

## Underdrain Design and Maintenance

**May 13, 2002**

M. ...., P.E.  
Director of Highways

M. ...., P.E.  
Division Administrator

Dear M. ....:

Subject: Underdrain Design and Maintenance

2002 (State)DOT/FHWA Joint Review Guidelines

Enclosed are the guidelines that the 2002 Underdrain Design and Maintenance review team will be using during their District visits over the next several months. The schedule for the review is as follows:

District :: May 21-23, 2002 District :: June 11-13, 2002 District ::  
August 6-8, 2002 District :: September 10-12, 2002 District ::  
October 8-10, 2002

Statewide Closeout: November 2002.

The team members for the review are:

If you have any questions or comments regarding this review, please contact .....  
at .... or ..... at .....

Sincerely yours,  
/s/ .....  
....., FHWA  
Review Co-Coordinator

Sincerely yours,  
/s/ .....  
....., (State)DOT  
Review Co-Coordinator

Enclosure

cc:

### **2002 JOINT FHWA/(STATE)DOT REVIEW UNDERDRAIN DESIGN AND MAINTENANCE**

**Purpose:**

The purpose of this Federal Highway Administration (FHWA) / (State)Department of Transportation ( (STATE)DOT ) joint process review is to determine the effectiveness of underdrains in highway pavement systems, compare current practices to identified best practices, and suggest possible improvements to the underdrain product/process.

### **Scope:**

The review will consist of an evaluation of present activities and procedures concerning design, materials, construction, and maintenance of underdrains. The primary emphasis of the review will consist of feedback from (STATE)DOT Districts, identification of best practices, and a literature review of past and ongoing research in this area.

Districts .., .., ..., ..., and .. have been selected for in-depth reviews. During the in-depth District reviews, discussions will be conducted with appropriate personnel responsible for the design, materials, construction, and maintenance of pavement underdrains. District visits will include an in-office overview of the joint process review, discussions and interviews, review of ongoing construction projects, performance review of in-service underdrains, and a closeout meeting. In addition, Districts not selected for in-depth reviews will be solicited for information regarding underdrain performance.

The District reviews and statewide closeout meeting will be completed by November of 2002.

### **Review Team Members:**

### **Interviews and Reviews:**

It is anticipated that interviews and reviews will be conducted with one or more of the following District personnel:

- District Engineer
- Operations/Maintenance
- Construction
- Design
- Materials

The team anticipates that the District Operations Engineer will be the main point of contact for coordinating the District review. A set of questions to be discussed with the District is attached.

### **QUESTIONS FOR DISTRICT PERSONNEL**

#### **Questions:**

1. Are the underdrains performing? **YES/NO**
  - If not, why?
  - Examples of ones that are functional and ones that are not functional under same pavement types.
  
2. How do you determine if an underdrain is **functioning**?
  - If not, what action would be considered?

3. Does your District have a written policy/procedure for underdrain **maintenance**? (i.e. underdrain vs. Outlet maintenance practices) **YES / NO** If yes, attach a copy. If not, briefly describe your District's practice.
  - Do you have issues or problems with flush-out access?
  - Have you used video inspection? For acceptance or other purposes?
  - Some states use video for acceptance; what do you think about that procedure for acceptance?
  
4. Have you noticed any shoulder heave/distress that may be related to underdrain performance? **YES / NO**
5. How does (STATE) DOT decide when to replace underdrains when an Interstate or other section is being rehabilitated?
6. Does your District have any policies or practices regarding the **use** of underdrains (i.e. when or under what conditions to use them) ?
  - you have any thoughts regarding current statewide policies?
7. What design standards have been used in your District?
  - Does one seem to function better than another? **YES / NO**
  - Do you have any suggestions for cost-effective underdrain designs?
  
8. What construction practices do you use when installing underdrains?
  - Does the RE or design lay out the locations?
  
9. Are you using the standard 500' spacing of laterals? **YES / NO**
  - During construction, how difficult is it to maintain distances as laid out on plans?
  
10. To what extent is ditch depth an issue/problem?
11. Where do you locate the underdrain (i.e. along e.o.p.)?
  - When full-section shoulder used?
  
12. If the road slope is less than 0.2%, do you match the road slope with the underdrain or make them not parallel? **YES / NO**
13. Describe the different methods/materials that you use to backfill underdrains. Which would you suggest is the most effective?
14. Are fabric specifications satisfactory? **YES / NO**
15. Have you experienced blinding of fabric? **YES / NO**
16. Have you used fin drains? **YES / NO**
  - What has your experience been?

17. Do you consider the rigid laterals sufficient to keep the headwalls from tipping or from crushing during construction? **YES / NO**

- Do they resist bending during installation?

18. Have you experienced crushing of the underdrains by mowers? **YES / NO**

19. What headwall designs have you used?

- Have you experienced any problems (fall off, grass plugging, rodents, etc.)?
- Do you have any suggestions on the design of headwalls?

20. With raised medians with granular backfill, do you require underdrains? **YES / NO**

21. Have you used the DRIP program? **YES / NO**

22. Do you have any additional comments or thoughts on underdrain design, construction, and/or maintenance?

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