APT steering committee meeting: HVS test plan 2003/04

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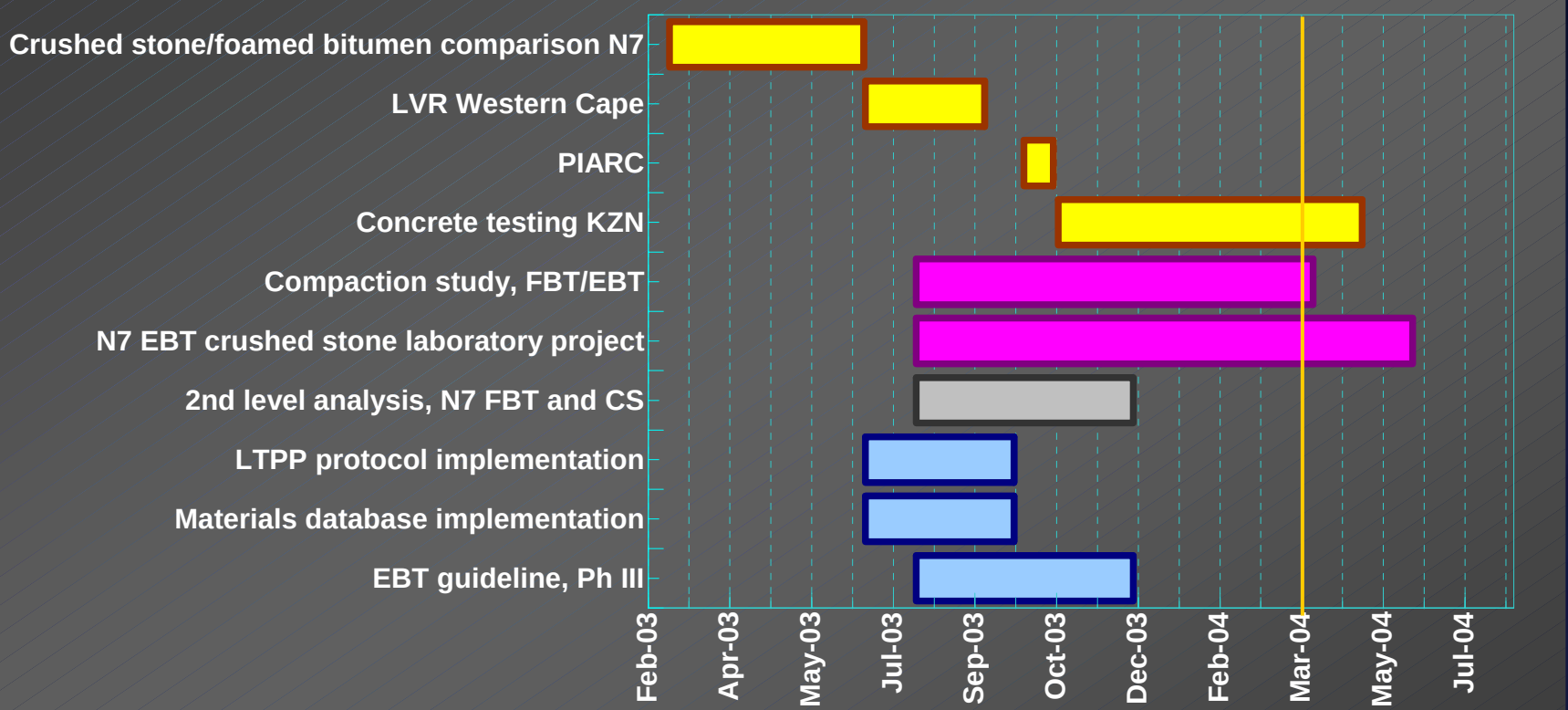
HVS program funding

HVS tests and associated projects	Cost (R million)	
	Gautrans	Others
Crushed stone/foamed bitumen comparison N7	1,36	
LVR Western Cape		1,51
PIARC	?	?
Concrete testing in KZN		3,07
2nd level analysis of concrete tests in KZN	?	?
Compaction study, FBT/EBT	0,26	
N7 EBT crushed stone laboratory project	1,14	0,19
2nd level analysis, N7 FBT and CS	0,41	
LTPP protocol implementation	0,15	
Materials database implementation	0,06	
EBT guideline, Ph III	0,09	0,09
Total	**3,47**	**4,86**

HVS and associated projects



Compaction study: Background and plan

- FBT Laboratory project
  - Higher binder content – lower density – higher permeability
- HVS on N7
  - Dry density lower on recycled slow lane compared to
    - Slow lane before recycling
    - Undisturbed fast lane
- Compare density in lab using constant compaction energy
  - Gyratory
  - Vibration table
  - mod AASHTO

Compaction study: Outcome

- Does emulsified-bitumen promote compaction?
  - Fines suspended in fluid available for filling voids
  - Breaking of emulsion ♏ volumetric changes?
- Does foamed-bitumen inhibit compaction?
  - Fines caught up in stiff “mortar”
- Realistic density specifications for construction

N7 EBT crushed stone laboratory project: Experimental plan

- Comprehensive laboratory testing of emulsified-bitumen-treated crushed hornfels
  - Engineering properties
    - UCS, ITS, permeability, shrinkage
  - Mechanical properties
    - Resilient modulus, Shear strength, Plastic deformation, Strain-at-break
  - Durability
    - Erosion, retained ITS, retained UCS, mechanical brush

N7 EBT crushed stone laboratory project: Outcome

- Recommendation on M_r input values
- Calibrated laboratory plastic deformation models (on par with model developed for FBTCS)
  - Different binder to cement content ratios
  - Shear stress
  - Density
  - Degree of saturation
- Contribute data towards future proper
  - Material classification
  - Durability specifications

2nd level analysis, N7 FBTM vs. CS: Technical plan

- Compare performance
  - Recycled, foamed-bitumen-treated crushed stone
  - G2 crushed stone base
  - Road P243/1
  - Koeberg and Stellenbosch roads
- Direct comparison of HVS data
  - Visual condition
  - Deflection
  - Rut
- Modeled comparisons
  - Resilient modulus
  - Plastic deformation
  - AC fatigue

2nd level analysis, N7 FBTM vs. CS: Outcome

- Site and material specific quantification of the benefit of foamed bitumen treatment
- Quantification of the effect of parent aggregate quality and bitumen to cement ratios on the performance of foamed-bitumen-treated material
- HVS performance compared to real life