

**AASHTO Preservation Management
Emulsion Task Force (ETF) Meeting Notes**
The Heritage Group Innovation Center and Research Lab
December 12-13, 2023

Attendees:

Name	Affiliation
Todd Shields	NCPP
Robert Betsold	All States Materials Group
Eric Biehl	Ohio DOT
Jody Bachini	Montana DOT
Darren Hazlett	UT Austin
Kevin McGlumphy	Associated Asphalt
Steven Loeffler	PRI Asphalt Technologies
Dave Welborn	Ingevity
Charity Cook	Paragon Technical Services
Danielle Knudtson	Mathy Construction
Chris Hollenback	Heritage Research Group
Mike Voth	CFLHD-FHWA
Codrin Daranga	Paragon Technical Services
Stphanie Smith	Flint Hills Resources
Marla Weigel	Mathy Construction
Mike Hemsley	Paragon Technical Services
Ryan Lynch	Bakelite Synthetics
Joel Ulring	Minnesota DOT
Raymundo Benitez	KAO
Arlis Kadrmas	BASF
John Murphy	TRCC/Ultrapave
Dinxin Cheng	CP2 Center
Andrew Braham	University of Arkansas
Colin Franco	Rhode Island DOT
Nathan Awwad	Indiana DOT
Shelly Cowley	Paragon Technical Services
Mike Anderson	Asphalt Institute
Kelly Morse	Illinois DOT
Adriana Vargase (Virtual)	NCAT
Matt Teto (Virtual)	Indus

Tuesday, December 12th

8:00 a.m. – 8:15 a.m. Welcome, Introductions/ Roll Call and Housekeeping Morse

Chris Lubbers was unable to make the meeting.

8:15 a.m. – 8:30 a.m. ETF Review Morse
a. Review of Meeting Minutes (June 2023)

<https://www.pavementpreservation.org/wp-content/uploads/ETF/Minutes/2023-06-29%20Minutes.pdf>

- Reviewed, no issues. Posted on ETF website.

b. Agenda Review

8:30 a.m. – 9:00 a.m. AASHTO Committee on Materials & Pavements Update Pfeifer/Morse
a. TS 2a – Emulsified Asphalts

- Annual meeting this past August in San Diego
- No ballot items this year
- Nothing from TFASH yet on T 59 or T 50
- Standard for performance-graded emulsions, plan to work with researchers and ETF on getting a provisional standard out as the research advances. Also considering updates to R 78 based on research findings and input from ETF.
- Plan on making some modifications to T 72, which I mentioned at previous meetings. We need to put together a TS ballot in the spring and then get it ready for a full COMP ballot next fall/winter.
- Sent survey to COMP members on viscosity testing in mid-November:
 - “TS 2a (Emulsified Asphalts) would like to request responses to a short survey based on discussion at the 2a meeting in San Diego. We’re interested in learning more about what methods and instruments are being used by agencies. Thanks to Delmar Salomon for developing the survey!”
 - I’ve received 31 responses so far. I can share the summary with the ETF.
- Mid-year meeting is scheduled, for January 25th at 1:00 ET

ETF asking for 2a to look at MSCR testing for emulsions, specifically adjusting the AASHTO method to allow more than RTFO aged binder. RTFO isn’t intended for testing of emulsion residue. MSCR is testing for elastic properties, not rutting like for hot mix testing. Codrin and Shelly provided insights.

b. TS 5b – Bridge & Pavement Preservation **Ilg (via Teams)**

All submitted construction guidelines went through AASHTO balloting.

Slurry Seal and Scrub Seal will be going through shortly.

CIR and CCPR – Passed, but received comments to change the term “recycling agent” to “asphalt stabilizer”. ETF suggests staying with “recycling agent”, this is the term ARRA uses.

Tack construction spec had a lot of comments and motions. Being sent back to the ETF with proposed changes for review and updating. Larry is willing to participate in subcommittee revisions.

Revision to 345 submitted to AASHTO. Should be published in 2024.

c. TS 5c – Quality Assurance and Environmental

Turgeon

Need to submit items to 5C before the end of March, and need the documents in AASHTO format.

d. TS 2b

Biehl

There is a push to get trichloroethylene banned. AASHTO is submitting a statement to the EPA in the comment period (due 12/15/23). Once the rule takes effect, will need to stop using it within 1 year. DOTs need time to research suitable alternatives.

<https://www.federalregister.gov/documents/2023/10/31/2023-23010/trichloroethylene-tce-regulation-under-the-toxic-substances-control-act-tsca#:~:text=To%20address%20the%20identified%20unreasonable,certain%20processing%20and%20industrial%20and>

Kelly has submitted an NCHRP synthesis on alternatives 1/16/24

9 a.m. – 9:45 a.m.

Research Project Updates

Hazlett, Franco

- a. NCHRP 9-62 Rapid Tests and Specifications for Construction of Asphalt-Treated Cold Recycled Pavements

Showed video of new field tests for determining cure for CR pavement utilizing DCP equipment. Has been sent to COMP. Need to develop a method to link videos to test standards. This provides a great visual reference. Report has been posted.

[\(Link to Video\)](#)

Daren provided updates on various research initiatives.

- b. NCHRP 14-43 Construction Guide Specifications for Cold Central Plant Recycling and Cold In-Place Recycling

Report published, as a web document. <https://www.trb.org/Publications/Blurbs/182965.aspx>

Voted through COMP. Some comments, i.e. ensure Type 1L cement is allowed, most comments were considered editorial. Should be coming out soon. The QA guide is still being worked on.

- c. NCHRP 14-44 Construction Guide Specifications for Slurry Seals, Scrub Seals, and Tack Coats

Completed. Part one is posted online. <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4756>

- d. NCHRP 14-48 Construction Guide Specifications for Pavement Treatments - Sand Seals and Ultra-thin Bonded Surface Treatments

Research in progress, due 4/9/2024. <https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=5149>

- e. NCHRP 10-114 Developing Performance and Safety Specifications for Rejuvenating Seals (Presentation)

Research in progress, due 8/4/2025. Discussion about not getting too much in the weeds of the chemistry, look at what the performance is.

- f. NCHRP 10-124 Development of Field Test to Determine Actual Percent Embedment of Chip Seal Aggregate

The contractor was selected, and the contract is pending. This will be a 3-year study.

- g. NCHRP 10-134 Performance-Based Tests for Asphalt Emulsion Treatments as part of Agency Acceptance and Incentive Programs

RFP being developed, panel chosen. Should be advertised in 2024.

- h. Submitted Research Needs Statements 2025 – Pavement Markings, High-Friction Treatments, and Slurry and Microsurfacing Sampling from Paver

Synthesis 20-05, Current Practices and Guidelines for FDR. The contractor was selected, and the contract is pending. Will be a 12-month study.

NCHRP 20-44 Implementation of guide specs for construction of chip seals and micro surfacing. Publication decision pending. Colin looks to this study as a model to do for the next round of guide specs.

NCHRP 9-63 Calibrated and Validated national performance-related specifications for emulsified asphalt binder. Research in progress, due 3/20/2027.

New research:

Pavement Marking Selection for Bridge and Pavement Preservation Treatments – submitted last year, not selected. Resubmitted. Will be a 3-year study.

Sampling from Micro and Slurry Pavers for QA testing

Developing emulsion-based high friction surface treatment. Will be a 3-year study. Suggest traffic safety folks get involved in this study.

General discussion about how it is taking longer and longer to get research projects moving.

9:45 a.m. – 10:00 a.m.

Stakeholder Updates

Cowley/Shields

- a. FP² b. AEMA c. ARRA d. ISSA e. FHWA (PPTFG)
- g. NCPP

AEMA Update:

2023 Accomplishments

- AEMA and FHWA Webinar Series
- University of Arkansas Educational Series
- Plant Recognition and Awards Program
- Development of PCR and LCA Tool
- LEAP Program
- Bi-Monthly Emulsion Notes

University of Arkansas Educational Series consists of 4 online certificate courses. 300 graduates total for the four courses. This is a great tool to assist members with workforce training at a low cost.

The AEMA Excellence in Manufacturing Award is an award that recognizes facilities that meet or exceed AEMA requirements in categories like operations, quality control laboratory, plant appearance, environmental practices, safety and community relations to name a few. To date, 83 plants have been recognized for operational excellence throughout 17 companies.

Sustainability leadership has been working on the development of a Life cycle Assessment (LCA). This is the first step to creating Environmental Product Declarations (EPDs). Thanks to the confidential information submitted by many members, the work of completing an industry average LCA for eight categories of asphalt emulsions will be completed by the end of 2023. Also underway is the creation of Product Category Rules (PCR). After completion of both the LCA and PCR, industry-average EPDs will be able to be made.

LEAP Program Leadership Education for Asphalt Preservation

Important to grow younger and newer members.

This year there were 14 LEAPers that visited:

- Marathon Refinery
- BASF TN
- Arkema Road Science FL
- Vulcan Materials AZ
- Paragon Technical Services MS

Registration is open until December 29th

The International Technical Committee (ITC) has recently been through a refresh and has a new mission statement and goals. Some of the goals of the ITC will be to advance understanding of studies and research for all members that will impact the industry

- To facilitate the creation of specifications that clarify issues or move the industry forward
- To liaison with groups that are working on issues affecting the emulsion industry
- To identify and develop articles of interest that will be published in Emulsion Notes
- To respond to technical questions posed through the AEMA or PPRA websites

Keep an eye on the “Let’s Get Technical” section of the bi-monthly Emulsion notes online.

Annual Meeting

- February 19-23
- Palm Harbor, FL

ISAET 2024 (8th international symposium on asphalt emulsion technology)

- November 4-6th Washington DC

FP2 Update:

FP2 is continuing the work of restructuring our membership, marketing, board engagement and the operations of the association via committee development and actions. The 2 primary efforts for FP2 are research and advocacy.

On the research front, there is the Phase 3 project administered by MNRoads which we are intending to support through requested assistance from NCAT and NCPP, the primary contractors that will be charged with education, implementation, data collection and technology exchange of the project. FP2 effort will likely be focused on the early stages of education and up to the point of application. As the final report of the Phase 1 continuation (NCAT) and Phase 2 study (NCAT/MNRoads) is generated we will be involved in the preparation and delivery of the data and other outcomes of the research.

Through funding and participation, we supported the National Preservation Conference in INDY and have been able to promote our message and our members at functions across the nation from Washington (State) to Maine to Florida. We have a strong presence in DC and fielded multiple visits to Capitol Hill. Front and center this year, we successfully pushed to achieve clarity on the provision of the Buy America Build America Act that affects everyone from agencies to suppliers to contractors. We are in the early stages now of setting the tone for the next transportation bill which is severely underfunded at this point.

We will be working to reinforce our membership into 2024 and will be at TRB in January. For our members (and potential members) we are offering to set up Capitol Hill visits with their legislative leaders. Our traditional hospitality room will be open Monday and Tuesday night and we invite all preservation practitioners to drop by for a visit and preservation conversation.

ISSA Update:

Here are some bullet points on what ISSA has been working on lately.

- Sustainability and developing EPDs to support our industry
- A collaboration with Arkansas DOT/FHWA/APTech to update existing web-based training modules and develop new web-based training for combination treatments.
- Open Forum calls for anyone in the industry to provide support for pavement preservation technologies
- Development of a Design & Inspection Manual App.
- The annual Slurry Systems Workshop that will be held in Las Vegas from January 15-18. Still not too late to sign up.

ARRA Update:

1. ARRA has begun work with an environmental sustainability consultant to capture national average Life Cycle Assessment data for four of ARRA's disciplines. This is a critical first step for ARRA and its members to ultimately be able to provide Environmental Product Declarations (EPDs) for their disciplines and processes. The anticipated completion date for the LCA project is in the second half of 2024.
2. The Pavement Recycling Summit was held in Indianapolis in early October. It was a very well-attended meeting with great presentations from several state and local agencies. In addition to agency feedback, presentations included research updates on projects investigating the characterization and performance of recycling treatments. Presentations are available online on ARRA's website.
3. Our Annual Meeting will be held in February with our sister organizations AEMA and ISSA. We are also very excited to share that the 2024 Pavement Recycling Summit will be held in Reno Nevada in October 2024.

4. ARRA is helping agencies get more involved and connected with our ongoing activities and education. ARRA is offering free memberships to agency representatives. Agency membership will connect you with ARRA updates, access to our online information, including the Basic Asphalt Recycling Manual, and presentations from previous meetings. Please let us if you would be interested in joining or connecting with us on our website; www.ARRA.org
5. We continue to support and update RoadResource.org with our sister PPRA organizations. We have added some great webinars and success stories for all to learn. Roadvocate training continues to be offered twice per year for anyone interested in learning how preservation and recycling can help with their road networks.
6. We are always interested in learning what we can do to help road owners and agencies. Please connect with ARRA if you have questions or need additional support from our technical director, technical committees, or members. We are happy to provide support.

10:00 a.m. – 10:15 a.m. NCPP Update

Shields

Todd provided updates on the 2024 regional partnership meetings.

Kelly led a discussion about federal funding and grants to look into sustainability and EPDs.

10:15 a.m. – 10:45 a.m. BREAK

10:45 a.m. – 11:25 a.m. NCHRP 9-63 (EA-PG) Update

Anderson

Update on Performance Related asphalt emulsion binder.

Looking for volunteer labs

Calibrate lab work with field test sections

([LINK To Epps-Martin Paper](#))

11:25 a.m. – 11:45 p.m. NRRA Project Work Plan – Recycled Materials in PP

Vargas (via Teams)

PPT Posted

NCAT is the lead, working with Clemson as a sub. Bergkamp and ISSA are supporting the project. 18-month project.

Just getting started – looking at previous studies/research.

Specifically looking at chip seal and slurry systems.

- Literature Review
 - Survey of current practice among NRRA states
- Develop an experimental Plan
- Lab testing and data analysis
 - Additional testing to evaluate the impact on durability
 - Evaluate potential economic and environmental benefits
- Final report and implementation plan

12:45 p.m. – 1:45 p.m. SUBCOMMITTEE BREAKOUT SESSION 1

4 Research

- a. Research Needs Statements 2025
- b. Research Ideas for 2026

Hazlett/(??)

- Reviewed existing roadmaps, lots of high-level concepts, some more “discrete research project” focused
 - Opening road to traffic, when is treatment ready for opening (chip seal, slurry seal, micro, etc.)
 - Did Scott Shuler and Amy Epps Martin do something for chip seals?
 - AASHTO asset management guide, AASHTOWare
- Synthesis
 1. “State of the art for equipment”
 2. Quality assurance plans for suppliers. Audit programs for sources.
 3. Quality assurance that agencies use for maintenance treatments. Incentives/disincentives? What tests give you a metric for incentives? Should be part of literature for embedment depth...

Kelly submitted Synthesis 1/16/24
- Evaluating solvents used in extraction (work with hot mix groups)
 - Alternatives to TCE, can be used efficiently and safely in auto extraction equipment
 - EPA is going to ban TCE
 - Perhaps a synthesis would be better?
- LCA/PCR/EPD
 - EDC-7 is focused on materials (A1-A3)
 - Emulsion-based treatments get huge leverage from A4-A5, C-phase
 - Can we mimic the 1998 FHWA LCCA document, but for the environment?
 - Combine cost with environment with performance
 - Use NCAT data to calibrate models, state data to validate the model
 - RNS28 from the 2020 roadmap
- Asset management and pavement management
 - Using existing PMS data to understand the impact of the quality of materials on future performance
 - Mining existing PMS data and using AI to better understand how our pavement deteriorates and how treatments impact

1:45 p.m. – 2:15 p.m. NCAT/MN Road PPG Study – Online Performance Metric Tools Vargas

SUBCOMMITTEE BREAKOUT SESSION 2

2:30 p.m. – 4:00 p.m.

#5 Asphalt Emulsion Binders (B/O)

Voth

- a. NCHRP 10-144 Status Update (Moraes)
- b. Development of Standard Definitions for Rejuvenators
- c. Technical Support for Ad Hoc AASHTO Standard Update/Edit Requests
- d. EPDs Future Work?

•NCHRP 10-114 (Performance Specifications for Rejuvenators) Update –
Raquel could not attend – will discuss at next meeting

•Framework for Definition of Rejuvenators -

Most of the breakout time was spent discussing and developing a framework for defining rejuvenators. Consensus was reached on the following:

Two Part Over-arching definition-

·It's a material that can soften a binder and modifies its rheology (Part 1)
and/or

·It's a material that is anti-aging for a binder (Part 2)

In addition to the above over-arching definition, the material would be further defined by its function (or need), such as whether it's being used in CIR, HIR, Scrub Seals, or Fog Seals. It's noted that some materials meet both part 1 & 2 and others do not; which is okay depending upon the specific functional need.

In the short term, definitions will perhaps need to reside in functional standards like AASHTO M 345, Materials for Emulsified Asphalt Scrub Seal (which includes use of PMRE); but in the long term there may be a benefit to developing a standard similar to AASHTO M 140, M 208, or M 316 that would include all the rejuvenator types/grades (and associated definitions) within a single standard.

•AASHTO Standards Updates or Technical Support
No additional requests received. No current activities.

•EPDs
No activities planned, but we will continue to monitor progress and evolution of standards. AEMA and ARRA are actively developing PCRs/EPDs.

•Other
Plan to market/promote greater use of Ash Test (particularly considering upcoming EPA ban on TCE use) at AASHTO tech section meetings, such as TS 2a and 5b mid-year meetings.

Steve Loeffler will be added to the subcommittee. His affiliation and contact information are as follows: PRI Asphalt Technologies, 813-893-7512, sloeffler@priasphalt.com

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|---|--------------|
| #1 Emulsion Treatments (B/O) | Morse |
| a. CCPR and CIR Best Practices | |
| b. Construction Guide Specs | |
| c. Support RNS – High Friction, PMM, Sampling | |
| d. AASHTO COMP Support – Ballot Results? | |

Discussed comments on tack spec. Larry will make revisions and let the ETF subcommittee review one last time.

- Word Documents:
 - COMP Item 41 4ZZ Tack Coat – Const Guide Spec 5b ballot 2023
 - [TS 5b MYM 23 Draft Agenda](#) – mike

Kelly asked committee members to volunteer to be on RNS panels, to keep ETF plugged in.

Best Practices for Chip Seal and CIR/CCPR – CIR/CCPR is missing a lot of the QC requirements that are included in the chip seal document.

Need a new co-chair to replace Travis – Marla Weigel volunteered.

MNDOT looking for specs on spray-applied rejuvenators, specifically material specs.

4:00 p.m. – 4:30 p.m. Open Discussion – Close Out Day 1 Morse

Adjourn Day 1 4:03 PM

Wednesday, December 13th

SUBCOMMITTEE BREAKOUT SESSION 3

8:15 a.m. – 9:45 a.m. #3 Messaging & Implementation Subcommittee (B/O) **Betsold**
 a. NCHRP Project Profiles
 b. CCPR and CIR Best Practices

- 1) Best Practices Guide: Create a template from Chip Seal / Microsurfacing guides to assure same sections are used for all future treatments
- 2) NCHRP 20-44 (26):
 - a. Is this concluded or can/will we extend it
 - b. Need for continued monitoring and follow-up on demo projects
 - c. Further training and outreach to improve more widespread implementation of specifications
 - d. How will M&I of new treatments be handled?
- 3) Additional Outreach Plans
 - a. Update ETF Website to more modern/user friendly layout – Check with NCPP
 - b. Establish a social media presence (LinkedIn?) – Need to clear through NCPP on setup and management requirements
 - c. Continued engagement with PPRA organizations, Regional Partnerships, NCAT/MnRoads, and others for potential speaking opportunities
 - i. Create a stock presentation that any ETF member could present
 - ii. Create a centralized calendar for opportunities to assure coverage
 - d. Make an “Ask the ETF” form or email address as a central point for questions, needs, etc.
 - e. Is there a way to integrate our materials with RoadResource.org?
- 4) Training
 - a. Important to have a consistent training message with ETF, NCPP, ISSA
 - b. Need to make sure new trainings follow same/similar formats previous
- 5) New TSP2 Brand
 - a. Update all templates, documents, slides, etc. to new branding
 - b. Assure all new items have this branding

#2 QA, Education & Certification Subcommittee (B/O) **Teto (Virtual)/Biehl**

QA guides for CIR and CCPR have been submitted in July, and talked about at the COMP meeting in August, but not brought up in the 5c meeting in November. Eric will follow up on the status, thinks next June will be a ballot opportunity.

Tack, Scrub, Slurry, and CR QA guides have been sent to COMP.

AASHTO Standards Update: 2023	M/MP	T/TP	R/PP	NCHRP Projects	Best Practices	Construction Guide Spec #	QA Guide
Chip Seal	M340		R102	NCHRP 14-37	Published	Section 406	
Micro Surfacing	M341		R103	NCHRP 14-37	Published	Section 408	
Tack Coat	M349		R112	NCHRP 14-44		Section 404	5c COMP
Fog Seal	M343		R105	NCHRP 14-37	Published	Section 410	
Asphalt Rejuvenators				NCHRP 10-114			
Scrub Seal	M345		R107	NCHRP 14-44			5c COMP
Sand Seal	M344		R106	NCHRP 14-48			
Slurry Seal	M342		R104	NCHRP 14-44	Published		5c COMP
Cold Recycled Mixtures with Foamed Asphalt	MP38		PP84	NCHRP 14-43			
Ultrathin Bonded Wearing Course	M346		R108	NCHRP 14-48			
Cold Recycled Mixtures with Emulsified Asphalt	MP31	LPST SPRT	PP86	NCHRP 9-62 NCHRP 14-43	Published	Section 411	5c COMP
Emulsified Asphalt	M140-16						
Cationic Emulsified Asphalt	M208-16						
Polymer-Modified Cationic Emulsified Asphalt	M316-16						
Emulsion/Surface Performance Grades (E/SPG)				NCHRP 9-63			

Education – NCPP trying to get a consistent syllabus for PP training. Arkansas and Nevada working on various modules. Look to best practices, and standardization.

Certification – how to get NCPP certification as a national standard. Create a single national certification body (AASHTO?) to oversee. Would then implement training. Would be for all treatments. Once “best practices” guides are published can follow with training and certification. The QA document, would require certification.

Incentives/Disincentives for materials and QA. There had previously been a lot of discussion but may need to be re-visited/resuscitated. ETF had previously drafted this for chip and micro. Look at, revise, and send to COMP. Jody, Rex, Kevin, and Eric were working in the group led by Larry G.

Consider surveying for what all tests (lab and field) agencies are doing for chip seals.

KYTC has some good online resources for inspectors/field staff:

<https://transportation.ky.gov/Construction/Pages/Preventive-Maintenance-Resources.aspx>

M/I Subcommittee Update – Betsold

PPT Posted.

Main focus – how do we get the message out there on all the things the ETF is doing/accomplished.

A lot of work was done on the NCHRP implementation project.

- What’s next – Colin says easier to do a continuation, and call Sid Mohan (NCHRP PM), Colin will call him. Otherwise we will have to go out with a new RFP for the 3 new specs.
- What to do with the completed projects? Do another NCHRP project to track them.
 - Colin to check with Sid on how best to do this.

Promoting ETF training at World of Asphalt in March 2024

Future – replicate efforts for new treatments

- CCPR and CIR
- Slurry/Scrub/Tack
- Sand Seals and UBWC

Membership Update – Morse

Have several vacancies, need to get new people.

Replacement for Colin – recommend a southern state, maybe Mississippi

Mike Voth suggesting another FHWA rep – reach out to preservation side, maybe TRB.
John Malusky with AASHTO ReSource is on board.

Need a new contractor rep to replace Larry Tomkins. Codrin Daranga with Paragon volunteered.

Andrew Hanz will rotate out and Marla Weigel with Mathy Construction will take place.

Not sure about Scott Dmytrow, he left Prism and started a new company, Pavement Aces, still interested. Updated the roster.

Ken Grzybowski with PRI will be replaced by Steven Loeffler.

QA/Education/Certification - Biehl

- QA Guides were talked about at the annual meeting, not sure of much movement at the mid-year meeting
- Scrub and Tack also submitted
- Sand Seal, Rejuvenators, UBWC – projects in progress
- Revisit including incentives/disincentives in the QA guides
 - Form a task force

11:45 a.m. – 12:00 p.m.

Future Direction – What’s Next for ETF

Morse

- Surface Characteristics
- Performance Tests for Field Performance
- Sustainability

Looking for industry partners to bring problems, innovations, etc. to the ETF to partner with.

Need to look into adding “sustainability” to the ETF mission. Arlis will give an update at the June 2024 meeting.

How to build a partnership with traffic safety engineers?

Larry Tomkins indicated he had an idea for a field test for open-to-traffic.

Colin gave farewell – this was his last meeting.