

**OFFICE OF BRIDGE DEVELOPMENT
MANUAL FOR HYDROLOGIC AND HYDRAULIC
DESIGN**

**CHAPTER 1
INTRODUCTION**



SEPTEMBER 2007

CHAPTER 1 INTRODUCTION

Welcome to the OBD Manual for Hydrologic and Hydraulic Design. This manual is prepared by the Office of Bridge Development, Structure Hydrology and Hydraulics Unit, to offer guidance and direction to engineers involved in locating, designing and inspecting bridges and large culverts in Maryland. In most cases, the information in this manual supersedes other written policies and directives of the Office of Bridge Development in regard to the hydraulic design of structures.

The material presented in the OBD Manual for Hydrologic and Hydraulic Design has been carefully researched and evaluated. It is being continually updated and improved to incorporate the results of new research and technology. However, no warranty expressed or implied is made on the contents of this manual. The distribution of this information does not constitute responsibility by the Maryland State Highway Administration or any contributors for omissions, errors or possible misinterpretations that may result from the use or interpretation of the materials contained herein.

We have made every effort to incorporate into the manual the latest results of research and technology transfer from the Federal Highway, AASHTO, Transportation Research Board and others. However, we recognize that the judgment of the Engineer remains of paramount importance in the plan development and construction of structures that meet the needs of the SHA and the State of Maryland. We encourage the Engineer to utilize the information in this manual when making judgments about hydraulic designs. We also recommend that the engineer become familiar with other important hydraulic publications such as the manuals of the Federal Highway Administration.

We have been constantly revising and up-dating the manual for about ten years to reflect changing policies, procedures and technologies. We anticipate that this process will continue.

For some subjects, such as hydrology or bridge scour, we can accomplish updates rather easily by revising a specific chapter. For other topics relating to procedures and design policies, several chapters are interrelated and need to be read in context with each other in order to understand the scope of the guidance provided. We have included cross-references to assist you with this task. In particular, Chapter 3 and its Appendix serve as a summary of many of the other chapters regarding design approaches and processes.

Each chapter is dated and provided with footer notes to alert the user as to the last time the chapter was revised. The manual may not always be up-to-date with regard to the latest version of software such as GIS-Hydro or HEC-RAS. The user should always check with Structures H&H if there is there is a question about which software version to use.

Please be advised that several chapters are currently under revision as of September, 2007 and will be updated when the revisions are complete. These include:

- Chapter 7
- Chapter 8
- Chapter 11 – the ABSCOUR User’s Manual
- Chapter 14
- H&H Software – Updating the ABSCOUR Program.

We are no longer providing hard copy of the manual to others. Since the manual has become very large, it is not possible to send it as a unit via email. Our current plans are to compile the information in the Manual on a CD disk. The Office of Bridge Development will provide copies upon request of this electronic file version of the Manual.

Questions regarding use of the manual should be directed to Mr. Andrzej Kosicki (410 545-8340) or Mr. Len Podell (410 545-8363)

BACKGROUND ON THE MANUAL

The responsibility for hydrologic and hydraulic design in the State Highway Administration (SHA) is divided between the Office of Bridge Development and the Office of Highway Development. The policies and procedures set forth in this Manual apply only to structures or other floodplain encroachments determined to be the responsibility of the Office of Bridge Development as defined below:

- Structures with a drainage area of one square mile or greater.
- Roadway encroachments on floodplains or streams having a drainage area of one square mile or more.

The following categories of drainage facilities and systems are the responsibility of the Office of Highway Development:

- Small concrete slab and rigid frame structures, culverts and other similar structures with a drainage area less than one square mile.
- Roadway drainage and storm water management facilities and systems.

Questions relating to such drainage facilities or systems should be referred to the Office of Highway Development.

The Manual for Hydrologic and Hydraulic Design, herein after referred to as the Manual, consists of 2 volumes:

Volume 1 sets forth design policies and project development procedures for:

-collection, evaluation, analysis, submittal and documentation of information for hydrologic, hydraulic and scour evaluation reports,

-development and review of plans and other project documents for the location and design of hydraulic structures, and

-coordination procedures for ensuring that the policies of the Office of Bridge Development are fully considered in the location and design phases of project development

Volume 2 contains detailed guidelines and recommendations of the SHA for various aspects of the design of hydraulic structures.

**Office of Bridge Development,
Structure Hydrology and Hydraulics Unit**

Manual for Hydrologic and Hydraulic Design

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 - **Volume 1: Policies and Procedures**
 - **Volume 2: Design Methodologies**

VOLUME 1- POLICIES AND PROCEDURES

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 - **Appendix A: Coordination with FEMA**
 - **Appendix B: Guidelines for In-Kind Replacement of Culverts and Bridges**
- ***Chapter 6 Data Collection**

* This chapter has not been written as of September 2006

VOLUME 2 - DESIGN METHODOLOGIES

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 - **Maryland OBD Design Procedure for Riprap Outlet Basins for Culverts**
 - **Maryland SHA Design Method for Evaluating Flow at Tidal Bridges (TIDEROUT 2)**

* These chapters have not been written as of September 2007