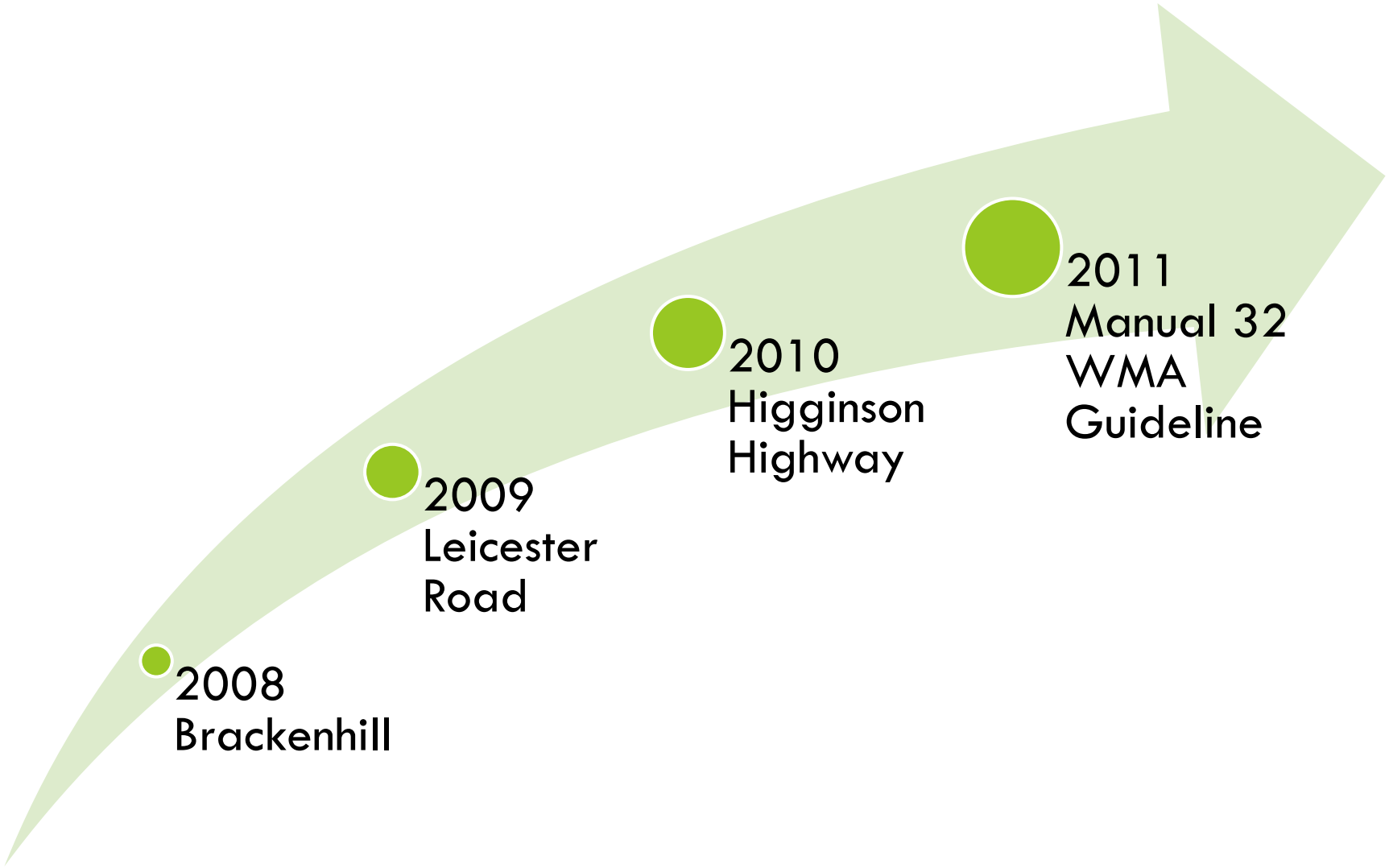

Roads Pavement Forum, Update 7 November 2012,
CSIR – krishna naidoo

# Journey thus far…..



# WMA national trial sections performance

warm mix asphalt rsa

**Brackenhill 2008**

- Hilly topography
- Mechanical failure

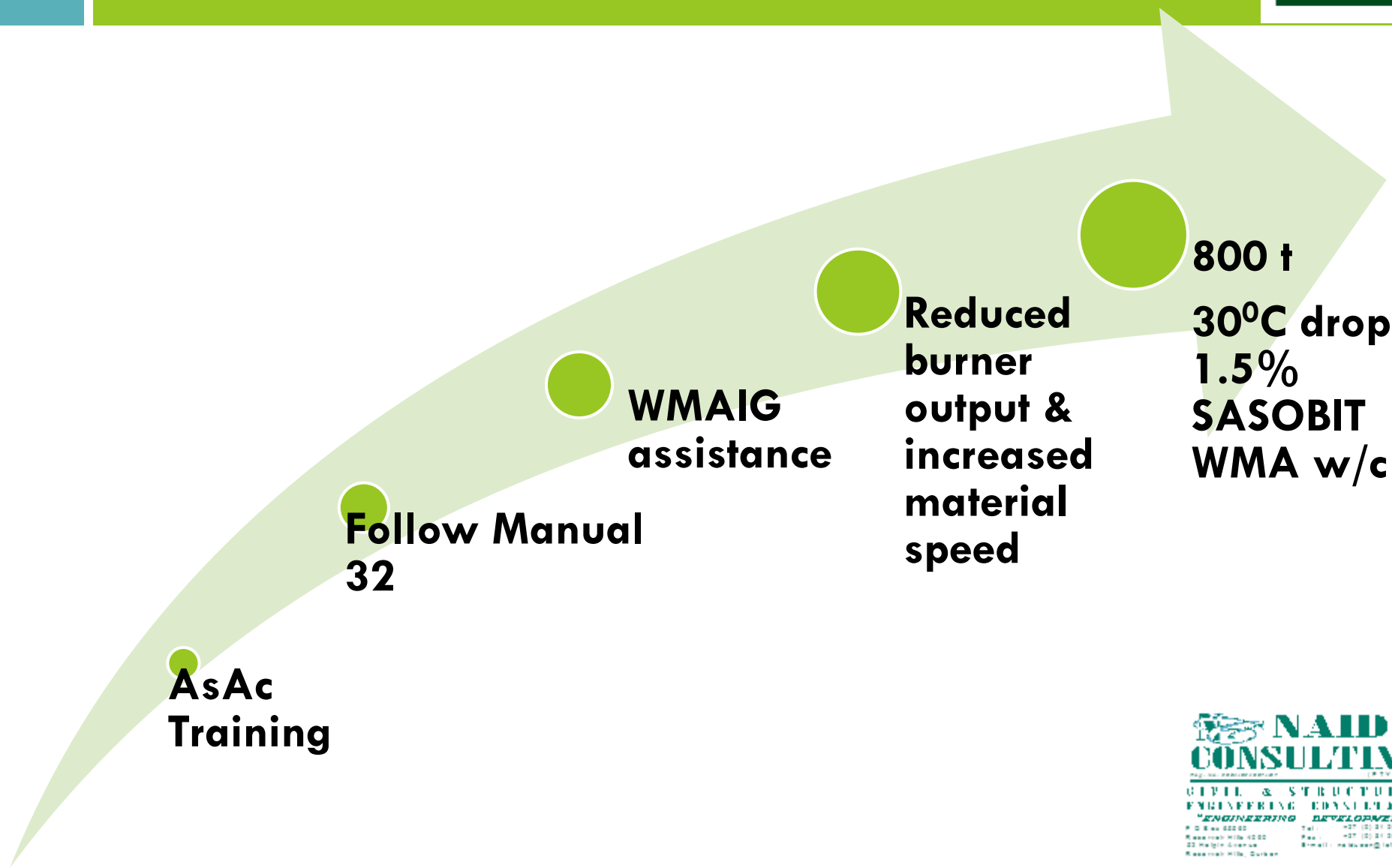
**Leicester 2009**

- Heavy, slow moving traffic
- Fattening up of HMA control

**Higginson 2010**

- Function as binder course
- No failures

# WMA Accreditation 2012



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TRANSPORT &
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warm mix
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NAIDU
CONSULTING
(PTY) LTD
CIVIL & STRUCTURAL
ENGINEERING CONSULTANTS
"ENGINEERING DEVELOPMENT"

# New WMA-T undergoing national trials - 2012

| WMA Tech | Tech Owner | Generic description |
|---|---|---|
| Advera | PQ Corporation | Zeolite – chemical foaming |
| Ammann Foam Generator | Ammann | Mechanical foaming |
| Econat | National Asphalt | Organic chemical |
| NAFoamtec | National Asphalt | Mechanical foaming |
| | | |

# Plant Mix trial

| WMAT | Mix type | Bitumen | % RA | Rejuvenator |
|---|---|---|---|---|
| Mechanical Foam | Base course | 50/70 | 20 | - |
| Advera | Base course | 50/70 | 20 | - |
| Mechanical Foam | Wearing course | A-E2 | 20 | - |
| Advera | Wearing course | A-E2 | 20 | - |

# Plant Mix Trial

| WMA T | Mix Type | Bitumen | %RA | Rejuvenator |
|---|---|---|---|---|
| Econat | Wearing course | A-P1 | 20 | - |
| Econat | Base course | A-P1 | 40 | Econat |
| Econat | Base course | A-E2 | 40 | Econat |
| Econat + NAFoamtec | Base course | 50/70 | 40 | Econat |
| Econat | Wearing course | 50/70 | 40 | Econat |
| Econat | Base course | 50/70 | 60 | Econat |

# Latest trial objectives

- Exploring at least $30^0$C temp drop threshold
- Explore higher % of RA
- Explore the use of bitumen rejuvenators
- Explore further mechanical foaming technologies
- Explore chemical foaming technology
- Update Manual 32 – WMA Guideline
- Update TRH 21 (RA)
- RA + rejuvenator + new binder = PG??

# Ammann Foam Generator – Basic Principle



Much Asphalt

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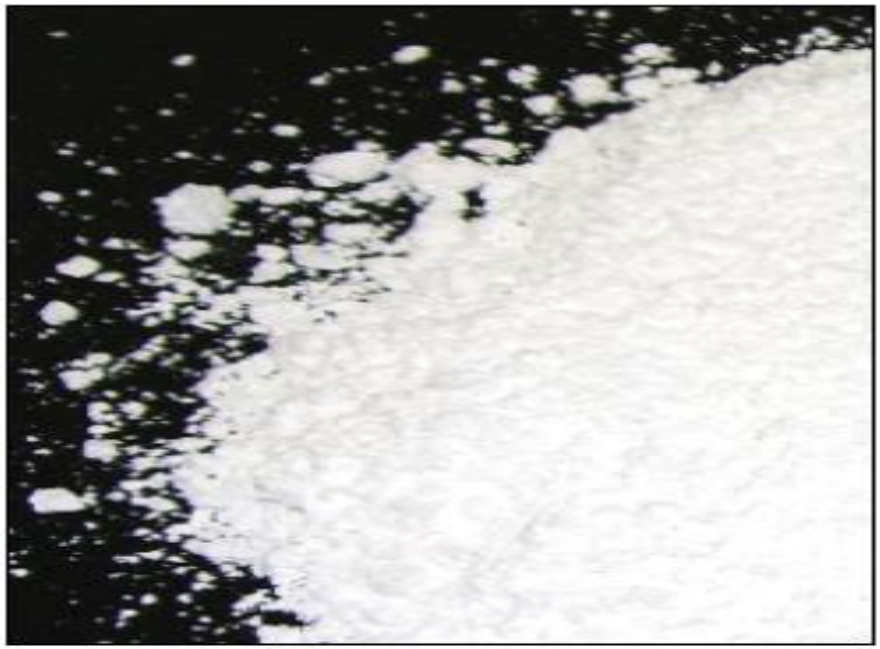
# Advera ®WMA
# Supplied by PQ Corporation



Advera WMA Powder

PQ Corporation

P.O. Box 840, Valley Forge, PA 19482-0840

# ECONAT

## *Claimed spinoffs*

- Enhances properties of foamed bitumen by improving coating and particle distribution
- Extends properties of “water technologies” – longer haulage distances and improved compaction at low temperatures
- Can be used in combination as WMA-T and as a binder rejuvenator
- Enables further reduction of mix temperatures

# Progress

- Mix design stage
  - Complete – Much and National
  - Road sections provided by Ethekwini for plant trial stage
- Plant trials
- Complete – Much Asphalt
- In progress – National Asphalt

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# Next step with trial

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- Big data discussion
- 10 mixes + 4 WMA-Ts + rejuvenators + %RA

- Agree with SANRAL which mixes will go onto paving trial stage.
- Target: Before shut down this year

# N3TC Toll - Frankfurt

- Trial section complete.
- WSP compiling an interim report for N3TC.

# $CO_2$ emission reductions due to WMA

| Month (2012) | Asphalt type | Production (ton) | $KgCO_2$/ton |
|---|---|---|---|
| Feb | HMA | 2714 | 54 |
| March | HMA | 4795 | 37 |
| April | HMA | 3578 | 32 |
| May | HMA | 4521 | 26 |
| June | HMA | 3918 | 40 |
| **June (1day)** | **WMA** | **241** | **18** |

# WMA being integrated…..

- Bitumen aspects of WMA Technologies will feature in updated version of TG1 for Modified Bitumen.

- Revision of Asphalt Mix Design Guideline.

# Conclusion

warm mix asphalt rsa

- The aim has and always will be to either the same as or better than HMA.
- It is not necessary to change mix properties when specifying WMA, the same can be used as for HMA
- Proven benefits in terms of the environment, compaction at lower temperatures, and increased haulage distance