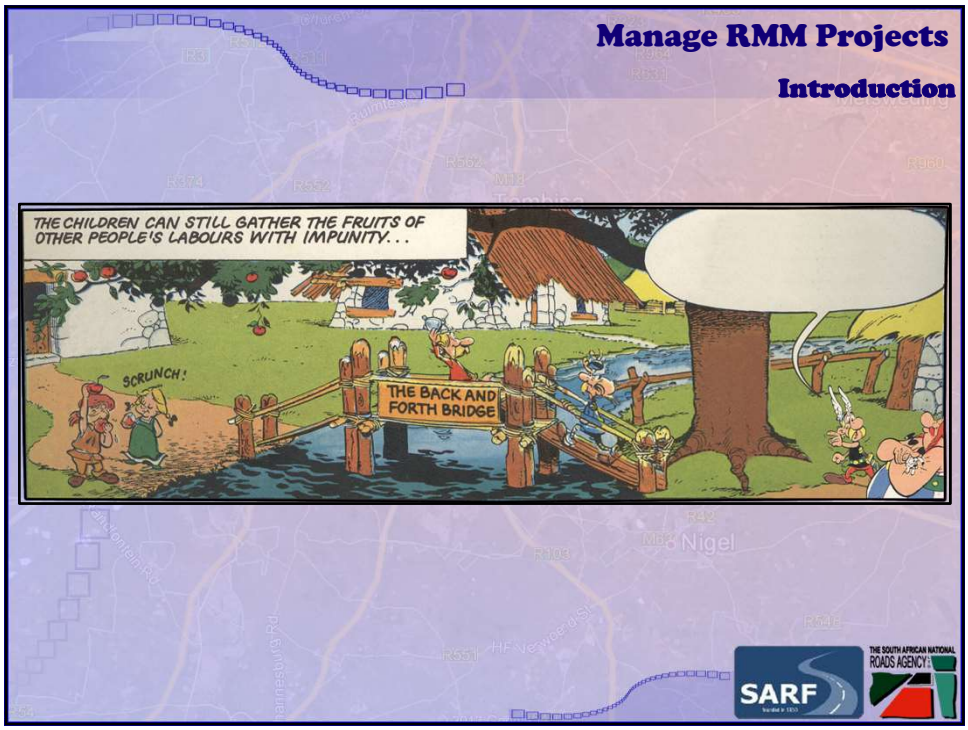
- Develop monthly schedules and match this with a budget provided
- Manage, coordinate and operate the RRM contract as per the Road Agency's Guidance Documents.
- Ensuring compliance to the contract documentation by all parties involved in the RRM contract
- Do financial management of the RMM contract in accordance with the Road Agency's financial management.

31

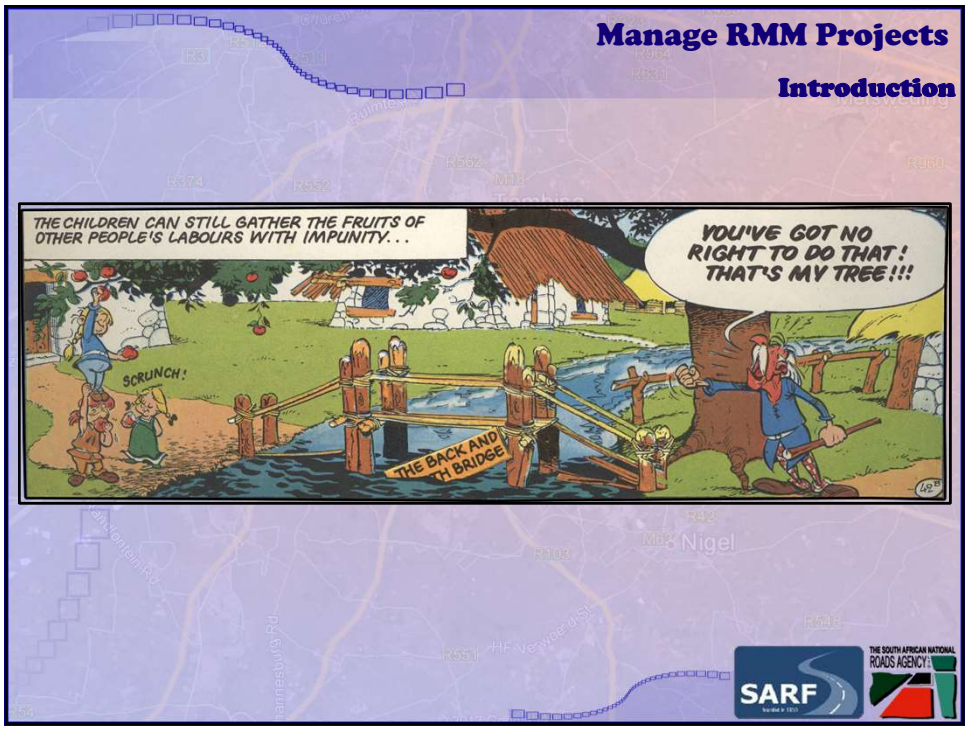
Manage RMM Projects

Introduction

32


Manage RMM Projects
Introduction
THE CHILDREN CAN STILL GATHER THE FRUITS OF OTHER PEOPLE'S LABOURS WITH IMPUNITY...
SCRUNCH!
THE BACK AND FORTH BRIDGE
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

33


Manage RMM Projects
Introduction
THE CHILDREN CAN STILL GATHER THE FRUITS OF OTHER PEOPLE'S LABOURS WITH IMPUNITY...
YOU'VE GOT NO RIGHT TO DO THAT! THAT'S MY TREE!!!
SCRUNCH!
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

34


Manage RMM Projects
Introduction
DISCUSSION
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

35


Manage RMM Projects
Specific Outcome 1:
Preparation for the RRM Project
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

36

Manage RMM Projects

Preparation for the RRM Project

This Specific Outcome will enable you to:

Conduct an inventory and a condition assessment of all assets within the road reserve

Identify maintenance needs

Prioritise maintenance needs

Schedule prioritised needs and recurring maintenance activities

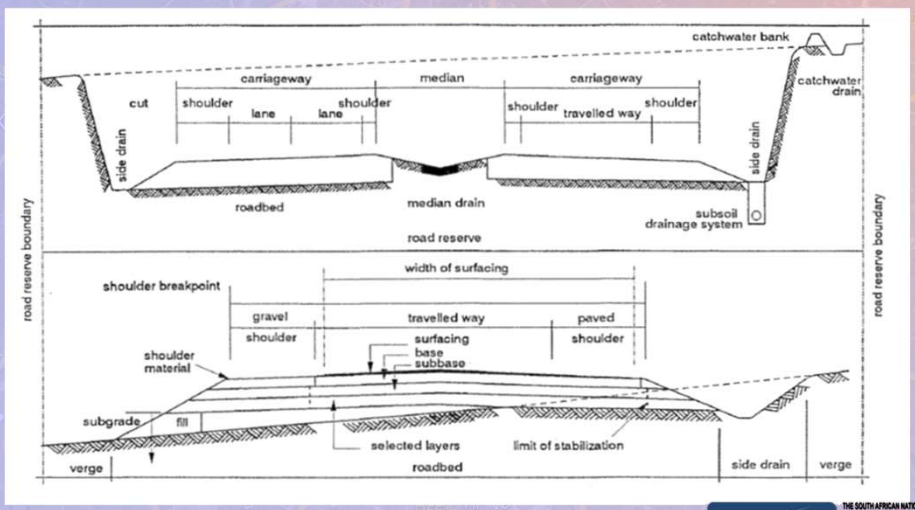
37

1.1.1 Road Reserve
1.1.1.1 Boundaries

Manage RMM Projects

Preparation for the RRM Project

Inventory & Condition Assessment

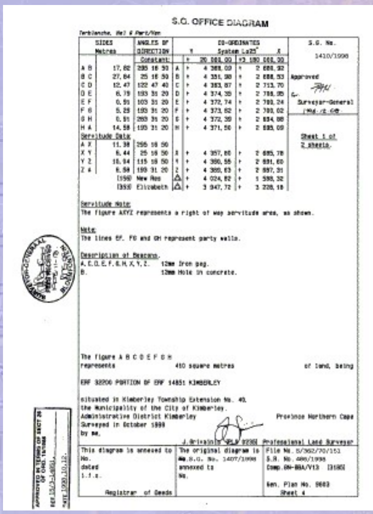


Road reserve

38

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

1.1.1 Road Reserve
1.1.1.1 Boundaries



S.G. OFFICE DIAGRAM

Terblanche, Hel & Part/Van

SIDES Metres		ANGLES OF DIRECTION		CO-ORDINATES System Lo25° Y		X	S.G. No.
		Constant:		+ 20 000,00		+3 180 000,00	1410/1998
A B	17,82	295 16 50	A	+ 4 369,03	+	2 686,92	
B C	27,84	25 16 50	B	+ 4 351,90	+	2 688,53	Approved
C D	12,47	122 47 40	C	+ 4 363,67	+	2 713,70	
D E	6,79	193 31 20	D	+ 4 374,35	+	2 708,95	Surveyor-General
E F	0,91	103 31 20	E	+ 4 372,74	+	2 703,24	1998.12.08
F G	5,29	193 31 20	F	+ 4 373,62	+	2 703,02	
G H	0,91	283 31 20	G	+ 4 372,39	+	2 694,88	
H A	14,58	193 31 20	H	+ 4 371,50	+	2 695,09	
Servitude Data							Sheet 1 of 2 sheets.
A X	11,38	295 16 50					
X Y	6,44	25 16 50	X	+ 4 357,60	+	2 685,78	
Y Z	10,94	115 16 50	Y	+ 4 360,55	+	2 691,60	
Z A	6,58	193 31 20	Z	+ 4 365,63	+	2 697,31	
	(156)	New Res	△	+ 4 024,82	+	1 598,32	
	(353)	Elizabeth	△	+ 3 947,72	+	3 228,18	

Servitude Note:
The figure AXYZ represents a right of way servitude area, as shown.

Note:
The lines EF, FG and GH represent party walls.

Description of Beacons.
A, C, D, E, F, G, H, X, Y, Z. 12mm Iron peg.
B. 12mm Hole in concrete.

The figure A B C D E F G H
represents 410 square metres of land, being

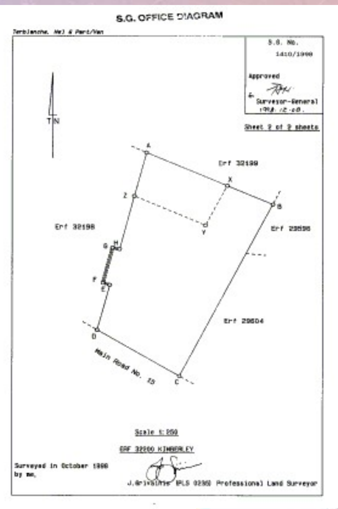
ERF 32200 PORTION OF ERF 14851 KIMBERLEY

situated in Kimberley Township Extension No. 40,
the Municipality of the City of Kimberley.
Administrative District Kimberley Province Northern Cape
Surveyed in October 1998
by me.

J.Grivainis PLS 0230 Professional Land Surveyor

This diagram is annexed to	The original diagram is	File No. S/362/70/151
No.	No. S.G. No. 1407/1998	S.R. No. 486/1998
dated	annexed to	Comp. GN-8BA/V13 (3165)
i.f.o.	No.	
		Gen. Plan No. 9683
Registrar of Deeds		Sheet 4

APPROVED IN TERMS OF SECT 38 OF ORD. 15/1986
REF 15/3-14851
DATE 1998.10.12



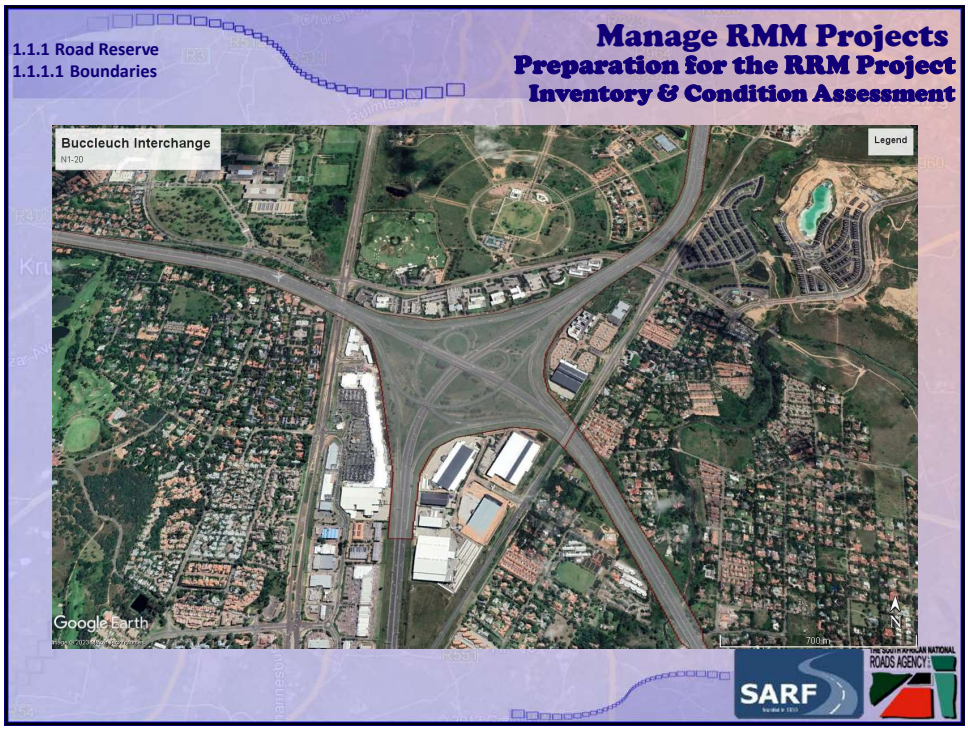
SG diagram

39

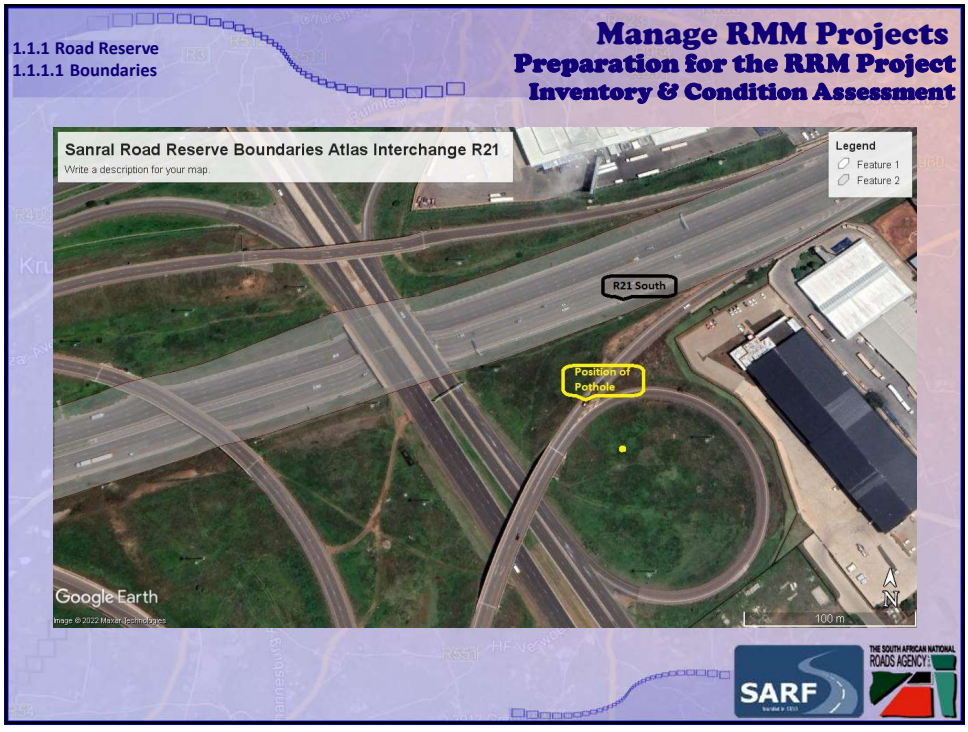
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

1.1.1 Road Reserve
1.1.1.1 Boundaries

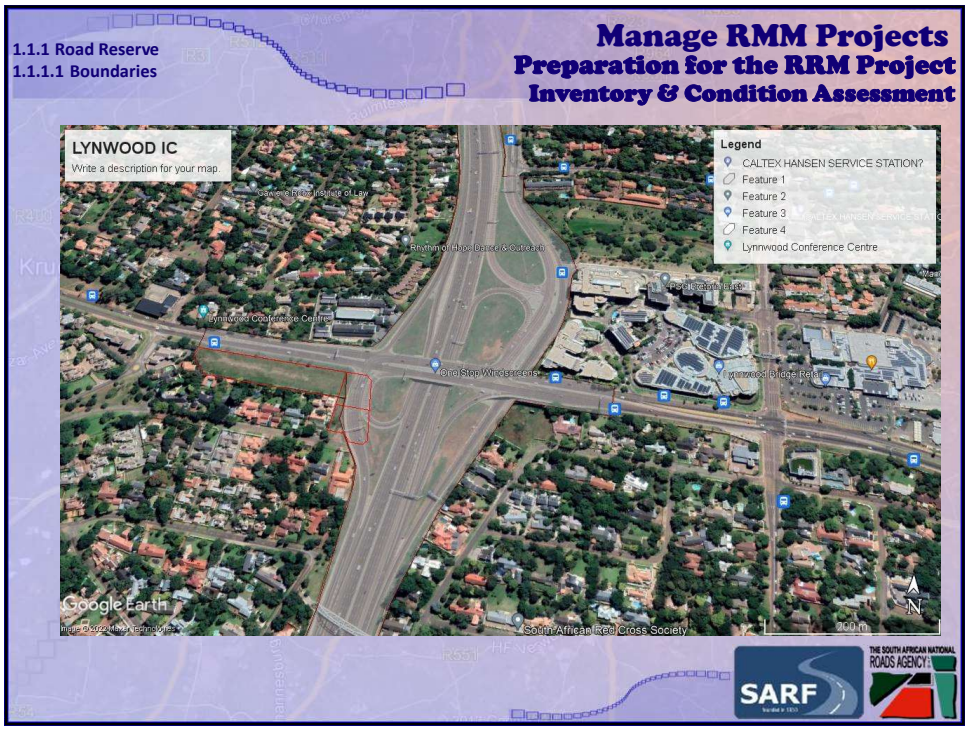
40


1.1.1 Road Reserve
1.1.1.1 Boundaries
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Buccleuch Interchange
N1-20
Legend
Google Earth
700 m
N
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

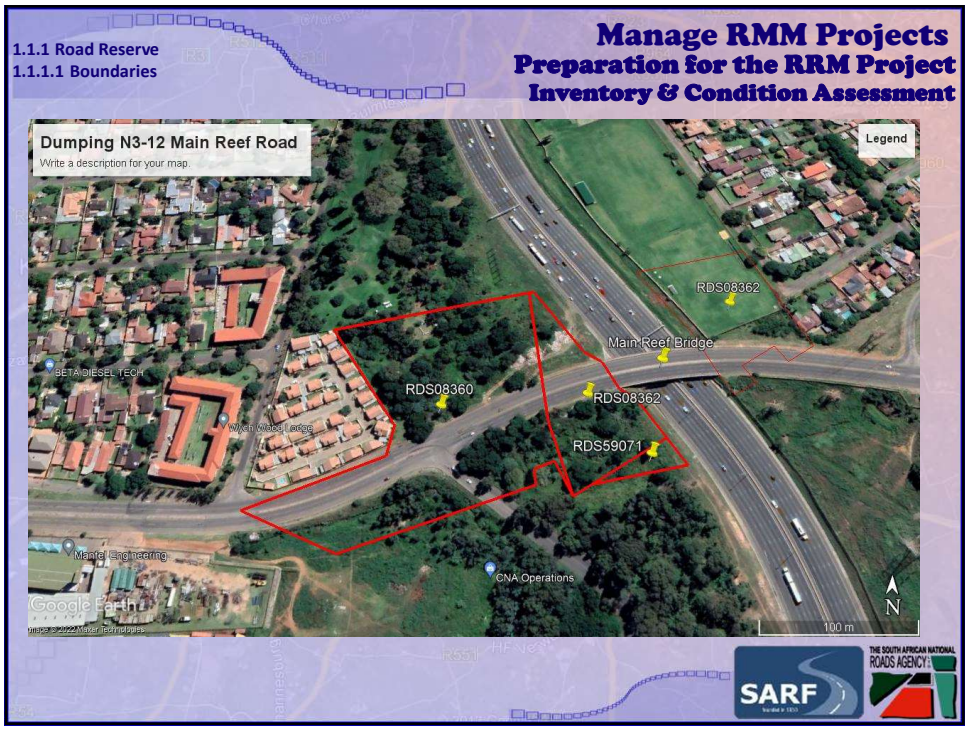
41


1.1.1 Road Reserve
1.1.1.1 Boundaries
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Sanral Road Reserve Boundaries Atlas Interchange R21
Write a description for your map.
Legend
Feature 1
Feature 2
R21 South
Position of Pothole
Google Earth
100 m
N
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

42


1.1.1 Road Reserve
1.1.1.1 Boundaries
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
LYNWOOD IC
Write a description for your map.
Legend
CALTEX HANSEN SERVICE STATION?
Feature 1
Feature 2
Feature 3
Feature 4
Lynnwood Conference Centre
Google Earth
South African Red Cross Society
100 m
N
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

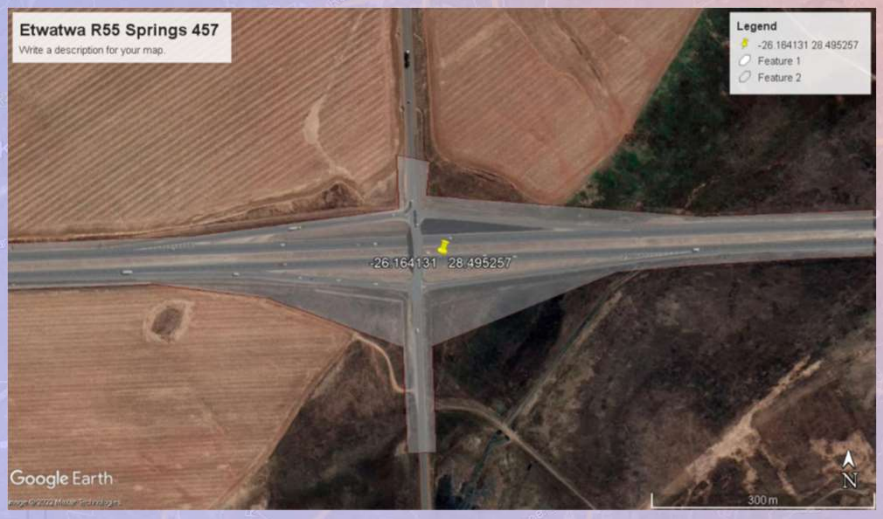
43


1.1.1 Road Reserve
1.1.1.1 Boundaries
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Dumping N3-12 Main Reef Road
Write a description for your map.
Legend
RDS08362
Main Reef Bridge
RDS08360
RDS08362
RDS59071
BETA DIESEL TECH
Mantel Engineering
CNA Operations
Google Earth
100 m
N
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

44

1.1.1 Road Reserve
1.1.1.1 Boundaries

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment



45

1.1.1 Road Reserve
1.1.1.1 Boundaries

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

The nature/scope of work to be carried out under this contract includes:

- Establishment of camps on site
- Inspection of the road, structures, waterways, cutting/fill slopes and night inspections
- Accommodation of traffic
- Pavement layers repairs
- Crack sealing and patching of asphalt pavements
- Repair edge breaks and edge drops
- Gravel shoulder repairs
- Repair of slope failures and washaways

Continue next slide

46

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

- Stabilisation of slopes
- Construction of drainage works to combat erosion
- Cleaning of all drainage structures, including removal of grass and debris from grids, as well as clearing bridge drainage ports and scuppers
- Repairing damaged fencing
- Clearing refuse from the road reserve, lay-byes, rest areas and interchanges
- Repairing damaged road signs
- Cleaning of road signs

Continue next slide

47

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

- Installation and replacement of road studs
- Repairing damaged guardrails and balustrades
- Road marking
- Regular mowing of grass in the road reserve including the median and the removal of grass cuttings
- Application of herbicide on road edges and around road signs
- Eradication of weeds and undesirable plant growth
- Burning or cutting of firebreaks and assistance with veld fires

Continue next slide

48

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

- Installation and replacement of road studs
- Repairing damaged guardrails and balustrades
- Road marking
- Regular mowing of grass in the road reserve including the median and the removal of grass cuttings
- Application of herbicide on road edges and around road signs
- Eradication of weeds and undesirable plant growth
- Burning or cutting of firebreaks and assistance with veld fires

NB: The scope of work item must be described in the specifications and to follow in the bill of quantities.

49

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

VEGETATION
1.1.1.2

VEGETATION CONTROL SHOULD NOT BE NEGLECTED DURING MAINTENANCE OF A ROAD SECTION

50

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

There are four basic methods of controlling invasive alien plants:

Mechanical control

Chemical control

Biological control

Indirect control

Integrated control

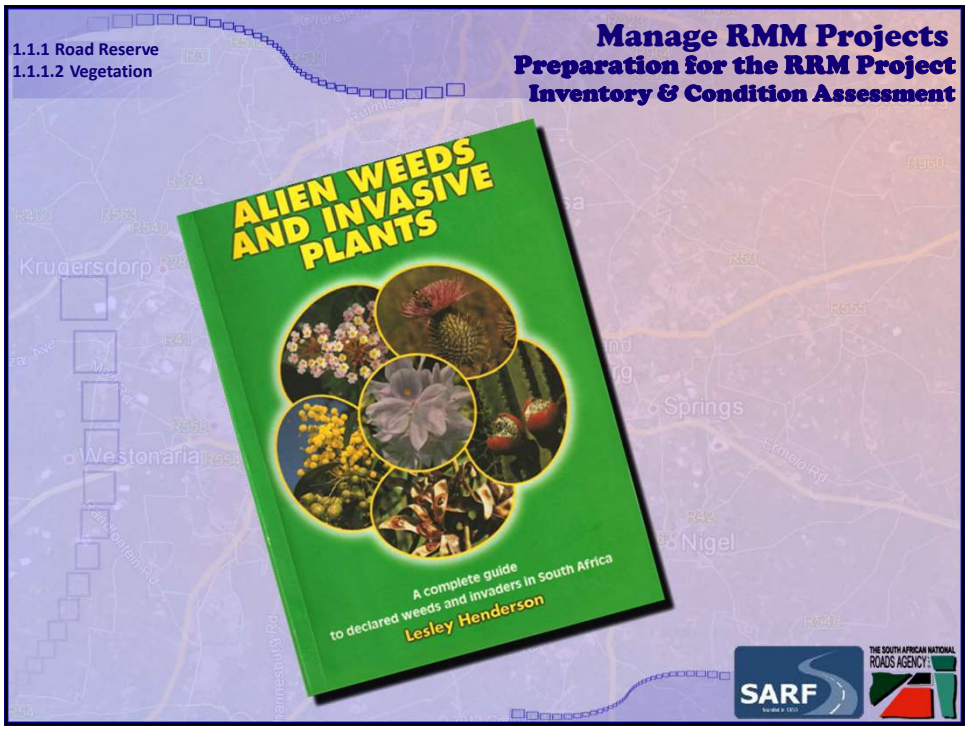
51

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

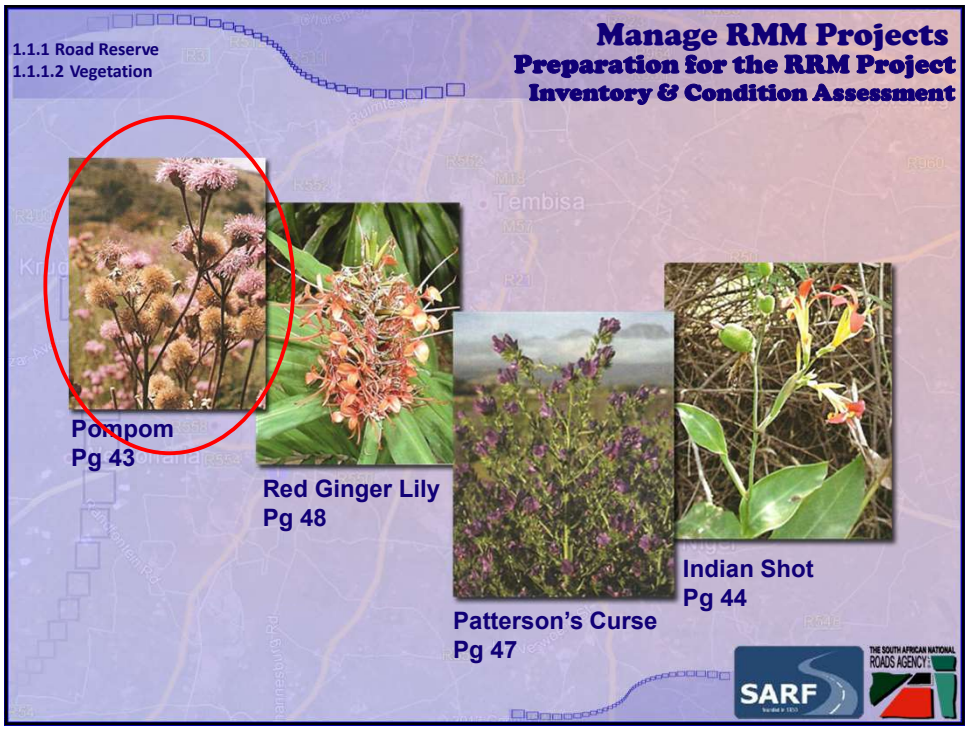
Declared weeds and invaders have been divided into three categories, namely:

Category 1:	Plants are prohibited and must be controlled;
Category 2:	Plants (commercially) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread; and
Category 3:	Plants (ornamentally) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading there of, except within the flood line of watercourses and wetlands.

52


1.1.1 Road Reserve
1.1.1.2 Vegetation
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
ALIEN WEEDS AND INVASIVE PLANTS
A complete guide to declared weeds and invaders in South Africa
Lesley Henderson
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

53


1.1.1 Road Reserve
1.1.1.2 Vegetation
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Pompom
Pg 43
Red Ginger Lily
Pg 48
Patterson's Curse
Pg 47
Indian Shot
Pg 44
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

54

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

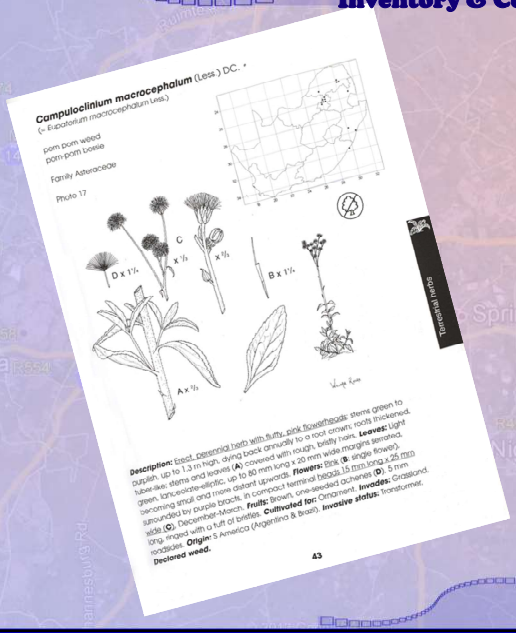
Identify the plant:
Pompom
Pg 43

17. ***Campuloclinium macrocephalum***, pom pom weed, p. 43

55

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment



Campuloclinium macrocephalum (Less.) DC. *
(= Eupatorium macrocephalum Less.)

pom pom weed
pom-pom Weisie

Family Asteraceae

Photo 17

Terrestrial herbs

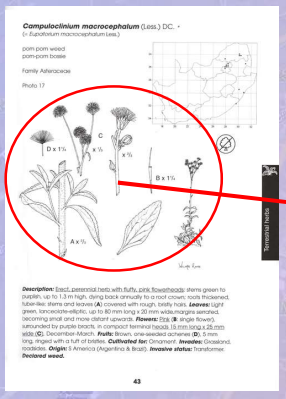
Description: Erect, perennial herb with fluffy, pink flowerheads; stems green to purplish, up to 1.3 m high, dying back annually to a root crown; roots thickened, tuber-like; stems and leaves (**A**) covered with rough, bristly hairs. **Leaves:** Light green, lanceolate-elliptic, up to 80 mm long x 20 mm wide margins serrated, becoming small and more distant upwards. **Flowers:** Pink (**B**, single flower), surrounded by purple bracts, in compact terminal heads 15 mm long x 25 mm wide (**C**). December-March. **Fruits:** Brown, one-seeded achenes (**D**), 5 mm long, ended with a tuft of bristles. **Cultivated for:** Ornament. **Invades:** Grassland, roadsides. **Origin:** S America (Argentina & Brasil). **Invasive status:** Instrumwar. **Declared weed.**

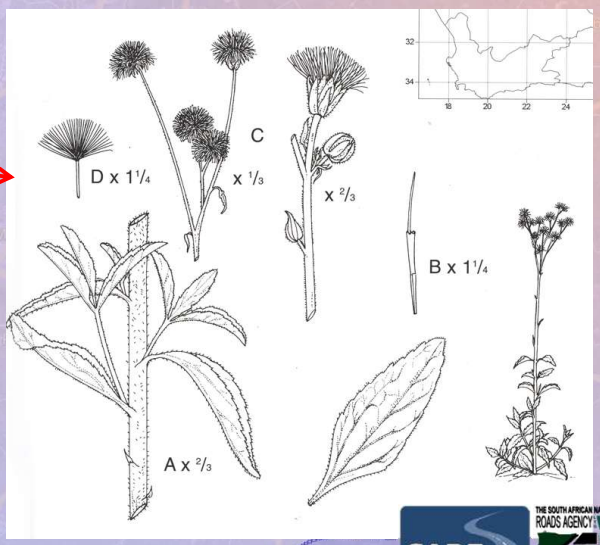
43

56

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

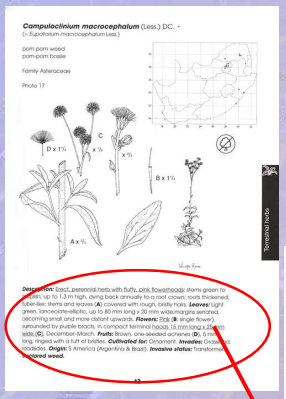




57

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment



Description: Erect, perennial herb with fluffy, pink flowerheads; stems green to purplish, up to 1.3 m high, dying back annually to a root crown; roots thickened, tuber-like; stems and leaves (**A**) covered with rough, bristly hairs. ***Leaves:*** Light green, lanceolate-elliptic, up to 80 mm long x 20 mm wide,margins serrated, becoming small and more distant upwards. ***Flowers:*** Pink (**B**: single flower), surrounded by purple bracts, in compact terminal heads 15 mm long x 25 mm wide (**C**), December-March. ***Fruits:*** Brown, one-seeded achenes (**D**), 5 mm long, ringed with a tuft of bristles. ***Cultivated for:*** Ornament. ***Invades:*** Grassland, roadsides. ***Origin:*** S America (Argentina & Brazil). ***Invasive status:*** Transformer. ***Declared weed.***

58

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

TABLE 3 CONTINUED

COLUMN 1		COLUMN 2	COLUMN 3	COLUMN 4
Botanical name	Common name	Type	Category	Special conditions
Albizia lebbeck (L.) Benth.	Lebbeckboom Lebbeck tree	Weed	1	
Albizia procera (Roxb.) Benth.	Basterlebbeck False lebbeck	Weed	1	
Alhagi maurorum Medik. (= *A. camelorum* Fisch.)	Kameeldoringbos Camel thorn bush	Weed	1	
Anredera cordifolia				
Atriplex lindleyi Moq. **subsp. inflata** (F.Müll.) P.G.Wilson	Blasiesoutbos Sponge-fruit saltbush	Invader	3	
Atriplex nummularia Lindl. **subsp. nummularia**	Oumansoutbos Old man saltbush	Invader	2	
Azolla filiculoides Lam.	Rooiwatervaring Azolla, Red water fern	Weed	1	
Bauhinia purpurea L.	Skoenlapperorgideeboom Butterfly orchid tree	Invader	3	
Bauhinia variegata L.	Orgideeboom Orchid tree	Invader	3	
Bryophyllum delagoense (Eckl. & Zeyh.) Schinz (= *B. tubiflorum* Harv., *Kalanchoe tubiflora* Raym.-Hamet, *K. delagoensis* Eckl. & Zeyh.)	Kandelaarplant Chandelier plant	Weed	1	
Caesalpinia decapetala (Roth) Alston (= *C. sepiaria* Roxb.)	Kraaldoring Mauritius thorn	Weed	1	
Campuloclinium macrocephalum (Less.) DC. (= *Eupatorium macrocephalum* Less.)	Pom-pom bossie Pom pom weed	Weed	1	
Canna indica L. Excluding hybrid cultivars	Indiese kanna Indian shot	Weed	1	
		261 Invader	3	

DECLARED WEED:
Action:
Integrated control

59

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

60

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

61

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

62

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

63

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

64

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

65

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

66

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

67

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

68

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

69

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

70

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

71

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

72

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

73

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

74

1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

75

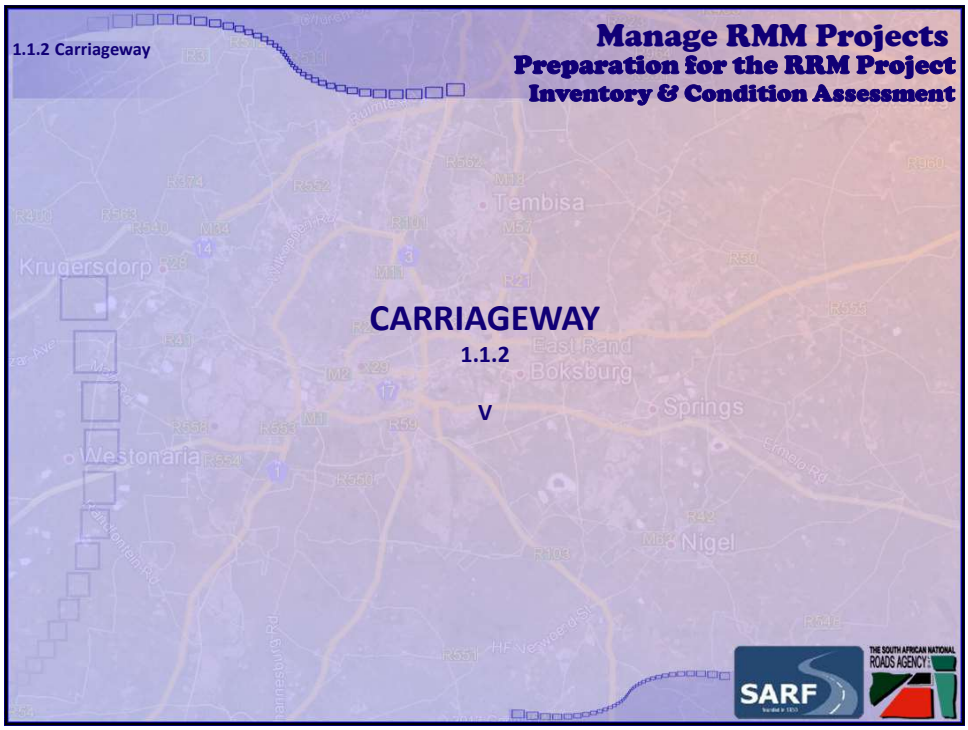
1.1.1 Road Reserve
1.1.1.2 Vegetation

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

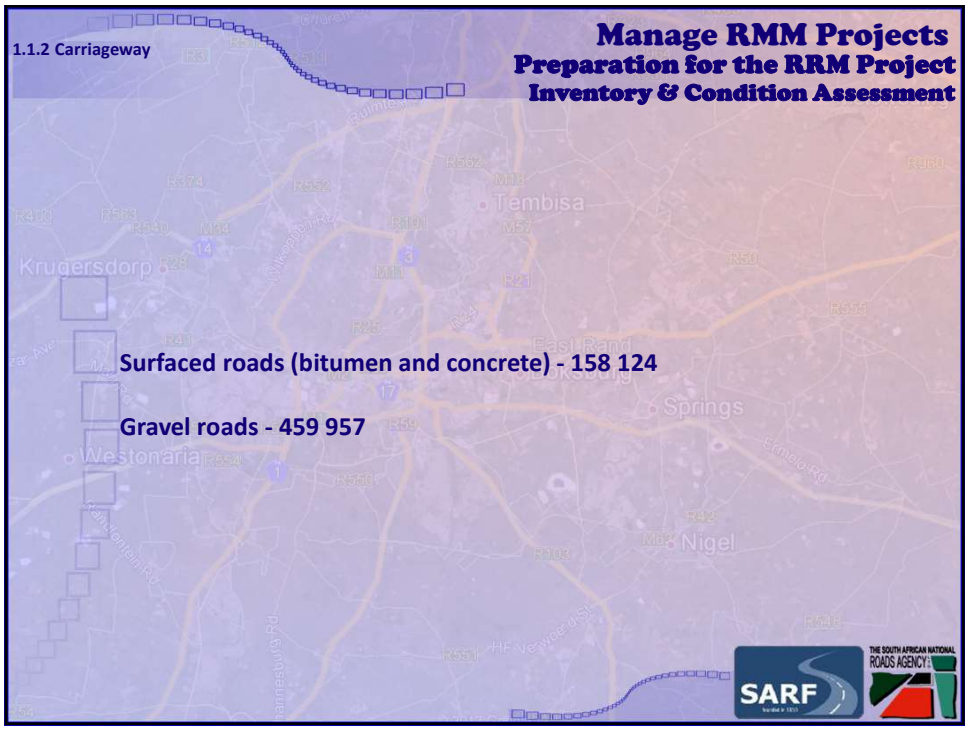
SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

76


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
CARRIAGEWAY
1.1.2
V
SARF

77


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Surfaced roads (bitumen and concrete) - 158 124
Gravel roads - 459 957
SARF

78


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

79

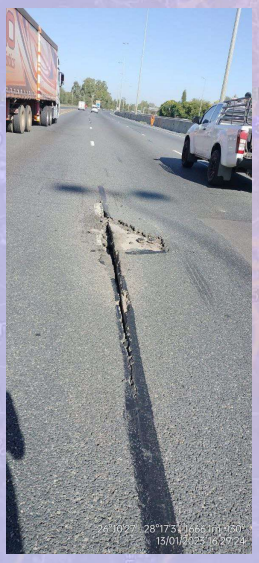

1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Tembisa
East Rand
Boksburg
Springs
Nigel
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

80

1.1.2 Carriageway

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Repair altrafinconcrete



81

1.1.2 Carriageway

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Repair altrafinconcrete

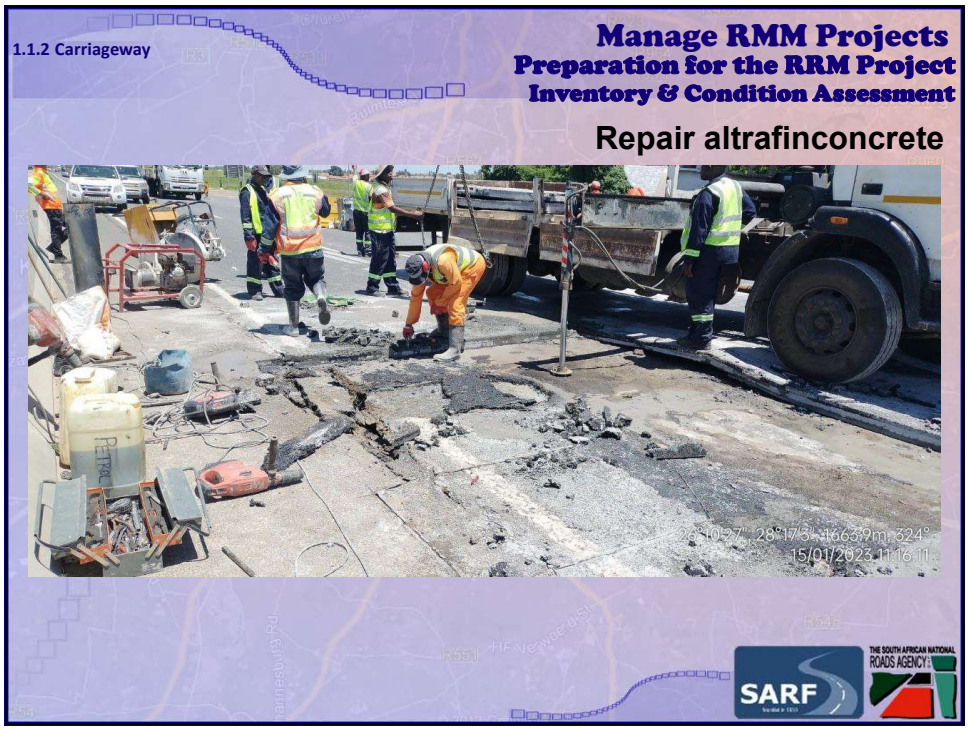
82


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Repair altrafinconcrete
-26°10'27", 28°17'3", 1664.7m, 176°
15/01/2023 09:12:36
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

83


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Repair altrafinconcrete
CAUTION
ACTIVE CONSTRUCTION VEHICLE
-26°10'27", 28°17'3", 1664.1m, 103°
15/01/2023 10:37:34
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

84


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Repair altrafinconcrete
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

85


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Repair altrafinconcrete
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

86


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Repair altrafinconcrete
26°10'27", 28°17'3", 1662.9m, 290°
16/01/2023 07:56:52
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

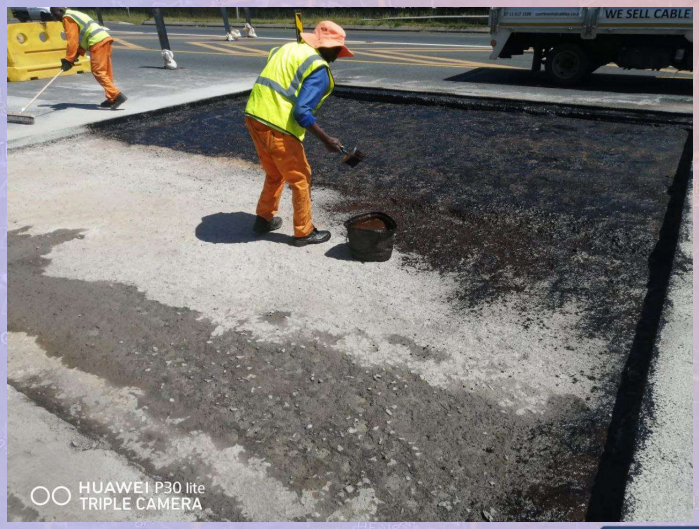
87


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Repair altrafinconcrete
26°10'27", 28°17'3", 1661.7m, 218°
16/01/2023 08:00:35
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

88

1.1.2 Carriageway

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment



SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

89

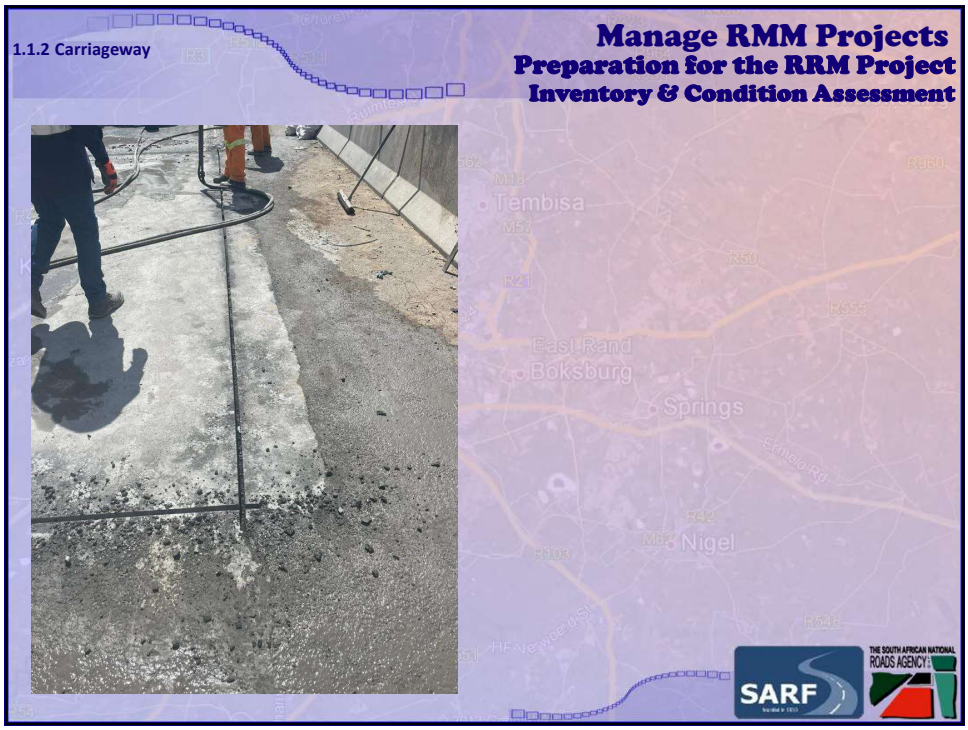
1.1.2 Carriageway

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

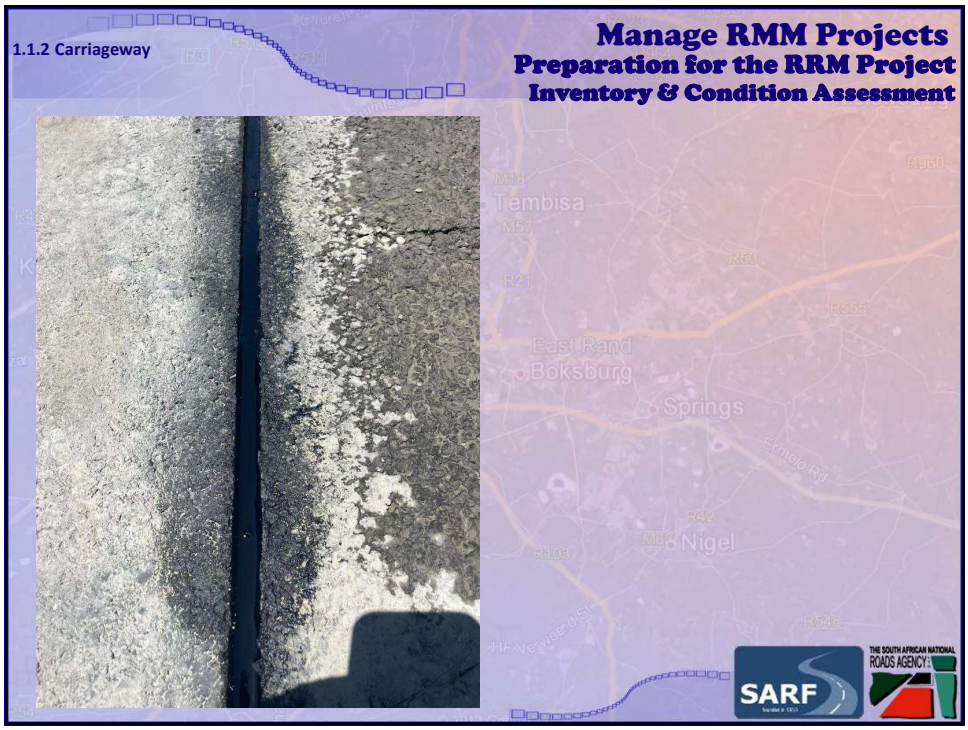
SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

90


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Tembisa
East Rand
Boksburg
Springs
Nigel
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

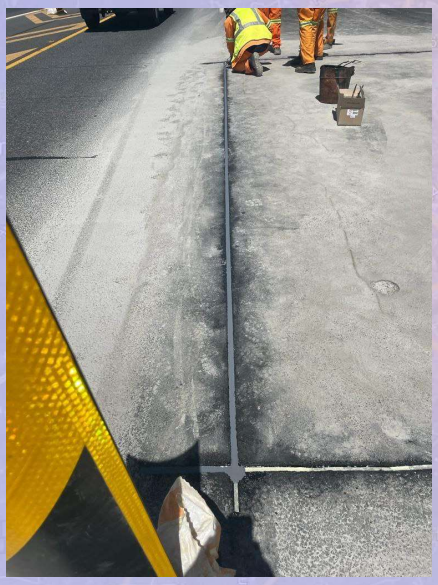
91


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Tembisa
East Rand
Boksburg
Springs
Nigel
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

92

1.1.2 Carriageway

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment



93

1.1.2 Carriageway
1.1.2.1 Surfaced Roads

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Edge breaking & material loss leads to dangerous drop offs.

94

1.1.2 Carriageway
1.1.2.1 Surfaced Roads

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

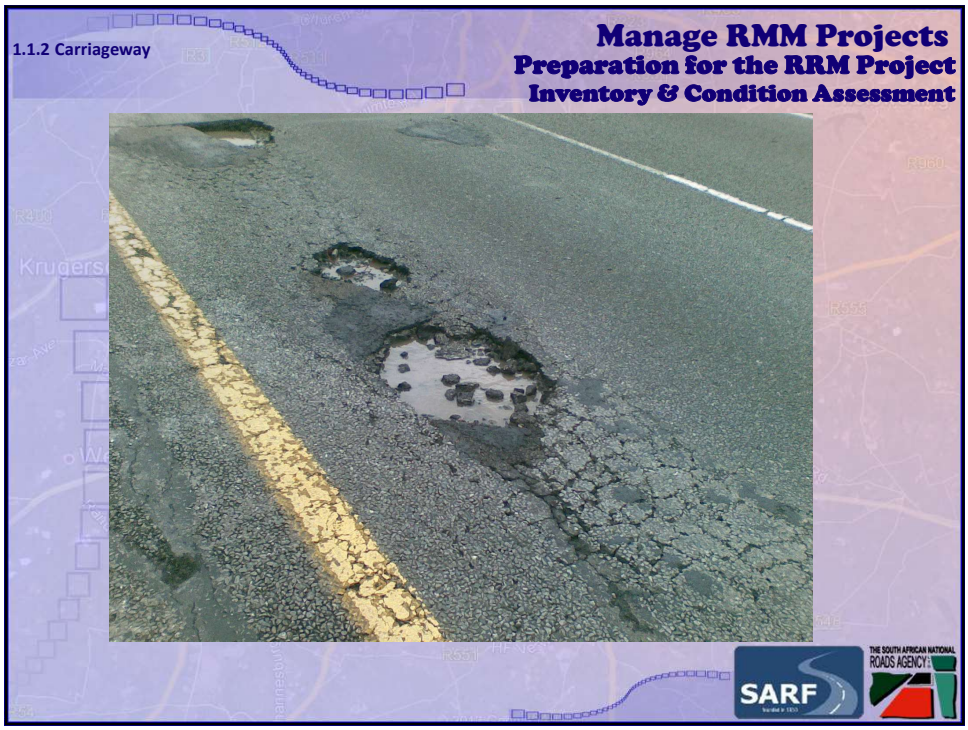
Edge breaking & material loss leads to dangerous drop offs.

95

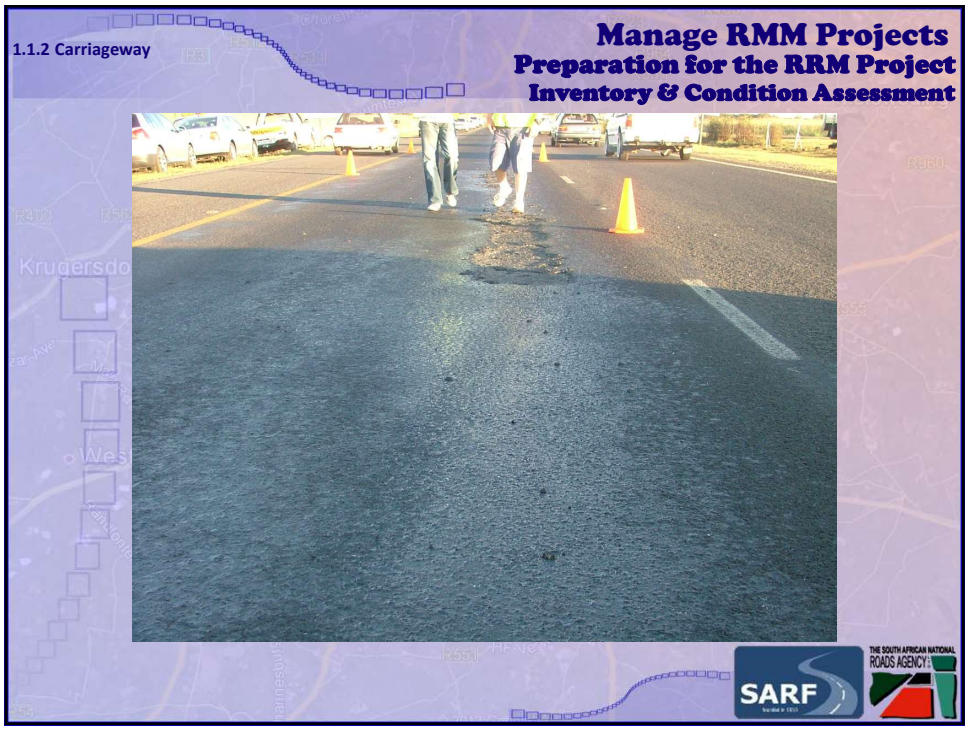
1.1.2 Carriageway

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

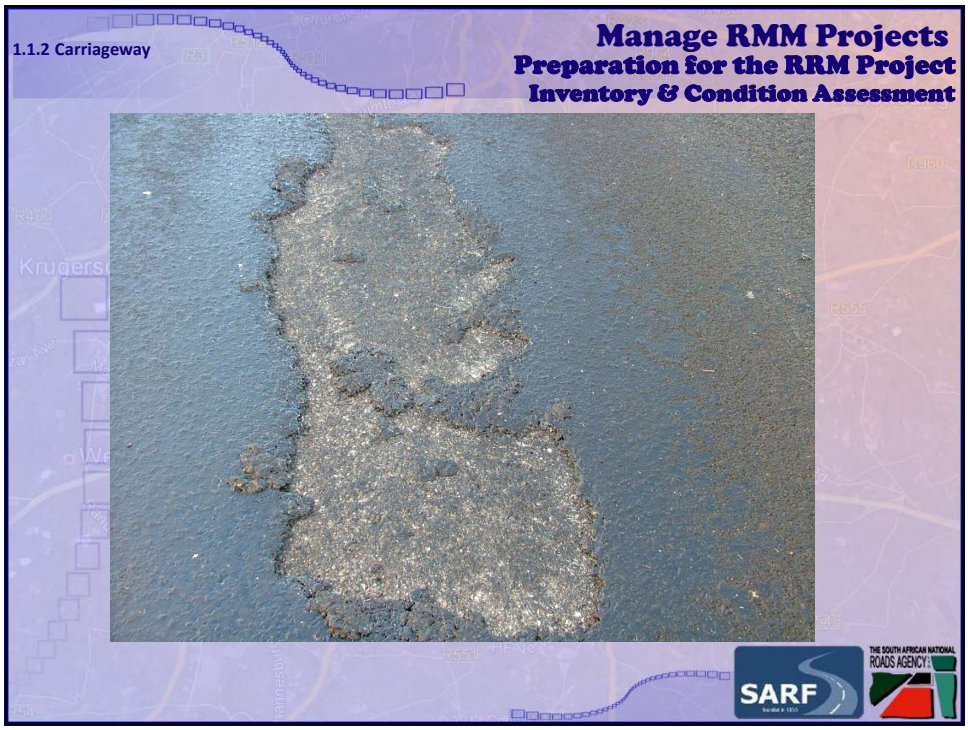
96


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

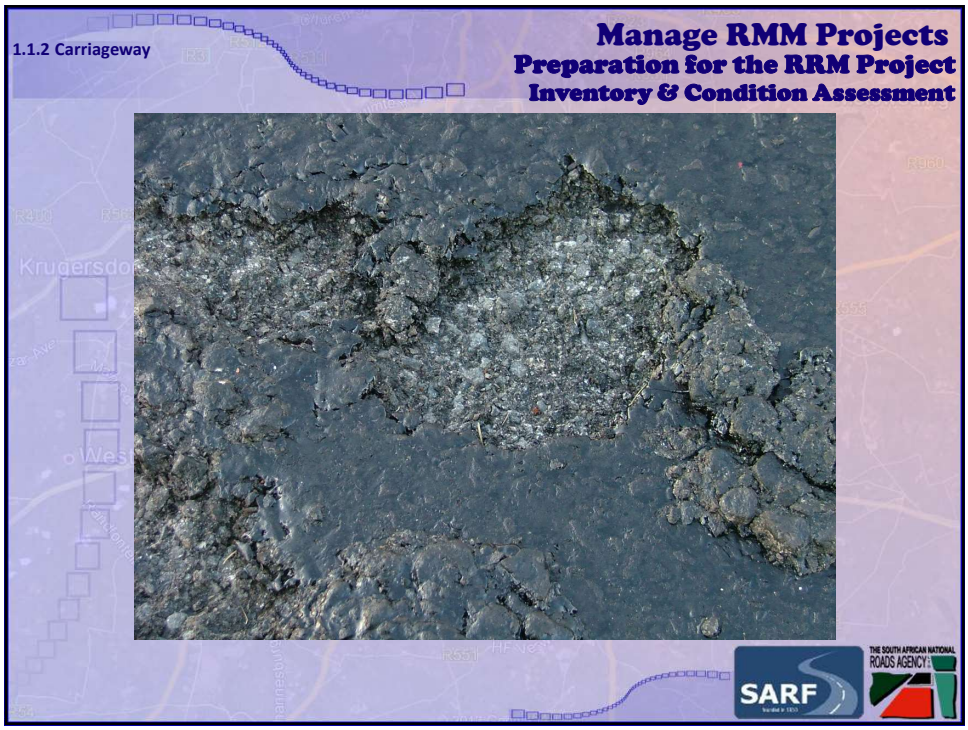
97


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

98


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

99


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

100

1.1.2 Carriageway

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

101

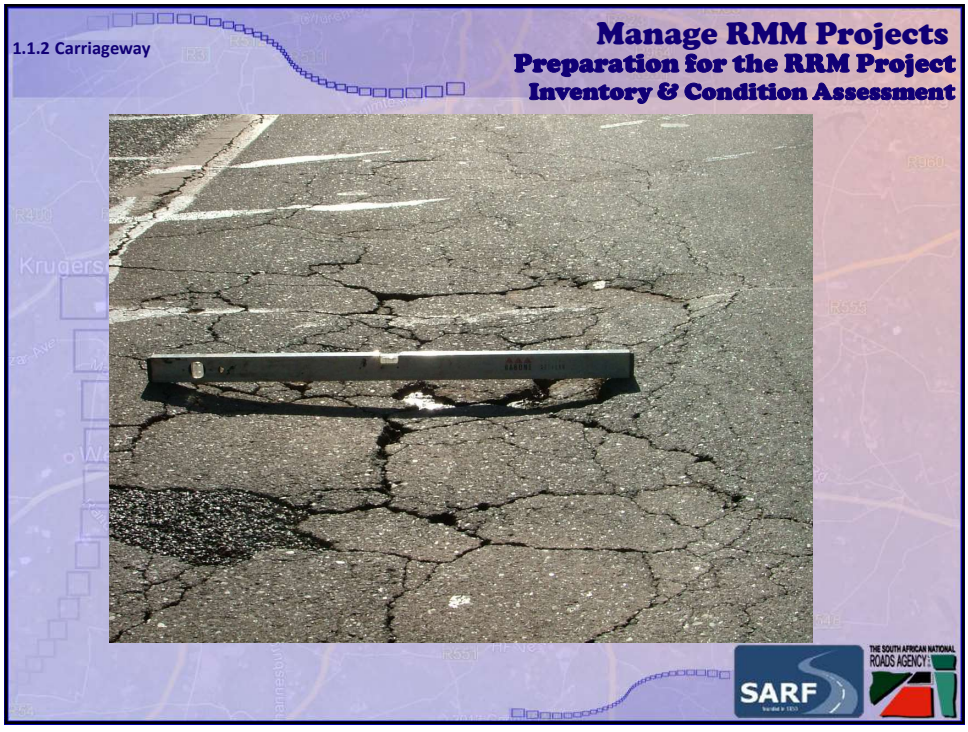
1.1.2 Carriageway

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

102


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

103


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

104

1.1.2 Carriageway

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

105

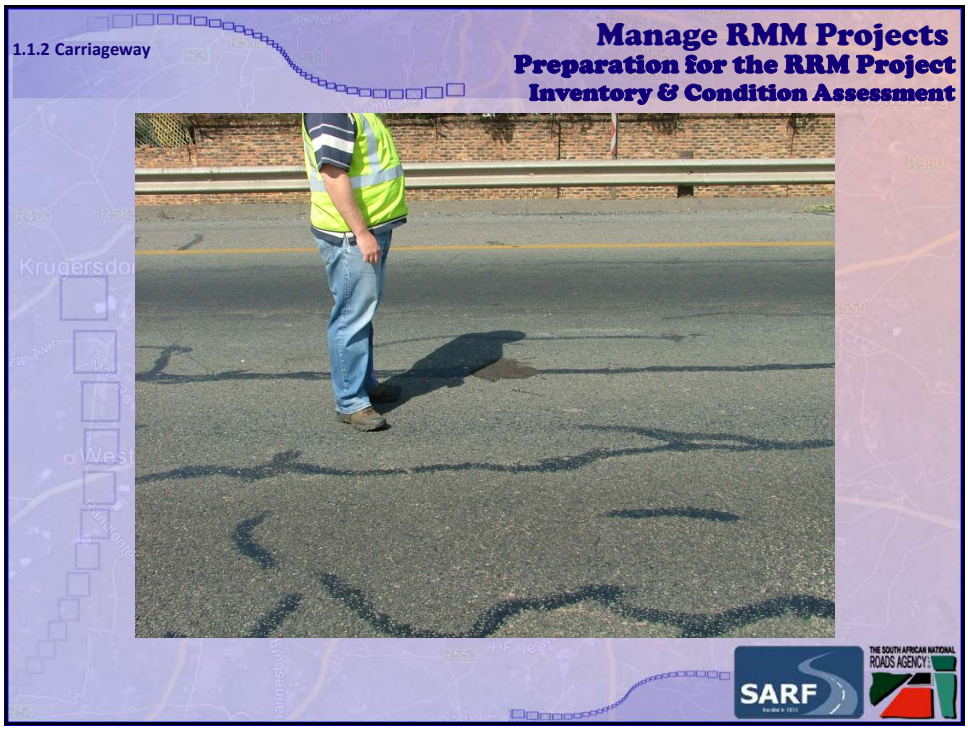
1.1.2 Carriageway

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

106


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

107


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

108


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

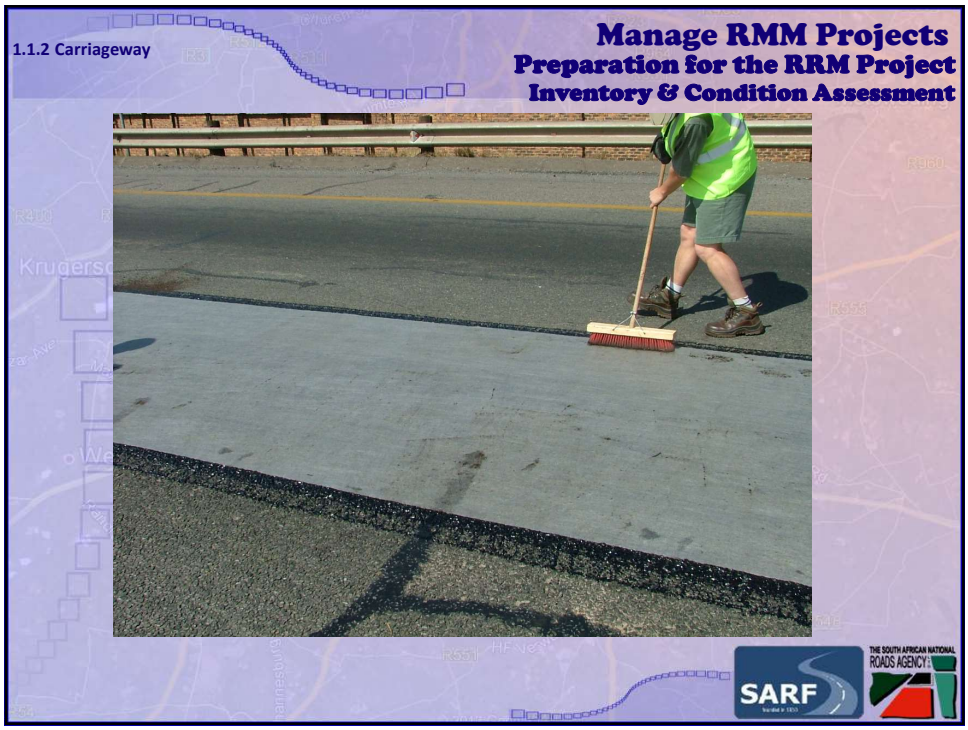
109


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

110


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

111


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

112

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

113

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

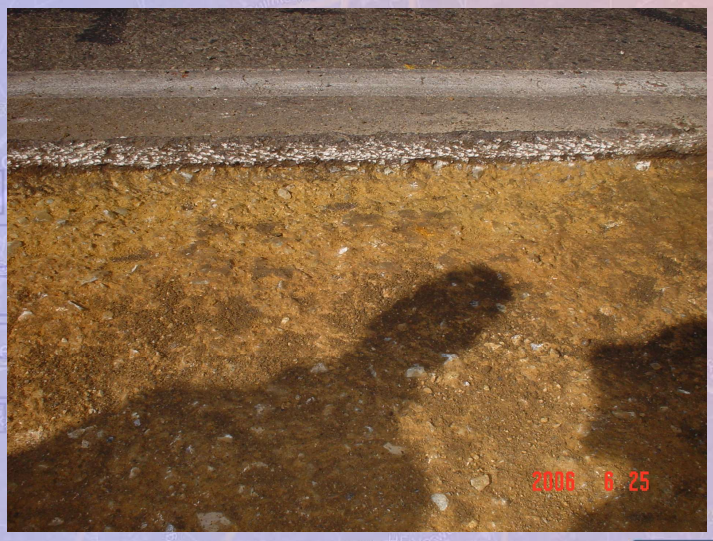
SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

114

1.1.2 Carriageway

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment



115

1.1.2 Carriageway

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

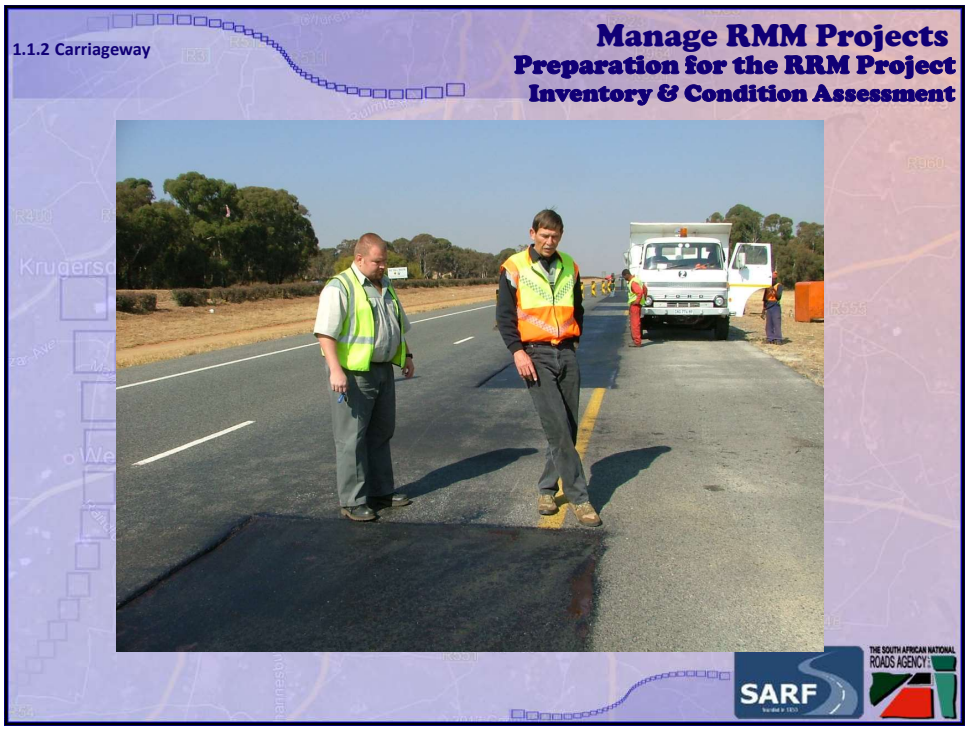
116


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

117


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

118


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

119


1.1.2 Carriageway
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

120

1.1.2 Carriageway

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

121

DISCUSSION

122

1.1.2 Carriageway
1.1.2.1 Surfaced Roads

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

VISUAL EVALUATION OF SURFACED ROADS

ROUTE/SECTION: ASSESSOR:

SEGMENT: Km: from: to DATE:

Start Description: Start Node:
End Description: End Node:

CLIMATE: Very Wet | Wet | Moderate | Dry TERRAIN: Mountains | Rolling | Flat

DM Area: Authority: Maintenance Auth: Area:

SURFACING

TEXTURE: VARYING | FINE | MEDIUM | COARSE
CURRENT SURFACE VOIDS: VARYING | NONE | FEW | MANY

	DEGREE (Slight 0 1 2 3 4 5 Severe)	EXTENT (Isolated 1 2 3 4 5 Common)
FAILURE/PATCHING		
CRACKS		
AGGREGATE LOSS		
BINDER CONDITION		
BLEEDING/FLUSHING		

STRUCTURE

	DEGREE (Small/Slight 0 1 2 3 4 5 Large/Severe)	EXTENT (Isolated 1 2 3 4 5 Common)
BLOCK/STAB. CRACKS (N M L)		
LONGITUDINAL/SLIP CRACKS		
TRANSVERSE CRACKS		
CROCODILE/FAILURE CRACKS		
PUMPING		
RUTTING		
UNDULATION/SETTLEMENT		
PATCHING		
FAILURES/POTHOLING		

OCCURRENCE | STRUCTURES | EDGES | DEPRESSIONS | CRACKS | CUTTINGS | GENERAL

FUNCTIONAL

RIDING QUALITY	VERY GOOD	GOOD	FAIR	POOR	VERY POOR
Problem			UNDULATION	SETTLEMENT	CORRUGATION
SKID RESISTANCE	VERY GOOD	GOOD	FAIR	POOR	VERY POOR
Problem				SLEEKING	POLISHED
SURFACE DRAINAGE	ADEQUATE		WARNING		INADEQUATE
Problem	RUTTING	SHOULDERS	UNDULATION	FAILURE	SIDE DRAINS
UNPAVED SHOULDERS	SAFE		WARNING		UNSAFE
Problem	ERODED	RUTTED	TOO HIGH	NARROW	INCLINED OVERGROWN

EDGE BREAKING 0 1 2 3 4 5 1 2 3 4 5

SUMMARY

TYPE ACTION NEEDED	NONE	STRUCTURE			SURFACE			ROUTINE	
		C	B	A	C	B	A	C	B	A
OVERALL PAVEMENT CONDITION	VERY GOOD	GOOD			FAIR		POOR		VERY POOR	

OTHER EVALUATION

ROAD MARKINGS: VERY GOOD | GOOD | FAIR | POOR | VERY POOR | NONE

Pumping

Longitudinal cracking

Visual assessment form taken from TMH 9 (1992)

123

1.1.2 Carriageway
1.1.2.2 Gravel shoulders & gravel roads

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

UNSEALED ROAD ASSESSMENT FORM

Evaluator Date

Road No Section
Start km End km Position

Segment No Start km End km

General performance	1	2	3	4	5	Moisture			Wet		Dry
Gravel quantity	1	Plenty	2	Sufficient	3	Isolated exposures	4	Extensive exposures	5	None	
Gravel quality	1	Very good	2	Good	3	Average	4	Poor	5	Very poor	
Influencing factors		Clay		Sand		Gravel/stones					
Road profile/shape	1	Very good (4%)	2	Good (2%)	3	Flat	4	Uneven	5	Very uneven	
Drainage from the road	1	Well above ground	2	Slightly above	3	Level with ground	4	Slightly below	5	Canal	
Riding quality/safety	1	Very good (>100 km/h)	2	Good (100 km/h)	3	Average (80 km/h)	4	Poor (60 km/h)	5	Very poor (40 km/h)	
Influencing factors		Corrugation		Loose material		Stoniness		Potholes		Ruts	Erosion
Maintenance action		Local repairs		Blading		Heavy blading		Regravelling		Reshaping	Drains

	Degree						Extent				
Potholes	0	1	2	3	4	5	1	2	3	4	5
Rutting	0	1	2	3	4	5	1	2	3	4	5
Erosion - transverse	0	1	2	3	4	5	1	2	3	4	5
Erosion – longitudinal	0	1	2	3	4	5	1	2	3	4	5
Corrugation	0	1	2	3	4	5	1	2	3	4	5
Loose material	0	1	2	3	4	5	1	2	3	4	5
Stoniness – embedded	0	1	2	3	4	5	1	2	3	4	5
Stoniness - loose	0	1	2	3	4	5	1	2	3	4	5
Dustiness	0	1	2	3	4	5					
Slipperiness	Acceptable			Unacceptable							
Skid resistance	Acceptable			Unacceptable							
Trafficability	Acceptable			Unacceptable							

Isolated problems	Potholes	Subgrade exposure	Transverse erosion	Longitudinal erosion	Rough area	Slipperiness

Stoniness - embedded

Loose material

Visual assessment form taken from THR 20 (1990)

124


1.1.2 Carriageway
1.1.2.2 Gravel shoulders & gravel roads
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Corrugated gravel road
Loose material
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

125


1.1.2 Carriageway
1.1.2.2 Gravel shoulders & gravel roads
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Loose edge
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

126

1.1.2 Carriageway
1.1.2.2 Gravel shoulders & gravel roads

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Stoniness - embedded

127

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Every maintained road section should have its own Drainage Structure Management System.

Proper drainage is critical for the long term performance of a road section.

If the drainage system fails to keep water from the road prism, deterioration will increase exponentially.

128

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Opening width <1.2M

A Combined opening < 5M²

129

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Cellular structure with clear span length ≥ 1.2M

Or
Diameter ≥ 2.1M

Culvert with total cross-sectional opening ≥ 5M²

130

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Clear span > 6M

AND

Opening height at inlet > 6M

AND

Individual clear spans > 1.5M & overall length between abutment faces > 20M

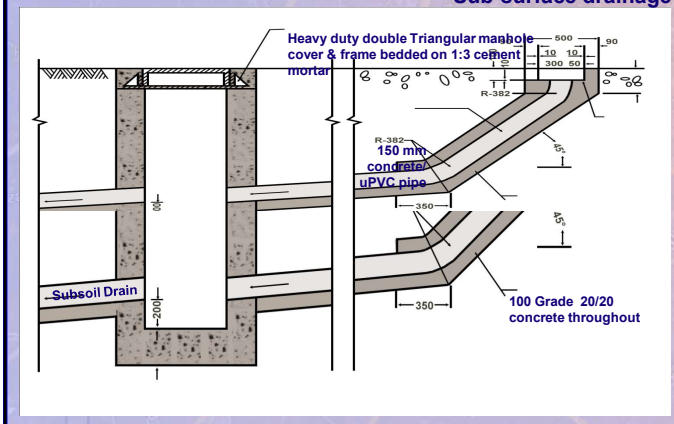
AND

Total cross-sectional opening ≥ 36M²

131

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Sub-surface drainage

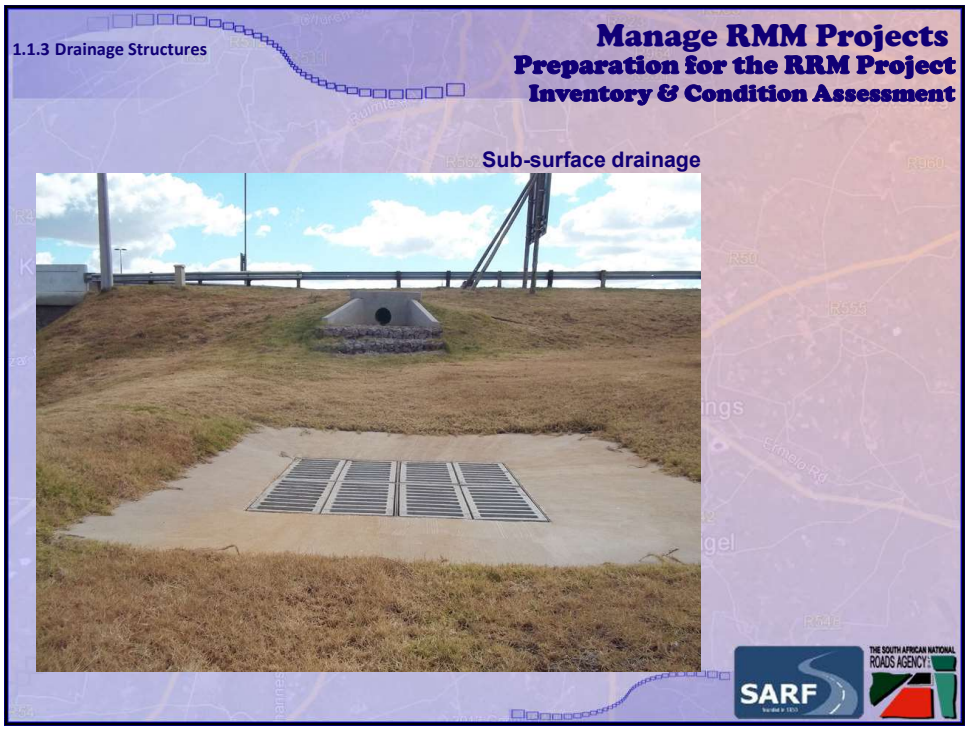


Section 1-1
Series 1 - 25

MANHOLE

RODDING EYE

132


1.1.3 Drainage Structures
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Sub-surface drainage
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

133


1.1.3 Drainage Structures
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Sub-surface drainage
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

134

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

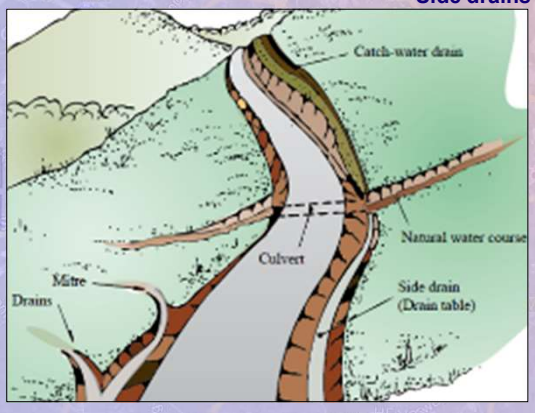
Sub-surface drainage

135

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Side drains



136

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Side drains

137

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

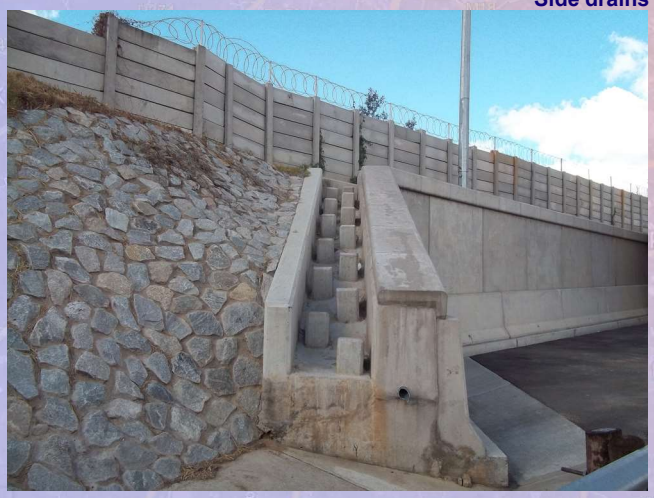
Side drains

138

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Side drains



139

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Side drains

140

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Side drains

141

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Side drains

142

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

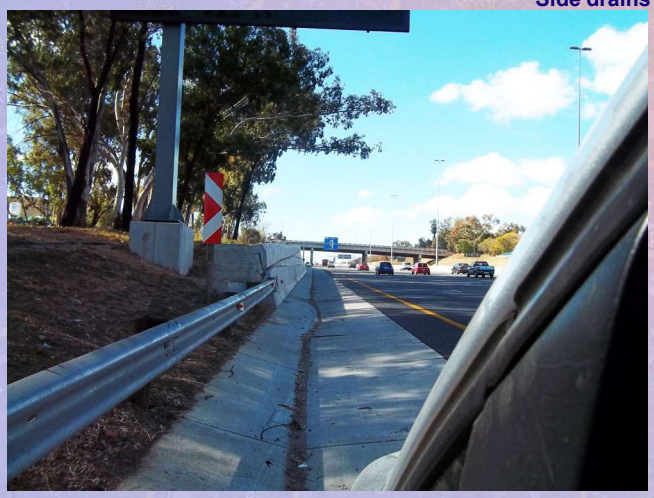
Side drains

143

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Side drains



144

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Side drains

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

145

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Side drains

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

146

1.1.3 Drainage Structures

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Side drains

147

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

148

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

149

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

150

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

151

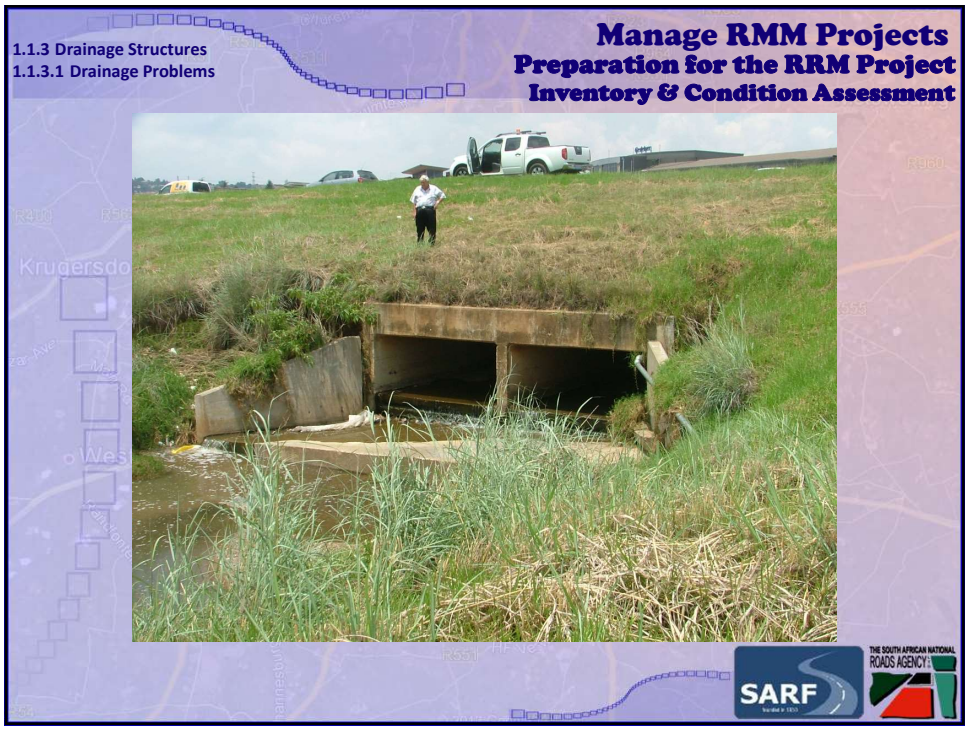
1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

152


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

153


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

154

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

155

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

156

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

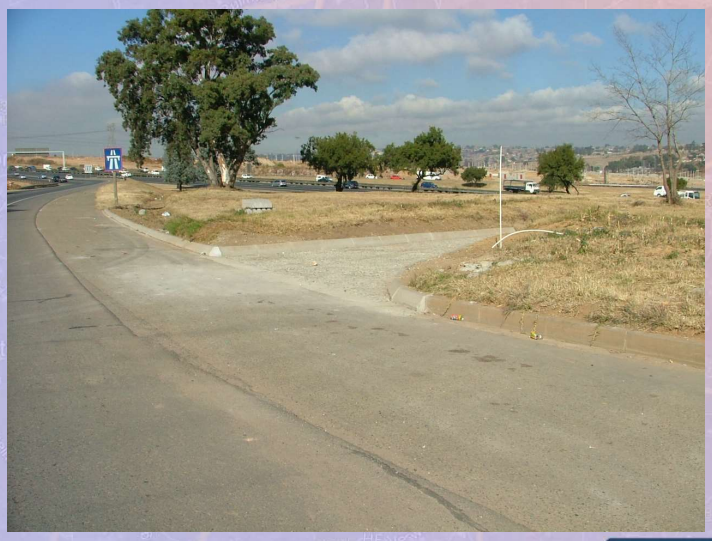
SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

157

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment



SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

158

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

159

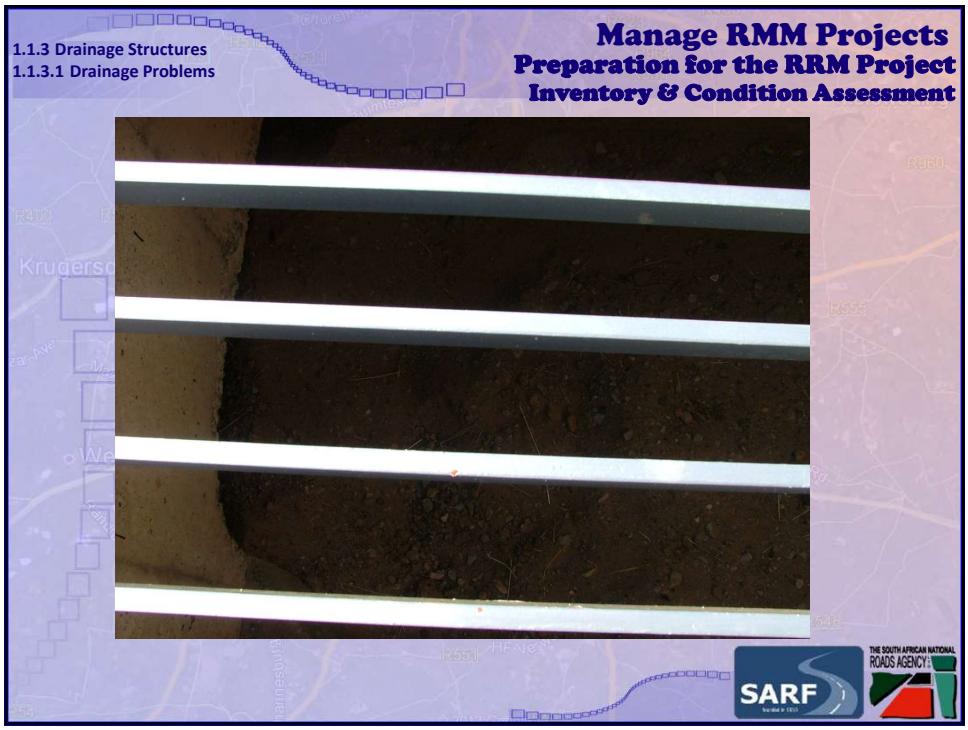
1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

160


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

161


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

162

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

163

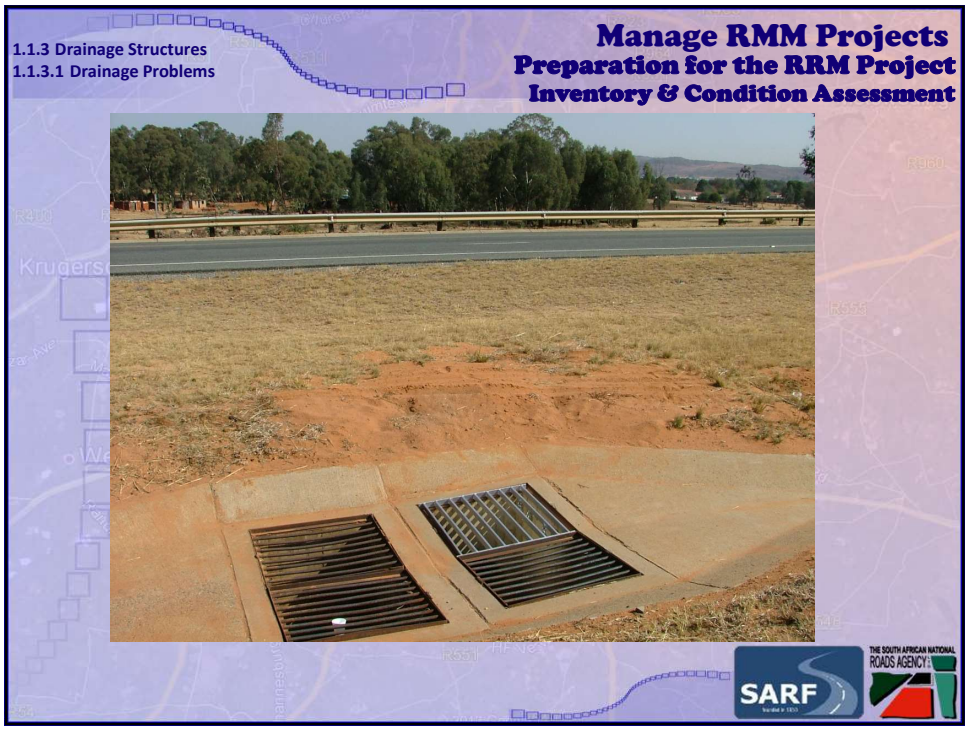
1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

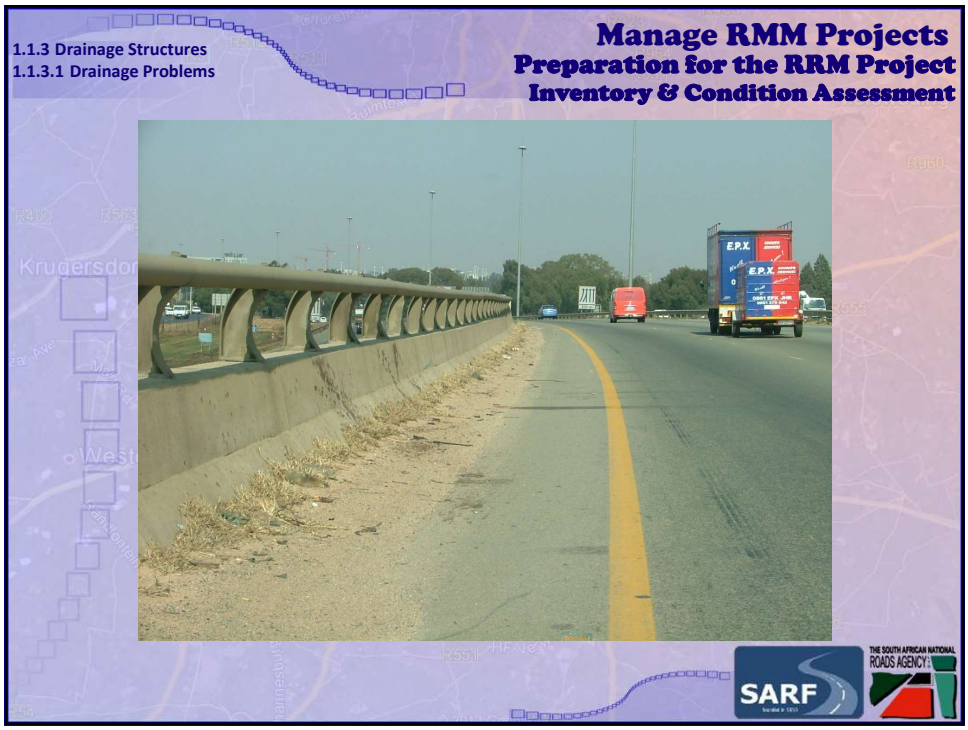
SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

164


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

165


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
E.P.X.
E.P.X.
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

166

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

167

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

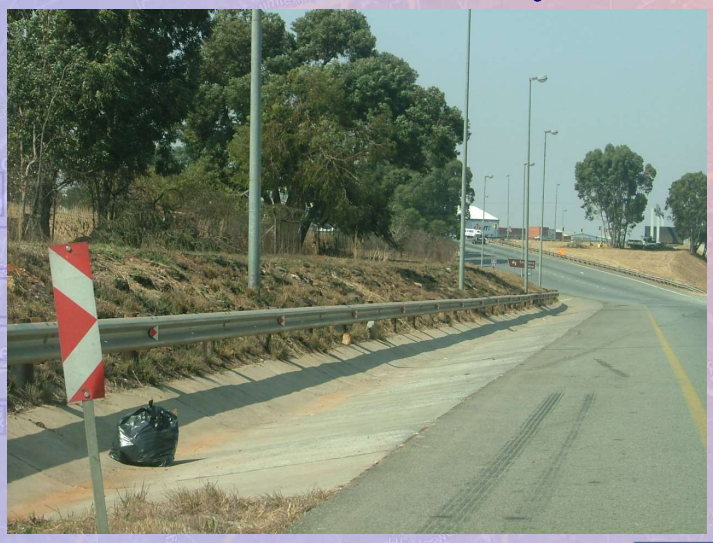
SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

168

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment



SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

169

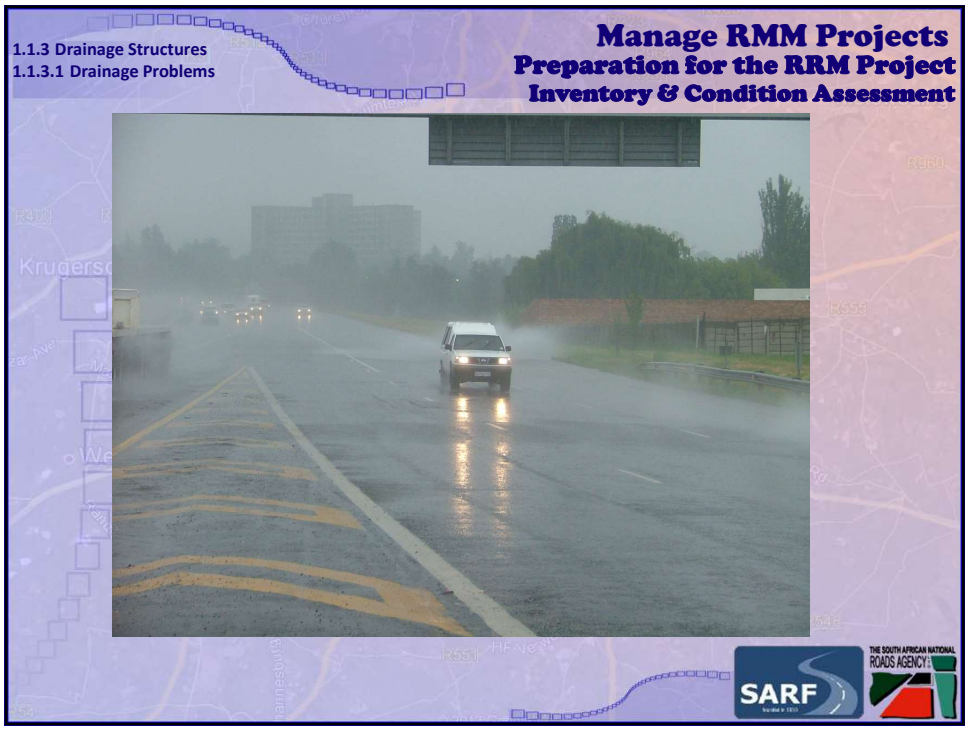
1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

170


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

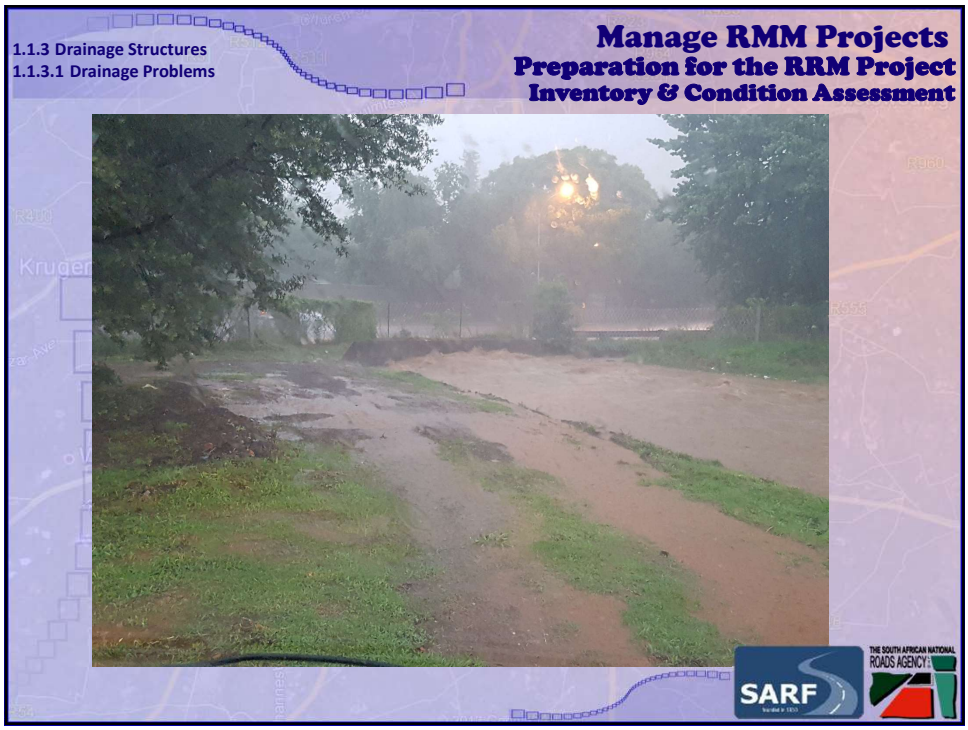
171


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

172


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

173


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

174


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

175


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
RICOH
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

176

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

177

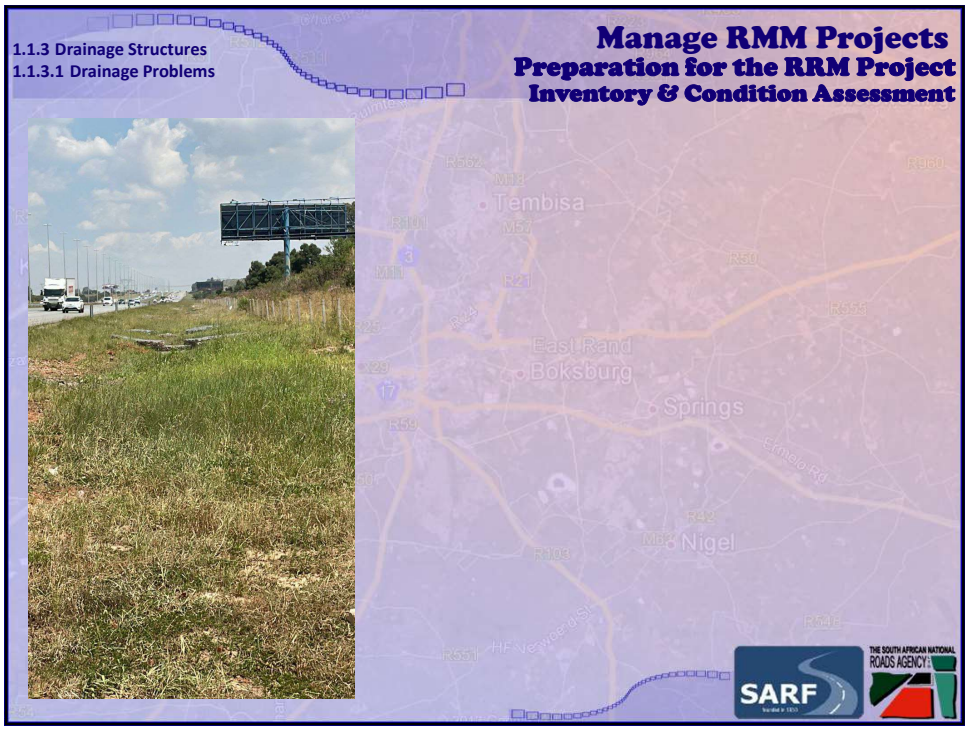
1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

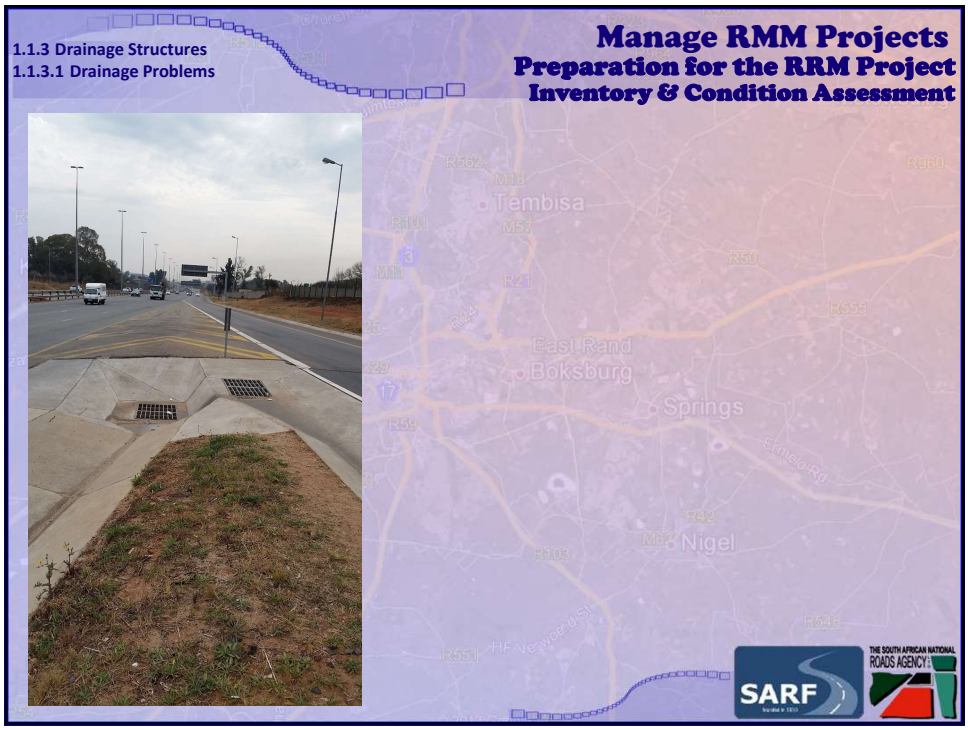
SARF

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

178


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Tembisa
East Rand
Boksburg
Springs
Nigel
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

179


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Tembisa
East Rand
Boksburg
Springs
Nigel
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

180


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

181


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

182


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

183


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
120
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

184


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

185


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

186


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

187


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

188


1.1.3 Drainage Structures
1.1.3.1 Drainage Problems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Tembisa
East Rand
Boksburg
Springs
Nigel
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

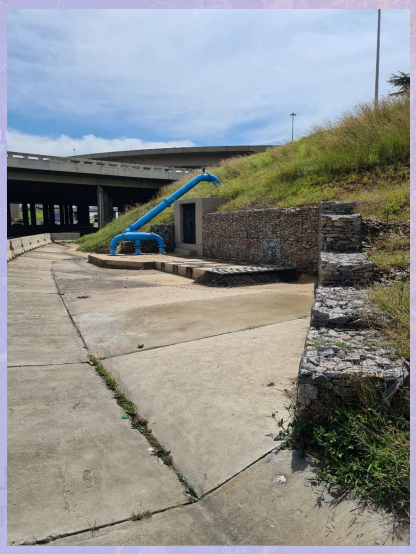
189


Manage RMM Projects
Springs
Nigel
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

190

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

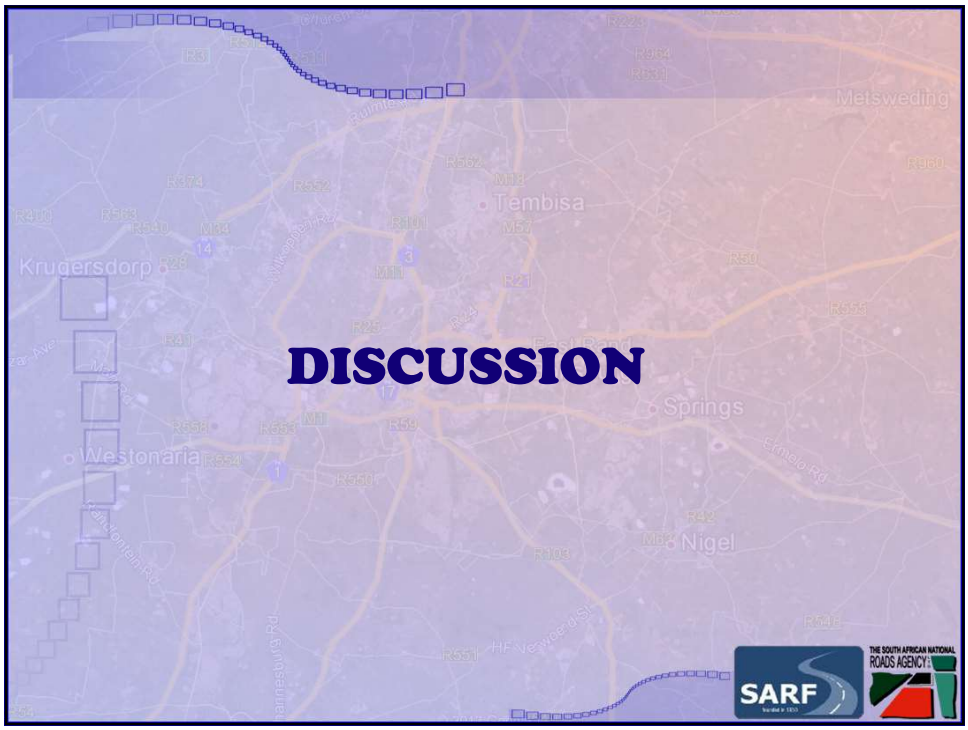


191

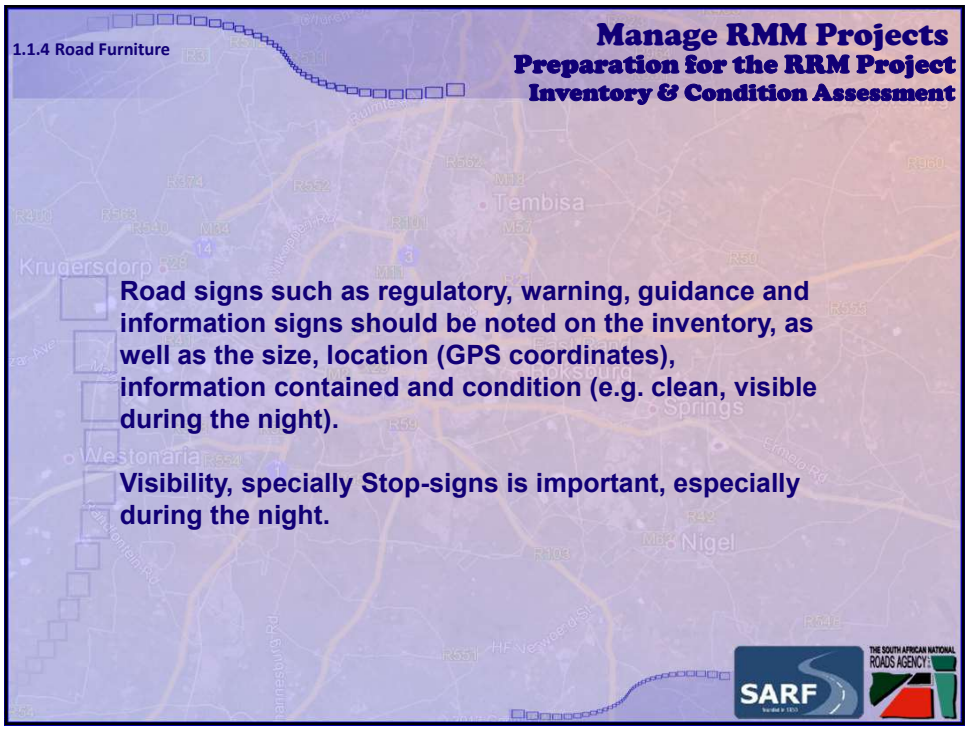
1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

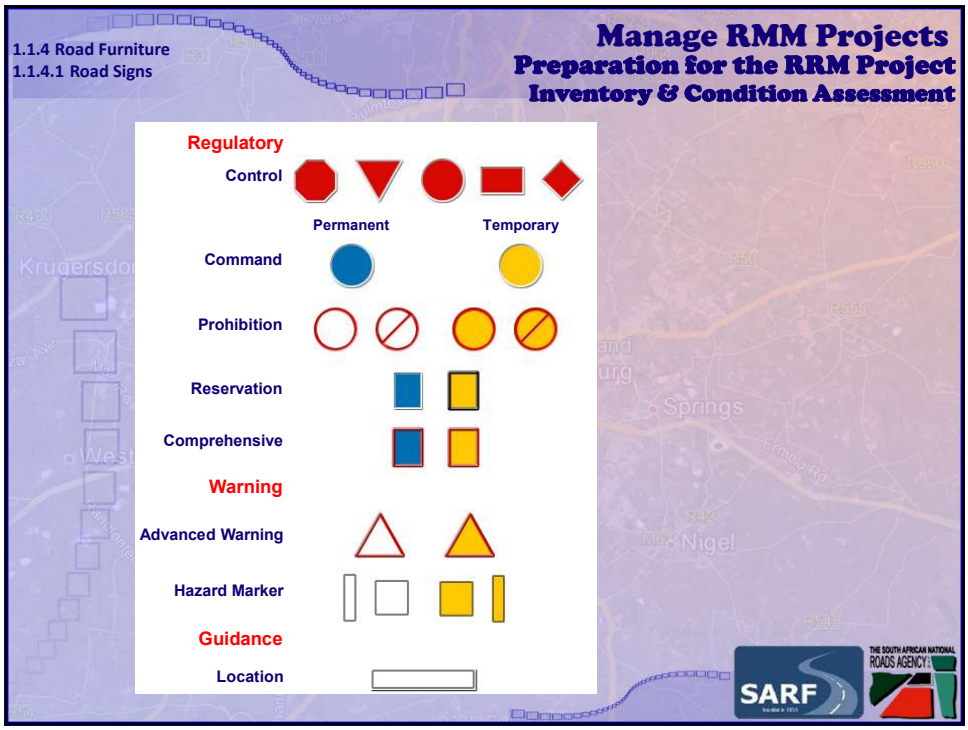
192


DISCUSSION
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

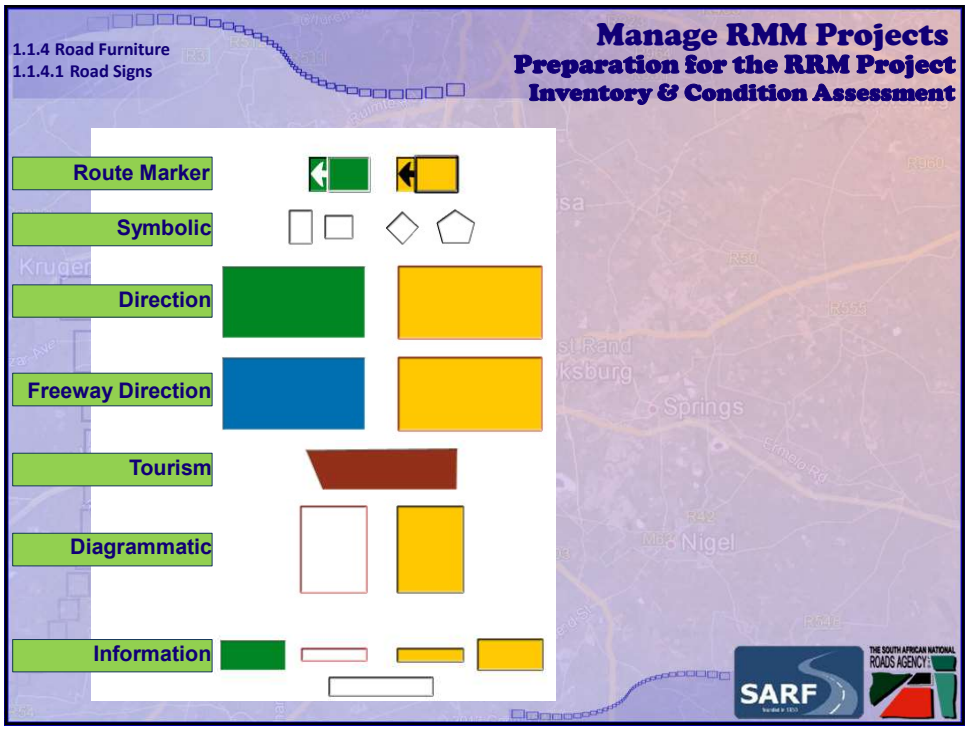
193


1.1.4 Road Furniture
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Road signs such as regulatory, warning, guidance and information signs should be noted on the inventory, as well as the size, location (GPS coordinates), information contained and condition (e.g. clean, visible during the night).
Visibility, specially Stop-signs is important, especially during the night.
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

194


1.1.4 Road Furniture
1.1.4.1 Road Signs
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Regulatory
Control
Permanent
Temporary
Command
Prohibition
Reservation
Comprehensive
Warning
Advanced Warning
Hazard Marker
Guidance
Location
SARF

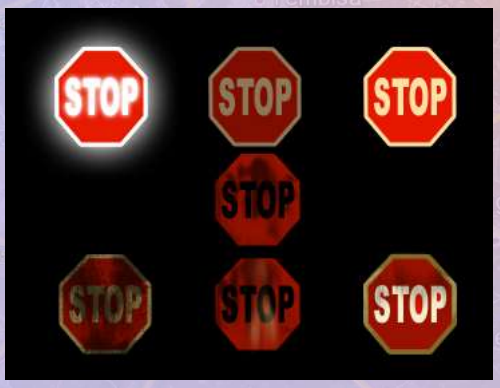
195


1.1.4 Road Furniture
1.1.4.1 Road Signs
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Route Marker
Symbolic
Direction
Freeway Direction
Tourism
Diagrammatic
Information
SARF

196

1.1.4 Road Furniture
1.1.4.1 Road Signs

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment



197

1.1.4 Road Furniture
1.1.4.1 Road Signs

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Information checklist for road signs

	Information required			
Road signs	Information contained on sign (photo/copy of information)			√
	Location of road sign (coordinates)			√
	Size of road sign (surface area)			√
	Identification code at back of sign (write code)			√
	Type of road sign support	Timber		√
	Sign vertical	YES		√
	Undersides of sign horizontal	YES		√
	Height of undersides of sign from ground level			√
	All bolts in place	YES	NO	√
	Road sign clean	YES	NO	√
	Night inspection: Visibility	Highly visible		√
		Intermediate visibility		
		Poor visibility		

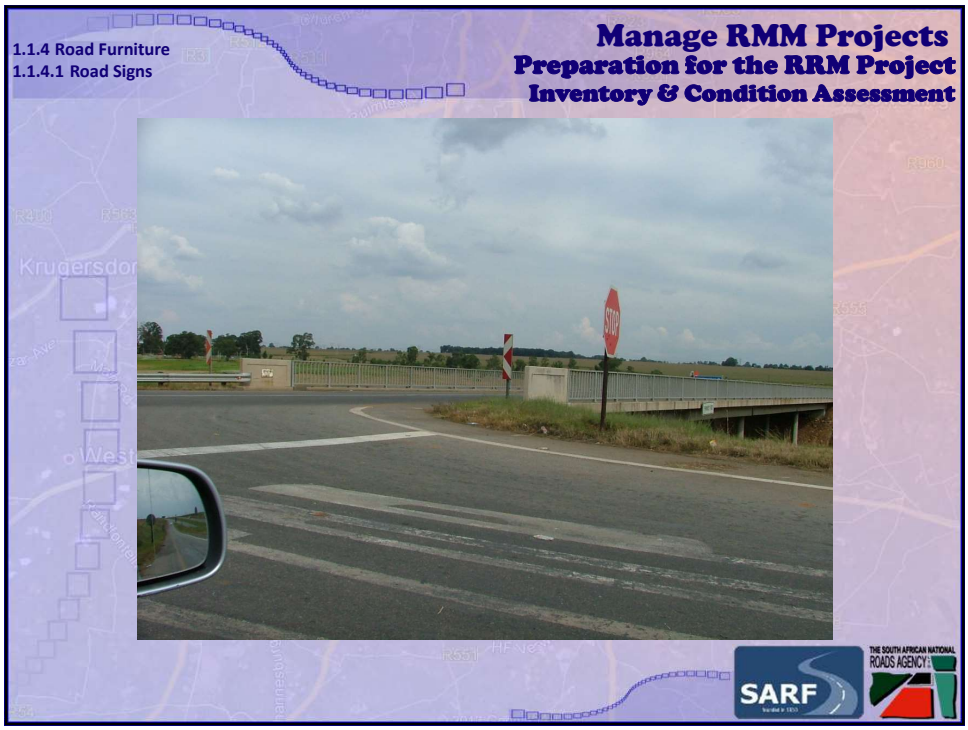
198


1.1.4 Road Furniture
1.1.4.1 Road Signs
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
46
O R Tambo Int
to Jones Road
500 m
Boksburg
R21
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

199


1.1.4 Road Furniture
1.1.4.1 Road Signs
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
93
GERMISTON
N3
Leondaleweg
Vosloorus
1 km
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

200


1.1.4 Road Furniture
1.1.4.1 Road Signs
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
STOP
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

201


1.1.4 Road Furniture
1.1.4.1 Road Signs
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

202


1.1.4 Road Furniture
1.1.4.1 Road Signs
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
108 B
N3 N12
Durban
Kimberley
M2
Germiston
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

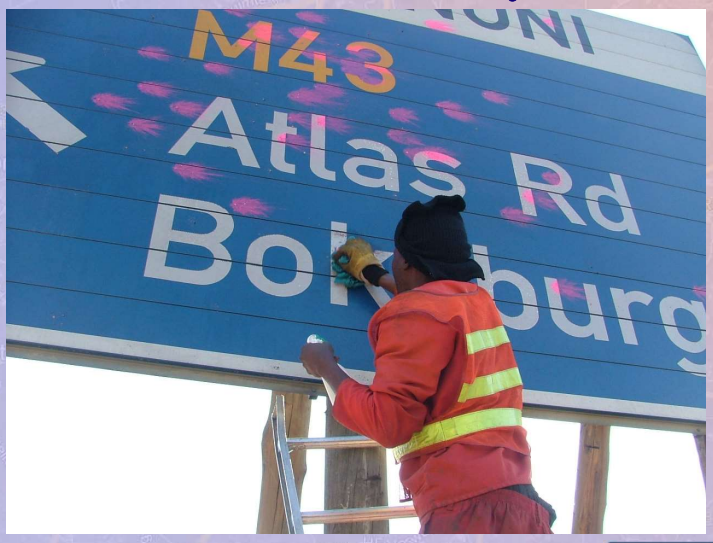
203


1.1.4 Road Furniture
1.1.4.1 Road Signs
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
60 km/h
108 B
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

204

1.1.4 Road Furniture
1.1.4.1 Road Signs

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment



205

1.1.4 Road Furniture
1.1.4.1 Road Signs

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

206

1.1.4 Road Furniture
1.1.4.1 Road Signs

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

207

1.1.4 Road Furniture
1.1.4.1 Road Signs

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

208

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

209

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

210

1.1.4 Road Furniture
1.1.4.1 Road Signs

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

211

1.1.4 Road Furniture
1.1.4.1 Road Signs

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

212

1.1.4 Road Furniture
1.1.4.1 Road Signs

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

213

1.1.3 Drainage Structures
1.1.3.1 Drainage Problems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

DISCUSSION

214

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Restraint system is the general name for vehicle- and pedestrian restraint systems.

In South Africa, the most common type of vehicle restraint system used is guardrails.

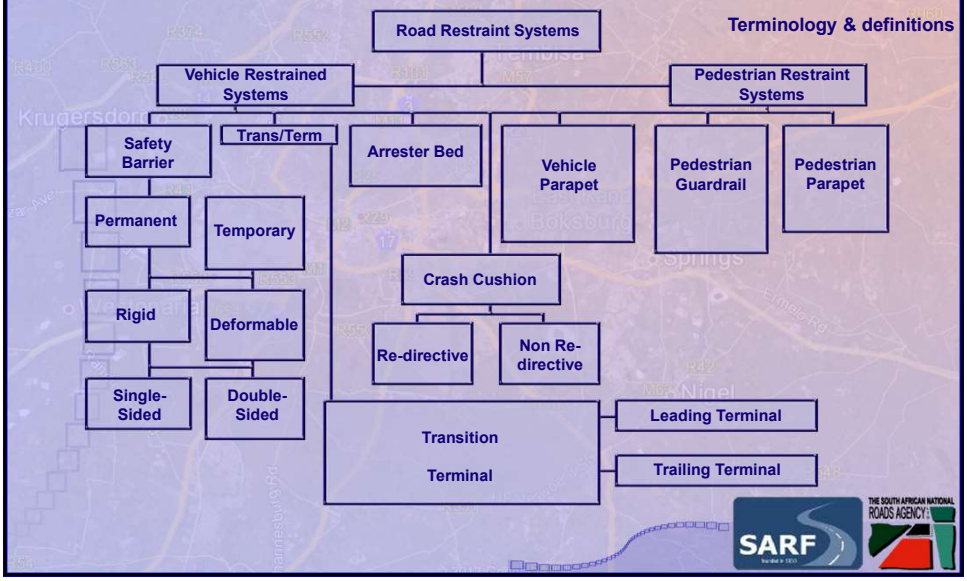
On a RRM project, the restraint system type, location and length should be noted, as well as the condition of the system.

215

Rest

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Terminology & definitions



216

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Vehicle restraints

Guardrails

New Jersey barrier

Wire rope safety fence

217

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Vehicle restraints

Guardrails

218

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Vehicle restraints

Guardrails

219

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Vehicle restraints

Guardrails

220

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Vehicle restraints

Guardrails

221

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Vehicle restraints

New Jersey barrier

222

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Vehicle restraints

Wire rope safety fence

223

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Vehicle restraints

Wire rope safety fence

224

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Vehicle restraints

Wire rope safety fence

225

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Vehicle restraints

Wire rope safety fence

226

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

227

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

228

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

229

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

230

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

231

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

232


1.1.4 Road Furniture
1.1.4.2 Restraint systems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

233


1.1.4 Road Furniture
1.1.4.2 Restraint systems
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

234

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

235

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

236

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Information checklist for guardrails

	Information required				
Guardrails	Location of system (start & end coordinates)				√
	New or new curved				√
	Alignment	Good			√
		Poor			√
	Height	Good			√
		Poor			√
	Posts	Backfill in soil			√
		Backfill in concrete			√
	End units	End wings			√
		Terminal sections with single guardrails			√
		Terminal sections with double guardrails			√
	Reflectors	New			√
		Missing	No.		√
	Spacer blocks	New			√
		Missing	No.		√
	All bolts tightened	Yes			√
		No			√
	Overlap	Yes	Distance (m)		√
		No			√

237

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Information checklist for wire rope safety systems

	Information required			
Wire rope safety	Location of system (start & end coordinates)			√
	3-rope or 4-rope system			√
	Alignment	Good		√
		Poor		√
	Height	Good		√
		Poor		√
	Post footings	Pre-fabricated		√
		Cast-on-site		√
	Working width			√
	Post distance			√
	Wire anchor in line with fence			√
	End fittings swaged			√
	Wire ropes tensioned			√

238

1.1.4 Road Furniture
1.1.4.2 Restraint systems

Manage RMM Projects

Specific Outcome 1

Inventory & Condition Assessment

Information checklist for pedestrian safety systems

	Information required			
Pedestrian safety system	Type of pedestrian restraint system			√
	Location of system (start & end coordinates)			√
	Condition of system	Damaged		√
		Intact		
	If damaged, provide short description & location (coordinates)			√
	Alignment of system	Aligned vertically		√
		Aligned horizontally		

239

DISCUSSION

240

1.1.4 Road Furniture
1.1.4.3 Fencing

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Fence type, location and length should be noted.

In the checklist to follow, some relevant information which should be captured during the inventory and assessment process is contained.

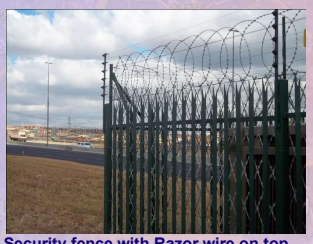
241

1.1.4 Road Furniture
1.1.4.3 Fencing

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Information checklist for Fences

Fence



Security fence with Razor wire on top

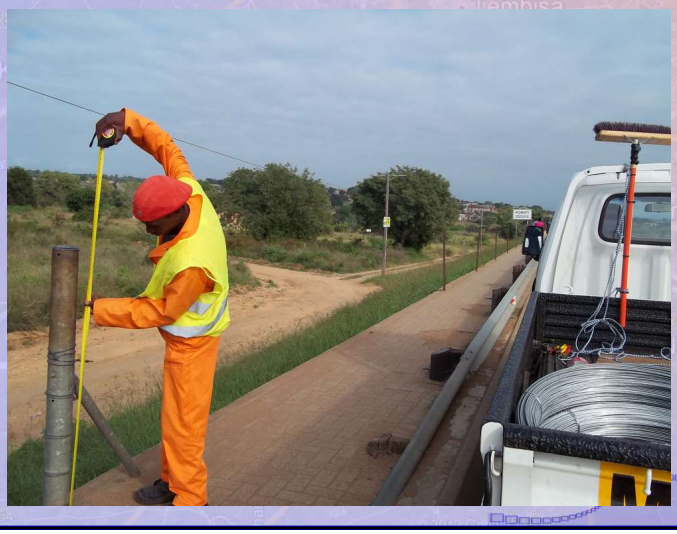
Concrete palisade fence

Mesh fence

242

1.1.4 Road Furniture
1.1.4.3 Fencing

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

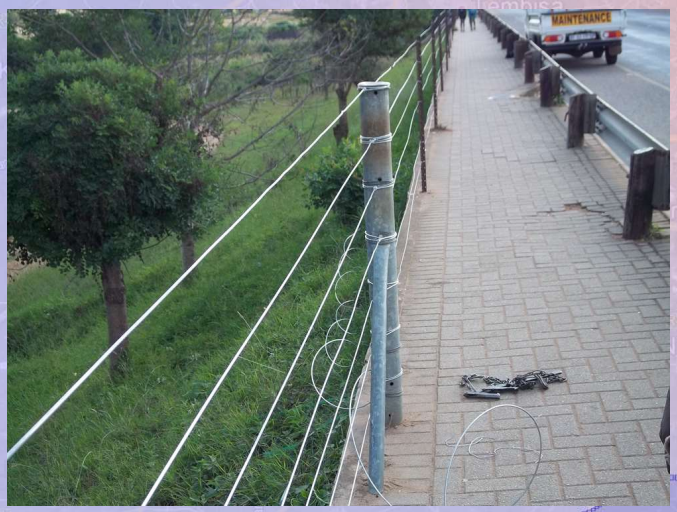


Fence

243

1.1.4 Road Furniture
1.1.4.3 Fencing

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment



Fence

244

1.1.4 Road Furniture
1.1.4.3 Fencing

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Fence

245

1.1.4 Road Furniture
1.1.4.3 Fencing

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Security fence with Razor wire on top

246

1.1.4 Road Furniture
1.1.4.3 Fencing

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Fence

247

1.1.4 Road Furniture
1.1.4.3 Fencing

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Fence

248

1.1.4 Road Furniture
1.1.4.3 Fencing

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Fence

249

1.1.4 Road Furniture
1.1.4.3 Fencing

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Fence

250

1.1.4 Road Furniture
1.1.4.3 Fencing

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Fencing	Information required		
	Type of fence	Stock-proof	√
		Vermin-proof	
		Pedestrian	
		Security	
	Type of wire/mesh	Barbed	√
		Smooth	
		Diamond	
		Wire netting	
		Barbed-tape concertina wire	
	Location of fence (start & end coordinates)		√
	Location of gates (coordinates)		√
	Condition of fence:	Plumb	√
		Taut	
		True to line & ground contour	
	Missing: Straining posts (no & coordinates)		√
	Missing: Stays (no & coordinates)		√
	Missing: Standards (no & coordinates)		√
	Missing: Droppers (no & coordinates)		√

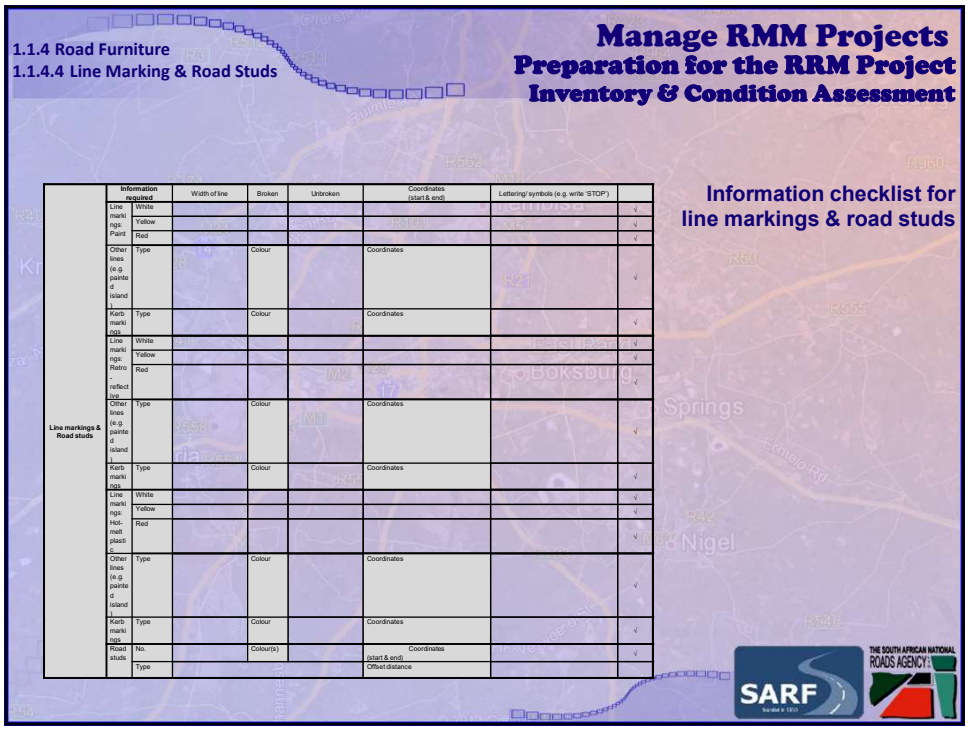
251

1.1.4 Road Furniture
1.1.4.4 Line Marking & Road Studs

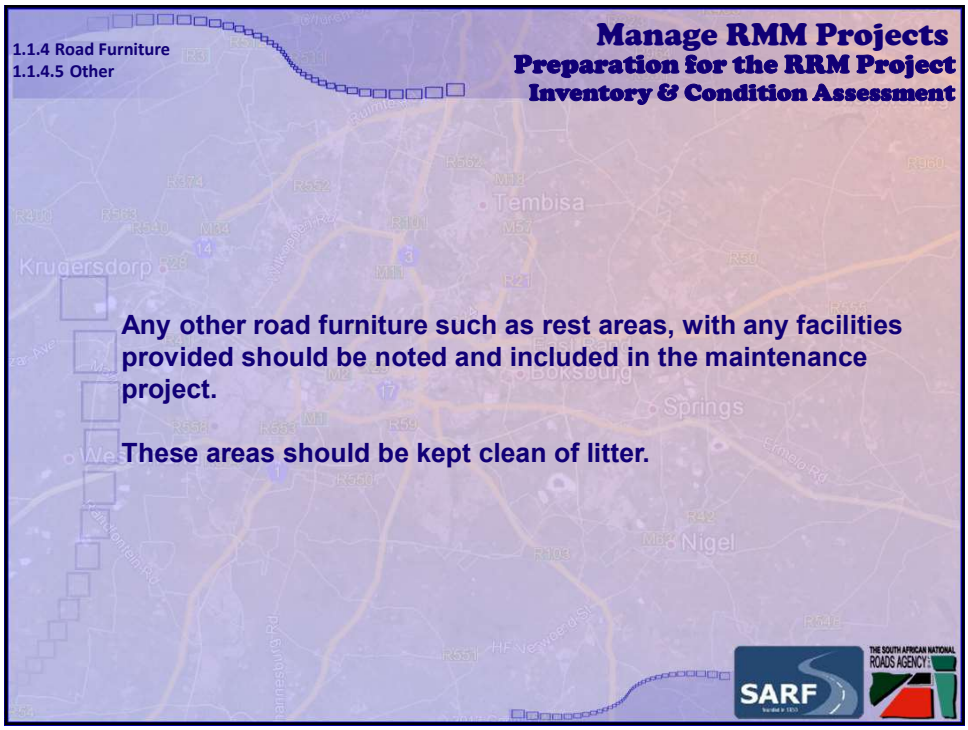
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Current line markings and location, colour and condition of road studs should be noted on the inventory, as well as night visibility of line markings and road studs.

252


1.1.4 Road Furniture
1.1.4.4 Line Marking & Road Studs
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Information checklist for line markings & road studs
Line markings & Road studs
Information required
Width of line
Broken
Unbroken
Coordinates (start & end)
Lettering/ symbols (e.g. write 'STOP')
Line markings: Paint
White
Yellow
Red
Other lines (e.g. painted islands)
Type
Colour
Coordinates
Kerb markings
Line markings: Retro-reflective
Hot-melt plastic
Road studs
No.
Colour(s)
Offset distance
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

253


1.1.4 Road Furniture
1.1.4.5 Other
Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment
Any other road furniture such as rest areas, with any facilities provided should be noted and included in the maintenance project.
These areas should be kept clean of litter.
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

254

1.1.4 Road Furniture
1.1.4.5 Other

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Rest areas next to the road section

255

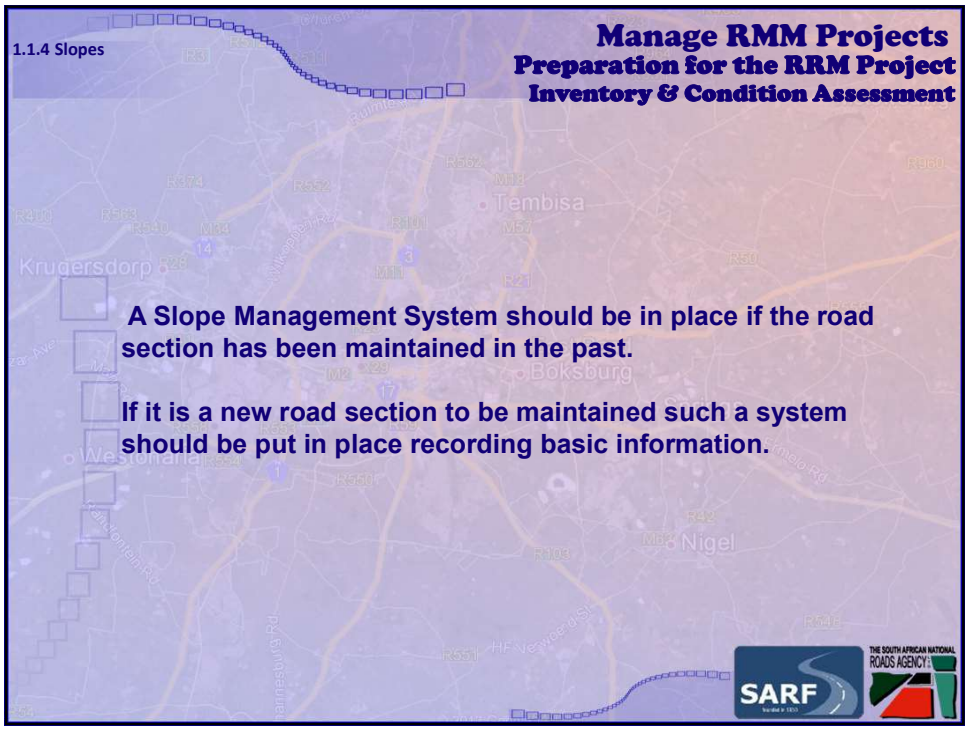
1.1.4 Road Furniture
1.1.4.5 Other

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

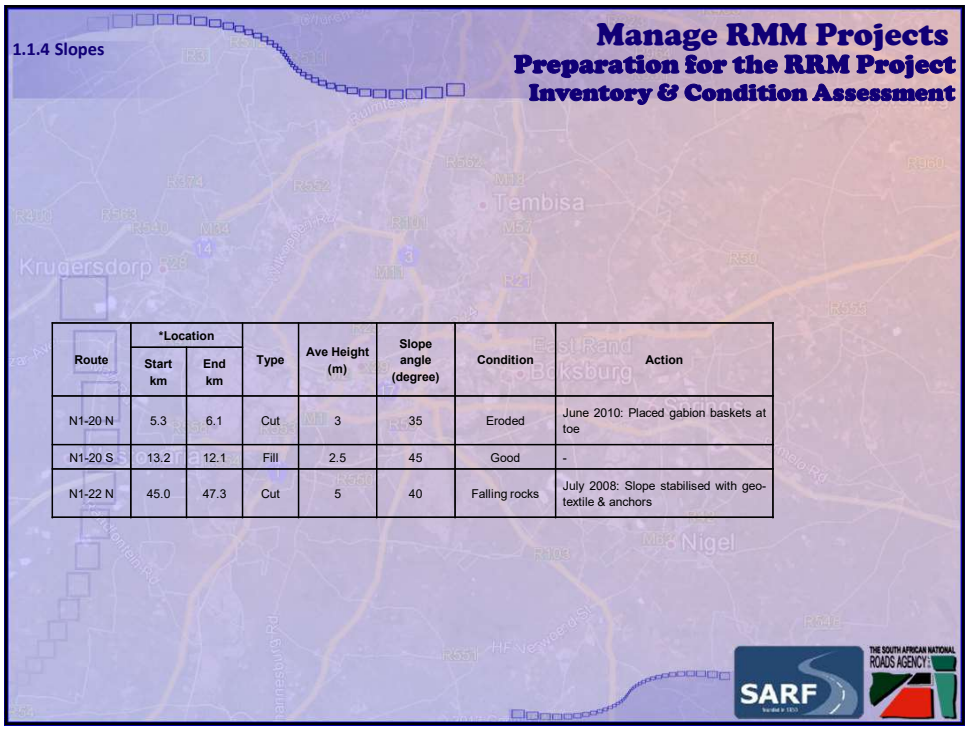
Information checklist for Rest Areas & SOS telephones

	Information required						
Rest areas & SOS telephones	Rest areas:	Co ord inat es	No.	Type	Condition		
	Shading				Dam age d		√
					Inta ct		
	Table				Dam age d		√
					Inta ct		
	Chairs				Dam age d		√
					Inta ct		
	Dust bin				Dam age d		√
					Inta ct		
					Emp ty		
					Full		
	SOS telephones				Wor king		√
					Brok en		
					Clea n		
					Dirty		

256



257



Route	*Location		Type	Ave Height (m)	Slope angle (degree)	Condition	Action
	Start km	End km					
N1-20 N	5.3	6.1	Cut	3	35	Eroded	June 2010: Placed gabion baskets at toe
N1-20 S	13.2	12.1	Fill	2.5	45	Good	-
N1-22 N	45.0	47.3	Cut	5	40	Falling rocks	July 2008: Slope stabilised with geo-textile & anchors

258

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Slope management system information sheet

Subsidence resulting in slacks (depressions) in the road surface or differential movement at the interfaces between bridges and the road.

Subsidence of fills due to poor compaction or overbuilding.

Slip failures in the road prism, in fills or in cuttings. Failure in the road usually occurs in the form of semi-circular open cracks close to the shoulder often with significant level differences.

Progressive slips can result in dangerous conditions.

Cut instability on steep cuts where loose rocks fall into the side drain or road or when significant quantities of cut material slide onto the road.

Cut and fill erosion where cut slopes or embankment fill material is eroded by weather action (rain, wind and natural weathering) resulting in material falling into and blocking the side drain.

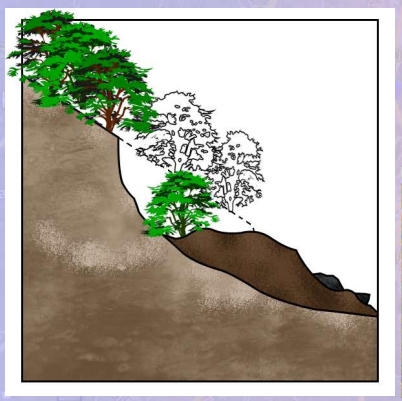
Failure of lateral support (gabions, retaining walls and ground anchors).

Expansive, collapsing or failing soft soils which result in deformation of the road (SANRAL, 2009). (See Reference CD: 1.1.5)

259

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Slope failure

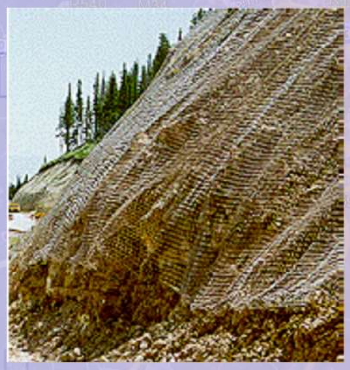


260

1.1.4 Slopes

Manage RMM Projects
Preparation for the RRM Project
Inventory & Condition Assessment

Slope stabilisation measures



Wire mesh

Concrete

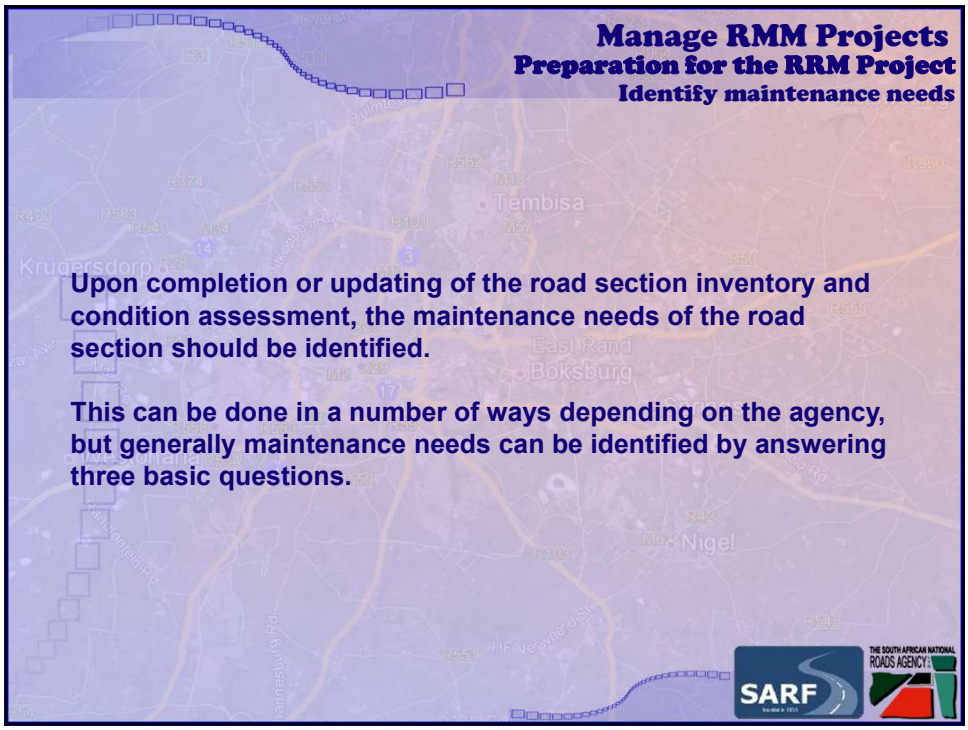
261

Manage RMM Projects
Preparation for the RRM Project

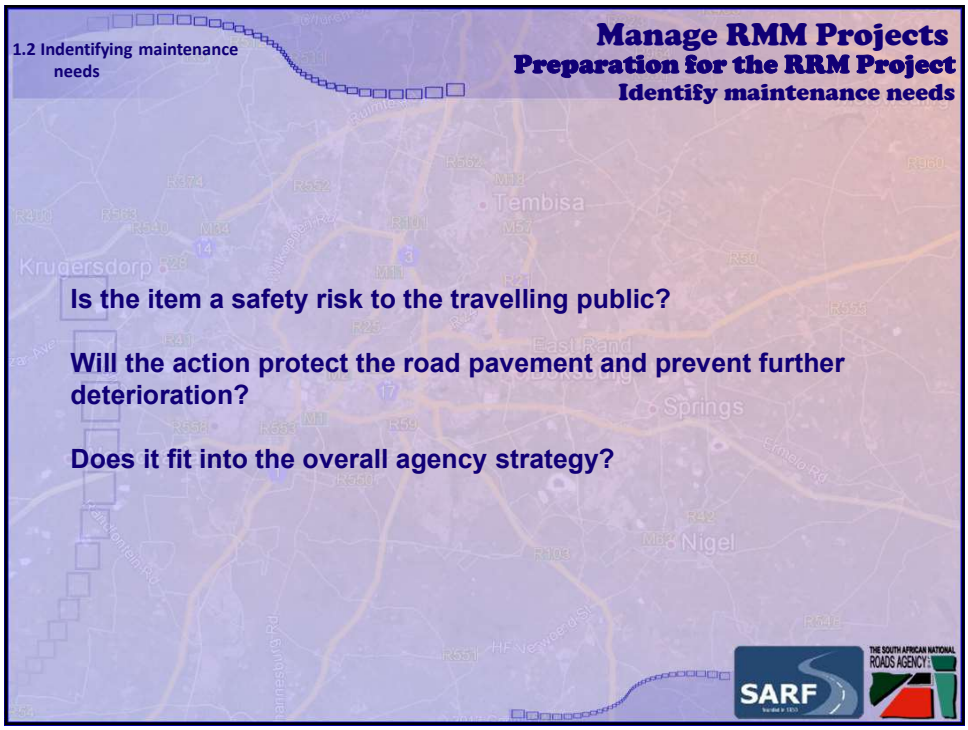
Identify maintenance needs

INVENTORY- & CONDITION ASSESSMENT SHOULD BE DONE ACCORDING TO THE SPECIFICATIONS OF THE SPECIFIC ROAD AGENCY

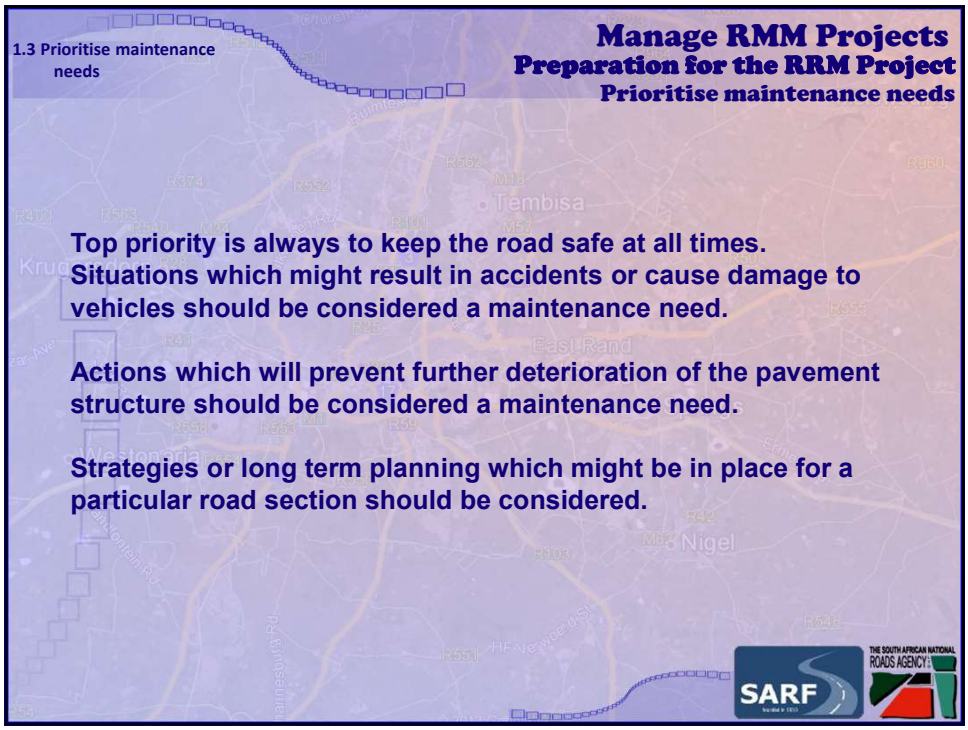
262


Manage RMM Projects
Preparation for the RRM Project
Identify maintenance needs
Upon completion or updating of the road section inventory and condition assessment, the maintenance needs of the road section should be identified.
This can be done in a number of ways depending on the agency, but generally maintenance needs can be identified by answering three basic questions.
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

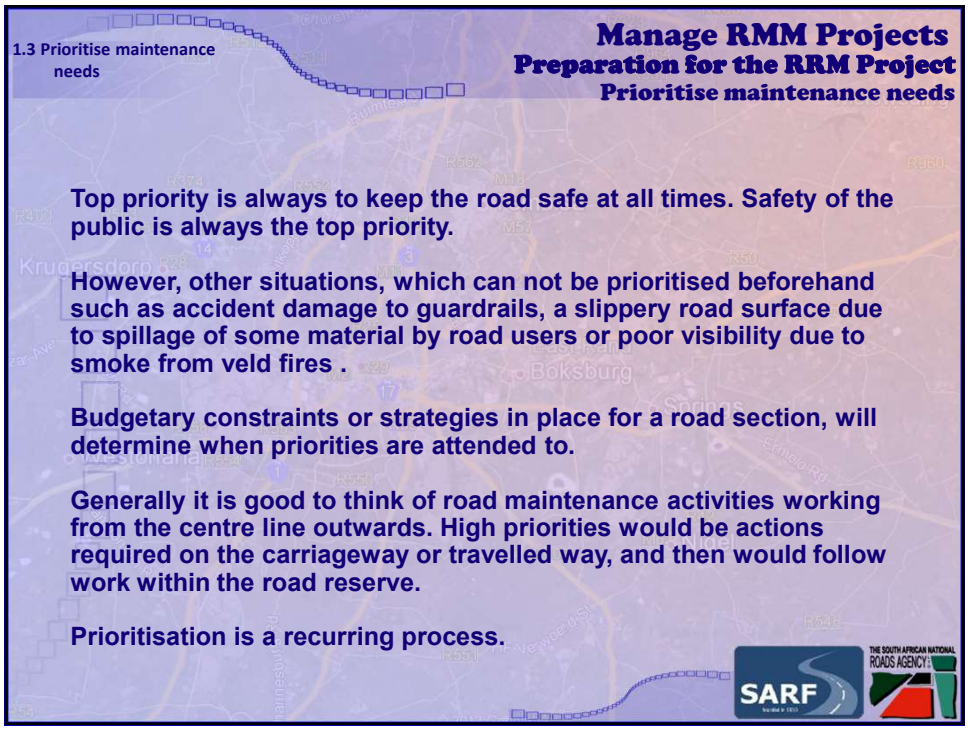
263


1.2 Indentifying maintenance needs
Manage RMM Projects
Preparation for the RRM Project
Identify maintenance needs
Is the item a safety risk to the travelling public?
Will the action protect the road pavement and prevent further deterioration?
Does it fit into the overall agency strategy?
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

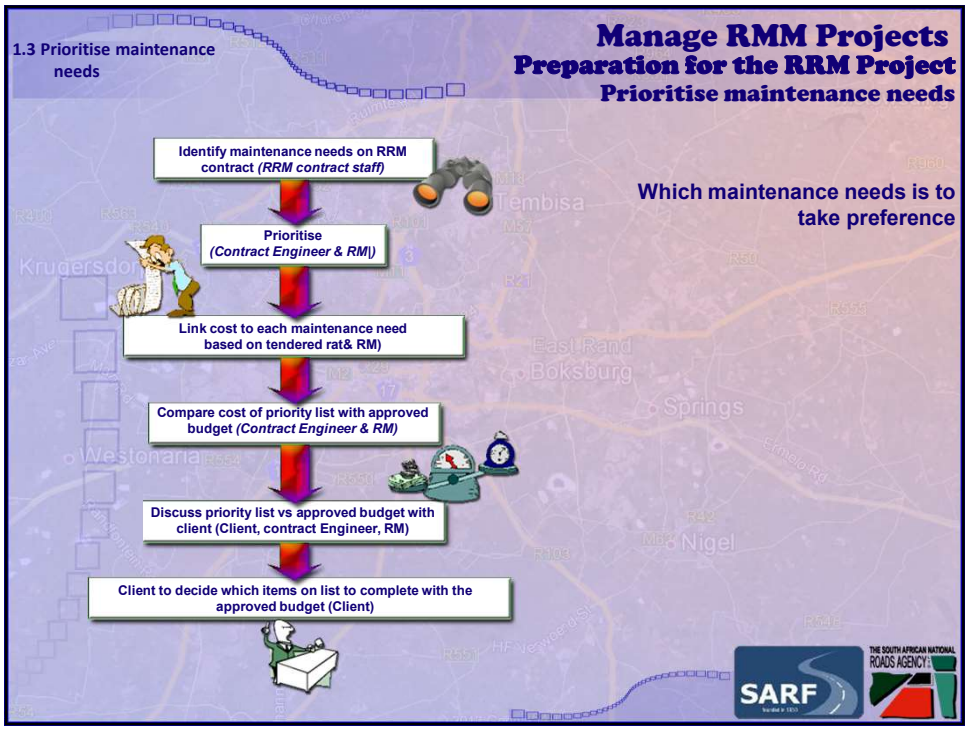
264


1.3 Prioritise maintenance needs
Manage RMM Projects
Preparation for the RRM Project
Prioritise maintenance needs
Top priority is always to keep the road safe at all times. Situations which might result in accidents or cause damage to vehicles should be considered a maintenance need.
Actions which will prevent further deterioration of the pavement structure should be considered a maintenance need.
Strategies or long term planning which might be in place for a particular road section should be considered.
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

265


1.3 Prioritise maintenance needs
Manage RMM Projects
Preparation for the RRM Project
Prioritise maintenance needs
Top priority is always to keep the road safe at all times. Safety of the public is always the top priority.
However, other situations, which can not be prioritised beforehand such as accident damage to guardrails, a slippery road surface due to spillage of some material by road users or poor visibility due to smoke from veld fires .
Budgetary constraints or strategies in place for a road section, will determine when priorities are attended to.
Generally it is good to think of road maintenance activities working from the centre line outwards. High priorities would be actions required on the carriageway or travelled way, and then would follow work within the road reserve.
Prioritisation is a recurring process.
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

266


1.3 Prioritise maintenance needs
Manage RMM Projects
Preparation for the RRM Project
Prioritise maintenance needs
Identify maintenance needs on RRM contract (RRM contract staff)
Prioritise (Contract Engineer & RM)
Link cost to each maintenance need based on tendered rat& RM)
Compare cost of priority list with approved budget (Contract Engineer & RM)
Discuss priority list vs approved budget with client (Client, contract Engineer, RM)
Client to decide which items on list to complete with the approved budget (Client)
Which maintenance needs is to take preference
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

267


1.3 Prioritise maintenance needs
Manage RMM Projects
Preparation for the RRM Project
Schedule prioritised needs & recurring maintenance activities
Which maintenance needs is to take preference
THERE ARE NO HARD AND FAST RULES TO APPLY WHEN PRIORITY IS GIVEN TO MAINTENANCE NEEDS.
COMMON SENSE ACCOMPANIED WITH BUDGETARY CONSIDERATIONS MUST PREVAIL.
SARF
THE SOUTH AFRICAN NATIONAL ROADS AGENCY

268

Manage RMM Projects
Preparation for the RRM Project
Schedule prioritised needs & recurring maintenance activities

Scheduling of prioritised maintenance activities can not be done without considering the budgetary constraints of the project.

Therefore it is best to schedule activities after the cost of each activity was calculated using tendered rates, the budget was considered as well as the season or time of year.

This will then determine the cash flow and/or change the approved cash flow.

269

Manage RMM Projects
Preparation for the RRM Project
Schedule prioritised needs & recurring maintenance activities

Surfaced road maintenance

Maintenance	Always inspect	Start of dry season	During dry season	Start of wet season	During rain season	Always	Comment
Crack seal	√		☺				Best noticeable if dry, seal all before start of rain season
Pothole repair temp.	√					☺	Temporary repair to prevent accidents & bigger holes
Pothole repair perm.			☺				Sound pavement layer get damaged if rain should get into hole
Undulation repair			☺				All surfacing is dry season work
Surfacing (small)	√		☺				All surfacing is dry season work
Re-shape shoulder		☺					The insitu moisture is useful, rain can cause havoc to traffic
Edge break			☺				Sound pavement layer get damaged if rain should get into hole

270

Manage RMM Projects
Preparation for the RRM Project
Schedule prioritised needs & recurring maintenance activities

Gravel road maintenance

Maintenance	Always inspect	Start of dry season	During dry season	Start of wet season	During rain season	Always	Comment
Camber			☺	☺			
Potholes			☺	☺			
Corrugations			☺	☺			
Gravel thickness			☺	☺			
Sand traps			☺	☺			
Exposed pipes	√		☺	☺		☺	
Blocked pipes	√		☺	☺		☺	

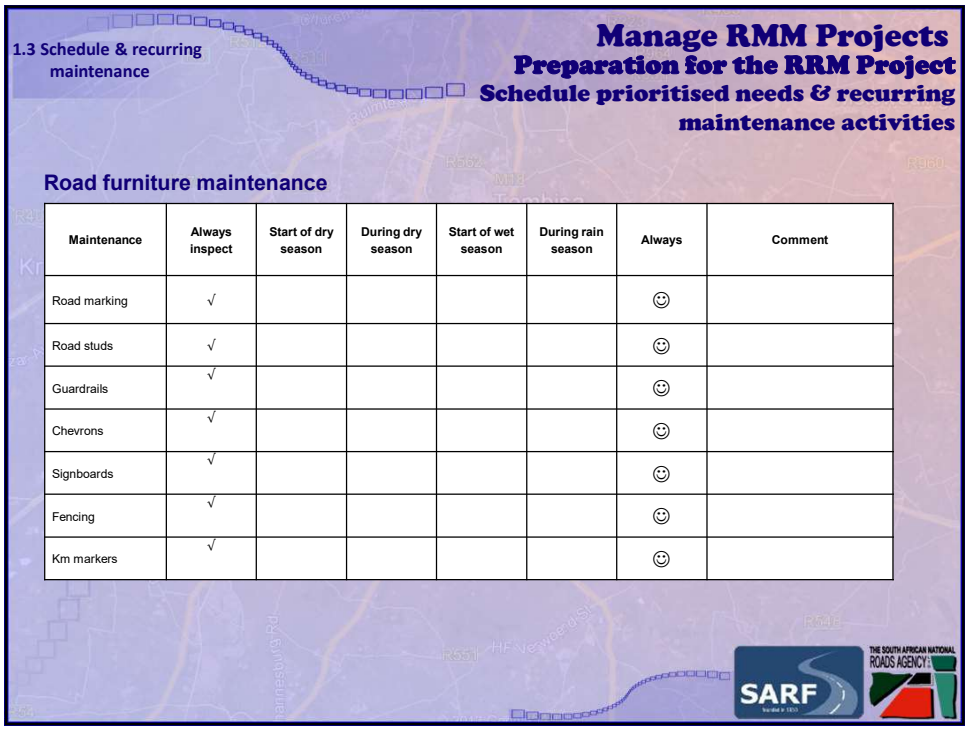
271

Manage RMM Projects
Preparation for the RRM Project
Schedule prioritised needs & recurring maintenance activities

Road drainage maintenance

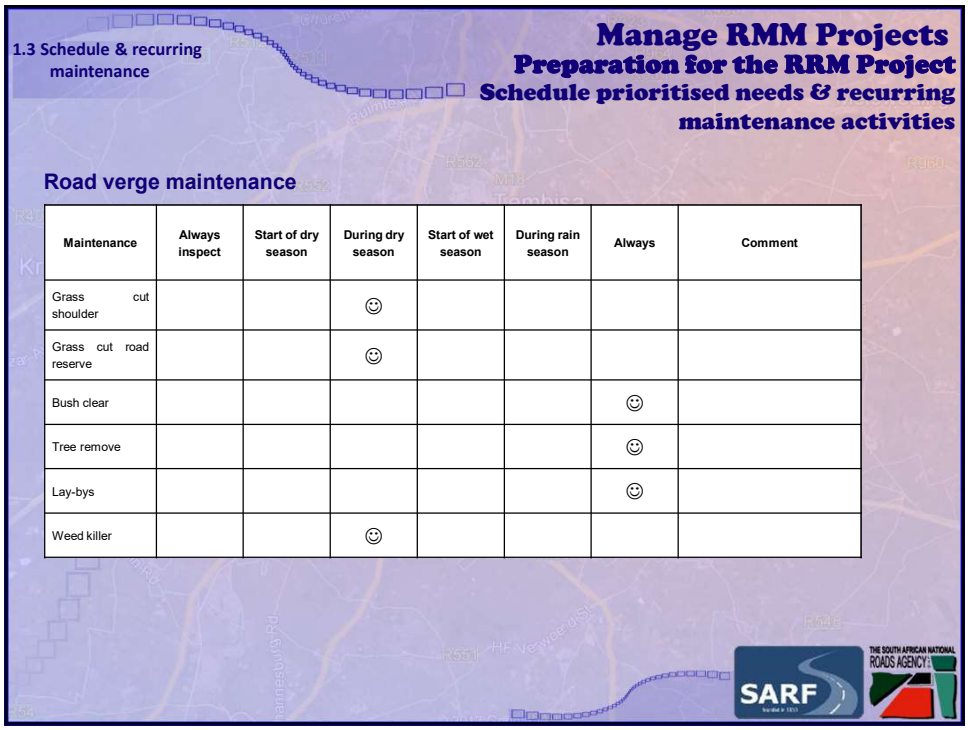
Maintenance	Always inspect	Start of dry season	During dry season	Start of wet season	During rain season	Always	Comment
Side drains	√		☺	☺		☺	
Cross drainage Culvert	√		☺	☺		☺	
In- and out-lets	√		☺	☺		☺	
Culvert natural flow	√		☺	☺		☺	
Mitre banks	√		☺	☺		☺	
Mitre berms	√		☺	☺		☺	

272



Maintenance	Always inspect	Start of dry season	During dry season	Start of wet season	During rain season	Always	Comment
Road marking	√					☺	
Road studs	√					☺	
Guardrails	√					☺	
Chevrons	√					☺	
Signboards	√					☺	
Fencing	√					☺	
Km markers	√					☺	

273



Maintenance	Always inspect	Start of dry season	During dry season	Start of wet season	During rain season	Always	Comment
Grass cut shoulder			☺				
Grass cut road reserve			☺				
Bush clear						☺	
Tree remove						☺	
Lay-bys						☺	
Weed killer			☺				

274

1.3 Schedule & recurring maintenance

Manage RMM Projects
Preparation for the RRM Project
Schedule prioritised needs & recurring maintenance activities

It is clear that the most active maintenance period is during the dry season and at the start of the wet season.

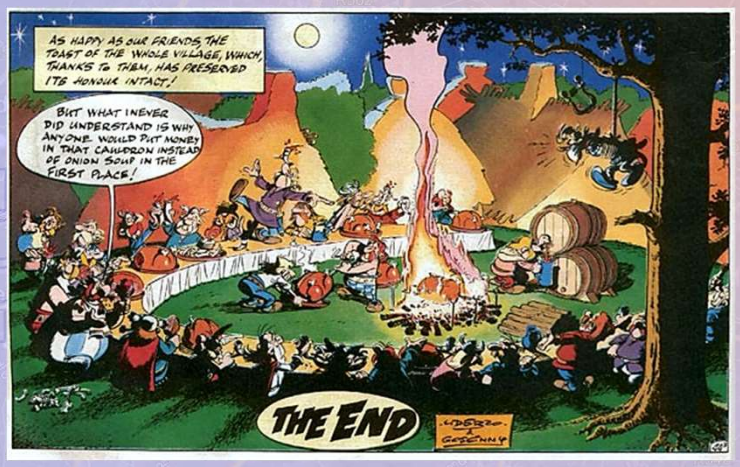
Maintenance actions which must always be undertaken are those that are critical to ensure the safety of the public.

It is advisable that maintenance programs should be re-visited at the start of the RRM contract to ensure it is applicable to the specific climatic region and relevant conditions of the contract.

The RM must be aware of the risks of each maintenance activity and the corresponding mitigating measures which must be taken.

275

Manage RMM Projects



276