CHAPTER 4

DOCUMENTATION AND DOCUMENT RETENTION

4.0 OVERVIEW

A. Introduction. An important part of the design or analysis of any hydraulic facility is the documentation. Appropriate documentation of the design of any hydraulic facility is needed for:

- The importance of public safety;
- Justification of expenditure of public funds;
- Future reference by designers (when improvements, changes or rehabilitations are made to the highway facilities);
- Information leading to the development of defense material for matters of litigation; and
- Public information requirements.

Frequently, it is necessary to refer to plans, reports, specifications and analyses (records) long after the actual construction has been completed. Documentation also allows evaluation of the performance of structures after flood events to determine if the structures performed as anticipated or to establish the cause of unexpected behavior, if such is the case. In the event of a failure, it is essential that contributing factors be identified so that recurring damage can be avoided. Records management is the systematic control of recorded information from the time that information is created until its ultimate disposition either through its destruction or its transfer to archives for permanent preservation. PennDOT is responsible for making provisions for the continued retention of permanently valuable records (permanent records) in a human-readable format (paper or microfilm) even though they have been copied into an imaging system. PennDOT must retain the original copy of a permanently valuable record or generate a security microfilm copy to serve as a substitute. Microfilm copies must be created and maintained in conformance with applicable Commonwealth standards.

B. Purpose. This chapter identifies the documentation to be included in the design files and on the construction plans. Although PennDOT's documentation requirements for existing and proposed drainage facilities are similar, the documentation retained for existing facilities are often slightly different than that for proposed facilities, and these differences are discussed. This chapter focuses on the documentation of the findings obtained in using the other chapters of this manual, and thus designers need to be familiar with all the hydrologic, hydraulic, erosion and sediment pollution control, drainage, and stormwater design procedures associated with this manual. This chapter identifies PennDOT's system for organizing the documentation of hydraulic designs and reviews to provide as complete a history of the design process as practical.

The major purpose of providing good documentation is to define the design procedure that was used and to show how the final design and decisions were determined. Often, there is expressed the myth that avoiding documentation will prevent or limit litigation losses because it supposedly precludes providing the plaintiff with incriminating evidence. This is seldom, if ever, the case. Clear, organized documentation provides a record of reasonable and prudent design analysis based on the best available technology. Thus, good documentation can provide the following:

- Protection for PennDOT by proving that reasonable and prudent actions were taken.
- Identification of the situation at the time of design.
- Documentation that rationally accepted procedures and analysis were used at the time of the design that were commensurate with the perceived site importance and flood hazard.
- Continuous site history to facilitate future reconstruction.
- The file data necessary to quickly evaluate any future site problems that might occur during the facility's service life.
- Expedient plan development by clearly providing the reasons and rationale for specific design decisions.
- Ensure any municipal agreements for future maintenance or ownership are negotiated and documented.
C. Documentation and District Project Files. The definition of hydrologic, hydraulic, drainage and stormwater documentation is the compilation and preservation of the design and related details and all pertinent information on which the design and decisions were based and is referred to as the District Project Files (DPFs). DPFs may include:

- The documentation for filing National Pollutant Discharge Elimination System (NPDES) applications.
- The documentation for Erosion and Sediment Pollution Control (E&SPC) Plans.
- The documentation for Preparedness, Prevention and Contingency (PPC) Plans.
- The documentation for Post-Construction Stormwater Management (PCSM) Plans.
- The Location Hydraulic Studies (Preliminary Engineering Phase) as defined in Publication 13M, Design Manual, Part 2, *Highway Design*, Chapter 10, Section 10.1.A.10 is to be included as part of the environmental review documents noted below.
- Conditional Letter of map Revision (CLOMR) or Letter of map Revision (LOMR) as per Publication 13M, Design Manual, Part 2, *Highway Design*, Chapter 10, Section 10.7.C.9 and Appendix C.
- Written agreements with the municipalities to maintain closed stormwater facilities that PennDOT installs during construction projects if applicable.
- Other supporting documentation such as drainage area and other maps, field survey information, source references, photographs, engineering calculations, analyses and computer files, plans, specifications, measured and other data and flood history including narratives from newspapers and individuals (e.g., highway maintenance personnel and local residents who witnessed or had knowledge of an unusual event).

D. Roadway Management System (RMS) and Location Reference System (LRS). The Roadway Management System (RMS) is PennDOT’s primary means for defining and monitoring the State-owned highway network, maintaining an inventory of the roadway features, conditions, and characteristics, and providing decision-makers with the information that is necessary for funding, business planning, project design, and maintenance programming. The Location Reference System (LRS) provides a framework for which all RMS data can be tied to true roadway locations. Data stored and managed in RMS includes roadway geometry information, traffic information, pavement and shoulder history, maintenance history, municipal and legislative boundaries, intersections, roadside features, structure locations, railroad crossings information, pavement testing, condition survey information (including guide rail and drainage features), and posting/bonding information. One of the primary uses of RMS is the annual allocation of highway maintenance funds. For an introduction to the RMS/SR system please see the LRS Introduction Manual specified in Appendix 4A, *Documentation Quick Reference Guide*, Section 4A.0.L.

RMS data can be obtained from all PennDOT District offices and most county maintenance offices, which are linked to the RMS network. For further information about RMS or the SR system, the RMS coordinator in each Engineering District office should be contacted. One of the most important aspects of RMS is having a viewable representation of a State Road (SR). This is accomplished with a graphical diagram called a Straight Line Diagram (SLD). The Bureau of Maintenance and Operations produces an electronic version of the SLD for every state road, in every county, annually that can be downloaded from the link specified in Appendix 4A, *Documentation Quick Reference Guide*, Section 4A.0.L.

E. Phases. Hydraulic documentation needs to be developed for up to four different phases of the project development cycle. The four phases are preliminary engineering, final design, construction, and maintenance or operation.
It is important to prepare and maintain in a permanent file the as-built plans for every drainage structure to document subsurface foundation elements (e.g., footing types and elevations, pile types and (driven) tip elevations).

According to the Commonwealth of Pennsylvania, Governors' Office State Records Management Manual, record series considered permanent by an agency should be identified by using "999" in the Retention for Agency field on the STD-56 and the retention fields on the STD-57. As the hydraulic facility design or investigation develops, additional information may be identified by the designer and incorporated into the project file at the designer's discretion. PennDOT also needs to record and maintain the agreements with local municipalities for operation/ownership of stormwater facilities.

1. Preliminary Engineering. Preliminary engineering documentation in the project file needs to include the following, if available, or within the budgetary restraints of the project:

- Location map and identification of the facility.
- Aerial photographs.
- Contour mapping.
- Watershed map or plan including:
  - Flow directions.
  - Watershed boundaries.
  - Watershed areas.
  - Natural storage areas.
- Surveyed data reduced to include:
  - Existing hydraulic facilities.
  - Existing controls.
  - Profiles (e.g., roadway, channel, driveways).
  - Cross sections (e.g., roadway, channels, faces of structures).
- Flood insurance studies and maps by FEMA.
- NRCS soils information.
- Hydrologic and hydraulic investigation/report.
- Site visit report(s) that may include:
  - Video recordings.
  - Audio recordings.
  - Photographs.
  - Interviews with local residents, municipal officials, and PennDOT maintenance personnel.
  - Written analysis of findings with sketches.
- Reports from other agencies (local, state or federal), PennDOT's personnel, and newspapers.
- Design notes/assumptions.
- Engineering cost estimates.

2. Final Design. During Final Design, the designer may need to contact the county maintenance office to determine if there are any concerns with what is being installed. In addition, if no maintenance agreement with another entity has been developed, the designer needs to determine whether the District's Maintenance forces are willing to maintain it. Design documentation in the project file needs to include all the information used to justify the design, including:

- Reports from other agencies.
- Hydrologic and hydraulic (H&H) report.
- Erosion and sediment pollution control plan and report.
- Completed water obstruction and encroachment permit.
- Post-construction stormwater management plan and report.
- Roadway drainage report.
- Preparedness prevention contingency plan approvals as described in Section 4.2.

3. Construction. Construction documentation in the project file needs to include:

- Plans.
- Revisions.
- As-built plans and subsurface borings.
- Photographs.
- Publication 408, *Specifications*, Section 100 requirements.

4. Operation and Maintenance. Operation and/or maintenance documentation in the project file needs to include:

- Record of operation during flooding events, complaints and resolutions.
- Plans or descriptions of any repairs or modifications affected by maintenance forces.
- The municipal agreement for maintenance of closed stormwater facilities.

5. Post-Construction Documentation. Possibly the most valuable experience of any designer is gained by observing and analyzing the performance of a facility under field conditions. Hydraulic engineers are in a unique position in this regard because their designs are often tested by nature and may suffer damage from relatively small flow rates as well as from larger flows. Unfortunately, documentation rarely is available for hydraulic engineers to accomplish more than a qualitative analysis of performance.

Hydraulic engineers should take advantage of their unique opportunities to gain experience from tests provided by nature. The following documentation are examples of the types of information which are of value in reviewing and analyzing designs to assess the validity of practices, procedures, assumptions and decisions:

- Highwater elevations and flow rates.
- Ice and drift conditions.
- Erosion of approach overflow sections, embankments and spur dikes.
- Stream aggradation or degradation.
- Scour location, depth and extent.
- Performance of scour and erosion preventive measures.
- Meander and bend migration.
- Performance of stream bank protection and river training measures.
- Costs of maintenance, repair and corrective measures.

While the emphasis in this section is on the knowledge and experience that can be gained from field tests of designs, the above documentation also are useful in detecting potential or existing problems at the crossing which can be resolved by providing corrective measures.

### 4.1 DOCUMENTATION TYPES

A. Documents. Through the design and permitting process, the designer may need to prepare a number of documents. These documents include:

- National pollutant discharge elimination system (NPDES) permit application.
- Erosion and sediment pollution control (E&SPC) plan and narrative (Chapter 102).
- Roadway drainage report (RDR).
- Post-construction stormwater management (PCSM) plan and report.
- Preparedness prevention contingency (PPC) plan.
• Water obstruction and encroachment permit (Waterway permit).
• Hydrology and hydraulics (H&H) report.
• FEMA conditional letter of map revision (CLOMR) and letter of map revision (LOMR).

Appendix 4A, Documentation Quick Reference Guide follows the outline of this section. It provides a concise summary of the requirements and where to find the application or information on the regulation or requirement. Superscripts on the required item below correspond to the number on the Quick Reference Guide. The following is a short discussion on what should be included in the project file documentation, and where to find the requirements for each.

B. National Pollutant Discharge Elimination System (NPDES) Permit Application. The same NPDES "Notice of Intent" (NOI) form is required for both the PAG-02 or Individual Permit submission. Links to the form and its instructions can be found in Appendix 4A, Documentation Quick Reference Guide. A sample NOI completed for PennDOT projects is found in Appendix 4B, Sample Notice of Intent (NOI) Application Form. Documentation required for general and individual permits can be found in Chapter 12, Erosion and Sediment Pollution Control, Section 12.3.H.

The Applicant Checklist is a list of required items for the NPDES permit application that is attached to the application form. The checklist can be used as a guide when compiling information for a permit application and must be completed and submitted along with the NOI form. There are separate Applicant Checklists for the General and Individual permits.

Copies of the Act 167 and/or floodplain letters with return receipts and responses must be included in the permit application package. The PNDI review receipts must also be included in the NPDES permit application, a sample of which is found in Appendix 4D, Sample PNDI Project Environmental Review Receipt.

Refer to Appendix 4A, Documentation Quick Reference Guide and Appendix 4B, Sample Notice of Intent (NOI) Application Form for additional references on NPDES documentation.

C. Erosion and Sediment Pollution Control (E&SPC) Plan and Narrative. The E&SPC Plan is to be prepared in accordance with Chapter 12, Erosion and Sediment Pollution Control, (particularly Table 12.1), Publication 13M, Design Manual, Part 2, Highway Design, Chapter 13, and the Publication 72M, Roadway Construction Standards.

An E&SPC Plan consists of a plan and a narrative and contains:

• The items listed in Publication 14M, Design Manual, Part 3, Plans Presentation, Chapter 6, Section 6.2.
• Drawings of standard E&SPC items from Publication 72M, Roadway Construction Standards, specifically RC-70M to RC-77M or from PA DEP's BMP Manual, if applicable.
• The narrative according to Chapter 12, Erosion and Sediment Pollution Control, Section 12.3.1, and Appendix 12C, Recommended Standards for E&SPC Plans.
• The E&SPC Plan according to PA Code Title 25, Chapter 102 § 102.4. Erosion and Sediment Control Requirements and Appendix 12C, Recommended Standards for E&SPC Plans.
• Recommended notes for E&SPC Plans as per Appendix 12B, Recommended Notes for E&SPC Plans.

For a detailed list of E&SPC related regulations that may apply, refer to Appendix 12A, E&S Related Regulations.

D. Roadway Drainage Report (RDR). A roadway drainage report contains a descriptive narrative, the hydrologic and hydraulic computations, and drainage plan sheets with drainage area delineations for roadway drainage structures (inlets, storm pipes, pipe culverts, ditches and swales, pavement base drains, curb flow, etc.).

The following general items are to be included in the RDR:

• Complete drainage area map(s).
• Design frequencies.
• Information concerning outfalls, existing storm drains and other design considerations.
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- Computations for drainage areas, inlets and storm drains, including hydraulic grade lines.
- Standard computation sheet given in Chapter 13, Storm Drainage Systems, and Publication 13M, Design Manual, Part 2, Highway Design, Figure 10.3.8.

A recommended outline for the RDR is provided in Publication 13M, Design Manual, Part 2, Highway Design, Chapter 10, Section 10.3.G.

The RDR, the PCSM, and the E&SPC reports have redundant information, such as project description narrative and design calculations for rock outlet protection. As a result, coordination of the three reports, specifically if separate subconsultants are working on the different phases of a project, is necessary.

The RDR is sent to and approved by the District Office with one copy of the submission and approval sent to the Central Office according to Publication 13M, Design Manual, Part 2, Highway Design, Chapter 10, Section 10.3.H.

References to aid in development of the RDR can be found in Appendix 4A, Documentation Quick Reference Guide.

E. Post-Construction Stormwater Management (PCSM) Plan. A PCSM Plan is required for all NPDES permit applications. The PCSM Plan identifies the proposed stormwater BMPs being used to manage and treat the stormwater discharges to protect water quality after construction. Preparation and implementation of the PCSM Plans is to be done in accordance with Chapter 14, Post-Construction Stormwater Management and the NPDES NOI checklist.

References to aid in development of the PCSM Plan can be found in Appendix 4A, Documentation Quick Reference Guide.

F. Preparedness, Prevention, & Contingency (PPC) Plan. A PPC Plan is required for any NPDES Application for Storm Water Discharge General Permits or Water Management Permits. Development of the PPC Plan is to be done in accordance with 25 PA Code Section 91.33 and 91.34.

For projects where the potential exists for causing accidental pollution of air, land, or water, or for causing endangerment of public health and safety through accidental release of toxic, hazardous, or other polluting materials, the NPDES permittee or co-permittee will need to develop a PPC Plan. In PennDOT's NPDES submission, the PPC Plan box (if it is believed an emergency or accidental spill during construction is possible) is to be checked. In addition, BMPs must be located on the PPC Plan for each identified area.

The PPC Plan is most often developed by the contractor after the project is let. In these cases, a special provision must be included in the construction bid documents and a statement needs to be provided in the E&S Plan general notes that the contractor is responsible for providing a PPC Plan. In rare cases, Districts may determine that for certain environmentally sensitive projects, the design consultant may prepare the PPC Plan for the project, prior to letting for inclusion in the bid documents.

No formal PPC Plan submission to an Agency is required, nor is formal approval from an agency required. However, a copy of the PPC Plan is to be filed in the District Project Files as well as be made available at the job site.

All members of the installation's organization for developing, implementing, and maintaining the PPC plan are to review the plan and be thoroughly familiar with its provisions.

References to aid in development of the PPC Plan can be found in Appendix 4A, Documentation Quick Reference Guide.

G. Water Obstruction and Encroachment Permit (Waterway Permit). Upon identification of the correct permit type, the JPA2 system and PA DEP's requirements describe the documentation required for the identified permit. References and links for much of this information can be found in Appendix 4A, Documentation Quick Reference Guide.
The waterways permit flowchart in Appendix 3A, *Waterways Permitting Flow Chart*, is a guide to assist in selecting the appropriate waterways permit for a project. Even though the permit may not require the submission of all of the environmental data, most of the preliminary environmental research needs to be completed to ensure that the project site meets the conditions of the general permit. For instance, although the GP-7 (Minor Road Crossing) permit does not require the submission of FEMA maps, the FEMA maps need to be researched; if a FEMA delineated floodway exists at the project site, the GP-7 is not applicable.

A full JPA submission is to follow the JPA2 system of reporting and includes:

- Application Interview.
- General Information Form (GIF) - The completed general information form and application properly signed sealed and witnessed (which includes the following):
  - Application fee.
  - Site information.
    - Name and location.
    - Written directions to the site.
    - Location map (copy of USGS quad map).
  - Project Information.
    - Name and description.
    - Time schedules/project milestones.
- Joint Permit Application.
- PNDI Search.
- Plans.
- Engineer Seal & Certification.
- Location Map.
- Project Description.
- Photographs with Map.
- Environmental Assessment (EA).
  - EA Introduction.
  - EA Form and signature.
  - Wetlands delineation and survey (where applicable).
  - Threatened & endangered species (T&E).
    - A search for threatened and endangered species (T&E) in the project area may be conducted using the PNDI Search on the Pennsylvania Natural Heritage Program web site.
    - Bog turtle screening is also required in the following counties: Adams, Berks, Bucks, Carbon (Aquashicola Creek Watershed only), Chester, Cumberland, Delaware, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Schuylkill (Swatara Creek Watershed only), and York.
    - High quality (HQ) or exceptional value (EV) watershed designation.
    - Wild trout stream classification.
    - Aquatic habitat.
    - Project impacts.
    - Resource identification.
- Cultural Documentation.
  - Description of historic, cultural, archaeological resources at the site.
  - Cultural Resource Notices completed and mailed to the Pennsylvania Historical and Museum Commission (PHMC).
  - Wild or scenic rivers designation.
- E&SPC.
  - Approval letter from the Conservation District; or
  - NPDES permit.
- Hydrologic/Hydraulic (H&H) Report.
  - The H&H report (See Section 4.2.H).
FEMA information (hydrology, profiles, maps).
- A stormwater and/or floodplain management analysis and/or consistency letter(s).
- H&H Input/Output Files.
  - HEC-RAS Input Files.
  - HEC-RAS Output files.
- Mitigation Plan.
- PA DEP Facility Detail.
- PennDOT Information and Files.
  - Application Log.

A Stormwater Consistency Letter is only needed when the project is in a watershed with an approved Act 167 Plan. A Floodplain Management Letter is only needed when the proposed waterway obstruction/encroachment is in a delineated FEMA floodway. Sample letters are included in Appendix 4C, *Sample Stormwater and Floodplain Management Consistency Letters*.

PennDOT requires that Joint Permit Applications be submitted electronically through the JPA2 Expert System. The approved permit and all computations and back-up data are saved and stored electronically within the JPA2 system. The link can be found in Appendix 4A, *Documentation Quick Reference Guide*.

In addition, reference Publication 15M, Design Manual, Part 4, *Structures*, Chapter 1, Section 1.9 for documentation requirements for bridges.


Generally, the H&H report for the design hydraulic study includes a general description of the site, upstream and downstream structures, watershed, a risk assessment, alternatives analysis, mitigation plan (if necessary), photographs, hydrologic and hydraulic supporting computations, FEMA FIS information, line and grade and TS&L drawings, computer (HEC-RAS) files, a summary sheet, (Publication 13M, Design Manual, Part 2, *Highway Design*, Chapter 10, Figure 10.7.1, *Sample Summary Data Sheet*), and QA/QC checklists. More specifically, the abbreviated and full H&H reports are to contain the information specified in Publication 13M, Design Manual, Part 2, *Highway Design*, Chapter 10, Sections 10.7.B and 10.7.C respectively, and Publication 13M, Design Manual, Part 2, *Highway Design*, Chapter 10, Appendix C.

For projects that have permits submitted electronically, the Final H&H Report is saved and stored electronically within the JPA2 Expert System. For all other projects, the final H&H report is to be submitted to the District Project Manager (PM) in accordance with the Districts' individual requirements and then be retained with the Bridge Files. A temporary conditions evaluation may be required where causeway/temporary stream crossings causes' water surface elevations to be beyond the normal stream lines.

Other references to hydraulic design of encroachments in floodplains can be found in Appendix 4A, *Documentation Quick Reference Guide*.

**I. FEMA Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR).** The CLOMR describes any eventual revisions to be made to the NFIP maps upon completion of the project. A map of the existing and proposed floodplain boundaries and elevations and any right-of-way impacts that may occur is to be included in the CLOMR.

The FEMA MT-2 application forms are applicable for CLOMR and LOMR requests and its website location can be found in Appendix 4A, *Documentation Quick Reference Guide*.

Along with the FEMA MT-2 application forms, the request is to include the following supporting information:
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- Transmittal letter (see example in Publication 13M, Design Manual, Part 2, Highway Design, Chapter 10, Figure 10.7.2).
- Completed MT-2 application forms.
- Project narrative (optional).
- Hydrologic computations (if applicable) along with digital files of computer models used.
- Hydraulic computations (if applicable) along with digital files of computer models used.
- Certified topographic map with floodplain and floodway (if applicable) delineations.
- Annotated FEMA FIRM and/or FBFM to reflect changes due to project.
- Items required to satisfy any FEMA NFIP regulatory requirements.
- Payment information form along with payment.

J. Pump Stations. The following items are to be included in the documentation for pump station design:

- Drainage area to the pump.
- Inflow design hydrograph from drainage area to pump.
- Inflow mass curve.
- Maximum allowable headwater elevations and related probable damage.
- Sump dimensions.
- Stage-storage curve.
- Stage-pump discharge relation and sequence.
- Mass curve routing results.
- Pump sizes and operations.
- Discharge line and fittings sizing.
- Total dynamic head curves.
- Selected pump performance curves.
- Design report.

4.2 PROCEDURE

A. File Overview. Each District is to maintain the complete hydrologic and hydraulic design and analysis documentation for each waterway encroachment or crossing, storm drain or stormwater management system, and erosion and sedimentation control plan.

The documentation for each facility is prepared by a designer, and contains design/analysis data and information that influenced the facility design that may not appear in other project documentation. Once the design is prepared, regardless of whether it was developed by a PennDOT or consultant design, the design is to be reviewed and approved by PennDOT.

For specific documentation procedures for bridge opening selection, refer to the Chapter 10, Hydraulics, Section 10.14.

B. Practices. Following are PennDOT's practices related to documentation of hydrologic and hydraulic designs and analyses:

- Hydrologic and hydraulic data, preliminary calculations and analyses and all related information used in developing conclusions and recommendations related to drainage requirements, including estimates of structure size and location, are to be compiled in the documentation.
- The designer is to document all design assumptions and selected criteria including the related decisions.
- The amount of documentation detail for each design or analysis is to be commensurate with the risk and the importance of the facility.
- Organization of the documentation is to be as concise and complete as practicable so that knowledgeable designers can understand years hence what was done by predecessors.
- Circumvent incriminating statements wherever possible by stating uncertainties in less than specific terms (e.g., the culvert may back water rather than the culvert will back water).
• Provide all related references in the documentation to include such items as published data and reports, memos and letters and interviews. Include dates and signatures where appropriate.
• Documentation is to include data and information from the conceptual stage of project development through service life to provide successors with all information.
• Documentation is to be organized to logically lead the reader from past history through the problem background, into the findings and through the performance.
• An executive summary at the beginning of the documentation will provide an outline of the documentation file to assist users in finding detailed information.
• A copy of the completed application forms for each documentation file as described in Section 4.2 are to be kept on file at the District.

The file reviewer needs to be aware that regulations, requirements, and forms are constantly being updated, and the designer is to ensure that he is following the latest documentation requirements.

C. Filing and Retention. Required permit application documents for GP-11 and full permits are electronically filed in the JPA2 Expert System as specified in Publication 13M, Design Manual, Part 2, Highway Design, Chapter 10, Sections 10.5.A and 10.5.B. All other General Permits and 9999 maintenance permits are to be maintained in the District files.

There are several types of electronic storage media available, such as scanning of project files and storage on compact discs, digital cameras where photographs can be stored electronically, computer-generated construction drawings, digital elevation models (DEMs) and Digital Terrain Models (DTMs), computer input and output files, e-mails, and other electronic files associated with a project.

Districts are to maintain the project documentation files including microfilm, microfiche, magnetic/electronic media, etc. where information can be accessed for use during construction, for defense of litigation and future replacement or extension. Bridge project files and non-bridge hydraulic structures are kept for 100 years or life of structure by the Districts in which they were built. Original plans, project correspondence files, construction modifications and inspection reports are the types of documentation usually kept with the bridge project files. Non-bridge hydraulic structure documentation files are to be retained for a period equal to the projected life span of the structure as indicated in Publication 13M, Design Manual, Part 2, Highway Design, Chapter 10, Table 10.3.4.

H&H reports and waterway permits (e.g., Chapter 105, Section 404, General Permits) are retained with the bridge files. NPDES permits are often not related to bridge projects and, as such, are kept with the project design files. "Design Project Files" are kept for seven years after the work is complete on the project. An electronic copy of the "Design Project Files" is scanned into ECMS. Hydrologic/hydraulic documentation is to be retained in the project plans or other permanent location at least until the drainage facility is totally replaced or modified as a result of a new drainage study.

Only the documents that received approval need to be retained by the District Office. Draft documents leading up to the documents that received approvals need not be retained.

D. Scheduling. Documentation does not need to occur at specific times during the design or as the final step in the process, which could be long after the final design is completed. Documentation is an ongoing process and part of each step in the hydrologic, hydraulic, drainage, stormwater and erosion and sedimentation pollution control analysis and design process. This increases the accuracy of the documentation, provide data for future steps in the plan development process and provide consistency in the design, even when different designers are involved at different times of the plan development process. Accurate documentation is to be developed and provided during the following steps or phases of the plan development process:

• Surface water environmental (EIS) phase.
• Reconnaissance phase.
• Route location phase.
• Survey phase (drainage surveys).
• Preliminary engineering phase.
• Final design phase.
• Construction phase to include "as-built" plans.
• Operational and maintenance phase (continuous documentation is to occur over the structure's life cycle).

E. Responsibility. PennDOT's designer in consultation with the District Project Manager (PM) is responsible for determining what hydrologic analyses, hydraulic design and related information is documented during the plan development process. The designer, in conjunction with the charts and information contained in Appendix 4A, Documentation Quick Reference Guide, is to make a determination that complete documentation has been achieved as a result of the plan development process through final design.