



Circularity Update

Use of Recycled Concrete Aggregate



Specification

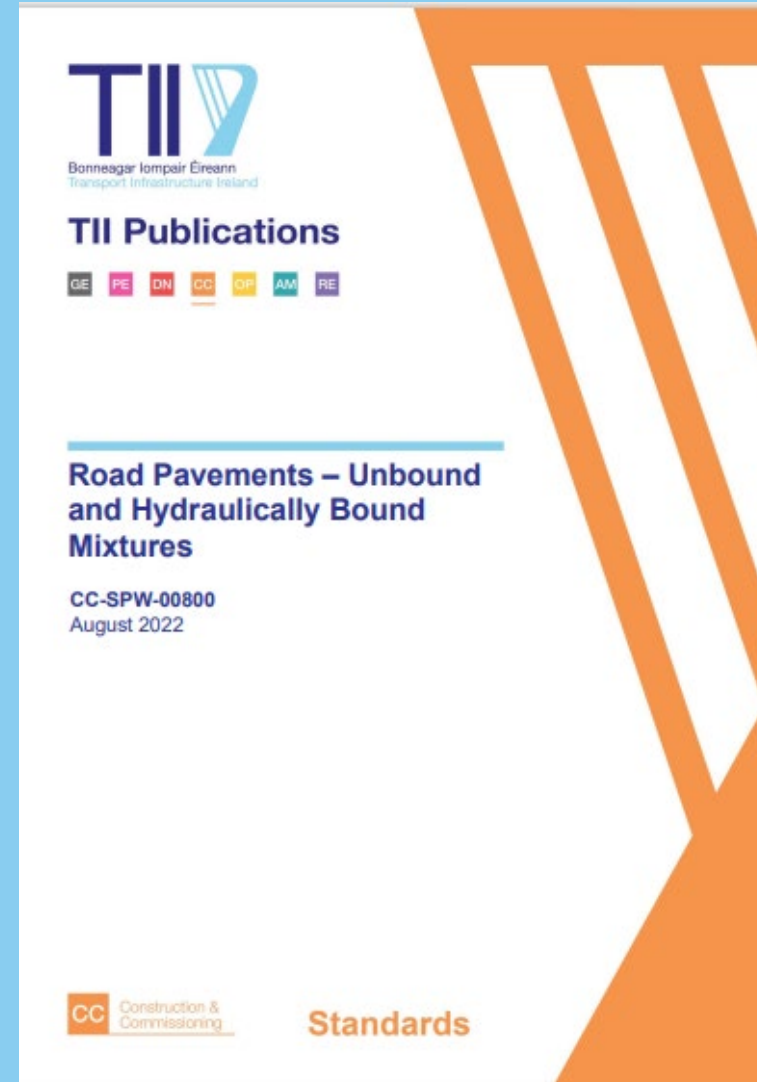
TII SHW

- CC-SPW-00800
- Replaces old Series 800

Changes

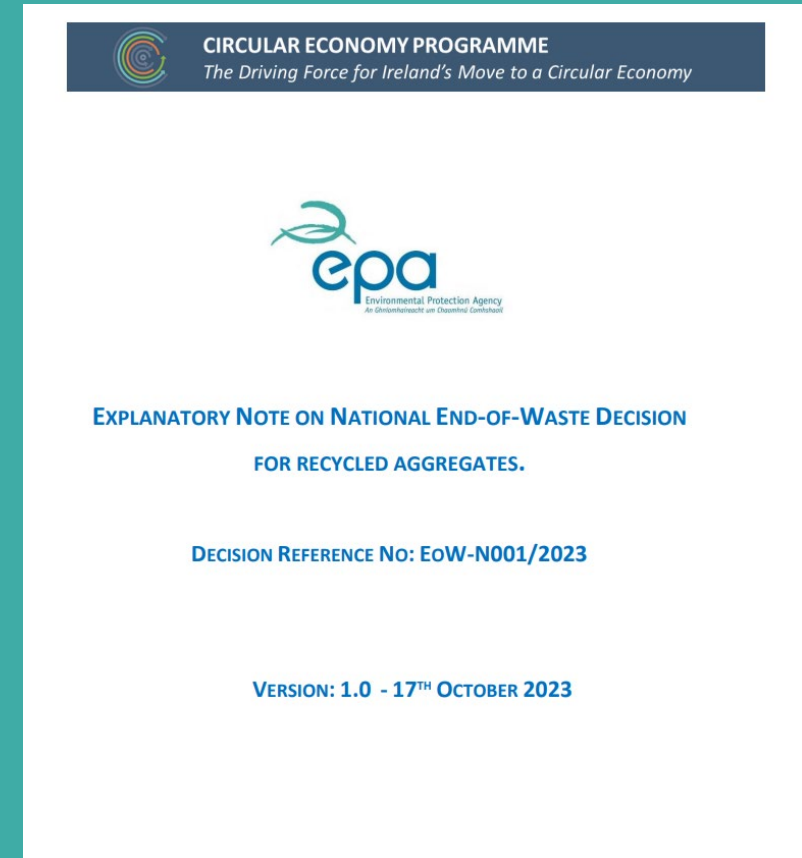
- What was
 - CI 803/4/6 is now UGM A
 - CI 808 is now UGM Ac
 - CI 809 is now UGM Am

All up to 30% RCA content



Specification and Restrictions

- EPA Articles 28
- Producer Registers under the National Decision
- Sample every 2,000tns
- Table 1. Allowable inputs
- Table 2. Solid PLV's
- Table 3. Leachate PLV's
- Certificate of Conformity



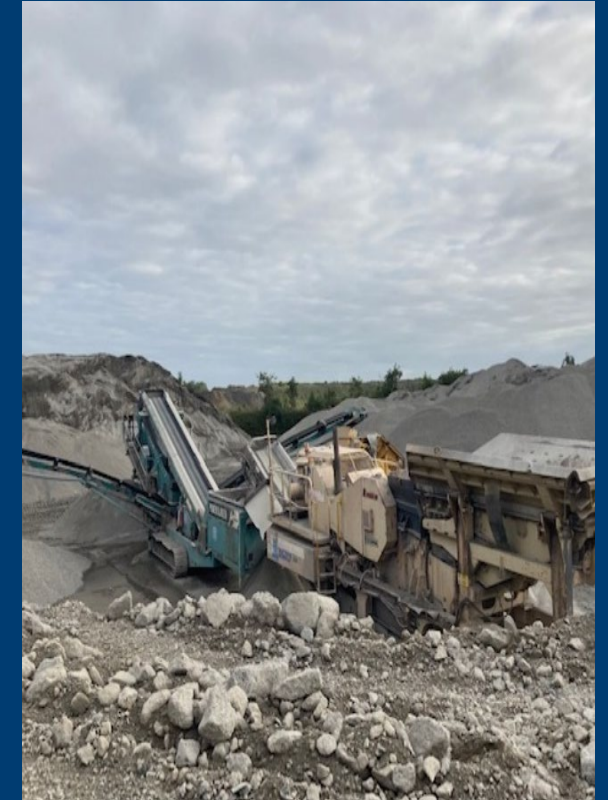
Purpose of Research and Methods

- Assess the performance of RCA as a replacement for natural aggregate in granular material
- Analysis
 - Mechanical
 - Chemical
- Field Trial
 - FWD before and after assessment
 - Relative density every 10m
 - Visual inspection



Material Production

- Rock-breaking of hardened concrete
- Crushing and screening
- Mixing at required proportions

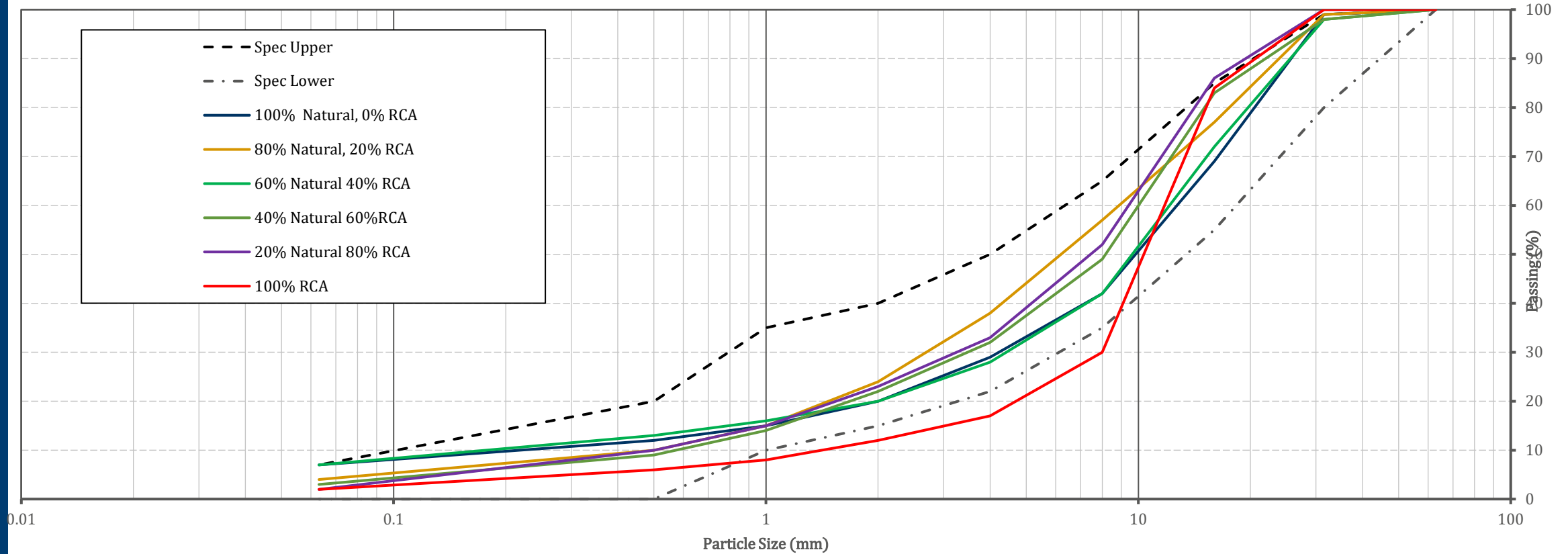


Laboratory Testing

| Sample Ref | DNC22-3779 | DNC22-3780 | DNC22-3781 | DNC22-3782 | DNC22-3783 | DNC22-3784 | TII Specification |
|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------------|
| %RCA | 0% | 20% | 40% | 60% | 80% | 100% | |
| Test | | | | | | | |
| Los Angeles Abrasion Value | 17 | 19 | 19 | 21 | 23 | 28 | 30 |
| Flakiness Index | 16 | 16 | 12 | 11 | 6 | 4 | 35 |
| Methylene Blue | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 1.0 |
| % Water Absorption | 0.2 | 1.4 | 2.6 | 3.3 | 4.8 | 6.3 | 2% |
| Magnesium Sulphate Soundness | 2 | 3 | 4 | 5 | 5 | 6 | 24 |
| Optimum Moisture Content | 2.70% | 4.30% | 6.30% | 7.80% | 9.80% | 8.10% | Declared |
| Liquid Limit | 17 | 24 | 24 | 28 | 38 | 46 | 20 |
| Plasticity Index | Non-Plastic | Non-Plastic | Non-Plastic | Non-Plastic | Non-Plastic | Non-Plastic | Non-Plastic |



PSD for % of RCA

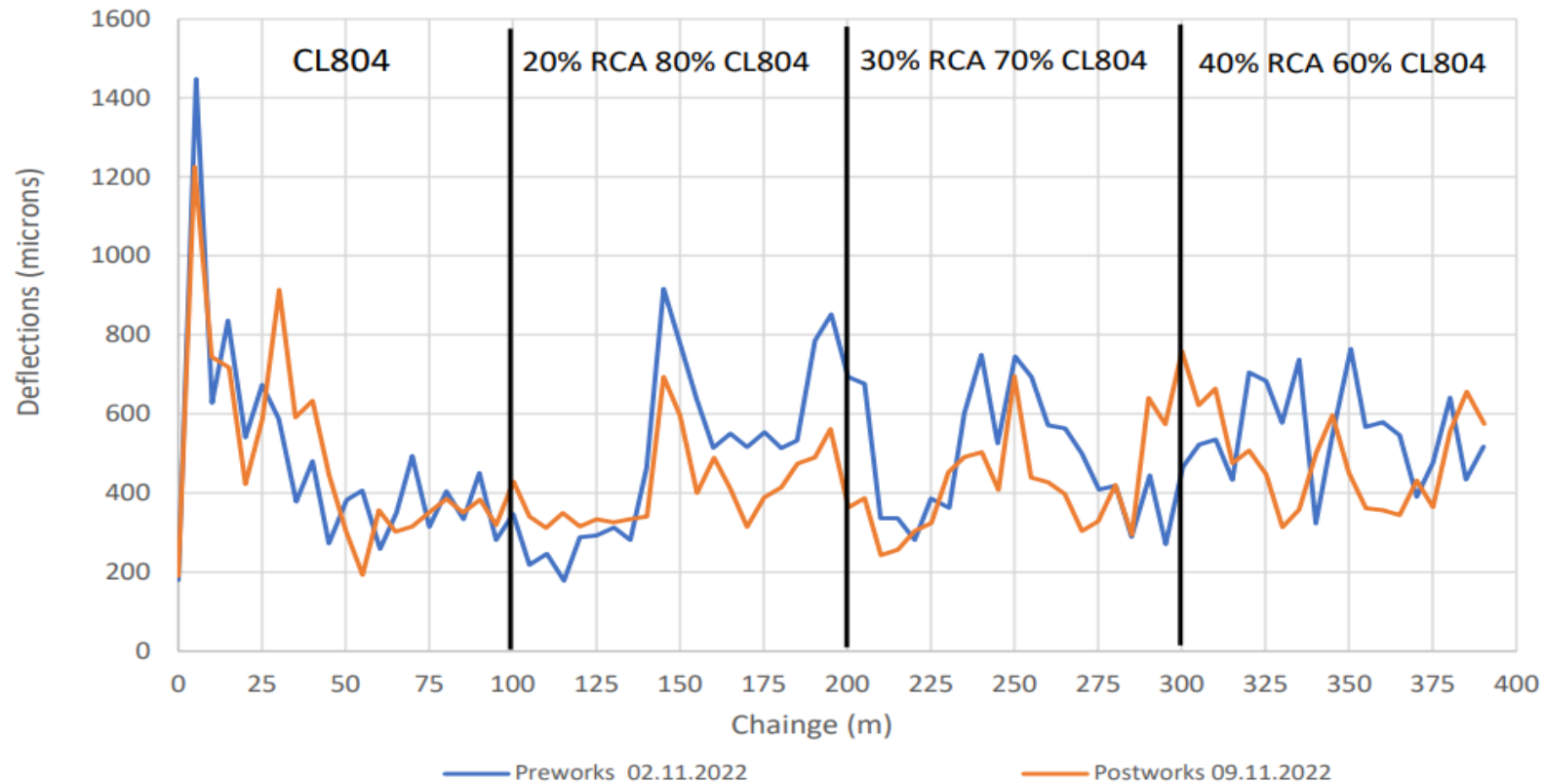


Field Trial

- Pre-works FWD
- Site trial – 400m x 3.5m road on
- Placed by Paver
- Compacted as per TII requirements
- In-situ samples for grading
- Density testing
- Post-works FWD



FWD Deflection Plot - SCI



Conclusions

- Deflectometer and laboratory analysis proves RCA with different mechanical properties has
- 6F2 Option for Roads



PSV Testing

- Resistance to polishing of aggregates
- Skid resistance in roads/concrete pavements
- Limestone's: low to mid 40's
- Diabase Rhyloite: +55
- Greywacke: PSV 60-64



PSV Testing – Testing Shoes



PSV Testing – Test Apparatus



3 hours Flour - 3 hours Grit



Control Stone 49 = PSV 60 for correction



PSV Testing Skid Arm



Skidder x 5, ignore first 2 and average next

