Vice chair Mark Miles on behalf of chair Dave Henderson, who was not able to attend the meeting, called the meeting to order at 8:00 a.m. on May 10, 2005. See attachment A for the attendance list for this meeting. The following members were present unless noted absent or resigned. (See attachment B for addresses of Technical Committee members with changes noted at the meeting):

<table>
<thead>
<tr>
<th>TECHNICAL COMMITTEE MEMBER, STATE</th>
<th>JOINED</th>
<th>AASHTO REGION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bill Bailey, Wyoming</td>
<td>1994</td>
<td>4</td>
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<tr>
<td>Brooks Booher, Arkansas</td>
<td>2002</td>
<td>2</td>
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<tr>
<td>Glenn DeCou, California</td>
<td>1994</td>
<td>4</td>
</tr>
<tr>
<td>Merril Dougherty, Indiana</td>
<td>1994</td>
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<tr>
<td>Hani Farghaly</td>
<td>2004</td>
<td>3</td>
</tr>
<tr>
<td>Mike Fazio, Utah</td>
<td>2001</td>
<td>4</td>
</tr>
<tr>
<td>Preston Helms, South Carolina</td>
<td>2001</td>
<td>2 (absent)</td>
</tr>
<tr>
<td>Dave Henderson, Chair, North Carolina</td>
<td>2000</td>
<td>2 (absent)</td>
</tr>
<tr>
<td>Andrea Hendrickson, Minnesota</td>
<td>2005</td>
<td>3 (absent)</td>
</tr>
<tr>
<td>Rae Van Hoven, New Mexico</td>
<td>2004</td>
<td>4</td>
</tr>
<tr>
<td>Mark Miles, Vice Chair, Alaska</td>
<td>2000</td>
<td>4</td>
</tr>
<tr>
<td>Roy Mills, Virginia</td>
<td>1999</td>
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<tr>
<td>Te Ngo, Oklahoma</td>
<td>1991</td>
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</tr>
<tr>
<td>Matt O’Connor/Bob Dawe, Illinois</td>
<td>2001</td>
<td>3 (absent)</td>
</tr>
<tr>
<td>Jorge Pagan-Ortiz, FHWA, Secretary Washington, DC</td>
<td>2004</td>
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</tr>
<tr>
<td>Karuna Pujara, Maryland</td>
<td>2005</td>
<td>1</td>
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<tr>
<td>Richard. Phillips, South Dakota</td>
<td>2002</td>
<td>4</td>
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<tr>
<td>Lotwick Reese, Idaho</td>
<td>1996</td>
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</tr>
<tr>
<td>Rick Renna, Florida</td>
<td>2001</td>
<td>2</td>
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<tr>
<td>J. Richardson, Kansas</td>
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<td>N. Schips, New York</td>
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</tr>
<tr>
<td>Duc minh Tran, Quebec</td>
<td>1999</td>
<td>1 (absent)</td>
</tr>
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VISITORS PRESENT (see attachment C for addresses)

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joe Krolak</td>
<td>FHWA Office of Bridge Technology</td>
</tr>
<tr>
<td>Dan Ghere</td>
<td>FHWA, Resource Center</td>
</tr>
<tr>
<td>Cynthia Nurmi</td>
<td>FHWA, Resource Center</td>
</tr>
<tr>
<td>Bart Bergendahl</td>
<td>FHWA, Federal Lands</td>
</tr>
<tr>
<td>Larry Arneson</td>
<td>FHWA, Resource Center</td>
</tr>
<tr>
<td>J. Sterling Jones</td>
<td>FHWA, R&amp;D</td>
</tr>
<tr>
<td>Kornel Kerenyi</td>
<td>FHWA, R&amp;D</td>
</tr>
<tr>
<td>Tim Hess</td>
<td>NCHRP</td>
</tr>
<tr>
<td>Jeremy Fissel</td>
<td>AASHTO staff</td>
</tr>
<tr>
<td>Hani Farghaly</td>
<td>Ministere du Transports du Ontario, Canada</td>
</tr>
</tbody>
</table>
**MEETING AGENDA**  (See attachment D)

**FINANCIAL REPORT**

Funds transferred from Dave Henderson: $3,225.00
Registration fees ($95 each) collected at this meeting: $1,900.00
Balance prior to expenses: $5,125.00
Less expenses (food/breaks/meeting room): $?
Net balance: $?

**FUTURE MEETINGS:**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>MEETING</th>
<th>REGION</th>
<th>LOCATION</th>
<th>DATE</th>
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<tr>
<td>2005 Fall</td>
<td>69</td>
<td>4</td>
<td>Sioux Falls, SD</td>
<td>October 25-27, 2005</td>
</tr>
<tr>
<td>2006 Spring</td>
<td>70</td>
<td>1</td>
<td>Buffalo, NY</td>
<td>Late April or early May, 2006</td>
</tr>
<tr>
<td>2006 Fall</td>
<td>71</td>
<td>4</td>
<td>Albuquerque, NM</td>
<td>October 11-13, 2006</td>
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<tr>
<td>2007 Spring</td>
<td>72</td>
<td>tbd</td>
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</tr>
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</table>

1. Glenn DeCou, CALTRANS, welcomed group to Sacramento, and invited the group to dinner at the Pyramid Ale House for the first evening.

2. Jorge Pagan-Ortiz, secretary of the technical committee, did not attend the meeting due to a special assignment with the Federal Transit Administration. He recommended J. Sterling Jones, FHWA, to serve as his representative for this meeting. Sterling Jones passed out minutes from the fall meeting and asked for corrections to be noted on a master copy sometime during the meeting.

3. Cynthia Nurmi briefed the group on the National Hydraulics Conference to be held in Southern California (San Diego area) in the spring of 2006.
   Topic Suggestions:
   - Rick Renna, FL DOT, suggested “culvert materials and structural analysis” with Tim McGrath as a possible speaker
   - Karuna Pujara, Md SHA, suggested “service life of culverts as influenced by abrasion, cold weather, climate change, and functional life.”

5. Sterling Jones presented the FHWA perspective. See attachment E for a summary of FHWA initiatives. The idea of a targeted pooled fund study was discussed at some length as a follow-up to the Ad Hoc meeting during the spring 2004 National Hydraulics Conference held in Asheville, N.C. Rick Renna provided a copy of the list of States and suggested funding from an e-mail message sent by Geoff Bonnin on Friday May 6, 2005 (see attachment F)
   Two scanning tours have been submitted for FY 2006:
   - “Scour and Integrity of Structures with Unknown Foundations”
   - “Fish Passage Design and Restoration Strategies for Highway Culverts”
   Selections will be made in June 2005.
6. Rick Renna described the I10 Escambia Bay Bridge failure. Florida was battered by four hurricanes in 2004 – Charlie, Francis, Jeann, and Ivan. Ivan caused the I10 bridge failure. The eye hit west of Florida, but the most destructive winds and rain were on the fringe. There was one fatality (truck driver). One family rode out the storm in a car trapped on the bridge but they survived. The bridge was “closed by common sense” but was not barricaded. Ivan was considered a 200 year event at that site based on the following comparisons:

<table>
<thead>
<tr>
<th></th>
<th>100 yr event</th>
<th>500 yr event</th>
<th>Ivan</th>
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</thead>
<tbody>
<tr>
<td>Still water elevations</td>
<td>10.69’</td>
<td>12.30’</td>
<td></td>
</tr>
<tr>
<td>Max. wave elevations</td>
<td>20’</td>
<td>24’</td>
<td>22’</td>
</tr>
<tr>
<td>Max. wave heights</td>
<td>11.63’</td>
<td>13.79’</td>
<td>12.6’</td>
</tr>
</tbody>
</table>

Lessons learned and reactions:
- Coastal engineers are needed in design
- Coastal hydraulics council was formed including Phil Donpe, Mark Gosselin, Max Sheppard, and Joe Krolak
- Florida will sponsor research on drag and lift forces caused by waves. Sterling Jones suggested that Kornel Kerenyi will be a good FHWA contact for that research study.
- Florida almost lost another bridge due to contraction scour. The HEC-18 procedures for contraction scour do not seem appropriate for contraction scour at coastal bridges.

7. Jeremy Fissel, AASHTO materials engineer, expects the transportation bill to be signed in June or July. Upcoming AASHTO events include the subcommittee on design meeting in June ’05 and the full annual meeting in Nashville, TN in Sept ’05. Jeremy indicated that AASHTO was missing chapter 15 “Consultants Guide” for the HDG. He said he would check with Jim McDonnell since the committee minutes indicate that the chapter was sent to AASHTO. When questioned about AASHTO taking on support of H&H software, Jeremy responded that he did not believe that AASHTO would be a cost effective option and that he did not think AASHTO had H&H expertise to take on that software. Glen Decou asked about AASHTO responsibility for materials specs for culverts and other drainage structures. Jeremy indicated he would confer with Jim McDonald on that question. Cecil Jones is chair of the technical committee on materials.

8. Tim Hess gave an update on NCHRP projects. See attachment G for a list of projects discussed by Tim. The status of all NCHRP projects can be checked on the NCHRP website which is www4.nas.edu/trb/crp.nsf. Project numbers listed in attachment 3 facilitate the web search for specific projects that are of interest to H&H. Project 24-27 was cancelled because the panel did not like either of the proposals that were submitted, but it will be reinstated with a different approach. The project will be split into seven functional areas and each portion will be sole sourced separately. The proposed task for special project 20-07 to conduct a survey of drainage practices was not selected for FY ’06. NCHRP is soliciting nominations for panel members for the new FY ’06 projects by May 31, 2005. Send nominations for H&H projects to Tim.
Kornel Kerenyi presented results of TFHRC lab study on Scour at Bottomless Culverts, Phase II. All experiments were clear water scour. The basic assumption in the data analysis was that pre-scour unit discharge near the corners at the entrance remains constant during the scour process. Lab experimental data was used to adjust the equilibrium flow distribution scour depth for the effects of secondary currents. Outlet scour is almost as high as the entrance scour but it was always located well downstream of the culvert. Smooth curved downstream wingwalls reduce large scale roughness and reduced outlet scour considerably. 45° wingwalls do not reduce outlet scour; 8° wingwalls with smoothed corners work much better.

Larry Arneson reviewed the survey form that is proposed for the Nationwide Drainage Review. The survey form can be filled out electronically. FHWA runs into an OMB obstacle in conducting surveys. NCHRP was considered to be an option, which is the reason the proposed task to conduct the survey was submitted for NCHRP special project 20-07, but it was not selected.

Discussion by committee:
- Checking boxes on a survey form takes answers out of context and is often misleading.
- Some states have several districts that are autonomous and varied in organizational structure.

There was open discussion about support and maintenance of H&H software in view of the decision at FHWA headquarters not to continue to provide this support as it has in the past. At stake are the future of programs like HY-8 “Design of Highway Culverts”, HYDRAIN “Integrated Drainage Design System” and continued licensing of SMS “Surface Modeling System” and WMS “Watershed Modeling System”. Some of these programs are “bread and butter” tools used routinely by drainage designers; others are future tools that are essential to training support to upgrade our technology. Several options have been suggested. One is to turn the H&H software over to AASHTO for distribution and support along with PONTIS, VIRTIS/OPIS and other AASHTO software. Another suggestion is to set up a continuing pooled fund study with each State contributing $2K or $3K to hire a contractor to distribute, maintain and provide user support for H&H software much like the user support task that we used in the final stages of the HYDRAIN pooled fund study. The following remarks were made by various technical committee attendees:
- History has been a good working relationship between FHWA and State Highway Agencies (SHA’s) in H&H software support.
- States prefer open source code; prefer not to have AASHTO proprietary software for routine design work. (Bill Bailey)
- Technical support has been a major role for FHWA (Lotwick Reese)
- The technical committee can help justify continued support.
- Need to involve organizations like the Assoc. of County Engineers. (Cynthia Nurmi)
- HEC-RAS is on the web for use; training is available. Main interest is HY-8. (Te Ngo)
- State DOT’s are more on front end of H&H software than industry is. Most software supports NHI training. (Mark Miles)
- Software development is very costly.
• HY-8 software has been totally responsive. Recommend anything the committee can do to encourage continued support of that software. (Lotwick Reese)
• Why not AASHTO?? (Glen Decou)
  o Software become proprietary
  o Not responsive improvements in technology
  o RDS was not a success for AASHTO
  o FHWA has technical expertise in hydraulics; AASHTO does not
  o The technical committee does not have time or resources to develop AASHTO software.
• Need to differentiate between enhancements and user support. HEC-RAS is a good management model. (Bart Bergendahl).
• A motion was made for the technical committee to prepare a letter asking for FHWA to continue support of H&H software. Mark Mile, Karuna Pujara and Mike Fazio volunteered to draft a letter for the committee to endorse.

12. Mark Miles led a discussion about developing a Policy Manual from the Model Drainage Manual (MDM). The following remarks were noted:
• The Green Book is policy
• Policy should specify Min sizes
• Omit example problems from the policy manual
• Difficult to agree on a national policy. States will ignore policy that does not follow state operating procedures (Glenn Decou)
• Canada adopted national standards but allowed local exceptions
• AASHTO standards could save lawsuits (Mark Miles)
• Green book sells like hot cakes, MDM sales like mud pies (Te)
• FL would not be threatened by a national policy (Rick Renna)
• Policy format should specify acceptable ranges rather than the double parenthesis format currently on the MDM (Norm Schips)
• Spread criteria for pavement drainage are needed. States can tighten criteria
• Policy should not change often (Bill Bailey)
• A policy manual will get a high level of scrutiny during AASHTO balloting
• Federal Lands could utilize policy that specifies acceptable ranges. Commentary would be helpful (Bart Bergindahl)
• Suggest looking at 4 or 5 examples during technical discussion of each chapter to find a good format and level of detail for the policy manual (Glenn Decou)
• Suggested titles for the isolated parts of the MDM:
  ➢ Level 1 “Policy on Drainage Structures”
  ➢ Level 2 “Recommended procedures”
  ➢ Level 3 “List of web-based procedures”
• AASHTO does have standards on titles

13. The following MDM Chapter assignments were decided after a little informal horse-trading:
• Norm Schips, Chapter 1, Introduction
• Jim Richardson, Chapter 2, Legal
• Norm Schips, Chapter 3, Policy
• Glenn De Cou, Chapter 4, Documentation
• Mike Fazio, Chapter 5, Planning and Location
• Lotwick Reese, Chapter 6, Data Collection
• Rae Van Hoven, Chapter 7, Hydrology
• Brooks Booher, Chapter 8, Channels
• Te Ngo, Chapter 9, Culverts
• Roy Mills, Chapter 10, Bridges
• Rich Phillips, Chapter 11, Energy Dissipators
• Merrill Dougherty, Chapter 12, Storage Facilities
• Bill Bailey, Chapter 13, Storm Drain Systems
• Dan Ghere, Chapter 14, Pump Stations
• Mark Miles, Chapter 15, Surface Water
• Dave Henderson, Chapter 16, Erosion and Sediment Control
• Karuma Pujara, Chapter 17, Bank Protection
• Rick Renna, Chapter 18, Coastal Zone
• Mike Fazio, Chapter 19, Construction
• Dave Henderson, Chapter 20, Maintenance
• TBD, Chapter 21, Wetlands
• Karuna Pujara, Chapter 22, Groundwater

13. The bulk of this committee meeting was devoted to the status of the committee initiative to revise the Model Drainage Manual (MDM) and separate it into two parts; namely a Policy (Drainage) Manual and a Procedure (Drainage) Manual. Discussion at this meeting focused on what could go in the policy manual, which is perceived to be a relatively thin document. Chapter chairpersons led discussions for each chapter. Most chapter chairpersons provided a handout to facilitate discussion. Those handouts will be turned over to Jorge Pagan, Committee Secretary, but they are not attached to these minutes. Highlights of discussion for chapters 1 thru 20 and the glossary are described below.

Chapter 1. "Introduction"
This was a new assignment chapter. After some discussion it was assigned to Dave Henderson since he wasn’t there to resist. Norm Schips preferred some other chapter rather than the introduction.
Mark Miles suggested that the committee needed to establish some definitions of “Policy” and “procedures” for the discussion. Rae Van Hoven offered the following definitions that were used by Smith Engineering for one of their projects:
- Policy is a plan of action designed to influence.
- Guideline is a statement of policy or procedure.
- Criterion is a standard upon which judgment is based.

The general consensus was that these definitions would not work for the AASHTO publications.
Chapter 2. “Legal.” Assigned to Jim Richardson.
This chapter is appropriate for a level 1 Policy Manual as is.
Joe Krolak agreed to get a legal opinion about limited use deeds when property is purchased for FEMA right-of-way.
Mark Miles recommended omitting “Agency” throughout most of this chapter.

Chapter 3. “Policy.” Assigned to Norm Schips.
This chapter is not appropriate for a Policy Manual. Most of the information on this chapter can be split between the introduction and legal chapters. Norm and Jim Richardson agreed to go through chapter 3 to determine where information should be moved. Norm recommended that definitions on chapter 3 be moved up front of the manual.
Chapter 3 will be disbanded but several replacement topics were suggested including:
  - Culvert rehabilitation
  - Culvert material selection
  - Ground water recharge
Karuna Pujara (MDSHA) agreed to scope out a new chapter on ground water recharge

Chapter 4 “Documentation.” Assigned to Glenn Decou.

Glenn focused on what to do, not how to do it. The policy portion of this chapter was reduced from 8 pages to 1 ½ page. The checklist was omitted. Discussions like data source and storage media belong in this procedures document; not in the policy document.
Mark Miles questioned whether the checklist should be split among various chapters or presented as one big list in the procedures document.
The consensus was to drop documentation sections from each chapter on the level 1 policy document and move them to the level 2 procedures document.

Chapter 5 “Planning and Location.” Assigned to Mike Fazio.
Mike separated policy from procedures.
Rick Renna suggested that planning should account for stream stability, scour resistance and other major cost items.
The general consensus about sections 5.1.3.3 is that is guidance on when H&H Planning reports are needed; it is not a documentation section. (No handouts were provided for their discussions)

Chapter 6 “Data Collection.” Assigned to Lotwick Reese.
95% of the material on this chapter belongs on the procedures manual. Lotwick pulled out a small portion for policy.
Discussion:
  - Concerns about appendices 6A and 6B (Mark Miles)
  - Recommend combining bullets on the general section of chapter 6 with 1.1.3 “Drainage Survey” (Te Ngo)
• Suggest elevating portion dealing with private and public property facilities (Mark Miles)
• Note that mat’l is written for Hydraulic engineers (Glenn Decou)
• Lotwick will rework this chapter based on discussion.

Chapter 7 “Hydrology.” Assigned to Rae Van Hoven.
Rae sent e-mail to committee members. Changes are shown on red on handout that was provided for discussion.
Discussion:
• Refer to FIRM (Flood Insurance Rate Maps as well as Flood Hazard Maps. (Te Ngo)
• Just refer to available FEMA maps (Mark Miles)
• Need consistency on tone of manual specially on use of “shall”, “should”, “must” (Glenn Decou)
• Joe Krolak agreed to get legal interpretation of that terminology
• A good role is to use “should” unless there is a conscious reason to use “shall”, “will” or “must”
• Policy really should address minimum criteria
• Delete “for routine urban designs”
• Reorder hydrologic methods on hierarchical order (Mark Miles)
• Unresolved issues:
  ➢ What really belongs on policy vs. procedures
  ➢ When to use “should”, “shall” etc
  ➢ How far to go on policy

Chapter 8 “Channel Design”
Assigned to Brooks Booher. Relatively minor changes are anticipated to make this chapter into a policy chapter
Discussion and suggestions:
• Omit “Agency”
• Modify bullets 2 and 3 of section 8. 2. 1
• Omit the section 8.3 tables including “n” value table from the policy manual. They belong on the procedures manual with reference to them on the policy manual

Chapter 9 “Culverts.” Assigned to Te Ngo.
This chapter drew considerable discussion and discussions suggestions including the following:
• Retain the “commercial end section” material on section 9.1.2. Add HPDE prefab end sections
• Change title of section 9.2 from “policy” to general
• Table of design frequency vs. class of road belongs in policy
• Table 9.1 belongs in procedures
• Section 9.3.2.2, delete 2nd bullet reword reminder
• Section 9.3.2.3, delete 3rd bullet. Add “incorporate provisions for thawing ice if necessary”
• Section 9.3.2.4, add bullet regarding fish passage
• Section 9.3.3.4, edit 3rd bullet, remove parenthesis. Add bullet for down stream reservoir conditions
• Section 9.3.3.5 Change title from “Max velocities” to abrasion but it belongs in procedures, not policy
• Need a table of minimum velocities for policy
• Section 9.3.3.7, storage, add a bullet to consider unsteady flow analysis

The consensus of the group was that further comments should be sent to Te by e-mail.

Chapter 10 “Bridges.” Assigned to Roy Mills.
Roy was not at the meeting but he distributed this chapter for review by e-mail.

Previously this chapter was assigned to Barry Newman, Te Ngo, and Phil Thompson.
Mark Miles agreed to make a copy of Barry Newman’s write-up for Rich.

Chapter 12 “Storage Facilities.” Assigned to Merril Dougherty (absent).
Mark Miles agreed to ask Merril to distribute copies of this chapter for review by e-mail.

Chapter 13 “Storm Drain Systems.” Assigned to Bill Bailey.

Discussion items:
• Section 13.1.2, “Cooperative Projects”
  Joe Krolak agreed to provide federal rules regarding use of federal aid funds for cooperative projects. Generally local governments pay for excess capacity for future growth.
• Section 13.2.1 “Design Frequency”
  ➢ Design spread vs. Roadway classification came directly from previous version
  ➢ Design storm frequency (return interval) was added
  ➢ Need ADT to characterize high volume roads
  ➢ Table headings should read minimum return interval and maximum spread
• Joe Krolak and Dan Ghere agreed to examine HEC-22 for return interval and spread criteria and try to find origin of the criteria
• Need to consider duration as well as return interval since most storm drain systems are designed using the rational equation to estimate runoff
• Bill likes to list a few of the alternate hydrologic methods. After extensive discussion Mark Miles tabled decision about when to list hydrologic methods
• Section 13.5 “Outfall Policy” is a rewrite of Bill Hultbergs version. It is somewhat political. Their section will be received by e-mail.
• Section 13.4 “Hydraulic Methods” needs an introduction
• Junction loss is still a problem. Current procedures do not apply for rapid flow where they are most needed
• Section 13.6 “Water Quality” much of their section should be moved to chapter 15 “Environment”
Chapter 14 “Pump Stations.” Assigned to Dan Ghere.

- Hydraulic Institute criteria are referenced
- Use caution about use of “shall” that suggests using this procedure even if it varies from accepted procedures
- Norm Schips agreed to add a paragraph to the introduction chapter indicating that existing accepted procedures by an agency take precedence over the policy manual in cases of conflict
- Return intervals in the policy manual are considered minimums
- Dan Ghere will look into questions about explosion proof pumps and spill containment systems

Chapter 15 “Surface Water Environment.” Assigned to Mark Miles.

- Reduced chapter from 96 to 20 pages for the policy manual
- Deleted “cognizant” throughout
- Omitted “wetlands” and ground water” there are candidates for separate chapters
- Most so called mandates are negotiable
- There are various techniques for determining ordinary high water boundary (OHW), using the annual peak runoff Q2.33 is not appropriate for determining jurisdictional or property boundary line.

Chapter 17 “Bank Protection.” Karuna Pujara agreed to take this chapter.
Karuna’s committee membership has not been processed, but no need to let a little detail like that hinder a good volunteer.

Chapter 18 “Coastal Zone.” Assigned to Rick Renna.

- Chapter is written for H&H Engineers with enough detail to communicate with coastal engineers
- Coastal engineers must hold M.S. or Ph.D. (or equivalent experience)
- HEC – 25 will help
- Design strategy for coastal roadway is to use low roadways and expect overtopping. Removing excess sand from the road is cheaper than reconstruction of an elevated embankment
- The storm surge manual dated back to 1986
- Multiple storm surge peaks from hurricanes is a problem
- Migration of deep water channels coastal zones is a major problem
- The simplified contraction scour procedure on HEC-18 is not appropriate for coastal waterways.
- A 2-D sediment transport model is more appropriate

Chapter 19 “Construction.” Michael Fazio agreed to take this chapter.
This chapter was previously assigned to Norm Schips. Norm led the discussion
- Policy part can probably be reduced to one page and will come mostly from what is now the introduction chapter
- Most of this chapter belongs in Procedures

Chapter 20 “Maintenance.” Assigned to Dave Henderson (absent)

“Glossary.” Assigned to Norm Schips
- Norm will get the electronic glossary file from Jim McDonald
- Norm will split the glossary and send parts to various chapter chairs for review
- The glossary belongs in Procedures
- Rick Renna will add coastal glossary

14. Bart Bergendahl gave an update on Fish Passage
   - HEC-26 is being developed at Washington State University. Rollin Hotchkiss is the P.I.
   - Survey is posted on the web at Washington State University
   - A summit meeting is scheduled for October 2005 in Pullman, WA
   - Glenn DeCou noted that California is considering research on hydraulics of baffles

15. Mike Fazio gave a presentation on the 2005 Utah Flooding
Utah experienced five years of drought followed by hard rains over a heavy snow pack. The Santa Clara in the South West corner of Utah experienced 200 year flooding. Four bridges failed. Debris and very dense flows contributed to problems.

16. Joe Krolak noted that FHWA has used a memo that reiterates FHWA statement that States have expertise and authority to select culvert materials

17. Sterling Jones presented results of the culvert study conducted at the FHWA Hydraulics lab. The FHWA partnered with SD DOT to investigate effects of bevels, corner fillets, multiple barrels, span to rise and skewed inlets. Revised final report has been submitted to the SD DOT

18. Open discussion about updating rainfall maps. Glenn DeCou questioned look of final product. The expectation is that the product will feature a map of the U.S. with click and zoom capability to pull up IDF curves. The challenge is going to be coordinating funding from Federal Agencies, State DOTs and local agencies.

19. Larry Arneson gave a status report on WMS and SMS
   - Digital data sources available via the internet have expanded considerably
   - Version 9 of SMS is still a Beta version. It has a new graphics library.
   - FESWMS is now called FST 2DH
   - User manuals are available from Larry
   - SMS and WMS have user groups that one can subscribe to.
   - The training course for 2D Modeling is NHI 135071

20. Mark Miles reported that the ad hoc group had drafted a letter appealing for the FHWA to continue supporting hydraulic software. HY-8, SMS and WMS are critical programs and critical
to the success of hydraulics units of State Highway Agencies. Larry Arneson suggested that it
would be best to keep the letter on hold for now. A better approach might be acknowledging
benefits of past support. The consensus was to polish the letter but not submit it yet.

21. Problem Statements are listed on Page 12 of the minutes for the Fall ’04 meeting in Austin,
TX. In the interest of time, Mark Miles decided to prioritize problem statements by e-mail. Rick
Renna suggested two new problem statements:
   1) Routing overland flow and detention pond outflow on one package
   2) Wave forces on bridges
Larry Arneson will work on a revised 20-07 statement on “Survey of Drainage Practices”.
Sterling Jones agreed to send electronic files of current problem statements as well as TRB
Committee AFB60 problem statements to AASHTO task Committee members for review and
modification/merging
The target dates for writing new problem statements and modifying current statements was set
for June 20. This target date will be delay because electronic files. The target date for balloting
is August 15.

22. Business Meeting
Future Meetings
• Fall 05 will be in Sioux Falls, SD
  October 25 – 27, 2005
  Lodging will be the Radison at $60.00/night meeting rooms will be $150/day
• Spring 06 meetings will be in Buffalo, NY on late April or first week of May 2006
• Fall 06 meeting will be in Albuquerque, NM on October 11 –13, 2006

Treasures Report
$3,225 balance from Dave Henderson
$1,900 fees collected for this meeting
$5,125 TOTAL

Minutes from this meeting should summarize chapter assignments

23. Wrap up Session - Concerns and Issues
   CA is going back to the English system. The SF/Oakland Bay bridge project resulted
from the 1989 earthquakes that took out one span. The estimate for seismic retrofits was
$1 B; the estimate for a new bridge was $1.2 B. The current estimate is $6.1 B driven in
part by dramatically increased costs for steel and concrete.

   Canada is developing its own design standards. They are developing pipe selection
criteria based on life cycle costs. They will assume a standard life of a project will be 75
years. The estimated life of concrete pipe is 75 years, of steel is 25 years, of coated steel
is 50 years and of plastic is 75 years.

   Wyoming is adamant against using plastic pipe. Hydraulics is often overpowered by
other issues, such as environmental constraints.
Arkansas has a contract with the University of Arkansas to develop new IDF curves and peak flow rate regression equations. Arkansas has several emergency repair projects that they are working on with the Corps of Engineers under section 14. They have been successful getting exemptions for small maintenance projects.

New York is coming to terms with state permits requirements.

Maryland has experience getting permits and special exemptions for maintenance projects.

Kansas is going back to the English system. Updated design manuals will go on-line but they are struggling with 508 compliance requirements.

Florida uses the Florida pier score equation rather than the HEC-18 equation. They have love bed score test results from New Zealand experiments to augment complex pier score procedures. They have developed a test apparatus for measuring rate of scour for rock samples. Pavement designs and high ground water tables are an issue. Florida is testing drop inlet storm water interceptors devices. Most of these devices do not work well for full range of flow.

New Mexico is revising drainage manuals into three volumes-hydrology, drainage criteria and drainage (procedures). They would like to get drainage criteria from other states. They don’t have much experience with HPDE culverts but are having some problems. Design/build projects have been relatively successful.

Idaho has the scour manual posted on a website. They are working with the USGS regarding use of “Streamstats” for delineating drainage basins, calculating regression equation parameters and reoccurrences interval flows for Q_{1.5} through Q_{500}. The website address for “Streamstats” is [http://streamstats.usgs.gov/cdstreamstats](http://streamstats.usgs.gov/cdstreamstats).

South Dakota is also looking at “Streamstats”.

Alaska is struggling with permit process. The coast guard often asks for information that is not pertinent. They have a big turnover in environmental analysts. The Hubbard Glacier may dam a large fiord causing the loss of a large steelhead sportfish and commercial salmon fishery, and the economic destruction of the town of Yakutat. The Corps of Engineers has embarked funds for monitoring the glacier. They have a vigorous spring break-up this year. There is a need a better prediction tool to deal with potential “pile-ups” vs. weather patterns.

24. The meeting was adjourned at noon on Thursday May 12, 2005.
# ATTACHMENT A

## AASHTO TECHNICAL COMMITTEE ON H&H
### 10-12 MAY 2005 SACRAMENTO, CA

### Attendance List

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<td>(202)493-3442</td>
<td><a href="mailto:sterling.jones@fhwa.dot.gov">sterling.jones@fhwa.dot.gov</a></td>
</tr>
<tr>
<td>Tim Hess</td>
<td>Transportation Research Board</td>
<td>500 Fifth Street, NW Washington, DC 20001</td>
<td>(202)334-2049</td>
<td>(202)</td>
<td><a href="mailto:timhess@naf.edu">timhess@naf.edu</a>@fhwa.dot.gov</td>
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ATTACHMENT D
AGENDA

Tuesday May 10, 2005

8:00 am – 8:15 M. Miles for Dave Henderson – Call Task Force Meeting to Order, Introductions, & Housekeeping
8:15 am – 8:30 am Welcome – Glenn DeCou
8:30 am – 9:15 am Jorge Pagan – FHWA Perspective
9:15 am – 10:00 am I-10, Escambia Bay Bridge Failure
10:00 am – 10:15 am Break
10:15 am – 10:45 am Jim McDonnell/Jeremy Fissel – AASHTO Update
10:45 am – 11:15 am Tim Hess – NCHRP Update
11:15 am – 12:00 pm Larry Arneson – Nationwide Perspective of State of Practices

12:00 pm – 1:00 pm Lunch
1:00 pm – 1:45 pm Sterling Jones – Bottomless Culverts Update & South Dakota Culverts Research
1:45 pm – 2:15 pm T. C. – Support & Maintenance of Software, Future needs
2:15 pm – 3:00 pm T. C. – Open Discussion on Direction of MDM
3:00 pm – 3:15 pm Break
3:15 pm – 3:30 pm New Assignment – MDM Chapter 1, Introduction
3:30 pm – 3:50 pm Glenn DeCou – MDM Chapter 4, Documentation
4:10 pm – 4:30 pm Mike Fazio – MDM Chapter 5, Planning & Location

Wednesday May 11, 2005

8:00 am – 8:20 am Lotwick Reese – MDM Chapter 6, Data Collection
8:20 am – 8:40 am Rae Van Hoven – MDM Chapter 7, Hydrology
8:40 am – 9:00 am Brooks Booher – MDM Chapter 8, Channels
9:00 am – 9:20 am Te Ngo – MDM Chapter 9, Culverts
9:20 am – 9:40 am Roy Mills – MDM Chapter 10, Bridges
9:40 am – 10:00 am New Assignment – Chapter 11 Energy Dissipators
10:00 am – 10:20 am Break
10:20 am – 10:40 am Merril Dougherty – MDM Chapter 12, Storage Facilities
10:40 am – 11:00 am Bill Bailey – MDM Chapter 13, Storm Drainage Systems
11:00 am – 11:30 am New Assignment – MDM Chapter 14, Pump Stations
11:30 am – 12:00 pm Mark Miles – MDM Chapter 15, Surface Water Environment

12:00 pm – 1:00 pm Lunch
1:00 pm – 1:20 pm Bart Bergendahl – Fish Passage Update
1:20 pm – 1:40 pm Michael Fazio – Flooding, Saint George, Utah
1:40 pm – 2:10 pm New Assignment – MDM Chapter 17, Bank Protection
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<tr>
<td>2:10 pm – 2:25 pm</td>
<td>Break</td>
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<td>2:25 pm – 2:55 pm</td>
<td>Rick Renna – MDM Chapter 18, Coastal Zone</td>
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<td>2:55 pm – 3:25 pm</td>
<td>Te Ngo – MDM Chapter 19, Construction</td>
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<tr>
<td>3:25 pm – 3:55 pm</td>
<td>David Stolpa – MDM Chapter 20, Maintenance</td>
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<td>3:55 pm – 4:30 pm</td>
<td>Norman Schips – MDM Glossary</td>
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**Thursday May 12, 2005**

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<td>8:00 am – 10:30 am</td>
<td>Technical Presentations (TBD)</td>
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<td>10:30 am – 10:45 am</td>
<td>Break</td>
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<tr>
<td>10:45 am – 12:00 pm</td>
<td>M Miles for David Henderson – Task Force Business Meeting (Meetings Fall 05, Spring 06, select Fall 06)</td>
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<tr>
<td>12:00 pm</td>
<td>M Miles for David Henderson – Adjourn Task Force</td>
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ATTACHMENT E

FHWA PERSPECTIVE by Jorge Pagan; presented by J. Sterling Jones

FHWA Website for Hydraulic Engineering
www.fhwa.dot.gov/engineering/hydraulics
Serves as our “Community of Practice”. Integrated program for research and bridge technology

Summary of FHWA Initiatives
First Edition of HEC-25 “Coastal Hydraulics”
available on the FHWA Hydraulics website.

Second Edition of HEC-25
Contractor: University of South Alabama (Dr. Scott Douglas).
NHI Course to be developed parallel to second edition.
Joe Krolak, has lead responsibility

Update HECs 18, 20 and 23
programmed for FY ‘05-’06

Rapid Stream Stability Assessment
Will be published as FHWA-RD-05-072
Will be considered for the next edition of HEC-20.

Abutment Scour Database
USGS 140 existing scour hole field measurements for SC used to develop envelop curves
Database lacks hydraulic information and is speculative about infilling

Scour and Protection of Bottomless Culverts Phase II
FHWA lab study near completion
Kornel Kerenyi will present results

Pressure Flow Scour Study for Various Deck Shapes
FHWA lab study approved for FY-05
Will use PIV (particle imaging velocimetry) to develop effective flow area criteria

Select Exposed Foundation Scour Test
Proposed additional testing to be coordinated with Florida DOT for the complex pier procedure

Module on Plan of Action for Scour Critical Bridges
Contactor: Ayres Associates.
Cynthia Nurmi has lead.

Unknown Foundation Synthesis
Proposals being reviewed by Panel
Sam Mansukhani, Geotechnical Engineer, FHWA Resource Center, has lead.

Unknown Foundation Summit
Scheduled for November 15-16, 2005 in Lakewood, CO.
Khamis Haramy, Geophysics, FHWA Central Federal Lands, has lead.

HEC-9 “Debris Control Structures”
Expanded scope to include debris at piers, scour effects and countermeasures
Brian Beucler, Hydraulics Engineer, FHWA Eastern Federal Lands, has lead

**New algorithms for FESWMS 2D**
- On going maintenance activity
- Dr. Larry Arneson has lead.

**New HDS-7 “Hydraulics of Bridge Waterways”**
- Update HDS-1 to reflect computerized technology, but HDS-1 will be retained as a classic
- Programmed for FY ’05-’06

**HEC-14 “Energy Dissipators for Highway Culverts”**
- Contractor: Kilgore Consulting and Management.
- Survey and literature review completed.
- Cynthia Nurmi has lead.

**HY-8 Culvert Design Software**
- RFP being prepared to develop Graphical User Interface
- Will convert to Windows operating system

**HDS-5 “Hydraulics of Highway Culverts”**
- Update will consider results from FHWA lab studies and NCHRP Project 15-24
- Programmed for FY ’05-’06

**Effects on Inlet Geometry on Performance of Rectangular Culverts**
- FHWA lab study sponsored by SD DOT
- Sterling Jones will present results

**New FHWA Storm Drain Software**
- Replace HYDRA which was challenged for proprietary rights
- Programmed for FY ’05-’06

**New algorithms for WMS (FY ’05)**
- On going maintenance activity
- Dr. Larry Arneson has lead.

**HEC-22 Urban Drainage Design Manual**
- Updates programmed for FY ’05-’06

**Junction Loss Study**
- FHWA lab study using PIV to visualize flow patterns and test Kilgore’s proposed procedures for the next edition of HEC-22

**Coastal Transportation Research Center**
- Earmark funds
- Contractor: University of South Alabama (Dr. Scott Douglas).
- Includes coastal hydrology, numerical modeling of coastal storm processes, water quality aspects

**Upgrade Rainfall Maps**
- Candidate for targeted pooled fund study
- Geof Bonning, NOAA, provided list of states and suggested funding over three year period. (see attached list)

**HEC-15 “Design of Roadside Channels with Flexible Linings”**
- Contractor: Kilgore Consulting and Management
- Final draft has been reviewed by FHWA.
- Dan Ghere has lead.

**HEC-26 “Design and Retrofit of Highway Culverts for Fish Passage”**
Contractor: Washington State University (Dr. Rollin Hotchkiss)
Earmark contract monitored by Hamid Ghasemi from TFHRC R&D
Bart Bergendahl, has lead for this Task.

**HEC-11 Design of Riprap Revetment**
Updates programmed for FY '05-'06

**Substrate Stability Tests for Fish Passage Culverts**
FHWA lab study discussed for funding by Alaska DOT
Mark Miles indicated that Alaska is negotiating with Utah State Univ. to do this work.

**NHI Training Courses**
135010 River Engineering for Highway Encroachments
135027 Urban Drainage Design
135028 Stormwater Pump Station Design
135041 HEC-RAS, River Analysis System
135046 Stream Stability and Scour at Highway Bridges
135047 Stream Stability and Scour at Highway Bridges for Bridge Inspectors
135048 Countermeasure Design for Bridge Scour and Stream Instability
135056 Culvert Design
135065 Introduction to Highway Hydraulics
135067 Practical Highway Hydrology
135071 Surface Water Modeling System with Flo2DH and SMS
135080 Hydrologic Analysis and Modeling with WMS
135081 Introduction to Highway Hydraulics Software

**NHI Training Courses New and Updates**
135082, Tidal Hydrology, Hydraulics and Scour at Bridges
   Contractors: University of South Alabama and Kilgore Consultant Management.
   Scheduled completion in FY '07.
   Joe Krolak has lead.
135083, Tidal Hydrology and Hydraulics Modeling
   programmed for FY '06
135084, Sediment Transport
   programmed for FY '06
135041 HEC-RAS, River Analysis System
   Contractor is Ayres Associates.
   Will add pre/post tests and a comprehensive workshop.
   Dr. Larry Arneson has lead.

**National Bridge Inspection Standards--- Updated Rule**
Enacted on January 13, 2005
requires a Plan Of Action (POA) for bridges identified as scour critical.
ATTACHMENT F
Geoff Bonnin estimate of funding requirements to update rainfall maps by pooled fund studies

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ATTACHMENT G

Tim Hess Summary of NCHRP Projects of Interest to H&H

Publications from Completed Research

*NCHRP Report 533, Web Doc 67, CD-48 and CD-49*  “Methodology for Predicting Channel Migration”
*NCHRP Report 516,* “Pier and Contraction Scour in Cohesive Soils”
*NCHRP Report 515,* “Portable Scour Monitoring Equipment”
*NCHRP Report 482,* “Guidance for Selecting Compensatory Wetland Mitigation Options”
*NCHRP Report 474,* “Assessments of Impacts of Bridge Deck Runoff Contaminants on Receiving Waters”
*NCHRP Report 473 and Web Doc 44,* “Recommended Specifications for Large-Span Culverts”
*NCHRP Reports 448, 443, and CRP –CD-7,* “Environmental Impact of Construction and Repair Materials on Surface and Ground Water”
*NCHRP Synthesis 303,* “Assessment and Rehabilitation of Existing Culverts”

Recent Completions

*NCHRP Project 24-14,* “Scour at Contracted Bridge Sites”
  Final Report published in July 2005
*NCHRP Project 24-19,* “Environmentally Sensitive Channel- and Bank-Protection Measures”
  Final Report published June 2005

Active Projects

*NCHRP Project 24-7(2),”Pier Scour Countermeasures”*
  Ayres and Associates, $800K
*NCHRP Project 24-15(2),”Abutment Scour in Cohesive Soils”*
  Texas A&M, $400K
*NCHRP Project 24-18A,”Countermeasures to Protect Bridge Abutments from Scour”*
  Michigan Tech, $500K
*NCHRP Project 24-20,”Prediction of Scour at Bridge Abutments”*
  University of Iowa, $500K
*NCHRP Project 24-23,”Riprap Design Criteria, Specifications, and Quality Control”*
  Ayres and Associates, $350K
*NCHRP Project 24-24,”Criteria for Selecting Numeric Hydraulic Modeling Software”*
  Ocean Engineering Associates, $175K
*NCHRP Project 24-25,”Risk-Based Management of Bridges with Unknown Foundations”*
  GKY & Associates, $200K
*NCHRP Project 24-26,”Effects of Debris on Bridge-Pier Scour”*
Ayres and Associates, $600K  
*NCHRP Project* 24-27, “Recommendations for the Adoption of Bridge Scour Research”  
In development, $350K  
University of South Carolina, $100,000  
Project 20-07(162), "Synthesis-of-Practice: Correlation of Bench-Scale and Large-Scale Testing on Rolled Erosion Control Products (RECP)"
  - Colorado State University, $50,000  
Ayres and Associates, $25K  
Project 20-05 (Synthesis 36-02) “Practices for Monitoring Scour Critical Bridges”  
Beatrice Hunt, Hardesty & Hanover  
GKY & Associates, $50,000  
Project 25-25(14), “The evaluation of various assessment methodologies used to study and monitor the effects of dam removal projects (stream restoration) implemented as appropriate stream mitigation for federally funded transportation projects”  
ICF Consulting, $75,000  
Oregon State University, $700,000  
Oregon State University, $100,000

**New H&H Projects funded for FY2006**

$400,000  
NCHRP Project 24-29, “Effects of Fractured or Degradable Rock on Pier Scour at Bridges”  
$750,000  
NCHRP Project 15-24, “Hydraulic Loss Coefficients for Culverts”  
$250,000 (continuation funding)  
NCHRP Project 24-20, “Prediction of Scour at Bridge Abutments”  
$200,000 (continuation funding)  
*Project E-08*, “Ecological Effects of Streambank Armoring”  
$500,000 (contingency funding)