

South African Road Design System (SARDS)

Revision Status Report

36th RPF Meeting

13 November 2018

L Kannemeyer

REAL ADVICE

FROM A USED CAR SALESMAN



- **SAMDM** – Old South African Mechanistic Design Method limited to flexible pavements only.
- **SAPDM** - South African Pavement Design Method include all pavements flexible / block /concrete.
- **SARDS** - South African Road Design System is the software portal incorporating revised SAPDM models

New Model Validation Procedure

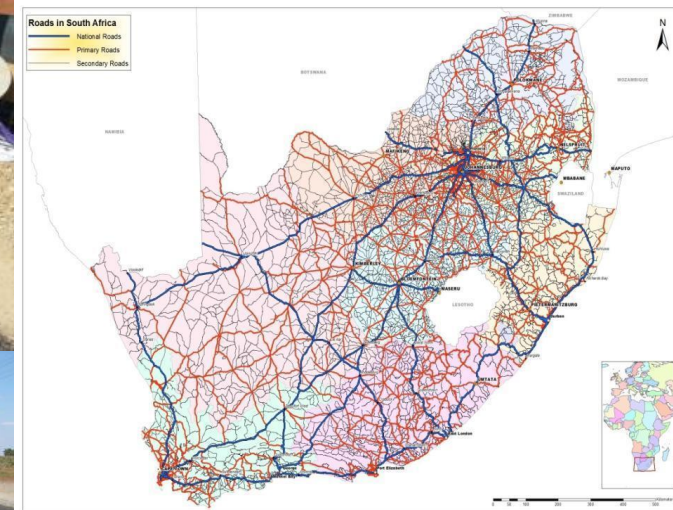
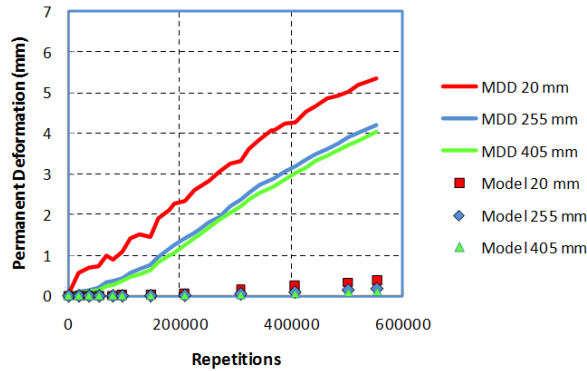
Phase 1

Phase 2

Phase 3

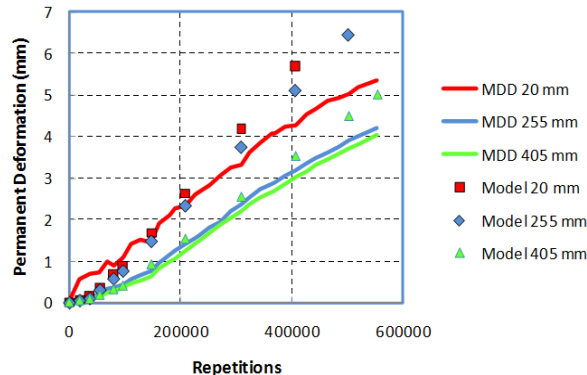
TRB'96 models

HVS test 417A5 - MDD 12



Current models

HVS test 417A5 - MDD 12



Phase 2 Validation: Major Frustrations

- Current SANRAL Server Constraints limiting Phase 2 Simulation Analysis (**3+ days**)
 - Intel Xeon® Phi™ Processors (Knights Landing) only became available November 2016
 - Currently only have access to developer platform with 1CPU (64 cores) in USA
 - Currently conducting testing on “scale model ”of proposed SANRAL production solution (3000 cores) in USA / France
 - **National Treasury refused extension of time for SAPDM project to complete outstanding work, had to go out to tender in September 2017. 1st tender had to be cancelled due to no single compliant tender been received (CSD), new programmers finally onboard 1st August 2018. Limited work Sep 2017 to August 2018 !**
 - **Research Panel Tenders – Still in progress**
 - **23 July 2018 - Intel announced that Xeon® Phi™ Processors (Knights Landing) are officially discontinued...**
 - **Have to revert back to Nvidia GPU**
- SARDS Beta Software
 - Project / Tender / Pavement Construction / Laboratory – End Nov 2018
 - Traffic Design / Pavement Investigation – **Feb 2019**
 - Pavement Design Module - **??? 2019**



Modules

Project Tender Traffic Design Pavement Investigation Pavement Construction Laboratory Binder

Refresh Projects Synchronize Lookups Synchronize Workspaces Synchronize Selected Projects

SARDS Projects Tender Projects

Drag a column header and drop it here to group by that column

Project Number	Project Description	End Date	Sync Type	Provisioned	Note	Exists Locally	Synchronize Project	Synchronize Video
91D577044877406C9615706F20ACBEA5	Routine Road Maintenance N1/29	2012-01-09		No	Not provisioned	<input type="checkbox"/>		
C.002-005-2011/1	DNURS: N10 Middelburg Walkways	2015-03-31	SARDS Project	Yes		<input checked="" type="checkbox"/>	<input type="checkbox"/> Synchronize	Download 56671 / 56671 Frames.
N.002-240-2018/1	DICAL: Lovu River to Umlaas Canal	2019-03-31	SARDS Project	Yes		<input checked="" type="checkbox"/>	<input type="checkbox"/> Synchronize	Download 28745 / 28745 Frames.
N.002-250-2009/2	DICIC: Capacity Improvement - EB Cloete	2019-06-30	SARDS Project	Yes		<input checked="" type="checkbox"/>	<input type="checkbox"/> Synchronize	Download 14700 / 14700 Frames.
N.002-256-2012/1	DICAL: Isipingo to Edwin Swales I/C	2018-12-31	SARDS Project	Yes		<input checked="" type="checkbox"/>	<input type="checkbox"/> Synchronize	Download 14700 / 14700 Frames.

SARDS - Projects
 South African Road Design System
 Select a project from the grid.

Modules

- Project
- Tender**
- Traffic Design
- Pavement Investigation
- Pavement Construction
- Laboratory
- Binder

Projects:

SARDS Tender Demo Project - SARDS Tender Demo

Sections :

N00217E-17-East
0.000 km
69.300 km

Hide Menu

SARDS Tender Demo Project - SARDS Tender Demo Project

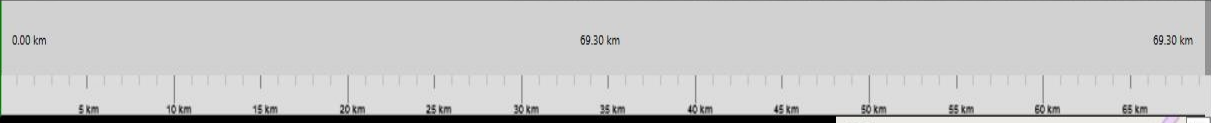
Features Save Workspace Reset Workspace Print Export

Current Mode: Default Mode

Videos Road Viewer Instrument Visuals Attributes Asbuilt Renewals H

Road Overview

Current Position
0.00 km



Right of way Video

21-06-2016 Lane: 2 P

Video playback controls: Play, Stop, Previous, Next, Full Screen, Repeat, Mute



Segments

Design Segment

Road Viewer

✓ Road Overview



Speed Limit

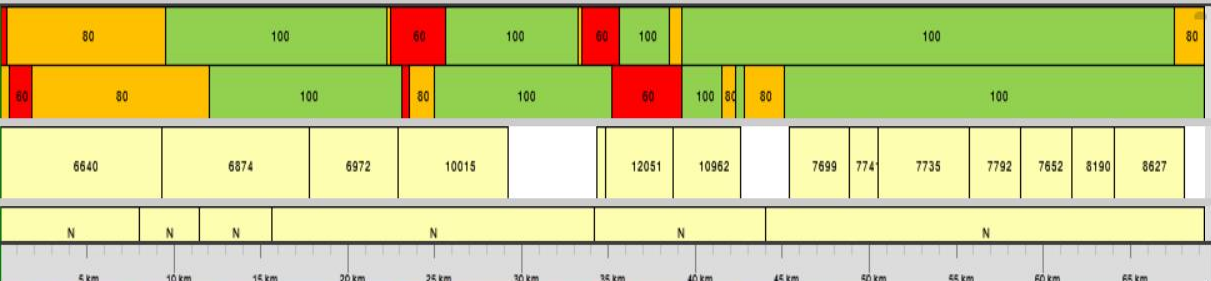
Traffic Segments: Speed

Traffic Segments: Speed Secondary

Traffic Segm

Traffic Segments: ADT

Segment Responsibility



Modules

SARDS Tender Demo Project - SARDS Tender Demo Project

Features

Sav

Current Mode: Default Mode

Videos

Road Viewer

Instrument

Visuals

Road Overview

Current Position
0.00 km

0.00 km

69.30 km

Segments

Design Segment

Road Viewer

Road Overview

Vertical Alignment

Overall Condition Index

Rutting Left Average

Rutting Right Average

Roughness Left Average

Roughness Right Average

Texture Left Average

Texture Right Average

FWD D0

FWD BLI

FWD MLJ

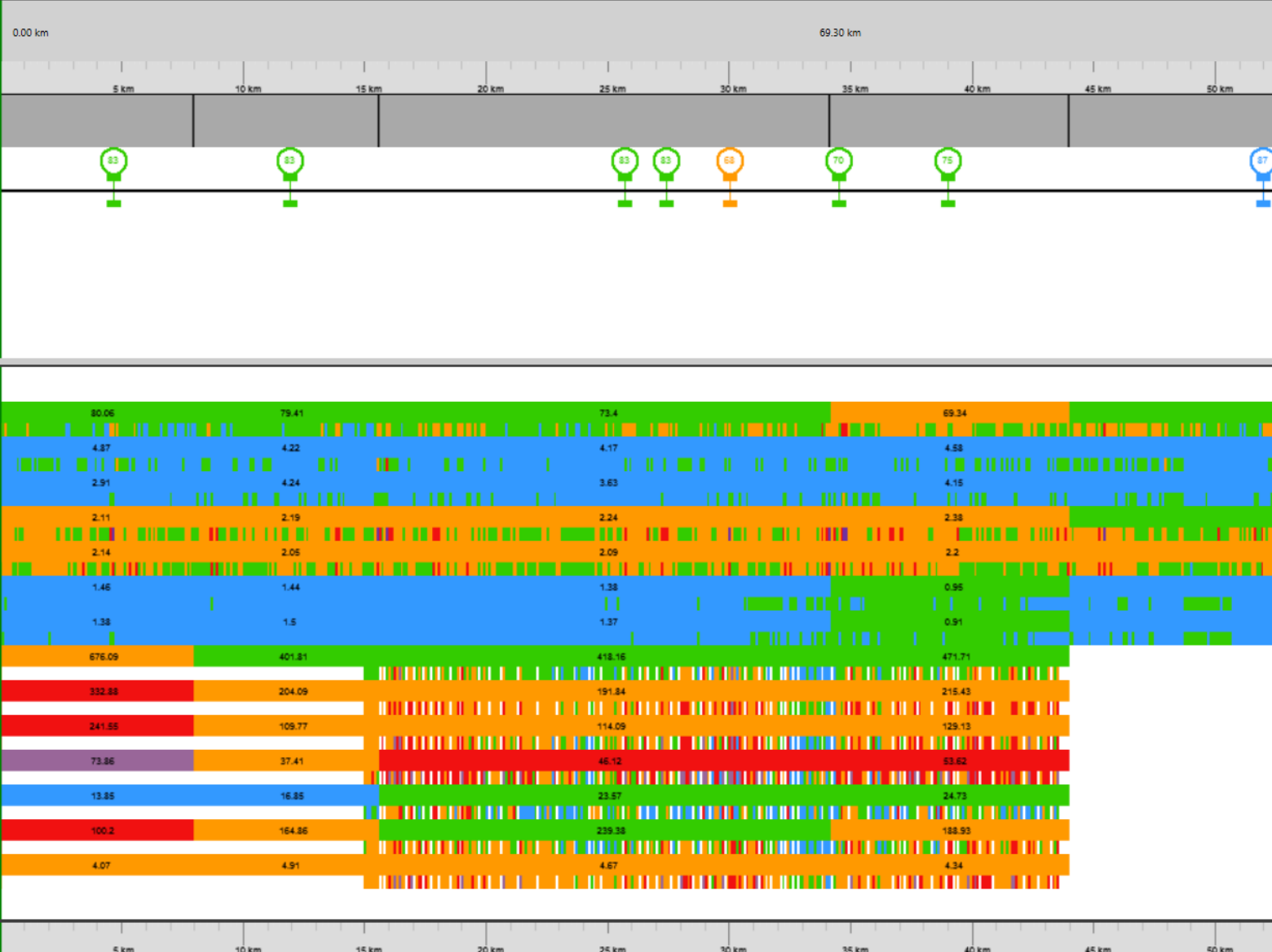
FWD LLJ

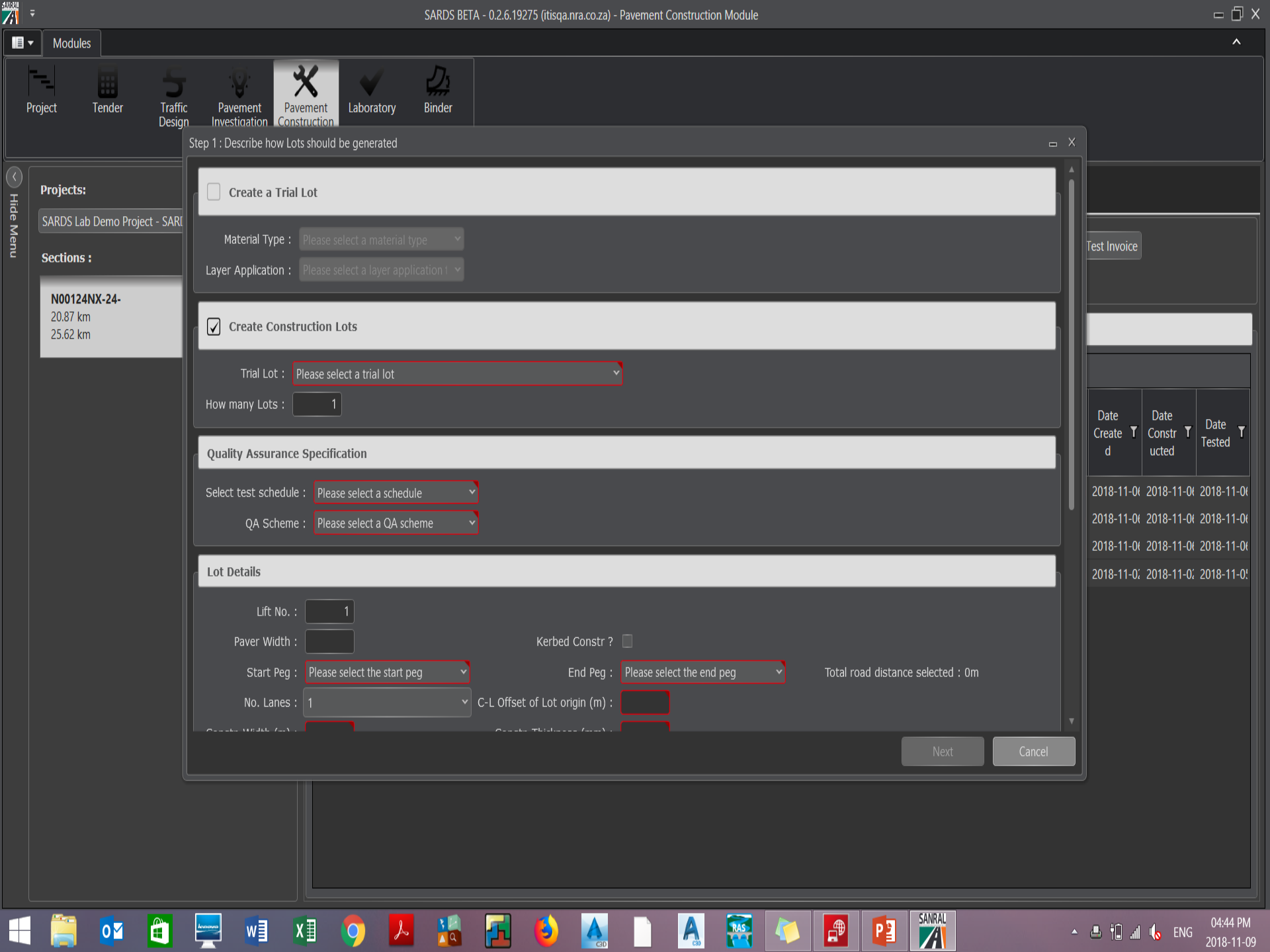
FWD FSD

FWD RoC

FWD SNP Rhode

Incident By Severity





Step 1 : Describe how Lots should be generated

Create a Trial Lot

Material Type :

Layer Application :

Create Construction Lots

Trial Lot :

How many Lots :

Quality Assurance Specification

Select test schedule :

QA Scheme :

Lot Details

Lift No. :

Paver Width :

Kerbed Constr ?

Start Peg :

End Peg :

Total road distance selected : 0m

No. Lanes : C-L Offset of Lot origin (m) :

Grade Width (m) : Grade Thickness (mm) :

Projects:

SARDS Lab Demo Project - SAR

Sections :

N00124NX-24-
20.87 km
25.62 km

Test Invoice

Date Create d	Date Constr ucted	Date Tested
2018-11-01	2018-11-01	2018-11-01
2018-11-01	2018-11-01	2018-11-01
2018-11-01	2018-11-01	2018-11-01
2018-11-01	2018-11-01	2018-11-01

THE SOUTH AFRICAN NATIONAL ROADS AGENCY 1994



Physical Address: 48 Tambotie Avenue,
Val de Grace, Pretoria
PO Box 415, Pretoria, 0001.

Tel: +27(0)12 844 8000
Fax: +27(0)12 844 8200
Reg No: 1998/009584/30

Reg. No 1056009584/30

Lot Test Plan - Construction QA Testing	
Project No:	Test DEMO
Rehabilitation of National Route:	Testing
Construction Lot Number:	N00124NX-Base-1-21200-21400-0-6/11/2018
Construction Lot Submission Status:	First Submission

Briquette Required Tests

Test Location	Stake Value	X Offset	Y Offset	Bulk Relative Density SANS3001	Indirect Tensile Strength HMA	Marshal stability SANS3001
L01	21220	0	1.5	✓	✓	✓
L02	21240	0	1.2	✓	✓	✓
L03	21280	0	1	✓	✓	✓
L04	21310	0	1.3	✓	✓	✓
L05	21340	0	1.3	✓	✓	✓
L06	21370	0	1.3	✓	✓	✓

Bulk Test Specimen Required Tests

Test Location	Stake Value	X Offset	Y Offset	Aggregate ARD BRD SANS3001	Aggregate Grading Asphalt SANS3001	Binder Content SANS3001	Maximum Void-less Density SANS3001
L01	21220	0	1.5	✓	✓	✓	✓
L02	21240	0	1.2	✓	✓	✓	✓
L03	21280	0	1	✓	✓	✓	✓
L04	21310	0	1.3	✓	✓	✓	✓
L05	21340	0	1.3	✓	✓	✓	✓
L06	21370	0	1.3	✓	✓	✓	✓

Core Test Specimen Required Tests

Test Location	Stake Value	X Offset	Y Offset	Binder Content SANS3001	Bulk Relative Density SANS3001
L01	21220	0	1.5	✓	✓
L02	21240	0	1.2	✓	✓
L03	21280	0	1	✓	✓
L04	21310	0	1.3	✓	✓
L05	21340	0	1.3	✓	✓
L06	21370	0	1.3	✓	✓

- Modules
- Project
- Tender
- Lots
- Project M
- Test DEMO
- Test DEMO
- Test DEMO
- Test DEMO

- Plan
- ssion
- ssion
- ssion
- ssion

Modules

- Project
- Tender
- Traffic Design
- Pavement Investigation
- Pavement Construction
- Laboratory**
- Binder

Lots | **Test Results**

- ✓ Bulk Test Specimen
- Aggregate Grading Unbound CS SANS3001 ✓
- AG1 - Aggregate Grading Imperial
- AG1 - Aggregate Grading Metric ✓
- Atterberg indicators SANS3001 ✓
- Crushing strength SANS3001 ✓
- Aggregate Flakiness Index SANS3001 ✓
- Optimum compaction moisture content and Max Dry Density SANS3001 ✓
- In-Situ Test
- Thickness Control

N00124NX-Base-1-20900-21200-0-6/11/2018 - Unbound CS G1 SANS3001

L01 ✓ L02 ✓ L03 ✓ L04 ✓ L05 ✓ L06 ✓

AG1 - Aggregate Grading Metric

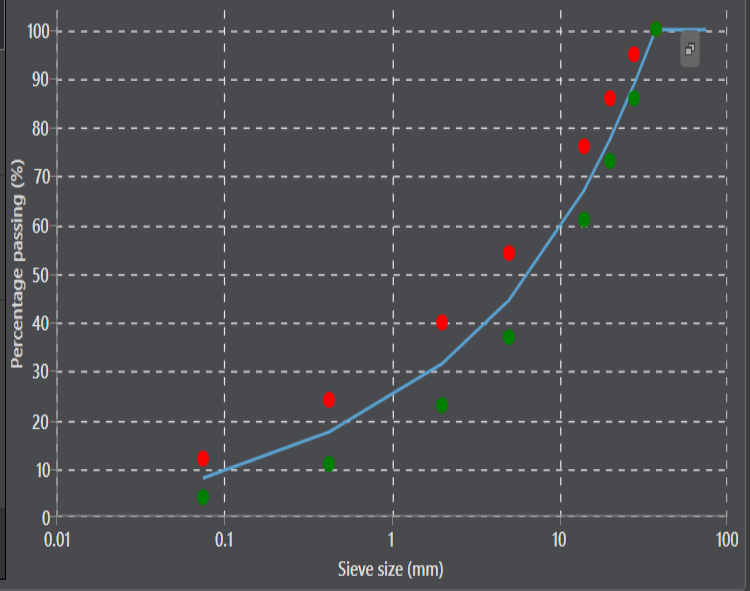
Laboratory Sample Number : AG1S1

Save Switch Test

Mass of total oven-dry sample, MT (g) 4.025

Sieve Size (mm)	Mass Retained (g)
75	0
63	0
50	0
37.50	0
28	443
20	463
14	423
5	906
2	523
0.4250	564
0.0750	382

Sieve size (mm): 0 Percentage passing (%): 0



Lab Equipment

Show Results

SARDS Software Release Strategy

Pre - Alpha Phase

- Software requirements analysis, software design, software development, and unit testing – Software Developers

Alpha Phase

- The alpha phase of the release life cycle is the first phase to begin software testing, first by developers and then selected users. Alpha software can be unstable and could cause crashes or data loss.
- **New Build every 2 weeks**

Beta Phase

- Software in the beta phase will generally have many more bugs in it than completed software, as well as speed/performance issues and may still cause crashes or data loss. The focus of beta testing is reducing impacts to users, often incorporating usability testing by users.
- **SARDS Demo Projects / User Feedback / Monthly Updates**

Release Candidate Phase

- A release candidate (RC) is a beta version with potential to be a final product, which is ready to release unless significant bugs emerge. In this stage of product stabilization, all product features have been designed, coded and tested through one or more beta cycles with no known showstopper-class bug.
- **Training / Recent Projects / Pilot Projects (March 2019, subject to server hardware)**

Release

- Released for general use on **all projects**
- **Ongoing Training / Support / Enhancements**

Thank you!

Andrew Mackellar
MackellarA@nra.co.za

SANRAL
48 Tambotie Avenue
Val de Grace
Pretoria
0184

PO Box 415
Pretoria
0001

Telephone: +27 12 8448 000
Fax: +27 12 8448200

FRAUD HOTLINE: 0800 204 558
Website: www.sanral.co.za